APPENDIX G

Marine Environment

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Baseline Water Quality

Geosyntec consultants | JBS&G A Geosyntec Company

Northern Water Mullaquana Station Water Quality Baseline

Department for Infrastructure and Transport

Report

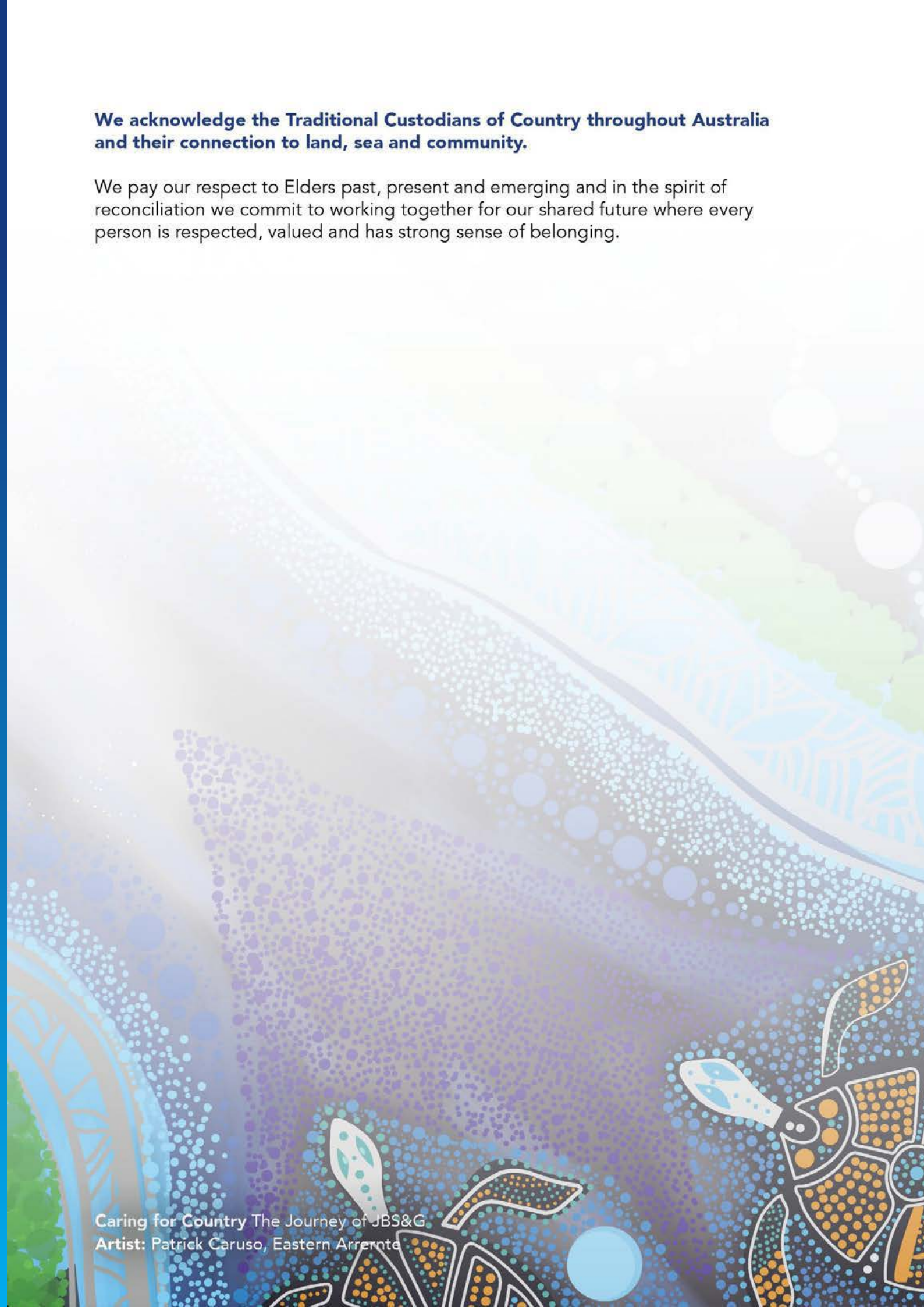
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23 September 2026



We acknowledge the Traditional Custodians of Country throughout Australia and their connection to land, sea and community.

We pay our respect to Elders past, present and emerging and in the spirit of reconciliation we commit to working together for our shared future where every person is respected, valued and has strong sense of belonging.



Caring for Country The Journey of JBS&G
Artist: Patrick Caruso, Eastern Arrernte

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Appendices

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Appendix C **Phytoplankton taxa reported during cell counts**

Appendix D **Seasonal and site variability**

Abbreviations / Symbols

Term	Definition
ANZG	Australian and New Zealand Guidelines for Fresh and Marine Water Quality
BTEXN	Benzene, toluene, ethylbenzene, xylene and naphthalene
Chl *a*	Chlorophyll *a*
CoC	Chain of Custody
CTD	Conductivity-temperature-depth
DGV	Default guideline value
DO	Dissolved oxygen
EPP	Environment Protection Policy
GL/year	Gigalitres per year
IMCRA	Integrated Marine and Coastal Regionalisation of Australia
NATA	National Association of Testing Authorities
NH_3	Ammonia as nitrogen
NO_2	Nitrite as nitrogen
NO_3	Nitrate as nitrogen
NO_x	Total oxidised nitrogen, comprising nitrate plus nitrite as nitrogen
NSG	Northen Spencer Gulf
NTU	Nephelometric turbidity units
NWQMS	National Water Quality Management Strategy
ON	Organic nitrogen
PO_4	Phosphate
PQL	Practical quantitation limit
PSU	Practical salinity units (Practical salinity unit (PSU) is a dimensionless measure of water salinity based on its electrical conductivity relative to a standard seawater solution)
QA/QC	Quality assurance / quality control
SARDI	South Australian Research and Development Institute
SD	Standard deviation
TDS	Total dissolved solids
TKN	Total Kjeldahl nitrogen
TN	Total nitrogen
TOC	Total organic carbon
TP	Total phosphorus
TRH	Total recoverable hydrocarbons
TSS	Total suspended solids
WQ EPP	*Environment Protection (Water Quality) Policy 2015*
°C	Degrees Celsius
µg/L	Micrograms per litre
µS/cm	Microsiemens per centimetre
mg/L	Milligrams per litre
mg/m^3	Milligrams per cubic metre
MPN/100 mL	Most probable number per 100 millilitres

1. Introduction

The Northern Water Project (the Project) aims to provide a secure climate resilient water source for industry in South Australia's Upper Spencer Gulf and Far North. Delivery of the Project will involve the construction and operation of a 51 gigalitre per year (GL/year) seawater reverse osmosis desalination plant located at Mullaquana Station on the Upper Spencer Gulf, and associated water transfer system (including pipelines, transfer pump stations, and product water storages) and electricity infrastructure.

The Project comprises the following key elements:

- a 51 GL/year seawater reverse osmosis desalination plant located at Mullaquana Station approximately 25 km south-west of Whyalla
- marine intake and outfall tunnels extending underneath the seabed and into Spencer Gulf
- diffuser structures for discharge of return water into Spencer Gulf
- a transfer system consisting of a ~360 km main transfer pipeline, a ~46 km lateral branch, and associated transfer pump stations and product water storage.
- high voltage electricity supply including new transmission and distribution lines and new network substations to provide power to the desalination plant and transfer pump stations.

A 12-month baseline water quality program has been undertaken by the South Australia Research Development Institute (SARDI) (Aquatic Sciences) for the Project.

1.1 Objectives

The objectives of the water quality program for the Project were:

1. To determine baseline spatial and temporal variability in water quality parameters at Mullaquana Station.
2. To compare water quality values to default guideline values (DGVs) from the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018).

2. Methodology

2.1 Water quality survey location

Nine long term water quality monitoring reference sites have been established at Mullaquana Station within the marine study area (Figure 2-1, Table 2-1). Three sites were located on each of the ~10 m, ~15 m and ~20 m depth contours (bottom depth), and with each site at each depth contour separated by approximately 2.5 km. The sites were further defined based on their relative location in the marine study area; south sites (MQ01, MQ04 and MQ07), central sites (MQ02, MQ05 and MQ08) and north sites (MQ03, MQ06 and MQ09) (Figure 2-1, Table 2-1).

Table 2-1: Monitoring sites at Mullaquana Station

Site	Latitude	Longitude	Bottom depth (m)	Site location
MQ01	-33.25808723	137.45091877877712	~10	South
MQ02	-33.23772289	137.45980041101575	~10	Central
MQ03	-33.21817	137.47145	~10	North
MQ04	-33.25953788	137.45880019851029	~15	South
MQ05	-33.23983798	137.46730070561171	~15	Central
MQ06	-33.22016071	137.47699253261089	~15	North
MQ07	-33.26335056	137.47275925241411	~20	South
MQ08	-33.24316501	137.47947676107287	~20	Central
MQ09	-33.22348145	137.48902115039527	~20	North

2.2 Survey frequency

Water quality surveys were undertaken on an approximate monthly basis from June 2025 to May 2006 (Table 2-2). Sampling across the nine sites (Conductivity-Temperature-Depth) (CTD) profiles and water samples – see below) required sampling over two consecutive days.

Additional sampling at MQ05 was also undertaken only on a ~fortnightly basis from May 2025 to November 2025 and thereafter, on a monthly basis through to May 2026 (Table 2-2) for a subset of analytes; with phytoplankton species composition and cell counts reported herein (see Section 2.6).

2.3 Oceanographic mooring

A coastal oceanographic mooring was deployed within the marine study area from 8 September 2025 to 11 June 2026 (Figure 2-1). The mooring was fitted with a Seabird SBE16plus Conductivity-temperature-depth (CTD instrument package for near bottom measurements of temperature (°C), salinity (Practical Salinity Units (PSU)) and pressure (depth in metres (m)). Data was logged every 15 to 30 minutes. The moorings were also fitted with an Acoustic Doppler Current Profiler (ADCP) to measure current speed and direction throughout the water column and surface wave height, period, and direction.

The mooring was serviced approximately every two to three months, with data downloaded, moorings cleaned and sensors either redeployed or exchanged.

2.4 Water column profiles

Water column profiles were recorded at each of the nine sites using a Sea-Bird SBE19+ V2 Conductivity-Temperature Depth (CTD) profiler with additional sensors for oxygen, turbidity (as Nephelometric Turbidity Units (NTU) and fluorescence (inferred Chlorophyll *a*). pH was measured at the surface and bottom of the water column using a YSI sonde (multiparameter probe).

Table 2-2: Water quality survey dates and sampling summary

Date of Survey	Season	Sites MQ01-MQ09		Site MQ05 only
		Monthly analyte suite and phytoplankton[2]	Seasonal analyte suite and phytoplankton[2]	Phytoplankton
20 May 2025	Autumn			X
3 – 4 June 2025	Winter		X	X
17 June 2025	Winter			X
1- 2 July 2025	Winter	X		X
16 July	Winter			X
30 – 31 July 2025	Winter	X		X
13 August 2025	Winter			X
26 – 27 August 2025	Spring[1]		X	X
9 September 2025	Spring			X
23 September 2025	Spring			X
8 – 9 October 2025	Spring	X		X
5 – 6 November 2025	Spring	X		X
2 – 3 December 2025	Summer		X	X
12 – 13 January 2026	Summer	X		X
3 – 4 February 2026	Summer	X		X
4 – 5 March 2026	Autumn		X	X
14 – 15 April 2026	Autumn	X		X
12 – 13 May 2026	Autumn	X		X

[1] For analysis and reporting purposes, 26-27 August survey was classed as Spring. [2]See Table 2-3 for monthly and seasonal analyte suite.

2.5 Bulk water sampling and analysis

Water samples were collected using a niskin bottle at four to five depths (depending on bottom depth at the site) spaced out throughout the water column to sample water from 'surface', 'mid-shallow', 'mid', 'mid-deep' and 'bottom' sample. For shallower sites (i.e. MQ01 – MQ03) the 'mid' sample was not taken. Water was pooled in pre-cleaned and sample rinsed carboys to represent 'composite' water samples of the water column. In addition to the composite samples, water was sampled from the 'surface' (1 m below surface) and 'bottom' of the water column water' (~1 m above benthos) at MQ05 and MQ08.

Triplicate water samples were dispensed into pre-labelled bottles, with preservative (where required) (bottles as supplied by the NATA accredited laboratory, Envirolabs). Once filled, bottles were placed in separate zip lock bags and stored in an insulated cooler with ice. Samples were freighted to Envirolabs within prescribed holding times. Secondary samples were sent to ALS.

Triplicate samples for phytoplankton were fixed with lugols iodine and freighted to Envirolabs as above, and with Envirolabs freighting these samples on to Microalgal Services (through Envirolabs Chain of Custody).

See Appendix A for water sample labelling and holding times for laboratory analysis.

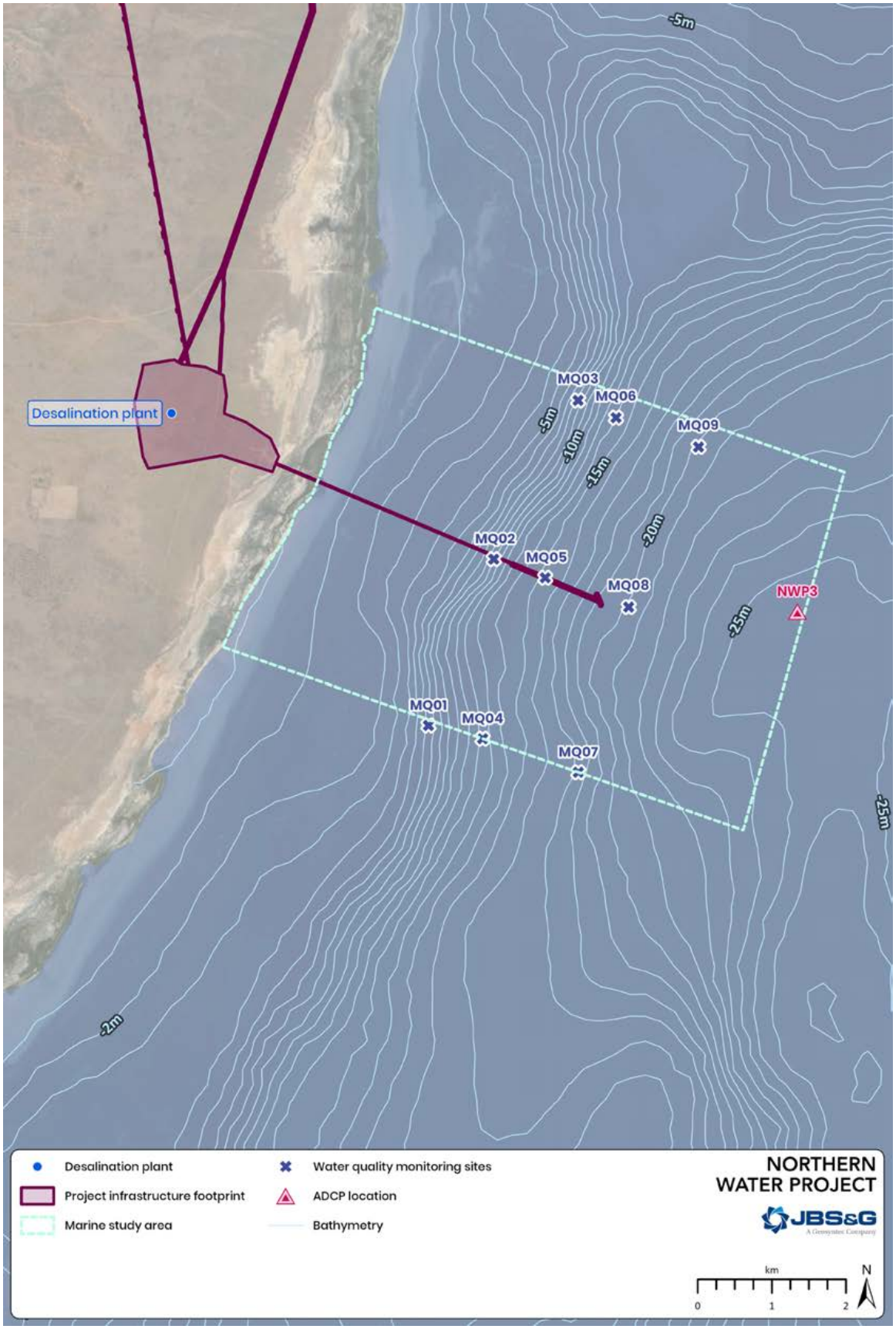


Figure 2-1: Location of water quality monitoring sites and mooring (ADCP; 'NWP3') within the marine study area at Mullaquana Station

2.6 Laboratory analysis of water samples

Water samples were analysed for a 'monthly' and 'seasonal' analyte suite per Table 2-3 at NATA accredited at Envirolabs.

Table 2-3: Summary of analytes sampled and analysed for the Project

Group	Parameters	Units	Monthly	Seasonal
Physical parameters	pH	pH units	X	X
	Electrical conductivity	µS/cm		
	Total Dissolved Solids (TDS), Total Suspended Solids (TSS) Estimated Salinity	mg/L		
Metal and metalloids	Aluminium (Al), Antimony (Sb), Arsenic (As), Barium (Ba), Beryllium (Be)*, Boron (B), Cadmium (Cd), Chromium (III+VI) (Cr) Cobalt (Co), Copper (Cu), Iron (Fe), Lead (Pb), Manganese (Mn), Mercury (Hg), Molybdenum (Mo) Nickel (Ni), Selenium (Se), Silicon (Si), Silver (Ag), Strontium (Sr), Thalium (Tl), Thorium (Th), Uranium (U) Vanadium (V) and Zinc (Zn).	µg/L	-	X
Major cations	Calcium, Potassium, Magnesium, Sodium	mg/L	-	X[1]
Hydrocarbons	Total Petroleum Hydrocarbons (C_6-C_{36}), Total Recoverable Hydrocarbons (TRH) and Total Petroleum Hydrocarbons (C_6-C_{40}) Benzene, Toluene, Ethylbenzene and Xylene (BTEX) and Naphthalene (N) (BETXN).	µg/L	-	X
Inorganics	Ammonia as N, Nitrite as N, Nitrate as N, Total oxidised Nitrogen (Nitrite + Nitrate = NO_x), Total Nitrogen (TN), Total Kjeldahl Nitrogen (TKN), Phosphate as P, Total Phosphate, Reactive silica	µg/L	X	X
Other	Total Organic Carbon	mg/L	-	X
	Chlorophyll *a*	µg/L	X	X
	Colioforms	MPN/100 mL	X	X
Phytoplankton	identification and abundance	Cells/L	X	X

*Analysed Winter 2025 only; [1]Analysed Winter 2025, Spring 2025 and Autumn 2026.

Testing methodology and descriptions for water sample analyses (including Practical Quantitation limits (PQL)) as undertaken by NATA accredited laboratory, Envirolabs is provided in Appendix A.

For the December 2025 and March 2026 'seasonal' suite of metals and metalloids, the octopole ultratrace methodology was employed due to not achieving the practical quantification limits (PQL) as initially specified by the laboratory, due to sample matrix interference (high salt content).

Samples for phytoplankton were analysed by Microalgal Services. Phytoplankton were identified down to the lowest taxonomic grouping.

See Appendix B for Chain of Custody and full laboratory results.

2.7 Quality Assurance/ Quality Control

Quality assurance procedures included the:

- Use of suitably qualified staff for undertaking water quality surveys.
- Cleaning and rinsing of water sampling equipment prior to and following surveys, with equipment air dried prior to storage.
- Cleaning water column profiling instruments following surveys.
- Servicing and calibration of instrument probes as per manufacturers specifications.
- Regular servicing of deployed equipment, and replacement of probes where required.
- Data downloaded from all instruments were reviewed to check data quality and reliability by a SARDI scientist. Data outliers can occur, especially in field instrument collected data through sensor malfunction, spikes (particularly in reference to NTU) resulting from detrital material, sediments or animals passing close to a given sensor, fouling of a sensor and or human error. To check for outliers, quality control procedures were applied to downloaded water column profile data as follows:
    - Raw data was plotted and visually inspected
    - Data from the upper ~1-2 m of the water column profile was removed due to instrument movement at the surface resulting in outlier spikes.
- Data received from the laboratory analysis was reviewed. To check for outliers, quality control procedures were applied to data as follows:
    - Data was visually inspected.
    - Where a value appeared well outside the expected range, or if a value represented a clear outlier relative to other replicates, then a decision was made to either remove the suspected outlier data (if the result was well outside the expected range) or for the data to remain (if deemed the data represented a value at the high or low end but still within the expected range)[1].

2.8 Environmental Values and Water Quality Guidelines

Water quality in South Australia is protected by the *Environment Protection Act 1993* (EP Act) and the environment protection policies made under it. The Environment Protection (Water Quality) Policy 2015 (WQ EPP) provides the most specific and detailed protection of the state's surface, marine and underground water sources.

The WQ EPP stipulates environmental values of marine waters, including those waters off Mullaquana Station of:

1. Aquatic ecosystems
2. Recreation and Aesthetics
3. Primary industries – aquaculture and human consumption of aquatic foods.

There is a general environmental duty and care to protect these environmental values of marine waters.

[1] It is noted that one (1) to three (3) data points at most were considered as outliers for a given analyte and removed from the data set. This was for the metal/metalloid suite only and specifically for chromium, copper, iron, manganese (for each representing <1% of total samples), and zinc (representing 2% of total samples).

The WQ EPP provides guidance for how to protect these environmental values by way of reference to the Australian and New Zealand guidelines for fresh and marine water quality (ANZG, 2018).

These guidelines for the management of water quality were developed as part of the National Water Quality Management Strategy (NWQMS).

As a starting point for assessing water quality, default guideline values (DGVs) for water quality are provided for a given area or region (ANZG, 2018). DGVs specific to the bioregion of Northern Spencer Gulf (NSG), based on the Integrated Marine and Coastal Regionalisation of Australia (IMCRA 4.0) are available for a small suite of physical and chemical parameters for the four seasons (ANZG, 2018 [2]) (see Table 2-4).

DGVs for other parameters are defined for Australian ecoregions ('South central' Australia most closely aligns with the Project location) (Table 2-4).

Physical and chemical data collected as part of the Project water quality program are assessed in the first instance against those DGVs presented in Table 2-4. Site specific DGVs may be determined at a later stage prior to commencing water quality monitoring for the construction and operational phase of the Project.

Table 2-4: DGVs for physical and chemical stressors for NSG IMCRA mesoscale bioregion for slightly disturbed marine ecosystems (ANZG, 2018)

Region	Parameter	Percentile	Summer	Autumn	Winter	Spring
North Spencer Gulf IMCRA mesoscale bioregion*	Chlorophyll *a* (µg/L)	80	2.962	3.394	2.800	2.467
	Dissolved oxygen (mg/L)	80	4.977	4.972	5.191	5.229
	Nitrate N (µmol/L)	80	0.110	0.162	0.243	0.083
	Phosphate as P (µmol/L)	80	0.167	0.169	0.285	0.351
	Salinity (PSU)	80	39.422	39.546	39.28	38.578
	Temperature (°C)	80	24.9	22.2	14.5	19.8
	Temperature (°C)***	20	21.9	17.2	12.8	15.3
	Silicate (µg/L)	80	1.089	1.138	1.076	1.565
South central Australian ecoregion**	Total Phosphorous (µg P/L)	80	100			
	PO_4 as P (µg P/L)	80	10			
	TN (µg N/L)	80	1000			
	Ammonia as N (µg N/L)	80	50			
	pH lower limit***	20	8.0			
	pH upper limit***	80	8.5			

*Parameter percentile values for North Spencer Gulf represent 'surface' water; defined as an average of the top 20 m of the water column (ANZG, 2018).

** Regional DGVs for physical and chemical stressors that are not included in the North Spencer Gulf IMCRA based derivations have been retained from the ANZECC & ARMCANZ (2000) guidelines.

*** For stressors that cause problems at high values or concentrations (e.g. hypersaline brines from desalinisation plants, nutrients, biochemical oxygen demand (BOD), the 80th percentile of the reference distribution is used as the low-risk DGV. For stressors that cause problems at both high and low values (e.g. temperature, salinity, pH), the desired range for the median concentration is defined by the 20th percentile and 80th percentile of the reference distribution (ANZG, 2018).

[2] North Spencer Gulf IMCRA mesoscale bioregions DGV for physical and chemical stressors: https://www.waterquality.gov.au/anz-guidelines/your-location/australia-marine-IMCRA/search-results?region=NSG

Toxicant DGVs for marine waters are provided for different levels of species protection (99%, 95%, 90, and 80%) (ANZG, 2018). As a general rule, the 99% species protection DGV is applied for a 'high ecological/conservation value system', and the 95% species protection DVG for 'slightly to moderately disturbed system' (ANZG, 2018). Toxicant water quality data collected as part of the Project would be assessed in the first instance against marine DGVs for 95% species level protection as presented in Table 2-5. Site specific DGVs may be determined at a later stage prior to commencing water quality monitoring for the construction and operational phase of the Project.

Table 2-5: Toxicant DGVs for the protection of aquatic ecosystems (ANZG, 2018)

Parameter	Unit	DGV 99% species level protection	DGV 95% species level protection	DGV Unknown % species level of protection
Aluminium	µg/L	9	37	
Antimony	µg/L	-	-	9[F]
Arsenic III Arsenic V	µg/L	1[F] 0.8[F]	24[F] 13[F]	
Barium	µg/L	-	-	
Beryllium	µg/L	-	-	
Boron	µg/L	340[F]	940[F]	
Cadmium	µg/L	0.7	5.5	
Chromium (III)	µg/L	7.7	27	
Chromium (VI)	µg/L	0.14	4.4	
Cobalt	µg/L	1.6	6.1	
Copper	µg/L	0.2	0.6	
Iron	µg/L	410	540	
Lead	µg/L	2.2	4.4	
Manganese	µg/L	190	300	
Mercury	µg/L	0.1	0.4	
Molybdenum	µg/L	-	-	34[F]
Nickel	µg/L	1.4	5.9	
Selenium	µg/L	5F	11F	
Silver	µg/L	0.8	1.4	
Strontium	µg/L	-	-	
Thallium	µg/L	-	-	0.03[F]
Thorium	µg/L	-	-	
Uranium	µg/L	-	-	0.05 [F]
Vanadium	µg/L	50	100	
Zinc	µg/L	3.3	8.0	
Benzene	µg/L	500	700	
Ethylbenzene	µg/L	50	80	
Toluene	µg/L	110	180	

[F] No DGVs for marine waters; the DGV presented is for freshwater (F) (ANZG, 2018). - no DGVs in ANZG (2018).

2.9 Data display and analysis

2.9.1 CTD data

All CTD data was reviewed by SARDI scientists following applied quality control procedures (See Section 2.7) and data provided to JBS&G.

Water column profile data from each survey was plotted as a function of depth to depict water column structure for recorded parameters at each site. Water column profile data was also analysed per survey and per season (data pooled from all nine sites) and with the average plus/ - (±) standard deviation (SD) reported.

Water column profile data was further categorised into seasons (see Table 2-2) and parameters plotted as box plots (showing the 25th and 75th percentiles, median, average and outliers) as a function of site location within the marine study area (south, central and north) and bottom depth (~10, ~15 and ~20 m).

2.9.2 Bulk water samples

Bulk water samples were analysed for select parameters per season.

For metals and metalloids, concentrations were reported as the range (minimum – maximum) and with the average calculated where results for a parameter in a given season were above the PQL (also Section 2.6). For nutrient and TSS, where concentrations were below the low level laboratory PQL, the PQL was multiplied by 0.5 and that value used in subsequent analysis. Nutrients, TSS and chlorophyll *a* were reported as averages ± SD for each survey and season. As described in Section 2.8, where relevant, parameters were compared to DGV in ANZG (2018).

Phytoplankton were identified down to the lowest taxonomic resolution by Microalgal Services. Phytoplankton data was analysed for the broad groupings of 'diatoms', 'dinoflagellates' and 'other' phytoplankton' (average cell counts (± SD) per survey and per season). Trends in key select phytoplankton taxa resolved to species or genus were further described.

3. Results

3.1 Mooring time series

Current speed and direction and wave height and direction are summarised in roses as Figure 3-1 and Figure 3-2 respectively. Current speed was generally on the order of 0.1 to 0.3 m/s from a south-west and north-north-east direction (Figure 3-1), and with wave height typically around 0.25 m to 0.75 m with peaks up to 1.25 m (Figure 3-2). Wave height, peak period and peak direction are further depicted for the duration of the mooring deployment from 8 September 2025 to 11 June 2026 (Figure 3-3).

Temperature followed an expected seasonal trend for the study period (8 September 2025 to 11 June 2026) (Figure 3-4). Lowest temperatures occurred at the start of the study period in early September, down to 13.6°C, then increasing to around 16°C at the start of October and thereafter, increasing by ~1 – 2°C per month to reach a maximum temperature of ~24.3 °C in late February 2024. Temperature thereafter decreased from early March onwards and down to 17.7 °C at the start of June 2026.

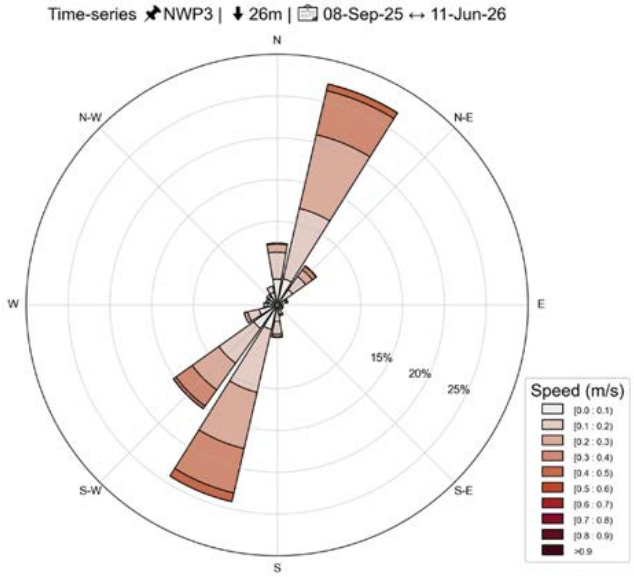


Figure 3-1: Current speed rose from 8 September 2025 to 11 June 2026

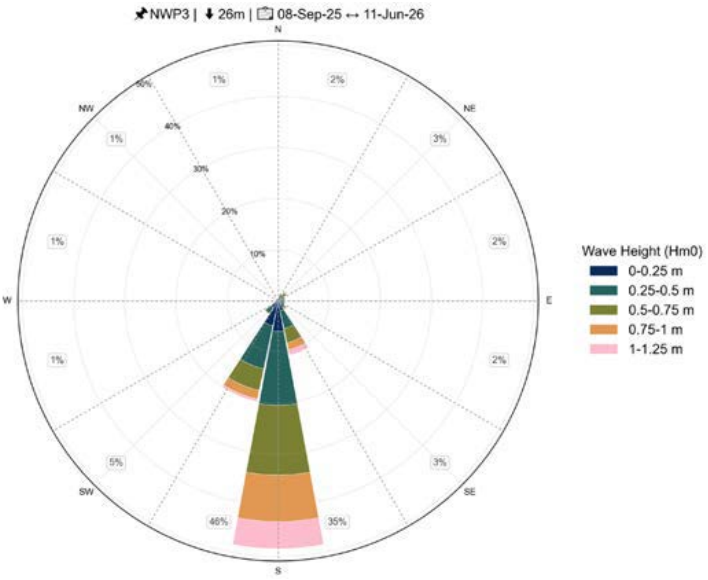


Figure 3-2: Wave height rose from 8 September 2025 to 11 June 2026

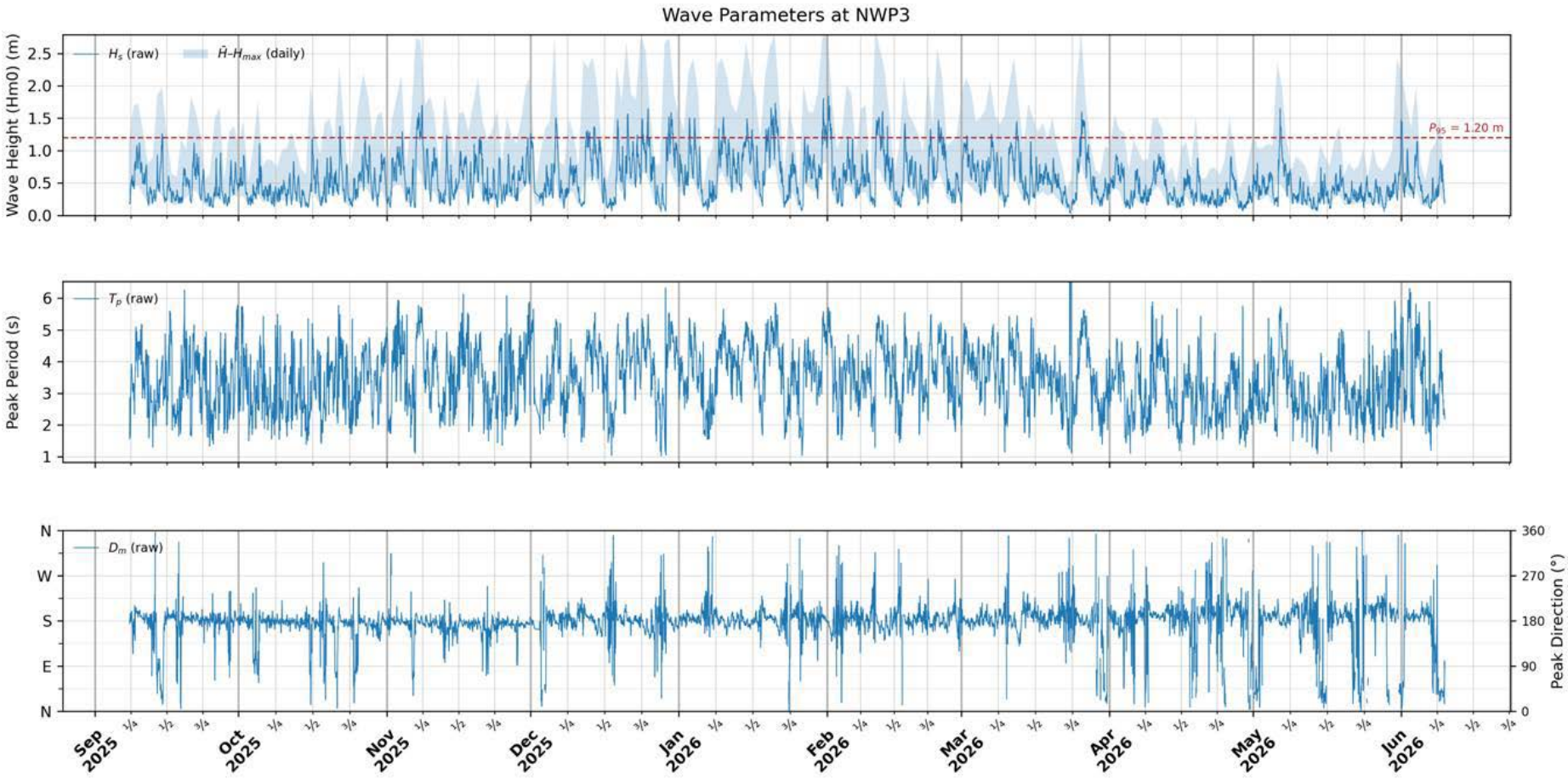


Figure 3-3: Wave height, peak period and peak direction from 8 September 2025 to 11 June 2026

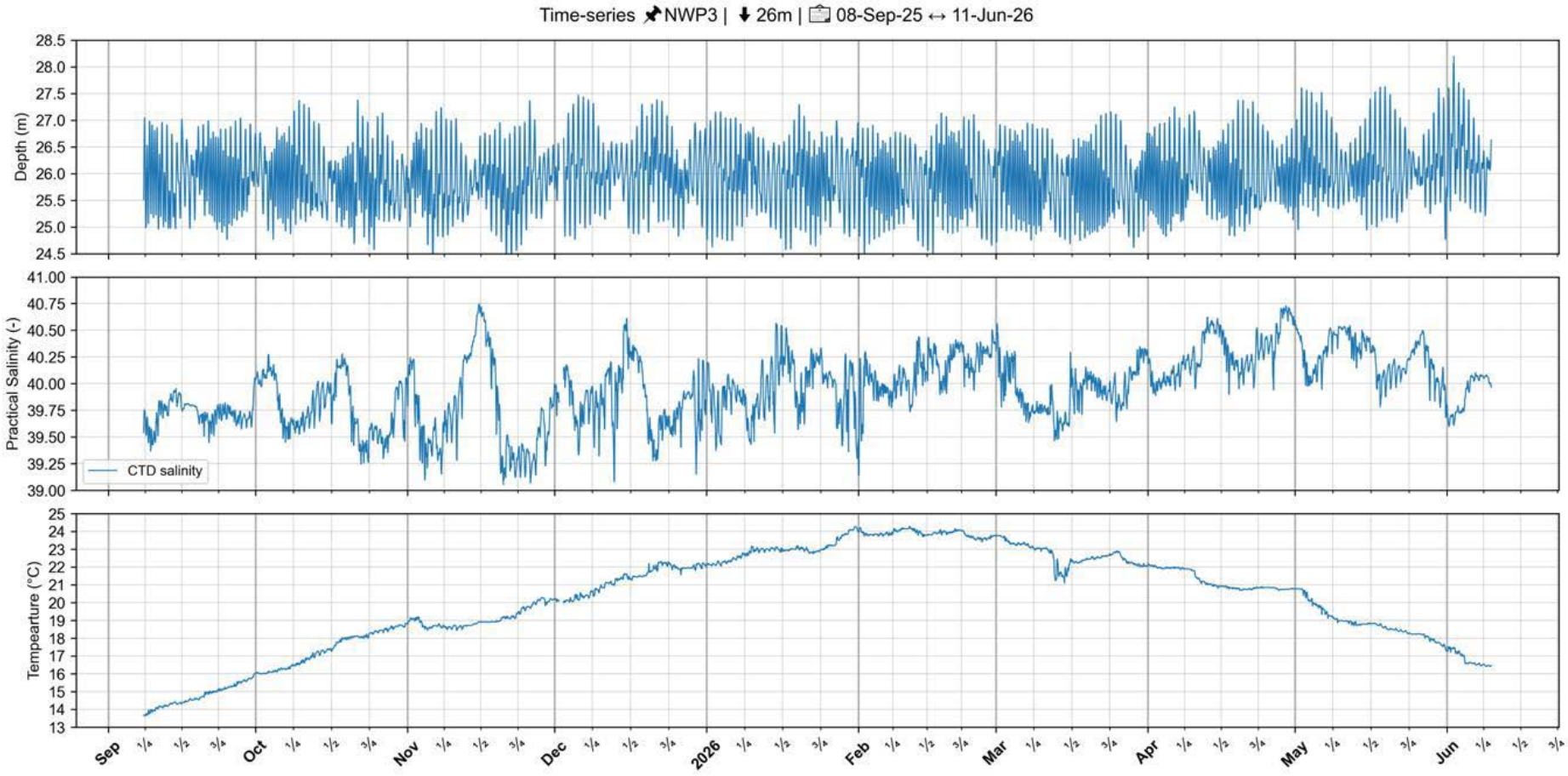


Figure 3-4: Mooring depth, salinity (PSU) and temperature (°C) from 8 September 2025 to 11 June 2026

Salinity showed higher overall short-term variability compared to temperature. This was particularly evident through the ~October to ~December 2026 period, with the minimum (39.0 PSU) and maximum salinity (40.7 PSU) recorded for the study period occurring over approximately 5 days in mid-November (Figure 3-4).Over a backdrop of variable salinity, salinity exhibited an overall increase from late November though to early March (reaching 40.7 PSU), before a short-term decline (for around 12 days) followed by a salinity increase through mid-March to late April (reaching 40.7 PSU) (Figure 3-4, Figure 3-5).Thereafter, salinity showed a gradual decline reaching a low of 39.6 in early June 2026). Summary statistics for the mooring are further shown in Figure 3-5.

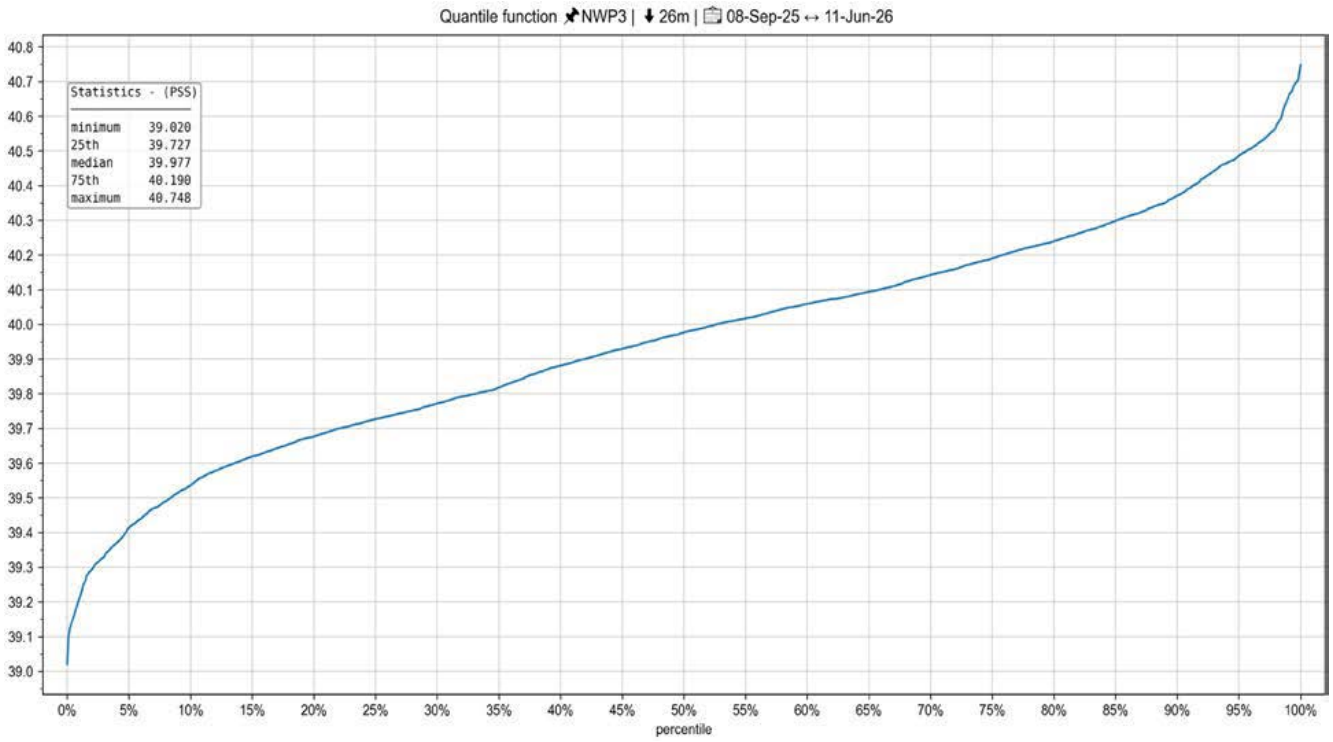


Figure 3-5: Salinity (Y axis in Practical Salinity Units (PSU)) quartile function plot and summary statistics

3.2 Water column profiles

Three sites were located on each of the ~10 m, ~15 m and ~20 m depth contours (bottom depth), and with each site at each depth contour separated by approximately 2.5 km. The sites were further defined based on their relative location in the marine study area; south sites (MQ01, MQ04 and MQ07), central sites (MQ02, MQ05 and MQ08) and north sites (MQ03, MQ06 and MQ09)

Water column profiles plots for parameters of temperature, salinity, dissolved oxygen, turbidity and inferred chlorophyll *a* are shown below in Figure 3-6 through to Figure 3-10. These parameters were further plotted to depict temporal trends (Figure 3-11 to Figure 3-15). Key features for temperature, salinity, dissolved oxygen, turbidity and inferred chlorophyll are described below.

The water column was overall well mixed in respect to temperature for most surveys however, temperature displayed a slight increase with depth in December 2025 and February 2026 (Figure 3-6). At seasonal scales however, there did not appear to be any clear trends in temperature as a function of bottom depth (i.e. sites located at each of the ~10 m, ~15 m and ~20 m depth contours), or site location (i.e. sites situated south, central and north) in the marine study area (Appendix D).

Lowest (down to ~13°C) and highest (up to ~23°C) water temperatures occurred in late August 2025 and early February 2026 respectively (Figure 3-11, Table 2-3). As noted in Section 3.1, maximum bottom water temperature recorded via the mooring CTD occurred late February (up to ~ 24°C) (Figure 3-4). The timing of

the mooring deployment (September 8) appeared to have missed the minimum water column temperature for 2025 (as recorded via water column profiles - down to 13°C).

In contrast to limited vertical gradients in temperature through the water column, salinity showed an increase with depth during early-mid Winter (June and July) and then through most of Summer and Autumn (Figure 3-7). Salinity varied by up to 1.9 PSU from surface to depth within a given site in January, and up to 1.5 PSU (within a given site) in July and October 2025 and March and April 2026.

The highest monthly average salinity recording occurred in June 2025 (up to 40.2 PSU) and with lowest salinity occurring in November through to January (down to ~38.9 PSU), increasing up to 39.9 PSU in April 2026 and decreasing thereafter in May 2026 to 39.5 PSU (Figure 3-12, Table 2-3). The absolute salinity range recorded at the nine sites was between 38.4 PSU and 40.6 PSU; with salinity from water column profiles being slightly lower than recorded at the mooring site (see Section 3.1).

In Summer and Autumn, a slight gradient in salinity was evident across sites situated at the ~10 m, ~15 m and ~20 m depth contours (bottom depth) (Appendix D).

Dissolved oxygen exhibited a generally uniform distribution throughout the water column with the exception of some lower concentrations at the deeper sites (Figure 3-8). Highest dissolved oxygen occurred in Winter (~5.6 mg/L) and lowest in Autumn (~4.8 mg/L)) (Table 2-3, Figure 3-13). Dissolved oxygen as percent (%) saturation was close to 100% most of the time. Turbidity exhibited high variation between surveys, between sites within given survey and within the water column at a given site (Figure 3-9). Turbidity ranged between an average of 0.5 NTU to 1.8 NTU between surveys (Figure 3-14, Table 2-3); but in March 2026 for example, this same approximate turbidity range was evident within the water column at a given site (Figure 3-9). At times, higher NTU occurred at depth, particularly at sites at the ~20m contour, likely a result of settling particles through the water column and or resuspension of sediments (Figure 3-9).

Like turbidity, inferred chlorophyll *a* showed similarly high variability between surveys, sites and within the water column (Figure 3-10). Average inferred chlorophyll *a* ranged from 0.27 mg/m^3 (in late July) to 1.31 mg/m^3 in December, and with highest variation between sites and within the water column occurring when inferred chlorophyll *a* was highest (Figure 3-15, Table 2-3).

pH as measured in surface water ranged from 8.0 in early June 2025 and up to 8.2 in February 2026, and aligned with DGVs for marine waters.

When compared to the DGVs for NSG IMCRA mesoscale bioregion for slightly disturbed marine ecosystems (ANZG, 2018) (see Table 2-4 and Table 3-2), there were key differences in the seasonal water column characteristics within the marine study area at Mullaquana Station. For example, 80th percentile seasonal temperature values were up to 1°C higher or lower than the NSG DGV (Table 3-2). The 80th percentile salinity measurements in Winter and Spring were also around 0.8 PSU higher within the marine study area compared with the NSG DGV (Table 3-2). The 80th percentile seasonal measurements for dissolved oxygen were markedly higher for Winter, Spring and Summer within the marine study area (Table 3-2).

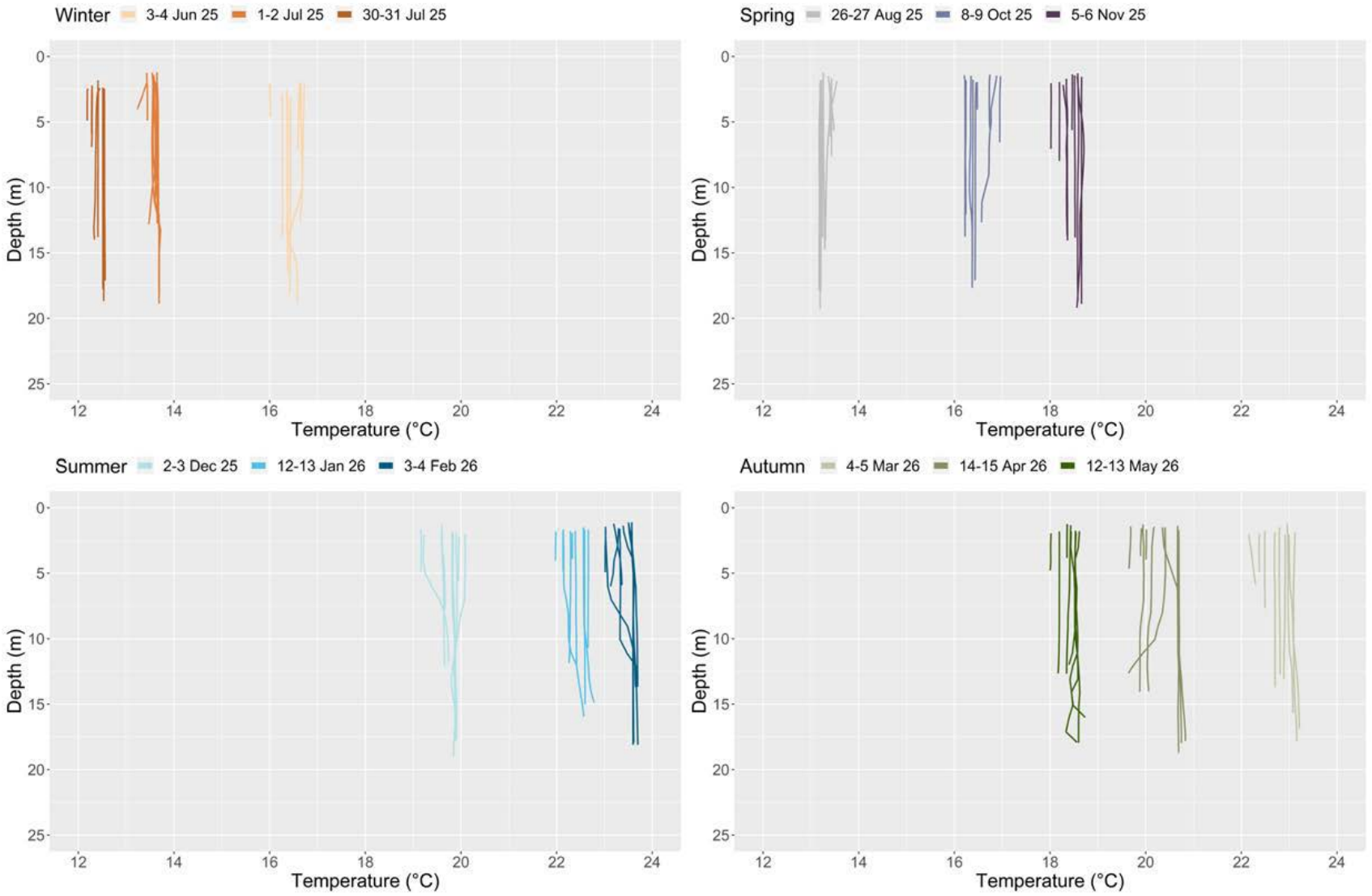


Figure 3-6: Temperature profiles for each survey (for each site) depicted by season

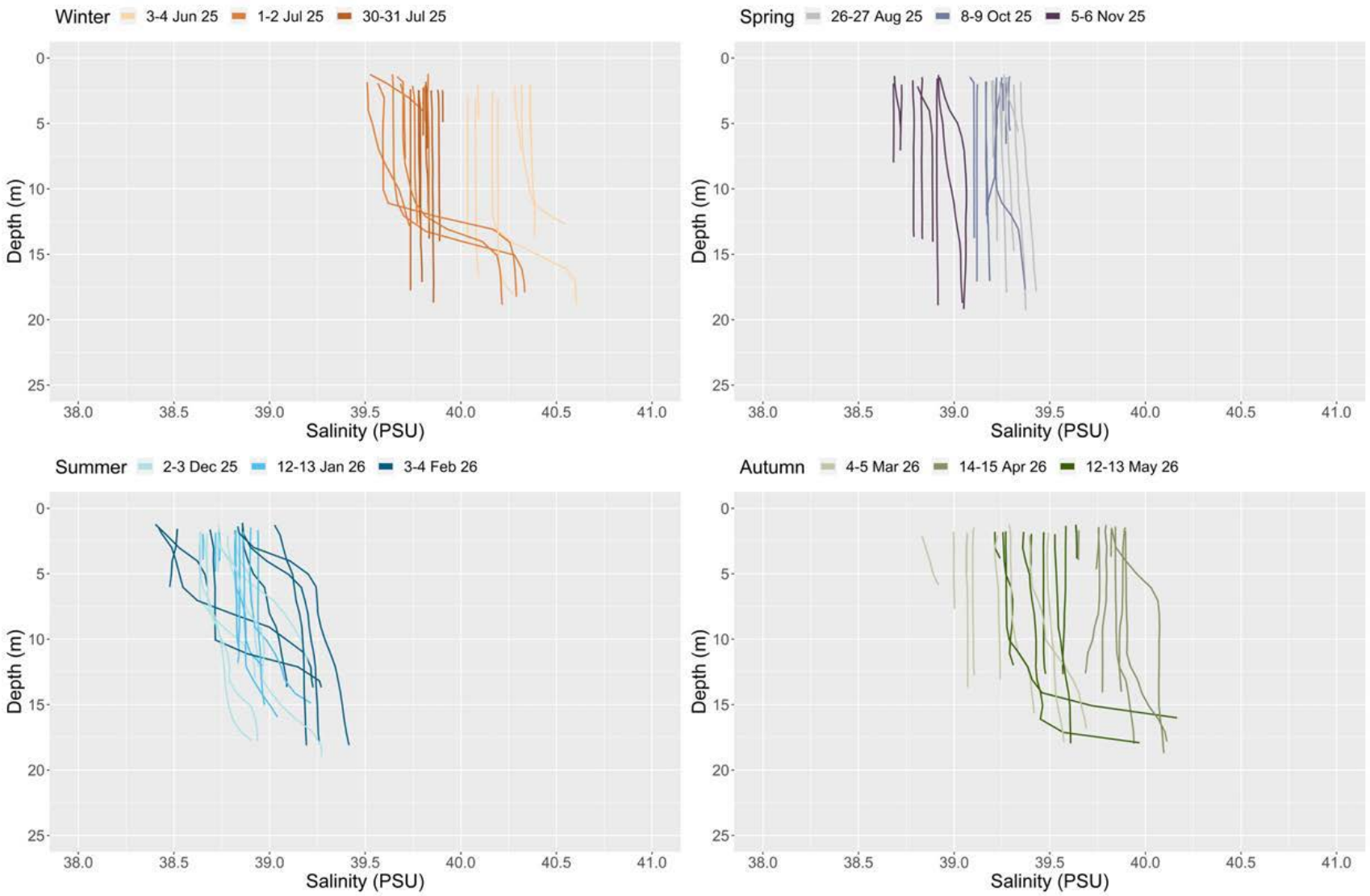


Figure 3-7: Salinity (PSU) profiles for each survey (for each site) depicted by season

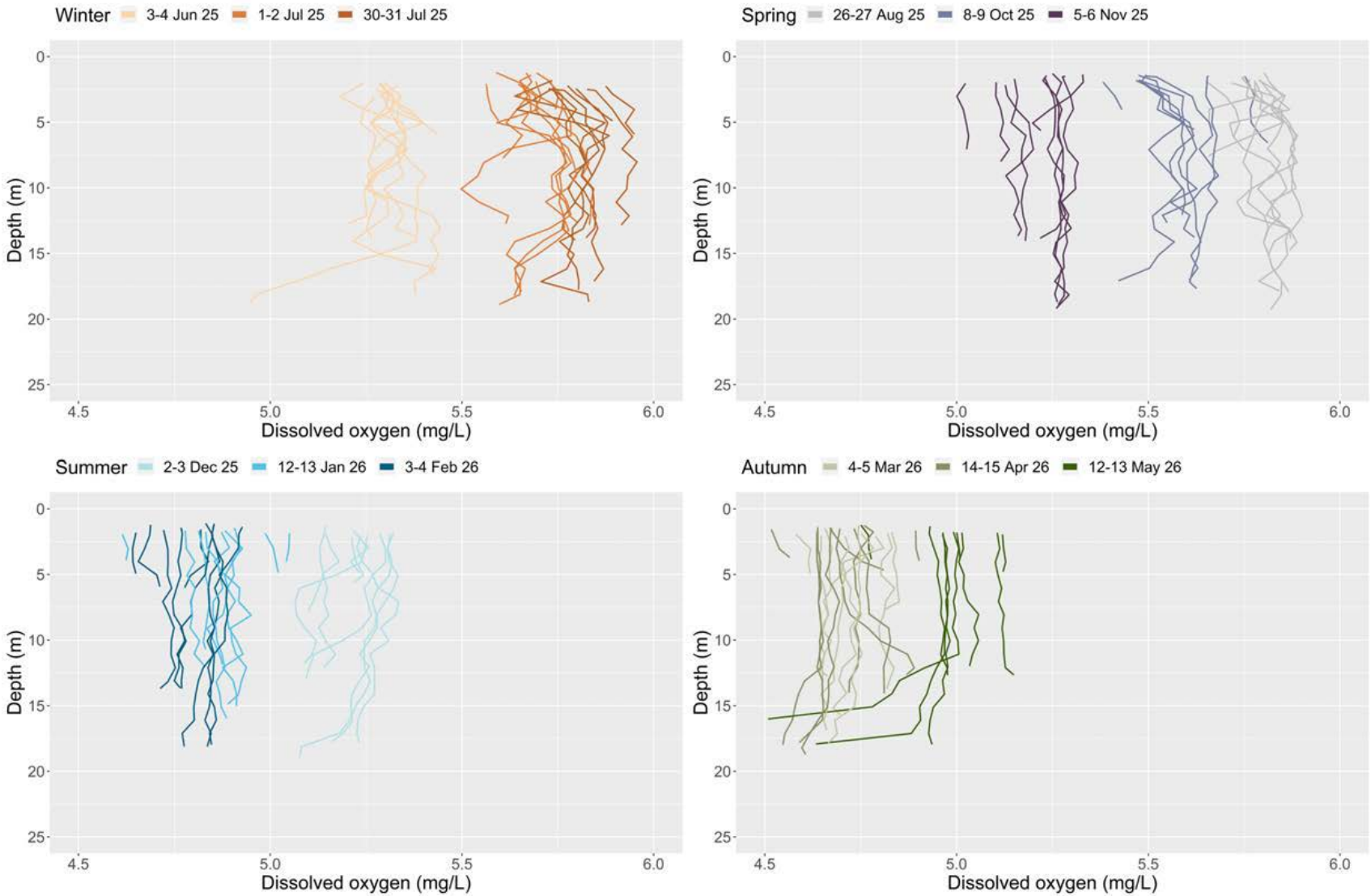


Figure 3-8: Dissolved oxygen (mg/L) profiles for each survey (for each site) depicted by season

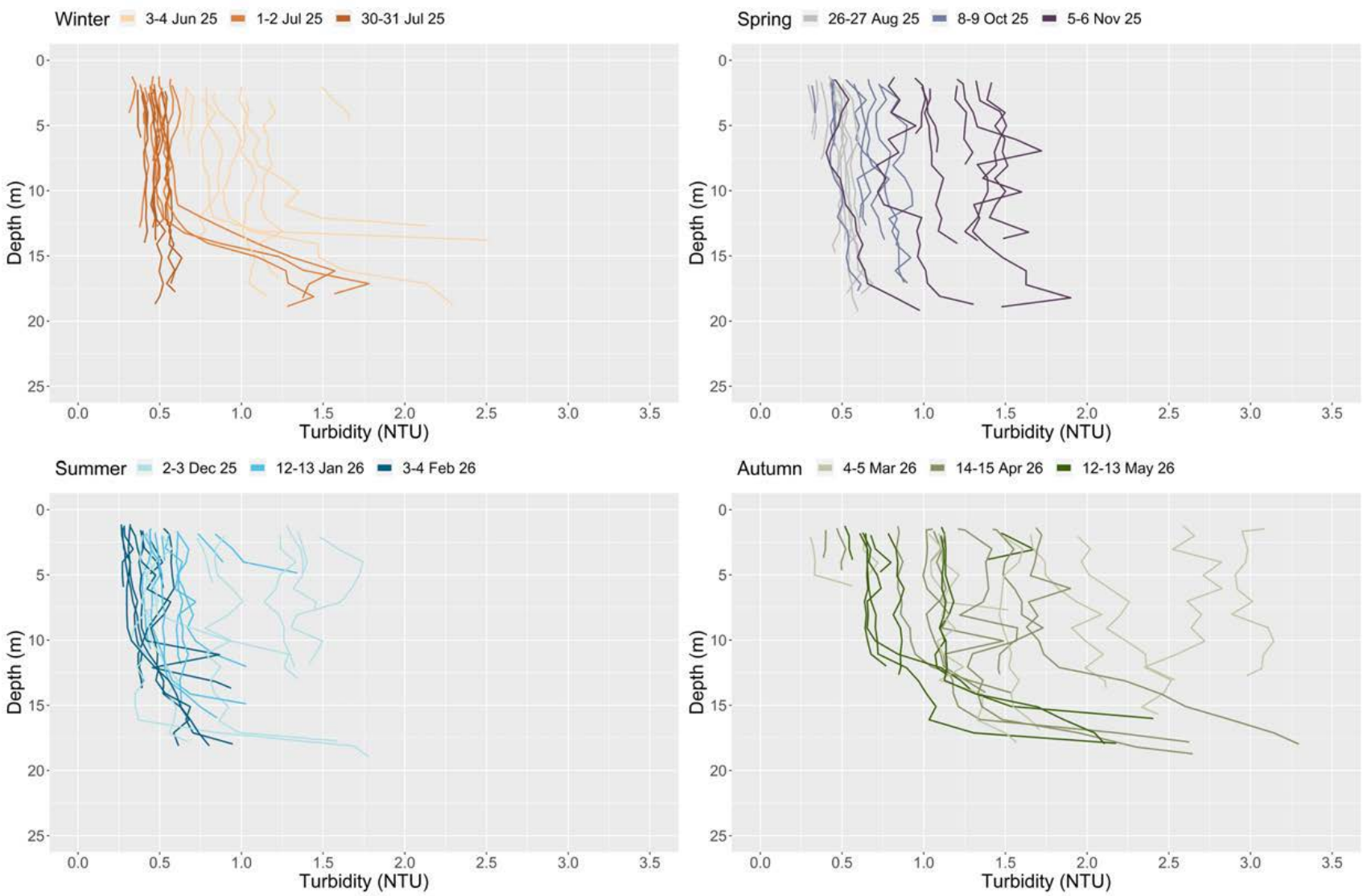


Figure 3-9: Turbidity (NTU) profiles for each survey (for each site) depicted per season

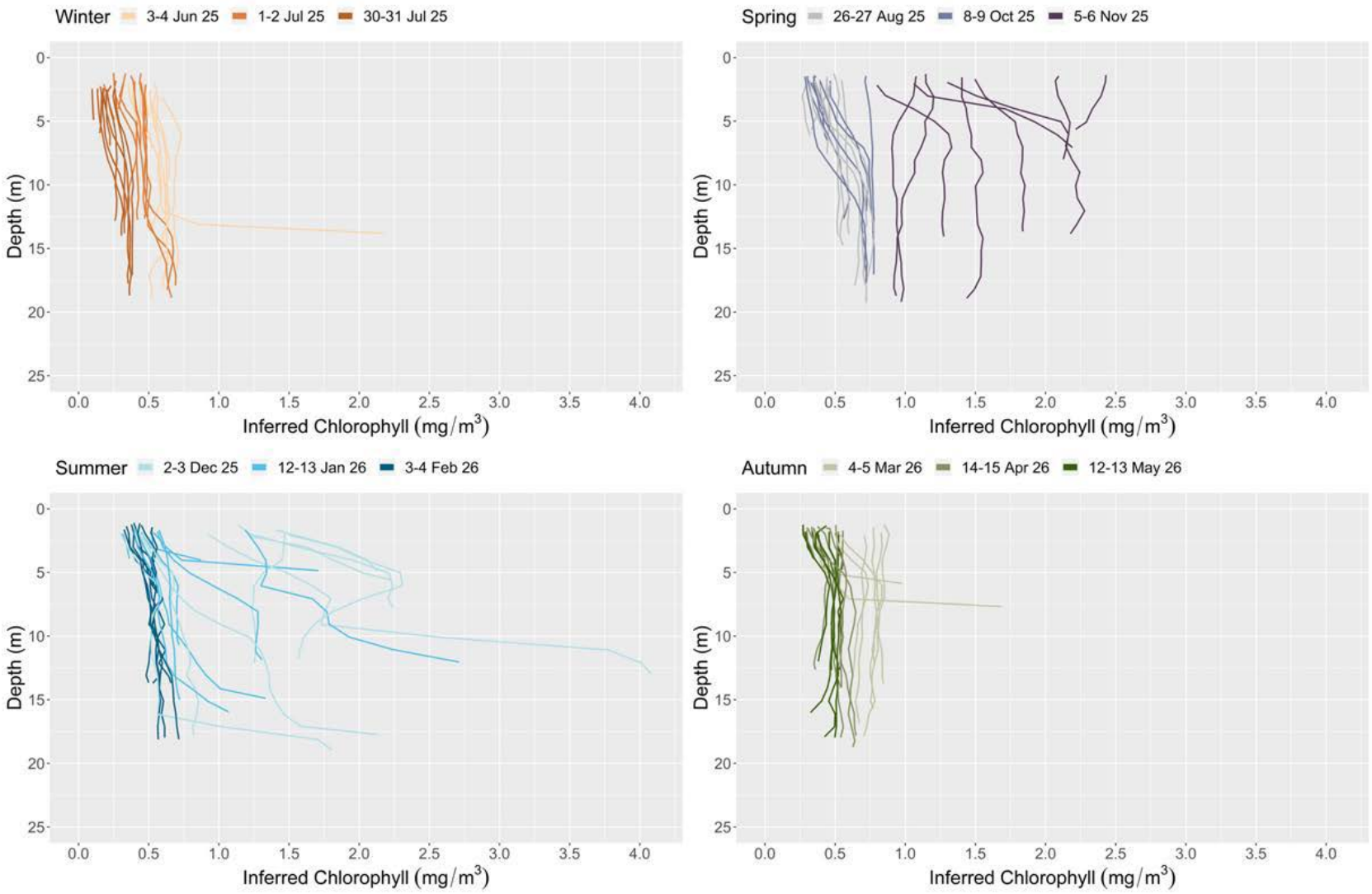


Figure 3-10: Inferred chlorophyll *a* (mg/m3) profiles for each survey (for each site) depicted per season

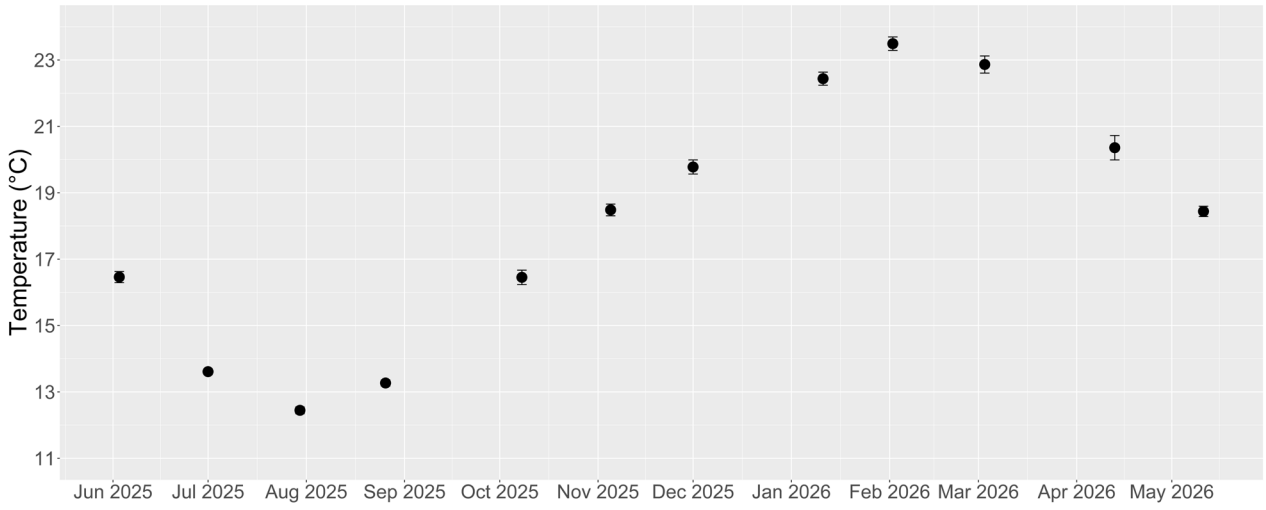


Figure 3-11: Temporal trends in temperature from CTD profiles (average ± SD) (all nine sites)

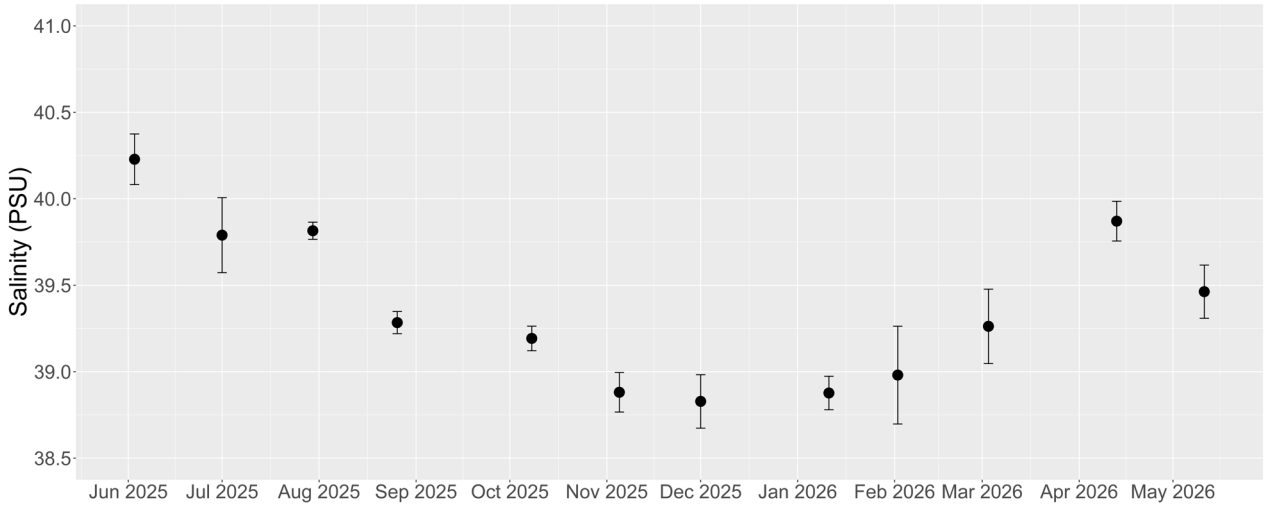


Figure 3-12: Temporal trends in salinity from CTD profiles (average ± SD) (all nine sites)

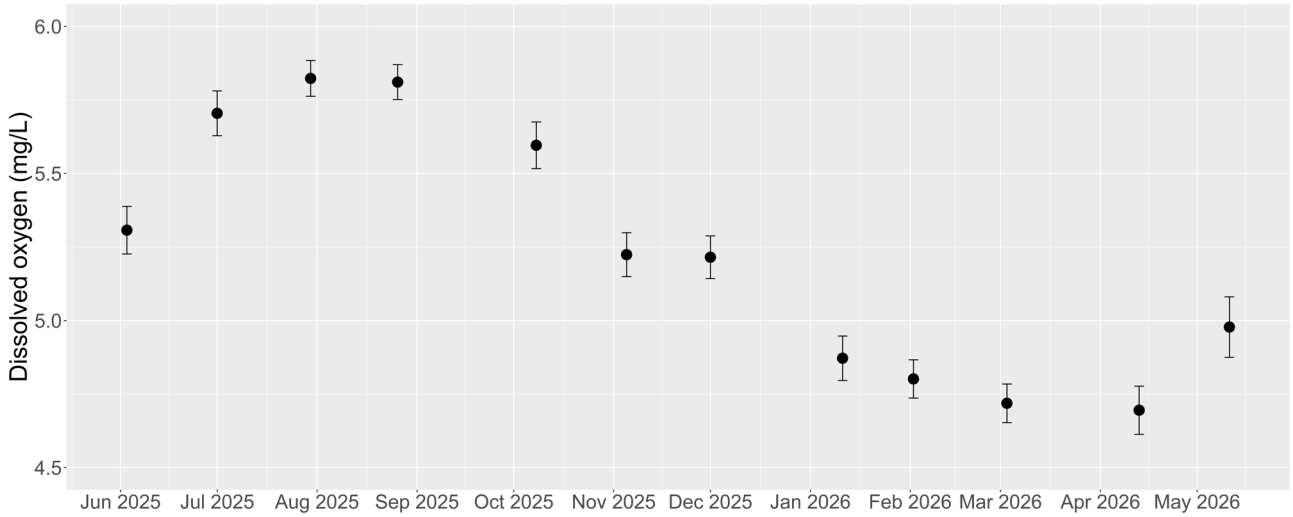


Figure 3-13: Temporal trends in dissolved oxygen from CTD profiles (average ± SD) (all nine sites)

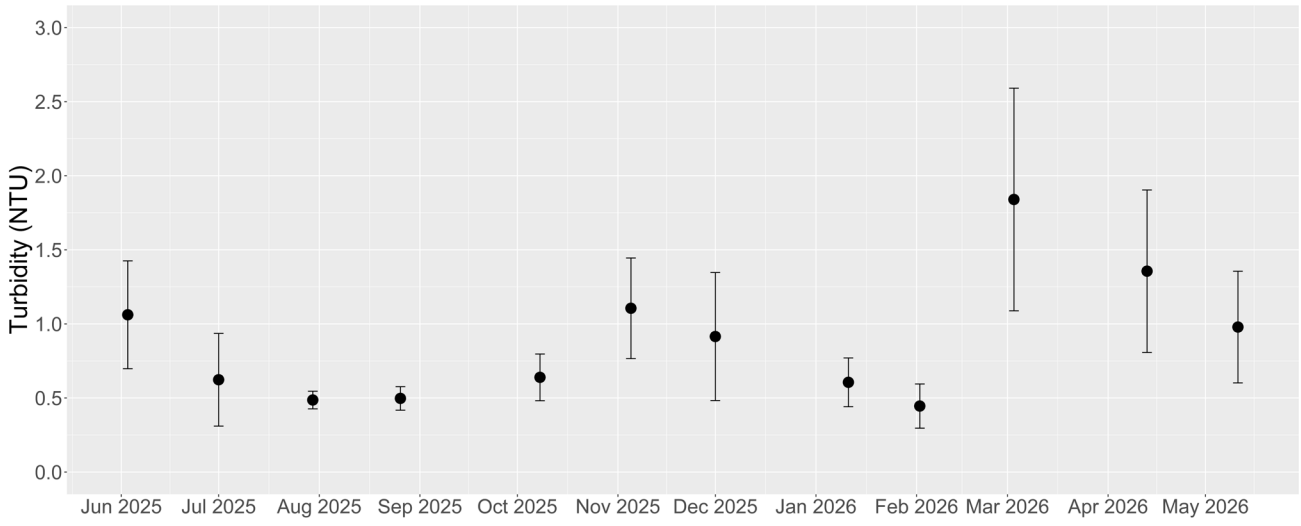


Figure 3-14: Temporal trends in turbidity from CTD profiles (average ± SD) (all nine sites)

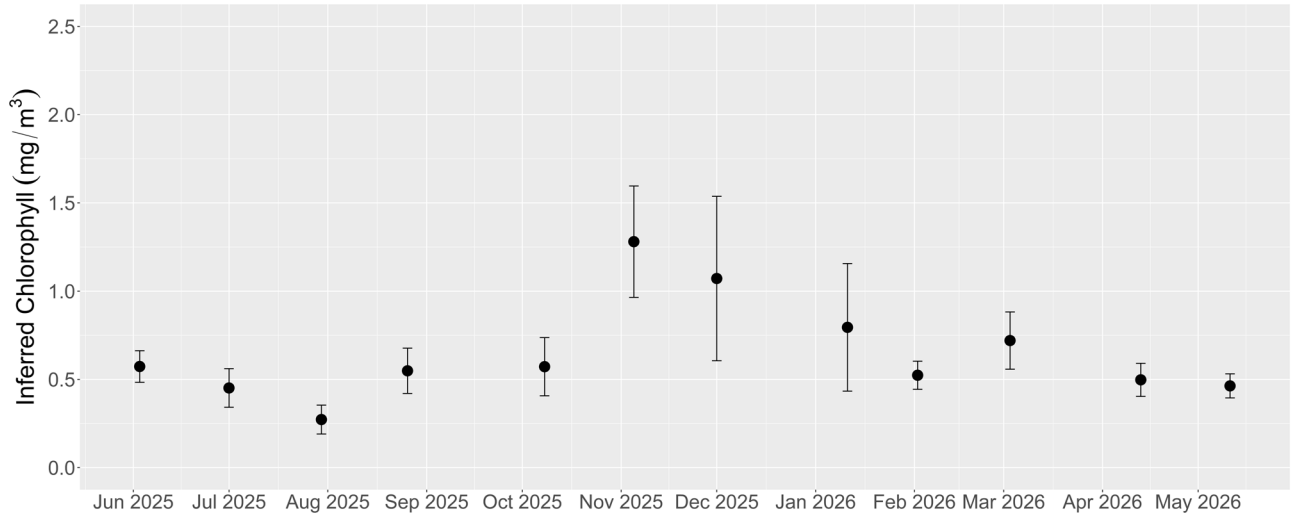


Figure 3-15: Temporal trends in inferred chlorophyll *a* from CTD profiles (average ± SD) (all nine sites)

Table 3-1: CTD Summary statistics for each survey and season (average ± SD)[3]

Season	Survey	Temperature °C	Salinity (PSU)	Dissolved oxygen (mg/L)	Turbidity (NTU)	Inferred Chlorophyll a (mg/m3)
Winter	3 – 4 June 2025	16.46 ± 0.17	40.23 ± 0.15	5.31 ± 0.08	1.06 ± 0.36	0.59 ± 0.18
	1- 2 July 2025	13.61 ± 0.08	39.79 ± 0.22	5.70 ± 0.08	0.62 ± 0.31	0.45 ± 0.11
	30 – 31 July 2025	12.44± 0.10	39.81 ± 0.05	5.82 ± 0.06	0.49 ± 0.06	0.27 ± 0.08
	Winter average	**14.15 ± 1.68**	**39.94 ± 0.25**	**5.62 ± 0.23**	**0.72 ± 0.37**	**0.44 ± 0.18**
Spring	26 – 27 August 2025	13.27 ± 0.09	39.28 ± 0.06	5.81 ± 0.06	0.50 ± 0.08	0.55 ± 0.13
	8 – 9 October 2025	16.45 ±0.22	39.19 ± 0.07	5.60 ± 0.08	0.64 ± 0.16	0.57 ± 0.16
	5 – 6 November 2025	18.48 ± 0.18	38.88 ±0.11	5.22 ± 0.07	1.11 ± 0.34	1.49 ± 0.48
	Spring average	**16.09 ± 2.18**	**39.11 ± 0.20**	**5.54 ± 0.26**	**0.75 ± 0.35**	**0.88 ± 0.54**
Summer	2 – 3 December 2025	19.78 ± 0.21	38.83 ± 0.15	5.22 ± 0.07	0.91 ± 0.43	1.31 ± 0.74
	12 – 13 January 2026	22.44 ± 0.20	38.88 ±0.10	4.87 ± 0.08	0.61 ± 0.16	0.83 ± 0.44
	3 – 4 February 2026	23.49 ± 0.20	38.98 ± 0.28	4.80 ± 0.07	0.45 ± 0.15	0.52 ±0.08
	Summer average	**21.91 ± 1.62**	**38.90 ± 0.21**	**4.96 ± 0.20**	**0.65 ± 0.35**	**0.88 ± 0.60**
Autumn	4 – 5 March 2026	22.86 ± 0.26	39.26 ± 0.22	4.72 ± 0.07	1.84 ± 0.75	0.72 ± 0.16
	14 – 15 April 2026	20.36 ± 0.37	39.87 ± 0.11	4.70 ± 0.08	1.36 ± 0.55	0.50 ± 0.09
	12 – 13 May 2026	18.44 ± 0.16	39.46 ± 0.15	4.98 ± 0.10	0.98 ± 0.38	0.46 ± 0.07
	Autumn average	**20.60 ± 1.82**	**39.54 ± 0.31**	**4.79 ± 0.15**	**1.40 ± 0.68**	**0.56 ± 0.16**

[3] CTD profile data from nine sites averaged per survey and per season

Table 3-2: CTD seasonal summary showing 80th percentile values

Parameter	Percentile	Summer (NSG DGV*)	Autumn (NSG DGV*)	Winter (NSG DGV*)	Spring (NSG DGV*)
Temperature (°C)	80	23.6 (24.9)	22.9 (22.2)	16.4 14.5	18.52 (19.8)
Salinity (PSU)	80	39.09 (39.42)	39.85 (39.55)	40.19 (39.28)	39.27 (38.58)
Dissolved oxygen (mg/L)	80	5.217 (4.977)	4.968 (4.972)	5.817 (5.191)	5.811 (5.229)
Turbidity	80	0.86	1.94	1.03	1.04
pH[1]	80	8.2	8.1	8.1	8.1

[1]Discreet measurements at surface (all sites) and bottom water (for MQ05 and MQ08 only) – see Section 2.4.

*Parameter percentile values for North Spencer Gulf represent 'surface' water; defined as an average of the top 20 m of the water column (ANZG, 2018).

3.3 Water samples

3.3.1 Metals, metalloids and other potential contaminants of concern

Metals and metalloid concentrations are summarised in Table 3-3 and compared with relevant water quality toxicant DVGs. Metal and metalloid concentrations were below their respective 95% DGVs, with a few exceptions as follows.

For lead, nickel and silver, instrumentation PQLs exceeded the 95% DGVs in June 2025 and August 2025 (Table 3-3). Similarly, in June and August 2025, for aluminium, chromium and copper, instrumentation PQLs exceeded the 95% DGVs and with a small number of samples (< 5% to at most 15%) also with concentrations further exceeding the DGV (Table 3-3). With lower PQLs for all analytes in December 2025 and March 2026, all average analyte concentrations were below the 95% DGV.

Zinc concentrations were mostly below the PQL (of 5 µg/L) in June 2025 (with a small number of individual samples exceeding the DGV of 8 µg/L), and well below the DGV in Summer and Autumn. However, average zinc concentrations well exceeded the 95% DGV in Spring (zinc average of 61 µg/L) (Table 3-3).

TRH, TPH, BTEX and Naphthalene were all below 95% DVGs (where a DGV was available) and all below (or close to) their respective PQLs.

3.3.2 Nutrients, Chlorophyll and TSS

Nutrients

Nutrient concentrations while low overall, showed temporal changes with peaks occurring throughout the 12-month study period (Figure 3-16 to Figure 3-19, Table 3-4).

Nitrate concentrations (Figure 3-16, Table 3-4) were typically low (below ~2 µg/L), however peaks occurred during late August (averaging 4.70 µg/L) and early March (3.82 µg/L), with higher nitrate variability between sites also occurring at these times. Subsequently, nitrate concentrations were highest in Spring (averaging 2.80 µg/L) and Autumn (averaging 2.24 µg/L), and lowest in Winter (averaging 1.26 µg/L) and Summer (averaging 1.05 µg/L) (Table 3-4).

Ammonia was low though Winter and Spring (averaging <2 µg/L), increasing through Summer (averaging 4.08 µg/L) and reaching up to 9.03 µg/L in early March (averaging 5.79 µg/L in Autumn) (Figure 3-17, Table 3-4).

Phosphate showed the opposite trend to ammonia, with highest concentrations occurring in Winter (averaging 4.11 µg/L) and Spring (averaging 3.41 µg/L) and lowest overall concentrations in Summer and Autumn (averaging <1.3 µg/L) (Figure 3-18, Table 3-4).

Reactive silica followed a similar trend to ammonia with highest concentrations occurring in Autumn (averaging 86.1 µg/L) and lower concentrations for other seasons (down to an average of 30.3 µg/L in Summer) (Figure 3-18, Table 3-4).

Chlorophyll *a*

Chlorophyll *a* was generally below 1 µg/L, however in December, averaged 1.40 µg/L and remained above 1 µg/L from January through to March before declining to 0.55 µg/L in May (Figure 3-20, Table 3-4).

TSS

TSS remained below an average of 4 mg/L for most of the 12-month survey, with the exception of higher TSS (and higher variability) occurring in June 2025, February and May 2026 (up to 7.12 mg/L in May) (Figure 3-21, Table 3-4). TSS did not appear to follow trends in chlorophyll *a*.

Table 3-3: Total metal/metalloid concentrations and comparison to Default Guideline Values

Metal/ metalloid	Unit	Range	PQL (PQL on day[1])	Range	PQL (PQL on day[1])	Min - Max (average)	PQL	Range	PQL	DGV[2]
		June		August		December		March		
Aluminium	µg/L	<50 – 110*	10 (<50)	<100-270*	10 (<100)	2.7 – 5.3	0.5	3 – 11 (4.8)	0.5	37
Antimony	µg/L	<5	1 (<5)	<10	1 (<10)	0.17 – 0.23	0.02	0.16 – 0.23 (0.20)	0.02	-
Arsenic	µg/L	<5	1 (<5)	<10	1 (<10)	1.5 – 1.8	0.05	2.0 – 2.3 (2.1)	0.05	-
Barium	µg/L	<5 – 8.0	1 (<5)	<10 – 12	1 (10)	5.6 – 6.7	0.1	6.3 – 6.9 (6.6)	0.1	-
Beryllium	µg/L	<2.5	0.5 (<2.5)	<5	0.5 (<5)	Not analysed		Not analysed		-
Boron	µg/L	4800 – 6300 (5527)	20 (20)	5000 – 5900 (5375)	20 (20)	4400 – 5700 (5178)	10	3700 to 5200 (4500)	10	-
Cadmium	µg/L	<0.5 – 0.55	0.1 (<0.50)	<1	0.1 (<1)	0.008 – 0.002 (0.013)	0.005	<0.005 – 0.018	0.005	5.5
Chromium (III+VI)	µg/L	<5 – 7.5**	1 (<5)	<10-40*	1 (<10)	0.05 – 0.09	0.05	0.07 – 0.13 (0.10)	0.05	4.4
Cobalt	µg/L	<5	1 (<5)	<10	1 (<10)	<0.02	0.02	<0.02 – 0.04	0.02	6.1
Copper	µg/L	<5- 7.1**	1 (<5)	<10-20**	1 (<10)	0.2 – 0.8 (0.3)	0.1	0.2 – 1.0 (0.5)	0.1	0.6
Iron	µg/L	<50	10 (<50)	<100-320*	10 / <100	0.6 – 3.8 (1.6)	0.2	<0.2 – 6.6	0.2	540
Lead	µg/L	<5	1 (<5)	<10	1 / < 10	0.07 – 0.53 (0.17)	0.02	0.08 – 0.74 (0.33)	0.02	4.4
Manganese	µg/L	<5	1 (<5	<10	1 / <10	0.27 – 0.50 (0.41)	0.02	0.21 – 0.51 (0.34)	0.02	300
Mercury	µg/L	<0.05	0.05 (<0.050)	<0.05	0.05 (<0.05)	<0.02	0.02	<0.02- 0.1	0.02	0.4
Molybdenum	µg/L	13 – 19 (14)	1 (1)	12 to 19	1 (1)	12 – 13 (12.5)	0.05	12 – 13 (12.4)	0.05	-
Nickel	µg/L	<5	1 (<5)	<10	1 (<10)	0.12 – 0.22 (0.17)	0.05	0.12 – 0.31 (0.19)	0.05	5.9
Selenium	µg/L	<5 – 5.1[§]	1 (<5)	<10	1 (<10)	<0.1 – 0.4	0.1	<0.1 – 0.4	0.1	-
Silver	µg/L	<5	1 (<5)	<10	1(<10)	<0.02	0.02	<0.02	0.02	1.4
Strontium	µg/L	8600 – 10000 (9081)	1 (1)	8600 – 9600 (8948)	1 (1)	8400 – 8800 (8624)	0.2	8500 – 9000 (8796)	0.2	-
Thallium	µg/L	<5	1 (<5)	<10	1 (<10)	0.019 – 0.026 (0.022)	0.005	0.017 – 0.029 (0.021)	0.005	17

Metal/ metalloid	Unit	Range	PQL (PQL on day[1])	Range	PQL (PQL on day[1])	Min - Max (average)	PQL	Range	PQL	DGV[2]
		June		August		December		March		
Thorium	µg/L	<2.5	0.5 (<2.5)	<5*	0.5 (<5)	<0.005 – 0.006	0.005	<0.005 – 0.006	0.005	-
Uranium	µg/L	<5	1 (<5)	<10	1 (<10)	3.6 – 4.0 (3.8)	0.001	3.4 – 3.7 (3.5)	0.001	-
Vanadium	µg/L	<5	1 (<5)	<10	1 (<10)	1.6 – 1.8 (1.7)	0.1	1.8 – 2.2 (2.0)	0.1	100
Zinc	µg/L	<5 – 10**	1 (<5)	31 – 130*	1 (1.0)	0.5- 1.6 (0.8)	0.1	0.3 – 15 (3.0)	0.1	8

[1] Instrument functioning can vary day to day leading to higher PQLs than expected (Envirolabs; personal communication). In addition, the sample matrix can interfere with analysis of specific compounds. Where this occurs, the PQL needs to be raised to a level where the laboratory is confident to report (see https://www.envirolab.com.au/Resources/FAQ). This was the case for June 2025 and August 2025 with the methodology employed. For December 2025 and March 2026, the Octopole Reaction Cell Ultratrace method was implemented to overcome the high salt content of water samples which can interfere with sample matrix and subsequent analysis.

[2] DGV for 95% species level protection for aquatic ecosystems (ANZG,2018).

- indicates no marine DGV.

*85% or more samples < PQL.

**95% or more of samples < PQL.

Dark grey highlight indicates where the PQL exceeded the 95% DGV.

Light grey highlight indicates where the obtained concentrations, and or the PQL exceeded the 95% DGV.

Table 3-4: Bio-chemical water quality parameters for each survey and season (average ± standard deviation)

Season	Survey	Ammonia as N (µg/L)	Nitrite as N (µg/L)	Nitrate as N (µg/L)	Total N (µg/L)	TKN (µg/L)	Phosphate as P (µg/L)	Total P (µg/L)	Reactive silica (µg/L)	TSS (mg/L)	Chl *a* (µg/L)
Winter	3 – 4 Jun 25	1.65± 0.61	1.00± 0.00	1.73± 1.21	165± 19.4	165± 19.4	4.03± 0.85	14.0± 1.46	53.0± 12.5	6.24± 5.15	0.87± 0.33
	1- 2 Jul 25	1.50± 0.00	1.00± 0.00	1.06± 0.24	155± 26.9	153± 27.7	4.97± 1.36	13.2± 1.89	32.8± 4.85	2.64± 1.62	0.72± 0.21
	30 – 31 Jul 25	1.50± 0.00	1.00± 0.00	1.00± 0.00	135± 10.0	134± 9.94	3.33± 0.69	12.9±1.19	38.2± 1.96	3.37± 2.04	0.59± 0.19
	Winter average	**1.55±0.35**	**1.00± 0.00**	**1.26±0.78**	**152±23.5**	**150±23.9**	**4.11±1.20**	**13.4±1.60**	**41.3±11.6**	**4.08±3.65**	**0.73±0.27**
Spring	26 – 27 Aug 25	1.68± 0.74	1.00± 0.00	4.70± 3.40	121± 8.79	117± 8.10	4.64± 0.60	13.8± 0.77	34.6± 2.50	2.47± 1.31	0.69± 0.14
	8 – 9 Oct 25	1.62± 0.50	1.00± 0.00	1.12± 0.42	165± 12.5	164± 12.9	3.15± 0.71	13.3± 1.23	50.4± 1.87	2.57± 0.69	0.80± 0.22
	5 – 6 Nov 25	2.45± 2.22	1.00± 0.00	2.58± 2.33	180± 34.6	177± 34.6	2.45± 1.00	14.7±2.53	18.5± 1.68	3.08± 1.30	1.14± 0.36
	Spring average	**1.92±1.42**	**1.00± 0.00**	**2.80±2.79**	**155±33.1**	**153±33.7**	**3.41±1.20**	**13.9±1.77**	**34.5±13.2**	**2.71±1.16**	**0.88±0.32**
Summer	2 – 3 Dec 25	2.02± 1.44	1.00± 0.00	1.09± 0.52	154 ± 21.9	156 ± 22.6	1.00± 0.00	8.67± 1.61	NS	3.00± 1.05	1.40± 0.73
	12 – 13 Jan 26	3.47± 1.26	1.00± 0.00	1.00± 0.00	173± 14.4	177± 14.0	1.27± 0.52	8.58± 0.94	37.5± 13.1	2.78± 1.28	1.25± 0.47
	3 – 4 Feb 26	6.76± 1.84	1.00± 0.00	1.06± 0.24	164± 19.0	163± 18.8	1.00± 0.00	8.06±0.90	23.1 ±5.72	4.39± 2.74	1.12± 0.22
	Summer average	**4.08±2.50**	**1.00± 0.00**	**1.05±0.33**	**164±20.1**	**165±20.6**	**1.09±0.32**	**8.43±1.21**	**30.3±12.4**	**3.39±1.97**	**1.26±0.52**
Autumn	4 – 5 Mar 26	9.03±3.11	1.00± 0.00	3.82± 1.70	152± 22.2	148± 21.0	1.30± 0.85	7.52± 1.42	103± 9.89	3.61± 1.62	1.36± 0.42
	14 – 15 Apr 26	3.73± 1.68	1.00± 0.00	1.36± 0.93	157± 12.1	155± 10.6	1.00± 0.00	8.64± 1.06	71.5± 4.08	2.48± 1.92	0.88± 0.25
	12 – 13 May 2026	4.62± 2.73	1.00± 0.00	1.55± 1.30	166± 15.6	163± 17.6	1.52± 0.83	7.85±1.09	84.1 ±7.44	7.12± 4.87	0.55± 0.15
	Autum average	**5.79±3.46**	**1.00± 0.00**	**2.24±1.74**	**159±18.0**	**155±17.9**	**1.27±0.71**	**8.00±1.28**	**86.1±14.9**	**4.40±3.71**	**0.93±0.45**

NS – not sampled.

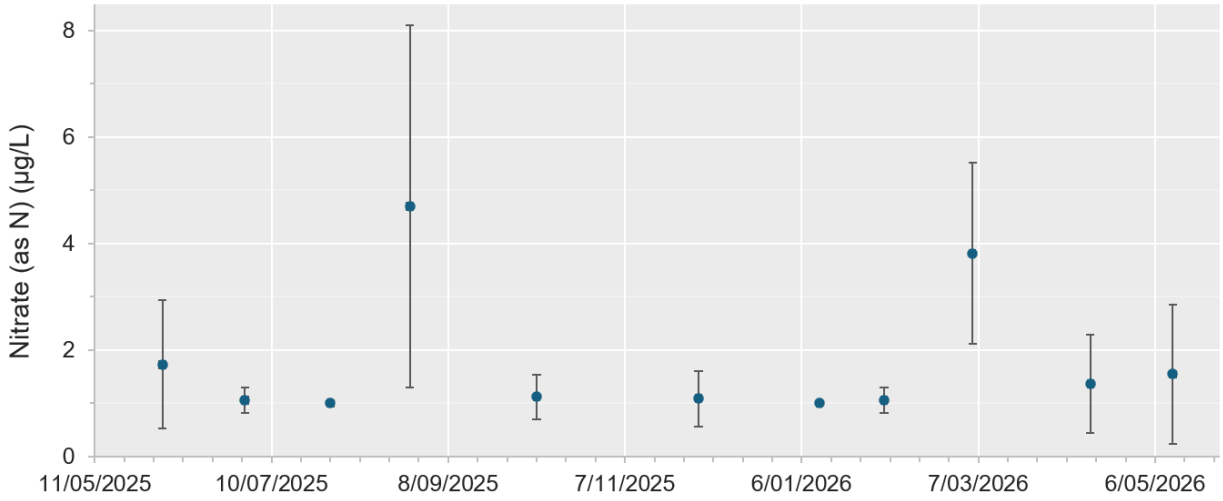


Figure 3-16: Temporal trends in Nitrate as N (average ± SD, µg/L)

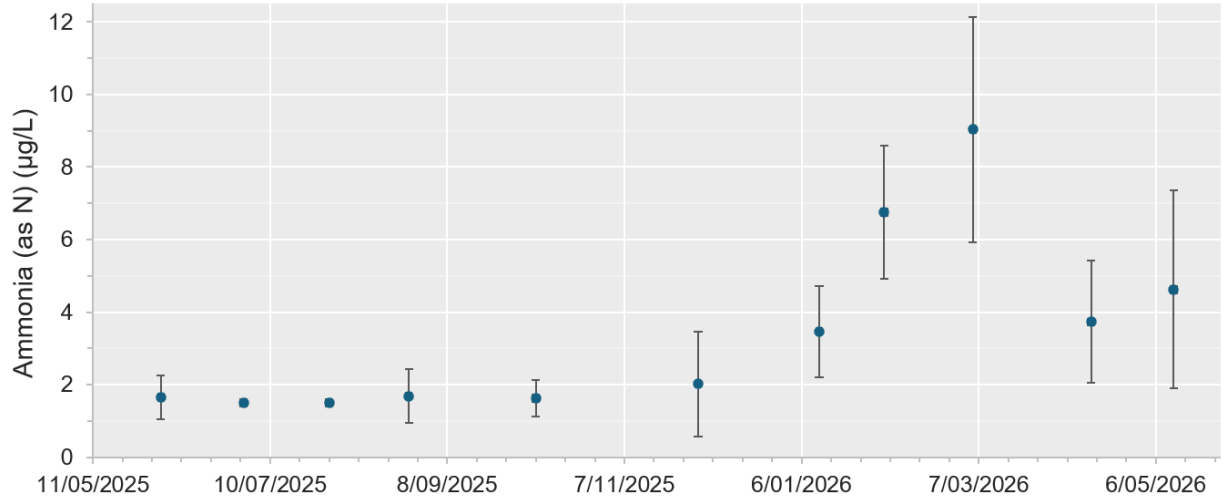


Figure 3-17: Temporal trends in Ammonia as N (average ± SD, µg/L)

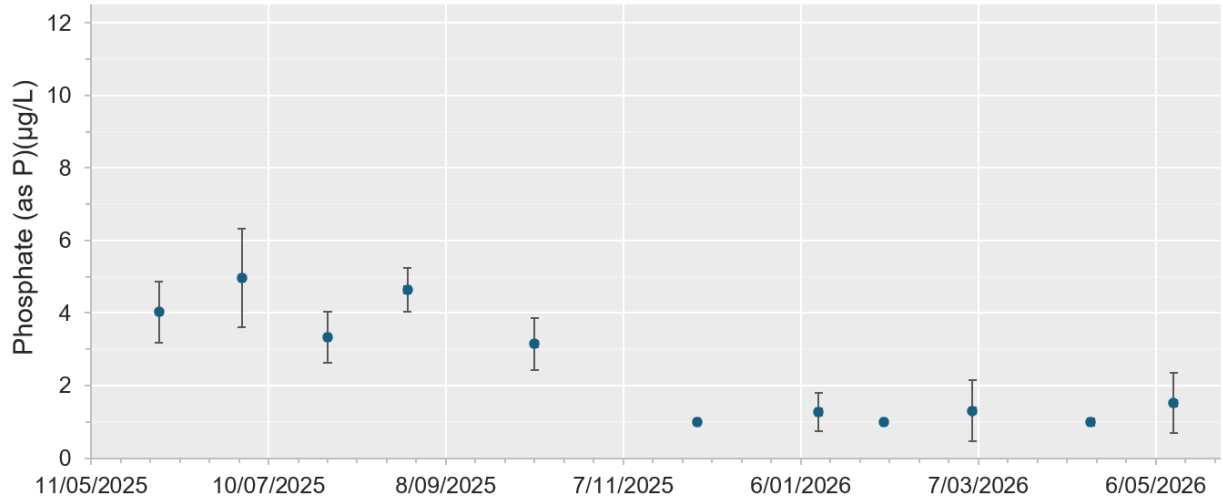


Figure 3-18: Temporal trends in Phosphate as P (average ± SD, µg/L)

Figure 3-19: Temporal trends in reactive silica (average ± SD, µg/L)

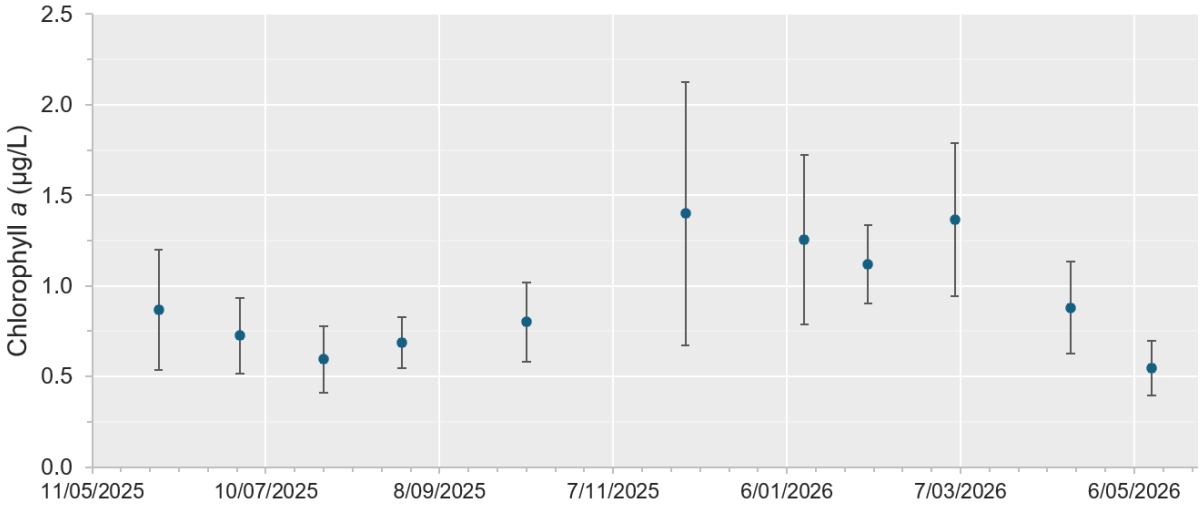


Figure 3-20: Temporal trends in chlorophyll a (average ± SD, µg/L)

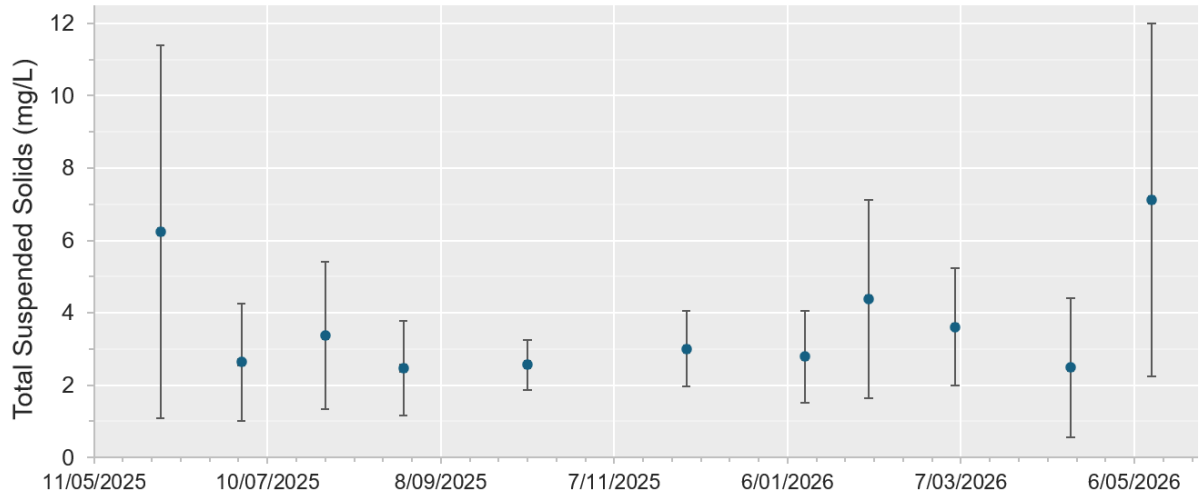


Figure 3-21 Temporal trends in Total Suspended Solids (average ± SD, mg/L)

3.3.3 Phytoplankton

Plots of total phytoplankton, diatoms, dinoflagellates and other phytoplankton are shown in Figure 3-22 to Figure 3-25. Figure 3-26 depicts the contribution of these broad phytoplankton groups to total cell counts. Summary statistics for total phytoplankton, diatoms, dinoflagellates and other phytoplankton are shown in Table 3-5.

Total phytoplankton averaged 140,000 cells/L to 1,192,017 cells/L but with elevated cell counts occurring in November 2025 (averaging up to 2,852,878 cells/L across all sites) and December 2025 (up to 1,513,050 cells/L across all sites) (Figure 3-22). Those highest counts in November and December were driven primarily by elevated diatoms (averaging up to 1,944987 cells/L in November across all sites) (Figure 3-23, Figure 3-25), however peaks in dinoflagellates (Figure 3-24), albeit less pronounced, were also evident from November 2025 through to January 2026 (averaging up to 242,713 cells/L in December across all sites – see below).

At the broad level of 'other phytoplankton', cell counts varied across the study period, with average minimum (59,750 cells/L across all sites) and average maximum cell counts (856,083 cells/L across all sites)

occurring in July 2025 and June 2025 respectively (Figure 3-25). Other phytoplankton commonly dominated cell counts throughout the study period however where peaks in diatoms and dinoflagellates occurred, other phytoplankton represented a lower proportion of the phytoplankton community composition (Figure 3-26). Highest numbers of other phytoplankton relative to diatoms and dinoflagellates occurred in February 2026 (Figure 3-26), where other phytoplankton represented on average more than 80% of the phytoplankton community as based on cell counts.

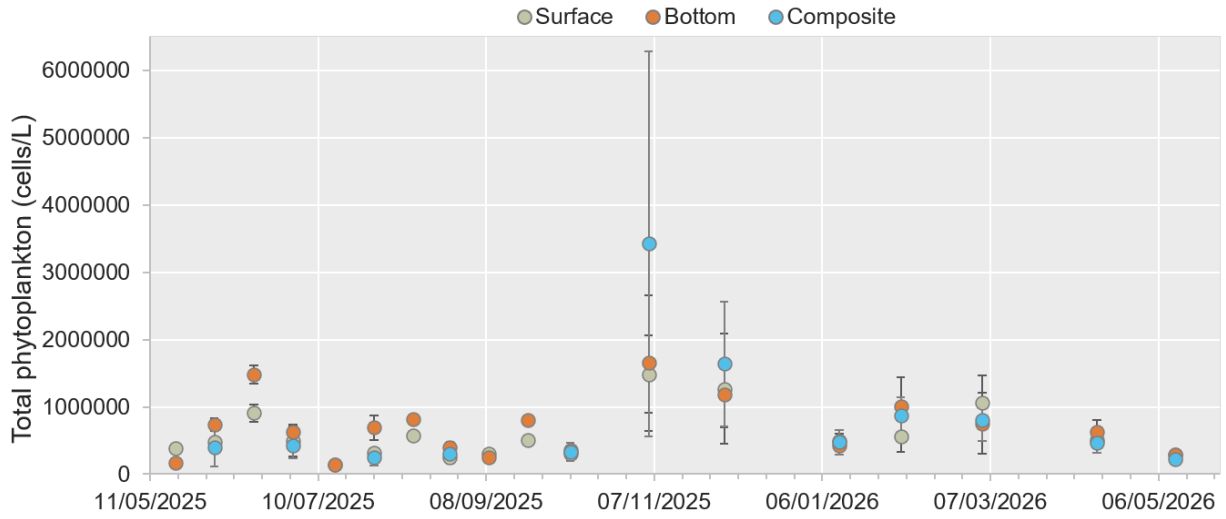


Figure 3-22: Total phytoplankton (average± SD, cells/L) in surface, bottom and composite water samples

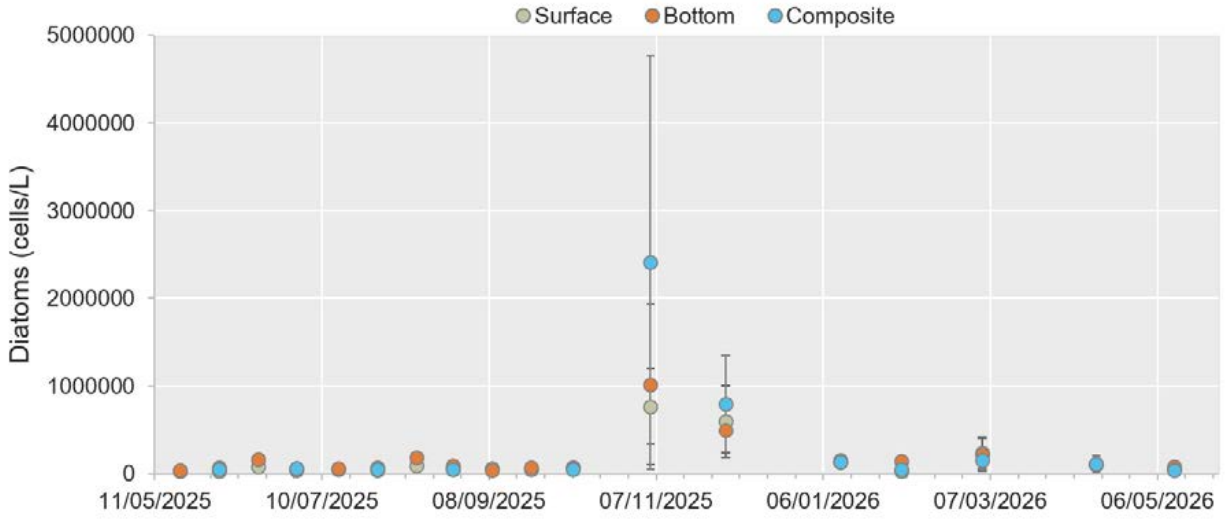


Figure 3-23: Diatoms (average± SD, cells/L) in surface, bottom and composite water samples

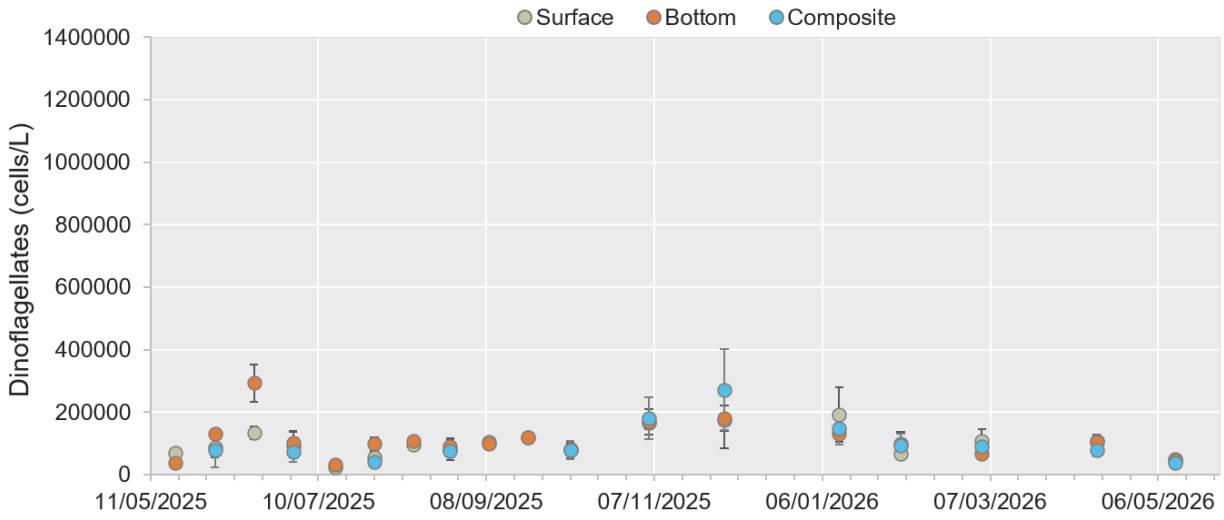


Figure 3-24: Dinoflagellates (average± SD, cells/L) in surface, bottom and composite water samples

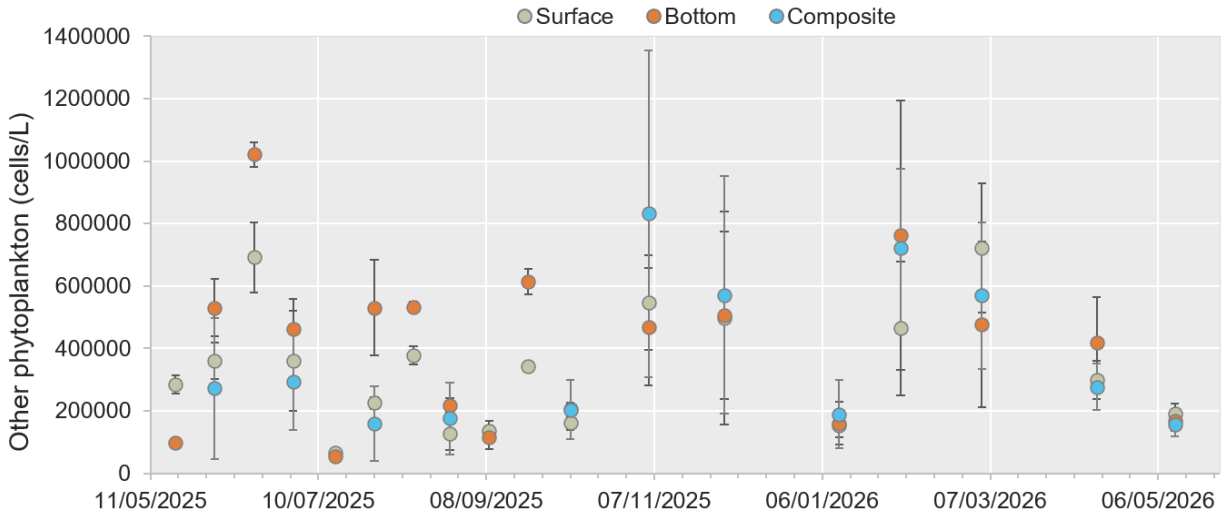


Figure 3-25: Other phytoplankton (average± SD, cells/L) in surface, bottom and composite water samples

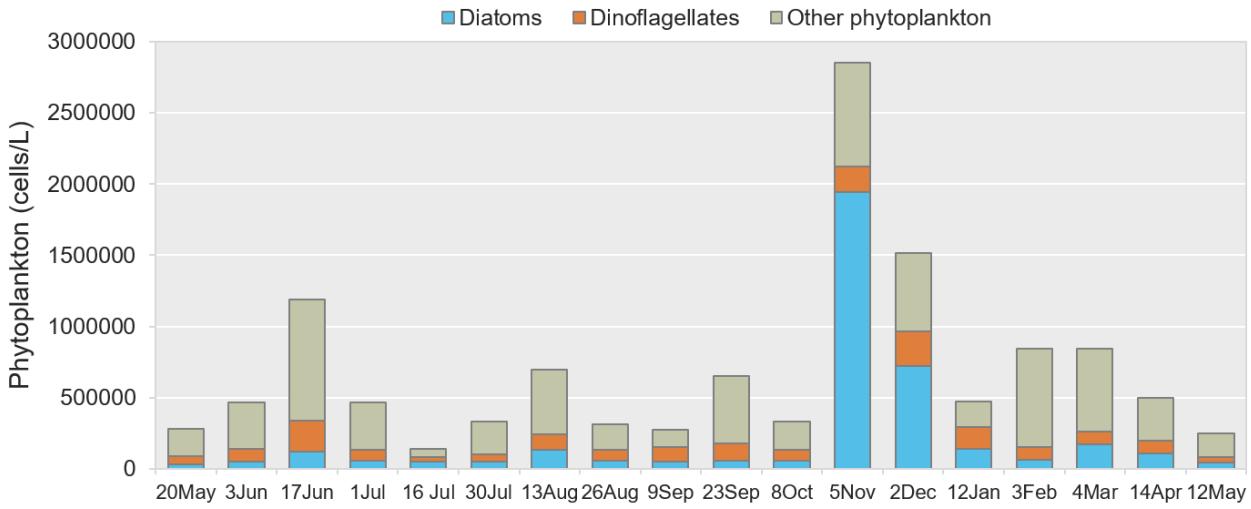


Figure 3-26: Phytoplankton community composition based on diatoms, dinoflagellates, other phytoplankton

Table 3-5: Summary statistics for Total phytoplankton, Diatoms, Dinoflagellates and Other Phytoplankton

Season	Date of Survey	Total Phytoplankton (cells/L)	Diatoms (cells/L)	Dinoflagellates (cells/L)	Other Phytoplankton (cells/L)
Autumn	20 May 2025	277700 ± 118213	33083 ± 7193	53617±20983	191000±103617
Winter	3 – 4 June 2025	464115 ± 267419	50282±21700	88115±50201	325718±212924
	17 June 2025	1192017 ± 332733	122125±58145	213808±95570	856083±195587
	1- 2 July 2025	463936 ± 193373	55024±37374	79968±37014	328944±156254
	16 July	140000 ± 26362	52542±23666	27708±6661	59750±11321
	30 – 31 July 2025	329115 ±202957	51032±17921	51571±26935	226513±174875
	13 August 2025	694167 ±142475	136500±54672	102750±12231	454917±86856
Winter average		**453234±288898**	**58994±37064**	**78756±53452**	**315484±222347**
Spring	26 – 27 August 20251	310292 ± 134950	56456±25619	79233±23536	174603±101157
	9 September 2025	275967 ± 48376	47792±11243	101758±8526	126417±32872
	23 September 2025	653867 ± 167474	57833±22706	118117±8275	477917±151116
	8 – 9 October 2025	331928 ± 110765	55873±23702	78804±26211	197251±81064
	5 – 6 November 2025	2852878 ± 2559972	1944987±2111741	176036±57942	731855±467045
Spring average		**1099906±1817385**	**626892±1443272**	**111226±57350**	**361788±366825**
Summer	2 – 3 December 2025	1513050 ± 863644	721008±503159	242713±12161	549329±353075
	12 – 13 January 2026	469750 ± 157820	137250±46002	153059±57076	179441±95462
	3 – 4 February 2026	841238 ± 320903	62614±45425	90168±34642	688456±290163
Summer average		**941346±688669**	**306957±414365**	**161980±101099**	**472409±343428**
Autumn	4 – 5 March 2026	840609 ± 352161	172590±132026	89583±33091	578436±239747
	14 – 15 April 2026	496867 ± 155072	107453±75645	87081±22449	302333±98151
	12 – 13 May 2026	248164 ± 65333	42788±29818	41009±15374	164367±39042
Autumn average		**528547±330773**	**107610±103480**	**72558±33230**	**348379±228857**

Within each of the broad phytoplankton groups, there were shifts in species composition throughout the study period. A summary is provided below, with Appendix C providing the full phytoplankton taxa list for all phytoplankton formally counted in samples (with overall minimum, maximum and average cell counts across reported for the study period – see Appendix C). It is noted phytoplankton were sometimes detected in samples but were not observed during cell counts.

Diatoms

Ninety-five (95) diatom taxa (resolved to species or genus level) were recorded during the study period (Appendix C). Diatoms present at cell counts exceeding 1000 cells/L for all surveys included *Chaetoceros* spp., *Cyclotella sp*. *Cylindrotheca closterium*, *Dactyliosolen fragilissimus*, *Entomoneis* spp., *Leptocylindrus danicus*, *Naviculoid* spp. *Nitzschia* spp. and *Thalassiosira* spp. (Appendix C).

During November 2025 when diatoms dominated the phytoplankton community, dominant taxa included *cf. Cylindrotheca costerium*, *Leptocylindrus minimus, Dactyliosolen fragilissimum and Rhizosolenia setigera*. During December 2025, *Chaetoceros* spp. were recorded in highest numbers, and with *Rhizosolenia setigera* and *Leptocylindrus* spp. also dominant at this time.

Dinoflagellates

Ninety-six (96) dinoflagellate taxa (resolved to species or genus level) were recorded during the study period (Appendix C). Dinoflagellate taxa recorded during all surveys included *Gymnodinoid* spp., *Gyrodinium* spp., *Katodinium sp*., *Heterocapsa rotunda* and *Heterocapsa* spp. During November through to January when highest numbers of dinoflagellates occurred, the same aforementioned dinoflagellates were recorded in generally higher numbers than previous months, but with other species recorded above previously low background numbers including *Karenia cristata*, *K. mikimotoi*, *K.cf. longicanalis*, *Mesoporous perforates, Lessardia elongata, Oxytoxum sp*. and *Peridinium sp*..

Dinoflagellates in the genus *Karenia* comprising *K. cristata*, *K. mikimotoi*, *K. cf. concordia* , *K.cf. longicanalis and K. papilionacea* were recorded throughout the study period at varying densities (Figure 3-27, Figure 3-28). Given *K. cristata* has been identified as a key species involved in the harmful algal bloom (HAB) in South Australian Waters (Murray et al. 2025), further information is provided below on the observed temporal dynamics of this species within the marine study area.

K. cristata was recorded from early June to mid July 2025 (but not in May 2025) in low numbers (<500 cells/L). *K. cristata* cell counts slowly increased through late July to early October 2025, reaching an average of 3,409 cells/L (in early October). In November, cell counts increased three-fold from the previous month (averaging 13,731 cells/L) and increasing to an average of 89,605 cells/L in early December 2025. *K.crisata* remained at relatively high cell counts in January 2026 (averaging 68,820 cells/L) and decreased rapidly over the next month down to an average of 260 cells/L in February and thereafter down to zero cell counts in May 2026.

K. cristata peak cell counts in November 2025 through to January 2026, *K.cristata* was the dominant *Karenia* species recorded (Figure 3-27, Figure 3-28). The contribution of *K.cristata* to total dinoflagellates cell counts also increased through October and November 2025, and with highest relative cell counts (compared to total dinoflagellates) occurring in December 2025 and January 2026 (Figure 3-28).

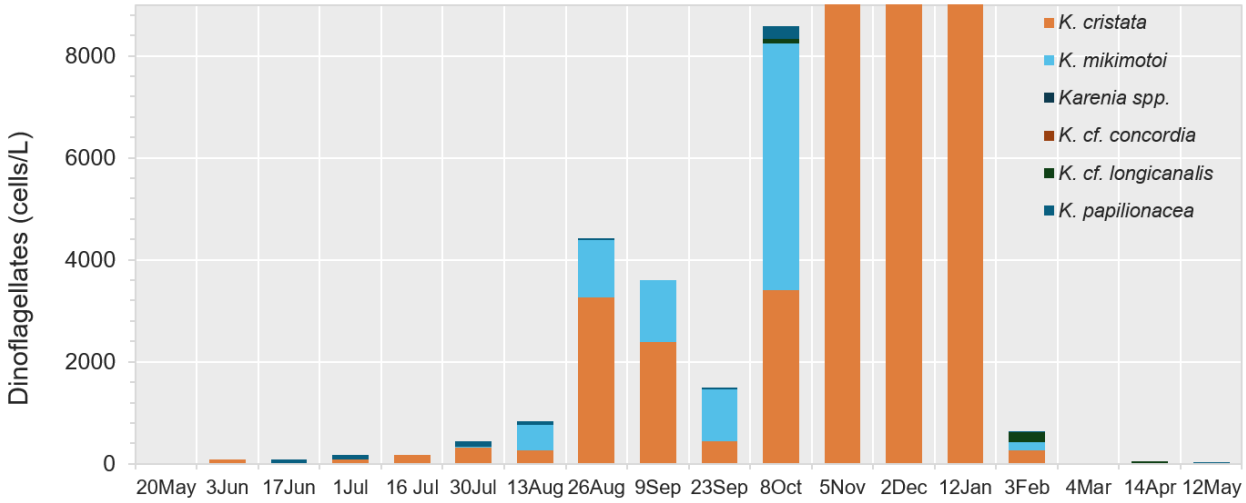


Figure 3-27: *Karenina* species cell counts to total *Karenia* cell counts (values represent averages) (also see Figure 3-28 below for full range)

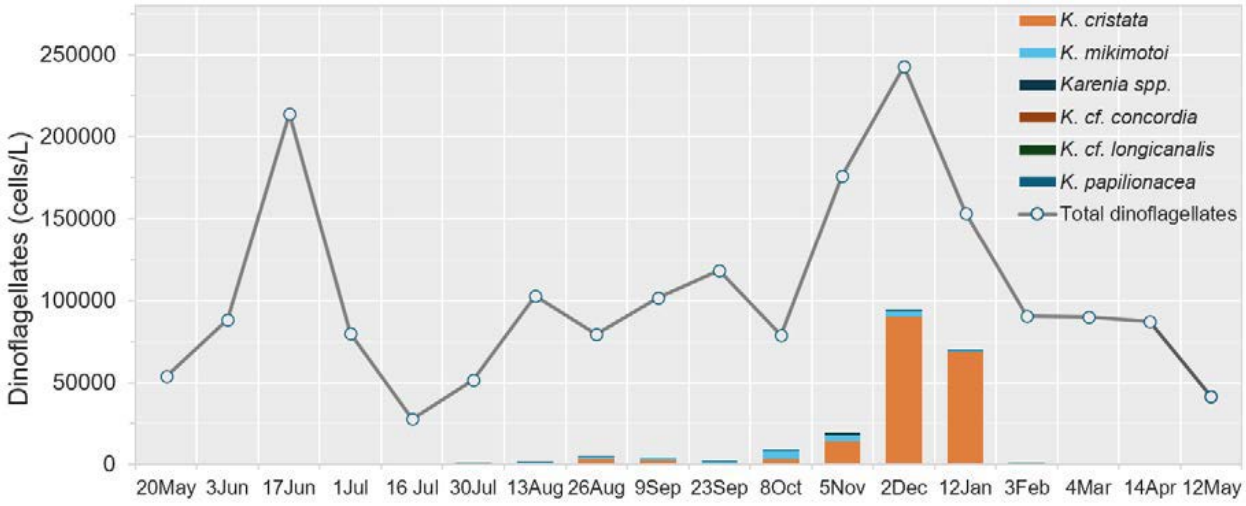


Figure 3-28: *Karenina* species cell counts to total *Karenia* cell counts (values represent averages) (enlargement of Figure 3-29) with average total dinoflagellate cell counts

Other phytoplankton

Other phytoplankton comprised several diverse groups including Chrysophyta, Prymnesiophytes, Cryptophyta, Chlorophyta, Prasinophytes, Euglenophyta and Cyanoprokaryota. Across these groups, more than 80 distinct phytoplankton taxa could be identified (refer to Appendix C).

Occurring at concentrations generally exceeding 10,000 cells/L for the majority of the study period included the Chrysophyte *Ochromonas* spp., the Prymesiophyte *Chrysochromulina* spp., Cryptophyes *Hemiselmis sp.* and *Plagioselmis prolonga* and the Prasinophyte *Pyramimonas* spp.. These taxa were also recorded in relatively high numbers during November and December 2025. Other taxa were recorded in relatively high numbers at other times, such as *Oochromoas;* with cell numbers exceeding 200,000 cells/L in mid-June 2025, November and December 2025 and March 2026, and with *Hemiselmis sp.* exceeding 200,000 cells/L in June 2025 and March 2026.

4. Discussion and Conclusion

Baseline temperature and salinity conditions at Mullaquana Station presented here reflect results from previous water surveys in Spencer Gulf (Middleton et al., 2013; Messer et al., 2021). Waters at Mullaquana Station are characterised by winter low temperatures, typically around 13°C and close to 24°C during summer. Lowest average salinity levels of approximately 39 PSU occurred from November through January and highest salinities up to ~40 PSU in late autumn into early winter depending on the year, and with an absolute range in salinity of 38.4 PSU to 40.6 PSU for the study. Dissolved oxygen ranged between ~4.8 mg/L to ~5.6 mg/L, with saturation around 100% for most of the study period, indicating well-oxygenated conditions. pH was within the typical range of marine waters (around 8.1 pH units). When comparing the 80th percentile values for temperature, salinity and dissolve oxygen to the NSG DGVs there were marked differences, highlighting the necessity for determining site specific baseline conditions.

Metal concentrations remained low overall; however, with some exceedance of the 95% DGV occurring when the instrumentation PQL was raised (In June 2025 and August 2025). The exception to this was for zinc, where in Spring, zinc concentrations exceeded the PQL and the 95% DGV. Zinc concentrations were however in the range previously reported in waters of Spencer Gulf (Jacobs, 2015). Other potential contaminants (i.e. TRH, TPH, BTEX and Naphthalene) were all below 95% DVGs (where a DGV was available) and all below their respective PQLs.

Dissolved nutrient concentrations at Mullaquana Station were overall low, again, reflecting previous studies in Spencer Gulf (Middleton et al. 2013). However, peaks in dissolved nutrients were apparent, with nitrate for example exceeding 2.5 µg/L at times in early Spring, late Spring and early Autumn, low ammonia throughout Winter and Spring (generally <2 µg/L), increasing through Summer and early Autumn, while highest Phosphate concentrations (i.e > 3 µg/L) occurred in Winter and into Spring. Phosphate in particular has been hypothesised to be limiting primary productivity in Spencer Gulf waters (Middleton et al. 2013).

Turbidity (as NTU), together with measurements of TSS (mg/L) showed waters to be relatively clear for much of the study period, close to or below 1 NTU, and TSS generally below 4 mg/L. At times, peaks above these low background levels occurred, with turbidity exceeding 1 NTU in March and April, and with TSS highest in June 2025 and May 2026 (up to around 7 mg/L).

During late spring to early Summer, chlorophyll *a* was slightly higher than has previously been reported in nearby waters by Middleton et al. (2013) but aligned more closely with values reported by Jacobs (2015). Chlorophyll *a* (from both the CTD and bulk water samples) showed the same overall trends, with highest chlorophyll *a* (up to 1.4 µg/L) occurring November and December 2025 and January 2026. Chlorophyll *a* concentrations were well below the DGVs for Northen Spencer Gulf (Table 2-4). No clear relationship between chlorophyll *a* or turbidity/ TSS was apparent.

Phytoplankton communities were diverse and showed marked temporal dynamics likely influenced by temperature, light and nutrient availability. Highest phytoplankton cell counts occurred in November and December, and to a lesser extent in January, concomitant with higher chlorophyll *a* concentration throughout this period. Highest phytoplankton cells counts were driven primarily by elevated diatoms, however peaks in dinoflagellates were also evident. Notably, the dinoflagellate *K. cristata* was recorded at higher numbers from November to January (up to around 90,000 cells/L) and comprised the largest proportion of the dinoflagellate cell counts during this time. Other phytoplankton, comprising diverse groups including Chrysophyta, Prymnesiophytes, Cryptophyta, Chlorophyta, Prasinophytes, Euglenophyta and Cyanoprokaryota commonly dominated cell counts outside of those periods of highest phytoplankton cell counts.

The findings here highlight the importance of long-term water quality monitoring to understand site-specific physical, chemical and biological variability and how these shifts influence ecosystem health and function.

5. Limitations

Scope of services

This report ("the report") has been prepared by JBS&G in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and JBS&G. In some circumstances, a range of factors such as time, budget, access and/or site disturbance constraints may have limited the scope of services. This report is strictly limited to the matters stated in it and is not to be read as extending, by implication, to any other matter in connection with the matters addressed in it.

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In preparing the report, JBS&G has relied upon data and other information provided by the Client and other individuals and organisations, most of which are referred to in the report ("the data"). Except as otherwise expressly stated in the report, JBS&G has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report ("conclusions") are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. JBS&G has also not attempted to determine whether any material matter has been omitted from the data. JBS&G will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to JBS&G. The making of any assumption does not imply that JBS&G has made any enquiry to verify the correctness of that assumption.

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Environmental conclusions

Within the limitations imposed by the scope of services, the preparation of this report has been undertaken and performed in a professional manner, in accordance with generally accepted environmental consulting practices. No other warranty, whether express or implied, is made, including to any third parties, and no liability will be accepted for use or interpretation of this report by any third party.

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Appendix A Water sample labels, holding times and Practical Quantification Limits

Table A-1: Water sample labels for laboratory analysis

Site	Sample	Replicate	Sample ID	Envirolab label	Approximate depth
MQ01	Composite	1	MQ01 R1 Comp	1	10
MQ01	Composite	2	MQ01 R2 Comp	2	10
MQ01	Composite	3	MQ01 R3 Comp	3	10
MQ02	Composite	1	MQ02 R1 Comp	4	10
MQ02	Composite	2	MQ02 R2 Comp	5	10
MQ02	Composite	3	MQ02 R3 Comp	6	10
MQ03	Composite	1	MQ03 R1 Comp	7	10
MQ03	Composite	2	MQ03 R2 Comp	8	10
MQ03	Composite	3	MQ03 R3 Comp	9	10
MQ04	Composite	1	MQ04 R1 Comp	10	15
MQ04	Composite	2	MQ04 R2 Comp	11	15
MQ04	Composite	3	MQ04 R3 Comp	12	15
MQ05	Composite	1	MQ05 R1 Comp	13	15
MQ05	Composite	2	MQ05 R2 Comp	14	15
MQ05	Composite	3	MQ05 R3 Comp	15	15
MQ06	Composite	1	MQ06 R1 Comp	16	15
MQ06	Composite	2	MQ06 R2 Comp	17	15
MQ06	Composite	3	MQ06 R3 Comp	18	15
MQ07	Composite	1	MQ07 R1 Comp	19	20
MQ07	Composite	2	MQ07 R2 Comp	20	20
MQ07	Composite	3	MQ07 R3 Comp	21	20
MQ08	Surface	1	MQ08 R1 Surface	22	20
MQ08	Surface	2	MQ08 R2 Surface	23	20
MQ08	Surface	3	MQ08 R3 Surface	24	20
MQ08	Bottom	1	MQ08 R1 Bottom	25	20
MQ08	Bottom	2	MQ08 R2 Bottom	26	20
MQ08	Bottom	3	MQ08 R3 Bottom	27	20
MQ08	Composite	1	MQ08 R1 Comp	28	20
MQ08	Composite	2	MQ08 R2 Comp	29	20
MQ08	Composite	3	MQ08 R3 Comp	30	20
MQ09	Composite	1	MQ09 R1 Comp	31	20
MQ09	Composite	2	MQ09 R2 Comp	32	20
MQ09	Composite	3	MQ09 R3 Comp	33	20

Table A-2: Sample Preservation Details & Holding Times

Analysis	Sample container and preservation (if required)	Transportation temperature/ Holding time
TSS – low level	1000 ml HDPE, unpreserved	Fill to the top, cool, 7 days
TDS, pH, EC, Turbidity	500 ml HDPE, unpreserved	Fill to the top, cool, 7 days
TKN, TN, TP,	250 ml HDPE, Sulphuric Acid preserved	Fill to the top, cool, 7 days
TOC	125 ml HDPE, Sulphuric Acid preserved	Fill to the top, cool, 28 days
NO2, NO3, PO4, NH3, Reactive silica	250 ml HDPE, unpreserved	Chill and transport within 2 days
vTRH/BTEXN	2 x 40ml vials, bisulfate preserved	Fill to the top, cool, 14 days
svTRH	2 x 100ml Amber bottle	Fill to the top, cool, 7 days
vTRH/BTEXN	2 x 40ml vials, bisulfate preserved	Fill to the top, cool, 14 days
Metals	1 x 125ml HDPE, unpreserved	Fill to the top, cool, 28 days
Chlorophyll a – low level	2500 ml Amber bottle	Chill and transport within 2 days
Algal ID	1000 ml HDPE bottle, Lugols preserved	Fill to top, cool, 2 days
Coliforms	250 ml Sterile PET bottle	Head space required, cool, 1 day

Table A-3: Practical Quantification Limits

Analyte	Units	PQL	Method	PQL**
TRH C6-C9	µg/L	10	ORG-023_F1_TOT	
TRH C6-C10	µg/L	10	ORG-023_F1_TOT	
TRH C6-C10 less BTEX (F1)	µg/L	10	ORG-023_F1_TOT	
Methyl tert butyl ether (MTBE)	µg/L	1.0	ORG-023_F1_TOT	
Benzene	µg/L	1.0	ORG-023_F1_TOT	
Toluene	µg/L	1.0	ORG-023_F1_TOT	
Ethylbenzene	µg/L	1.0	ORG-023_F1_TOT	
meta+para Xylene	µg/L	2.0	ORG-023_F1_TOT	
ortho-Xylene	µg/L	1.0	ORG-023_F1_TOT	
Total +ve Xylenes	µg/L	1.0	ORG-023_F1_TOT	
Naphthalene (value used in F2 calc)	µg/L	1.0	ORG-023_F1_TOT	
Total +ve BTEX	µg/L	1.0	ORG-023_F1_TOT	
Surrogate Dibromofluoromethane	%		ORG-023_F1_TOT	
Surrogate Toluene-D8	%		ORG-023_F1_TOT	
Surrogate 4-Bromofluorobenzene	%		ORG-023_F1_TOT	
TRH C10-C14	µg/L	50	ORG-020	
TRH C15-C28	µg/L	100	ORG-020	
TRH C29-C36	µg/L	100	ORG-020	
Total +ve TRH C10-C36	µg/L	50	ORG-020	
TRH >C10-C16	µg/L	50	ORG-020	
TRH >C10-C16 less Naphthalene F2	µg/L	50	ORG-020	
TRH >C16-C34 (F3)	µg/L	100	ORG-020	
TRH >C34-C40 (F4)	µg/L	100	ORG-020	
Total +ve TRH >C10-C40	µg/L	50	ORG-020	
Surrogate o-Terphenyl	%		ORG-020	
Calcium	mg/L	0.50	METALS-020	
Magnesium	mg/L	0.50	METALS-020	
Potassium	mg/L	0.50	METALS-020	
Silicon	mg/L	0.10	METALS-020	
Sodium	mg/L	0.50	METALS-020	
Hardness (calc) equivalent CaCO3	mg/L	3.0	METALS-020	
Aluminium	µg/L	10*	METALS-022	0.50**
Antimony	µg/L	1.0*	METALS-022	0.020**
Arsenic	µg/L	1.0*	METALS-022	0.050**
Barium	µg/L	1.0*	METALS-022	0.10**
Beryllium	µg/L	0.50*	METALS-022	Not analysed
Boron	µg/L	20	METALS-022	10**
Cadmium	µg/L	0.10*	METALS-022	0.0050**
Chromium	µg/L	1.0*	METALS-022	0.050**

Analyte	Units	PQL	Method	PQL**
Cobalt	µg/L	1.0*	METALS-022	0.020**
Copper	µg/L	1.0*	METALS-022	0.10**
Iron	µg/L	10*	METALS-022	0.20**
Lead	µg/L	1.0*	METALS-022	0.020**
Manganese	µg/L	1.0*	METALS-022	0.020**
Mercury	µg/L	0.050	METALS-021	0.020**
Molybdenum	µg/L	1.0	METALS-022	0.050**
Nickel	µg/L	1.0*	METALS-022	0.050**
Selenium	µg/L	1.0*	METALS-022	0.10**
Silicon	µg/L	0.10	METALS-020	0.10**
Silver	µg/L	1.0*	METALS-022	0.020**
Strontium	µg/L	1.0	METALS-022	0.20**
Thallium	µg/L	1.0*	METALS-022	0.0010**
Thorium	µg/L	0.50*	METALS-022	0.0050**
Uranium	µg/L	1.0*	METALS-022	0.0010**
Vanadium	µg/L	1.0*	METALS-022	0.10**
Zinc	µg/L	1.0*	METALS-022	0.10**
pH	pH units		INORG-001	
Electrical Conductivity	µS/cm	2.0	INORG-002	
Total Dissolved Solids	mg/L	5.0	INORG-018	
Estimated Salinity	mg/L	1.0	INORG-002	
Total Suspended Solids	mg/L	1.0	INORG-019	
Total Organic Carbon	mg/L	1.0	INORG-079	
Chlorophyll a	mg/m3	0.20	INORG-119	
Ammonia as N	µg/L	3.0	SUB-021	
Nitrate as N	µg/L	2.0	SUB-021	
Nitrite as N	µg/L	2.0	SUB-021	
Phosphate as P	µg/L	2.0	SUB-021	
Total Nitrogen	µg/L	50	SUB-021	
Total Phosphorus	µg/L	5.0	SUB-021	
NOx as N	µg/L	2.0	SUB-021	
TKN as N	µg/L	50	SUB-021	
Reactive Silica	µg/L	2.0	SUB-021	
Total Coliforms	MPN/100mL	1.0	SUB-041_CA	

*Instrument functioning can vary day to day leading to higher PQLs than expected (Envirolabs; personal communication). In addition, the sample matrix (including the high salt content of seawater samples) can interfere with determination of specific compounds. Where this occurs, the PQL needs to be raised to a level where the laboratory is confident to report (see https://www.envirolab.com.au/Resources/FAQ). The PQL was raised above those PQLs in the above table for June 2025 and August 2025.

**For December 2025 and March 2026, the Octopole Reaction Cell Ultrarace method was implemented for the metal / metalloid suite to overcome the high salt content of water samples which can interfere with sample matrix and subsequent analysis.

Appendix B Chain of Custody and Certificate of Analysis

CHAIN OF CUSTODY FORM - Client

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ENVIROLAB GROUP
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Perth Lab - MPL Laboratories
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08 9317 2505 | lab@mpl.com.au

Melbourne Lab - Envirolab Services
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Newcastle Lab - Envirolab Services
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Adelaide Office - Envirolab Services
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08 7067 6800 | adelaide@envirolab.com.au

Brisbane Office - Envirolab Services
20a, 10-28 Depot St, Banyo, QLD 4014
07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 28/119 Reichardt Road, Winnellie, NT 0820

Company:	SARDI
Contact Person:	Ian Moody
Project Mgr:	
Sampler:	Sunira Reardon + ALEX DOBRENOVSKIS
Address:	2 Hamra Ave, West Beach SA 5024
Phone:	Mobile:
Email Results to:	ian.moody@sa.gov.au
Email Invoice to:	ian.moody@sa.gov.au

Client Project Name/Number/Site etc (ie report title): **NWP Mullaquana Environmental Seasonal - May**

PO No. (if applicable):

Envirolab Quote No.: 25SA070

Date results required:

Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day

Note: Inform lab in advance if urgent turnaround is required - surcharges apply

Additional report format: ☐ Esdat ☐ Equis

Lab Comments: Total Metals – Al, Sb, As, Ba, Be, B, Cd, Co, Cr, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Ag, Sr, Th, Tl, U, V, Zn + Silica

Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	Combo 1M - Total	pH, EC, Salinity	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	TDS Grav	TOC	Total Coliforms	Chlorophyll a - LL								Comments
1	MQ01 R1 Comp	4/6/25	Sea water																	Provide as much information about the sample as you can
2	MQ01 R2 Comp	↓																		
3	MQ01 R3 Comp	↓																		
4	MQ02 R1 Comp	3/6/25																		
5	MQ02 R2 Comp																			
6	MQ02 R3 Comp																			
7	MQ03 R1 Comp																			
8	MQ03 R2 Comp																			
9	MQ03 R3 Comp	↓																		
10	MQ04 R1 Comp	4/6/25																		
11	MQ04 R2 Comp	↓																		
12	MQ04 R3 Comp	↓																		

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only
Print Name:	Sunira Reardon	ELS ADL Reference	ELS - KV	Job number: MGE00806
Date & Time:	3/6/25 // 4/6/25	5/6/25 12pm	0850 6/6/25	Temp Office: 10.4 Temp Lab: 17.4
Signature:		KS	KV	TAT: SAME day / 1 / 2 / 3 / 4 / STD

Office Cooling: Ice / Ice pack / None
Lab Cooling: Ice / Ice pack / None
Security seal: Intact / Broken / None

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08 9317 2505 | lab@mpl.com.au

Melbourne Lab - Envirolab Services
25 Research Drive, Croydon South, VIC 3136
03 9763 2500 | melbourne@envirolab.com.au

Newcastle Lab - Envirolab Services
92 Hill Street, Carrington Newcastle, NSW 2294
02 4902 9231 | newcastle@envirolab.com.au

Adelaide Office - Envirolab Services
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Brisbane Office - Envirolab Services
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07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820
08 8967 1201 | darwin@envirolab.com.au

Company:	SARDI
Contact Person:	Ian Moody
Project Mgr:	
Sampler:	Sunira Reardon + Alex Doblevolver
Address:	2 Hamra Ave, West Beach SA 5024
Phone:	Mobile:
Email Results to:	ian.moody@sa.gov.au
Email Invoice to:	ian.moody@sa.gov.au

Client Project Name/Number/Site etc (ie report title): Northern Water Program- Mullaquana (Seasonality)

PO No. (If applicable):

Envirolab Quote No. : 25SA070

Date results required:

Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day

Note: Inform lab in advance if urgent turnaround is required - surcharges apply

Additional report format: Esdat | Equis

Lab Comments: Total Metals – Al, Sb, As, Ba, Be, B, Cd, Co, Cr, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Ag, Sr, Th, Tl, U, V, Zn + Silica

Sample Information				Tests Required																Comments
Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	Combo 1M - Total	pH, EC, Salinity	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	TDS Grav	TOC	Total Coliforms	Chlorophyll a - LL								Provide as much information about the sample as you can
13	MQ05 R1 Comp	3/6/25	Sea water																	
14	MQ05 R2 Comp	↓																		
15	MQ05 R3 Comp	↓																		
16	MQ06 R1 Comp	↓																		
17	MQ06 R2 Comp	↓																		
18	MQ06 R3 Comp	↓																		
19	MQ07 R1 Comp	4/6/25																		
20	MQ07 R2 Comp	↓																		
21	MQ07 R3 Comp	↓																		
22	MQ08 R1 Comp	↓																		
23	MQ08 R2 Comp	↓																		
24	MQ08 R3 Comp	↓																		

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory
Print Name:	Sunira Reardon	ECS ADL Yvonne	
Date & Time:	3/6/25 // 4/6/25	5/6/25 12pm	
Signature:		KS	

Lab Use Only

Job number: MGF00486 | Office Cooling: Ice / Ice pack / None

Temp Office: 10.9°C Temp Lab: | Lab Cooling: Ice / Ice pack / None

TAT: SAME day / 1 / 2 / 3 / 4 / STD | Security seal: Intact / Broken / None

2 of 4

1/3

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Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820
08 8967 1201 | darwin@envirolab.com.au

Company:	SARDI
Contact Person:	Ian Moody
Project Mgr:	
Sampler:	ALEX DEBROVOLICH + SUNIRA RAJARAM
Address:	2 Hamra Ave, West Beach SA 5024
Phone:	Mobile:
Email Results to:	ian.moody@sa.gov.au
Email Invoice to:	ian.moody@sa.gov.au

Client Project Name/Number/Site etc (ie report title): Northern Water Program- Mullaquana

PO No. (If applicable):

Envirolab Quote No.: 25SA070

Date results required:

Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day

Note: Inform lab in advance if urgent turnaround is required - surcharges apply

Additional report format: Esdat | Equis

Lab Comments: Total Metals – Al, Sb, As, Ba, Be, B, Cd, Co, Cr, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Ag, Sr, Th, Tl, U, V, Zn + Silica

Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	Combo 1A	pH, EC, salinity	TSS-LL	Nutrients-LL	Reactive Silica-LL	TDS Grav	TOC	Total Coliforms-LL	Chlorophyll-LL	Comments
25	MQ08 R1 Surface	4/6/25	Sea water										Provide as much information about the sample as you can
26	MQ08 R2 Surface												
27	MQ08 R3 Surface												
28	MQ08 R1 Bottom												
29	MQ08 R2 Bottom												
30	MQ08 R3 Bottom												
31	MQ09 R1 Comp												
32	MQ09 R2 Comp												
33	MQ09 R3 Comp												

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory
Print Name:	ALEX DEBROVOLICH	EES ADL KSpring	
Date & Time:	4/6/25	5/6/25 12pm	
Signature:		K.S.	

Lab Use Only

Job number: MGF00056 | Office Cooling: Ice / Ice pack / None

Temp Office: 10.9°C Temp Lab: | Lab Cooling: Ice / Ice pack / None

TAT: SAME day / 1 / 2 / 3 / 4 / STD | Security seal: Intact / Broken / None

3/3.

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Melbourne Lab - Envirolab Services
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Newcastle Lab - Envirolab Services
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Brisbane Office - Envirolab Services
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T 07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820

Company:	SARDI	Client Project Name/Number/Site etc (ie report title):	NWP Mullaquana Monthly Sampling
Contact Person:	Ian Moody	PO No. (if applicable):	
Project Mgr:		Envirolab Quote No. :	25SA070v2
Sampler:	Alex Dobrovolskis & Sunny Reardon	Date results required:	☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day
Address:	2 Hamra Ave, West Beach SA 5024	Or choose:	
Phone:	Mobile: 0425 146 583	Note: Inform lab in advance if urgent turnaround is required - surcharges apply	
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au	Additional report format:	☐ Esdat ☐ Equis
Email Invoice to:	ian.moody@sa.gov.au	Lab Comments	

Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms	Comments
1	MQ01 R1 Comp	02/07/25	Sea water	X	X	X	X	X	X	
2	MQ01 R2 Comp	02/07/25		X	X	X	X	X	X	
3	MQ01 R3 Comp	02/07/25		X	X	X	X	X	X	
4	MQ02 R1 Comp	01/07/25		X	X	X	X	X	X	
5	MQ02 R2 Comp	01/07/25		X	X	X	X	X	X	
6	MQ02 R3 Comp	01/07/25		X	X	X	X	X	X	
7	MQ03 R1 Comp	01/07/25		X	X	X	X	X	X	
8	MQ03 R2 Comp	01/07/25		X	X	X	X	X	X	
9	MQ03 R3 Comp	01/07/25		X	X	X	X	X	X	
10	MQ04 R1 Comp	02/07/25		X	X	X	X	X	X	
11	MQ04 R2 Comp	02/07/25		X	X	X	X	X	X	
12	MQ04 R3 Comp	02/07/25		X	X	X	X	X	X	

☐ Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis

Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only	
Print Name:	SUNIRA REARDON	ELS ADL Kspence	ELS - KW	Job number: MGG00034	Office Cooling: Ice / Ice pack / None
Date & Time:	02/07/25	2/7/25 2pm	0820 3/7/25	Temp Office: 6.0°C Temp Lab: 10.5°	Lab Cooling: Ice / Ice pack / None
Signature:		KS	KW	TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

CHAIN OF CUSTODY FORM - Client

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ENVIROLAB GROUP
National phone number 1300 424 344
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Melbourne Lab - Envirolab Services
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T 07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820

Company:	SARDI	Client Project Name/Number/Site etc (ie report title):	NWP Mullaquana Monthly Sampling
Contact Person:	Ian Moody	PO No. (if applicable):	
Project Mgr:		Envirolab Quote No.:	25SA070v2
Sampler:	Alex Dobrovolskis & Sunny Reardon	Date results required:	
Address:	2 Hamra Ave, West Beach SA 5024	Or choose:	☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day
Phone:	Mobile: 0425 146 583	Note: Inform lab in advance if urgent turnaround is required - surcharges apply	
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au	Additional report format:	Esdat / Equis
Email Invoice to:	ian.moody@sa.gov.au	Lab Comments:	

Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms	Comments
13	MQ05 R1 Comp	01/07/25	Sea water	X	X	X	X	X	X	
14	MQ05 R2 Comp	01/07/25		X	X	X	X	X	X	
15	MQ05 R3 Comp	01/07/25		X	X	X	X	X	X	
16	MQ06 R1 Comp	01/07/25		X	X	X	X	X	X	
17	MQ06 R2 Comp	01/07/25		X	X	X	X	X	X	
18	MQ06 R3 Comp	01/07/25		X	X	X	X	X	X	
19	MQ07 R1 Comp	02/07/25		X	X	X	X	X	X	
20	MQ07 R2 Comp	02/07/25		X	X	X	X	X	X	
21	MQ07 R3 Comp	02/07/25		X	X	X	X	X	X	
22	MQ08 R1 Comp	02/07/25		X	X	X	X	X	X	
23	MQ08 R2 Comp	02/07/25		X	X	X	X	X	X	
24	MQ08 R3 Comp	02/07/25		X	X	X	X	X	X	

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory
Print Name:	SUNIRA REARDON.	ECS AOL KSpence	
Date & Time:	02/07/25	2/7/25 2pm	
Signature:		KS	

Lab Use Only	
Job number:	Office Cooling: Ice / Ice pack / None
Temp Office: 6.0°C Temp Lab:	Lab Cooling: Ice / Ice pack / None
TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

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National phone number 1300 424 344

Sydney Lab - Envirolab Services
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16-18 Hayden Crt, Myaree, WA 6154
T: 08 9317 2505 | lab@mpl.com.au

Melbourne Lab - Envirolab Services
25 Research Drive, Croydon South, VIC 3136
T: 03 9763 2500 | melbourne@envirolab.com.au

Newcastle Lab - Envirolab Services
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T: 02 4902 9231 | newcastle@envirolab.com.au

Adelaide Office - Envirolab Services
7a The Parade, Norwood, SA 5067
T: 08 7087 6800 | adelaide@envirolab.com.au

Brisbane Office - Envirolab Services
20a, 10-20 Depot St, Banyo, QLD 4014
T: 07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820

Company:	SARDI	Client Project Name/Number/Site etc (ie report title):	NWP Mullaquana Monthly Sampling
Contact Person:	Ian Moody	PO No. (if applicable):	
Project Mgr:		Envirolab Quote No.:	25SA070v2
Sampler:	Alex Dobrovolskis & Sunny Reardon	Date results required:	Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day
Address:	2 Hamra Ave, West Beach SA 5024	Note: Inform lab in advance if urgent turnaround is required - surcharges apply	
Phone:	Mobile: 0425 146 583	Additional report format:	Esdat / Equis
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au	Lab Comments:	
Email Invoice to:	ian.moody@sa.gov.au		

Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms	Comments
25	MQ08 R1 Surface	02/07/25	Sea water	X	X	X	X	X	X	
26	MQ08 R2 Surface	02/07/25		X	X	X	X	X	X	
27	MQ08 R3 Surface	02/07/25		X	X	X	X	X	X	
28	MQ08 R1 Bottom	02/07/25		X	X	X	X	X	X	
29	MQ08 R2 Bottom	02/07/25		X	X	X	X	X	X	
30	MQ08 R3 Bottom	02/07/25		X	X	X	X	X	X	
31	MQ09 R1 Comp	02/07/25		X	X	X	X	X	X	
32	MQ09 R2 Comp	02/07/25		X	X	X	X	X	X	
33	MQ09 R3 Comp	02/07/25		X	X	X	X	X	X	

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only	
Print Name:	SUNIRA REARDON	ECS ADL Kspence		Job number:	Office Cooling: Ice / Ice pack / None
Date & Time:	02/07/25	2/7/25 2pm		Temp Office: 6.0°C Temp Lab:	Lab Cooling: Ice / Ice pack / None
Signature:		ES		TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

CHAIN OF CUSTODY FORM - Client

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National phone number 1300 424 344

Sydney Lab - Envirolab Services
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Perth Lab - MPL Laboratories
16-18 Hayden Crt, Myaree, WA 6154
08 9317 2505 | lab@mpl.com.au

Melbourne Lab - Envirolab Services
25 Research Drive, Croydon South, VIC 3136
03 9763 2500 | melbourne@envirolab.com.au

Newcastle Lab - Envirolab Services
92 Hill Street, Carrington Newcastle, NSW 2294
02 4902 9231 | newcastle@envirolab.com.au

Adelaide Office - Envirolab Services
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08 7087 6800 | adelaide@envirolab.com.au

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07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820

Company:	SARDI	Client Project Name/Number/Site etc (ie report title):	NWP Mullaquana Monthly Sampling
Contact Person:	Ian Moody	PO No. (if applicable):	
Project Mgr:		Envirolab Quote No. :	25SA070v2
Sampler:	Alex Dobrovolskis & Sunny Reardon	Date results required:	
Address:	2 Hamra Ave, West Beach SA 5024	Or choose:	☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day
Phone: / Mobile:	0425 146 583	Note: Inform lab in advance if urgent turnaround is required - surcharges apply	
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au	Additional report format:	☐ Esdat ☐ Equis
Email Invoice to:	ian.moody@sa.gov.au	Lab Comments	

Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms	Comments
1	MQ01 R1 Comp		Sea water	X	X	X	X	X	X	
2	MQ01 R2 Comp			X	X	X	X	X	X	
3	MQ01 R3 Comp			X	X	X	X	X	X	
4	MQ02 R1 Comp	30/7/25		X	X	X	X	X	X	
5	MQ02 R2 Comp			X	X	X	X	X	X	
6	MQ02 R3 Comp			X	X	X	X	X	X	
7	MQ03 R1 Comp			X	X	X	X	X	X	
8	MQ03 R2 Comp			X	X	X	X	X	X	
9	MQ03 R3 Comp			X	X	X	X	X	X	
10	MQ04 R1 Comp			X	X	X	X	X	X	
11	MQ04 R2 Comp			X	X	X	X	X	X	
12	MQ04 R3 Comp			X	X	X	X	X	X	

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only
Print Name:		ELS ADL KSpence	ELS-KW	Job number: MGG0504
Date & Time:		31/7/25 12.45pm	0810 1/8/25	Temp Office: 9.2°C Temp Lab: 8.6°C
Signature:		KS	KW	TAT: SAME day / 1 / 2 / 3 / 4 / STD

Office Cooling: Ice / Ice pack / None
Lab Cooling: Ice / Ice pack / None
Security seal: Intact / Broken / None

#4 - #9
#13 - #18

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Sydney Lab - Envirolab Services
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Perth Lab - MPL Laboratories
16-18 Hayden Crt, Myaree, WA 6154
08 9317 2505 | lab@mpl.com.au

Melbourne Lab - Envirolab Services
25 Research Drive, Croydon South, VIC 3136
03 9763 2500 | melbourne@envirolab.com.au

Newcastle Lab - Envirolab Services
92 Hill Street, Carrington Newcastle, NSW 2294
02 4902 9231 | newcastle@envirolab.com.au

Adelaide Office - Envirolab Services
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08 7087 6800 | adelaide@envirolab.com.au

Brisbane Office - Envirolab Services
20a, 10-20 Depot St, Banyo, QLD 4014
07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820

Company:	SARDI	Client Project Name/Number/Site etc (ie report title):	NWP Mullaquana Monthly Sampling
Contact Person:	Ian Moody		
Project Mgr:		PO No. (if applicable):	
Sampler:	Alex Dobrovolskis & Sunny Reardon	Envirolab Quote No. :	25SA070v2
Address:	2 Hamra Ave, West Beach SA 5024	Date results required:	Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day
Phone: / Mobile:	0425 146 583	*Note: Inform lab in advance if urgent turnaround is required - surcharges apply*	
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au	Additional report format:	Esdat ☐ Equis ☐
Email Invoice to:	ian.moody@sa.gov.au	Lab Comments:	

Sample information				Tests Required																Comments
Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms											
13	MQ05 R1 Comp	30/7/25	Sea water	X	X	X	X	X	X											
14	MQ05 R2 Comp			X	X	X	X	X	X											
15	MQ05 R3 Comp			X	X	X	X	X	X											
16	MQ06 R1 Comp			X	X	X	X	X	X											
17	MQ06 R2 Comp			X	X	X	X	X	X											
18	MQ06 R3 Comp			X	X	X	X	X	X											
19	MQ07 R1 Comp			X	X	X	X	X	X											
20	MQ07 R2 Comp			X	X	X	X	X	X											
21	MQ07 R3 Comp			X	X	X	X	X	X											
22	MQ08 R1 Comp			X	X	X	X	X	X											
23	MQ08 R2 Comp			X	X	X	X	X	X											
24	MQ08 R3 Comp			X	X	X	X	X	X											

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory	MGG0504 Lab Use Only	
Print Name:		ECS ADL KSpence		Job number: MGG0504	Office Cooling: Ice / Ice pack / None
Date & Time:		31/7/25 12.45pm		Temp Office: 9.2C Temp Lab:	Lab Cooling: Ice / Ice pack / None
Signature:		KS.		TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

#4 - #9
#13 - #18

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07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820

Company:	SARDI	Client Project Name/Number/Site etc (ie report title):	NWP Mullaquana Monthly Sampling
Contact Person:	Ian Moody		
Project Mgr:		PO No. (if applicable):	
Sampler:	Alex Dobrovolskis & Sunny Reardon	Envirolab Quote No. :	25SA070v2
Address:	2 Hamra Ave, West Beach SA 5024	Date results required: Or choose:	☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day
Phone: / Mobile:	0425 146 583	Note: Inform lab in advance if urgent turnaround is required - surcharges apply	
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au	Additional report format:	☐ Esdat ☐ Equis
Email Invoice to:	ian.moody@sa.gov.au	Lab Comments:	

Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms	Comments
25	MQ08 R1 Surface		Sea water	X	X	X	X	X	X	
26	MQ08 R2 Surface			X	X	X	X	X	X	
27	MQ08 R3 Surface			X	X	X	X	X	X	
28	MQ08 R1 Bottom			X	X	X	X	X	X	
29	MQ08 R2 Bottom			X	X	X	X	X	X	
30	MQ08 R3 Bottom			X	X	X	X	X	X	
31	MQ09 R1 Comp			X	X	X	X	X	X	
32	MQ09 R2 Comp			X	X	X	X	X	X	
33	MQ09 R3 Comp			X	X	X	X	X	X	

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only	
Print Name:		ECS ADL Kspence		Job number: MGG0504	Office Cooling: Ice / Ice pack / None
Date & Time:		31/7/25 12.45pm		Temp Office: 9.2°C Temp Lab:	Lab Cooling: Ice / Ice pack / None
Signature:		KS		TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

(#4-#9
#13-#18)

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16-18 Hayden Crt, Myaree, WA 6154
T 08 9317 2505 | lab@mpl.com.au

Melbourne Lab - Envirolab Services
25 Research Drive, Croydon South, VIC 3136
T 03 9763 2500 | melbourne@envirolab.com.au

Newcastle Lab - Envirolab Services
92 Hill Street, Carrington Newcastle, NSW 2294
T 02 4902 9231 | newcastle@envirolab.com.au

Adelaide Office - Envirolab Services
7a The Parade, Norwood, SA 5067
T 08 7087 6800 | adelaide@envirolab.com.au

Brisbane Office - Envirolab Services
20a, 10-20 Depot St, Banyo, QLD 4014
T 07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820

Company:	SARDI	Client Project Name/Number/Site etc (ie report title):	NWP Mullaquana Environmental Seasonal - August
Contact Person:	Ian Moody	PO No. (if applicable):	
Project Mgr:		Envirolab Quote No.:	25SA070v2
Sampler:	Sunira Reardon / Alex Dobrovolskis	Date results required:	Standard ☑ Same Day ☐ 1 day ☐ 2 day ☐ 3 day ☐
Address:	2 Hamra Ave, West Beach SA 5024	Or choose:	
Phone:	Mobile:	Note: Inform lab in advance if urgent turnaround is required - surcharges apply	
Email Results to:	ian.moody@sa.gov.au	Additional report format:	Esdat ☐ Equis ☐
Email Invoice to:	ian.moody@sa.gov.au	Lab Comments: Total Metals – Al, Sb, As, Ba, Be, B, Cd, Co, Cr, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Ag, Sr, Th, Tl, U, V, Zn + Silica	No charge for freight - KS ELS ADL

Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	Combo 1M - Total	pH, EC, Salinity	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	TDS Grav	TOC	Total Coliforms	Chlorophyll a - LL	Comments
1	MQ01 R1 Comp	26.08	Sea water	X	X	X	X	X	X	X	X	X	Provide as much information about the sample as you can
2	MQ01 R2 Comp	↓		X	X	X	X	X	X	X	X	X	
3	MQ01 R3 Comp	↓		X	X	X	X	X	X	X	X	X	
4	MQ02 R1 Comp	26.08		X	X	X	X	X	X	X	X	X	
5	MQ02 R2 Comp	26.08		X	X	X	X	X	X	X	X	X	
6	MQ02 R3 Comp	|		X	X	X	X	X	X	X	X	X	
7	MQ03 R1 Comp	|		X	X	X	X	X	X	X	X	X	
8	MQ03 R2 Comp	|		X	X	X	X	X	X	X	X	X	
9	MQ03 R3 Comp	↓		X	X	X	X	X	X	X	X	X	
10	MQ04 R1 Comp	27.08		X	X	X	X	X	X	X	X	X	
11	MQ04 R2 Comp	↓		X	X	X	X	X	X	X	X	X	
12	MQ04 R3 Comp	↓		X	X	X	X	X	X	X	X	X	

* #4-#9 #13-#18

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only	
Print Name:	Sunira Reardon	ELS ADL KSpence	ELS Melb JS	Job number: MGH0404	Office Cooling: Ice / Ice pack / None
Date & Time:	26.08.25	27/8/25 KS	29/8/25 7:50	Temp Office: 12.0°C Temp Lab: 5.8	Lab Cooling: Ice / Ice pack / None
Signature:				TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

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Perth Lab - MPL Laboratories
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T 08 9317 2505 | lab@mpl.com.au

Melbourne Lab - Envirolab Services
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T 03 9763 2500 | melbourne@envirolab.com.au

Newcastle Lab - Envirolab Services
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T 02 4902 9231 | newcastle@envirolab.com.au

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T 08 7087 6800 | adelaide@envirolab.com.au

Brisbane Office - Envirolab Services
20a, 10-20 Depot St, Banyo, QLD 4014
T 07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820
T 08 8967 1201 | darwin@envirolab.com.au

Company:	SARDI
Contact Person:	Ian Moody
Project Mgr:	
Sampler:	Sunira Reardon / Alex Dobrovolskis
Address:	2 Hamra Ave, West Beach SA 5024
Phone:	Mobile:
Email Results to:	ian.moody@sa.gov.au
Email Invoice to:	ian.moody@sa.gov.au

Client Project Name/Number/Site etc (ie report title): **NWP Mullaquana Environmental Seasonal - August**

PO No. (if applicable):

Envirolab Quote No.: **25SA070v2**

Date results required:

Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day

Note: Inform lab in advance if urgent turnaround is required - surcharges apply

Additional report format: ☐ Esdat ☐ Equis

Lab Comments: Total Metals – Al, Sb, As, Ba, Be, B, Cd, Co, Cr, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Ag, Sr, Th, Tl, U, V, Zn + Silica

Sample Information				Tests Required																	Comments
Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	Combo 1M - Total	pH, EC, Salinity	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	TDS Grav	TOC	Total Coliforms	Chlorophyll a - LL									Provide as much information about the sample as you can
13	MQ05 R1 Comp	26.08	Sea water	X	X	X	X	X	X	X	X	X									
14	MQ05 R2 Comp	↓		X	X	X	X	X	X	X	X	X									
15	MQ05 R3 Comp			X	X	X	X	X	X	X	X	X									
16	MQ06 R1 Comp			X	X	X	X	X	X	X	X	X									
17	MQ06 R2 Comp			X	X	X	X	X	X	X	X	X									
18	MQ06 R3 Comp	↓		X	X	X	X	X	X	X	X	X									
19	MQ07 R1 Comp			X	X	X	X	X	X	X	X	X									
20	MQ07 R2 Comp			X	X	X	X	X	X	X	X	X									
21	MQ07 R3 Comp			X	X	X	X	X	X	X	X	X									
22	MQ08 R1 Comp			X	X	X	X	X	X	X	X	X									
23	MQ08 R2 Comp			X	X	X	X	X	X	X	X	X									
24	MQ08 R3 Comp			X	X	X	X	X	X	X	X	X									

☐ ***Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis***

Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only	
Print Name:	Sunira Reardon	ELS ADL Kspence		Job number: MGH0404	Office Cooling: Ice / Ice pack / None
Date & Time:	26.08.25	27/8/25 KS		Temp Office: 12.0°C Temp Lab:	Lab Cooling: Ice / Ice pack / None
Signature:				TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

* #4-#9
#13-#18

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National phone number 1300 424 344

Sydney Lab - Envirolab Services
12 Ashley St, Chatswood, NSW 2067
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Perth Lab - MPL Laboratories
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T 08 9317 2505 | lab@mpl.com.au

Melbourne Lab - Envirolab Services
25 Research Drive, Croydon South, VIC 3136
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Newcastle Lab - Envirolab Services
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T 02 4902 9231 | newcastle@envirolab.com.au

Adelaide Office - Envirolab Services
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Brisbane Office - Envirolab Services
20a. 10-20 Depot St, Banyo, QLD 4014
T 07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820
T 08 8967 1201 | darwin@envirolab.com.au

Company:	SARDI
Contact Person:	Ian Moody
Project Mgr:	
Sampler:	Sunira Reardon / Alex Dobrovolskis
Address:	2 Hamra Ave, West Beach SA 5024
Phone:	Mobile:
Email Results to:	ian.moody@sa.gov.au
Email Invoice to:	ian.moody@sa.gov.au

Client Project Name/Number/Site etc (ie report title): NWP Mullaquana Environmental Seasonal - August

PO No. (if applicable):

Envirolab Quote No. : 25SA070v2

Date results required:

Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day

Note: Inform lab in advance if urgent turnaround is required - surcharges apply

Additional report format: ☐ Esdat ☐ Equis

Lab Comments: Total Metals – Al, Sb, As, Ba, Be, B, Cd, Co, Cr, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Ag, Sr, Th, Tl, U, V, Zn + Silica

Sample information				Tests Required																	Comments
Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	Combo 1M - Total	pH, EC, Salinity	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	TDS Grav	TOC	Total Coliforms	Chlorophyll a - LL									Provide as much information about the sample as you can
25	MQ08 R1 Surface	27.08	Sea water	X	X	X	X	X	X	X	X	X									
26	MQ08 R2 Surface	↓		X	X	X	X	X	X	X	X	X									
27	MQ08 R3 Surface			X	X	X	X	X	X	X	X	X									
28	MQ08 R1 Bottom			X	X	X	X	X	X	X	X	X									
29	MQ08 R2 Bottom			X	X	X	X	X	X	X	X	X									
30	MQ08 R3 Bottom			X	X	X	X	X	X	X	X	X									
31	MQ09 R1 Comp			X	X	X	X	X	X	X	X	X									
32	MQ09 R2 Comp			X	X	X	X	X	X	X	X	X									
33	MQ09 R3 Comp	↓		X	X	X	X	X	X	X	X	X									

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only	
Print Name:	Sunira Reardon	EIS ADL KSpence		Job number: MGH0404	Office Cooling: Ice / Ice pack / None
Date & Time:	27.08.25	27/8/25 KS		Temp Office: 12.0°C Temp Lab:	Lab Cooling: Ice / Ice pack / None
Signature:				TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

(#4 - #9 #13 - #18) *

CHAIN OF CUSTODY FORM - Client

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ENVIROLAB GROUP
National phone number 1300 424 344
Sydney Lab - Envirolab Services
12 Ashley St, Chatswood, NSW 2067
T 02 9910 6200 | sydney@envirolab.com.au

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16-18 Hayden Crt, Myaree, WA 6154
T 08 9317 2505 | lab@mpl.com.au

Melbourne Lab - Envirolab Services
25 Research Drive, Croydon South, VIC 3136
T 03 9763 2500 | melbourne@envirolab.com.au

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92 Hill Street, Carrington Newcastle, NSW 2294
T 02 4902 9231 | newcastle@envirolab.com.au

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T 08 7087 6800 | adelaide@envirolab.com.au

Brisbane Office - Envirolab Services
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T 07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820

Company:	SARDI
Contact Person:	Ian Moody
Project Mgr:	
Sampler:	Alex Dobrovolskis & Sunny Reardon
Address:	2 Hamra Ave, West Beach SA 5024
Phone:	Mobile: 0425 146 583
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au
Email Invoice to:	ian.moody@sa.gov.au

Client Project Name/Number/Site etc (ie report title): NWP Mullaquana Monthly Sampling

PO No. (if applicable):

Envirolab Quote No. : 25SA070v2

Date results required:

Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day

Note: Inform lab in advance if urgent turnaround is required - surcharges apply

Additional report format: ☐ Esdat ☐ Equis

Lab Comments: no charge for freight (accounted for on MGJ0140) KS ECS ADL

Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms	Comments
1	MQ01 R1 Comp	9/10/25	Sea water	X	X	X	X	X	X	
2	MQ01 R2 Comp	↓		X	X	X	X	X	X	
3	MQ01 R3 Comp	↓		X	X	X	X	X	X	
4	MQ02 R1 Comp	8/10/25		X	X	X	X	X	X	
5	MQ02 R2 Comp	↓		X	X	X	X	X	X	
6	MQ02 R3 Comp	↓		X	X	X	X	X	X	
7	MQ03 R1 Comp	↓		X	X	X	X	X	X	
8	MQ03 R2 Comp	↓		X	X	X	X	X	X	
9	MQ03 R3 Comp	↓		X	X	X	X	X	X	
10	MQ04 R1 Comp	9/10/25		X	X	X	X	X	X	
11	MQ04 R2 Comp	↓		X	X	X	X	X	X	
12	MQ04 R3 Comp	↓		X	X	X	X	X	X	

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory
Print Name:	Sunira Reardon	ECS ADL Kspence	ECS-BV
Date & Time:	8/10/25	~~9/10/25~~ 9/10/25	0905 13/10/25
Signature:	~~[illegible]~~	KS 3:15pm	VW

Lab Use Only

Job number: MGJ0141 — Office Cooling: Ice / Ice pack / None

Temp Office: 15-1°C Temp Lab: 12.2-4 — Lab Cooling: Ice / Ice pack / None

TAT: SAME day / 1 / 2 / 3 / 4 / STD — Security seal: Intact / Broken / None

Received & relinq KS of ECS ADL 10/10/25 11.15am 14-8°C icepack

#1-#3
#10-#12
#14-#33

#4-#9
#13-#18

CHAIN OF CUSTODY FORM - Client

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Sydney Lab - Envirolab Services
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: 07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820

Company:	SARDI
Contact Person:	Ian Moody
Project Mgr:	
Sampler:	Alex Dobrovolskis & Sunny Reardon
Address:	2 Hamra Ave, West Beach SA 5024
Phone:	Mobile: 0425 146 583
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au
Email Invoice to:	ian.moody@sa.gov.au

Client Project Name/Number/Site etc (ie report title): **NWP Mullaquana Monthly Sampling**

PO No. (if applicable):

Envirolab Quote No.: 25SA070v2

Date results required:

Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day

Note Inform lab in advance if urgent turnaround is required - surcharges apply

Additional report format: Esdat Equis

Lab Comments:

Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms	Comments
13	MQ05 R1 Comp	8/10/25	Sea water	X	X	X	X	X	X	
14	MQ05 R2 Comp	↓		X	X	X	X	X	X	
15	MQ05 R3 Comp	↓		X	X	X	X	X	X	
16	MQ06 R1 Comp	8/10/25		X	X	X	X	X	X	
17	MQ06 R2 Comp	↓		X	X	X	X	X	X	
18	MQ06 R3 Comp	↓		X	X	X	X	X	X	
19	MQ07 R1 Comp	9/10/25		X	X	X	X	X	X	
20	MQ07 R2 Comp			X	X	X	X	X	X	
21	MQ07 R3 Comp			X	X	X	X	X	X	
22	MQ08 R1 Comp			X	X	X	X	X	X	
23	MQ08 R2 Comp			X	X	X	X	X	X	
24	MQ08 R3 Comp	↓		X	X	X	X	X	X	

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory
Print Name:	Sunira Reardon	ECS ADL KSpence	
Date & Time:	8/10/25	9/10/25 3.15pm KS	
Signature:			

Lab Use Only

Job number: MGJ0141	Office Cooling: Ice / Ice pack / None
Temp Office: 15.1°C Temp Lab:	Lab Cooling: Ice / Ice pack / None
TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

(#4 - #9)
(#13 - #18)

Received & veling #1-#3
KS of ECS ADL #10-#12
10/10/25 11.15am #19-#33
14.8°C icepack

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Sydney Lab - Envirolab Services
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: 08 9317 2505 | lab@mpl.com.au

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: 07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820

Company:	SARDI
Contact Person:	Ian Moody
Project Mgr:	
Sampler:	Alex Dobrovolskis & Sunny Reardon
Address:	2 Hamra Ave, West Beach SA 5024
Phone:	Mobile: 0425 146 583
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au
Email Invoice to:	ian.moody@sa.gov.au

Client Project Name/Number/Site etc (ie report title): **NWP Mullaquana Monthly Sampling**

PO No. (if applicable):

Envirolab Quote No.: 25SA070v2

Date results required:

Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day

Note. Inform lab in advance if urgent turnaround is required - surcharges apply

Additional report format: ☐ Esdat ☐ Equis

Lab Comments:

Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms	Comments
25	MQ08 R1 Surface	9/10/25	Sea water	X	X	X	X	X	X	
26	MQ08 R2 Surface			X	X	X	X	X	X	
27	MQ08 R3 Surface			X	X	X	X	X	X	
28	MQ08 R1 Bottom			X	X	X	X	X	X	
29	MQ08 R2 Bottom			X	X	X	X	X	X	
30	MQ08 R3 Bottom			X	X	X	X	X	X	
31	MQ09 R1 Comp			X	X	X	X	X	X	
32	MQ09 R2 Comp			X	X	X	X	X	X	
33	MQ09 R3 Comp			X	X	X	X	X	X	

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory
Print Name:	Sunira Reardon	ELS ADL KSpence	
Date & Time:	9/10/25	9/10/25 3:15pm KS	
Signature:			

Lab Use Only

Job number: MGJ0141	Office Cooling: Ice / (Ice pack) / None
Temp Office: 15.1°C Temp Lab:	Lab Cooling: Ice / Ice pack / None
TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

(#4 - #9
#13 - #18)

Received & veling KS of ELS ADL 10/10/25 11.15am 14.8°C icepack
#1 - #3
#10 - #12
#19 - #33

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Sydney Lab - Envirolab Services
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16-18 Hayden Crt, Myaree, WA 6154
T 08 9317 2505 | lab@mpl.com.au

Melbourne Lab - Envirolab Services
25 Research Drive, Croydon South, VIC 3136
T 03 9763 2500 | melbourne@envirolab.com.au

Newcastle Lab - Envirolab Services
92 Hill Street, Carrington Newcastle, NSW 2294
T 02 4502 9231 | newcastle@envirolab.com.au

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T 07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820

Company:	SARDI	Client Project Name/Number/Site etc (ie report title):	NWP Mullaquana Monthly Sampling
Contact Person:	Ian Moody	PO No. (If applicable):	
Project Mgr:		Envirolab Quote No.:	25SA070v2
Sampler:	Alex Dobrovolskis & Sunny Reardon	Date results required:	
Address:	2 Hamra Ave, West Beach SA 5024	Or choose:	☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day
Phone:	Mobile: 0425 146 583	Note: Inform lab in advance if urgent turnaround is required - surcharges apply	
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au	Additional report format:	Esdat / Equis
Email Invoice to:	ian.moody@sa.gov.au	Lab Comments	

Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms	Comments
1	MQ01 R1 Comp	9/10/25	Sea water	X	X	X	X	X	X	
2	MQ01 R2 Comp	↓		X	X	X	X	X	X	
3	MQ01 R3 Comp			X	X	X	X	X	X	
4	MQ02 R1 Comp	8/10/25		X	X	X	X	X	X	
5	MQ02 R2 Comp			X	X	X	X	X	X	
6	MQ02 R3 Comp			X	X	X	X	X	X	
7	MQ03 R1 Comp			X	X	X	X	X	X	
8	MQ03 R2 Comp			X	X	X	X	X	X	
9	MQ03 R3 Comp	↓		X	X	X	X	X	X	
10	MQ04 R1 Comp	9/10/25		X	X	X	X	X	X	
11	MQ04 R2 Comp	↓		X	X	X	X	X	X	
12	MQ04 R3 Comp	↓		X	X	X	X	X	X	

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only
Print Name:	Sunira Reardon	ELS ADL Kspence	ELS-KW	Job number: MGJ0141
Date & Time:	8/10/25	~~9/10/25~~ 9/10/25	0355 10/10/25	Temp Office: 15.1°C Temp Lab: 14.6°
Signature:		KS 3:15pm	KW	TAT: SAME day / 1 / 2 / 3 / 4 / STD
				Office Cooling: Ice / Ice pack / None
				Lab Cooling: Ice / Ice pack / None
				Security seal: Intact / Broken / None

#4 - #9
#13 - #18

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ENVIROLAB GROUP
National phone number 1300 424 344

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Perth Lab - MPL Laboratories
16-18 Hayden Crt, Myaree, WA 6154
: 08 9317 2505 | lab@mpl.com.au

Melbourne Lab - Envirolab Services
25 Research Drive, Croydon South, VIC 3136
: 03 9763 2500 | melbourne@envirolab.com.au

Newcastle Lab - Envirolab Services
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: 07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820

Company:	SARDI	Client Project Name/Number/Site etc (ie report title):	NWP Mullaquana Monthly Sampling
Contact Person:	Ian Moody	PO No. (if applicable):	
Project Mgr:		Envirolab Quote No.:	25SA070v2
Sampler:	Alex Dobrovolskis & Sunny Reardon	Date results required:	Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day
Address:	2 Hamra Ave, West Beach SA 5024	Note: Inform lab in advance if urgent turnaround is required - surcharges apply	
Phone:	Mobile: 0425 146 583	Additional report format:	Esdat / Equis
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au	Lab Comments:	
Email Invoice to:	ian.moody@sa.gov.au		

Sample Information				Tests Required							Comments
Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms		
13	MQ05 R1 Comp	8/10/25	Sea water	X	X	X	X	X	X		
14	MQ05 R2 Comp	↓		X	X	X	X	X	X		
15	MQ05 R3 Comp	↓		X	X	X	X	X	X		
16	MQ06 R1 Comp	8/10/25		X	X	X	X	X	X		
17	MQ06 R2 Comp	↓		X	X	X	X	X	X		
18	MQ06 R3 Comp	↓		X	X	X	X	X	X		
19	MQ07 R1 Comp	9/10/25		X	X	X	X	X	X		
20	MQ07 R2 Comp	↓		X	X	X	X	X	X		
21	MQ07 R3 Comp	↓		X	X	X	X	X	X		
22	MQ08 R1 Comp	↓		X	X	X	X	X	X		
23	MQ08 R2 Comp	↓		X	X	X	X	X	X		
24	MQ08 R3 Comp	↓		X	X	X	X	X	X		

☐ Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis

	Client	Interstate Office	Laboratory	Lab Use Only	
Relinquished by					
Print Name:	Sunira Reardon	ELS ADL Esperance		Job number: MGJ0141	Office Cooling: Ice / Ice pack / None
Date & Time:	8/10/25	9/10/25 3:15pm		Temp Office: 15.1°C Temp Lab:	Lab Cooling: Ice / Ice pack / None
Signature:		ES		TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

(#4-#9)
(#13-#18)

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Melbourne Lab - Envirolab Services
25 Research Drive, Croydon South, VIC 3136
: 03 9763 2500 | melbourne@envirolab.com.au

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92 Hill Street, Carrington Newcastle, NSW 2294
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: 07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820

Company:	SARDI	Client Project Name/Number/Site etc (ie report title):	NWP Mullaquana Monthly Sampling
Contact Person:	Ian Moody	PO No. (if applicable):	
Project Mgr:		Envirolab Quote No. :	25SA070v2
Sampler:	Alex Dobrovolskis & Sunny Reardon	Date results required:	Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day
Address:	2 Hamra Ave, West Beach SA 5024	Note. Inform lab in advance if urgent turnaround is required - surcharges apply	
Phone:	Mobile: 0425 146 583	Additional report format:	Esdat / Equis
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au	Lab Comments:	
Email Invoice to:	Ian.moody@sa.gov.au		

Sample Information				Tests Required																	Comments
Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms												
25	MQ08 R1 Surface	9/10/25	Sea water	X	X	X	X	X	X												
26	MQ08 R2 Surface			X	X	X	X	X	X												
27	MQ08 R3 Surface			X	X	X	X	X	X												
28	MQ08 R1 Bottom			X	X	X	X	X	X												
29	MQ08 R2 Bottom			X	X	X	X	X	X												
30	MQ08 R3 Bottom			X	X	X	X	X	X												
31	MQ09 R1 Comp			X	X	X	X	X	X												
32	MQ09 R2 Comp			X	X	X	X	X	X												
33	MQ09 R3 Comp			X	X	X	X	X	X												

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only	
Print Name:	Sunira Reardon	ECS ADL KSpence		Job number: MGJ0141	Office Cooling: Ice / Ice pack / None
Date & Time:	9/10/25	9/10/25 3:15pm KS		Temp Office: 15-17 Temp Lab:	Lab Cooling: Ice / Ice pack / None
Signature:				TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

(#4 - #9
#13 - #18)

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Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820

Company:	SARDI
Contact Person:	Ian Moody
Project Mgr:	
Sampler:	Alex Dobrovolskis & Sunny Reardon
Address:	2 Hamra Ave, West Beach SA 5024
Phone:	Mobile: 0425 146 583
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au
Email Invoice to:	ian.moody@sa.gov.au

Client Project Name/Number/Site etc (le report title): **NWP Mullaquana Monthly Sampling**

PO No. (If applicable):

Envirolab Quote No.: 25SA070v2

Date results required:

Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day

Note: Inform lab in advance if urgent turnaround is required - surcharges apply

Additional report format: ☐ Esdat ☐ Equis

Lab Comments: No charge for freight- accounted for on the Engineering job.

Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms											Comments
				Tests Required																
1	MQ01 R1 Comp		Sea water	X	X	X	X	X	X											
2	MQ01 R2 Comp			X	X	X	X	X	X											
3	MQ01 R3 Comp			X	X	X	X	X	X											
4	MQ02 R1 Comp	5/11/25		X	X	X	X	X	X											
5	MQ02 R2 Comp	"		X	X	X	X	X	X											
6	MQ02 R3 Comp	"		X	X	X	X	X	X											
7	MQ03 R1 Comp	"		X	X	X	X	X	X											
8	MQ03 R2 Comp	"		X	X	X	X	X	X											
9	MQ03 R3 Comp	"		X	X	X	X	X	X											
10	MQ04 R1 Comp			X	X	X	X	X	X											
11	MQ04 R2 Comp			X	X	X	X	X	X											
12	MQ04 R3 Comp			X	X	X	X	X	X											

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

	Client	Interstate Office	Laboratory
Relinquished by		ELS ADL OD	ELS Melb
Print Name:		6/11/25 10 am	8:40am 7/11/25
Date & Time:		OD	AG
Signature:			

Lab Use Only

Job number: MGK0036

Temp Office: Temp Lab: 12.8°C

TAT: SAME day / 1 / 2 / 3 / 4 / STD

Office Cooling: Ice / Ice pack / None

Lab Cooling: Ice / Ice pack / None

Security seal: Intact / Broken / None

CHAIN OF CUSTODY FORM - Client

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National phone number 1300 424 344

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08 9317 2505 | lab@mpl.com.au

Melbourne Lab - Envirolab Services
25 Research Drive, Croydon South, VIC 3136
03 9763 2500 | melbourne@envirolab.com.au

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92 Hill Street, Carrington Newcastle, NSW 2294
02 4902 9231 | newcastle@envirolab.com.au

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20a, 10-20 Depot St, Banyo, QLD 4014
07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820

Company:	SARDI	Client Project Name/Number/Site etc (ie report title):	NWP Mullaquana Monthly Sampling
Contact Person:	Ian Moody	PO No. (If applicable):	
Project Mgr:		Envirolab Quote No.:	25SA070v2
Sampler:	Alex Dobrovolskis & Sunny Reardon	Date results required:	Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day
Address:	2 Hamra Ave, West Beach SA 5024	Note: Inform lab in advance if urgent turnaround is required - surcharges apply	
Phone:	Mobile: 0425 146 583	Additional report format:	Esdat / Equis
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au	Lab Comments: No charge for freight- accounted for on the Engineering job.	
Email Invoice to:	ian.moody@sa.gov.au		

Sample information				Tests Required																		Comments
Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms													
13	MQ05 R1 Comp	5/11/25	Sea water	X	X	X	X	X	X													
14	MQ05 R2 Comp	"		X	X	X	X	X	X													
15	MQ05 R3 Comp	"		X	X	X	X	X	X													
16	MQ06 R1 Comp	5/11/25		X	X	X	X	X	X													
17	MQ06 R2 Comp	"		X	X	X	X	X	X													
18	MQ06 R3 Comp	"		X	X	X	X	X	X													
19	MQ07 R1 Comp			X	X	X	X	X	X													
20	MQ07 R2 Comp			X	X	X	X	X	X													
21	MQ07 R3 Comp			X	X	X	X	X	X													
22	MQ08 R1 Comp			X	X	X	X	X	X													
23	MQ08 R2 Comp			X	X	X	X	X	X													
24	MQ08 R3 Comp			X	X	X	X	X	X													

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory
Print Name:	Sunira Reardon		
Date & Time:	5/11/25		
Signature:			

Lab Use Only

Job number: M6K0036	Office Cooling: Ice / Ice pack / None
Temp Office: 14.4° Temp Lab:	Lab Cooling: Ice / Ice pack / None
TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

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Sydney Lab - Envirolab Services
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Perth Lab - MPL Laboratories
16-18 Hayden Crt, Myaree, WA 6154
T: 08 9317 2505 | lab@mpl.com.au

Melbourne Lab - Envirolab Services
25 Research Drive, Croydon South, VIC 3136
T: 03 9763 2500 | melbourne@envirolab.com.au

Newcastle Lab - Envirolab Services
92 Hill Street, Carrington Newcastle, NSW 2294
T: 02 4902 9231 | newcastle@envirolab.com.au

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T: 08 7087 6800 | adelaide@envirolab.com.au

Brisbane Office - Envirolab Services
20a, 10-20 Depot St, Banyo, QLD 4014
T: 07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820

Company:	SARDI	**Client Project Name/Number/Site etc (ie report title):**	NWP Mullaquana Monthly Sampling
Contact Person:	Ian Moody	**PO No. (if applicable):**	
Project Mgr:		**Envirolab Quote No.:**	25SA070v2
Sampler:	Alex Dobrovolskis & Sunny Reardon	**Date results required:**	Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day
Address:	2 Hamra Ave, West Beach SA 5024	*Note: Inform lab in advance if urgent turnaround is required - surcharges apply*	
Phone:	**Mobile:** 0425 146 583	**Additional report format:**	Esdat / Equis
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au	**Lab Comments:** No charge for freight- accounted for on the Engineering job.	
Email Invoice to:	ian.moody@sa.gov.au		

Sample information				Tests Required																Comments
Envirolab Sample ID (Lab use only)	Client Sample ID or information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms											
25	MQ08 R1 Surface	6/11/25	Sea water	X	X	X	X	X	X											
26	MQ08 R2 Surface	"		X	X	X	X	X	X											
27	MQ08 R3 Surface	"		X	X	X	X	X	X											
28	MQ08 R1 Bottom	"		X	X	X	X	X	X											
29	MQ08 R2 Bottom	"		X	X	X	X	X	X											
30	MQ08 R3 Bottom	"		X	X	X	X	X	X											
31	MQ09 R1 Comp	"		X	X	X	X	X	X											
32	MQ09 R2 Comp	"		X	X	X	X	X	X											
33	MQ09 R3 Comp	"		X	X	X	X	X	X											

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only	
Print Name:		ELS ADC OD		Job number: MGK0036	Office Cooling: Ice / Ice pack / None
Date & Time:		7/11/25 10:30am		Temp Office: 15.6°C Temp Lab:	Lab Cooling: Ice / Ice pack / None
Signature:		OD-		TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

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Melbourne Lab - Envirolab Services
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03 9763 2500 | melbourne@envirolab.com.au

Newcastle Lab - Envirolab Services
92 Hill Street, Carrington Newcastle, NSW 2294
02 4902 9231 | newcastle@envirolab.com.au

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07 3266 9632 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820

Company:	SARDI
Contact Person:	Ian Moody
Project Mgr:	
Sampler:	Sunira Reardon / Alex Dobrovolskis
Address:	2 Hamra Ave, West Beach SA 5024
Phone:	Mobile:
Email Results to:	ian.moody@sa.gov.au
Email Invoice to:	ian.moody@sa.gov.au

Client Project Name/Number/Site etc (ie report title): **NWP Mullaquana Environmental Seasonal - December**

PO No. (If applicable):

Envirolab Quote No.: **25SA070v2**

Date results required:

Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day

Note: Inform lab in advance if urgent turnaround is required - surcharges apply

Additional report format: ☐ Esdat ☐ Equis

Lab Comments: Total Metals – Al, Sb, As, Ba, Be, B, Cd, Co, Cr, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Ag, Sr, Th, Tl, U, V, Zn + Silica (low level) Intertek ICPMS QQQ
No charge for freight- accounted for on the Engineering job.

Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	Combo 1M - Total	pH, EC, Salinity	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	TDS Grav	TOC	Total Coliforms	Chlorophyll a - LL								Comments
				Tests Required																Provide as much information about the sample as you can
1	MQ01 R1 Comp	3/12/25	Sea water	X	X	X	X	X	X	X	X	X								
2	MQ01 R2 Comp	"		X	X	X	X	X	X	X	X	X								
3	MQ01 R3 Comp	"		X	X	X	X	X	X	X	X	X								
4	MQ02 R1 Comp	2/12/25		X	X	X	X	X	X	X	X	X								
5	MQ02 R2 Comp	"		X	X	X	X	X	X	X	X	X								
6	MQ02 R3 Comp	"		X	X	X	X	X	X	X	X	X								
7	MQ03 R1 Comp	"		X	X	X	X	X	X	X	X	X								
8	MQ03 R2 Comp	"		X	X	X	X	X	X	X	X	X								
9	MQ03 R3 Comp	"		X	X	X	X	X	X	X	X	X								
10	MQ04 R1 Comp	3/12/25		X	X	X	X	X	X	X	X	X								
11	MQ04 R2 Comp	"		X	X	X	X	X	X	X	X	X								
12	MQ04 R3 Comp	"		X	X	X	X	X	X	X	X	X								

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory
Print Name:	Sunira Reardon	ELS ADL OO	EL Melb JJ
Date & Time:	2/12/25	3/12/25 10.15am	4/12/25 9:10am
Signature:		OP -	JS

Lab Use Only

Job number: MGL0020	Office Cooling: Ice / Ice pack / None
Temp Office: 16.1°C Temp Lab: 13.2	Lab Cooling: Ice / Ice pack / None
TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

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08 9317 2505 | lab@mpl.com.au

Melbourne Lab - Envirolab Services
25 Research Drive, Croydon South, VIC 3136
03 9763 2500 | melbourne@envirolab.com.au

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92 Hill Street, Carrington Newcastle, NSW 2294
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Adelaide Office - Envirolab Services
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Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820
08 8967 1201 | darwin@envirolab.com.au

Company:	SARDI
Contact Person:	Ian Moody
Project Mgr:	
Sampler:	Sunira Reardon / Alex Dobrovolskis
Address:	2 Hamra Ave, West Beach SA 5024
Phone:	Mobile:
Email Results to:	ian.moody@sa.gov.au
Email Invoice to:	ian.moody@sa.gov.au

Client Project Name/Number/Site etc (ie report title): NWP Mullaquana Environmental Seasonal - December

PO No. (if applicable):

Envirolab Quote No. : 25SA070v2

Date results required:

Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day

Note: Inform lab in advance if urgent turnaround is required - surcharges apply

Additional report format: ☐ Esdat ☐ Equis

Lab Comments: Total Metals – Al, Sb, As, Ba, Be, B, Cd, Co, Cr, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Ag, Sr, Th, Tl, U, V, Zn + Silica (low level) Intertek ICPMS QQQ
No charge for freight- accounted for on the Engineering job.

Sample information				Tests Required																Comments
Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	Combo 1M - Total	pH, EC, Salinity	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	TDS Grav	TOC	Total Coliforms	Chlorophyll a - LL								Provide as much information about the sample as you can
13	MQ05 R1 Comp	2/12/25	Sea water	X	X	X	X	X	X	X	X	X								
14	MQ05 R2 Comp	"		X	X	X	X	X	X	X	X	X								
15	MQ05 R3 Comp	"		X	X	X	X	X	X	X	X	X								
16	MQ06 R1 Comp	"		X	X	X	X	X	X	X	X	X								
17	MQ06 R2 Comp	"		X	X	X	X	X	X	X	X	X								
18	MQ06 R3 Comp	"		X	X	X	X	X	X	X	X	X								
19	MQ07 R1 Comp	3/12/25		X	X	X	X	X	X	X	X	X								
20	MQ07 R2 Comp	"		X	X	X	X	X	X	X	X	X								
21	MQ07 R3 Comp	"		X	X	X	X	X	X	X	X	X								
22	MQ08 R1 Comp	"		X	X	X	X	X	X	X	X	X								
23	MQ08 R2 Comp	"		X	X	X	X	X	X	X	X	X								
24	MQ08 R3 Comp	"		X	X	X	X	X	X	X	X	X								

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory
Print Name:	Sunira Reardon	ELS ADL OD	
Date & Time:	2/12/25	3/12/25 10.15am	
Signature:		OD.	

Lab Use Only

Job number: MGL0020 — Office Cooling: Ice / Ice pack / None

Temp Office: 16.1°C Temp Lab: — Lab Cooling: Ice / Ice pack / None

TAT: SAME day / 1 / 2 / 3 / 4 / STD — Security seal: Intact / Broken / None

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Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820
T 08 8967 1201 | darwin@envirolab.com.au

Company:	SARDI
Contact Person:	Ian Moody
Project Mgr:	
Sampler:	Sunira Reardon / Alex Dobrovolskis
Address:	2 Hamra Ave, West Beach SA 5024
Phone:	Mobile:
Email Results to:	ian.moody@sa.gov.au
Email Invoice to:	ian.moody@sa.gov.au

Client Project Name/Number/Site etc (ie report title): **NWP Mullaquana Environmental Seasonal - December**

PO No. (if applicable):

Envirolab Quote No. : **25SA070v2**

Date results required:

Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day

Note: Inform lab in advance if urgent turnaround is required - surcharges apply

Additional report format: Esdat Equis

Lab Comments: **Total Metals** – Al, Sb, As, Ba, Be, B, Cd, Co, Cr, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Ag, Sr, Th, Tl, U, V, Zn + Silica **(low level) Intertek ICPMS QQQ**
No charge for freight- accounted for on the Engineering job.

Sample information				Tests Required																	Comments
Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	Combo 1M - Total	pH, EC, Salinity	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	TDS Grav	TOC	Total Coliforms	Chlorophyll a - LL									Provide as much information about the sample as you can
25	MQ08 R1 Surface	"	Sea water	X	X	X	X	X	X	X	X	X									
26	MQ08 R2 Surface	"		X	X	X	X	X	X	X	X	X									
27	MQ08 R3 Surface	"		X	X	X	X	X	X	X	X	X									
28	MQ08 R1 Bottom	"		X	X	X	X	X	X	X	X	X									
29	MQ08 R2 Bottom	"		X	X	X	X	X	X	X	X	X									
30	MQ08 R3 Bottom	"		X	X	X	X	X	X	X	X	X									
31	MQ09 R1 Comp	"		X	X	X	X	X	X	X	X	X									
32	MQ09 R2 Comp	"		X	X	X	X	X	X	X	X	X									
33	MQ09 R3 Comp	"		X	X	X	X	X	X	X	X	X									

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory
Print Name:		ELS ADL OD	
Date & Time:		4/12/25 11am	
Signature:		OP-	

Lab Use Only

Job number:	Office Cooling: Ice / Ice pack / None
Temp Office: 16 Temp Lab:	Lab Cooling: Ice / Ice pack / None
TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

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Brisbane Office - Envirolab Services
20a, 10-20 Depot St, Banyo, QLD 4014
07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services

Company:	SARDI
Contact Person:	Ian Moody
Project Mgr:	
Sampler:	Alex Dobrovolskis & Sunny Reardon
Address:	2 Hamra Ave, West Beach SA 5024
Phone:	Mobile: 0425 146 583
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au
Email Invoice to:	ian.moody@sa.gov.au

Client Project Name/Number/Site etc (ie report title): **NWP Mullaquana Monthly Sampling**

PO No. (if applicable):

Envirolab Quote No.: **25SA070v2**

Date results required:

Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day

Note: Inform lab in advance if urgent turnaround is required - surcharges apply

Additional report format: ☐ Esdat ☐ Equis

Lab Comments: No charge for freight- accounted for on the Engineering job.

Sample information

Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms											Comments
1	MQ01 R1 Comp	13/01/2026	Sea water	X	X	X	X	X	X											
2	MQ01 R2 Comp	13/01/2026		X	X	X	X	X	X											
3	MQ01 R3 Comp	13/01/2026		X	X	X	X	X	X											
4	MQ02 R1 Comp	12/01/2026		X	X	X	X	X	X											
5	MQ02 R2 Comp	12/01/2026		X	X	X	X	X	X											
6	MQ02 R3 Comp	12/01/2026		X	X	X	X	X	X											
7	MQ03 R1 Comp	12/01/2026		X	X	X	X	X	X											
8	MQ03 R2 Comp	12/01/2026		X	X	X	X	X	X											
9	MQ03 R3 Comp	12/01/2026		X	X	X	X	X	X											
10	MQ04 R1 Comp	13/01/2026		X	X	X	X	X	X											
11	MQ04 R2 Comp	13/01/2026		X	X	X	X	X	X											
12	MQ04 R3 Comp	13/01/2026		X	X	X	X	X	X											

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory
Print Name:	Sunira Reardon	ELS ADL	ELS Melb
Date & Time:	12/01/2026 0:00	13/1/26 12:30pm	14/01/26
Signature:	SR	OP-	JJ

Lab Use Only

Job number: MHA0063	Office Cooling: Ice / Ice pack / None
Temp Office: 9.2°C Temp Lab: 17.0°C	Lab Cooling: Ice / Ice pack / None
TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

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National phone number 1300 424 344
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07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services

Company:	SARDI	Client Project Name/Number/Site etc (ie report title):	NWP Mullaquana Monthly Sampling
Contact Person:	Ian Moody	PO No. (if applicable):	
Project Mgr:		Envirolab Quote No. :	25SA070v2
Sampler:	Alex Dobrovolskis & Sunny Reardon	Date results required:	Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day
Address:	2 Hamra Ave, West Beach SA 5024		Note: Inform lab in advance if urgent turnaround is required - surcharges apply
Phone:	Mobile: 0425 146 583	Additional report format:	☐ Esdat ☐ Equis
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au	Lab Comments: No charge for freight- accounted for on the Engineering job.	
Email Invoice to:	ian.moody@sa.gov.au		

Sample information				Tests Required							Comments
Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms		
13	MQ05 R1 Comp	12/01/2026	Sea water	X	X	X	X	X	X		
14	MQ05 R2 Comp	12/01/2026		X	X	X	X	X	X		
15	MQ05 R3 Comp	12/01/2026		X	X	X	X	X	X		
16	MQ06 R1 Comp	12/01/2026		X	X	X	X	X	X		
17	MQ06 R2 Comp	12/01/2026		X	X	X	X	X	X		
18	MQ06 R3 Comp	12/01/2026		X	X	X	X	X	X		
19	MQ07 R1 Comp	13/01/2026		X	X	X	X	X	X		
20	MQ07 R2 Comp	13/01/2026		X	X	X	X	X	X		
21	MQ07 R3 Comp	13/01/2026		X	X	X	X	X	X		
22	MQ08 R1 Comp	13/01/2026		X	X	X	X	X	X		
23	MQ08 R2 Comp	13/01/2026		X	X	X	X	X	X		
24	MQ08 R3 Comp	13/01/2026		X	X	X	X	X	X		

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only	
Print Name:	Sunira Reardon	ELS ADL		Job number:	Office Cooling: Ice / Ice pack / None
Date & Time:	12/01/2026 0:00	13/1/26 12-30pm OD.		Temp Office: 19-20°C Temp Lab:	Lab Cooling: Ice / Ice pack / None
Signature:	SR			TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

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07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services

Company:	SARDI	Client Project Name/Number/Site etc (ie report title):	NWP Mullaquana Monthly Sampling
Contact Person:	Ian Moody	PO No. (if applicable):	
Project Mgr:		Envirolab Quote No.:	25SA070v2
Sampler:	Alex Dobrovolskis & Sunny Reardon	Date results required:	Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day
Address:	2 Hamra Ave, West Beach SA 5024		
Phone:	Mobile: 0425 146 583		*Note: Inform lab in advance if urgent turnaround is required - surcharges apply*
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au	Additional report format:	☐ Esdat ☐ Equis
Email Invoice to:	ian.moody@sa.gov.au	Lab Comments:	No charge for freight- accounted for on the Engineering job.

Sample information				Tests Required																Comments
Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms											
25	MQ08 R1 Surface	13/01/2026	Sea water	X	X	X	X	X	X											
26	MQ08 R2 Surface	13/01/2026		X	X	X	X	X	X											
27	MQ08 R3 Surface	13/01/2026		X	X	X	X	X	X											
28	MQ08 R1 Bottom	13/01/2026		X	X	X	X	X	X											
29	MQ08 R2 Bottom	13/01/2026		X	X	X	X	X	X											
30	MQ08 R3 Bottom	13/01/2026		X	X	X	X	X	X											
31	MQ09 R1 Comp	13/01/2026		X	X	X	X	X	X											
32	MQ09 R2 Comp	13/01/2026		X	X	X	X	X	X											
33	MQ09 R3 Comp	13/01/2026		X	X	X	X	X	X											

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only	
Print Name:	Sunira Reardon	ADL ELS		Job number:	Office Cooling: Ice / Ice pack / None
Date & Time:	13/01/2026 0:00	14/1/26 2pm		Temp Office: 19-20° Temp Lab:	Lab Cooling: Ice / Ice pack / None
Signature:	SR	OD.		TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

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Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820

Company:	SARDI	Client Project Name/Number/Site etc (ie report title):	NWP Mullaquana Monthly Sampling
Contact Person:	Ian Moody	PO No. (if applicable):	
Project Mgr:		Envirolab Quote No.:	25SA070v2
Sampler:	Alex Dobrovolskis & Sunny Reardon	Date results required:	
Address:	2 Hamra Ave, West Beach SA 5024	Or choose:	☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day
Phone:	Mobile: 0425 146 583	Note: Inform lab in advance if urgent turnaround is required - surcharges apply	
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au	Additional report format:	☐ Esdat ☐ Equis
Email Invoice to:	ian.moody@sa.gov.au	Lab Comments: No charge for freight- accounted for on the Engineering job.	

Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms	Comments
1	MQ01 R1 Comp		Sea water	X	X	X	X	X	X	
2	MQ01 R2 Comp			X	X	X	X	X	X	
3	MQ01 R3 Comp			X	X	X	X	X	X	
- 4	MQ02 R1 Comp	12/01/2026		X	X	X	X	X	X	
- 5	MQ02 R2 Comp	12/01/2026		X	X	X	X	X	X	
- 6	MQ02 R3 Comp	12/01/2026		X	X	X	X	X	X	
- 7	MQ03 R1 Comp	12/01/2026		X	X	X	X	X	X	
- 8	MQ03 R2 Comp	12/01/2026		X	X	X	X	X	X	
- 9	MQ03 R3 Comp	12/01/2026		X	X	X	X	X	X	
10	MQ04 R1 Comp			X	X	X	X	X	X	
11	MQ04 R2 Comp			X	X	X	X	X	X	
12	MQ04 R3 Comp			X	X	X	X	X	X	

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only	
Print Name:	Sunira Reardon	ELS ADL	ELS-KW	Job number: MHA0063	Office Cooling: Ice / Ice pack / None
Date & Time:	12/01/2026 0:00	13/1/26 12:30pm	0820 14/1/26	Temp Office: 19.2°C Temp Lab: 17.0°C	Lab Cooling: Ice / Ice pack / None
Signature:	SR	OD.	KW	TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

- = Received 14/1/26 KW.

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Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820

Company:	SARDI	Client Project Name/Number/Site etc (ie report title):	NWP Mullaquana Monthly Sampling
Contact Person:	Ian Moody	PO No. (if applicable):	
Project Mgr:		Envirolab Quote No. :	25SA070v2
Sampler:	Alex Dobrovolskis & Sunny Reardon	Date results required:	Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day
Address:	2 Hamra Ave, West Beach SA 5024	Note: Inform lab in advance if urgent turnaround is required - surcharges apply	
Phone:	Mobile: 0425 146 583	Additional report format:	Esdat / Equis
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au	Lab Comments: No charge for freight- accounted for on the Engineering job.	
Email Invoice to:	ian.moody@sa.gov.au		

Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms	Comments
13	MQ05 R1 Comp	12/01/2026	Sea water	X	X	X	X	X	X	
14	MQ05 R2 Comp	12/01/2026		X	X	X	X	X	X	
15	MQ05 R3 Comp	12/01/2026		X	X	X	X	X	X	
16	MQ06 R1 Comp	12/01/2026		X	X	X	X	X	X	
17	MQ06 R2 Comp	12/01/2026		X	X	X	X	X	X	
18	MQ06 R3 Comp	12/01/2026		X	X	X	X	X	X	
19	MQ07 R1 Comp			X	X	X	X	X	X	
20	MQ07 R2 Comp			X	X	X	X	X	X	
21	MQ07 R3 Comp			X	X	X	X	X	X	
22	MQ08 R1 Comp			X	X	X	X	X	X	
23	MQ08 R2 Comp			X	X	X	X	X	X	
24	MQ08 R3 Comp			X	X	X	X	X	X	

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only	
Print Name:	Sunira Reardon		ECS-KV	Job number: MHA2063	Office Cooling: Ice / Ice pack / None
Date & Time:	12/01/2026 0:00		0820 14/1/26 KV	Temp Office: Temp Lab: 17.0	Lab Cooling: Ice / Ice pack / None
Signature:	SR			TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

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07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820

Company:	SARDI	**Client Project Name/Number/Site etc (ie report title):**	NWP Mullaquana Monthly Sampling
Contact Person:	Ian Moody	**PO No. (if applicable):**	
Project Mgr:		**Envirolab Quote No. :**	25SA070v2
Sampler:	Alex Dobrovolskis & Sunny Reardon	**Date results required:**	
Address:	2 Hamra Ave, West Beach SA 5024	**Or choose:**	☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day
Phone:	**Mobile:** 0425 146 583	*Note: Inform lab in advance if urgent turnaround is required - surcharges apply*	
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au	**Additional report format:**	Esdat / Equis
Email Invoice to:	ian.moody@sa.gov.au	**Lab Comments:** No charge for freight- accounted for on the Engineering job.	

Sample information				Tests Required							Comments
Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms		
1	MQ01 R1 Comp	4/2/26	Sea water	X	X	X	X	X	X		
2	MQ01 R2 Comp	↓		X	X	X	X	X	X		
3	MQ01 R3 Comp	↓		X	X	X	X	X	X		
4	MQ02 R1 Comp	3/2/26		X	X	X	X	X	X		
5	MQ02 R2 Comp	3/2/26		X	X	X	X	X	X		
6	MQ02 R3 Comp	↓		X	X	X	X	X	X		
7	MQ03 R1 Comp	↓		X	X	X	X	X	X		
8	MQ03 R2 Comp	↓		X	X	X	X	X	X		
9	MQ03 R3 Comp	↓		X	X	X	X	X	X		
10	MQ04 R1 Comp	4/2/26		X	X	X	X	X	X		
11	MQ04 R2 Comp	↓		X	X	X	X	X	X		
12	MQ04 R3 Comp	↓		X	X	X	X	X	X		

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only	
Print Name:	Sunira Reardon	ELS ADL	ELS-KW	Job number: MHB0012	Office Cooling: Ice / Ice pack / None
Date & Time:	3/2/26	5/2/26 10:30am	06/2/26	Temp Office: 19.8°C Temp Lab: 11.4°	Lab Cooling: Ice / Ice pack / None
Signature:		CP.	KW	TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

1-3, 10-12, 19-20-24, 25-33 received 6/2/26

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Company:	SARDI	Client Project Name/Number/Site etc (ie report title):	NWP Mullaquana Monthly Sampling
Contact Person:	Ian Moody	PO No. (if applicable):	
Project Mgr:		Envirolab Quote No.:	25SA070v2
Sampler:	Alex Dobrovolskis & Sunny Reardon	Date results required:	Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day
Address:	2 Hamra Ave, West Beach SA 5024		
Phone:	Mobile: 0425 146 583	Note: Inform lab in advance if urgent turnaround is required - surcharges apply	
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au	Additional report format:	☐ Esdat ☐ Equis
Email Invoice to:	ian.moody@sa.gov.au	Lab Comments: No charge for freight- accounted for on the Engineering job.	

Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms	Comments
13	MQ05 R1 Comp	3/2/26	Sea water	X	X	X	X	X	X	
14	MQ05 R2 Comp			X	X	X	X	X	X	
15	MQ05 R3 Comp			X	X	X	X	X	X	
16	MQ06 R1 Comp			X	X	X	X	X	X	
17	MQ06 R2 Comp			X	X	X	X	X	X	
18	MQ06 R3 Comp			X	X	X	X	X	X	
19	MQ07 R1 Comp	4/2/26		X	X	X	X	X	X	
20	MQ07 R2 Comp			X	X	X	X	X	X	
21	MQ07 R3 Comp			X	X	X	X	X	X	
22	MQ08 R1 Comp			X	X	X	X	X	X	
23	MQ08 R2 Comp			X	X	X	X	X	X	
24	MQ08 R3 Comp			X	X	X	X	X	X	

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only	
Print Name:	Sunira Reardon	ELS ADL		Job number: M1HB0012	Office Cooling: Ice / Ice pack / None
Date & Time:	3/2/26	5/2/26 10:9am		Temp Office: 19.8°C Temp Lab:	Lab Cooling: Ice / Ice pack / None
Signature:		GD.		TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

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Company:	SARDI	**Client Project Name/Number/Site etc (ie report title):**	NWP Mullaquana Monthly Sampling
Contact Person:	Ian Moody	**PO No. (if applicable):**	
Project Mgr:		**Envirolab Quote No. :**	25SA070v2
Sampler:	Alex Dobrovolskis & Sunny Reardon	**Date results required:**	
Address:	2 Hamra Ave, West Beach SA 5024	**Or choose:**	☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day
Phone:	**Mobile:** 0425 146 583	*Note: Inform lab in advance if urgent turnaround is required - surcharges apply*	
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au	**Additional report format:**	Esdat / Equis
Email Invoice to:	ian.moody@sa.gov.au	**Lab Comments:** No charge for freight- accounted for on the Engineering job.	

Sample information				Tests Required																	Comments
Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms												
25	MQ08 R1 Surface	4/2/26	Sea water	X	X	X	X	X	X												
26	MQ08 R2 Surface			X	X	X	X	X	X												
27	MQ08 R3 Surface			X	X	X	X	X	X												
28	MQ08 R1 Bottom			X	X	X	X	X	X												
29	MQ08 R2 Bottom			X	X	X	X	X	X												
30	MQ08 R3 Bottom			X	X	X	X	X	X												
31	MQ09 R1 Comp			X	X	X	X	X	X												
32	MQ09 R2 Comp			X	X	X	X	X	X												
33	MQ09 R3 Comp	↓		X	X	X	X	X	X												

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Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only	
Print Name:	Sunira Reardon	ELS ADL		Job number: MHB0012	Office Cooling: Ice / Ice pack / None
Date & Time:	4/2/26	5/2/26 10:30am		Temp Office: 19-8°C Temp Lab:	Lab Cooling: Ice / Ice pack / None
Signature:		OD.		TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

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Unit 20/119 Reichardt Road, Winnellie, NT 0820

Company:	SARDI
Contact Person:	Ian Moody
Project Mgr:	
Sampler:	Sunira Reardon / Alex Dobrovolskis
Address:	2 Hamra Ave, West Beach SA 5024
Phone:	Mobile:
Email Results to:	ian.moody@sa.gov.au
Email Invoice to:	ian.moody@sa.gov.au

Client Project Name/Number/Site etc (ie report title): **NWP Mullaquana Environmental Seasonal - March**

PO No. (if applicable):

Envirolab Quote No. : **25SA070v2**

Date results required:

Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day

Note: Inform lab in advance if urgent turnaround is required - surcharges apply

Additional report format: ☐ Esdat ☐ Equis

Lab Comments: **Total Metals** – Al, Sb, As, Ba, Be, B, Cd, Co, Cr, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Ag, Sr, Th, Tl, U, V, Zn + Silica **(low level) Intertek ICPMS QQQ**
No charge for freight- accounted for on the Engineering job.

Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	Combo 1M - Total	pH, EC, Salinity	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	TDS Grav	TOC	Total Coliforms	Chlorophyll a – LL									Comments
																					Provide as much information about the sample as you can
1	MQ01 R1 Comp		Sea water	X	X	X	X	X	X	X	X	X									
2	MQ01 R2 Comp			X	X	X	X	X	X	X	X	X									
3	MQ01 R3 Comp			X	X	X	X	X	X	X	X	X									
4	MQ02 R1 Comp	4/03/2026		X	X	X	X	X	X	X	X	X									
5	MQ02 R2 Comp	4/03/2026		X	X	X	X	X	X	X	X	X									
6	MQ02 R3 Comp	4/03/2026		X	X	X	X	X	X	X	X	X									
7	MQ03 R1 Comp	4/03/2026		X	X	X	X	X	X	X	X	X									
8	MQ03 R2 Comp	4/03/2026		X	X	X	X	X	X	X	X	X									
9	MQ03 R3 Comp	4/03/2026		X	X	X	X	X	X	X	X	X									
10	MQ04 R1 Comp			X	X	X	X	X	X	X	X	X									
11	MQ04 R2 Comp			X	X	X	X	X	X	X	X	X									
12	MQ04 R3 Comp			X	X	X	X	X	X	X	X	X									

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only
Print Name:	Sunira Reardon	ELS ADC	E4S C. De Luca	Job number: MHC0057
Date & Time:	4/03/2026 0:00	5/3/26 10 am	6/3/2026 8:15Am	Temp Office: 17°C Temp Lab: 8.6
Signature:	S.R.	OD.		TAT: SAME day / 1 / 2 / 3 / 4 / (STD)

Office Cooling: Ice / Ice pack / None
Lab Cooling: Ice / Ice pack / None
Security seal: Intact / Broken / None

1-3, 10-12, 19-33 recd 10/3/26 ← ELS KV 0820 10/3/26 KV.

19 5°C 10/3/26

CHAIN OF CUSTODY FORM - Client

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National phone number 1300 424 344

Sydney Lab - Envirolab Services
12 Ashley St, Chatswood, NSW 2067
02 9910 6200 | sydney@envirolab.com.au

Perth Lab - MPL Laboratories
16-18 Hayden Crt, Myaree, WA 6154
08 9317 2505 | lab@mpl.com.au

Melbourne Lab - Envirolab Services
25 Research Drive, Croydon South, VIC 3136
03 9763 2500 | melbourne@envirolab.com.au

Newcastle Lab - Envirolab Services
92 Hill Street, Carrington Newcastle, NSW 2294
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Adelaide Office - Envirolab Services
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08 7087 6800 | adelaide@envirolab.com.au

Brisbane Office - Envirolab Services
20a, 10-20 Depot St, Banyo, QLD 4014
07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820
08 8967 1201 | darwin@envirolab.com.au

Company:	SARDI	Client Project Name/Number/Site etc (ie report title):	NWP Mullaquana Environmental Seasonal - March
Contact Person:	Ian Moody	PO No. (if applicable):	
Project Mgr:		Envirolab Quote No.:	25SA070v2
Sampler:	Sunira Reardon / Alex Dobrovolskis	Date results required:	Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day
Address:	2 Hamra Ave, West Beach SA 5024		Note: Inform lab in advance if urgent turnaround is required - surcharges apply
Phone:	Mobile:	Additional report format:	☐ Esdat ☐ Equis
Email Results to:	ian.moody@sa.gov.au	Lab Comments: Total Metals – Al, Sb, As, Ba, Be, B, Cd, Co, Cr, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Ag, Sr, Th, Tl, U, V, Zn + Silica (low level) Intertek ICPMS QQQ	
Email Invoice to:	ian.moody@sa.gov.au	No charge for freight- accounted for on the Engineering job.	

Sample information				Tests Required																Comments
Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	Combo 1M - Total	pH, EC, Salinity	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	TDS Grav	TOC	Total Coliforms	Chlorophyll a - LL								Provide as much information about the sample as you can
13	MQ05 R1 Comp	4/03/2026	Sea water	X	X	X	X	X	X	X	X	X								
14	MQ05 R2 Comp	4/03/2026		X	X	X	X	X	X	X	X	X								
15	MQ05 R3 Comp	4/03/2026		X	X	X	X	X	X	X	X	X								
16	MQ06 R1 Comp	4/03/2026		X	X	X	X	X	X	X	X	X								
17	MQ06 R2 Comp	4/03/2026		X	X	X	X	X	X	X	X	X								
18	MQ06 R3 Comp	4/03/2026		X	X	X	X	X	X	X	X	X								
19	MQ07 R1 Comp			X	X	X	X	X	X	X	X	X								
20	MQ07 R2 Comp			X	X	X	X	X	X	X	X	X								
21	MQ07 R3 Comp			X	X	X	X	X	X	X	X	X								
22	MQ08 R1 Comp			X	X	X	X	X	X	X	X	X								
23	MQ08 R2 Comp			X	X	X	X	X	X	X	X	X								
24	MQ08 R3 Comp			X	X	X	X	X	X	X	X	X								

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only	
Print Name:	Sunira Reardon		ELS - C. De Luca	Job number: MHC0057	Office Cooling: Ice / Ice pack / None
Date & Time:	4/03/2026 0:00		6/3/2026 8:15am	Temp Office: Temp Lab: 8.6°C	Lab Cooling: Ice / Ice pack / None
Signature:	S.R.			TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

ELS - KW 0820 10/3/26. KW

19.5°C 10/3/26

CHAIN OF CUSTODY FORM - Client

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National phone number 1300 424 344

Sydney Lab - Envirolab Services
12 Ashley St, Chatswood, NSW 2067
02 9910 6200 | sydney@envirolab.com.au

Perth Lab - MPL Laboratories
16-18 Hayden Crt, Myaree, WA 6154
08 9317 2505 | lab@mpl.com.au

Melbourne Lab - Envirolab Services
25 Research Drive, Croydon South, VIC 3136
03 9763 2500 | melbourne@envirolab.com.au

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Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820
08 8967 1201 | darwin@envirolab.com.au

Company:	SARDI
Contact Person:	Ian Moody
Project Mgr:	
Sampler:	Sunira Reardon / Alex Dobrovolskis
Address:	2 Hamra Ave, West Beach SA 5024
Phone:	Mobile:
Email Results to:	ian.moody@sa.gov.au
Email Invoice to:	ian.moody@sa.gov.au

Client Project Name/Number/Site etc (ie report title): **NWP Mullaquana Environmental Seasonal - March**

PO No. (if applicable):

Envirolab Quote No. : **25SA070v2**

Date results required:

Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day

Note: Inform lab in advance if urgent turnaround is required - surcharges apply

Additional report format: ☐ Esdat ☐ Equis

Lab Comments: Total Metals – Al, Sb, As, Ba, Be, B, Cd, Co, Cr, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Ag, Sr, Th, Tl, U, V, Zn + Silica **(low level) Intertek ICPMS QQQ**
No charge for freight- accounted for on the Engineering job.

Sample Information | **Tests Required**

Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	Combo 1M - Total	pH, EC, Salinity	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	TDS Grav	TOC	Total Coliforms	Chlorophyll a - LL	Comments
25	MQ08 R1 Surface	5/03/2026	Sea water	X	X	X	X	X	X	X	X	X	Provide as much information about the sample as you can
26	MQ08 R2 Surface	5/03/2026		X	X	X	X	X	X	X	X	X	
27	MQ08 R3 Surface	5/03/2026		X	X	X	X	X	X	X	X	X	
28	MQ08 R1 Bottom	5/03/2026		X	X	X	X	X	X	X	X	X	
29	MQ08 R2 Bottom	5/03/2026		X	X	X	X	X	X	X	X	X	
30	MQ08 R3 Bottom	5/03/2026		X	X	X	X	X	X	X	X	X	
31	MQ09 R1 Comp	5/03/2026		X	X	X	X	X	X	X	X	X	
32	MQ09 R2 Comp	5/03/2026		X	X	X	X	X	X	X	X	X	
33	MQ09 R3 Comp	5/03/2026		X	X	X	X	X	X	X	X	X	

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only
Print Name:	Sunira Reardon	ELS ADL	ELS-W	Job number: MHC0057
Date & Time:	5/03/2026 0:00	6/3/26 10:40am	0820 10/3/26	Temp Office: 17.7°C Temp Lab:
Signature:	S.R	OP.		TAT: SAME day / 1 / 2 / 3 / 4 / STD

Office Cooling: Ice / Ice pack / None
Lab Cooling: Ice / Ice pack / None
Security seal: Intact / Broken / None

19.5°C

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16-18 Hayden Crt, Myaree, WA 6154
08 9317 2505 | lab@mpl.com.au

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03 9763 2500 | melbourne@envirolab.com.au

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08 7087 6800 | adelaide@envirolab.com.au

Brisbane Office - Envirolab Services
20a, 10-20 Depot St, Banyo, QLD 4014
07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820

Company:	SARDI	Client Project Name/Number/Site etc (ie report title):	NWP Mullaquana Monthly Sampling
Contact Person:	Ian Moody	PO No. (if applicable):	
Project Mgr:		Envirolab Quote No. :	25SA070v2
Sampler:	Alex Dobrovolskis & Sunny Reardon	Date results required:	
Address:	2 Hamra Ave, West Beach SA 5024	Or choose:	☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day
Phone:	Mobile: 0425 146 583	Note: Inform lab in advance if urgent turnaround is required - surcharges apply	
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au	Additional report format:	☐ Esdat ☐ Equis
Email Invoice to:	ian.moody@sa.gov.au	Lab Comments: No charge for freight- accounted for on the Engineering job.	

Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms	Comments
1	MQ01 R1 Comp		Sea water	X	X	X	X	X	X	
2	MQ01 R2 Comp			X	X	X	X	X	X	
3	MQ01 R3 Comp			X	X	X	X	X	X	
4	MQ02 R1 Comp	14/04/2026		X	X	X	X	X	X	
5	MQ02 R2 Comp	14/04/2026		X	X	X	X	X	X	
6	MQ02 R3 Comp	14/04/2026		X	X	X	X	X	X	
7	MQ03 R1 Comp	14/04/2026		X	X	X	X	X	X	
8	MQ03 R2 Comp	14/04/2026		X	X	X	X	X	X	
9	MQ03 R3 Comp	14/04/2026		X	X	X	X	X	X	
10	MQ04 R1 Comp			X	X	X	X	X	X	
11	MQ04 R2 Comp			X	X	X	X	X	X	
12	MQ04 R3 Comp			X	X	X	X	X	X	

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only	
Print Name:	Sunira Reardon		ELS TM / ELS	Job number: MHD0196	Office Cooling: Ice / Ice pack / None
Date & Time:	14/04/2026 0:00		16/4/26 8:10 / 17/4/26	Temp Office: Temp Lab: 9.1	Lab Cooling: Ice / Ice pack / None
Signature:	S.R.		TM / KV 085	TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

Received 17/4/26 = 1-3, 10-12, 19-33. KV.

temp: 12.5°C

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02 9910 6200 | sydney@envirolab.com.au

Perth Lab - MPL Laboratories
16-18 Hayden Crt, Myaree, WA 6154
08 9317 2505 | lab@mpl.com.au

Melbourne Lab - Envirolab Services
25 Research Drive, Croydon South, VIC 3136
03 9763 2500 | melbourne@envirolab.com.au

Newcastle Lab - Envirolab Services
92 Hill Street, Carrington Newcastle, NSW 2294
02 4902 9231 | newcastle@envirolab.com.au

Adelaide Office - Envirolab Services
7a The Parade, Norwood, SA 5067
08 7087 6800 | adelaide@envirolab.com.au

Brisbane Office - Envirolab Services
20a, 10-20 Depot St, Banyo, QLD 4014
07 3266 9532 | brisbane@envirolab.com.au

Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820

Company:	SARDI	Client Project Name/Number/Site etc (ie report title):	NWP Mullaquana Monthly Sampling
Contact Person:	Ian Moody		
Project Mgr:		PO No. (if applicable):	
Sampler:	Alex Dobrovolskis & Sunny Reardon	Envirolab Quote No. :	25SA070v2
Address:	2 Hamra Ave, West Beach SA 5024	Date results required:	Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day
Phone:	Mobile: 0425 146 583		*Note: Inform lab in advance if urgent turnaround is required - surcharges apply*
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au	Additional report format:	☐ Esdat ☐ Equis
Email Invoice to:	ian.moody@sa.gov.au	Lab Comments: No charge for freight- accounted for on the Engineering job.	

Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms											Comments
13	MQ05 R1 Comp	14/04/2026	Sea water	X	X	X	X	X	X											
14	MQ05 R2 Comp	14/04/2026		X	X	X	X	X	X											
15	MQ05 R3 Comp	14/04/2026		X	X	X	X	X	X											
16	MQ06 R1 Comp	14/04/2026		X	X	X	X	X	X											
17	MQ06 R2 Comp	14/04/2026		X	X	X	X	X	X											
18	MQ06 R3 Comp	14/04/2026		X	X	X	X	X	X											
19	MQ07 R1 Comp			X	X	X	X	X	X											
20	MQ07 R2 Comp			X	X	X	X	X	X											
21	MQ07 R3 Comp			X	X	X	X	X	X											
22	MQ08 R1 Comp			X	X	X	X	X	X											
23	MQ08 R2 Comp			X	X	X	X	X	X											
24	MQ08 R3 Comp			X	X	X	X	X	X											

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only	
Print Name:	Sunira Reardon			Job number: MHD0196	Office Cooling: Ice / Ice pack / None
Date & Time:	14/04/2026 0:00			Temp Office: Temp Lab: 9.1	Lab Cooling: Ice / Ice pack / None
Signature:	S.R.			TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

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Darwin Office - Envirolab Services
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Company:	SARDI	Client Project Name/Number/Site etc (ie report title):	NWP Mullaquana Monthly Sampling
Contact Person:	Ian Moody	PO No. (if applicable):	
Project Mgr:		Envirolab Quote No. :	25SA070v2
Sampler:	Alex Dobrovolskis & Sunny Reardon	Date results required:	
Address:	2 Hamra Ave, West Beach SA 5024	Or choose:	☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day
Phone: / Mobile:	0425 146 583	Note: Inform lab in advance if urgent turnaround is required - surcharges apply	
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au	Additional report format:	☐ Esdat ☐ Equis
Email Invoice to:	ian.moody@sa.gov.au	Lab Comments: No charge for freight- accounted for on the Engineering job.	

Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms											Comments
25	MQ08 R1 Surface		Sea water	X	X	X	X	X	X											
26	MQ08 R2 Surface			X	X	X	X	X	X											
27	MQ08 R3 Surface			X	X	X	X	X	X											
28	MQ08 R1 Bottom			X	X	X	X	X	X											
29	MQ08 R2 Bottom			X	X	X	X	X	X											
30	MQ08 R3 Bottom			X	X	X	X	X	X											
31	MQ09 R1 Comp			X	X	X	X	X	X											
32	MQ09 R2 Comp			X	X	X	X	X	X											
33	MQ09 R3 Comp			X	X	X	X	X	X											

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only	
Print Name:				Job number: MHD0196	Office Cooling: Ice / Ice pack / None
Date & Time:				Temp Office: Temp Lab: 9.1	Lab Cooling: Ice / Ice pack / None
Signature:				TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

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Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820

Company:	SARDI
Contact Person:	Ian Moody
Project Mgr:	
Sampler:	Alex Dobrovolskis & Sunny Reardon
Address:	2 Hamra Ave, West Beach SA 5024
Phone:	Mobile: 0425 146 583
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au
Email Invoice to:	ian.moody@sa.gov.au

Client Project Name/Number/Site etc (ie report title): **NWP Mullaquana Monthly Sampling**

PO No. (if applicable):

Envirolab Quote No. : **25SA070v2**

Date results required:

Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day

Note: Inform lab in advance if urgent turnaround is required - surcharges apply

Additional report format: ☑ Esdat ☐ Equis

Lab Comments: No charge for freight- accounted for on the Engineering job. ESdat output AND in the usual format

Sample information				Tests Required							Comments
Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms		
1	MQ01 R1 Comp	13/05/2026	Sea water	X	X	X	X	X	X		
2	MQ01 R2 Comp	13/05/2026		X	X	X	X	X	X		
3	MQ01 R3 Comp	13/05/2026		X	X	X	X	X	X		
4	MQ02 R1 Comp	12/05/2026		X	X	X	X	X	X		
5	MQ02 R2 Comp	12/05/2026		X	X	X	X	X	X		
6	MQ02 R3 Comp	12/05/2026		X	X	X	X	X	X		
7	MQ03 R1 Comp	12/05/2026		X	X	X	X	X	X		
8	MQ03 R2 Comp	12/05/2026		X	X	X	X	X	X		
9	MQ03 R3 Comp	12/05/2026		X	X	X	X	X	X		
10	MQ04 R1 Comp	13/05/2026		X	X	X	X	X	X		
11	MQ04 R2 Comp	13/05/2026		X	X	X	X	X	X		
12	MQ04 R3 Comp	13/05/2026		X	X	X	X	X	X		

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only	
Print Name:	Sunira Reardon	ELS ADL	Envirolab - C De Luca	Job number: MHE00053	Office Cooling: Ice / Ice pack / None
Date & Time:	12/05/2026 0:00	13/5/26 10am	14/5/2026 8:10 Am	Temp Office: 13.6°C Temp Lab: 6.5°C	Lab Cooling: Ice / Ice pack / None
Signature:	S.R.	OD.		TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

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07 3266 9532 | brisbane@envirolab.com.au
Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820

Company:	SARDI	**Client Project Name/Number/Site etc (ie report title):**	NWP Mullaquana Monthly Sampling
Contact Person:	Ian Moody	**PO No. (if applicable):**	
Project Mgr:		**Envirolab Quote No. :**	25SA070v2
Sampler:	Alex Dobrovolskis & Sunny Reardon	**Date results required:**	Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day
Address:	2 Hamra Ave, West Beach SA 5024	*Note: Inform lab in advance if urgent turnaround is required - surcharges apply*	
Phone:	**Mobile:** 0425 146 583	**Additional report format:**	✓Esdat ☐ Equis
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au	**Lab Comments:**	No charge for freight- accounted for on the Engineering job. ESdat output AND in the usual format
Email Invoice to:	ian.moody@sa.gov.au		

Sample information				Tests Required																		Comments
Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms													
13	MQ05 R1 Comp	12/05/2026	Sea water	X	X	X	X	X	X													
14	MQ05 R2 Comp	12/05/2026		X	X	X	X	X	X													
15	MQ05 R3 Comp	12/05/2026		X	X	X	X	X	X													
16	MQ06 R1 Comp	12/05/2026		X	X	X	X	X	X													
17	MQ06 R2 Comp	12/05/2026		X	X	X	X	X	X													
18	MQ06 R3 Comp	12/05/2026		X	X	X	X	X	X													
19	MQ07 R1 Comp	13/05/2026		X	X	X	X	X	X													
20	MQ07 R2 Comp	13/05/2026		X	X	X	X	X	X													
21	MQ07 R3 Comp	13/05/2026		X	X	X	X	X	X													
22	MQ08 R1 Comp	13/05/2026		X	X	X	X	X	X													
23	MQ08 R2 Comp	13/05/2026		X	X	X	X	X	X													
24	MQ08 R3 Comp	13/05/2026		X	X	X	X	X	X													

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Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only	
Print Name:	Sunira Reardon	ELS ADL	Envirolab - C. De Luca	Job number: MHE0053	Office Cooling: Ice / Ice pack / None
Date & Time:	12/05/2026 0:00	13/5/26 10am	14/5/2026 8:10am	Temp Office: 13.6°C Temp Lab: 6.5	Lab Cooling: Ice / Ice pack / None
Signature:	S.R.			TAT: SAME day / 1 / 2 / 3 / 4 / (STD)	Security seal: Intact / Broken / None

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Darwin Office - Envirolab Services
Unit 20/119 Reichardt Road, Winnellie, NT 0820

Company:	SARDI	**Client Project Name/Number/Site etc (ie report title):**	NWP Mullaquana Monthly Sampling
Contact Person:	Ian Moody	**PO No. (if applicable):**	
Project Mgr:		**Envirolab Quote No. :**	25SA070v2
Sampler:	Alex Dobrovolskis & Sunny Reardon	**Date results required:**	
Address:	2 Hamra Ave, West Beach SA 5024	**Or choose:**	☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day
Phone:	**Mobile:** 0425 146 583	*Note: Inform lab in advance if urgent turnaround is required - surcharges apply*	
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au	**Additional report format:**	✓Esdat Equis
Email Invoice to:	ian.moody@sa.gov.au	**Lab Comments:** No charge for freight- accounted for on the Engineering job. ESdat output AND in the usual format	

Sample information				Tests Required																		Comments
Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms													
25	MQ08 R1 Surface	13/05/2026	Sea water	X	X	X	X	X	X													
26	MQ08 R2 Surface	13/05/2026		X	X	X	X	X	X													
27	MQ08 R3 Surface	13/05/2026		X	X	X	X	X	X													
28	MQ08 R1 Bottom	13/05/2026		X	X	X	X	X	X													
29	MQ08 R2 Bottom	13/05/2026		X	X	X	X	X	X													
30	MQ08 R3 Bottom	13/05/2026		X	X	X	X	X	X													
31	MQ09 R1 Comp	13/05/2026		X	X	X	X	X	X													
32	MQ09 R2 Comp	13/05/2026		X	X	X	X	X	X													
33	MQ09 R3 Comp	13/05/2026		X	X	X	X	X	X													

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only	
Print Name:	Sunira Reardon		Envirolab - C. DeLuca	Job number: MHE0053	Office Cooling: Ice / Ice pack / None
Date & Time:	13/05/2026 0:00		14/5/2026 8:10Am	Temp Office: Temp Lab: 6.5	Lab Cooling: Ice / Ice pack / None
Signature:	S.R.			TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

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Company:	SARDI	**Client Project Name/Number/Site etc (ie report title):**	NWP Mullaquana Monthly Sampling
Contact Person:	Ian Moody	**PO No. (if applicable):**	
Project Mgr:		**Envirolab Quote No. :**	25SA070v2
Sampler:	Alex Dobrovolskis & Sunny Reardon	**Date results required:**	Or choose: ☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day
Address:	2 Hamra Ave, West Beach SA 5024	*Note: Inform lab in advance if urgent turnaround is required - surcharges apply*	
Phone:	**Mobile:** 0425 146 583	**Additional report format:**	✓ Esdat ☐ Equis
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au	**Lab Comments:**	No charge for freight- accounted for on the Engineering job. ESdat output AND in the usual format
Email Invoice to:	ian.moody@sa.gov.au		

Sample information				Tests Required							Comments
Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms		
1	MQ01 R1 Comp	13/05/2026	Sea water	X	X	X	X	X	X		
2	MQ01 R2 Comp	13/05/2026		X	X	X	X	X	X		
3	MQ01 R3 Comp	13/05/2026		X	X	X	X	X	X		
4	MQ02 R1 Comp	12/05/2026		X	X	X	X	X	X		
5	MQ02 R2 Comp	12/05/2026		X	X	X	X	X	X		
6	MQ02 R3 Comp	12/05/2026		X	X	X	X	X	X		
7	MQ03 R1 Comp	12/05/2026		X	X	X	X	X	X		
8	MQ03 R2 Comp	12/05/2026		X	X	X	X	X	X		
9	MQ03 R3 Comp	12/05/2026		X	X	X	X	X	X		
10	MQ04 R1 Comp	13/05/2026		X	X	X	X	X	X		
11	MQ04 R2 Comp	13/05/2026		X	X	X	X	X	X		
12	MQ04 R3 Comp	13/05/2026		X	X	X	X	X	X		

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Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only	
Print Name:	Sunira Reardon	ELS APC	ELS-ICV	Job number: MHE0053	Office Cooling: Ice / Ice pack / None
Date & Time:	12/05/2026 0:00	14/5/26 10am	0730 15/5/26	Temp Office: 14.5° Temp Lab: 11.8°	Lab Cooling: Ice / Ice pack / None
Signature:	S.R.	OD.	ICV	TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

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Company:	SARDI	**Client Project Name/Number/Site etc (ie report title):**	NWP Mullaquana Monthly Sampling
Contact Person:	Ian Moody	**PO No. (if applicable):**	
Project Mgr:		**Envirolab Quote No. :**	25SA070v2
Sampler:	Alex Dobrovolskis & Sunny Reardon	**Date results required:**	
Address:	2 Hamra Ave, West Beach SA 5024	**Or choose:**	☑ Standard ☐ Same Day ☐ 1 day ☐ 2 day ☐ 3 day
Phone:	**Mobile:** 0425 146 583	*Note: Inform lab in advance if urgent turnaround is required - surcharges apply*	
Email Results to:	Ian.Moody@sa.gov.au; Sunira.Reardon@sa.gov.au; Alexander.Dobrovolskis@sa.gov.au	**Additional report format:**	✓Esdat ☐ Equis
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Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms	Comments
13	MQ05 R1 Comp	12/05/2026	Sea water	X	X	X	X	X	X	
14	MQ05 R2 Comp	12/05/2026		X	X	X	X	X	X	
MR 15	MQ05 R3 Comp	12/05/2026		X	X	X	X	X	X	
16	MQ06 R1 Comp	12/05/2026		X	X	X	X	X	X	
17	MQ06 R2 Comp	12/05/2026		X	X	X	X	X	X	
18	MQ06 R3 Comp	12/05/2026		X	X	X	X	X	X	
19	MQ07 R1 Comp	13/05/2026		X	X	X	X	X	X	
20	MQ07 R2 Comp	13/05/2026		X	X	X	X	X	X	
21	MQ07 R3 Comp	13/05/2026		X	X	X	X	X	X	
22	MQ08 R1 Comp	13/05/2026		X	X	X	X	X	X	
23	MQ08 R2 Comp	13/05/2026		X	X	X	X	X	X	
24	MQ08 R3 Comp	13/05/2026		X	X	X	X	X	X	

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Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only	
Print Name:	Sunira Reardon	ELS ADL	ELS KW	Job number: MHE0053	Office Cooling: Ice / Ice pack / None
Date & Time:	12/05/2026 0:00	14/5/26 10am	0730 15/5/26 KW	Temp Office: 14.5°C Temp Lab: 11.8°C	Lab Cooling: Ice / Ice pack / None
Signature:	S.R.	OD.		TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

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Contact Person:	Ian Moody	**PO No. (if applicable):**	
Project Mgr:		**Envirolab Quote No. :**	25SA070v2
Sampler:	Alex Dobrovolskis & Sunny Reardon	**Date results required:**	
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Email Invoice to:	ian.moody@sa.gov.au	**Lab Comments:**	No charge for freight- accounted for on the Engineering job. ESdat output AND in the usual format

Envirolab Sample ID (Lab use only)	Client Sample ID or Information	Date Sampled	Type of Sample	pH, EC, Salinity, TDS Grav	TSS-LL	Nutrient Suite - LL	Reactive Silica - LL	Chlorophyll a - LL	Total Coliforms	Comments
25	MQ08 R1 Surface	13/05/2026	Sea water	X	X	X	X	X	X	
26	MQ08 R2 Surface	13/05/2026		X	X	X	X	X	X	
27	MQ08 R3 Surface	13/05/2026		X	X	X	X	X	X	
28	MQ08 R1 Bottom	13/05/2026		X	X	X	X	X	X	
29	MQ08 R2 Bottom	13/05/2026		X	X	X	X	X	X	
30	MQ08 R3 Bottom	13/05/2026		X	X	X	X	X	X	
31	MQ09 R1 Comp	13/05/2026		X	X	X	X	X	X	
32	MQ09 R2 Comp	13/05/2026		X	X	X	X	X	X	
33	MQ09 R3 Comp	13/05/2026		X	X	X	X	X	X	

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by	Client	Interstate Office	Laboratory	Lab Use Only	
Print Name:	Sunira Reardon	ELS ADL	ELS-LV	Job number: MHE0053	Office Cooling: Ice / Ice pack / None
Date & Time:	13/05/2026 0:00	14/5/26 10am	0730 15/5/26	Temp Office: 14.5° Temp Lab: 11.8°	Lab Cooling: Ice / Ice pack / None
Signature:	S.R.	OD.	LV	TAT: SAME day / 1 / 2 / 3 / 4 / STD	Security seal: Intact / Broken / None

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ph +61 3 9763 2500
melbourne@envirolab.com.au
www.envirolab.com.au

Certificate of Analysis MGF0086

Client Details

Client	South Australian Research & Development Institute
Contact	Ian Moody
Address	SARDI Aquatic Science Centre, 2 Hamra Avenue, WEST BEACH, SA, 5024

Sample Details

Your Reference	NWP Mullaquana Environmental Seasonal - May
Number of Samples	33 Water
Date Samples Received	05/06/2025
Date Instructions Received	05/06/2025

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for soils and on an as received basis for other matrices.

Report Details

Date Final Results Expected	24/06/2025
Date of Issue	25/06/2025

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Accredited for compliance with ISO/IEC 17025. Tests not covered by NATA are denoted with *.

Authorisation Details

Results Approved By	Chaminda Gunasekara, Inorganics Supervisor Chris De Luca, Lab Manager Diego Bigolin, Supervisor, Inorganics Maggie Hu, Organics Supervisor Tara White, Metals Supervisor Tianna Milburn, Operations Manager
Laboratory Manager	Chris De Luca

Samples in this Report

Envirolab ID	Sample ID	Matrix	Date Sampled	Date Received
MGF0086-01	MQ01 R1 Comp	Water	04/06/2025	05/06/2025
MGF0086-02	MQ01 R2 Comp	Water	04/06/2025	05/06/2025
MGF0086-03	MQ01 R3 Comp	Water	04/06/2025	05/06/2025
MGF0086-04	MQ02 R1 Comp	Water	03/06/2025	05/06/2025
MGF0086-05	MQ02 R2 Comp	Water	03/06/2025	05/06/2025
MGF0086-06	MQ02 R3 Comp	Water	03/06/2025	05/06/2025
MGF0086-07	MQ03 R1 Comp	Water	03/06/2025	05/06/2025
MGF0086-08	MQ03 R2 Comp	Water	03/06/2025	05/06/2025
MGF0086-09	MQ03 R3 Comp	Water	03/06/2025	05/06/2025
MGF0086-10	MQ04 R1 Comp	Water	04/06/2025	05/06/2025
MGF0086-11	MQ04 R2 Comp	Water	04/06/2025	05/06/2025
MGF0086-12	MQ04 R3 Comp	Water	04/06/2025	05/06/2025
MGF0086-13	MQ05 R1 Comp	Water	03/06/2025	05/06/2025
MGF0086-14	MQ05 R2 Comp	Water	03/06/2025	05/06/2025
MGF0086-15	MQ05 R3 Comp	Water	03/06/2025	05/06/2025
MGF0086-16	MQ06 R1 Comp	Water	03/06/2025	05/06/2025
MGF0086-17	MQ06 R2 Comp	Water	03/06/2025	05/06/2025
MGF0086-18	MQ06 R3 Comp	Water	03/06/2025	05/06/2025
MGF0086-19	MQ07 R1 Comp	Water	04/06/2025	05/06/2025
MGF0086-20	MQ07 R2 Comp	Water	04/06/2025	05/06/2025
MGF0086-21	MQ07 R3 Comp	Water	04/06/2025	05/06/2025
MGF0086-22	MQ08 R1 Comp	Water	04/06/2025	05/06/2025
MGF0086-23	MQ08 R2 Comp	Water	04/06/2025	05/06/2025
MGF0086-24	MQ08 R3 Comp	Water	04/06/2025	05/06/2025
MGF0086-25	MQ08 R1 Surface	Water	04/06/2025	05/06/2025
MGF0086-26	MQ08 R2 Surface	Water	04/06/2025	05/06/2025
MGF0086-27	MQ08 R3 Surface	Water	04/06/2025	05/06/2025
MGF0086-28	MQ08 R1 Bottom	Water	04/06/2025	05/06/2025
MGF0086-29	MQ08 R2 Bottom	Water	04/06/2025	05/06/2025
MGF0086-30	MQ08 R3 Bottom	Water	04/06/2025	05/06/2025
MGF0086-31	MQ09 R1 Comp	Water	04/06/2025	05/06/2025
MGF0086-32	MQ09 R2 Comp	Water	04/06/2025	05/06/2025
MGF0086-33	MQ09 R3 Comp	Water	04/06/2025	05/06/2025

Volatile TRH and BTEX (Water)

Envirolab ID	Units	PQL	MGF0086-01	MGF0086-02	MGF0086-03	MGF0086-04	MGF0086-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			04/06/2025	04/06/2025	04/06/2025	03/06/2025	03/06/2025
TRH C6-C9	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	<10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve Xylenes	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve BTEX	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*103*	*105*	*107*	*106*	*108*
Surrogate Toluene-D8	%		*104*	*103*	*105*	*105*	*105*
Surrogate 4-Bromofluorobenzene	%		*102*	*101*	*103*	*88.3*	*104*

Envirolab ID	Units	PQL	MGF0086-06	MGF0086-07	MGF0086-08	MGF0086-09	MGF0086-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			03/06/2025	03/06/2025	03/06/2025	03/06/2025	04/06/2025
TRH C6-C9	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	<10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve Xylenes	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve BTEX	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*109*	*110*	*108*	*106*	*110*
Surrogate Toluene-D8	%		*109*	*109*	*109*	*110*	*109*
Surrogate 4-Bromofluorobenzene	%		*103*	*105*	*101*	*101*	*102*

Envirolab ID	Units	PQL	MGF0086-11	MGF0086-12	MGF0086-13	MGF0086-14	MGF0086-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			04/06/2025	04/06/2025	03/06/2025	03/06/2025	03/06/2025
TRH C6-C9	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	<10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Volatile TRH and BTEX (Water)

Envirolab ID	Units	PQL	MGF0086-11	MGF0086-12	MGF0086-13	MGF0086-14	MGF0086-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			04/06/2025	04/06/2025	03/06/2025	03/06/2025	03/06/2025
Total +ve Xylenes	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve BTEX	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*110*	*110*	*108*	*109*	*109*
Surrogate Toluene-D8	%		*106*	*108*	*108*	*111*	*106*
Surrogate 4-Bromofluorobenzene	%		*104*	*103*	*103*	*100*	*103*

Envirolab ID	Units	PQL	MGF0086-16	MGF0086-17	MGF0086-18	MGF0086-19	MGF0086-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			03/06/2025	03/06/2025	03/06/2025	04/06/2025	04/06/2025
TRH C6-C9	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	<10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve Xylenes	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve BTEX	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*109*	*109*	*111*	*109*	*110*
Surrogate Toluene-D8	%		*107*	*104*	*105*	*107*	*104*
Surrogate 4-Bromofluorobenzene	%		*103*	*104*	*104*	*103*	*104*

Envirolab ID	Units	PQL	MGF0086-21	MGF0086-22	MGF0086-23	MGF0086-24	MGF0086-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			04/06/2025	04/06/2025	04/06/2025	04/06/2025	04/06/2025
TRH C6-C9	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	<10	17	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	<10	17	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve Xylenes	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve BTEX	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*114*	*115*	*116*	*119*	*115*
Surrogate Toluene-D8	%		*101*	*101*	*102*	*106*	*98.4*
Surrogate 4-Bromofluorobenzene	%		*93.5*	*91.5*	*101*	*104*	*119*

Volatile TRH and BTEX (Water)

Envirolab ID	Units	PQL	MGF0086-26	MGF0086-27	MGF0086-28	MGF0086-29	MGF0086-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			04/06/2025	04/06/2025	04/06/2025	04/06/2025	04/06/2025
TRH C6-C9	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	13	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	13	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve Xylenes	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve BTEX	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*108*	*118*	*119*	*118*	*118*
Surrogate Toluene-D8	%		*102*	*103*	*104*	*103*	*104*
Surrogate 4-Bromofluorobenzene	%		*104*	*103*	*106*	*101*	*92.8*

Envirolab ID	Units	PQL	MGF0086-31	MGF0086-32	MGF0086-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			04/06/2025	04/06/2025	04/06/2025
TRH C6-C9	µg/L	10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	10	14
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	10	14
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0
Total +ve Xylenes	µg/L	1.0	<1.0	<1.0	<1.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0
Total +ve BTEX	µg/L	1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*116*	*130*	*128*
Surrogate Toluene-D8	%		*103*	*111*	*108*
Surrogate 4-Bromofluorobenzene	%		*105*	*114*	*104*

Semi-volatile TRH (Water)

Envirolab ID	Units	PQL	MGF0086-01	MGF0086-02	MGF0086-03	MGF0086-04	MGF0086-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			04/06/2025	04/06/2025	04/06/2025	03/06/2025	03/06/2025
TRH C10-C14	µg/L	50	<50	<50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%		*68.3*	*74.9*	*78.8*	*65.4*	*76.8*

Envirolab ID	Units	PQL	MGF0086-06	MGF0086-07	MGF0086-08	MGF0086-09	MGF0086-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			03/06/2025	03/06/2025	03/06/2025	03/06/2025	04/06/2025
TRH C10-C14	µg/L	50	<50	<50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%		*70.9*	*85.1*	*78.7*	*60.8*	*76.3*

Envirolab ID	Units	PQL	MGF0086-11	MGF0086-12	MGF0086-13	MGF0086-14	MGF0086-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			04/06/2025	04/06/2025	03/06/2025	03/06/2025	03/06/2025
TRH C10-C14	µg/L	50	<50	<50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%		*73.8*	*81.1*	*82.8*	*63.2*	*82.9*

Envirolab ID	Units	PQL	MGF0086-16	MGF0086-17	MGF0086-18	MGF0086-19	MGF0086-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			03/06/2025	03/06/2025	03/06/2025	04/06/2025	04/06/2025
TRH C10-C14	µg/L	50	<50	<50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50	<50	<50

Semi-volatile TRH (Water)

Envirolab ID	Units	PQL	MGF0086-16	MGF0086-17	MGF0086-18	MGF0086-19	MGF0086-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			03/06/2025	03/06/2025	03/06/2025	04/06/2025	04/06/2025
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%		*86.6*	*81.9*	*76.2*	*83.4*	*82.0*

Envirolab ID	Units	PQL	MGF0086-21	MGF0086-22	MGF0086-23	MGF0086-24	MGF0086-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			04/06/2025	04/06/2025	04/06/2025	04/06/2025	04/06/2025
TRH C10-C14	µg/L	50	<50	<50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%		*84.7*	*62.5*	*77.0*	*72.6*	*90.6*

Envirolab ID	Units	PQL	MGF0086-26	MGF0086-27	MGF0086-28	MGF0086-29	MGF0086-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			04/06/2025	04/06/2025	04/06/2025	04/06/2025	04/06/2025
TRH C10-C14	µg/L	50	<50	<50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%		*63.8*	*75.3*	*74.3*	*77.7*	*79.0*

Envirolab ID	Units	PQL	MGF0086-31	MGF0086-32	MGF0086-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			04/06/2025	04/06/2025	04/06/2025
TRH C10-C14	µg/L	50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100

Semi-volatile TRH (Water)

Envirolab ID	Units	PQL	MGF0086-31	MGF0086-32	MGF0086-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			04/06/2025	04/06/2025	04/06/2025
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50
Surrogate o-Terphenyl	%		*80.5*	*76.8*	*76.2*

Acid Extractable Metals (Water)

Envirolab ID	Units	PQL	MGF0086-01	MGF0086-02	MGF0086-03	MGF0086-04	MGF0086-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			04/06/2025	04/06/2025	04/06/2025	03/06/2025	03/06/2025
Silicon*	mg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Calcium	mg/L	0.50	420	440	430	430	440
Magnesium	mg/L	0.50	1500	1600	1500	1500	1600
Potassium	mg/L	0.50	500	530	520	520	530
Sodium	mg/L	0.50	10000	11000	11000	11000	11000
Hardness (calc) equivalent CaCO3	mg/L	3.0	7200	7600	7400	7400	7500

Envirolab ID	Units	PQL	MGF0086-06	MGF0086-07	MGF0086-08	MGF0086-09	MGF0086-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			03/06/2025	03/06/2025	03/06/2025	03/06/2025	04/06/2025
Silicon*	mg/L	0.10	<0.10	<0.20 [3]	<0.20 [3]	<0.20 [3]	<0.20 [3]
Calcium	mg/L	0.50	440	410	410	400	420
Magnesium	mg/L	0.50	1600	1300	1300	1300	1300
Potassium	mg/L	0.50	520	510	500	490	490
Sodium	mg/L	0.50	11000	11000	10000	10000	10000
Hardness (calc) equivalent CaCO3	mg/L	3.0	7500	6300	6500	6200	6500

Envirolab ID	Units	PQL	MGF0086-11	MGF0086-12	MGF0086-13	MGF0086-14	MGF0086-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			04/06/2025	04/06/2025	03/06/2025	03/06/2025	03/06/2025
Silicon*	mg/L	0.10	<0.20 [3]	<0.20 [3]	<0.20 [3]	<0.20 [3]	<0.20 [3]
Calcium	mg/L	0.50	410	420	410	420	430
Magnesium	mg/L	0.50	1300	1300	1300	1300	1400
Potassium	mg/L	0.50	500	500	500	520	520
Sodium	mg/L	0.50	10000	10000	10000	11000	11000
Hardness (calc) equivalent CaCO3	mg/L	3.0	6300	6500	6500	6600	6700

Envirolab ID	Units	PQL	MGF0086-16	MGF0086-17	MGF0086-18	MGF0086-19	MGF0086-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			03/06/2025	03/06/2025	03/06/2025	04/06/2025	04/06/2025
Silicon*	mg/L	0.10	<0.20 [3]	<0.20 [3]	<0.20 [3]	<0.20 [3]	<0.20 [3]
Calcium	mg/L	0.50	410	420	430	420	420
Magnesium	mg/L	0.50	1300	1300	1400	1400	1300
Potassium	mg/L	0.50	500	500	500	500	500
Sodium	mg/L	0.50	10000	10000	10000	10000	10000
Hardness (calc) equivalent CaCO3	mg/L	3.0	6500	6600	6700	6700	6500

Envirolab ID	Units	PQL	MGF0086-21	MGF0086-22	MGF0086-23	MGF0086-24	MGF0086-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			04/06/2025	04/06/2025	04/06/2025	04/06/2025	04/06/2025
Silicon*	mg/L	0.10	<0.20 [3]	<0.20 [3]	<0.20 [3]	<0.20 [3]	<0.20 [3]
Calcium	mg/L	0.50	420	420	430	410	410
Magnesium	mg/L	0.50	1300	1400	1300	1300	1300
Potassium	mg/L	0.50	500	510	510	500	500
Sodium	mg/L	0.50	10000	11000	10000	10000	10000
Hardness (calc) equivalent CaCO3	mg/L	3.0	6600	6700	6600	6400	6400

Acid Extractable Metals (Water)

Envirolab ID	Units	PQL	MGF0086-26	MGF0086-27	MGF0086-28	MGF0086-29	MGF0086-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			04/06/2025	04/06/2025	04/06/2025	04/06/2025	04/06/2025
Silicon*	mg/L	0.10	<0.20 [3]	<0.20 [3]	0.20	0.22	<0.20 [3]
Calcium	mg/L	0.50	420	380	390	400	400
Magnesium	mg/L	0.50	1300	1200	1200	1300	1200
Potassium	mg/L	0.50	500	500	510	510	490
Sodium	mg/L	0.50	10000	10000	10000	10000	10000
Hardness (calc) equivalent CaCO3	mg/L	3.0	6500	5800	6100	6300	6100

Envirolab ID	Units	PQL	MGF0086-31	MGF0086-32	MGF0086-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			04/06/2025	04/06/2025	04/06/2025
Silicon*	mg/L	0.10	<0.20 [3]	<0.20 [3]	<0.20 [3]
Calcium	mg/L	0.50	410	410	400
Magnesium	mg/L	0.50	1300	1300	1300
Potassium	mg/L	0.50	500	510	500
Sodium	mg/L	0.50	10000	10000	10000
Hardness (calc) equivalent CaCO3	mg/L	3.0	6400	6400	6200

Acid Extractable Low Level Metals (Water)

Envirolab ID	Units	PQL	MGF0086-01	MGF0086-02	MGF0086-03	MGF0086-04	MGF0086-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			04/06/2025	04/06/2025	04/06/2025	03/06/2025	03/06/2025
Silver	µg/L	1.0	<5.0	<5.0	<5.0	<5.0	<5.0
Aluminium	µg/L	10	<50	<50	<50	<50	<50
Arsenic	µg/L	1.0	<5.0	<5.0	<5.0	<5.0	<5.0
Boron	µg/L	20	4800	5000	5000	4800	4900
Barium	µg/L	1.0	6.5	5.5	6.6	7.2	6.0
Beryllium	µg/L	0.50	<2.5	<2.5	<2.5	<2.5	<2.5
Cadmium	µg/L	0.10	<0.50	<0.50	<0.50	<0.50	<0.50
Cobalt	µg/L	1.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chromium	µg/L	1.0	7.5	<5.0	<5.0	<5.0	<5.0
Copper	µg/L	1.0	47	<5.0	<5.0	<5.0	<5.0
Iron	µg/L	10	11000	<50	<50	<50	<50
Mercury	µg/L	0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Manganese	µg/L	1.0	64	<5.0	<5.0	<5.0	<5.0
Molybdenum	µg/L	1.0	19	14	15	14	14
Nickel	µg/L	1.0	23	<5.0	<5.0	<5.0	<5.0
Lead	µg/L	1.0	<5.0	<5.0	<5.0	<5.0	<5.0
Antimony	µg/L	1.0	<5.0	<5.0	<5.0	<5.0	<5.0
Selenium	µg/L	1.0	<5.0	<5.0	<5.0	<5.0	<5.0
Strontium	µg/L	1.0	8900	9000	9200	8800	9100
Thorium	µg/L	0.50	<2.5	<2.5	<2.5	<2.5	<2.5
Thallium	µg/L	1.0	<5.0	<5.0	<5.0	<5.0	<5.0
Uranium	µg/L	1.0	<5.0	<5.0	<5.0	<5.0	<5.0
Vanadium	µg/L	1.0	<5.0	<5.0	<5.0	<5.0	<5.0
Zinc	µg/L	1.0	1400	<5.0	<5.0	<5.0	29

Envirolab ID	Units	PQL	MGF0086-06	MGF0086-07	MGF0086-08	MGF0086-09	MGF0086-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			03/06/2025	03/06/2025	03/06/2025	03/06/2025	04/06/2025
Silver	µg/L	1.0	<5.0	<5.0	<5.0	<5.0 [3]	<5.0 [3]
Aluminium	µg/L	10	<50	<50	<50	<50 [3]	52
Arsenic	µg/L	1.0	<5.0	<5.0	<5.0	<5.0 [3]	<5.0 [3]
Boron	µg/L	20	5100	5000	5000	5500	5500
Barium	µg/L	1.0	<5.0	6.4	6.6	6.8	6.5
Beryllium	µg/L	0.50	<2.5	<2.5	<2.5	<2.5 [3]	<2.5 [3]
Cadmium	µg/L	0.10	<0.50	<0.50	<0.50	<0.50 [3]	<0.50 [3]
Cobalt	µg/L	1.0	<5.0	<5.0	<5.0	<5.0 [3]	<5.0 [3]
Chromium	µg/L	1.0	<5.0	<5.0	<5.0	<5.0 [3]	<5.0 [3]
Copper	µg/L	1.0	<5.0	<5.0	<5.0	<5.0 [3]	<5.0 [3]
Iron	µg/L	10	<50	<50	<50	<50 [3]	<50 [3]
Mercury	µg/L	0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Manganese	µg/L	1.0	<5.0	<5.0	<5.0	<5.0 [3]	<5.0 [3]
Molybdenum	µg/L	1.0	15	15	15	16	14
Nickel	µg/L	1.0	<5.0	<5.0	<5.0	<5.0 [3]	<5.0 [3]
Lead	µg/L	1.0	<5.0	<5.0	<5.0	<5.0 [3]	<5.0 [3]
Antimony	µg/L	1.0	<5.0	<5.0	<5.0	<5.0 [3]	<5.0 [3]
Selenium	µg/L	1.0	<5.0	<5.0	<5.0	<5.0 [3]	<5.0 [3]

Acid Extractable Low Level Metals (Water)

Envirolab ID	Units	PQL	MGF0086-06	MGF0086-07	MGF0086-08	MGF0086-09	MGF0086-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			03/06/2025	03/06/2025	03/06/2025	03/06/2025	04/06/2025
Strontium	µg/L	1.0	9200	8900	8900	9200	9000
Thorium	µg/L	0.50	<2.5	<2.5	<2.5	<2.5 [3]	<2.5 [3]
Thallium	µg/L	1.0	<5.0	<5.0	<5.0	<5.0 [3]	<5.0 [3]
Uranium	µg/L	1.0	<5.0	<5.0	<5.0	<5.0 [3]	<5.0 [3]
Vanadium	µg/L	1.0	<5.0	<5.0	<5.0	<5.0 [3]	<5.0 [3]
Zinc	µg/L	1.0	<5.0	<5.0	<5.0	<5.0 [3]	<5.0 [3]

Envirolab ID	Units	PQL	MGF0086-11	MGF0086-12	MGF0086-13	MGF0086-14	MGF0086-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			04/06/2025	04/06/2025	03/06/2025	03/06/2025	03/06/2025
Silver	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Aluminium	µg/L	10	<50 [3]	<50 [3]	<50 [3]	<50 [3]	<50 [3]
Arsenic	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Boron	µg/L	20	5100	5300	5600	5700	5700
Barium	µg/L	1.0	7.0	6.4	7.6	7.4	8.5
Beryllium	µg/L	0.50	<2.5 [3]	<2.5 [3]	<2.5 [3]	<2.5 [3]	<2.5 [3]
Cadmium	µg/L	0.10	<0.50 [3]	<0.50 [3]	<0.50 [3]	<0.50 [3]	0.55
Cobalt	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Chromium	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	36
Copper	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Iron	µg/L	10	<50 [3]	<50 [3]	<50 [3]	<50 [3]	<50 [3]
Mercury	µg/L	0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Manganese	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Molybdenum	µg/L	1.0	14	14	14	14	14
Nickel	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Lead	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Antimony	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Selenium	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Strontium	µg/L	1.0	8800	8900	9400	9100	9400
Thorium	µg/L	0.50	<2.5 [3]	<2.5 [3]	<2.5 [3]	<2.5 [3]	<2.5 [3]
Thallium	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Uranium	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Vanadium	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Zinc	µg/L	1.0	<5.0 [3]	250	<5.0 [3]	<5.0 [3]	1600

Envirolab ID	Units	PQL	MGF0086-16	MGF0086-17	MGF0086-18	MGF0086-19	MGF0086-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			03/06/2025	03/06/2025	03/06/2025	04/06/2025	04/06/2025
Silver	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Aluminium	µg/L	10	60	<50 [3]	51	<50 [3]	<50 [3]
Arsenic	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Boron	µg/L	20	5600	5600	5500	5900	5700
Barium	µg/L	1.0	6.4	7.8	7.2	7.8	8.8
Beryllium	µg/L	0.50	<2.5 [3]	<2.5 [3]	<2.5 [3]	<2.5 [3]	<2.5 [3]
Cadmium	µg/L	0.10	<0.50 [3]	<0.50 [3]	<0.50 [3]	<0.50 [3]	<0.50 [3]
Cobalt	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Chromium	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]

Acid Extractable Low Level Metals (Water)

Envirolab ID	Units	PQL	MGF0086-16	MGF0086-17	MGF0086-18	MGF0086-19	MGF0086-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			03/06/2025	03/06/2025	03/06/2025	04/06/2025	04/06/2025
Copper	µg/L	1.0	7.1	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Iron	µg/L	10	<50 [3]	<50 [3]	<50 [3]	<50 [3]	<50 [3]
Mercury	µg/L	0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Manganese	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Molybdenum	µg/L	1.0	14	15	15	15	13
Nickel	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Lead	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Antimony	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Selenium	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	5.1	<5.0 [3]
Strontium	µg/L	1.0	9100	10000	9000	9500	9000
Thorium	µg/L	0.50	<2.5 [3]	<2.5 [3]	<2.5 [3]	<2.5 [3]	<2.5 [3]
Thallium	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Uranium	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Vanadium	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Zinc	µg/L	1.0	10	<5.0 [3]	9.1	6.0	<5.0 [3]

Envirolab ID	Units	PQL	MGF0086-21	MGF0086-22	MGF0086-23	MGF0086-24	MGF0086-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			04/06/2025	04/06/2025	04/06/2025	04/06/2025	04/06/2025
Silver	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Aluminium	µg/L	10	<50 [3]	55	<50 [3]	<50 [3]	<50 [3]
Arsenic	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Boron	µg/L	20	5700	6000	6100	5800	5900
Barium	µg/L	1.0	6.6	7.4	7.8	6.4	5.4
Beryllium	µg/L	0.50	<2.5 [3]	<2.5 [3]	<2.5 [3]	<2.5 [3]	<2.5 [3]
Cadmium	µg/L	0.10	<0.50 [3]	<0.50 [3]	<0.50 [3]	<0.50 [3]	<0.50 [3]
Cobalt	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Chromium	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Copper	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Iron	µg/L	10	<50 [3]	<50 [3]	<50 [3]	<50 [3]	<50 [3]
Mercury	µg/L	0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Manganese	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Molybdenum	µg/L	1.0	14	13	16	13	14
Nickel	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Lead	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Antimony	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Selenium	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Strontium	µg/L	1.0	9700	9000	9300	9200	9100
Thorium	µg/L	0.50	<2.5 [3]	<2.5 [3]	<2.5 [3]	<2.5 [3]	<2.5 [3]
Thallium	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Uranium	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Vanadium	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Zinc	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]

Acid Extractable Low Level Metals (Water)

Envirolab ID	Units	PQL	MGF0086-26	MGF0086-27	MGF0086-28	MGF0086-29	MGF0086-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			04/06/2025	04/06/2025	04/06/2025	04/06/2025	04/06/2025
Silver	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Aluminium	µg/L	10	<50 [3]	<50 [3]	110	64	<50 [3]
Arsenic	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Boron	µg/L	20	5700	5800	5900	6100	5500
Barium	µg/L	1.0	5.4	5.9	8.0	5.5	5.4
Beryllium	µg/L	0.50	<2.5 [3]	<2.5 [3]	<2.5 [3]	<2.5 [3]	<2.5 [3]
Cadmium	µg/L	0.10	<0.50 [3]	<0.50 [3]	<0.50 [3]	<0.50 [3]	<0.50 [3]
Cobalt	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Chromium	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Copper	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Iron	µg/L	10	<50 [3]	<50 [3]	<50 [3]	<50 [3]	<50 [3]
Mercury	µg/L	0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Manganese	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Molybdenum	µg/L	1.0	14	13	14	14	13
Nickel	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Lead	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Antimony	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Selenium	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Strontium	µg/L	1.0	9000	8900	9300	8700	8600
Thorium	µg/L	0.50	<2.5 [3]	<2.5 [3]	<2.5 [3]	<2.5 [3]	<2.5 [3]
Thallium	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Uranium	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Vanadium	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]
Zinc	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]	<5.0 [3]

Envirolab ID	Units	PQL	MGF0086-31	MGF0086-32	MGF0086-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			04/06/2025	04/06/2025	04/06/2025
Silver	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]
Aluminium	µg/L	10	<50 [3]	<50 [3]	<50 [3]
Arsenic	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]
Boron	µg/L	20	6300	5700	5600
Barium	µg/L	1.0	6.6	8.6	7.6
Beryllium	µg/L	0.50	<2.5 [3]	<2.5 [3]	<2.5 [3]
Cadmium	µg/L	0.10	<0.50 [3]	<0.50 [3]	<0.50 [3]
Cobalt	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]
Chromium	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]
Copper	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]
Iron	µg/L	10	<50 [3]	<50 [3]	<50 [3]
Mercury	µg/L	0.050	<0.050	<0.050	<0.050
Manganese	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]
Molybdenum	µg/L	1.0	14	14	13
Nickel	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]
Lead	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]
Antimony	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]
Selenium	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]

Acid Extractable Low Level Metals (Water)

Envirolab ID	Units	PQL	MGF0086-31	MGF0086-32	MGF0086-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			04/06/2025	04/06/2025	04/06/2025
Strontium	µg/L	1.0	8900	8900	8700
Thorium	µg/L	0.50	<2.5 [3]	<2.5 [3]	<2.5 [3]
Thallium	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]
Uranium	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]
Vanadium	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]
Zinc	µg/L	1.0	<5.0 [3]	<5.0 [3]	<5.0 [3]

Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	MGF0086-01	MGF0086-02	MGF0086-03	MGF0086-04	MGF0086-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			04/06/2025	04/06/2025	04/06/2025	03/06/2025	03/06/2025
pH	pH units		7.9	8.0	7.8	8.0	8.0
Electrical Conductivity	µS/cm	2.0	59000	58000	59000	58000	58000
Total Dissolved Solids	mg/L	5.0	47000	42000	44000	44000	45000
Estimated Salinity*	mg/L	1.0	37000	37000	38000	37000	37000
Total Suspended Solids	mg/L	1.0	2.7	26	3.7	2.5	3.0

Envirolab ID	Units	PQL	MGF0086-06	MGF0086-07	MGF0086-08	MGF0086-09	MGF0086-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			03/06/2025	03/06/2025	03/06/2025	03/06/2025	04/06/2025
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	59000	59000	59000	59000	59000
Total Dissolved Solids	mg/L	5.0	46000	43000	44000	43000	43000
Estimated Salinity*	mg/L	1.0	37000	38000	38000	38000	38000
Total Suspended Solids	mg/L	1.0	2.6	2.6	2.8	4.7	12

Envirolab ID	Units	PQL	MGF0086-11	MGF0086-12	MGF0086-13	MGF0086-14	MGF0086-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			04/06/2025	04/06/2025	03/06/2025	03/06/2025	03/06/2025
pH	pH units		8.0	8.0	8.0	8.0	8.1
Electrical Conductivity	µS/cm	2.0	59000	59000	59000	59000	59000
Total Dissolved Solids	mg/L	5.0	47000	44000	44000	46000	46000
Estimated Salinity*	mg/L	1.0	38000	38000	38000	38000	38000
Total Suspended Solids	mg/L	1.0	7.7	5.1	3.5	4.9	3.4

Envirolab ID	Units	PQL	MGF0086-16	MGF0086-17	MGF0086-18	MGF0086-19	MGF0086-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			03/06/2025	03/06/2025	03/06/2025	04/06/2025	04/06/2025
pH	pH units		8.1	8.1	8.1	8.0	8.0
Electrical Conductivity	µS/cm	2.0	59000	59000	59000	59000	59000
Total Dissolved Solids	mg/L	5.0	47000	46000	46000	44000	47000
Estimated Salinity*	mg/L	1.0	38000	38000	38000	38000	38000
Total Suspended Solids	mg/L	1.0	4.9	4.0	4.6	3.4	3.3

Envirolab ID	Units	PQL	MGF0086-21	MGF0086-22	MGF0086-23	MGF0086-24	MGF0086-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			04/06/2025	04/06/2025	04/06/2025	04/06/2025	04/06/2025
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	59000	59000	59000	59000	59000
Total Dissolved Solids	mg/L	5.0	46000	47000	45000	45000	44000
Estimated Salinity*	mg/L	1.0	38000	38000	38000	38000	38000
Total Suspended Solids	mg/L	1.0	3.9	5.3	4.5	13	3.3

Envirolab ID	Units	PQL	MGF0086-26	MGF0086-27	MGF0086-28	MGF0086-29	MGF0086-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			04/06/2025	04/06/2025	04/06/2025	04/06/2025	04/06/2025
pH	pH units		8.0	8.1	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	59000	59000	59000	59000	60000
Total Dissolved Solids	mg/L	5.0	43000	44000	43000	48000	44000

Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	MGF0086-26	MGF0086-27	MGF0086-28	MGF0086-29	MGF0086-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			04/06/2025	04/06/2025	04/06/2025	04/06/2025	04/06/2025
Estimated Salinity*	mg/L	1.0	38000	38000	38000	38000	38000
Total Suspended Solids	mg/L	1.0	2.4	3.3	17	12	9.5

Envirolab ID	Units	PQL	MGF0086-31	MGF0086-32	MGF0086-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			04/06/2025	04/06/2025	04/06/2025
pH	pH units		8.1	8.1	8.1
Electrical Conductivity	µS/cm	2.0	59000	59000	59000
Total Dissolved Solids	mg/L	5.0	44000	44000	43000
Estimated Salinity*	mg/L	1.0	38000	38000	38000
Total Suspended Solids	mg/L	1.0	5.8	5.5	13

Inorganics - Carbon, Nitrogen and Sulfur Species (Water)

Envirolab ID	Units	PQL	MGF0086-01	MGF0086-02	MGF0086-03	MGF0086-04	MGF0086-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			04/06/2025	04/06/2025	04/06/2025	03/06/2025	03/06/2025
Total Organic Carbon	mg/L	1.0	5.0	5.1	5.2	5.0	4.7

Envirolab ID	Units	PQL	MGF0086-06	MGF0086-07	MGF0086-08	MGF0086-09	MGF0086-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			03/06/2025	03/06/2025	03/06/2025	03/06/2025	04/06/2025
Total Organic Carbon	mg/L	1.0	5.0	4.8	4.6	4.4	4.9

Envirolab ID	Units	PQL	MGF0086-11	MGF0086-12	MGF0086-13	MGF0086-14	MGF0086-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			04/06/2025	04/06/2025	03/06/2025	03/06/2025	03/06/2025
Total Organic Carbon	mg/L	1.0	4.6	4.6	4.7	4.7	4.7

Envirolab ID	Units	PQL	MGF0086-16	MGF0086-17	MGF0086-18	MGF0086-19	MGF0086-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			03/06/2025	03/06/2025	03/06/2025	04/06/2025	04/06/2025
Total Organic Carbon	mg/L	1.0	4.3	4.5	4.2	4.4	4.7

Envirolab ID	Units	PQL	MGF0086-21	MGF0086-22	MGF0086-23	MGF0086-24	MGF0086-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			04/06/2025	04/06/2025	04/06/2025	04/06/2025	04/06/2025
Total Organic Carbon	mg/L	1.0	4.9	5.2	5.2	5.1	5.1

Envirolab ID	Units	PQL	MGF0086-26	MGF0086-27	MGF0086-28	MGF0086-29	MGF0086-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			04/06/2025	04/06/2025	04/06/2025	04/06/2025	04/06/2025
Total Organic Carbon	mg/L	1.0	4.9	5.0	4.9	4.8	4.9

Envirolab ID	Units	PQL	MGF0086-31	MGF0086-32	MGF0086-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			04/06/2025	04/06/2025	04/06/2025
Total Organic Carbon	mg/L	1.0	4.8	4.6	4.9

Certificate of Analysis MGF0086

Inorganics - Nutrients (Water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	MGF0086-01	MGF0086-02	MGF0086-03	MGF0086-04	MGF0086-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			04/06/2025	04/06/2025	04/06/2025	03/06/2025	03/06/2025
Chlorophyll a	mg/m3	0.20	1.1	0.53	0.53	0.67	0.53

Envirolab ID	Units	PQL	MGF0086-06	MGF0086-07	MGF0086-08	MGF0086-09	MGF0086-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			03/06/2025	03/06/2025	03/06/2025	03/06/2025	04/06/2025
Chlorophyll a	mg/m3	0.20	0.53	0.53	0.67	0.67	0.53

Envirolab ID	Units	PQL	MGF0086-11	MGF0086-12	MGF0086-13	MGF0086-14	MGF0086-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			04/06/2025	04/06/2025	03/06/2025	03/06/2025	03/06/2025
Chlorophyll a	mg/m3	0.20	0.67	0.80	0.80	0.67	0.93

Envirolab ID	Units	PQL	MGF0086-16	MGF0086-17	MGF0086-18	MGF0086-19	MGF0086-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			03/06/2025	03/06/2025	03/06/2025	04/06/2025	04/06/2025
Chlorophyll a	mg/m3	0.20	0.80	0.93	0.93	1.2	1.2

Envirolab ID	Units	PQL	MGF0086-21	MGF0086-22	MGF0086-23	MGF0086-24	MGF0086-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			04/06/2025	04/06/2025	04/06/2025	04/06/2025	04/06/2025
Chlorophyll a	mg/m3	0.20	1.1	0.80	0.93	1.2	1.1

Envirolab ID	Units	PQL	MGF0086-26	MGF0086-27	MGF0086-28	MGF0086-29	MGF0086-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			04/06/2025	04/06/2025	04/06/2025	04/06/2025	04/06/2025
Chlorophyll a	mg/m3	0.20	0.80	0.93	0.93	0.80	0.93

Envirolab ID	Units	PQL	MGF0086-31	MGF0086-32	MGF0086-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			04/06/2025	04/06/2025	04/06/2025
Chlorophyll a	mg/m3	0.20	0.80	0.80	2.3

Subcontracted Inorganics - Certificate: ENVL25-5 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MGF0086-01	MGF0086-02	MGF0086-03	MGF0086-04	MGF0086-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			04/06/2025	04/06/2025	04/06/2025	03/06/2025	03/06/2025
Ammonia as N	µg/L	3.0	<3 [6]	<3 [6]	<3 [6]	<3 [6]	<3 [6]
Nitrate as N	µg/L	2.0	2 [6]	<2 [6]	<2 [6]	<2 [6]	2 [6]
Nitrite as N	µg/L	2.0	<2 [6]	<2 [6]	<2 [6]	<2 [6]	<2 [6]
Total Nitrogen	µg/L	50	170 [6]	160 [6]	160 [6]	160 [6]	160 [6]
Phosphate as P	µg/L	2.0	4 [6]	4 [6]	4 [6]	3 [6]	5 [6]
Total Phosphorus	µg/L	5.0	14 [6]	14 [6]	13 [6]	13 [6]	12 [6]
NOx as N	µg/L	2.0	2 [6]	<2 [6]	<2 [6]	<2 [6]	2 [6]
TKN as N*	µg/L	50	170 [6]	160 [6]	160 [6]	160 [6]	160 [6]

Envirolab ID	Units	PQL	MGF0086-06	MGF0086-07	MGF0086-08	MGF0086-09	MGF0086-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			03/06/2025	03/06/2025	03/06/2025	03/06/2025	04/06/2025
Ammonia as N	µg/L	3.0	<3 [6]	<3 [6]	<3 [6]	<3 [6]	<3 [6]
Nitrate as N	µg/L	2.0	2 [6]	<2 [6]	<2 [6]	<2 [6]	3 [6]
Nitrite as N	µg/L	2.0	<2 [6]	<2 [6]	<2 [6]	<2 [6]	<2 [6]
Total Nitrogen	µg/L	50	240 [6]	160 [6]	150 [6]	160 [6]	170 [6]
Phosphate as P	µg/L	2.0	4 [6]	5 [6]	4 [6]	4 [6]	4 [6]
Total Phosphorus	µg/L	5.0	14 [6]	13 [6]	13 [6]	13 [6]	16 [6]
NOx as N	µg/L	2.0	2 [6]	<2 [6]	<2 [6]	<2 [6]	3 [6]
TKN as N*	µg/L	50	240 [6]	160 [6]	150 [6]	160 [6]	170 [6]

Envirolab ID	Units	PQL	MGF0086-11	MGF0086-12	MGF0086-13	MGF0086-14	MGF0086-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			04/06/2025	04/06/2025	03/06/2025	03/06/2025	03/06/2025
Ammonia as N	µg/L	3.0	<3 [6]	<3 [6]	<3 [6]	4 [6]	<3 [6]
Nitrate as N	µg/L	2.0	3 [6]	2 [6]	<2 [6]	<2 [6]	<2 [6]
Nitrite as N	µg/L	2.0	<2 [6]	<2 [6]	<2 [6]	<2 [6]	<2 [6]
Total Nitrogen	µg/L	50	160 [6]	150 [6]	200 [6]	200 [6]	190 [6]
Phosphate as P	µg/L	2.0	4 [6]	4 [6]	3 [6]	4 [6]	3 [6]
Total Phosphorus	µg/L	5.0	14 [6]	13 [6]	14 [6]	15 [6]	15 [6]
NOx as N	µg/L	2.0	3 [6]	2 [6]	<2 [6]	2 [6]	<2 [6]
TKN as N*	µg/L	50	160 [6]	150 [6]	200 [6]	200 [6]	190 [6]

Envirolab ID	Units	PQL	MGF0086-16	MGF0086-17	MGF0086-18	MGF0086-19	MGF0086-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			03/06/2025	03/06/2025	03/06/2025	04/06/2025	04/06/2025
Ammonia as N	µg/L	3.0	<3 [6]	<3 [6]	<3 [6]	<3 [6]	<3 [6]

Subcontracted Inorganics - Certificate: ENVL25-5 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MGF0086-16	MGF0086-17	MGF0086-18	MGF0086-19	MGF0086-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			03/06/2025	03/06/2025	03/06/2025	04/06/2025	04/06/2025
Nitrate as N	µg/L	2.0	<2 [6]	<2 [6]	<2 [6]	<2 [6]	3 [6]
Nitrite as N	µg/L	2.0	<2 [6]	<2 [6]	<2 [6]	<2 [6]	<2 [6]
Total Nitrogen	µg/L	50	160 [6]	160 [6]	160 [6]	170 [6]	150 [6]
Phosphate as P	µg/L	2.0	3 [6]	4 [6]	3 [6]	4 [6]	5 [6]
Total Phosphorus	µg/L	5.0	14 [6]	15 [6]	14 [6]	14 [6]	14 [6]
NOx as N	µg/L	2.0	<2 [6]	<2 [6]	<2 [6]	<2 [6]	3 [6]
TKN as N*	µg/L	50	160 [6]	160 [6]	160 [6]	170 [6]	150 [6]

Envirolab ID	Units	PQL	MGF0086-21	MGF0086-22	MGF0086-23	MGF0086-24	MGF0086-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			04/06/2025	04/06/2025	04/06/2025	04/06/2025	04/06/2025
Ammonia as N	µg/L	3.0	<3 [6]	<3 [6]	<3 [6]	<3 [6]	<3 [6]
Nitrate as N	µg/L	2.0	<2 [6]	4 [6]	2 [6]	3 [6]	<2 [6]
Nitrite as N	µg/L	2.0	<2 [6]	<2 [6]	<2 [6]	<2 [6]	<2 [6]
Total Nitrogen	µg/L	50	150 [6]	160 [6]	170 [6]	150 [6]	150 [6]
Phosphate as P	µg/L	2.0	4 [6]	4 [6]	6 [6]	5 [6]	4 [6]
Total Phosphorus	µg/L	5.0	13 [6]	13 [6]	14 [6]	12 [6]	13 [6]
NOx as N	µg/L	2.0	<2 [6]	4 [6]	3 [6]	3 [6]	<2 [6]
TKN as N*	µg/L	50	150 [6]	160 [6]	170 [6]	150 [6]	150 [6]

Envirolab ID	Units	PQL	MGF0086-26	MGF0086-27	MGF0086-28	MGF0086-29	MGF0086-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			04/06/2025	04/06/2025	04/06/2025	04/06/2025	04/06/2025
Ammonia as N	µg/L	3.0	<3 [6]	<3 [6]	<3 [6]	4 [6]	4 [6]
Nitrate as N	µg/L	2.0	<2 [6]	<2 [6]	<2 [6]	6 [6]	4 [6]
Nitrite as N	µg/L	2.0	<2 [6]	<2 [6]	<2 [6]	<2 [6]	<2 [6]
Total Nitrogen	µg/L	50	150 [6]	140 [6]	180 [6]	170 [6]	160 [6]
Phosphate as P	µg/L	2.0	3 [6]	4 [6]	2 [6]	5 [6]	6 [6]
Total Phosphorus	µg/L	5.0	14 [6]	12 [6]	19 [6]	17 [6]	16 [6]
NOx as N	µg/L	2.0	<2 [6]	<2 [6]	<2 [6]	6 [6]	5 [6]
TKN as N*	µg/L	50	150 [6]	140 [6]	180 [6]	170 [6]	160 [6]

Envirolab ID	Units	PQL	MGF0086-31	MGF0086-32	MGF0086-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			04/06/2025	04/06/2025	04/06/2025
Ammonia as N	µg/L	3.0	<3 [6]	<3 [6]	<3 [6]

Subcontracted Inorganics - Certificate: ENVL25-5 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MGF0086-31	MGF0086-32	MGF0086-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			04/06/2025	04/06/2025	04/06/2025
Nitrate as N	µg/L	2.0	<2 [6]	<2 [6]	<2 [6]
Nitrite as N	µg/L	2.0	<2 [6]	<2 [6]	<2 [6]
Total Nitrogen	µg/L	50	150 [6]	150 [6]	160 [6]
Phosphate as P	µg/L	2.0	4 [6]	4 [6]	4 [6]
Total Phosphorus	µg/L	5.0	13 [6]	15 [6]	14 [6]
NOx as N	µg/L	2.0	<2 [6]	<2 [6]	<2 [6]
TKN as N*	µg/L	50	150 [6]	150 [6]	160 [6]

Subcontracted Metals - Certificate: ENVL25-5 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MGF0086-01	MGF0086-02	MGF0086-03	MGF0086-04	MGF0086-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			04/06/2025	04/06/2025	04/06/2025	03/06/2025	03/06/2025
Reactive Silica	µg/L	2.0	39 [6]	40 [6]	40 [6]	50 [6]	51 [6]

Envirolab ID	Units	PQL	MGF0086-06	MGF0086-07	MGF0086-08	MGF0086-09	MGF0086-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			03/06/2025	03/06/2025	03/06/2025	03/06/2025	04/06/2025
Reactive Silica	µg/L	2.0	50 [6]	53 [6]	52 [6]	52 [6]	39 [6]

Envirolab ID	Units	PQL	MGF0086-11	MGF0086-12	MGF0086-13	MGF0086-14	MGF0086-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			04/06/2025	04/06/2025	03/06/2025	03/06/2025	03/06/2025
Reactive Silica	µg/L	2.0	40 [6]	40 [6]	60 [6]	61 [6]	61 [6]

Envirolab ID	Units	PQL	MGF0086-16	MGF0086-17	MGF0086-18	MGF0086-19	MGF0086-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			03/06/2025	03/06/2025	03/06/2025	04/06/2025	04/06/2025
Reactive Silica	µg/L	2.0	55 [6]	56 [6]	56 [6]	43 [6]	44 [6]

Envirolab ID	Units	PQL	MGF0086-21	MGF0086-22	MGF0086-23	MGF0086-24	MGF0086-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			04/06/2025	04/06/2025	04/06/2025	04/06/2025	04/06/2025
Reactive Silica	µg/L	2.0	43 [6]	62 [6]	63 [6]	63 [6]	44 [6]

Envirolab ID	Units	PQL	MGF0086-26	MGF0086-27	MGF0086-28	MGF0086-29	MGF0086-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			04/06/2025	04/06/2025	04/06/2025	04/06/2025	04/06/2025
Reactive Silica	µg/L	2.0	45 [6]	45 [6]	84 [6]	84 [6]	84 [6]

Envirolab ID	Units	PQL	MGF0086-31	MGF0086-32	MGF0086-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			04/06/2025	04/06/2025	04/06/2025
Reactive Silica	µg/L	2.0	50 [6]	50 [6]	49 [6]

Subcontracted Micro - Certificate: Various - Analysed By SA Pathology (Water)

Envirolab ID	Units	PQL	MGF0086-01	MGF0086-02	MGF0086-03	MGF0086-04	MGF0086-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			04/06/2025	04/06/2025	04/06/2025	03/06/2025	03/06/2025
Total Coliforms	MPN/100mL	1.0	38	42	35	37	9

Envirolab ID	Units	PQL	MGF0086-06	MGF0086-07	MGF0086-08	MGF0086-09	MGF0086-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			03/06/2025	03/06/2025	03/06/2025	03/06/2025	04/06/2025
Total Coliforms	MPN/100mL	1.0	29	8	12	7	44

Envirolab ID	Units	PQL	MGF0086-11	MGF0086-12	MGF0086-13	MGF0086-14	MGF0086-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			04/06/2025	04/06/2025	03/06/2025	03/06/2025	03/06/2025
Total Coliforms	MPN/100mL	1.0	25	37	170	160	240

Envirolab ID	Units	PQL	MGF0086-16	MGF0086-17	MGF0086-18	MGF0086-19	MGF0086-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			03/06/2025	03/06/2025	03/06/2025	04/06/2025	04/06/2025
Total Coliforms	MPN/100mL	1.0	24	19	13	12	11

Envirolab ID	Units	PQL	MGF0086-21	MGF0086-22	MGF0086-23	MGF0086-24	MGF0086-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			04/06/2025	04/06/2025	04/06/2025	04/06/2025	04/06/2025
Total Coliforms	MPN/100mL	1.0	11	26	33	40	15

Envirolab ID	Units	PQL	MGF0086-26	MGF0086-27	MGF0086-28	MGF0086-29	MGF0086-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			04/06/2025	04/06/2025	04/06/2025	04/06/2025	04/06/2025
Total Coliforms	MPN/100mL	1.0	16	13	47	54	51.2

Envirolab ID	Units	PQL	MGF0086-31	MGF0086-32	MGF0086-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			04/06/2025	04/06/2025	04/06/2025
Total Coliforms	MPN/100mL	1.0	27	25	13

Result Comments

Identifier	Description
[3]	PQL has been raised due to matrix requiring dilution
[6]	The sub-contracting laboratory did not provide analysis and/or preparation and/or sample receipt dates. The date(s) the sample(s) was/were received at the sub-contracting laboratory has/have been used to assess holding time(s).

Method Summary

Method ID	Methodology Summary
INORG-001	pH - Measured using pH meter and electrode. Please note that the results for water analyses are indicative only, as analysis can be completed outside of the recommended holding times. Solids are reported from a 1:5 water extract unless otherwise specified. Alternatively, pH is determined in a 1:5 extract using 0.01M calcium chloride or a solid is extracted at a ratio of 1:2.5 (AS1289.4.3.1), pH is measured in the extract.
INORG-002	Conductivity and Salinity - measured using a conductivity cell at 25°C. Soil results reported from a 1:5 Soil:Water extract unless otherwise specified. Please note Resistivity is estimated by calculation and may not correlate with results otherwise obtained using the Resistivity current method (based on AS 1289.4.4.1), depending on the nature of the soil being analysed.
INORG-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180±10°C. NOTE: Where the EC of the sample is <100µS/cm, the TDS will typically be below 70mg/L (as the sample is very likely to be at least drinking water quality). Therefore to ensure data quality for TDS, the TDS is typically calculated as per the equation: TDS = EC*0.6
INORG-019	Suspended Solids - determined gravimetrically by filtration of the sample. The solids are dried at 104±5°C
INORG-079	Carbon forms (inorganic, organic, total) determined using a TOC/NDIR analyser via combustion. Dissolved aqueous\forms require filtering prior to determination.
INORG-119	Chlorophyll A based on APHA 10200 H latest edition.
METALS-020	Determination of various metals by ICP-OES. Where salts (oxides, chlorides etc.) are calculated from the element concentration stoichiometrically there is no guarantee that the salt form is completely soluble in the acids used in the preparation.
METALS-021	Determination of Mercury by Cold Vapour AAS.
METALS-022	Determination of various metals by ICP-MS. Please note for Bromine and Iodine, any forms of these elements that are present are included together in the one result reported for each of these two elements. Where salts (oxides, chlorides etc.) are calculated from the element concentration stoichiometrically there is no guarantee that the salt form is completely soluble in the acids used in the preparation.
ORG-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
ORG-023_F1_TOT	Determination of volatile organic compounds (VOCs) by P&T-GC-MS. Water samples are analysed directly by purge and trap GC-MS. Solids are extracted with Methanol, diluted and analysed by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.
SUB-021	Subcontracted to Marine & Freshwater Research - Accreditation number 10603
SUB-041_CA	Subcontracted to SA Pathology

Result Definitions

Identifier	Description
NR	Not reported
NEPM	National Environment Protection Measure
NS	Not specified
LCS	Laboratory Control Sample
RPD	Relative Percent Difference
>	Greater than
<	Less than
PQL	Practical Quantitation Limit
INS	Insufficient sample for this test
NA	Test not required
NT	Not tested
DOL	Samples rejected due to particulate overload (air filters only)
RFD	Samples rejected due to filter damage (air filters only)
RUD	Samples rejected due to uneven deposition (air filters only)
##	Indicates a laboratory acceptance criteria outlier, for further details, see Result Comments and/or QC Comments

Quality Control Definitions

Blank

This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, and is determined by processing solvents and reagents in exactly the same manner as for samples.

Surrogate Spike

Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

LCS (Laboratory Control Sample)

This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Matrix Spike

A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

Duplicate

This is the complete duplicate analysis of a sample from the process batch. The sample selected should be one where the analyte concentration is easily measurable.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria. Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction. Spikes for Physical and Aggregate Tests are not applicable. For VOCs in water samples, three vials are required for duplicate or spike analysis.

General Acceptance Criteria (GAC) - Analyte specific criteria applies for some analytes and is reflected in QC recovery tables.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% - see ELN-P05 QAQC tables for details (available on request); <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase. Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was typically insufficient in order to satisfy laboratory QA/QC protocols.

Miscellaneous Information

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached. We have taken the sampling date as being the date received at the laboratory.

Two significant figures are reported for the majority of tests and with a high degree of confidence, for results <10*PQL, the second significant figure may be in doubt i.e. has a relatively high degree of uncertainty and is provided for information only.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS where sediment/solids are included by default.

Urine Analysis - The BEI values listed are taken from the 2022 edition of *TLVs and BEIs Threshold Limits by ACGIH*.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volume(s) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

Data Quality Assessment Summary MGF0086

Client Details

Client	South Australian Research & Development Institute
Your Reference	NWP Mullaquana Environmental Seasonal - May
Date Issued	25/06/2025

Recommended Holding Time Compliance

Recommended holding time exceedances exist - See detailed list below

Quality Control and QC Frequency

QC Type	Compliant	Details
Blank	Yes	No Outliers
LCS	Yes	No Outliers
Duplicates	Yes	No Outliers
Matrix Spike	No	Matrix Spike Outliers Exist - See detailed list below
Surrogates / Extracted Internal Standards	Yes	No Outliers
QC Frequency	No	QC Frequency Outliers Exist - See detailed list below

Surrogates/Extracted Internal Standards, Duplicates and/or Matrix Spikes are not always relevant/applicable to certain analyses and matrices. Therefore, said QC measures are deemed compliant in these situations by default. See Laboratory Acceptance Criteria for more information

Data Quality Assessment Summary MGF0086

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
vTRH&MBTEXN | Water	4-9, 13-18	03/06/2025	11/06/2025	11/06/2025	Yes
	1-3, 10-12, 19-33	04/06/2025	11/06/2025	11/06/2025	Yes
sTRH | Water	4-9, 13-18	03/06/2025	10/06/2025	14/06/2025	Yes
	30-33	04/06/2025	10/06/2025	12/06/2025	Yes
	1-3, 11-12, 19-29	04/06/2025	10/06/2025	13/06/2025	Yes
	10	04/06/2025	10/06/2025	19/06/2025	Yes
Total Cations | Water	4-9, 13-18	03/06/2025	10/06/2025	13/06/2025	Yes
	1-3, 10-12, 19-33	04/06/2025	10/06/2025	13/06/2025	Yes
Total Metals | Water	4-9, 13-18	03/06/2025	10/06/2025	10/06/2025	Yes
	1-3, 10-12, 19-33	04/06/2025	10/06/2025	10/06/2025	Yes
Total Metals (LL) | Water	4-8	03/06/2025	10/06/2025	16/06/2025	Yes
	9, 13-18	03/06/2025	10/06/2025	18/06/2025	Yes
	1-3, 29-33	04/06/2025	10/06/2025	16/06/2025	Yes
	10-12, 19-28	04/06/2025	10/06/2025	18/06/2025	Yes
Total Metals (LL)-Hg | Water	4-9, 13-18	03/06/2025	10/06/2025	11/06/2025	Yes
	1-3, 10-12, 19-33	04/06/2025	10/06/2025	11/06/2025	Yes
EC | Water	4-9, 13-18	03/06/2025	06/06/2025	12/06/2025	Yes
	3, 10-12, 19-33	04/06/2025	05/06/2025	11/06/2025	Yes
	1-2	04/06/2025	06/06/2025	12/06/2025	Yes
pH | Water	4-9, 13-18	03/06/2025	06/06/2025	12/06/2025	No
	3, 10-12, 19-33	04/06/2025	05/06/2025	11/06/2025	Yes
	1-2	04/06/2025	06/06/2025	12/06/2025	No
Salinity | Water	4-9, 13-18	03/06/2025	06/06/2025	12/06/2025	Yes
	3, 10-12, 19-33	04/06/2025	05/06/2025	11/06/2025	Yes
	1-2	04/06/2025	06/06/2025	12/06/2025	Yes
TDS | Water	4-9, 13-18	03/06/2025	06/06/2025	12/06/2025	Yes
	1-3, 10-12, 19-22	04/06/2025	11/06/2025	12/06/2025	Yes
	24-33	04/06/2025	11/06/2025	16/06/2025	Yes
	23	04/06/2025	13/06/2025	17/06/2025	No
TSS (LL) | Water	4-9, 13-18	03/06/2025	06/06/2025	10/06/2025	Yes
	1	04/06/2025	06/06/2025	10/06/2025	Yes
	2-3, 10-12, 19-33	04/06/2025	10/06/2025	20/06/2025	Yes
Total Organic Carbon | Water	4-9, 13-18	03/06/2025	11/06/2025	11/06/2025	Yes
	1-3, 10-12, 19-20	04/06/2025	11/06/2025	11/06/2025	Yes
	21-33	04/06/2025	11/06/2025	13/06/2025	Yes
Chlorophyll a (LL) | Water	4-9, 13-18	03/06/2025	12/06/2025	17/06/2025	No
	1-3, 10-12, 19-33	04/06/2025	12/06/2025	17/06/2025	No
Ammonia as N | Water	4-9, 13-18	03/06/2025	06/06/2025	16/06/2025	Yes
	1-3, 10-12, 19-33	04/06/2025	06/06/2025	16/06/2025	Yes
Nitrate as N (LL) | Water	4-9, 13-18	03/06/2025	06/06/2025	11/06/2025	Yes
	1-3, 10-12, 19-33	04/06/2025	06/06/2025	11/06/2025	Yes
Nitrite as N (LL) | Water	4-9, 13-18	03/06/2025	06/06/2025	11/06/2025	Yes

Data Quality Assessment Summary MGF0086

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
	1-3, 10-12, 19-33	04/06/2025	06/06/2025	11/06/2025	Yes
NOx as N (LL) | Water	4-9, 13-18	03/06/2025	06/06/2025	16/06/2025	Yes
	1-3, 10-12, 19-33	04/06/2025	06/06/2025	16/06/2025	Yes
Phosphate as P (LL) | Water	4-9, 13-18	03/06/2025	06/06/2025	16/06/2025	Yes
	1-3, 10-12, 19-33	04/06/2025	06/06/2025	16/06/2025	Yes
TKN as N calc (LL) | Water	4-9, 13-18	03/06/2025	06/06/2025	16/06/2025	Yes
	1-3, 10-12, 19-33	04/06/2025	06/06/2025	16/06/2025	Yes
Total N and P (LL) | Water	4-9, 13-18	03/06/2025	06/06/2025	20/06/2025	Yes
	1-3, 10-12, 19-33	04/06/2025	06/06/2025	20/06/2025	Yes
Reactive Silica (LL) | Water	4-9, 13-18	03/06/2025	06/06/2025	18/06/2025	Yes
	1-3, 10-12, 19-33	04/06/2025	06/06/2025	18/06/2025	Yes
Total Coliforms | Water	4-9, 13-18	03/06/2025	05/06/2025	06/06/2025	Yes
	1-3, 10-12, 19-33	04/06/2025	05/06/2025	06/06/2025	Yes

Outliers: Matrix Spike

METALS-020|Acid Extractable Metals (Water)| Batch BGF1309

Sample ID	Analyte	% Limits	% Recovery
MGF0086-08	Calcium	70 - 130	##[1]
MGF0086-08	Magnesium	70 - 130	##[1]
MGF0086-08	Potassium	70 - 130	##[1]
MGF0086-08	Sodium	70 - 130	##[1]

METALS-020|Acid Extractable Metals (Water)| Batch BGF1310

Sample ID	Analyte	% Limits	% Recovery
MGF0086-28	Calcium	70 - 130	##[1]
MGF0086-28	Magnesium	70 - 130	##[1]
MGF0086-28	Potassium	70 - 130	##[1]
MGF0086-28	Sodium	70 - 130	##[1]

METALS-021|Acid Extractable Low Level Metals (Water)| Batch BGF1299

Sample ID	Analyte	% Limits	% Recovery
BGF1299-MS1#	Mercury	70 - 130	##[2]

METALS-021|Acid Extractable Low Level Metals (Water)| Batch BGF1300

Sample ID	Analyte	% Limits	% Recovery
MGF0086-12	Mercury	70 - 130	##[2]

METALS-021|Acid Extractable Low Level Metals (Water)| Batch BGF1301

Sample ID	Analyte	% Limits	% Recovery
MGF0086-32	Mercury	70 - 130	##[2]

METALS-022|Acid Extractable Low Level Metals (Water)| Batch BGF1303

Sample ID	Analyte	% Limits	% Recovery
BGF1303-MS1#	Boron	70 - 130	##[1]
BGF1303-MS1#	Strontium	70 - 130	##[1]

METALS-022|Acid Extractable Low Level Metals (Water)| Batch BGF1304

Sample ID	Analyte	% Limits	% Recovery
MGF0086-10	Boron	70 - 130	##[1]

METALS-022|Acid Extractable Low Level Metals (Water)| Batch BGF1304

Sample ID	Analyte	% Limits	% Recovery
MGF0086-10	Iron	70 - 130	##[1]
MGF0086-10	Strontium	70 - 130	##[1]

METALS-022|Acid Extractable Low Level Metals (Water)| Batch BGF1305

Sample ID	Analyte	% Limits	% Recovery
MGF0086-30	Aluminium	70 - 130	##[1]
MGF0086-30	Boron	70 - 130	##[1]
MGF0086-30	Iron	70 - 130	##[1]
MGF0086-30	Strontium	70 - 130	##[1]

Outliers: QC Frequency

INORG-119|Inorganics - Nutrients (Water)| Batch BGF1941

Analysis	QC Type	Expected	Reported
Chlorophyll a (LL)	Duplicate	2	0

INORG-119|Inorganics - Nutrients (Water)| Batch BGF1942

Analysis	QC Type	Expected	Reported
Chlorophyll a (LL)	Duplicate	2	0

ORG-020|Semi-volatile TRH (Water)| Batch BGF1266

Analysis	QC Type	Expected	Reported
sTRH	Duplicate	2	0
	Matrix Spike	1	0

ORG-020|Semi-volatile TRH (Water)| Batch BGF1460

Analysis	QC Type	Expected	Reported
	Duplicate	2	0
	Matrix Spike	1	0

ORG-020|Semi-volatile TRH (Water)| Batch BGF1463

Analysis	QC Type	Expected	Reported
	Duplicate	1	0
	Matrix Spike	1	0

Quality Control MGF0086

ORG-023_F1_TOT|Volatile TRH and BTEX (Water) | Batch BGF1573

Analyte	Units	PQL	Blank	DUP1 MGF0086-01 Samp | QC | RPD %	DUP2 MGF0086-11 Samp | QC | RPD %	LCS %	Spike % MGF0086-02
TRH C6-C9	µg/L	10	<10	<10 | <10 | [NA]	<10 | <10 | [NA]	100	94.2
TRH C6-C10	µg/L	10	<10	<10 | <10 | [NA]	<10 | <10 | [NA]	99.0	92.6
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
Benzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	103	105
Toluene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	106	109
Ethylbenzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	97.8	90.7
meta+para Xylene	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	101	94.5
ortho-Xylene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	98.2	97.1
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
Surrogate Dibromofluoromethane	%		*98.2*	*103 | 104*	*110 | 111*	*92.9*	*99.2*
Surrogate Toluene-D8	%		*113*	*104 | 104*	*106 | 107*	*102*	*104*
Surrogate 4-Bromofluorobenzene	%		*94.2*	*102 | 102*	*104 | 104*	*91.3*	*83.0*

ORG-023_F1_TOT|Volatile TRH and BTEX (Water) | Batch BGF1575

Analyte	Units	PQL	Blank	DUP1 BGF1575-DUP1# Samp | QC | RPD %	DUP2 MGF0086-24 Samp | QC | RPD %	LCS %	Spike % BGF1575-MS1#
TRH C6-C9	µg/L	10	<10	<10 | <10 | [NA]	<10 | <10 | [NA]	112	101
TRH C6-C10	µg/L	10	<10	<10 | <10 | [NA]	16.9 | <10 | [NA]	109	97.5
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
Benzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	110	117
Toluene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	112	111
Ethylbenzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	117	103
meta+para Xylene	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	118	103
ortho-Xylene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	111	109
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
Surrogate Dibromofluoromethane	%		*101*	*100 | 111*	*119 | 117*	*97.3*	*106*
Surrogate Toluene-D8	%		*85.2*	*100 | 100*	*106 | 92.8*	*100*	*98.9*
Surrogate 4-Bromofluorobenzene	%		*97.0*	*105 | 105*	*104 | 104*	*109*	*103*

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

ORG-020|Semi-volatile TRH (Water) | Batch BGF1266

Analyte	Units	PQL	Blank	LCS %
TRH C10-C14	µg/L	50	<50	89.9
TRH C15-C28	µg/L	100	<100	101
TRH C29-C36	µg/L	100	<100	120
TRH >C10-C16	µg/L	50	<50	80.1
TRH >C16-C34 (F3)	µg/L	100	<100	104
TRH >C34-C40 (F4)	µg/L	100	<100	109
Surrogate o-Terphenyl	%		*76.3*	*115*

Batch QC Comments: [5]

ORG-020|Semi-volatile TRH (Water) | Batch BGF1460

Analyte	Units	PQL	Blank	LCS %
TRH C10-C14	µg/L	50	<50	89.6
TRH C15-C28	µg/L	100	<100	105
TRH C29-C36	µg/L	100	<100	127
TRH >C10-C16	µg/L	50	<50	80.7
TRH >C16-C34 (F3)	µg/L	100	<100	110
TRH >C34-C40 (F4)	µg/L	100	<100	113
Surrogate o-Terphenyl	%		*60.8*	*62.9*

Batch QC Comments: [5]

Quality Control MGF0086

ORG-020|Semi-volatile TRH (Water) | Batch BGF1463

Analyte	Units	PQL	Blank	LCS %
TRH C10-C14	µg/L	50	<50	87.8
TRH C15-C28	µg/L	100	<100	102
TRH C29-C36	µg/L	100	<100	128
TRH >C10-C16	µg/L	50	<50	78.9
TRH >C16-C34 (F3)	µg/L	100	<100	107
TRH >C34-C40 (F4)	µg/L	100	<100	109
Surrogate o-Terphenyl	*%*		*76.0*	*69.7*

Batch QC Comments: [5]

METALS-020|Acid Extractable Metals (Water) | Batch BGF1308

Analyte	Units	PQL	Blank	DUP1 BGF1308-DUP1# Samp | QC | RPD %	DUP2 MGF0086-04 Samp | QC | RPD %	LCS %	Spike % BGF1308-MS1#
Calcium	mg/L	0.50	<0.50	<0.50 | <0.50 | [NA]	432 | 433 | 0.301	94.2	91.4
Magnesium	mg/L	0.50	<0.50	<0.50 | <0.50 | [NA]	1540 | 1540 | 0.311	97.8	96.7
Potassium	mg/L	0.50	<0.50	<0.50 | <0.50 | [NA]	522 | 516 | 1.20	105	110
Silicon	mg/L	0.10	<0.10	0.128 | 0.128 | [NA]	<0.10 | <0.10 | [NA]	106	[NA]
Sodium	mg/L	0.50	<0.50	<0.50 | <0.50 | [NA]	10700 | 10700 | 0.338	110	88.9
Hardness (calc) equivalent CaCO3	mg/L	3.0	<3.0	<3.0 | <3.0 | [NA]	7420 | 7440 | 0.310	[NA]	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

METALS-020|Acid Extractable Metals (Water) | Batch BGF1309

Analyte	Units	PQL	Blank	DUP1 MGF0086-07 Samp | QC | RPD %	DUP2 MGF0086-17 Samp | QC | RPD %	LCS %	Spike % MGF0086-08
Calcium	mg/L	0.50	<0.50	415 | 417 | 0.620	419 | 434 | 3.47	87.6	##[1]
Magnesium	mg/L	0.50	<0.50	1290 | 1300 | 1.18	1340 | 1370 | 2.03	90.7	##[1]
Potassium	mg/L	0.50	<0.50	512 | 504 | 1.50	500 | 503 | 0.518	108	##[1]
Silicon	mg/L	0.10	<0.10	<0.20 | <0.20 | [NA] [3]	<0.20 | <0.20 | [NA] [3]	99.7	121
Sodium	mg/L	0.50	<0.50	10500 | 10400 | 1.09	10400 | 10400 | 0.464	112	##[1]
Hardness (calc) equivalent CaCO3	mg/L	3.0	<3.0	6340 | 6400 | 1.09	6570 | 6720 | 2.26	[NA]	[NA]

METALS-020|Acid Extractable Metals (Water) | Batch BGF1310

Analyte	Units	PQL	Blank	DUP1 MGF0086-27 Samp | QC | RPD %	LCS %	Spike % MGF0086-28
Calcium	mg/L	0.50	<0.50	376 | 389 | 3.31	87.5	##[1]
Magnesium	mg/L	0.50	<0.50	1180 | 1260 | 6.84	90.2	##[1]
Potassium	mg/L	0.50	<0.50	496 | 505 | 1.82	101	##[1]
Silicon	mg/L	0.10	<0.10	<0.20 | <0.20 | [NA] [3]	99.4	119
Sodium	mg/L	0.50	<0.50	10100 | 10400 | 2.63	111	##[1]
Hardness (calc) equivalent CaCO3	mg/L	3.0	<3.0	5780 | 6150 | 6.27	[NA]	[NA]

METALS-021|Acid Extractable Low Level Metals (Water) | Batch BGF1299

Analyte	Units	PQL	Blank	DUP1 BGF1299-DUP1# Samp | QC | RPD %	DUP2 MGF0086-04 Samp | QC | RPD %	LCS %	Spike % BGF1299-MS1#
Mercury	µg/L	0.050	<0.050	<0.050 | <0.050 | [NA]	<0.050 | <0.050 | [NA]	108	##[2]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

METALS-021|Acid Extractable Low Level Metals (Water) | Batch BGF1300

Analyte	Units	PQL	Blank	DUP1 MGF0086-11 Samp | QC | RPD %	DUP2 MGF0086-21 Samp | QC | RPD %	LCS %	Spike % MGF0086-12
Mercury	µg/L	0.050	<0.050	<0.050 | <0.050 | [NA]	<0.050 | <0.050 | [NA]	107	##[2]

Quality Control MGF0086

METALS-021|Acid Extractable Low Level Metals (Water) | Batch BGF1301

Analyte	Units	PQL	Blank	DUP1 MGF0086-31 Samp | QC | RPD %	LCS %	Spike % MGF0086-32
Mercury	µg/L	0.050	<0.050	<0.050 | <0.050 | [NA]	108	##[2]

METALS-022|Acid Extractable Low Level Metals (Water) | Batch BGF1303

Analyte	Units	PQL	Blank	DUP1 BGF1303-DUP1# Samp | QC | RPD %	DUP2 MGF0086-05 Samp | QC | RPD %	LCS %	Spike % BGF1303-MS1#
Aluminium	µg/L	10	<10	<50 | <50 | [NA]	<50 | <50 | [NA]	104	102
Antimony	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	107	114
Arsenic	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	104	114
Barium	µg/L	1.0	<1.0	5.25 | 7.95 | [NA]	6.05 | 7.75 | [NA]	99.2	102
Beryllium	µg/L	0.50	<0.50	<2.5 | <2.5 | [NA]	<2.5 | <2.5 | [NA]	101	93.8
Boron	µg/L	20	<20	4950 | 5040 | 1.83	4930 | 5080 | 2.98	106	##[1]
Cadmium	µg/L	0.10	<0.10	<0.50 | <0.50 | [NA]	<0.50 | <0.50 | [NA]	106	104
Chromium	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	104	108
Cobalt	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	98.7	98.3
Copper	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	106	93.0
Iron	µg/L	10	<10	<50 | <50 | [NA]	<50 | <50 | [NA]	108	118
Lead	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	107	93.6
Manganese	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	103	104
Molybdenum	µg/L	1.0	<1.0	14.5 | 15.4 | [NA]	13.6 | 14.8 | [NA]	99.6	111
Nickel	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	104	98.5
Selenium	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	110	99.0
Silver	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	114	79.4
Strontium	µg/L	1.0	<1.0	9050 | 9200 | 1.62	9080 | 9030 | 0.524	102	##[1]
Thallium	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	108	88.8
Thorium	µg/L	0.50	<0.50	<2.5 | <2.5 | [NA]	<2.5 | <2.5 | [NA]	109	91.4
Uranium	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	114	111
Vanadium	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	102	113
Zinc	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA]		105	101

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

Quality Control MGF0086

METALS-022|Acid Extractable Low Level Metals (Water) | Batch BGF1304

Analyte	Units	PQL	Blank	DUP1 MGF0086-09 Samp | QC | RPD %	DUP2 MGF0086-19 Samp | QC | RPD %	LCS %	Spike % MGF0086-10
Aluminium	µg/L	10	<10	<50 | <50 | [NA] [3]	<50 | <50 | [NA] [3]	97.8	121
Antimony	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA] [3]	<5.0 | <5.0 | [NA] [3]	99.1	116
Arsenic	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA] [3]	<5.0 | <5.0 | [NA] [3]	102	102
Barium	µg/L	1.0	<1.0	6.85 | 5.65 | [NA]	7.85 | 5.70 | [NA] [4]	94.5	103
Beryllium	µg/L	0.50	<0.50	<2.5 | <2.5 | [NA] [3]	<2.5 | <2.5 | [NA] [3]	111	104
Boron	µg/L	20	<20	5530 | 5400 | 2.37	5950 | 5560 | 6.67	99.4	##[1]
Cadmium	µg/L	0.10	<0.10	<0.50 | <0.50 | [NA] [3]	<0.50 | <0.50 | [NA] [3]	105	98.3
Chromium	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA] [3]	<5.0 | <5.0 | [NA] [3]	99.7	116
Cobalt	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA] [3]	<5.0 | <5.0 | [NA] [3]	97.3	93.3
Copper	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA] [3]	<5.0 | <5.0 | [NA] [3]	102	94.1
Iron	µg/L	10	<10	<50 | <50 | [NA] [3]	<50 | <50 | [NA] [3]	105	##[1]
Lead	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA] [3]	<5.0 | <5.0 | [NA] [3]	98.3	85.9
Manganese	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA] [3]	<5.0 | <5.0 | [NA] [3]	99.5	105
Molybdenum	µg/L	1.0	<1.0	16.2 | 15.2 | [NA]	14.8 | 13.2 | [NA]	95.3	107
Nickel	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA] [3]	<5.0 | <5.0 | [NA] [3]	101	101
Selenium	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA] [3]	5.10 | <5.0 | [NA] [3]	105	101
Silver	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA] [3]	<5.0 | <5.0 | [NA] [3]	104	72.0
Strontium	µg/L	1.0	<1.0	9150 | 9160 | 0.121	9530 | 8690 | 9.22	99.8	##[1]
Thallium	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA] [3]	<5.0 | <5.0 | [NA] [3]	98.8	80.1
Thorium	µg/L	0.50	<0.50	<2.5 | <2.5 | [NA] [3]	<2.5 | <2.5 | [NA] [3]	107	92.0
Uranium	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA] [3]	<5.0 | <5.0 | [NA] [3]	105	104
Vanadium	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA] [3]	<5.0 | <5.0 | [NA] [3]	99.8	105
Zinc	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA] [3]	6.00 | 7.00 | 15.4 [3]	102	101

METALS-022|Acid Extractable Low Level Metals (Water) | Batch BGF1305

Analyte	Units	PQL	Blank	DUP1 MGF0086-29 Samp | QC | RPD %	DUP2 BGF1305-DUP2# Samp | QC | RPD %	LCS %	Spike % MGF0086-30
Aluminium	µg/L	10	<10	64.5 | 56.9 | [NA]	176 | 187 | 6.12	95.1	##[1]
Antimony	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA] [3]	<1.0 | <1.0 | [NA]	96.4	106
Arsenic	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA] [3]	<1.0 | <1.0 | [NA]	100	108
Barium	µg/L	1.0	<1.0	5.50 | 6.45 | [NA]	3.74 | 3.42 | [NA]	90.4	100
Beryllium	µg/L	0.50	<0.50	<2.5 | <2.5 | [NA] [3]	<0.50 | <0.50 | [NA]	112	103
Boron	µg/L	20	<20	6120 | 5520 | 10.4	35.7 | 35.8 | [NA]	95.0	##[1]
Cadmium	µg/L	0.10	<0.10	<0.50 | <0.50 | [NA] [3]	<0.10 | <0.10 | [NA]	103	99.5
Chromium	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA] [3]	1.15 | 1.62 | [NA]	99.0	102
Cobalt	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA] [3]	<1.0 | <1.0 | [NA]	95.8	94.3
Copper	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA] [3]	19.4 | 19.3 | 0.464	103	91.6
Iron	µg/L	10	<10	<50 | <50 | [NA] [3]	141 | 149 | 5.80	102	##[1]
Lead	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA] [3]	<1.0 | <1.0 | [NA]	105	88.6
Manganese	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA] [3]	1.31 | 1.44 | [NA]	99.0	102
Molybdenum	µg/L	1.0	<1.0	14.2 | 14.4 | [NA]	1.71 | 1.80 | [NA]	97.4	107
Nickel	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA] [3]	<1.0 | <1.0 | [NA]	101	99.4
Selenium	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA] [3]	<1.0 | <1.0 | [NA]	102	103
Silver	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA] [3]	<1.0 | <1.0 | [NA]	107	70.3
Strontium	µg/L	1.0	<1.0	8680 | 8770 | 1.09	63.2 | 60.8 | 4.00	99.7	##[1]
Thallium	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA] [3]	<1.0 | <1.0 | [NA]	102	82.1
Thorium	µg/L	0.50	<0.50	<2.5 | <2.5 | [NA] [3]	<0.50 | <0.50 | [NA]	107	84.4
Uranium	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA] [3]	<1.0 | <1.0 | [NA]	107	106
Vanadium	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA] [3]	<1.0 | <1.0 | [NA]	96.1	110
Zinc	µg/L	1.0	<1.0	<5.0 | <5.0 | [NA] [3]	54.9 | 56.2 | 2.34	101	103

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

Quality Control MGF0086

INORG-001 | Inorganics - Physical Parameters (Water) | Batch BGF1321

Analyte	Units	PQL	Blank	DUP1 BGF1321-DUP1# Samp | QC | RPD %	DUP2 MGF0086-06 Samp | QC | RPD %	LCS %
pH	pH units		4.5	7.8 | 7.8 | 0.255	8.0 | 8.0 | 0.874	98.3
Electrical Conductivity	µS/cm	2.0	<2.0	58300 | 58500 | 0.332	58600 | 58900 | 0.465	103
Estimated Salinity	mg/L	1.0	<1.0	37300 | 37400 | 0.332	37500 | 37700 | 0.465	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-001 | Inorganics - Physical Parameters (Water) | Batch BGF1322

Analyte	Units	PQL	Blank	DUP1 MGF0086-03 Samp | QC | RPD %	DUP2 MGF0086-25 Samp | QC | RPD %	LCS %
pH	pH units		4.6	7.8 | 7.9 | 1.14	8.0 | 8.0 | 0.124	98.3
Electrical Conductivity	µS/cm	2.0	<2.0	59300 | 59100 | 0.311	58900 | 58600 | 0.404	99.1
Estimated Salinity	mg/L	1.0	<1.0	37900 | 37800 | 0.311	37700 | 37500 | 0.404	[NA]

INORG-019 | Inorganics - Physical Parameters (Water) | Batch BGF1370

Analyte	Units	PQL	Blank	DUP1 BGF1370-DUP1# Samp | QC | RPD %	DUP2 MGF0086-06 Samp | QC | RPD %	LCS %
Total Suspended Solids	mg/L	1.0	<1.0	3.80 | 3.40 | [NA]	2.60 | 2.40 | [NA]	96.0

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-019 | Inorganics - Physical Parameters (Water) | Batch BGF1371

Analyte	Units	PQL	Blank	DUP1 MGF0086-02 Samp | QC | RPD %	DUP2 MGF0086-24 Samp | QC | RPD %	LCS %
Total Suspended Solids	mg/L	1.0	<1.0	25.8 | 27.8 | 7.46	13.0 | 15.8 | 19.4	90.0

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BGF1639

Analyte	Units	PQL	Blank	DUP1 BGF1639-DUP1# Samp | QC | RPD %	DUP2 MGF0086-06 Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	860 | 830 | 3.55	45900 | 44600 | 2.76	109

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BGF1640

Analyte	Units	PQL	Blank	DUP1 BGF1640-DUP1# Samp | QC | RPD %	DUP2 MGF0086-02 Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	90.0 | 80.0 | 11.8	42200 | 42600 | 0.945	104

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BGF1641

Analyte	Units	PQL	Blank	DUP1 MGF0086-24 Samp | QC | RPD %	DUP2 MGF0086-33 Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	45200 | 43900 | 2.81	42800 | 46300 | 7.74	102

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BGF2111

Analyte	Units	PQL	Blank	DUP1 MGF0086-23 Samp | QC | RPD %	DUP2 BGF2111-DUP2# Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	45400 | 46600 | 2.39	900 | 885 | 1.68	108

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

Quality Control MGF0086

INORG-079|Inorganics - Carbon, Nitrogen and Sulfur Species (Water) | Batch BGF1756

Analyte	Units	PQL	Blank	DUP1 MGF0086-01 Samp | QC | RPD %	DUP2 MGF0086-11 Samp | QC | RPD %	LCS %	Spike % MGF0086-02
Total Organic Carbon	mg/L	1.0	<1.0	5.03|4.60|[NA]	4.64|4.32|[NA]	93.8	90.9

INORG-079|Inorganics - Carbon, Nitrogen and Sulfur Species (Water) | Batch BGF1757

Analyte	Units	PQL	Blank	DUP1 MGF0086-21 Samp | QC | RPD %	DUP2 MGF0086-27 Samp | QC | RPD %	LCS %	Spike % MGF0086-22
Total Organic Carbon	mg/L	1.0	<1.0	4.85|5.03|[NA]	4.96|5.08|2.53	94.6	93.1

INORG-119|Inorganics - Nutrients (Water) | Batch BGF1941

Analyte	Units	PQL	Blank	LCS %
Chlorophyll a	mg/m3	0.20	<0.20	99.0

INORG-119|Inorganics - Nutrients (Water) | Batch BGF1942

Analyte	Units	PQL	Blank	LCS %
Chlorophyll a	mg/m3	0.20	<0.20	99.0

QC Comments

Identifier	Description
[1]	Spike recovery is not applicable due to the relatively high analyte background in the sample (>3* spike level). However, the LCS recovery is within acceptance criteria.
[2]	Spike recovery is outside routine acceptance criteria (70-130%), this may be due to suspected non-homogeneity and/or matrix interference effects. However, an acceptable recovery was achieved for the LCS.
[3]	PQL has been raised due to matrix requiring dilution
[4]	Duplicate %RPD may be flagged as an outlier to routine laboratory acceptance, however, where one or both results are <10*PQL, the RPD acceptance criteria increases exponentially.
[5]	Unable to perform all QC according to our internal guidelines due to the limited amount of sample(s) available for testing.

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Certificate of Analysis MGG0034

Client Details

Client	South Australian Research & Development Institute
Contact	Ian Moody
Address	SARDI Aquatic Science Centre, 2 Hamra Avenue, WEST BEACH, SA, 5024

Sample Details

Your Reference	NWP Mullaquana Monthly Sampling
Number of Samples	33 Water
Date Samples Received	03/07/2025
Date Instructions Received	04/07/2025

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for soils and on an as received basis for other matrices.

Report Details

Date Final Results Expected	22/07/2025
Date of Issue	23/07/2025

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Accredited for compliance with ISO/IEC 17025. Tests not covered by NATA are denoted with *.

Authorisation Details

Results Approved By	Chaminda Gunasekara, Inorganics Supervisor Chris De Luca, Lab Manager Jenny Xin He, Chemist
Laboratory Manager	Chris De Luca

Certificate of Analysis MGG0034

Samples in this Report

Envirolab ID	Sample ID	Matrix	Date Sampled	Date Received
MGG0034-01	MQ01 R1 Comp	Water	02/07/2025	04/07/2025
MGG0034-02	MQ01 R2 Comp	Water	02/07/2025	04/07/2025
MGG0034-03	MQ01 R3 Comp	Water	02/07/2025	04/07/2025
MGG0034-04	MQ02 R1 Comp	Water	01/07/2025	04/07/2025
MGG0034-05	MQ02 R2 Comp	Water	01/07/2025	04/07/2025
MGG0034-06	MQ02 R3 Comp	Water	01/07/2025	04/07/2025
MGG0034-07	MQ03 R1 Comp	Water	01/07/2025	04/07/2025
MGG0034-08	MQ03 R2 Comp	Water	01/07/2025	04/07/2025
MGG0034-09	MQ03 R3 Comp	Water	01/07/2025	04/07/2025
MGG0034-10	MQ04 R1 Comp	Water	02/07/2025	04/07/2025
MGG0034-11	MQ04 R2 Comp	Water	02/07/2025	04/07/2025
MGG0034-12	MQ04 R3 Comp	Water	02/07/2025	04/07/2025
MGG0034-13	MQ05 R1 Comp	Water	01/07/2025	04/07/2025
MGG0034-14	MQ05 R2 Comp	Water	01/07/2025	04/07/2025
MGG0034-15	MQ05 R3 Comp	Water	01/07/2025	04/07/2025
MGG0034-16	MQ06 R1 Comp	Water	01/07/2025	04/07/2025
MGG0034-17	MQ06 R2 Comp	Water	01/07/2025	04/07/2025
MGG0034-18	MQ06 R3 Comp	Water	01/07/2025	04/07/2025
MGG0034-19	MQ07 R1 Comp	Water	02/07/2025	04/07/2025
MGG0034-20	MQ07 R2 Comp	Water	02/07/2025	04/07/2025
MGG0034-21	MQ07 R3 Comp	Water	02/07/2025	04/07/2025
MGG0034-22	MQ08 R1 Comp	Water	02/07/2025	04/07/2025
MGG0034-23	MQ08 R2 Comp	Water	02/07/2025	04/07/2025
MGG0034-24	MQ08 R3 Comp	Water	02/07/2025	04/07/2025
MGG0034-25	MQ08 R1 Surface	Water	02/07/2025	04/07/2025
MGG0034-26	MQ08 R2 Surface	Water	02/07/2025	04/07/2025
MGG0034-27	MQ08 R3 Surface	Water	02/07/2025	04/07/2025
MGG0034-28	MQ08 R1 Bottom	Water	02/07/2025	04/07/2025
MGG0034-29	MQ08 R2 Bottom	Water	02/07/2025	04/07/2025
MGG0034-30	MQ08 R3 Bottom	Water	02/07/2025	04/07/2025
MGG0034-31	MQ09 R1 Comp	Water	02/07/2025	04/07/2025
MGG0034-32	MQ09 R2 Comp	Water	02/07/2025	04/07/2025
MGG0034-33	MQ09 R3 Comp	Water	02/07/2025	04/07/2025

Sample Comments

General Comment	Sample #4-9, 13-18 received 03/07/2025
General Comment	Samples 1-3, 10-12, 19-33 received 04/07/2025, ice pack, seal intact, 8.6C

Certificate of Analysis MGG0034

Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	MGG0034-01	MGG0034-02	MGG0034-03	MGG0034-04	MGG0034-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			02/07/2025	02/07/2025	02/07/2025	01/07/2025	01/07/2025
pH	pH units		7.9	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	59000	59000	59000	59000	59000
Total Dissolved Solids	mg/L	5.0	41000	34000	38000	44000	47000
Estimated Salinity*	mg/L	1.0	38000	38000	38000	38000	38000
Total Suspended Solids	mg/L	1.0	<1.0	2.5	3.1	1.6	1.6

Envirolab ID	Units	PQL	MGG0034-06	MGG0034-07	MGG0034-08	MGG0034-09	MGG0034-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			01/07/2025	01/07/2025	01/07/2025	01/07/2025	02/07/2025
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	59000	59000	59000	59000	59000
Total Dissolved Solids	mg/L	5.0	46000	45000	38000	43000	44000
Estimated Salinity*	mg/L	1.0	38000	38000	38000	38000	38000
Total Suspended Solids	mg/L	1.0	1.1	1.8	2.8	1.9	2.7

Envirolab ID	Units	PQL	MGG0034-11	MGG0034-12	MGG0034-13	MGG0034-14	MGG0034-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			02/07/2025	02/07/2025	01/07/2025	01/07/2025	01/07/2025
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	59000	59000	59000	59000	59000
Total Dissolved Solids	mg/L	5.0	38000	46000	35000	46000	46000
Estimated Salinity*	mg/L	1.0	38000	37000	38000	38000	38000
Total Suspended Solids	mg/L	1.0	1.1	2.2	3.2	2.3	1.3

Envirolab ID	Units	PQL	MGG0034-16	MGG0034-17	MGG0034-18	MGG0034-19	MGG0034-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			01/07/2025	01/07/2025	01/07/2025	02/07/2025	02/07/2025
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	59000	59000	59000	59000	59000
Total Dissolved Solids	mg/L	5.0	47000	45000	40000	47000	43000
Estimated Salinity*	mg/L	1.0	38000	38000	38000	38000	38000
Total Suspended Solids	mg/L	1.0	1.9	1.4	2.7	8.3	5.3

Envirolab ID	Units	PQL	MGG0034-21	MGG0034-22	MGG0034-23	MGG0034-24	MGG0034-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			02/07/2025	02/07/2025	02/07/2025	02/07/2025	02/07/2025
pH	pH units		7.8	7.8	7.9	8.0	8.0
Electrical Conductivity	µS/cm	2.0	58000	58000	57000	57000	57000
Total Dissolved Solids	mg/L	5.0	46000	45000	46000	45000	45000
Estimated Salinity*	mg/L	1.0	37000	37000	37000	37000	36000
Total Suspended Solids	mg/L	1.0	6.6	2.3	3.0	2.5	<1.0

Envirolab ID	Units	PQL	MGG0034-26	MGG0034-27	MGG0034-28	MGG0034-29	MGG0034-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			02/07/2025	02/07/2025	02/07/2025	02/07/2025	02/07/2025
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	57000	57000	58000	58000	58000
Total Dissolved Solids	mg/L	5.0	46000	43000	45000	46000	45000

Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	MGG0034-26	MGG0034-27	MGG0034-28	MGG0034-29	MGG0034-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			02/07/2025	02/07/2025	02/07/2025	02/07/2025	02/07/2025
Estimated Salinity*	mg/L	1.0	36000	36000	37000	37000	37000
Total Suspended Solids	mg/L	1.0	1.8	1.5	3.3	2.7	2.9

Envirolab ID	Units	PQL	MGG0034-31	MGG0034-32	MGG0034-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			02/07/2025	02/07/2025	02/07/2025
pH	pH units		7.9	8.0	8.0
Electrical Conductivity	µS/cm	2.0	58000	57000	57000
Total Dissolved Solids	mg/L	5.0	46000	45000	43000
Estimated Salinity*	mg/L	1.0	37000	37000	37000
Total Suspended Solids	mg/L	1.0	3.1	4.6	2.9

Certificate of Analysis MGG0034

Inorganics - Nutrients (Water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	MGG0034-01	MGG0034-02	MGG0034-03	MGG0034-04	MGG0034-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			02/07/2025	02/07/2025	02/07/2025	01/07/2025	01/07/2025
Chlorophyll a	mg/m3	0.20	0.67	0.53	0.40	0.67	0.80

Envirolab ID	Units	PQL	MGG0034-06	MGG0034-07	MGG0034-08	MGG0034-09	MGG0034-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			01/07/2025	01/07/2025	01/07/2025	01/07/2025	02/07/2025
Chlorophyll a	mg/m3	0.20	0.93	0.40	0.80	0.67	0.80

Envirolab ID	Units	PQL	MGG0034-11	MGG0034-12	MGG0034-13	MGG0034-14	MGG0034-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			02/07/2025	02/07/2025	01/07/2025	01/07/2025	01/07/2025
Chlorophyll a	mg/m3	0.20	0.67	0.67	0.80	0.93	0.40

Envirolab ID	Units	PQL	MGG0034-16	MGG0034-17	MGG0034-18	MGG0034-19	MGG0034-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			01/07/2025	01/07/2025	01/07/2025	02/07/2025	02/07/2025
Chlorophyll a	mg/m3	0.20	0.93	0.80	0.80	1.2	1.1

Envirolab ID	Units	PQL	MGG0034-21	MGG0034-22	MGG0034-23	MGG0034-24	MGG0034-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			02/07/2025	02/07/2025	02/07/2025	02/07/2025	02/07/2025
Chlorophyll a	mg/m3	0.20	0.67	0.80	1.2	0.53	0.80

Envirolab ID	Units	PQL	MGG0034-26	MGG0034-27	MGG0034-28	MGG0034-29	MGG0034-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			02/07/2025	02/07/2025	02/07/2025	02/07/2025	02/07/2025
Chlorophyll a	mg/m3	0.20	0.53	0.40	0.67	0.67	0.53

Envirolab ID	Units	PQL	MGG0034-31	MGG0034-32	MGG0034-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			02/07/2025	02/07/2025	02/07/2025
Chlorophyll a	mg/m3	0.20	0.67	0.67	0.80

Subcontracted Inorganics - Certificate: ENVL25-8 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MGG0034-01	MGG0034-02	MGG0034-03	MGG0034-04	MGG0034-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			02/07/2025	02/07/2025	02/07/2025	01/07/2025	01/07/2025
Ammonia as N	µg/L	3.0	<3	<3	<3	<3	<3
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	140	140	130	160	150
Phosphate as P	µg/L	2.0	5	5	4	4	6
Total Phosphorus	µg/L	5.0	13	12	11	14	12
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	140	130	120	160	150

Envirolab ID	Units	PQL	MGG0034-06	MGG0034-07	MGG0034-08	MGG0034-09	MGG0034-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			01/07/2025	01/07/2025	01/07/2025	01/07/2025	02/07/2025
Ammonia as N	µg/L	3.0	<3	<3	<3	<3	<3
Nitrate as N	µg/L	2.0	<2	2	2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	140	190	200	220	140
Phosphate as P	µg/L	2.0	4	8	9	9	5
Total Phosphorus	µg/L	5.0	11	19	17	18	12
NOx as N	µg/L	2.0	<2	2	2	2	<2
TKN as N*	µg/L	50	140	180	200	220	140

Envirolab ID	Units	PQL	MGG0034-11	MGG0034-12	MGG0034-13	MGG0034-14	MGG0034-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			02/07/2025	02/07/2025	01/07/2025	01/07/2025	01/07/2025
Ammonia as N	µg/L	3.0	<3	<3	<3	<3	<3
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	150	140	160	150	150
Phosphate as P	µg/L	2.0	4	5	5	6	5
Total Phosphorus	µg/L	5.0	12	11	13	13	14
NOx as N	µg/L	2.0	<2	2	<2	<2	<2
TKN as N*	µg/L	50	140	130	160	150	150

Envirolab ID	Units	PQL	MGG0034-16	MGG0034-17	MGG0034-18	MGG0034-19	MGG0034-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			01/07/2025	01/07/2025	01/07/2025	02/07/2025	02/07/2025
Ammonia as N	µg/L	3.0	<3	<3	<3	<3	<3

Subcontracted Inorganics - Certificate: ENVL25-8 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MGG0034-16	MGG0034-17	MGG0034-18	MGG0034-19	MGG0034-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			01/07/2025	01/07/2025	01/07/2025	02/07/2025	02/07/2025
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	110	140	140	140	150
Phosphate as P	µg/L	2.0	4	4	4	4	5
Total Phosphorus	µg/L	5.0	10	12	11	14	13
NOx as N	µg/L	2.0	<2	<2	2	<2	<2
TKN as N*	µg/L	50	110	130	140	140	150

Envirolab ID	Units	PQL	MGG0034-21	MGG0034-22	MGG0034-23	MGG0034-24	MGG0034-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			02/07/2025	02/07/2025	02/07/2025	02/07/2025	02/07/2025
Ammonia as N	µg/L	3.0	<3	<3	<3	<3	<3
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	140	190	150	250	140
Phosphate as P	µg/L	2.0	4	4	5	5	5
Total Phosphorus	µg/L	5.0	13	13	13	13	14
NOx as N	µg/L	2.0	<2	3	<2	<2	<2
TKN as N*	µg/L	50	140	190	150	250	140

Envirolab ID	Units	PQL	MGG0034-26	MGG0034-27	MGG0034-28	MGG0034-29	MGG0034-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			02/07/2025	02/07/2025	02/07/2025	02/07/2025	02/07/2025
Ammonia as N	µg/L	3.0	<3	<3	<3	<3	<3
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	150	160	160	150	160
Phosphate as P	µg/L	2.0	4	5	4	6	5
Total Phosphorus	µg/L	5.0	13	13	14	13	14
NOx as N	µg/L	2.0	<2	<2	2	<2	<2
TKN as N*	µg/L	50	150	160	150	150	150

Envirolab ID	Units	PQL	MGG0034-31	MGG0034-32	MGG0034-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			02/07/2025	02/07/2025	02/07/2025
Ammonia as N	µg/L	3.0	<3	<3	<3

Subcontracted Inorganics - Certificate: ENVL25-8 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MGG0034-31	MGG0034-32	MGG0034-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			02/07/2025	02/07/2025	02/07/2025
Nitrate as N	µg/L	2.0	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2
Total Nitrogen	µg/L	50	150	140	150
Phosphate as P	µg/L	2.0	4	4	4
Total Phosphorus	µg/L	5.0	14	14	12
NOx as N	µg/L	2.0	<2	<2	<2
TKN as N*	µg/L	50	150	140	150

Certificate of Analysis MGG0034

Subcontracted Metals - Certificate: ENVL25-8 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MGG0034-01	MGG0034-02	MGG0034-03	MGG0034-04	MGG0034-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			02/07/2025	02/07/2025	02/07/2025	01/07/2025	01/07/2025
Reactive Silica	µg/L	2.0	27	28	27	29	30

Envirolab ID	Units	PQL	MGG0034-06	MGG0034-07	MGG0034-08	MGG0034-09	MGG0034-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			01/07/2025	01/07/2025	01/07/2025	01/07/2025	02/07/2025
Reactive Silica	µg/L	2.0	30	30	30	30	28

Envirolab ID	Units	PQL	MGG0034-11	MGG0034-12	MGG0034-13	MGG0034-14	MGG0034-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			02/07/2025	02/07/2025	01/07/2025	01/07/2025	01/07/2025
Reactive Silica	µg/L	2.0	28	28	30	31	31

Envirolab ID	Units	PQL	MGG0034-16	MGG0034-17	MGG0034-18	MGG0034-19	MGG0034-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			01/07/2025	01/07/2025	01/07/2025	02/07/2025	02/07/2025
Reactive Silica	µg/L	2.0	33	32	33	36	35

Envirolab ID	Units	PQL	MGG0034-21	MGG0034-22	MGG0034-23	MGG0034-24	MGG0034-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			02/07/2025	02/07/2025	02/07/2025	02/07/2025	02/07/2025
Reactive Silica	µg/L	2.0	35	36	37	36	30

Envirolab ID	Units	PQL	MGG0034-26	MGG0034-27	MGG0034-28	MGG0034-29	MGG0034-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			02/07/2025	02/07/2025	02/07/2025	02/07/2025	02/07/2025
Reactive Silica	µg/L	2.0	29	29	44	44	44

Envirolab ID	Units	PQL	MGG0034-31	MGG0034-32	MGG0034-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			02/07/2025	02/07/2025	02/07/2025
Reactive Silica	µg/L	2.0	37	37	37

Certificate of Analysis MGG0034

Subcontracted Micro - Certificate: Various - Analysed By SA Pathology (Water)

Envirolab ID	Units	PQL	MGG0034-01	MGG0034-02	MGG0034-03	MGG0034-04	MGG0034-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			02/07/2025	02/07/2025	02/07/2025	01/07/2025	01/07/2025
Total Coliforms	MPN/100mL	1.0	46	27	73	210	220

Envirolab ID	Units	PQL	MGG0034-06	MGG0034-07	MGG0034-08	MGG0034-09	MGG0034-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			01/07/2025	01/07/2025	01/07/2025	01/07/2025	02/07/2025
Total Coliforms	MPN/100mL	1.0	180	150	37	40	130

Envirolab ID	Units	PQL	MGG0034-11	MGG0034-12	MGG0034-13	MGG0034-14	MGG0034-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			02/07/2025	02/07/2025	01/07/2025	01/07/2025	01/07/2025
Total Coliforms	MPN/100mL	1.0	220	370	190	220	360

Envirolab ID	Units	PQL	MGG0034-16	MGG0034-17	MGG0034-18	MGG0034-19	MGG0034-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			01/07/2025	01/07/2025	01/07/2025	02/07/2025	02/07/2025
Total Coliforms	MPN/100mL	1.0	140	58	71	56	46

Envirolab ID	Units	PQL	MGG0034-21	MGG0034-22	MGG0034-23	MGG0034-24	MGG0034-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			02/07/2025	02/07/2025	02/07/2025	02/07/2025	02/07/2025
Total Coliforms	MPN/100mL	1.0	82	110	80	200	200

Envirolab ID	Units	PQL	MGG0034-26	MGG0034-27	MGG0034-28	MGG0034-29	MGG0034-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			02/07/2025	02/07/2025	02/07/2025	02/07/2025	02/07/2025
Total Coliforms	MPN/100mL	1.0	340	500	180	200	190

Envirolab ID	Units	PQL	MGG0034-31	MGG0034-32	MGG0034-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			02/07/2025	02/07/2025	02/07/2025
Total Coliforms	MPN/100mL	1.0	180	190	180

Method Summary

Method ID	Methodology Summary
INORG-001	pH - Measured using pH meter and electrode. Please note that the results for water analyses are indicative only, as analysis can be completed outside of the recommended holding times. Solids are reported from a 1:5 water extract unless otherwise specified. Alternatively, pH is determined in a 1:5 extract using 0.01M calcium chloride or a solid is extracted at a ratio of 1:2.5 (AS1289.4.3.1), pH is measured in the extract.
INORG-002	Conductivity and Salinity - measured using a conductivity cell at 25°C. Soil results reported from a 1:5 Soil:Water extract unless otherwise specified. Please note Resistivity is estimated by calculation and may not correlate with results otherwise obtained using the Resistivity current method (based on AS 1289.4.4.1), depending on the nature of the soil being analysed. Blanks may yield EC readings >1µS/cm, this is likely due to adsorption of Carbon Dioxide while the blank sample is sat on the instrument autosampler prior to analysis. The values are generally insignificant (<5µS/cm) compared to most actual sample conductivities.
INORG-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180±10°C. NOTE: Where the EC of the sample is <100µS/cm, the TDS will typically be below 70mg/L (as the sample is very likely to be at least drinking water quality). Therefore to ensure data quality for TDS, the TDS is typically calculated as per the equation: TDS = EC*0.6
INORG-019	Suspended Solids - determined gravimetrically by filtration of the sample. The solids are dried at 104±5°C
INORG-119	Chlorophyll A based on APHA 10200 H latest edition.
SUB-021	Subcontracted to Marine & Freshwater Research - Accreditation number 10603
SUB-041_CA	Subcontracted to SA Pathology

Result Definitions

Identifier	Description
NR	Not reported
NEPM	National Environment Protection Measure
NS	Not specified
LCS	Laboratory Control Sample
RPD	Relative Percent Difference
>	Greater than
<	Less than
PQL	Practical Quantitation Limit
INS	Insufficient sample for this test
NA	Test not required
NT	Not tested
DOL	Samples rejected due to particulate overload (air filters only)
RFD	Samples rejected due to filter damage (air filters only)
RUD	Samples rejected due to uneven deposition (air filters only)
##	Indicates a laboratory acceptance criteria outlier, for further details, see Result Comments and/or QC Comments

Quality Control Definitions

Blank

This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, and is determined by processing solvents and reagents in exactly the same manner as for samples.

Surrogate Spike

Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

LCS (Laboratory Control Sample)

This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Matrix Spike

A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

Duplicate

This is the complete duplicate analysis of a sample from the process batch. The sample selected should be one where the analyte concentration is easily measurable.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria. Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction. Spikes for Physical and Aggregate Tests are not applicable. For VOCs in water samples, three vials are required for duplicate or spike analysis.

General Acceptance Criteria (GAC) - Analyte specific criteria applies for some analytes and is reflected in QC recovery tables.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% - see ELN-P05 QAQC tables for details (available on request); <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase. Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was typically insufficient in order to satisfy laboratory QA/QC protocols.

Miscellaneous Information

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached. We have taken the sampling date as being the date received at the laboratory.

Two significant figures are reported for the majority of tests and with a high degree of confidence, for results <10*PQL, the second significant figure may be in doubt i.e. has a relatively high degree of uncertainty and is provided for information only.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS where sediment/solids are included by default.

Urine Analysis - The BEI values listed are taken from the 2022 edition of *TLVs and BEIs Threshold Limits by ACGIH*.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volume(s) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

Data Quality Assessment Summary MGG0034

Client Details

Client	South Australian Research & Development Institute
Your Reference	NWP Mullaquana Monthly Sampling
Date Issued	23/07/2025

Recommended Holding Time Compliance

Recommended holding time exceedances exist - See detailed list below

Quality Control and QC Frequency

QC Type	Compliant	Details
Blank	Yes	No Outliers
LCS	Yes	No Outliers
Duplicates	Yes	No Outliers
Matrix Spike	Yes	No Outliers
Surrogates / Extracted Internal Standards	Yes	No Outliers
QC Frequency	No	QC Frequency Outliers Exist - See detailed list below

Surrogates/Extracted Internal Standards, Duplicates and/or Matrix Spikes are not always relevant/applicable to certain analyses and matrices. Therefore, said QC measures are deemed compliant in these situations by default. See Laboratory Acceptance Criteria for more information

Data Quality Assessment Summary MGG0034

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
EC | Water	4-9, 13-18	01/07/2025	04/07/2025	16/07/2025	Yes
	21-33	02/07/2025	04/07/2025	08/07/2025	Yes
	1-3, 10-12, 19-20	02/07/2025	04/07/2025	16/07/2025	Yes
pH | Water	4-9, 13-18	01/07/2025	04/07/2025	16/07/2025	No
	21-33	02/07/2025	04/07/2025	08/07/2025	No
	1-3, 10-12, 19-20	02/07/2025	04/07/2025	16/07/2025	No
Salinity | Water	4-9, 13-18	01/07/2025	04/07/2025	16/07/2025	Yes
	21-33	02/07/2025	04/07/2025	08/07/2025	Yes
	1-3, 10-12, 19-20	02/07/2025	04/07/2025	16/07/2025	Yes
TDS | Water	8-9, 13-18	01/07/2025	07/07/2025	21/07/2025	Yes
	4-7	01/07/2025	12/07/2025	17/07/2025	No
	25-33	02/07/2025	07/07/2025	09/07/2025	Yes
	1-3, 10-12, 19-24	02/07/2025	07/07/2025	21/07/2025	Yes
TSS (LL) | Water	4-9, 13-18	01/07/2025	07/07/2025	22/07/2025	Yes
	1-3, 10-12, 19-33	02/07/2025	07/07/2025	22/07/2025	Yes
Chlorophyll a (LL) - Frozen | Water	4-9, 13-18	01/07/2025	15/07/2025	15/07/2025	Yes
	1-3, 10-12, 19-33	02/07/2025	15/07/2025	15/07/2025	Yes
Ammonia as N | Water	4-9, 13-18	01/07/2025	16/07/2025	16/07/2025	Yes
	1-3, 10-12, 19-33	02/07/2025	16/07/2025	16/07/2025	Yes
Nitrate as N (LL) | Water	4-9, 13-18	01/07/2025	21/07/2025	21/07/2025	Yes
	1-3, 10-12, 19-33	02/07/2025	21/07/2025	21/07/2025	Yes
Nitrite as N (LL) | Water	4-9, 13-18	01/07/2025	10/07/2025	10/07/2025	Yes
	1-3, 10-12, 19-33	02/07/2025	10/07/2025	10/07/2025	Yes
NOx as N (LL) | Water	4-9, 13-18	01/07/2025	21/07/2025	21/07/2025	Yes
	1-3, 10-12, 19-33	02/07/2025	21/07/2025	21/07/2025	Yes
Phosphate as P (LL) | Water	4-9, 13-18	01/07/2025	16/07/2025	16/07/2025	Yes
	1-3, 10-12, 19-33	02/07/2025	16/07/2025	16/07/2025	Yes
TKN as N calc (LL) | Water	4-9, 13-18	01/07/2025	17/07/2025	18/07/2025	Yes
	1-3, 10-12, 19-33	02/07/2025	17/07/2025	18/07/2025	Yes
Total N and P (LL) | Water	4-9, 13-18	01/07/2025	17/07/2025	18/07/2025	Yes
	1-3, 10-12, 19-33	02/07/2025	17/07/2025	18/07/2025	Yes
Reactive Silica (LL) | Water	4-9, 13-18	01/07/2025	15/07/2025	15/07/2025	Yes
	1-3, 10-12, 19-33	02/07/2025	15/07/2025	15/07/2025	Yes
Total Coliforms | Water	4-9, 13-18	01/07/2025	04/07/2025	07/07/2025	Yes
	1-3, 10-12, 19-33	02/07/2025	04/07/2025	07/07/2025	Yes

Data Quality Assessment Summary MGG0034

Outliers: QC Frequency

INORG-119 | Inorganics - Nutrients (Water) | Batch BGG2512

Analysis	QC Type	Expected	Reported
Chlorophyll a (LL) - Frozen	Duplicate	2	0

INORG-119 | Inorganics - Nutrients (Water) | Batch BGG2513

Analysis	QC Type	Expected	Reported
Chlorophyll a (LL) - Frozen	Duplicate	2	0

Quality Control MGG0034

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BGG1001

Analyte	Units	PQL	Blank	DUP1 MGG0034-01 Samp | QC | RPD %	DUP2 MGG0034-15 Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	41200 | 41700 | 1.21	46100 | 44100 | 4.43	99.0

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BGG1002

Analyte	Units	PQL	Blank	DUP1 MGG0034-25 Samp | QC | RPD %	DUP2 BGG1002-DUP2# Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	44700 | 41500 | 7.42	70.0 | 70.0 | 0.00	104

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-001 | Inorganics - Physical Parameters (Water) | Batch BGG1360

Analyte	Units	PQL	Blank	DUP1 MGG0034-01 Samp | QC | RPD %	DUP2 MGG0034-11 Samp | QC | RPD %	LCS %
pH	pH units		5.2	7.9 | 8.0 | 1.26	8.0 | 8.0 | 0.124	100
Electrical Conductivity	µS/cm	2.0	<2.0	58700 | 58700 | 0.0146	58600 | 58600 | 0.0835	99.8
Estimated Salinity	mg/L	1.0	<1.0	37600 | 37600 | 0.0147	37500 | 37500 | 0.0835	[NA]

INORG-001 | Inorganics - Physical Parameters (Water) | Batch BGG1361

Analyte	Units	PQL	Blank	DUP1 MGG0034-21 Samp | QC | RPD %	DUP2 MGG0034-30 Samp | QC | RPD %	LCS %
pH	pH units		4.6	7.8 | 7.8 | 0.515	8.0 | 7.9 | 1.63	98.4
Electrical Conductivity	µS/cm	2.0	<2.0	57800 | 57900 | 0.158	57900 | 58500 | 0.962	103
Estimated Salinity	mg/L	1.0	<1.0	37000 | 37000 | 0.158	37100 | 37400 | 0.962	[NA]

INORG-019 | Inorganics - Physical Parameters (Water) | Batch BGG1778

Analyte	Units	PQL	Blank	DUP1 MGG0034-01 Samp | QC | RPD %	DUP2 MGG0034-11 Samp | QC | RPD %	LCS %
Total Suspended Solids	mg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	1.10 | 1.00 | [NA]	90.0

INORG-019 | Inorganics - Physical Parameters (Water) | Batch BGG1779

Analyte	Units	PQL	Blank	DUP1 MGG0034-21 Samp | QC | RPD %	DUP2 MGG0034-27 Samp | QC | RPD %	LCS %
Total Suspended Solids	mg/L	1.0	<1.0	6.60 | 7.40 | 11.4	1.50 | 1.20 | [NA] [1]	88.0

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BGG2392

Analyte	Units	PQL	Blank	DUP1 MGG0034-04 Samp | QC | RPD %	DUP2 BGG2392-DUP2# Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	44500 | 44800 | 0.560	105 | 115 | 9.09	109

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-119 | Inorganics - Nutrients (Water) | Batch BGG2512

Analyte	Units	PQL	Blank	LCS %
Chlorophyll a	mg/m3	0.20	<0.20	99.0

INORG-119 | Inorganics - Nutrients (Water) | Batch BGG2513

Analyte	Units	PQL	Blank	LCS %
Chlorophyll a	mg/m3	0.20	<0.20	85.0

Batch QC Comments: [2]

Quality Control MGG0034

QC Comments

Identifier	Description
[1]	Duplicate %RPD may be flagged as an outlier to routine laboratory acceptance, however, where one or both results are <10*PQL, the RPD acceptance criteria increases exponentially.
[2]	Unable to perform all QC according to our internal guidelines due to the limited amount of sample(s) available for testing.

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Certificate of Analysis MGG0504

Client Details

Client	South Australian Research & Development Institute
Contact	Mark Doubell
Address	SARDI Aquatic Science Centre, 2 Hamra Avenue, WEST BEACH, SA, 5024

Sample Details

Your Reference	NWP Mullaquana Monthly Sampling
Number of Samples	33 Water
Date Samples Received	01/08/2025
Date Instructions Received	01/08/2025

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for soils and on an as received basis for other matrices.

Report Details

Date Final Results Expected	19/08/2025
Date of Issue	21/08/2025

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Authorisation Details

Results Approved By	Chris De Luca, Lab Manager Nick Salarmis, Assistant Operations Manager
Laboratory Manager	Chris De Luca

Samples in this Report

Envirolab ID	Sample ID	Matrix	Date Sampled	Date Received
MGG0504-01	MQ01 R1 Comp	Water	31/07/2025	01/08/2025
MGG0504-02	MQ01 R2 Comp	Water	31/07/2025	01/08/2025
MGG0504-03	MQ01 R3 Comp	Water	31/07/2025	01/08/2025
MGG0504-04	MQ02 R1 Comp	Water	30/07/2025	01/08/2025
MGG0504-05	MQ02 R2 Comp	Water	30/07/2025	01/08/2025
MGG0504-06	MQ02 R3 Comp	Water	30/07/2025	01/08/2025
MGG0504-07	MQ03 R1 Comp	Water	30/07/2025	01/08/2025
MGG0504-08	MQ03 R2 Comp	Water	30/07/2025	01/08/2025
MGG0504-09	MQ03 R3 Comp	Water	30/07/2025	01/08/2025
MGG0504-10	MQ04 R1 Comp	Water	31/07/2025	01/08/2025
MGG0504-11	MQ04 R2 Comp	Water	31/07/2025	01/08/2025
MGG0504-12	MQ04 R3 Comp	Water	31/07/2025	01/08/2025
MGG0504-13	MQ05 R1 Comp	Water	30/07/2025	01/08/2025
MGG0504-14	MQ05 R2 Comp	Water	30/07/2025	01/08/2025
MGG0504-15	MQ05 R3 Comp	Water	30/07/2025	01/08/2025
MGG0504-16	MQ06 R1 Comp	Water	30/07/2025	01/08/2025
MGG0504-17	MQ06 R2 Comp	Water	30/07/2025	01/08/2025
MGG0504-18	MQ06 R3 Comp	Water	30/07/2025	01/08/2025
MGG0504-19	MQ07 R1 Comp	Water	31/07/2025	01/08/2025
MGG0504-20	MQ07 R2 Comp	Water	31/07/2025	01/08/2025
MGG0504-21	MQ07 R3 Comp	Water	31/07/2025	01/08/2025
MGG0504-22	MQ08 R1 Comp	Water	31/07/2025	01/08/2025
MGG0504-23	MQ08 R2 Comp	Water	31/07/2025	01/08/2025
MGG0504-24	MQ08 R3 Comp	Water	31/07/2025	01/08/2025
MGG0504-25	MQ08 R1 Surface	Water	31/07/2025	01/08/2025
MGG0504-26	MQ08 R2 Surface	Water	31/07/2025	01/08/2025
MGG0504-27	MQ08 R3 Surface	Water	31/07/2025	01/08/2025
MGG0504-28	MQ08 R1 Bottom	Water	31/07/2025	01/08/2025
MGG0504-29	MQ08 R2 Bottom	Water	31/07/2025	01/08/2025
MGG0504-30	MQ08 R3 Bottom	Water	31/07/2025	01/08/2025
MGG0504-31	MQ09 R1 Comp	Water	31/07/2025	01/08/2025
MGG0504-32	MQ09 R2 Comp	Water	31/07/2025	01/08/2025
MGG0504-33	MQ09 R3 Comp	Water	31/07/2025	01/08/2025

Sample Comments

General Comment	Samples 1-3, 10-12, 19-33 received 4/08/25, 7:55am, 8.3 degrees, icepack, seal intact

Certificate of Analysis MGG0504

Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	MGG0504-01	MGG0504-02	MGG0504-03	MGG0504-04	MGG0504-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			31/07/2025	31/07/2025	31/07/2025	30/07/2025	30/07/2025
pH	pH units		7.7	7.9	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	62000	62000	62000	62000	62000
Total Dissolved Solids	mg/L	5.0	47000	49000	46000	49000	48000
Estimated Salinity*	mg/L	1.0	40000	40000	40000	40000	40000
Total Suspended Solids	mg/L	1.0	3.8	1.6	3.0	2.6	1.8

Envirolab ID	Units	PQL	MGG0504-06	MGG0504-07	MGG0504-08	MGG0504-09	MGG0504-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			30/07/2025	30/07/2025	30/07/2025	30/07/2025	31/07/2025
pH	pH units		8.0	8.0	8.0	8.0	7.8
Electrical Conductivity	µS/cm	2.0	62000	62000	62000	62000	62000
Total Dissolved Solids	mg/L	5.0	45000	49000	47000	49000	41000
Estimated Salinity*	mg/L	1.0	40000	40000	40000	40000	40000
Total Suspended Solids	mg/L	1.0	2.0	1.6	2.0	1.2	3.9

Envirolab ID	Units	PQL	MGG0504-11	MGG0504-12	MGG0504-13	MGG0504-14	MGG0504-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			31/07/2025	31/07/2025	30/07/2025	30/07/2025	30/07/2025
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	62000	62000	62000	62000	62000
Total Dissolved Solids	mg/L	5.0	36000	36000	47000	47000	45000
Estimated Salinity*	mg/L	1.0	40000	40000	40000	40000	40000
Total Suspended Solids	mg/L	1.0	3.9	3.3	1.8	2.7	2.2

Envirolab ID	Units	PQL	MGG0504-16	MGG0504-17	MGG0504-18	MGG0504-19	MGG0504-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			30/07/2025	30/07/2025	30/07/2025	31/07/2025	31/07/2025
pH	pH units		8.0	8.0	8.0	7.8	7.8
Electrical Conductivity	µS/cm	2.0	62000	62000	62000	58000	59000
Total Dissolved Solids	mg/L	5.0	44000	43000	48000	36000	32000
Estimated Salinity*	mg/L	1.0	40000	40000	40000	37000	37000
Total Suspended Solids	mg/L	1.0	5.7	5.5	4.3	3.6	1.3

Envirolab ID	Units	PQL	MGG0504-21	MGG0504-22	MGG0504-23	MGG0504-24	MGG0504-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			31/07/2025	31/07/2025	31/07/2025	31/07/2025	31/07/2025
pH	pH units		7.9	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	58000	58000	58000	58000	58000
Total Dissolved Solids	mg/L	5.0	36000	32000	36000	38000	37000
Estimated Salinity*	mg/L	1.0	37000	37000	37000	37000	37000
Total Suspended Solids	mg/L	1.0	2.3	1.7	1.5	5.2	2.4

Envirolab ID	Units	PQL	MGG0504-26	MGG0504-27	MGG0504-28	MGG0504-29	MGG0504-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			31/07/2025	31/07/2025	31/07/2025	31/07/2025	31/07/2025
pH	pH units		8.0	8.0	8.0	8.0	7.8
Electrical Conductivity	µS/cm	2.0	58000	58000	59000	59000	59000
Total Dissolved Solids	mg/L	5.0	32000	33000	35000	31000	38000

Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	MGG0504-26	MGG0504-27	MGG0504-28	MGG0504-29	MGG0504-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			31/07/2025	31/07/2025	31/07/2025	31/07/2025	31/07/2025
Estimated Salinity*	mg/L	1.0	37000	37000	38000	37000	38000
Total Suspended Solids	mg/L	1.0	2.4	2.0	9.1	9.2	6.8

Envirolab ID	Units	PQL	MGG0504-31	MGG0504-32	MGG0504-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			31/07/2025	31/07/2025	31/07/2025
pH	pH units		8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	59000	59000	59000
Total Dissolved Solids	mg/L	5.0	36000	38000	38000
Estimated Salinity*	mg/L	1.0	38000	38000	38000
Total Suspended Solids	mg/L	1.0	2.6	3.7	4.5

Certificate of Analysis MGG0504

Inorganics - Nutrients (Water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	MGG0504-01	MGG0504-02	MGG0504-03	MGG0504-04	MGG0504-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			31/07/2025	31/07/2025	31/07/2025	30/07/2025	30/07/2025
Chlorophyll a	mg/m3	0.20	0.53	0.67	0.67	0.53	0.80

Envirolab ID	Units	PQL	MGG0504-06	MGG0504-07	MGG0504-08	MGG0504-09	MGG0504-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			30/07/2025	30/07/2025	30/07/2025	30/07/2025	31/07/2025
Chlorophyll a	mg/m3	0.20	0.80	0.67	0.93	0.80	0.67

Envirolab ID	Units	PQL	MGG0504-11	MGG0504-12	MGG0504-13	MGG0504-14	MGG0504-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			31/07/2025	31/07/2025	30/07/2025	30/07/2025	30/07/2025
Chlorophyll a	mg/m3	0.20	0.67	0.40	0.93	0.80	0.40

Envirolab ID	Units	PQL	MGG0504-16	MGG0504-17	MGG0504-18	MGG0504-19	MGG0504-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			30/07/2025	30/07/2025	30/07/2025	31/07/2025	31/07/2025
Chlorophyll a	mg/m3	0.20	0.80	0.67	0.67	0.27	0.40

Envirolab ID	Units	PQL	MGG0504-21	MGG0504-22	MGG0504-23	MGG0504-24	MGG0504-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			31/07/2025	31/07/2025	31/07/2025	31/07/2025	31/07/2025
Chlorophyll a	mg/m3	0.20	0.40	0.80	0.80	0.40	0.53

Envirolab ID	Units	PQL	MGG0504-26	MGG0504-27	MGG0504-28	MGG0504-29	MGG0504-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			31/07/2025	31/07/2025	31/07/2025	31/07/2025	31/07/2025
Chlorophyll a	mg/m3	0.20	0.40	0.40	0.40	0.53	0.53

Envirolab ID	Units	PQL	MGG0504-31	MGG0504-32	MGG0504-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			31/07/2025	31/07/2025	31/07/2025
Chlorophyll a	mg/m3	0.20	0.53	0.53	0.27

Certificate of Analysis MGG0504

Subcontracted Inorganics - Certificate: ENVL25-11 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MGG0504-01	MGG0504-02	MGG0504-03	MGG0504-04	MGG0504-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			31/07/2025	31/07/2025	31/07/2025	30/07/2025	30/07/2025
Ammonia as N	µg/L	3.0	<3	<3	<3	<3	<3
Nitrate as N	µg/L	2.0	<2	<2	<2	2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	140	130	140	140	130
Phosphate as P	µg/L	2.0	5	4	3	4	3
Total Phosphorus	µg/L	5.0	12	11	12	12	12
NOx as N	µg/L	2.0	<2	<2	<2	2	<2
TKN as N*	µg/L	50	140	130	140	140	130

Envirolab ID	Units	PQL	MGG0504-06	MGG0504-07	MGG0504-08	MGG0504-09	MGG0504-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			30/07/2025	30/07/2025	30/07/2025	30/07/2025	31/07/2025
Ammonia as N	µg/L	3.0	<3	<3	<3	<3	<3
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	130	130	120	130	140
Phosphate as P	µg/L	2.0	4	4	4	4	4
Total Phosphorus	µg/L	5.0	14	13	11	13	13
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	130	130	120	130	130

Envirolab ID	Units	PQL	MGG0504-11	MGG0504-12	MGG0504-13	MGG0504-14	MGG0504-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			31/07/2025	31/07/2025	30/07/2025	30/07/2025	30/07/2025
Ammonia as N	µg/L	3.0	<3	<3	3	<3	<3
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	140	120	130	130	130
Phosphate as P	µg/L	2.0	4	4	3	3	3
Total Phosphorus	µg/L	5.0	13	13	12	13	13
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	140	120	130	130	130

Envirolab ID	Units	PQL	MGG0504-16	MGG0504-17	MGG0504-18	MGG0504-19	MGG0504-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			30/07/2025	30/07/2025	30/07/2025	31/07/2025	31/07/2025
Ammonia as N	µg/L	3.0	<3	<3	<3	<3	<3

Certificate of Analysis MGG0504

Subcontracted Inorganics - Certificate: ENVL25-11 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MGG0504-16	MGG0504-17	MGG0504-18	MGG0504-19	MGG0504-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			30/07/2025	30/07/2025	30/07/2025	31/07/2025	31/07/2025
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	150	140	150	140	130
Phosphate as P	µg/L	2.0	3	4	3	4	3
Total Phosphorus	µg/L	5.0	17	15	14	13	12
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	150	140	150	130	130

Envirolab ID	Units	PQL	MGG0504-21	MGG0504-22	MGG0504-23	MGG0504-24	MGG0504-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			31/07/2025	31/07/2025	31/07/2025	31/07/2025	31/07/2025
Ammonia as N	µg/L	3.0	<3	<3	<3	<3	<3
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	150	120	130	130	120
Phosphate as P	µg/L	2.0	3	4	3	3	2
Total Phosphorus	µg/L	5.0	13	13	13	12	12
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	150	120	130	130	120

Envirolab ID	Units	PQL	MGG0504-26	MGG0504-27	MGG0504-28	MGG0504-29	MGG0504-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			31/07/2025	31/07/2025	31/07/2025	31/07/2025	31/07/2025
Ammonia as N	µg/L	3.0	<3	<3	<3	<3	<3
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	140	120	130	130	130
Phosphate as P	µg/L	2.0	3	3	2	3	3
Total Phosphorus	µg/L	5.0	13	12	15	14	12
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	130	120	130	130	130

Envirolab ID	Units	PQL	MGG0504-31	MGG0504-32	MGG0504-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			31/07/2025	31/07/2025	31/07/2025
Ammonia as N	µg/L	3.0	<3	<3	<3

Subcontracted Inorganics - Certificate: ENVL25-11 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MGG0504-31	MGG0504-32	MGG0504-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			31/07/2025	31/07/2025	31/07/2025
Nitrate as N	µg/L	2.0	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2
Total Nitrogen	µg/L	50	140	150	160
Phosphate as P	µg/L	2.0	3	2	3
Total Phosphorus	µg/L	5.0	13	12	13
NOx as N	µg/L	2.0	<2	<2	<2
TKN as N*	µg/L	50	140	150	160

Subcontracted Metals - Certificate: ENVL25-11 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MGG0504-01	MGG0504-02	MGG0504-03	MGG0504-04	MGG0504-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			31/07/2025	31/07/2025	31/07/2025	30/07/2025	30/07/2025
Reactive Silica	µg/L	2.0	34	33	33	37	38

Envirolab ID	Units	PQL	MGG0504-06	MGG0504-07	MGG0504-08	MGG0504-09	MGG0504-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			30/07/2025	30/07/2025	30/07/2025	30/07/2025	31/07/2025
Reactive Silica	µg/L	2.0	38	37	36	36	38

Envirolab ID	Units	PQL	MGG0504-11	MGG0504-12	MGG0504-13	MGG0504-14	MGG0504-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			31/07/2025	31/07/2025	30/07/2025	30/07/2025	30/07/2025
Reactive Silica	µg/L	2.0	37	37	40	40	40

Envirolab ID	Units	PQL	MGG0504-16	MGG0504-17	MGG0504-18	MGG0504-19	MGG0504-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			30/07/2025	30/07/2025	30/07/2025	31/07/2025	31/07/2025
Reactive Silica	µg/L	2.0	40	40	40	39	39

Envirolab ID	Units	PQL	MGG0504-21	MGG0504-22	MGG0504-23	MGG0504-24	MGG0504-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			31/07/2025	31/07/2025	31/07/2025	31/07/2025	31/07/2025
Reactive Silica	µg/L	2.0	39	40	40	39	39

Envirolab ID	Units	PQL	MGG0504-26	MGG0504-27	MGG0504-28	MGG0504-29	MGG0504-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			31/07/2025	31/07/2025	31/07/2025	31/07/2025	31/07/2025
Reactive Silica	µg/L	2.0	38	38	39	39	40

Envirolab ID	Units	PQL	MGG0504-31	MGG0504-32	MGG0504-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			31/07/2025	31/07/2025	31/07/2025
Reactive Silica	µg/L	2.0	39	39	39

Subcontracted Micro - Certificate: Various - Analysed By SA Pathology (Water)

Envirolab ID	Units	PQL	MGG0504-01	MGG0504-02	MGG0504-03	MGG0504-04	MGG0504-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			31/07/2025	31/07/2025	31/07/2025	30/07/2025	30/07/2025
Total Coliforms	MPN/100mL	1.0	2000	1300	2400	32	20

Envirolab ID	Units	PQL	MGG0504-06	MGG0504-07	MGG0504-08	MGG0504-09	MGG0504-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			30/07/2025	30/07/2025	30/07/2025	30/07/2025	31/07/2025
Total Coliforms	MPN/100mL	1.0	14	86	34	37	730

Envirolab ID	Units	PQL	MGG0504-11	MGG0504-12	MGG0504-13	MGG0504-14	MGG0504-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			31/07/2025	31/07/2025	30/07/2025	30/07/2025	30/07/2025
Total Coliforms	MPN/100mL	1.0	260	320	6	4	7

Envirolab ID	Units	PQL	MGG0504-16	MGG0504-17	MGG0504-18	MGG0504-19	MGG0504-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			30/07/2025	30/07/2025	30/07/2025	31/07/2025	31/07/2025
Total Coliforms	MPN/100mL	1.0	400	340	460	580	160

Envirolab ID	Units	PQL	MGG0504-21	MGG0504-22	MGG0504-23	MGG0504-24	MGG0504-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			31/07/2025	31/07/2025	31/07/2025	31/07/2025	31/07/2025
Total Coliforms	MPN/100mL	1.0	610	110	100	190	770

Envirolab ID	Units	PQL	MGG0504-26	MGG0504-27	MGG0504-28	MGG0504-29	MGG0504-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			31/07/2025	31/07/2025	31/07/2025	31/07/2025	31/07/2025
Total Coliforms	MPN/100mL	1.0	360	1300	580	300	260

Envirolab ID	Units	PQL	MGG0504-31	MGG0504-32	MGG0504-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			31/07/2025	31/07/2025	31/07/2025
Total Coliforms	MPN/100mL	1.0	610	520	290

Method Summary

Method ID	Methodology Summary
INORG-001	pH - Measured using pH meter and electrode. Please note that the results for water analyses are indicative only, as analysis can be completed outside of the recommended holding times. Solids are reported from a 1:5 water extract unless otherwise specified. Alternatively, pH is determined in a 1:5 extract using 0.01M calcium chloride or a solid is extracted at a ratio of 1:2.5 (AS1289.4.3.1), pH is measured in the extract.
INORG-002	Conductivity and Salinity - measured using a conductivity cell at 25°C. Soil results reported from a 1:5 Soil:Water extract unless otherwise specified. Please note Resistivity is estimated by calculation and may not correlate with results otherwise obtained using the Resistivity current method (based on AS 1289.4.4.1), depending on the nature of the soil being analysed. Blanks may yield EC readings >1µS/cm, this is likely due to adsorption of Carbon Dioxide while the blank sample is sat on the instrument autosampler prior to analysis. The values are generally insignificant (<5µS/cm) compared to most actual sample conductivities.
INORG-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180±10°C. NOTE: Where the EC of the sample is <100µS/cm, the TDS will typically be below 70mg/L (as the sample is very likely to be at least drinking water quality). Therefore to ensure data quality for TDS, the TDS is typically calculated as per the equation: TDS = EC*0.6
INORG-019	Suspended Solids - determined gravimetrically by filtration of the sample. The solids are dried at 104±5°C
INORG-119	Chlorophyll A based on APHA 10200 H latest edition.
SUB-021	Subcontracted to Marine & Freshwater Research - Accreditation number 10603
SUB-041_CA	Subcontracted to SA Pathology

Result Definitions

Identifier	Description
NR	Not reported
NEPM	National Environment Protection Measure
NS	Not specified
LCS	Laboratory Control Sample
RPD	Relative Percent Difference
>	Greater than
<	Less than
PQL	Practical Quantitation Limit
INS	Insufficient sample for this test
NA	Test not required
NT	Not tested
DOL	Samples rejected due to particulate overload (air filters only)
RFD	Samples rejected due to filter damage (air filters only)
RUD	Samples rejected due to uneven deposition (air filters only)
##	Indicates a laboratory acceptance criteria outlier, for further details, see Result Comments and/or QC Comments

Quality Control Definitions

Blank

This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, and is determined by processing solvents and reagents in exactly the same manner as for samples.

Surrogate Spike

Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

LCS (Laboratory Control Sample)

This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Matrix Spike

A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

Duplicate

This is the complete duplicate analysis of a sample from the process batch. The sample selected should be one where the analyte concentration is easily measurable.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria. Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction. Spikes for Physical and Aggregate Tests are not applicable. For VOCs in water samples, three vials are required for duplicate or spike analysis.

General Acceptance Criteria (GAC) - Analyte specific criteria applies for some analytes and is reflected in QC recovery tables.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% - see ELN-P05 QAQC tables for details (available on request); <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase. Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was typically insufficient in order to satisfy laboratory QA/QC protocols.

Miscellaneous Information

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached. We have taken the sampling date as being the date received at the laboratory.

Two significant figures are reported for the majority of tests and with a high degree of confidence, for results <10*PQL, the second significant figure may be in doubt i.e. has a relatively high degree of uncertainty and is provided for information only.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS where sediment/solids are included by default.

Urine Analysis - The BEI values listed are taken from the 2022 edition of *TLVs and BEIs Threshold Limits by ACGIH*.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volume(s) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

Data Quality Assessment Summary MGG0504

Client Details

Client	South Australian Research & Development Institute
Your Reference	NWP Mullaquana Monthly Sampling
Date Issued	21/08/2025

Recommended Holding Time Compliance

Recommended holding time exceedances exist - See detailed list below

Quality Control and QC Frequency

QC Type	Compliant	Details
Blank	Yes	No Outliers
LCS	Yes	No Outliers
Duplicates	Yes	No Outliers
Matrix Spike	Yes	No Outliers
Surrogates / Extracted Internal Standards	Yes	No Outliers
QC Frequency	No	QC Frequency Outliers Exist - See detailed list below

Surrogates/Extracted Internal Standards, Duplicates and/or Matrix Spikes are not always relevant/applicable to certain analyses and matrices. Therefore, said QC measures are deemed compliant in these situations by default. See Laboratory Acceptance Criteria for more information

Data Quality Assessment Summary MGG0504

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
EC | Water	4-9, 13-18	30/07/2025	01/08/2025	04/08/2025	Yes
	1-3, 10-12	31/07/2025	01/08/2025	04/08/2025	Yes
	19-33	31/07/2025	01/08/2025	05/08/2025	Yes
pH | Water	4-9, 13-18	30/07/2025	01/08/2025	04/08/2025	No
	1-3, 10-12	31/07/2025	01/08/2025	04/08/2025	Yes
	19-33	31/07/2025	01/08/2025	05/08/2025	Yes
Salinity | Water	4-9, 13-18	30/07/2025	01/08/2025	04/08/2025	Yes
	1-3, 10-12	31/07/2025	01/08/2025	04/08/2025	Yes
	19-33	31/07/2025	01/08/2025	05/08/2025	Yes
TDS | Water	5-9, 13-18	30/07/2025	04/08/2025	07/08/2025	Yes
	4	30/07/2025	05/08/2025	13/08/2025	Yes
	1-2	31/07/2025	04/08/2025	07/08/2025	Yes
	3, 10-12, 19-33	31/07/2025	04/08/2025	15/08/2025	Yes
TSS (LL) | Water	4-9, 13-18	30/07/2025	11/08/2025	18/08/2025	No
	3, 10-12, 19-33	31/07/2025	05/08/2025	19/08/2025	Yes
	1-2	31/07/2025	11/08/2025	18/08/2025	No
Chlorophyll a (LL) - Frozen | Water	4-9, 13-18	30/07/2025	05/08/2025	12/08/2025	Yes
	1-3, 10-12, 19-33	31/07/2025	05/08/2025	12/08/2025	Yes
Ammonia as N | Water	4-9, 13-18	30/07/2025	12/08/2025	12/08/2025	Yes
	1-3, 10-12, 19-33	31/07/2025	12/08/2025	12/08/2025	Yes
Nitrate as N (LL) | Water	4-9, 13-18	30/07/2025	12/08/2025	12/08/2025	Yes
	1-3, 10-12, 19-33	31/07/2025	12/08/2025	12/08/2025	Yes
Nitrite as N (LL) | Water	4-9, 13-18	30/07/2025	11/08/2025	11/08/2025	Yes
	1-3, 10-12, 19-33	31/07/2025	11/08/2025	11/08/2025	Yes
NOx as N (LL) | Water	4-9, 13-18	30/07/2025	12/08/2025	12/08/2025	Yes
	1-3, 10-12, 19-33	31/07/2025	12/08/2025	12/08/2025	Yes
Phosphate as P (LL) | Water	4-9, 13-18	30/07/2025	12/08/2025	12/08/2025	Yes
	1-3, 10-12, 19-33	31/07/2025	12/08/2025	12/08/2025	Yes
TKN as N calc (LL) | Water	4-9, 13-18	30/07/2025	12/08/2025	13/08/2025	Yes
	1-3, 10-12, 19-31, 33	31/07/2025	12/08/2025	13/08/2025	Yes
	32	31/07/2025	19/08/2025	19/08/2025	Yes
Total N and P (LL) | Water	4-9, 13-18	30/07/2025	12/08/2025	13/08/2025	Yes
	1-3, 10-12, 19-31, 33	31/07/2025	12/08/2025	13/08/2025	Yes
	32	31/07/2025	19/08/2025	19/08/2025	Yes
Reactive Silica (LL) | Water	4-9, 13-18	30/07/2025	15/08/2025	15/08/2025	Yes
	1-3, 10-12, 19-33	31/07/2025	15/08/2025	15/08/2025	Yes
Total Coliforms | Water	4-9, 13-18	30/07/2025	31/07/2025	31/07/2025	Yes
	1-3, 10-12, 19-33	31/07/2025	01/08/2025	01/08/2025	Yes

Outliers: QC Frequency

INORG-119|Inorganics - Nutrients (Water)| Batch BGH0643

Analysis	QC Type	Expected	Reported
Chlorophyll a (LL) - Frozen	Duplicate	2	0

INORG-119|Inorganics - Nutrients (Water)| Batch BGH0644

Analysis	QC Type	Expected	Reported
Chlorophyll a (LL) - Frozen	Duplicate	2	0

Quality Control MGG0504

INORG-001 | Inorganics - Physical Parameters (Water) | Batch BGH0367

Analyte	Units	PQL	Blank	DUP1 BGH0367-DUP1# Samp | QC | RPD %	DUP2 MGG0504-09 Samp | QC | RPD %	LCS %
pH	pH units		4.6	7.3 | 7.2 | 0.414	8.0 | 7.8 | 2.27	98.3
Electrical Conductivity	µS/cm	2.0	<2.0	386 | 386 | 0.0778	62000 | 62400 | 0.692	110
Estimated Salinity	mg/L	1.0	<1.0	243 | 247 | 1.65	39700 | 39900 | 0.692	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-001 | Inorganics - Physical Parameters (Water) | Batch BGH0368

Analyte	Units	PQL	Blank	DUP1 MGG0504-19 Samp | QC | RPD %	DUP2 MGG0504-29 Samp | QC | RPD %	LCS %
pH	pH units		5.8	7.8 | 7.8 | 0.129	8.0 | 7.8 | 1.52	98.0
Electrical Conductivity	µS/cm	2.0	<2.0	58300 | 58600 | 0.466	58600 | 58900 | 0.632	103
Estimated Salinity	mg/L	1.0	1.02	37300 | 37500 | 0.466	37500 | 37700 | 0.632	[NA]

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BGH0374

Analyte	Units	PQL	Blank	DUP1 MGG0504-01 Samp | QC | RPD %	DUP2 MGG0504-16 Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	46800 | 48800 | 4.29	44400 | 45300 | 1.89	101

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BGH0375

Analyte	Units	PQL	Blank	DUP1 MGG0504-03 Samp | QC | RPD %	DUP2 MGG0504-25 Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	46400 | 47900 | 3.29	37400 | 39600 | 5.71	104

INORG-019 | Inorganics - Physical Parameters (Water) | Batch BGH1548

Analyte	Units	PQL	Blank	DUP1 MGG0504-01 Samp | QC | RPD %	DUP2 MGG0504-15 Samp | QC | RPD %	LCS %
Total Suspended Solids	mg/L	1.0	<1.0	3.80 | 4.20 | [NA]	2.20 | 2.00 | [NA]	101

INORG-019 | Inorganics - Physical Parameters (Water) | Batch BGH1549

Analyte	Units	PQL	Blank	DUP1 MGG0504-03 Samp | QC | RPD %	DUP2 MGG0504-24 Samp | QC | RPD %	LCS %
Total Suspended Solids	mg/L	1.0	<1.0	3.00 | 3.00 | [NA]	5.20 | 5.20 | [NA]	94.0

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BGH1916

Analyte	Units	PQL	Blank	DUP1 MGG0504-04 Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	49200 | 45400 | 8.03	99.0

INORG-119 | Inorganics - Nutrients (Water) | Batch BGH0643

Analyte	Units	PQL	Blank	LCS %
Chlorophyll a	mg/m3	0.20	<0.20	106

Batch QC Comments: [1]

INORG-119 | Inorganics - Nutrients (Water) | Batch BGH0644

Analyte	Units	PQL	Blank	LCS %
Chlorophyll a	mg/m3	0.20	<0.20	94.0

Batch QC Comments: [1]

Quality Control MGG0504

QC Comments

Identifier	Description
[1]	Unable to perform all QC according to our internal guidelines due to the limited amount of sample(s) available for testing.

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Certificate of Analysis MGH0404

Client Details

Client	South Australian Research & Development Institute
Contact	Ian Moody
Address	SARDI Aquatic Science Centre, 2 Hamra Avenue, WEST BEACH, SA, 5024

Sample Details

Your Reference	NWP Mullaquana Environmental Seasonal - August
Number of Samples	33 Water
Date Samples Received	28/08/2025
Date Instructions Received	28/08/2025

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for soils and on an as received basis for other matrices.

Report Details

Date Final Results Expected	19/09/2025
Date of Issue	19/09/2025

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Authorisation Details

Results Approved By	Chaminda Gunasekara, Inorganics Supervisor Chris De Luca, Lab Manager Diego Bigolin, Supervisor, Inorganics Maggie Hu, Organics Supervisor Priya Samarawickrama, Senior Chemist, Inorganics Tara White, Metals Supervisor Tianna Milburn, Operations Manager
Laboratory Manager	Chris De Luca

Samples in this Report

Envirolab ID	Sample ID	Matrix	Date Sampled	Date Received
MGH0404-01	MQ01 R1 Comp	Water	27/08/2025	28/08/2025
MGH0404-02	MQ01 R2 Comp	Water	27/08/2025	28/08/2025
MGH0404-03	MQ01 R3 Comp	Water	27/08/2025	28/08/2025
MGH0404-04	MQ02 R1 Comp	Water	26/08/2025	28/08/2025
MGH0404-05	MQ02 R2 Comp	Water	26/08/2025	28/08/2025
MGH0404-06	MQ02 R3 Comp	Water	26/08/2025	28/08/2025
MGH0404-07	MQ03 R1 Comp	Water	26/08/2025	28/08/2025
MGH0404-08	MQ03 R2 Comp	Water	26/08/2025	28/08/2025
MGH0404-09	MQ03 R3 Comp	Water	26/08/2025	28/08/2025
MGH0404-10	MQ04 R1 Comp	Water	27/08/2025	28/08/2025
MGH0404-11	MQ04 R2 Comp	Water	27/08/2025	28/08/2025
MGH0404-12	MQ04 R3 Comp	Water	27/08/2025	28/08/2025
MGH0404-13	MQ05 R1 Comp	Water	26/08/2025	28/08/2025
MGH0404-14	MQ05 R2 Comp	Water	26/08/2025	28/08/2025
MGH0404-15	MQ05 R3 Comp	Water	26/08/2025	28/08/2025
MGH0404-16	MQ06 R1 Comp	Water	26/08/2025	28/08/2025
MGH0404-17	MQ06 R2 Comp	Water	26/08/2025	28/08/2025
MGH0404-18	MQ06 R3 Comp	Water	26/08/2025	28/08/2025
MGH0404-19	MQ07 R1 Comp	Water	26/08/2025	28/08/2025
MGH0404-20	MQ07 R2 Comp	Water	26/08/2025	28/08/2025
MGH0404-21	MQ07 R3 Comp	Water	26/08/2025	28/08/2025
MGH0404-22	MQ08 R1 Comp	Water	26/08/2025	28/08/2025
MGH0404-23	MQ08 R2 Comp	Water	26/08/2025	28/08/2025
MGH0404-24	MQ08 R3 Comp	Water	26/08/2025	28/08/2025
MGH0404-25	MQ08 R1 Surface	Water	27/08/2025	28/08/2025
MGH0404-26	MQ08 R2 Surface	Water	27/08/2025	28/08/2025
MGH0404-27	MQ08 R3 Surface	Water	27/08/2025	28/08/2025
MGH0404-28	MQ08 R1 Bottom	Water	27/08/2025	28/08/2025
MGH0404-29	MQ08 R2 Bottom	Water	27/08/2025	28/08/2025
MGH0404-30	MQ08 R3 Bottom	Water	27/08/2025	28/08/2025
MGH0404-31	MQ09 R1 Comp	Water	27/08/2025	28/08/2025
MGH0404-32	MQ09 R2 Comp	Water	27/08/2025	28/08/2025
MGH0404-33	MQ09 R3 Comp	Water	27/08/2025	28/08/2025

Volatile TRH and BTEX (Water)

Envirolab ID	Units	PQL	MGH0404-01	MGH0404-02	MGH0404-03	MGH0404-04	MGH0404-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			27/08/2025	27/08/2025	27/08/2025	26/08/2025	26/08/2025
TRH C6-C9	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	<10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve Xylenes	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve BTEX	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*105*	*105*	*106*	*106*	*106*
Surrogate Toluene-D8	%		*92.9*	*92.8*	*93.4*	*93.7*	*93.6*
Surrogate 4-Bromofluorobenzene	%		*109*	*109*	*109*	*109*	*110*

Envirolab ID	Units	PQL	MGH0404-06	MGH0404-07	MGH0404-08	MGH0404-09	MGH0404-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	27/08/2025
TRH C6-C9	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	<10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve Xylenes	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve BTEX	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*106*	*107*	*108*	*109*	*107*
Surrogate Toluene-D8	%		*93.7*	*94.9*	*95.0*	*94.9*	*93.8*
Surrogate 4-Bromofluorobenzene	%		*108*	*109*	*108*	*108*	*108*

Envirolab ID	Units	PQL	MGH0404-11	MGH0404-12	MGH0404-13	MGH0404-14	MGH0404-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			27/08/2025	27/08/2025	26/08/2025	26/08/2025	26/08/2025
TRH C6-C9	µg/L	10	<10	<10	20 [4]	11 [4]	<10
TRH C6-C10	µg/L	10	<10	<10	29 [4]	11 [4]	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	29	11	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Volatile TRH and BTEX (Water)

Envirolab ID	Units	PQL	MGH0404-11	MGH0404-12	MGH0404-13	MGH0404-14	MGH0404-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			27/08/2025	27/08/2025	26/08/2025	26/08/2025	26/08/2025
Total +ve Xylenes	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve BTEX	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*107*	*122*	*107*	*107*	*94.3*
Surrogate Toluene-D8	%		*94.6*	*102*	*118*	*99.1*	*107*
Surrogate 4-Bromofluorobenzene	%		*109*	*106*	*89.6*	*94.0*	*82.2*

Envirolab ID	Units	PQL	MGH0404-16	MGH0404-17	MGH0404-18	MGH0404-19	MGH0404-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	26/08/2025
TRH C6-C9	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10	µg/L	10	12 [4]	<10	<10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	12	<10	<10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve Xylenes	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve BTEX	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*105*	*101*	*101*	*102*	*101*
Surrogate Toluene-D8	%		*96.9*	*96.8*	*97.5*	*97.2*	*97.1*
Surrogate 4-Bromofluorobenzene	%		*94.7*	*99.5*	*98.8*	*99.4*	*99.7*

Envirolab ID	Units	PQL	MGH0404-21	MGH0404-22	MGH0404-23	MGH0404-24	MGH0404-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	27/08/2025
TRH C6-C9	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	10 [4]	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve Xylenes	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve BTEX	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*101*	*102*	*102*	*101*	*124*
Surrogate Toluene-D8	%		*97.6*	*97.1*	*96.5*	*95.6*	*103*
Surrogate 4-Bromofluorobenzene	%		*99.2*	*99.7*	*98.4*	*98.2*	*105*

Volatile TRH and BTEX (Water)

Envirolab ID	Units	PQL	MGH0404-26	MGH0404-27	MGH0404-28	MGH0404-29	MGH0404-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			27/08/2025	27/08/2025	27/08/2025	27/08/2025	27/08/2025
TRH C6-C9	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	<10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve Xylenes	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve BTEX	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*101*	*101*	*102*	*102*	*102*
Surrogate Toluene-D8	%		*97.4*	*97.3*	*97.0*	*96.7*	*97.0*
Surrogate 4-Bromofluorobenzene	%		*97.9*	*97.3*	*98.3*	*98.1*	*97.7*

Envirolab ID	Units	PQL	MGH0404-31	MGH0404-32	MGH0404-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			27/08/2025	27/08/2025	27/08/2025
TRH C6-C9	µg/L	10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0
Total +ve Xylenes	µg/L	1.0	<1.0	<1.0	<1.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0
Total +ve BTEX	µg/L	1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*101*	*101*	*101*
Surrogate Toluene-D8	%		*97.1*	*97.5*	*97.6*
Surrogate 4-Bromofluorobenzene	%		*98.4*	*97.2*	*98.1*

Semi-volatile TRH (Water)

Envirolab ID	Units	PQL	MGH0404-01	MGH0404-02	MGH0404-03	MGH0404-04	MGH0404-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			27/08/2025	27/08/2025	27/08/2025	26/08/2025	26/08/2025
TRH C10-C14	µg/L	50	<50	<50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%		*83.6*	*68.4*	*72.2*	*66.3*	*86.1*

Envirolab ID	Units	PQL	MGH0404-06	MGH0404-07	MGH0404-08	MGH0404-09	MGH0404-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	27/08/2025
TRH C10-C14	µg/L	50	<50	<50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100	<100	110
TRH C29-C36	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50	<50	110
TRH >C10-C16	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100	<100	150
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50	<50	150
Surrogate o-Terphenyl	%		*69.7*	*76.3*	*87.7*	*77.5*	*103*

Envirolab ID	Units	PQL	MGH0404-11	MGH0404-12	MGH0404-13	MGH0404-14	MGH0404-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			27/08/2025	27/08/2025	26/08/2025	26/08/2025	26/08/2025
TRH C10-C14	µg/L	50	<50	62	<50	<50	<50
TRH C15-C28	µg/L	100	<100	130	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	190	<50	<50	<50
TRH >C10-C16	µg/L	50	<50	59	<50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	59	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	170	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	230	<50	<50	<50
Surrogate o-Terphenyl	%		*79.4*	*97.6*	*128*	*79.1*	*98.3*

Envirolab ID	Units	PQL	MGH0404-16	MGH0404-17	MGH0404-18	MGH0404-19	MGH0404-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	26/08/2025
TRH C10-C14	µg/L	50	<50	<50	<50	<50	90
TRH C15-C28	µg/L	100	<100	<100	<100	<100	170
TRH C29-C36	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50	<50	260
TRH >C10-C16	µg/L	50	<50	<50	<50	<50	86

Semi-volatile TRH (Water)

Envirolab ID	Units	PQL	MGH0404-16	MGH0404-17	MGH0404-18	MGH0404-19	MGH0404-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	26/08/2025
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50	<50	86
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100	<100	230
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50	<50	320
Surrogate o-Terphenyl	%		*94.9*	*86.9*	*89.4*	*107*	*## [5]*

Envirolab ID	Units	PQL	MGH0404-21	MGH0404-22	MGH0404-23	MGH0404-24	MGH0404-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	27/08/2025
TRH C10-C14	µg/L	50	<50	<50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100	110	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50	110	<50
Surrogate o-Terphenyl	%		*103*	*102*	*123*	*71.3*	*79.6*

Envirolab ID	Units	PQL	MGH0404-26	MGH0404-27	MGH0404-28	MGH0404-29	MGH0404-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			27/08/2025	27/08/2025	27/08/2025	27/08/2025	27/08/2025
TRH C10-C14	µg/L	50	<50	<50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%		*65.9*	*73.1*	*75.8*	*72.1*	*72.9*

Envirolab ID	Units	PQL	MGH0404-31	MGH0404-32	MGH0404-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			27/08/2025	27/08/2025	27/08/2025
TRH C10-C14	µg/L	50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100

Semi-volatile TRH (Water)

Envirolab ID	Units	PQL	MGH0404-31	MGH0404-32	MGH0404-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			27/08/2025	27/08/2025	27/08/2025
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50
Surrogate o-Terphenyl	%		*86.4*	*87.5*	*81.6*

Acid Extractable Metals (Water)

Envirolab ID	Units	PQL	MGH0404-01	MGH0404-02	MGH0404-03	MGH0404-04	MGH0404-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			27/08/2025	27/08/2025	27/08/2025	26/08/2025	26/08/2025
Silicon*	mg/L	0.10	<2.0 [6]	<2.0 [6]	<2.0 [6]	<2.0 [6]	<2.0 [6]
Calcium	mg/L	0.50	430	430	440	430	440
Magnesium	mg/L	0.50	1400	1400	1400	1400	1400
Potassium	mg/L	0.50	590	580	600	590	600
Sodium	mg/L	0.50	11000	11000	11000	11000	12000
Hardness (calc) equivalent CaCO3	mg/L	3.0	6800	6800	6800	6800	6900

Envirolab ID	Units	PQL	MGH0404-06	MGH0404-07	MGH0404-08	MGH0404-09	MGH0404-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	27/08/2025
Silicon*	mg/L	0.10	<2.0 [6]	<2.0 [6]	<2.0 [6]	<2.0 [6]	<2.0 [6]
Calcium	mg/L	0.50	450	440	440	440	440
Magnesium	mg/L	0.50	1400	1400	1400	1400	1400
Potassium	mg/L	0.50	600	590	600	590	590
Sodium	mg/L	0.50	12000	11000	12000	11000	11000
Hardness (calc) equivalent CaCO3	mg/L	3.0	7000	6900	7000	6800	6800

Envirolab ID	Units	PQL	MGH0404-11	MGH0404-12	MGH0404-13	MGH0404-14	MGH0404-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			27/08/2025	27/08/2025	26/08/2025	26/08/2025	26/08/2025
Silicon*	mg/L	0.10	<2.0 [6]	<2.0 [6]	<2.0 [6]	<2.0 [6]	<2.0 [6]
Calcium	mg/L	0.50	440	440	430	430	450
Magnesium	mg/L	0.50	1400	1400	1400	1400	1500
Potassium	mg/L	0.50	590	600	590	590	610
Sodium	mg/L	0.50	11000	12000	11000	11000	12000
Hardness (calc) equivalent CaCO3	mg/L	3.0	6800	6900	6800	6800	7100

Envirolab ID	Units	PQL	MGH0404-16	MGH0404-17	MGH0404-18	MGH0404-19	MGH0404-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	26/08/2025
Silicon*	mg/L	0.10	<2.0 [6]	<2.0 [6]	<2.0 [6]	<2.0 [6]	<2.0 [6]
Calcium	mg/L	0.50	430	420	430	430	420
Magnesium	mg/L	0.50	1400	1400	1400	1400	1300
Potassium	mg/L	0.50	590	580	600	600	580
Sodium	mg/L	0.50	11000	11000	11000	11000	11000
Hardness (calc) equivalent CaCO3	mg/L	3.0	6800	6600	6700	6700	6600

Envirolab ID	Units	PQL	MGH0404-21	MGH0404-22	MGH0404-23	MGH0404-24	MGH0404-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	27/08/2025
Silicon*	mg/L	0.10	<2.0 [6]	<2.0 [6]	<2.0 [6]	<2.0 [6]	<2.0 [6]
Calcium	mg/L	0.50	440	430	440	440	440
Magnesium	mg/L	0.50	1400	1400	1400	1400	1400
Potassium	mg/L	0.50	610	580	610	610	600
Sodium	mg/L	0.50	11000	11000	12000	11000	11000
Hardness (calc) equivalent CaCO3	mg/L	3.0	6900	6700	6900	6800	6800

Acid Extractable Metals (Water)

Envirolab ID	Units	PQL	MGH0404-26	MGH0404-27	MGH0404-28	MGH0404-29	MGH0404-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			27/08/2025	27/08/2025	27/08/2025	27/08/2025	27/08/2025
Silicon*	mg/L	0.10	<2.0 [6]	<2.0 [6]	<2.0 [6]	<2.0 [6]	<2.0 [6]
Calcium	mg/L	0.50	440	410	430	430	430
Magnesium	mg/L	0.50	1400	1300	1400	1400	1400
Potassium	mg/L	0.50	610	560	590	590	590
Sodium	mg/L	0.50	11000	11000	11000	11000	11000
Hardness (calc) equivalent CaCO3	mg/L	3.0	6900	6600	6700	6700	6700

Envirolab ID	Units	PQL	MGH0404-31	MGH0404-32	MGH0404-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			27/08/2025	27/08/2025	27/08/2025
Silicon*	mg/L	0.10	<2.0 [6]	<2.0 [6]	<2.0 [6]
Calcium	mg/L	0.50	430	420	440
Magnesium	mg/L	0.50	1400	1400	1400
Potassium	mg/L	0.50	580	580	600
Sodium	mg/L	0.50	11000	11000	12000
Hardness (calc) equivalent CaCO3	mg/L	3.0	6700	6700	6800

Acid Extractable Low Level Metals (Water)

Envirolab ID	Units	PQL	MGH0404-01	MGH0404-02	MGH0404-03	MGH0404-04	MGH0404-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			27/08/2025	27/08/2025	27/08/2025	26/08/2025	26/08/2025
Silver	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Aluminium	µg/L	10	<100 [6]	<100 [6]	<100 [6]	140	<100 [6]
Arsenic	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Boron	µg/L	20	5000	5100	5100	5100	5100
Barium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Beryllium	µg/L	0.50	<5.0 [6]	<5.0 [6]	<5.0 [6]	<5.0 [6]	<5.0 [6]
Cadmium	µg/L	0.10	<1.0 [6]	<1.0 [6]	<1.0 [6]	<1.0 [6]	<1.0 [6]
Cobalt	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Chromium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	40	<10 [6]
Copper	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Iron	µg/L	10	<100 [6]	<100 [6]	<100 [6]	210	<100 [6]
Mercury	µg/L	0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Manganese	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Molybdenum	µg/L	1.0	19	15	14	18	15
Nickel	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Lead	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Antimony	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Selenium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Strontium	µg/L	1.0	8800	8800	8800	9000	9100
Thorium	µg/L	0.50	7.1	<5.0 [6]	<5.0 [6]	<5.0 [6]	<5.0 [6]
Thallium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Uranium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Vanadium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Zinc	µg/L	1.0	31	36	45	37	46

Envirolab ID	Units	PQL	MGH0404-06	MGH0404-07	MGH0404-08	MGH0404-09	MGH0404-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	27/08/2025
Silver	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Aluminium	µg/L	10	<100 [6]	<100 [6]	<100 [6]	<100 [6]	<100 [6]
Arsenic	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Boron	µg/L	20	5100	5300	5100	5200	5300
Barium	µg/L	1.0	<10 [6]	11	<10 [6]	<10 [6]	12
Beryllium	µg/L	0.50	<5.0 [6]	<5.0 [6]	<5.0 [6]	<5.0 [6]	<5.0 [6]
Cadmium	µg/L	0.10	<1.0 [6]	<1.0 [6]	<1.0 [6]	<1.0 [6]	<1.0 [6]
Cobalt	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Chromium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Copper	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Iron	µg/L	10	<100 [6]	<100 [6]	<100 [6]	<100 [6]	<100 [6]
Mercury	µg/L	0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Manganese	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Molybdenum	µg/L	1.0	19	14	14	13	15
Nickel	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Lead	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Antimony	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Selenium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]

Acid Extractable Low Level Metals (Water)

Envirolab ID	Units	PQL	MGH0404-06	MGH0404-07	MGH0404-08	MGH0404-09	MGH0404-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	27/08/2025
Strontium	µg/L	1.0	9500	9400	9100	8800	9600
Thorium	µg/L	0.50	6.3	<5.0 [6]	<5.0 [6]	<5.0 [6]	<5.0 [6]
Thallium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Uranium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Vanadium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Zinc	µg/L	1.0	45	38	42	97	43

Envirolab ID	Units	PQL	MGH0404-11	MGH0404-12	MGH0404-13	MGH0404-14	MGH0404-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			27/08/2025	27/08/2025	26/08/2025	26/08/2025	26/08/2025
Silver	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Aluminium	µg/L	10	<100 [6]	<100 [6]	<100 [6]	<100 [6]	<100 [6]
Arsenic	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Boron	µg/L	20	5100	5300	5300	5200	5300
Barium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Beryllium	µg/L	0.50	<5.0 [6]	<5.0 [6]	<5.0 [6]	<5.0 [6]	<5.0 [6]
Cadmium	µg/L	0.10	<1.0 [6]	<1.0 [6]	<1.0 [6]	<1.0 [6]	<1.0 [6]
Cobalt	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Chromium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Copper	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Iron	µg/L	10	<100 [6]	<100 [6]	<100 [6]	<100 [6]	<100 [6]
Mercury	µg/L	0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Manganese	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Molybdenum	µg/L	1.0	15	15	15	14	14
Nickel	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Lead	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Antimony	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Selenium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Strontium	µg/L	1.0	9300	8800	8800	8700	9000
Thorium	µg/L	0.50	<5.0 [6]	<5.0 [6]	<5.0 [6]	<5.0 [6]	<5.0 [6]
Thallium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Uranium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Vanadium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Zinc	µg/L	1.0	49	32	49	48	190

Envirolab ID	Units	PQL	MGH0404-16	MGH0404-17	MGH0404-18	MGH0404-19	MGH0404-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	26/08/2025
Silver	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Aluminium	µg/L	10	<100 [6]	<100 [6]	<100 [6]	<100 [6]	<100 [6]
Arsenic	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Boron	µg/L	20	5800	5300	5300	5200	5100
Barium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Beryllium	µg/L	0.50	<5.0 [6]	<5.0 [6]	<5.0 [6]	<5.0 [6]	<5.0 [6]
Cadmium	µg/L	0.10	<1.0 [6]	<1.0 [6]	<1.0 [6]	<1.0 [6]	<1.0 [6]
Cobalt	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Chromium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]

Acid Extractable Low Level Metals (Water)

Envirolab ID	Units	PQL	MGH0404-16	MGH0404-17	MGH0404-18	MGH0404-19	MGH0404-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	26/08/2025
Copper	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Iron	µg/L	10	<100 [6]	<100 [6]	<100 [6]	<100 [6]	<100 [6]
Mercury	µg/L	0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Manganese	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Molybdenum	µg/L	1.0	14	14	13	17	15
Nickel	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Lead	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Antimony	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Selenium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Strontium	µg/L	1.0	8900	9100	9600	8800	9100
Thorium	µg/L	0.50	<5.0 [6]	<5.0 [6]	<5.0 [6]	6.4	<5.0 [6]
Thallium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Uranium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Vanadium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Zinc	µg/L	1.0	37	46	130	42	33

Envirolab ID	Units	PQL	MGH0404-21	MGH0404-22	MGH0404-23	MGH0404-24	MGH0404-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	27/08/2025
Silver	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Aluminium	µg/L	10	<100 [6]	<100 [6]	<100 [6]	<100 [6]	<100 [6]
Arsenic	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Boron	µg/L	20	5500	5400	5700	5800	5600
Barium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Beryllium	µg/L	0.50	<5.0 [6]	<5.0 [6]	<5.0 [6]	<5.0 [6]	<5.0 [6]
Cadmium	µg/L	0.10	<1.0 [6]	<1.0 [6]	<1.0 [6]	<1.0 [6]	<1.0 [6]
Cobalt	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Chromium	µg/L	1.0	<10	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Copper	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Iron	µg/L	10	<100	<100 [6]	<100 [6]	<100 [6]	<100 [6]
Mercury	µg/L	0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Manganese	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Molybdenum	µg/L	1.0	17	17	14	15	13
Nickel	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Lead	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Antimony	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Selenium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Strontium	µg/L	1.0	9000	9200	9100	8700	8600
Thorium	µg/L	0.50	12	14	5.3	<5.0 [6]	<5.0 [6]
Thallium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Uranium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Vanadium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Zinc	µg/L	1.0	33	43	48	44	220

Acid Extractable Low Level Metals (Water)

Envirolab ID	Units	PQL	MGH0404-26	MGH0404-27	MGH0404-28	MGH0404-29	MGH0404-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			27/08/2025	27/08/2025	27/08/2025	27/08/2025	27/08/2025
Silver	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Aluminium	µg/L	10	<100 [6]	<100 [6]	<100 [6]	120	<100 [6]
Arsenic	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Boron	µg/L	20	5600	5400	5600	5600	5700
Barium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Beryllium	µg/L	0.50	<5.0 [6]	<5.0 [6]	<5.0 [6]	<5.0 [6]	<5.0 [6]
Cadmium	µg/L	0.10	<1.0 [6]	<1.0 [6]	<1.0 [6]	<1.0 [6]	<1.0 [6]
Cobalt	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Chromium	µg/L	1.0	<10 [6]	<10 [6]	16	19	<10 [6]
Copper	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Iron	µg/L	10	<100 [6]	<100 [6]	110	570	<100 [6]
Mercury	µg/L	0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Manganese	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Molybdenum	µg/L	1.0	13	14	12	14	13
Nickel	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Lead	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Antimony	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Selenium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Strontium	µg/L	1.0	8600	8600	8700	8700	9000
Thorium	µg/L	0.50	<5.0 [6]	<5.0 [6]	<5.0 [6]	<5.0 [6]	<5.0 [6]
Thallium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Uranium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Vanadium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]	<10 [6]	<10 [6]
Zinc	µg/L	1.0	58	39	130	54	62

Envirolab ID	Units	PQL	MGH0404-31	MGH0404-32	MGH0404-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			27/08/2025	27/08/2025	27/08/2025
Silver	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]
Aluminium	µg/L	10	<100 [6]	270	<100 [6]
Arsenic	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]
Boron	µg/L	20	5700	5600	5900
Barium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]
Beryllium	µg/L	0.50	<5.0 [6]	<5.0 [6]	<5.0 [6]
Cadmium	µg/L	0.10	<1.0 [6]	<1.0 [6]	<1.0 [6]
Cobalt	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]
Chromium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]
Copper	µg/L	1.0	<10 [6]	20	<10 [6]
Iron	µg/L	10	<100 [6]	320	<100 [6]
Mercury	µg/L	0.050	<0.050	<0.050	<0.050
Manganese	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]
Molybdenum	µg/L	1.0	14	15	12
Nickel	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]
Lead	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]
Antimony	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]
Selenium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]

Acid Extractable Low Level Metals (Water)

Envirolab ID	Units	PQL	MGH0404-31	MGH0404-32	MGH0404-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			27/08/2025	27/08/2025	27/08/2025
Strontium	µg/L	1.0	9200	8800	9300
Thorium	µg/L	0.50	<5.0 [6]	<5.0 [6]	<5.0 [6]
Thallium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]
Uranium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]
Vanadium	µg/L	1.0	<10 [6]	<10 [6]	<10 [6]
Zinc	µg/L	1.0	38	65	65

Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	MGH0404-01	MGH0404-02	MGH0404-03	MGH0404-04	MGH0404-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			27/08/2025	27/08/2025	27/08/2025	26/08/2025	26/08/2025
pH	pH units		7.8	8.0	7.9	8.0	8.0
Electrical Conductivity	µS/cm	2.0	53000	53000	52000	53000	53000
Total Dissolved Solids	mg/L	5.0	42000	42000	41000	43000	42000
Estimated Salinity*	mg/L	1.0	34000	34000	33000	34000	34000
Total Suspended Solids	mg/L	1.0	1.9	2.6	2.0	2.8	2.8

Envirolab ID	Units	PQL	MGH0404-06	MGH0404-07	MGH0404-08	MGH0404-09	MGH0404-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	27/08/2025
pH	pH units		8.0	8.0	8.0	8.0	7.8
Electrical Conductivity	µS/cm	2.0	53000	53000	53000	54000	53000
Total Dissolved Solids	mg/L	5.0	41000	42000	42000	43000	41000
Estimated Salinity*	mg/L	1.0	34000	34000	34000	34000	34000
Total Suspended Solids	mg/L	1.0	2.9	2.9	1.2	4.4	7.4

Envirolab ID	Units	PQL	MGH0404-11	MGH0404-12	MGH0404-13	MGH0404-14	MGH0404-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			27/08/2025	27/08/2025	26/08/2025	26/08/2025	26/08/2025
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	53000	53000	53000	53000	53000
Total Dissolved Solids	mg/L	5.0	42000	41000	41000	42000	43000
Estimated Salinity*	mg/L	1.0	34000	34000	34000	34000	34000
Total Suspended Solids	mg/L	1.0	4.8	3.8	1.6	1.9	1.4

Envirolab ID	Units	PQL	MGH0404-16	MGH0404-17	MGH0404-18	MGH0404-19	MGH0404-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	26/08/2025
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	54000	53000	54000	54000	53000
Total Dissolved Solids	mg/L	5.0	42000	42000	41000	41000	40000
Estimated Salinity*	mg/L	1.0	34000	34000	34000	34000	34000
Total Suspended Solids	mg/L	1.0	4.1	2.8	2.3	2.1	1.7

Envirolab ID	Units	PQL	MGH0404-21	MGH0404-22	MGH0404-23	MGH0404-24	MGH0404-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	27/08/2025
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	54000	54000	54000	54000	53000
Total Dissolved Solids	mg/L	5.0	41000	41000	40000	40000	39000
Estimated Salinity*	mg/L	1.0	34000	34000	34000	34000	34000
Total Suspended Solids	mg/L	1.0	1.4	1.9	2.4	1.4	2.5

Envirolab ID	Units	PQL	MGH0404-26	MGH0404-27	MGH0404-28	MGH0404-29	MGH0404-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			27/08/2025	27/08/2025	27/08/2025	27/08/2025	27/08/2025
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	53000	53000	53000	53000	53000
Total Dissolved Solids	mg/L	5.0	40000	41000	40000	40000	41000

Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	MGH0404-26	MGH0404-27	MGH0404-28	MGH0404-29	MGH0404-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			27/08/2025	27/08/2025	27/08/2025	27/08/2025	27/08/2025
Estimated Salinity*	mg/L	1.0	34000	34000	34000	34000	34000
Total Suspended Solids	mg/L	1.0	1.4	1.2	3.6	1.5	1.1

Envirolab ID	Units	PQL	MGH0404-31	MGH0404-32	MGH0404-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			27/08/2025	27/08/2025	27/08/2025
pH	pH units		8.0	8.0	7.9
Electrical Conductivity	µS/cm	2.0	53000	53000	56000
Total Dissolved Solids	mg/L	5.0	40000	40000	40000
Estimated Salinity*	mg/L	1.0	34000	34000	36000
Total Suspended Solids	mg/L	1.0	1.2	2.1	2.5

Inorganics - Carbon, Nitrogen and Sulfur Species (Water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	MGH0404-01	MGH0404-02	MGH0404-03	MGH0404-04	MGH0404-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			27/08/2025	27/08/2025	27/08/2025	26/08/2025	26/08/2025
Total Organic Carbon	mg/L	1.0	1.1	1.0	1.1	1.1	1.1

Envirolab ID	Units	PQL	MGH0404-06	MGH0404-07	MGH0404-08	MGH0404-09	MGH0404-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	27/08/2025
Total Organic Carbon	mg/L	1.0	1.2	1.1	1.0	1.0	<1.0

Envirolab ID	Units	PQL	MGH0404-11	MGH0404-12	MGH0404-13	MGH0404-14	MGH0404-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			27/08/2025	27/08/2025	26/08/2025	26/08/2025	26/08/2025
Total Organic Carbon	mg/L	1.0	1.0	<1.0	1.1	<1.0	1.1

Envirolab ID	Units	PQL	MGH0404-16	MGH0404-17	MGH0404-18	MGH0404-19	MGH0404-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	26/08/2025
Total Organic Carbon	mg/L	1.0	1.2	1.2	1.2	1.5	1.3

Envirolab ID	Units	PQL	MGH0404-21	MGH0404-22	MGH0404-23	MGH0404-24	MGH0404-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	27/08/2025
Total Organic Carbon	mg/L	1.0	1.3	1.1	1.2	1.0	<1.0

Envirolab ID	Units	PQL	MGH0404-26	MGH0404-27	MGH0404-28	MGH0404-29	MGH0404-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			27/08/2025	27/08/2025	27/08/2025	27/08/2025	27/08/2025
Total Organic Carbon	mg/L	1.0	1.2	1.4	1.1	<1.0	1.3

Envirolab ID	Units	PQL	MGH0404-31	MGH0404-32	MGH0404-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			27/08/2025	27/08/2025	27/08/2025
Total Organic Carbon	mg/L	1.0	1.3	1.1	1.1

Inorganics - Nutrients (Water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	MGH0404-01	MGH0404-02	MGH0404-03	MGH0404-04	MGH0404-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			27/08/2025	27/08/2025	27/08/2025	26/08/2025	26/08/2025
Chlorophyll a	mg/m3	0.20	0.53	0.53	0.67	0.53	0.93

Envirolab ID	Units	PQL	MGH0404-06	MGH0404-07	MGH0404-08	MGH0404-09	MGH0404-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	27/08/2025
Chlorophyll a	mg/m3	0.20	0.67	0.53	0.53	0.80	0.80

Envirolab ID	Units	PQL	MGH0404-11	MGH0404-12	MGH0404-13	MGH0404-14	MGH0404-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			27/08/2025	27/08/2025	26/08/2025	26/08/2025	26/08/2025
Chlorophyll a	mg/m3	0.20	0.53	0.67	0.53	0.80	0.40

Envirolab ID	Units	PQL	MGH0404-16	MGH0404-17	MGH0404-18	MGH0404-19	MGH0404-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	26/08/2025
Chlorophyll a	mg/m3	0.20	0.40	0.67	0.67	0.67	0.93

Envirolab ID	Units	PQL	MGH0404-21	MGH0404-22	MGH0404-23	MGH0404-24	MGH0404-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	27/08/2025
Chlorophyll a	mg/m3	0.20	0.67	0.80	0.80	0.80	0.67

Envirolab ID	Units	PQL	MGH0404-26	MGH0404-27	MGH0404-28	MGH0404-29	MGH0404-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			27/08/2025	27/08/2025	27/08/2025	27/08/2025	27/08/2025
Chlorophyll a	mg/m3	0.20	0.93	0.67	0.67	0.67	0.80

Envirolab ID	Units	PQL	MGH0404-31	MGH0404-32	MGH0404-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			27/08/2025	27/08/2025	27/08/2025
Chlorophyll a	mg/m3	0.20	0.80	0.80	0.80

Subcontracted Inorganics - Certificate: ENVL25-14 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MGH0404-01	MGH0404-02	MGH0404-03	MGH0404-04	MGH0404-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			27/08/2025	27/08/2025	27/08/2025	26/08/2025	26/08/2025
Ammonia as N	µg/L	3.0	<3	<3	<3	<3	<3
Nitrate as N	µg/L	2.0	6	3	2	3	3
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	120	140	150	120	120
Phosphate as P	µg/L	2.0	4	5	5	5	4
Total Phosphorus	µg/L	5.0	12	14	14	15	13
NOx as N	µg/L	2.0	6	3	2	3	3
TKN as N*	µg/L	50	120	140	140	120	120

Envirolab ID	Units	PQL	MGH0404-06	MGH0404-07	MGH0404-08	MGH0404-09	MGH0404-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	27/08/2025
Ammonia as N	µg/L	3.0	3	<3	<3	<3	<3
Nitrate as N	µg/L	2.0	3	<2	2	<2	6
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	130	120	110	120	130
Phosphate as P	µg/L	2.0	4	4	5	4	4
Total Phosphorus	µg/L	5.0	14	13	14	14	15
NOx as N	µg/L	2.0	3	<2	2	<2	6
TKN as N*	µg/L	50	130	120	110	110	120

Envirolab ID	Units	PQL	MGH0404-11	MGH0404-12	MGH0404-13	MGH0404-14	MGH0404-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			27/08/2025	27/08/2025	26/08/2025	26/08/2025	26/08/2025
Ammonia as N	µg/L	3.0	<3	<3	<3	<3	<3
Nitrate as N	µg/L	2.0	5	4	<2	2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	120	110	110	120	110
Phosphate as P	µg/L	2.0	4	5	4	5	5
Total Phosphorus	µg/L	5.0	14	13	13	14	13
NOx as N	µg/L	2.0	5	4	<2	2	<2
TKN as N*	µg/L	50	110	110	110	120	110

Envirolab ID	Units	PQL	MGH0404-16	MGH0404-17	MGH0404-18	MGH0404-19	MGH0404-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	26/08/2025
Ammonia as N	µg/L	3.0	<3	<3	<3	<3	<3

Subcontracted Inorganics - Certificate: ENVL25-14 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MGH0404-16	MGH0404-17	MGH0404-18	MGH0404-19	MGH0404-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	26/08/2025
Nitrate as N	µg/L	2.0	5	4	5	3	3
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	120	120	120	110	110
Phosphate as P	µg/L	2.0	5	5	5	4	5
Total Phosphorus	µg/L	5.0	15	13	13	14	14
NOx as N	µg/L	2.0	5	4	5	3	3
TKN as N*	µg/L	50	120	110	120	110	110

Envirolab ID	Units	PQL	MGH0404-21	MGH0404-22	MGH0404-23	MGH0404-24	MGH0404-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	27/08/2025
Ammonia as N	µg/L	3.0	<3	<3	<3	<3	<3
Nitrate as N	µg/L	2.0	5	3	3	2	12
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	120	120	110	120	120
Phosphate as P	µg/L	2.0	5	5	4	4	4
Total Phosphorus	µg/L	5.0	15	14	14	14	14
NOx as N	µg/L	2.0	5	3	2	2	12
TKN as N*	µg/L	50	120	120	110	120	110

Envirolab ID	Units	PQL	MGH0404-26	MGH0404-27	MGH0404-28	MGH0404-29	MGH0404-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			27/08/2025	27/08/2025	27/08/2025	27/08/2025	27/08/2025
Ammonia as N	µg/L	3.0	5	<3	<3	<3	<3
Nitrate as N	µg/L	2.0	10	10	12	12	11
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	120	130	130	130	120
Phosphate as P	µg/L	2.0	5	6	4	5	4
Total Phosphorus	µg/L	5.0	14	14	15	15	14
NOx as N	µg/L	2.0	10	10	12	12	11
TKN as N*	µg/L	50	110	120	120	120	110

Envirolab ID	Units	PQL	MGH0404-31	MGH0404-32	MGH0404-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			27/08/2025	27/08/2025	27/08/2025
Ammonia as N	µg/L	3.0	<3	<3	4

Subcontracted Inorganics - Certificate: ENVL25-14 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MGH0404-31	MGH0404-32	MGH0404-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			27/08/2025	27/08/2025	27/08/2025
Nitrate as N	µg/L	2.0	4	4	4
Nitrite as N	µg/L	2.0	<2	<2	<2
Total Nitrogen	µg/L	50	120	120	120
Phosphate as P	µg/L	2.0	5	6	5
Total Phosphorus	µg/L	5.0	13	13	13
NOx as N	µg/L	2.0	4	4	4
TKN as N*	µg/L	50	110	110	120

Subcontracted Metals - Certificate: ENVL25-14 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MGH0404-01	MGH0404-02	MGH0404-03	MGH0404-04	MGH0404-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			27/08/2025	27/08/2025	27/08/2025	26/08/2025	26/08/2025
Reactive Silica	µg/L	2.0	28	28	29	32	32

Envirolab ID	Units	PQL	MGH0404-06	MGH0404-07	MGH0404-08	MGH0404-09	MGH0404-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	27/08/2025
Reactive Silica	µg/L	2.0	32	33	33	34	34

Envirolab ID	Units	PQL	MGH0404-11	MGH0404-12	MGH0404-13	MGH0404-14	MGH0404-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			27/08/2025	27/08/2025	26/08/2025	26/08/2025	26/08/2025
Reactive Silica	µg/L	2.0	35	35	35	36	35

Envirolab ID	Units	PQL	MGH0404-16	MGH0404-17	MGH0404-18	MGH0404-19	MGH0404-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	26/08/2025
Reactive Silica	µg/L	2.0	35	36	36	36	36

Envirolab ID	Units	PQL	MGH0404-21	MGH0404-22	MGH0404-23	MGH0404-24	MGH0404-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	27/08/2025
Reactive Silica	µg/L	2.0	37	37	37	36	36

Envirolab ID	Units	PQL	MGH0404-26	MGH0404-27	MGH0404-28	MGH0404-29	MGH0404-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			27/08/2025	27/08/2025	27/08/2025	27/08/2025	27/08/2025
Reactive Silica	µg/L	2.0	36	36	37	37	36

Envirolab ID	Units	PQL	MGH0404-31	MGH0404-32	MGH0404-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			27/08/2025	27/08/2025	27/08/2025
Reactive Silica	µg/L	2.0	36	36	36

Subcontracted Micro - Certificate: Various - Analysed By SA Pathology (Water)

Envirolab ID	Units	PQL	MGH0404-01	MGH0404-02	MGH0404-03	MGH0404-04	MGH0404-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			27/08/2025	27/08/2025	27/08/2025	26/08/2025	26/08/2025
Total Coliforms	MPN/100mL	1.0	>2400	>2400	>2400	1	360

Envirolab ID	Units	PQL	MGH0404-06	MGH0404-07	MGH0404-08	MGH0404-09	MGH0404-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	27/08/2025
Total Coliforms	MPN/100mL	1.0	360	7	6	1	>2400

Envirolab ID	Units	PQL	MGH0404-11	MGH0404-12	MGH0404-13	MGH0404-14	MGH0404-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			27/08/2025	27/08/2025	26/08/2025	26/08/2025	26/08/2025
Total Coliforms	MPN/100mL	1.0	660	690	>2400	>2400	>2400

Envirolab ID	Units	PQL	MGH0404-16	MGH0404-17	MGH0404-18	MGH0404-19	MGH0404-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	26/08/2025
Total Coliforms	MPN/100mL	1.0	94	260	340	>2400	>2400

Envirolab ID	Units	PQL	MGH0404-21	MGH0404-22	MGH0404-23	MGH0404-24	MGH0404-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			26/08/2025	26/08/2025	26/08/2025	26/08/2025	27/08/2025
Total Coliforms	MPN/100mL	1.0	>2400	>2400	>2400	>2400	>2400

Envirolab ID	Units	PQL	MGH0404-26	MGH0404-27	MGH0404-28	MGH0404-29	MGH0404-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			27/08/2025	27/08/2025	27/08/2025	27/08/2025	27/08/2025
Total Coliforms	MPN/100mL	1.0	>2400	>2400	>2400	>2400	>2400

Envirolab ID	Units	PQL	MGH0404-31	MGH0404-32	MGH0404-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			27/08/2025	27/08/2025	27/08/2025
Total Coliforms	MPN/100mL	1.0	>2400	>2400	>2400

Result Comments

Identifier	Description
[4]	TRHC6-C9/C6-C10 results are positive (or in part positive) due to the presence of THMs and/or other discrete analytes within the sample
[5]	Surrogate recovery is outside routine acceptance criteria (60-140%) as a result of the high concentration of analyte(s) in the sample.
[6]	PQL has been raised due to matrix requiring dilution

Method Summary

Method ID	Methodology Summary
INORG-001	pH - Measured using pH meter and electrode. Please note that the results for water analyses are indicative only, as analysis can be completed outside of the recommended holding times. Solids are reported from a 1:5 water extract unless otherwise specified. Alternatively, pH is determined in a 1:5 extract using 0.01M calcium chloride or a solid is extracted at a ratio of 1:2.5 (AS1289.4.3.1), pH is measured in the extract.
INORG-002	Conductivity and Salinity - measured using a conductivity cell at 25°C. Soil results reported from a 1:5 Soil:Water extract unless otherwise specified. Please note Resistivity is estimated by calculation and may not correlate with results otherwise obtained using the Resistivity current method (based on AS 1289.4.4.1), depending on the nature of the soil being analysed. Blanks may yield EC readings >1µS/cm, this is likely due to adsorption of Carbon Dioxide while the blank sample is sat on the instrument autosampler prior to analysis. The values are generally insignificant (<5µS/cm) compared to most actual sample conductivities.
INORG-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180±10°C. NOTE: Where the EC of the sample is <100µS/cm, the TDS will typically be below 70mg/L (as the sample is very likely to be at least drinking water quality). Therefore to ensure data quality for TDS, the TDS is typically calculated as per the equation: TDS = EC*0.6
INORG-019	Suspended Solids - determined gravimetrically by filtration of the sample. The solids are dried at 104±5°C
INORG-079	Carbon forms (inorganic, organic, total) determined using a TOC/NDIR analyser via combustion. Dissolved aqueous\forms require filtering prior to determination.
INORG-119	Chlorophyll A based on APHA 10200 H latest edition.
METALS-020	Determination of various metals by ICP-OES. Where salts (oxides, chlorides etc.) are calculated from the element concentration stoichiometrically there is no guarantee that the salt form is completely soluble in the acids used in the preparation.
METALS-021	Determination of Mercury by Cold Vapour AAS.
METALS-022	Determination of various metals by ICP-MS. Please note for Bromine and Iodine, any forms of these elements that are present are included together in the one result reported for each of these two elements. Where salts (oxides, chlorides etc.) are calculated from the element concentration stoichiometrically there is no guarantee that the salt form is completely soluble in the acids used in the preparation.
ORG-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
ORG-023_F1_TOT	Determination of volatile organic compounds (VOCs) by P&T-GC-MS. Water samples are analysed directly by purge and trap GC-MS. Solids are extracted with Methanol, diluted and analysed by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.
SUB-021	Subcontracted to Marine & Freshwater Research - Accreditation number 10603
SUB-041_CA	Subcontracted to SA Pathology

Result Definitions

Identifier	Description
NR	Not reported
NEPM	National Environment Protection Measure
NS	Not specified
LCS	Laboratory Control Sample
RPD	Relative Percent Difference
>	Greater than
<	Less than
PQL	Practical Quantitation Limit
INS	Insufficient sample for this test
NA	Test not required
NT	Not tested
DOL	Samples rejected due to particulate overload (air filters only)
RFD	Samples rejected due to filter damage (air filters only)
RUD	Samples rejected due to uneven deposition (air filters only)
##	Indicates a laboratory acceptance criteria outlier, for further details, see Result Comments and/or QC Comments

Quality Control Definitions

Blank

This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, and is determined by processing solvents and reagents in exactly the same manner as for samples.

Surrogate Spike

Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

LCS (Laboratory Control Sample)

This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Matrix Spike

A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

Duplicate

This is the complete duplicate analysis of a sample from the process batch. The sample selected should be one where the analyte concentration is easily measurable.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria. Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction. Spikes for Physical and Aggregate Tests are not applicable. For VOCs in water samples, three vials are required for duplicate or spike analysis.

General Acceptance Criteria (GAC) - Analyte specific criteria applies for some analytes and is reflected in QC recovery tables.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% - see ELN-P05 QAQC tables for details (available on request); <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase. Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was typically insufficient in order to satisfy laboratory QA/QC protocols.

Miscellaneous Information

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached. We have taken the sampling date as being the date received at the laboratory.

Two significant figures are reported for the majority of tests and with a high degree of confidence, for results <10*PQL, the second significant figure may be in doubt i.e. has a relatively high degree of uncertainty and is provided for information only.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS where sediment/solids are included by default.

Urine Analysis - The BEI values listed are taken from the 2022 edition of *TLVs and BEIs Threshold Limits by ACGIH*.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volume(s) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

Data Quality Assessment Summary MGH0404

Client Details

Client	South Australian Research & Development Institute
Your Reference	NWP Mullaquana Environmental Seasonal - August
Date Issued	19/09/2025

Recommended Holding Time Compliance

Recommended holding time exceedances exist - See detailed list below

Quality Control and QC Frequency

QC Type	Compliant	Details
Blank	Yes	No Outliers
LCS	Yes	No Outliers
Duplicates	Yes	No Outliers
Matrix Spike	No	Matrix Spike Outliers Exist - See detailed list below
Surrogates / Extracted Internal Standards	No	Surrogates / Extracted ISTD Outliers Exist - See detailed list below
QC Frequency	No	QC Frequency Outliers Exist - See detailed list below

Surrogates/Extracted Internal Standards, Duplicates and/or Matrix Spikes are not always relevant/applicable to certain analyses and matrices. Therefore, said QC measures are deemed compliant in these situations by default. See Laboratory Acceptance Criteria for more information

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
vTRH&MBTEXN | Water	4-9, 13-24	26/08/2025	01/09/2025	02/09/2025	Yes
	1-3, 10-11, 26-27	27/08/2025	01/09/2025	02/09/2025	Yes
	28-33	27/08/2025	01/09/2025	03/09/2025	Yes
	12, 25	27/08/2025	04/09/2025	04/09/2025	Yes
sTRH | Water	4-9	26/08/2025	01/09/2025	09/09/2025	Yes
	13-20	26/08/2025	03/09/2025	15/09/2025	No
	21-24	26/08/2025	03/09/2025	16/09/2025	No
	1-3	27/08/2025	01/09/2025	09/09/2025	Yes
	25-33	27/08/2025	03/09/2025	08/09/2025	Yes
	10-12	27/08/2025	03/09/2025	15/09/2025	Yes
Total Cations | Water	4-9, 13-24	26/08/2025	01/09/2025	02/09/2025	Yes
	1-3, 10-12, 25-33	27/08/2025	01/09/2025	02/09/2025	Yes
Total Metals | Water	4-9, 13-24	26/08/2025	01/09/2025	02/09/2025	Yes
	1-3, 10-12, 25-33	27/08/2025	01/09/2025	02/09/2025	Yes
Total Metals (LL) | Water	4-9, 13-24	26/08/2025	29/08/2025	08/09/2025	Yes
	1-3, 10-12, 25-33	27/08/2025	29/08/2025	08/09/2025	Yes
Total Metals (LL)-Hg | Water	4-9, 13-24	26/08/2025	29/08/2025	02/09/2025	Yes
	1-3, 10-12, 25-33	27/08/2025	29/08/2025	02/09/2025	Yes
EC | Water	4-9, 13-24	26/08/2025	01/09/2025	02/09/2025	Yes
	1, 3, 10-12, 25-32	27/08/2025	01/09/2025	01/09/2025	Yes
	2	27/08/2025	01/09/2025	02/09/2025	Yes
	33	27/08/2025	02/09/2025	02/09/2025	Yes
pH | Water	4-9, 13-24	26/08/2025	01/09/2025	02/09/2025	No
	1, 3, 10-12, 25-32	27/08/2025	01/09/2025	01/09/2025	No
	2	27/08/2025	01/09/2025	02/09/2025	No
	33	27/08/2025	02/09/2025	02/09/2025	No
Salinity | Water	4-9, 13-24	26/08/2025	01/09/2025	02/09/2025	Yes
	1, 3, 10-12, 25-32	27/08/2025	01/09/2025	01/09/2025	Yes
	2	27/08/2025	01/09/2025	02/09/2025	Yes
	33	27/08/2025	02/09/2025	02/09/2025	Yes
TDS | Water	19-24	26/08/2025	01/09/2025	02/09/2025	Yes
	4-9, 13-18	26/08/2025	02/09/2025	04/09/2025	Yes
	1-3, 10-12, 25-32	27/08/2025	01/09/2025	02/09/2025	Yes
	33	27/08/2025	02/09/2025	04/09/2025	Yes
TSS (LL) | Water	4-9, 13-14	26/08/2025	01/09/2025	05/09/2025	Yes
	15-24	26/08/2025	01/09/2025	11/09/2025	Yes
	1-3, 10-12	27/08/2025	01/09/2025	05/09/2025	Yes
	25-33	27/08/2025	01/09/2025	11/09/2025	Yes
Total Organic Carbon | Water	4-9, 13-24	26/08/2025	02/09/2025	02/09/2025	Yes
	1-3, 10-12, 25-33	27/08/2025	02/09/2025	02/09/2025	Yes
Chlorophyll a (LL) - Frozen | Water	4-9, 13-24	26/08/2025	04/09/2025	05/09/2025	Yes
	1-3, 10-12, 25-33	27/08/2025	04/09/2025	05/09/2025	Yes
Ammonia as N | Water	4-9, 13-24	26/08/2025	08/09/2025	08/09/2025	Yes

Data Quality Assessment Summary MGH0404

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
	1-3, 10-12, 25-33	27/08/2025	08/09/2025	08/09/2025	Yes
Nitrate as N (LL) | Water	4-9, 13-24	26/08/2025	12/09/2025	12/09/2025	Yes
	1-3, 10-12, 25-33	27/08/2025	12/09/2025	12/09/2025	Yes
Nitrite as N (LL) | Water	4-9	26/08/2025	28/08/2025	28/08/2025	Yes
	13-24	26/08/2025	29/08/2025	29/08/2025	Yes
	1-3, 10-12, 25-33	27/08/2025	29/08/2025	29/08/2025	Yes
NOx as N (LL) | Water	4-9, 13-24	26/08/2025	12/09/2025	12/09/2025	Yes
	1-3, 10-12, 25-33	27/08/2025	12/09/2025	12/09/2025	Yes
Phosphate as P (LL) | Water	4-9, 13-24	26/08/2025	08/09/2025	08/09/2025	Yes
	1-3, 10-12, 25-33	27/08/2025	08/09/2025	08/09/2025	Yes
TKN as N calc (LL) | Water	4-9, 13-24	26/08/2025	02/09/2025	03/09/2025	Yes
	1-3, 10-12, 25-33	27/08/2025	02/09/2025	03/09/2025	Yes
Total N and P (LL) | Water	4-9, 13-24	26/08/2025	02/09/2025	03/09/2025	Yes
	1-3, 10-12, 25-33	27/08/2025	02/09/2025	03/09/2025	Yes
Reactive Silica (LL) | Water	4-9, 13-24	26/08/2025	05/09/2025	05/09/2025	Yes
	1-3, 10-12, 25-33	27/08/2025	05/09/2025	05/09/2025	Yes
Total Coliforms | Water	4-9, 13-18	26/08/2025	27/08/2025	28/08/2025	Yes
	19-24	26/08/2025	28/08/2025	01/09/2025	Yes
	1-3, 10-12, 25-33	27/08/2025	28/08/2025	01/09/2025	Yes

Outliers: Matrix Spike

METALS-020|Acid Extractable Metals (Water)| Batch BGI0026

Sample ID	Analyte	% Limits	% Recovery
BGI0026-MS1#	Calcium	70 - 130	##[1]
BGI0026-MS1#	Magnesium	70 - 130	##[1]
BGI0026-MS1#	Potassium	70 - 130	##[1]
BGI0026-MS1#	Sodium	70 - 130	##[1]

METALS-020|Acid Extractable Metals (Water)| Batch BGI0027

Sample ID	Analyte	% Limits	% Recovery
MGH0404-16	Calcium	70 - 130	##[1]
MGH0404-16	Magnesium	70 - 130	##[1]
MGH0404-16	Potassium	70 - 130	##[1]
MGH0404-16	Sodium	70 - 130	##[1]

METALS-021|Acid Extractable Low Level Metals (Water)| Batch BGH4925

Sample ID	Analyte	% Limits	% Recovery
MGH0404-02	Mercury	70 - 130	##[2]

METALS-021|Acid Extractable Low Level Metals (Water)| Batch BGH4926

Sample ID	Analyte	% Limits	% Recovery
MGH0404-22	Mercury	70 - 130	##[2]

METALS-022|Acid Extractable Low Level Metals (Water)| Batch BGH4921

Sample ID	Analyte	% Limits	% Recovery
MGH0404-02	Barium	70 - 130	##[2]
MGH0404-02	Boron	70 - 130	##[1]
MGH0404-02	Iron	70 - 130	##[2]
MGH0404-02	Strontium	70 - 130	##[1]
MGH0404-02	Vanadium	70 - 130	##[2]
MGH0404-02	Zinc	70 - 130	##[1]

METALS-022|Acid Extractable Low Level Metals (Water)| Batch BGH4922

Sample ID	Analyte	% Limits	% Recovery

METALS-022|Acid Extractable Low Level Metals (Water)| Batch BGH4922

Sample ID	Analyte	% Limits	% Recovery
MGH0404-22	Boron	70 - 130	##[1]
MGH0404-22	Strontium	70 - 130	##[1]
MGH0404-22	Zinc	70 - 130	##[1]

ORG-020|Semi-volatile TRH (Water)| Batch BGI0463

Sample ID	Analyte	% Limits	% Recovery
MGH0404-11	TRH C29-C36	60 - 140	##[3]

Outliers: Surrogate / Extracted Internal Standards

ORG-020|Semi-volatile TRH (Matrix)| Batch BGI0463

Sample ID	Analyte	% Limits	% Recovery
MGH0404-20	o-Terphenyl	60 - 140	## [5]

Outliers: QC Frequency

INORG-119|Inorganics - Nutrients (Water)| Batch BGI0885

Analysis	QC Type	Expected	Reported
Chlorophyll a (LL) - Frozen	Duplicate	2	0

INORG-119|Inorganics - Nutrients (Water)| Batch BGI0886

Analysis	QC Type	Expected	Reported
Chlorophyll a (LL) - Frozen	Duplicate	2	0

ORG-023_F1_TOT|Volatile TRH and BTEX (Water) | Batch BGI0022

Analyte	Units	PQL	Blank	DUP1 BGI0022-DUP1# Samp | QC | RPD %	DUP2 MGH0404-05 Samp | QC | RPD %	LCS %	Spike % BGI0022-MS1#
TRH C6-C9	µg/L	10	<10	<10 | <10 | [NA]	<10 | <10 | [NA]	107	80.4
TRH C6-C10	µg/L	10	<10	<10 | <10 | [NA]	<10 | <10 | [NA]	104	83.4
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
Benzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	100	74.8
Toluene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	101	76.2
Ethylbenzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	111	79.7
meta+para Xylene	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	120	87.2
ortho-Xylene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	118	88.1
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
Surrogate Dibromofluoromethane	*%*		*97.2*	*102 | 102*	*106 | 107*	*97.7*	*103*
Surrogate Toluene-D8	*%*		*91.2*	*92.4 | 92.3*	*93.6 | 94.2*	*101*	*99.9*
Surrogate 4-Bromofluorobenzene	*%*		*105*	*109 | 109*	*110 | 109*	*99.6*	*104*

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

ORG-023_F1_TOT|Volatile TRH and BTEX (Water) | Batch BGI0029

Analyte	Units	PQL	Blank	DUP1 MGH0404-13 Samp | QC | RPD %	DUP2 MGH0404-23 Samp | QC | RPD %	LCS %	Spike % MGH0404-17
TRH C6-C9	µg/L	10	<10	20.0 | <10 | [NA]	<10 | <10 | [NA]	94.6	104
TRH C6-C10	µg/L	10	<10	28.8 | 13.9 | [NA]	10.1 | <10 | [NA]	80.1	104
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
Benzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	115	110
Toluene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	106	116
Ethylbenzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	104	96.8
meta+para Xylene	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	93.8	104
ortho-Xylene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	91.0	106
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
Surrogate Dibromofluoromethane	*%*		*97.7*	*107 | 107*	*102 | 101*	*99.6*	*112*
Surrogate Toluene-D8	*%*		*93.7*	*118 | 104*	*96.5 | 96.8*	*99.6*	*99.6*
Surrogate 4-Bromofluorobenzene	*%*		*94.8*	*89.6 | 80.1*	*98.4 | 98.1*	*83.9*	*104*

ORG-023_F1_TOT|Volatile TRH and BTEX (Water) | Batch BGI0772

Analyte	Units	PQL	Blank	DUP1 MGH0404-12 Samp | QC | RPD %	DUP2 BGI0772-DUP2# Samp | QC | RPD %	LCS %	Spike % MGH0404-25
TRH C6-C9	µg/L	10	<10	<10 | <10 | [NA]	<10 | <10 | [NA]	115	98.9
TRH C6-C10	µg/L	10	<10	<10 | <10 | [NA]	<10 | <10 | [NA]	112	96.6
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
Benzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	112	114
Toluene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	117	117
Ethylbenzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	111	107
meta+para Xylene	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	119	118
ortho-Xylene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	114	117
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
Surrogate Dibromofluoromethane	*%*		*115*	*122 | 123*	*119 | 118*	*104*	*117*
Surrogate Toluene-D8	*%*		*102*	*102 | 103*	*105 | 103*	*98.1*	*98.5*
Surrogate 4-Bromofluorobenzene	*%*		*103*	*106 | 106*	*97.4 | 96.7*	*99.2*	*107*

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

Quality Control MGH0404

ORG-020|Semi-volatile TRH (Water) | Batch BGI0201

Analyte	Units	PQL	Blank	DUP1 BGI0201-DUP1# Samp | QC | RPD %	DUP2 MGH0404-05 Samp | QC | RPD %	LCS %	Spike % BGI0201-MS1#
TRH C10-C14	µg/L	50	<50	<50 | <50 | [NA]	<50 | <50 | [NA]	78.8	80.3
TRH C15-C28	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	92.6	106
TRH C29-C36	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	128	136
TRH >C10-C16	µg/L	50	<50	<50 | <50 | [NA]	<50 | <50 | [NA]	67.7	70.6
TRH >C16-C34 (F3)	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	100	115
TRH >C34-C40 (F4)	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	107	115
Surrogate o-Terphenyl	*%*		*62.0*	*64.1 | 83.0*	*86.1 | 87.1*	*82.1*	*82.5*

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

ORG-020|Semi-volatile TRH (Water) | Batch BGI0463

Analyte	Units	PQL	Blank	DUP1 MGH0404-10 Samp | QC | RPD %	DUP2 MGH0404-20 Samp | QC | RPD %	LCS %	Spike % MGH0404-11
TRH C10-C14	µg/L	50	<50	<50 | 50.5 | [NA]	89.8 | <50 | [NA]	96.0	103
TRH C15-C28	µg/L	100	<100	111 | <100 | [NA]	172 | <100 | [NA]	89.8	123
TRH C29-C36	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	97.4	##[3]
TRH >C10-C16	µg/L	50	<50	<50 | <50 | [NA]	86.1 | <50 | [NA]	77.4	89.4
TRH >C16-C34 (F3)	µg/L	100	<100	153 | 123 | [NA]	230 | <100 | [NA]	92.9	130
TRH >C34-C40 (F4)	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	87.2	125
Surrogate o-Terphenyl	*%*		*71.9*	*103 | 89.7*	*307 | 83.7*	*97.4*	*108*

ORG-020|Semi-volatile TRH (Water) | Batch BGI0648

Analyte	Units	PQL	Blank	DUP1 MGH0404-25 Samp | QC | RPD %	LCS %	Spike % MGH0404-26
TRH C10-C14	µg/L	50	<50	<50 | <50 | [NA]	72.6	76.0
TRH C15-C28	µg/L	100	<100	<100 | <100 | [NA]	77.5	98.9
TRH C29-C36	µg/L	100	<100	<100 | <100 | [NA]	99.2	130
TRH >C10-C16	µg/L	50	<50	<50 | <50 | [NA]	63.4	67.5
TRH >C16-C34 (F3)	µg/L	100	<100	<100 | <100 | [NA]	82.3	107
TRH >C34-C40 (F4)	µg/L	100	<100	<100 | <100 | [NA]	84.8	110
Surrogate o-Terphenyl	*%*		*60.4*	*79.6 | 63.8*	*89.2*	*84.3*

METALS-020|Acid Extractable Metals (Water) | Batch BGI0026

Analyte	Units	PQL	Blank	DUP1 BGI0026-DUP1# Samp | QC | RPD %	DUP2 MGH0404-05 Samp | QC | RPD %	LCS %	Spike % BGI0026-MS1#
Calcium	mg/L	0.50	<0.50	24.0 | 24.4 | 1.58		97.4	##[1]
Magnesium	mg/L	0.50	<0.50	12.3 | 12.5 | 1.73		99.3	##[1]
Potassium	mg/L	0.50	<0.50	13.5 | 13.7 | 1.44		98.0	##[1]
Silicon	mg/L	0.10	<0.10	1.80 | 1.84 | 2.14		95.7	93.1
Sodium	mg/L	0.50	<0.50	34.1 | 34.5 | 1.21		103	##[1]
Hardness (calc) equivalent CaCO3	mg/L	3.0	<3.0	111 | 113 | 1.65		[NA]	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

METALS-020|Acid Extractable Metals (Water) | Batch BGI0027

Analyte	Units	PQL	Blank	DUP1 MGH0404-15 Samp | QC | RPD %	DUP2 MGH0404-24 Samp | QC | RPD %	LCS %	Spike % MGH0404-16
Calcium	mg/L	0.50	<0.50	446 | 453 | 1.39	438 | 440 | 0.351	96.1	##[1]
Magnesium	mg/L	0.50	<0.50	1450 | 1430 | 1.64	1390 | 1410 | 1.19	97.9	##[1]
Potassium	mg/L	0.50	<0.50	611 | 610 | 0.0721	611 | 610 | 0.200	98.4	##[1]
Silicon	mg/L	0.10	<0.10	<2.0 | <2.0 | [NA] [6]	<2.0 | <2.0 | [NA] [6]	93.6	102
Sodium	mg/L	0.50	<0.50	12100 | 11800 | 2.36	11300 | 11600 | 3.21	104	##[1]
Hardness (calc) equivalent CaCO3	mg/L	3.0	<3.0	7100 | 7020 | 1.16	6830 | 6900 | 1.06	[NA]	[NA]

Quality Control MGH0404

METALS-022|Acid Extractable Low Level Metals (Water) | Batch BGH4921

Analyte	Units	PQL	Blank	DUP1 MGH0404-01 Samp | QC | RPD %	DUP2 MGH0404-11 Samp | QC | RPD %	LCS %	Spike % MGH0404-02
Aluminium	µg/L	10	<10	<100 | <100 | [NA] [6]	<100 | <100 | [NA] [6]	109	[NA]
Antimony	µg/L	1.0	<1.0	<10 | <10 | [NA] [6]	<10 | <10 | [NA] [6]	115	130
Arsenic	µg/L	1.0	<1.0	<10 | <10 | [NA] [6]	<10 | <10 | [NA] [6]	104	124
Barium	µg/L	1.0	<1.0	<10 | 10.9 | [NA] [7]	<10 | <10 | [NA] [6]	105	##[2]
Beryllium	µg/L	0.50	<0.50	<5.0 | <5.0 | [NA] [6]	<5.0 | <5.0 | [NA] [6]	106	107
Boron	µg/L	20	<20	5010 | 5150 | 2.76	5140 | 5210 | 1.34	107	##[1]
Cadmium	µg/L	0.10	<0.10	<1.0 | <1.0 | [NA] [6]	<1.0 | <1.0 | [NA] [6]	103	107
Chromium	µg/L	1.0	<1.0	<10 | <10 | [NA] [6]	<10 | <10 | [NA] [6]	102	113
Cobalt	µg/L	1.0	<1.0	<10 | <10 | [NA] [6]	<10 | <10 | [NA] [6]	103	110
Copper	µg/L	1.0	<1.0	<10 | <10 | [NA] [6]	<10 | <10 | [NA] [6]	110	107
Iron	µg/L	10	<10	<100 | <100 | [NA] [6]	<100 | <100 | [NA] [6]	102	##[2]
Lead	µg/L	1.0	<1.0	<10 | <10 | [NA] [6]	<10 | <10 | [NA] [6]	104	96.6
Manganese	µg/L	1.0	<1.0	<10 | <10 | [NA] [6]	<10 | <10 | [NA] [6]	109	118
Molybdenum	µg/L	1.0	<1.0	18.8 | 16.8 | [NA]	14.8 | 13.6 | [NA]	108	113
Nickel	µg/L	1.0	<1.0	<10 | <10 | [NA] [6]	<10 | <10 | [NA] [6]	110	117
Selenium	µg/L	1.0	<1.0	<10 | <10 | [NA] [6]	<10 | <10 | [NA] [6]	107	107
Silver	µg/L	1.0	<1.0	<10 | <10 | [NA] [6]	<10 | <10 | [NA] [6]	109	74.6
Strontium	µg/L	1.0	<1.0	8820 | 9090 | 3.03	9290 | 8800 | 5.36	109	##[1]
Thallium	µg/L	1.0	<1.0	<10 | <10 | [NA] [6]	<10 | <10 | [NA] [6]	106	91.8
Thorium	µg/L	0.50	<0.50	7.10 | 5.30 | [NA]	<5.0 | <5.0 | [NA] [6]	106	98.6
Uranium	µg/L	1.0	<1.0	<10 | <10 | [NA] [6]	<10 | <10 | [NA] [6]	107	110
Vanadium	µg/L	1.0	<1.0	<10 | <10 | [NA] [6]	<10 | <10 | [NA] [6]	98.8	##[2]
Zinc	µg/L	1.0	<1.0	31.0 | 33.7 | [NA]	49.3 | 33.9 | [NA] [7]	107	##[1]

METALS-022|Acid Extractable Low Level Metals (Water) | Batch BGH4922

Analyte	Units	PQL	Blank	DUP1 MGH0404-21 Samp | QC | RPD %	DUP2 MGH0404-31 Samp | QC | RPD %	LCS %	Spike % MGH0404-22
Aluminium	µg/L	10	<10	<100 | <100 | [NA] [6]	<100 | <100 | [NA] [6]	85.5	##[1]
Antimony	µg/L	1.0	<1.0	<10 | <10 | [NA] [6]	<10 | <10 | [NA] [6]	97.1	109
Arsenic	µg/L	1.0	<1.0	<10 | <10 | [NA] [6]	<10 | <10 | [NA] [6]	104	113
Barium	µg/L	1.0	<1.0	<10 | 10.1 | [NA]	<10 | <10 | [NA] [6]	99.1	118
Beryllium	µg/L	0.50	<0.50	<5.0 | <5.0 | [NA] [6]	<5.0 | <5.0 | [NA] [6]	107	103
Boron	µg/L	20	<20	5480 | 5620 | 2.42	5700 | 5710 | 0.147	109	##[1]
Cadmium	µg/L	0.10	<0.10	<1.0 | <1.0 | [NA] [6]	<1.0 | <1.0 | [NA] [6]	110	112
Chromium	µg/L	1.0	<1.0	<10 | <10 | [NA] [6]	<10 | <10 | [NA] [6]	104	120
Cobalt	µg/L	1.0	<1.0	<10 | <10 | [NA] [6]	<10 | <10 | [NA] [6]	105	108
Copper	µg/L	1.0	<1.0	<10 | <10 | [NA] [6]	<10 | <10 | [NA] [6]	103	92.6
Iron	µg/L	10	<10	<100 | <100 | [NA] [6]	<100 | <100 | [NA] [6]	104	[NA]
Lead	µg/L	1.0	<1.0	<10 | <10 | [NA] [6]	<10 | <10 | [NA] [6]	103	95.0
Manganese	µg/L	1.0	<1.0	<10 | <10 | [NA] [6]	<10 | <10 | [NA] [6]	96.5	99.8
Molybdenum	µg/L	1.0	<1.0	17.4 | 14.8 | [NA]	13.5 | 13.8 | [NA]	88.8	102
Nickel	µg/L	1.0	<1.0	<10 | <10 | [NA] [6]	<10 | <10 | [NA] [6]	99.6	97.4
Selenium	µg/L	1.0	<1.0	<10 | <10 | [NA] [6]	<10 | <10 | [NA] [6]	102	110
Silver	µg/L	1.0	<1.0	<10 | <10 | [NA] [6]	<10 | <10 | [NA] [6]	109	80.4
Strontium	µg/L	1.0	<1.0	9030 | 8990 | 0.366	9200 | 9170 | 0.324	99.9	##[1]
Thallium	µg/L	1.0	<1.0	<10 | <10 | [NA] [6]	<10 | <10 | [NA] [6]	107	93.4
Thorium	µg/L	0.50	<0.50	11.7 | 9.30 | [NA]	<5.0 | <5.0 | [NA] [6]	106	85.4
Uranium	µg/L	1.0	<1.0	<10 | <10 | [NA] [6]	<10 | <10 | [NA] [6]	114	111
Vanadium	µg/L	1.0	<1.0	<10 | <10 | [NA] [6]	<10 | <10 | [NA] [6]	105	116
Zinc	µg/L	1.0	<1.0	32.6 | 42.3 | [NA]	38.0 | 44.9 | [NA]	107	##[1]

METALS-021|Acid Extractable Low Level Metals (Water) | Batch BGH4925

Analyte	Units	PQL	Blank	DUP1 MGH0404-01 Samp | QC | RPD %	DUP2 MGH0404-11 Samp | QC | RPD %	LCS %	Spike % MGH0404-02
Mercury	µg/L	0.050	<0.050	<0.050 | <0.050 | [NA]	<0.050 | <0.050 | [NA]	111	##[2]

Quality Control MGH0404

METALS-021|Acid Extractable Low Level Metals (Water) | Batch BGH4926

Analyte	Units	PQL	Blank	DUP1 MGH0404-21 Samp | QC | RPD %	DUP2 BGH4926-DUP2# Samp | QC | RPD %	LCS %	Spike % MGH0404-22
Mercury	µg/L	0.050	<0.050	<0.050 | <0.050 | [NA]	<0.050 | <0.050 | [NA]	114	##[2]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-018|Inorganics - Physical Parameters (Water) | Batch BGI0048

Analyte	Units	PQL	Blank	DUP1 MGH0404-01 Samp | QC | RPD %	DUP2 MGH0404-23 Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	41900 | 39200 | 6.66	40400 | 38800 | 4.04	109

INORG-001|Inorganics - Physical Parameters (Water) | Batch BGI0068

Analyte	Units	PQL	Blank	DUP1 MGH0404-01 Samp | QC | RPD %	DUP2 MGH0404-15 Samp | QC | RPD %	LCS %
pH	pH units		5.3	7.8 | 7.9 | 1.52	8.0 | 8.0 | 0.00	98.7
Electrical Conductivity	µS/cm	2.0	<2.0	53300 | 53300 | 0.00768	53400 | 53500 | 0.171	96.4
Estimated Salinity	mg/L	1.0	<1.0	34100 | 34100 | 0.00771	34200 | 34200 | 0.171	[NA]

INORG-001|Inorganics - Physical Parameters (Water) | Batch BGI0069

Analyte	Units	PQL	Blank	DUP1 MGH0404-03 Samp | QC | RPD %	DUP2 MGH0404-32 Samp | QC | RPD %	LCS %
pH	pH units		4.6	7.9 | 7.8 | 0.890	8.0 | 8.0 | 0.00	98.1
Electrical Conductivity	µS/cm	2.0	<2.0	52200 | 53200 | 1.87	53200 | 53200 | 0.0729	92.7
Estimated Salinity	mg/L	1.0	<1.0	33400 | 34000 | 1.87	34100 | 34100 | 0.0729	[NA]

INORG-019|Inorganics - Physical Parameters (Water) | Batch BGI0072

Analyte	Units	PQL	Blank	DUP1 BGI0072-DUP1# Samp | QC | RPD %	DUP2 MGH0404-05 Samp | QC | RPD %	LCS %
Total Suspended Solids	mg/L	1.0	<1.0	2.00 | 2.40 | [NA]	2.80 | 2.60 | [NA]	101

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-019|Inorganics - Physical Parameters (Water) | Batch BGI0073

Analyte	Units	PQL	Blank	DUP1 MGH0404-15 Samp | QC | RPD %	DUP2 MGH0404-24 Samp | QC | RPD %	LCS %
Total Suspended Solids	mg/L	1.0	<1.0	1.43 | 1.57 | [NA]	1.43 | 2.00 | [NA] [7]	91.0

INORG-001|Inorganics - Physical Parameters (Water) | Batch BGI0379

Analyte	Units	PQL	Blank	DUP1 MGH0404-33 Samp | QC | RPD %	DUP2 BGI0379-DUP2# Samp | QC | RPD %	LCS %
pH	pH units		4.8	7.9 | 7.8 | 1.02	6.9 | 6.7 | 2.35	98.1
Electrical Conductivity	µS/cm	2.0	<2.0	56100 | 57100 | 1.78	4230 | 4330 | 2.20	102
Estimated Salinity	mg/L	1.0	<1.0	35900 | 36600 | 1.78	2710 | 2770 | 2.20	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-018|Inorganics - Physical Parameters (Water) | Batch BGI0668

Analyte	Units	PQL	Blank	DUP1 BGI0668-DUP1# Samp | QC | RPD %	DUP2 MGH0404-09 Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	40500 | 41800 | 3.16	42700 | 42100 | 1.42	95.6

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

Quality Control MGH0404

INORG-079|Inorganics - Carbon, Nitrogen and Sulfur Species (Water) | Batch BGI0428

Analyte	Units	PQL	Blank	DUP1 MGH0404-04 Samp | QC | RPD %	DUP2 MGH0404-14 Samp | QC | RPD %	LCS %	Spike % MGH0404-05
Total Organic Carbon	mg/L	1.0	<1.0	1.08 | 1.13 | [NA]	<1.0 | <1.0 | [NA]	98.0	95.8

INORG-079|Inorganics - Carbon, Nitrogen and Sulfur Species (Water) | Batch BGI0429

Analyte	Units	PQL	Blank	DUP1 MGH0404-24 Samp | QC | RPD %	DUP2 MGH0404-31 Samp | QC | RPD %	LCS %	Spike % MGH0404-25
Total Organic Carbon	mg/L	1.0	<1.0	1.01 | <1.0 | [NA] [7]	1.26 | 1.01 | [NA]	106	114

INORG-119|Inorganics - Nutrients (Water) | Batch BGI0885

Analyte	Units	PQL	Blank	LCS %
Chlorophyll a	mg/m3	0.20	<0.20	88.0

INORG-119|Inorganics - Nutrients (Water) | Batch BGI0886

Analyte	Units	PQL	Blank	LCS %
Chlorophyll a	mg/m3	0.20	<0.20	90.0

QC Comments

Identifier	Description
[1]	Spike recovery is not applicable due to the relatively high analyte background in the sample (>3* spike level). However, the LCS recovery is within acceptance criteria.
[2]	Spike recovery is outside routine acceptance criteria (70-130%), this may be due to suspected non-homogeneity and/or matrix interference effects. However, an acceptable recovery was achieved for the LCS.
[3]	Spike recovery is outside routine acceptance criteria (60-140%), this may be due to suspected non-homogeneity and/or matrix interference effects. However, an acceptable recovery was achieved for the LCS.
[6]	PQL has been raised due to matrix requiring dilution
[7]	Duplicate %RPD may be flagged as an outlier to routine laboratory acceptance, however, where one or both results are <10*PQL, the RPD acceptance criteria increases exponentially.

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Certificate of Analysis MGJ0141

Client Details

Client	South Australian Research & Development Institute
Contact	Ian Moody
Address	SARDI Aquatic Science Centre, 2 Hamra Avenue, WEST BEACH, SA, 5024

Sample Details

Your Reference	NWP Mullaquana Monthly Sampling
Number of Samples	33 Water
Date Samples Received	10/10/2025
Date Instructions Received	10/10/2025

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for soils and on an as received basis for other matrices.

Report Details

Date Final Results Expected	31/10/2025
Date of Issue	31/10/2025

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Authorisation Details

Results Approved By	Chaminda Gunasekara, Inorganics Supervisor Chris De Luca, Lab Manager Diego Bigolin, Supervisor, Inorganics
Laboratory Manager	Chris De Luca

Certificate of Analysis MGJ0141

Samples in this Report

Envirolab ID	Sample ID	Matrix	Date Sampled	Date Received
MGJ0141-01	MQ01 R1 Comp	Water	09/10/2025	10/10/2025
MGJ0141-02	MQ01 R2 Comp	Water	09/10/2025	10/10/2025
MGJ0141-03	MQ01 R3 Comp	Water	09/10/2025	10/10/2025
MGJ0141-04	MQ02 R1 Comp	Water	08/10/2025	10/10/2025
MGJ0141-05	MQ02 R2 Comp	Water	08/10/2025	10/10/2025
MGJ0141-06	MQ02 R3 Comp	Water	08/10/2025	10/10/2025
MGJ0141-07	MQ03 R1 Comp	Water	08/10/2025	10/10/2025
MGJ0141-08	MQ03 R2 Comp	Water	08/10/2025	10/10/2025
MGJ0141-09	MQ03 R3 Comp	Water	08/10/2025	10/10/2025
MGJ0141-10	MQ04 R1 Comp	Water	09/10/2025	10/10/2025
MGJ0141-11	MQ04 R2 Comp	Water	09/10/2025	10/10/2025
MGJ0141-12	MQ04 R3 Comp	Water	09/10/2025	10/10/2025
MGJ0141-13	MQ05 R1 Comp	Water	08/10/2025	10/10/2025
MGJ0141-14	MQ05 R2 Comp	Water	08/10/2025	10/10/2025
MGJ0141-15	MQ05 R3 Comp	Water	08/10/2025	10/10/2025
MGJ0141-16	MQ06 R1 Comp	Water	08/10/2025	10/10/2025
MGJ0141-17	MQ06 R2 Comp	Water	08/10/2025	10/10/2025
MGJ0141-18	MQ06 R3 Comp	Water	08/10/2025	10/10/2025
MGJ0141-19	MQ07 R1 Comp	Water	09/10/2025	10/10/2025
MGJ0141-20	MQ07 R2 Comp	Water	09/10/2025	10/10/2025
MGJ0141-21	MQ07 R3 Comp	Water	09/10/2025	10/10/2025
MGJ0141-22	MQ08 R1 Comp	Water	09/10/2025	10/10/2025
MGJ0141-23	MQ08 R2 Comp	Water	09/10/2025	10/10/2025
MGJ0141-24	MQ08 R3 Comp	Water	09/10/2025	10/10/2025
MGJ0141-25	MQ08 R1 Surface	Water	09/10/2025	10/10/2025
MGJ0141-26	MQ08 R2 Surface	Water	09/10/2025	10/10/2025
MGJ0141-27	MQ08 R3 Surface	Water	09/10/2025	10/10/2025
MGJ0141-28	MQ08 R1 Bottom	Water	09/10/2025	10/10/2025
MGJ0141-29	MQ08 R2 Bottom	Water	09/10/2025	10/10/2025
MGJ0141-30	MQ08 R3 Bottom	Water	09/10/2025	10/10/2025
MGJ0141-31	MQ09 R1 Comp	Water	09/10/2025	10/10/2025
MGJ0141-32	MQ09 R2 Comp	Water	09/10/2025	10/10/2025
MGJ0141-33	MQ09 R3 Comp	Water	09/10/2025	10/10/2025

Sample Comments

General Comment	Samples 1-3, 10-12, 19-33 recieved on 13/10 8:05am 12.2C Icepack Seal

Certificate of Analysis MGJ0141

Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	MGJ0141-01	MGJ0141-02	MGJ0141-03	MGJ0141-04	MGJ0141-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			09/10/2025	09/10/2025	09/10/2025	08/10/2025	08/10/2025
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	57000	58000	58000	58000	57000
Total Dissolved Solids	mg/L	5.0	42000	43000	42000	41000	41000
Estimated Salinity*	mg/L	1.0	36000	37000	37000	37000	37000
Total Suspended Solids	mg/L	1.0	3.2	2.7	2.4	1.5	1.3

Envirolab ID	Units	PQL	MGJ0141-06	MGJ0141-07	MGJ0141-08	MGJ0141-09	MGJ0141-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			08/10/2025	08/10/2025	08/10/2025	08/10/2025	09/10/2025
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	57000	58000	57000	57000	58000
Total Dissolved Solids	mg/L	5.0	43000	43000	41000	43000	42000
Estimated Salinity*	mg/L	1.0	37000	37000	37000	37000	37000
Total Suspended Solids	mg/L	1.0	3.0	1.5	2.4	1.8	2.1

Envirolab ID	Units	PQL	MGJ0141-11	MGJ0141-12	MGJ0141-13	MGJ0141-14	MGJ0141-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			09/10/2025	09/10/2025	08/10/2025	08/10/2025	08/10/2025
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	58000	58000	57000	57000	57000
Total Dissolved Solids	mg/L	5.0	42000	40000	41000	41000	43000
Estimated Salinity*	mg/L	1.0	37000	37000	37000	37000	37000
Total Suspended Solids	mg/L	1.0	1.7	2.6	1.8	2.0	3.4

Envirolab ID	Units	PQL	MGJ0141-16	MGJ0141-17	MGJ0141-18	MGJ0141-19	MGJ0141-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			08/10/2025	08/10/2025	08/10/2025	09/10/2025	09/10/2025
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	57000	57000	57000	58000	58000
Total Dissolved Solids	mg/L	5.0	41000	42000	41000	41000	41000
Estimated Salinity*	mg/L	1.0	37000	37000	37000	37000	37000
Total Suspended Solids	mg/L	1.0	2.0	3.3	1.3	3.1	2.7

Envirolab ID	Units	PQL	MGJ0141-21	MGJ0141-22	MGJ0141-23	MGJ0141-24	MGJ0141-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			09/10/2025	09/10/2025	09/10/2025	09/10/2025	09/10/2025
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	58000	58000	58000	58000	58000
Total Dissolved Solids	mg/L	5.0	42000	41000	41000	40000	42000
Estimated Salinity*	mg/L	1.0	37000	37000	37000	37000	37000
Total Suspended Solids	mg/L	1.0	3.0	2.2	2.5	3.2	2.7

Envirolab ID	Units	PQL	MGJ0141-26	MGJ0141-27	MGJ0141-28	MGJ0141-29	MGJ0141-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			09/10/2025	09/10/2025	09/10/2025	09/10/2025	09/10/2025
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	58000	58000	58000	58000	58000
Total Dissolved Solids	mg/L	5.0	40000	41000	41000	39000	41000

Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	MGJ0141-26	MGJ0141-27	MGJ0141-28	MGJ0141-29	MGJ0141-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			09/10/2025	09/10/2025	09/10/2025	09/10/2025	09/10/2025
Estimated Salinity*	mg/L	1.0	37000	37000	37000	37000	37000
Total Suspended Solids	mg/L	1.0	2.7	2.4	3.6	3.3	3.7

Envirolab ID	Units	PQL	MGJ0141-31	MGJ0141-32	MGJ0141-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			09/10/2025	09/10/2025	09/10/2025
pH	pH units		8.0	8.0	7.8
Electrical Conductivity	µS/cm	2.0	58000	58000	58000
Total Dissolved Solids	mg/L	5.0	40000	40000	41000
Estimated Salinity*	mg/L	1.0	37000	37000	37000
Total Suspended Solids	mg/L	1.0	3.2	3.4	3.0

Certificate of Analysis MGJ0141

Inorganics - Nutrients (Water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	MGJ0141-01	MGJ0141-02	MGJ0141-03	MGJ0141-04	MGJ0141-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			09/10/2025	09/10/2025	09/10/2025	08/10/2025	08/10/2025
Chlorophyll a	mg/m3	0.20	0.67	0.67	0.53	0.67	0.40

Envirolab ID	Units	PQL	MGJ0141-06	MGJ0141-07	MGJ0141-08	MGJ0141-09	MGJ0141-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			08/10/2025	08/10/2025	08/10/2025	08/10/2025	09/10/2025
Chlorophyll a	mg/m3	0.20	0.40	0.53	0.53	0.53	0.80

Envirolab ID	Units	PQL	MGJ0141-11	MGJ0141-12	MGJ0141-13	MGJ0141-14	MGJ0141-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			09/10/2025	09/10/2025	08/10/2025	08/10/2025	08/10/2025
Chlorophyll a	mg/m3	0.20	0.67	0.53	0.67	0.80	0.80

Envirolab ID	Units	PQL	MGJ0141-16	MGJ0141-17	MGJ0141-18	MGJ0141-19	MGJ0141-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			08/10/2025	08/10/2025	08/10/2025	09/10/2025	09/10/2025
Chlorophyll a	mg/m3	0.20	0.80	0.80	1.1	0.67	0.80

Envirolab ID	Units	PQL	MGJ0141-21	MGJ0141-22	MGJ0141-23	MGJ0141-24	MGJ0141-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			09/10/2025	09/10/2025	09/10/2025	09/10/2025	09/10/2025
Chlorophyll a	mg/m3	0.20	0.93	0.93	1.1	0.93	0.93

Envirolab ID	Units	PQL	MGJ0141-26	MGJ0141-27	MGJ0141-28	MGJ0141-29	MGJ0141-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			09/10/2025	09/10/2025	09/10/2025	09/10/2025	09/10/2025
Chlorophyll a	mg/m3	0.20	1.1	1.1	0.93	1.1	1.2

Envirolab ID	Units	PQL	MGJ0141-31	MGJ0141-32	MGJ0141-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			09/10/2025	09/10/2025	09/10/2025
Chlorophyll a	mg/m3	0.20	0.93	0.93	0.93

Subcontracted Inorganics - Certificate: ENVL25-18 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MGJ0141-01	MGJ0141-02	MGJ0141-03	MGJ0141-04	MGJ0141-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			09/10/2025	09/10/2025	09/10/2025	08/10/2025	08/10/2025
Ammonia as N	µg/L	3.0	<3	<3	<3	4	<3
Nitrate as N	µg/L	2.0	<2	<2	2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	200	160	160	170	160
Phosphate as P	µg/L	2.0	3	3	3	3	4
Total Phosphorus	µg/L	5.0	18	12	12	14	13
NOx as N	µg/L	2.0	<2	<2	2	<2	<2
TKN as N*	µg/L	50	200	160	160	160	160

Envirolab ID	Units	PQL	MGJ0141-06	MGJ0141-07	MGJ0141-08	MGJ0141-09	MGJ0141-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			08/10/2025	08/10/2025	08/10/2025	08/10/2025	09/10/2025
Ammonia as N	µg/L	3.0	<3	<3	3	<3	<3
Nitrate as N	µg/L	2.0	<2	3	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	160	160	170	160	170
Phosphate as P	µg/L	2.0	3	4	4	3	3
Total Phosphorus	µg/L	5.0	13	12	12	12	14
NOx as N	µg/L	2.0	<2	3	<2	<2	<2
TKN as N*	µg/L	50	160	160	170	160	170

Envirolab ID	Units	PQL	MGJ0141-11	MGJ0141-12	MGJ0141-13	MGJ0141-14	MGJ0141-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			09/10/2025	09/10/2025	08/10/2025	08/10/2025	08/10/2025
Ammonia as N	µg/L	3.0	<3	<3	<3	<3	<3
Nitrate as N	µg/L	2.0	<2	<2	<2	2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	180	180	170	170	150
Phosphate as P	µg/L	2.0	4	4	3	3	4
Total Phosphorus	µg/L	5.0	14	13	13	14	13
NOx as N	µg/L	2.0	<2	<2	<2	2	<2
TKN as N*	µg/L	50	180	180	160	170	150

Envirolab ID	Units	PQL	MGJ0141-16	MGJ0141-17	MGJ0141-18	MGJ0141-19	MGJ0141-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			08/10/2025	08/10/2025	08/10/2025	09/10/2025	09/10/2025
Ammonia as N	µg/L	3.0	<3	<3	<3	<3	<3

Subcontracted Inorganics - Certificate: ENVL25-18 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MGJ0141-16	MGJ0141-17	MGJ0141-18	MGJ0141-19	MGJ0141-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			08/10/2025	08/10/2025	08/10/2025	09/10/2025	09/10/2025
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	160	160	160	160	160
Phosphate as P	µg/L	2.0	3	2	3	2	4
Total Phosphorus	µg/L	5.0	14	14	13	14	14
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	160	160	160	160	150

Envirolab ID	Units	PQL	MGJ0141-21	MGJ0141-22	MGJ0141-23	MGJ0141-24	MGJ0141-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			09/10/2025	09/10/2025	09/10/2025	09/10/2025	09/10/2025
Ammonia as N	µg/L	3.0	<3	<3	<3	<3	<3
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	160	210	160	160	160
Phosphate as P	µg/L	2.0	4	3	4	3	3
Total Phosphorus	µg/L	5.0	14	13	14	13	13
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	160	210	160	160	160

Envirolab ID	Units	PQL	MGJ0141-26	MGJ0141-27	MGJ0141-28	MGJ0141-29	MGJ0141-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			09/10/2025	09/10/2025	09/10/2025	09/10/2025	09/10/2025
Ammonia as N	µg/L	3.0	<3	<3	<3	<3	<3
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	160	150	160	160	170
Phosphate as P	µg/L	2.0	3	3	<2	3	4
Total Phosphorus	µg/L	5.0	15	13	13	12	13
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	150	150	160	160	170

Envirolab ID	Units	PQL	MGJ0141-31	MGJ0141-32	MGJ0141-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			09/10/2025	09/10/2025	09/10/2025
Ammonia as N	µg/L	3.0	<3	<3	<3

Subcontracted Inorganics - Certificate: ENVL25-18 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MGJ0141-31	MGJ0141-32	MGJ0141-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			09/10/2025	09/10/2025	09/10/2025
Nitrate as N	µg/L	2.0	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2
Total Nitrogen	µg/L	50	160	150	160
Phosphate as P	µg/L	2.0	3	2	3
Total Phosphorus	µg/L	5.0	12	11	14
NOx as N	µg/L	2.0	<2	<2	<2
TKN as N*	µg/L	50	160	150	160

Certificate of Analysis MGJ0141

Subcontracted Metals - Certificate: ENVL25-18 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MGJ0141-01	MGJ0141-02	MGJ0141-03	MGJ0141-04	MGJ0141-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			09/10/2025	09/10/2025	09/10/2025	08/10/2025	08/10/2025
Reactive Silica	µg/L	2.0	47	47	47	47	47

Envirolab ID	Units	PQL	MGJ0141-06	MGJ0141-07	MGJ0141-08	MGJ0141-09	MGJ0141-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			08/10/2025	08/10/2025	08/10/2025	08/10/2025	09/10/2025
Reactive Silica	µg/L	2.0	47	50	49	50	50

Envirolab ID	Units	PQL	MGJ0141-11	MGJ0141-12	MGJ0141-13	MGJ0141-14	MGJ0141-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			09/10/2025	09/10/2025	08/10/2025	08/10/2025	08/10/2025
Reactive Silica	µg/L	2.0	51	50	49	50	50

Envirolab ID	Units	PQL	MGJ0141-16	MGJ0141-17	MGJ0141-18	MGJ0141-19	MGJ0141-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			08/10/2025	08/10/2025	08/10/2025	09/10/2025	09/10/2025
Reactive Silica	µg/L	2.0	52	51	52	52	52

Envirolab ID	Units	PQL	MGJ0141-21	MGJ0141-22	MGJ0141-23	MGJ0141-24	MGJ0141-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			09/10/2025	09/10/2025	09/10/2025	09/10/2025	09/10/2025
Reactive Silica	µg/L	2.0	52	51	51	52	51

Envirolab ID	Units	PQL	MGJ0141-26	MGJ0141-27	MGJ0141-28	MGJ0141-29	MGJ0141-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			09/10/2025	09/10/2025	09/10/2025	09/10/2025	09/10/2025
Reactive Silica	µg/L	2.0	51	51	52	52	52

Envirolab ID	Units	PQL	MGJ0141-31	MGJ0141-32	MGJ0141-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			09/10/2025	09/10/2025	09/10/2025
Reactive Silica	µg/L	2.0	52	52	53

Certificate of Analysis MGJ0141

Subcontracted Micro - Certificate: 1856604920-31, 1855604950-70 - Analysed By SA Pathology (Water)

Envirolab ID	Units	PQL	MGJ0141-01	MGJ0141-02	MGJ0141-03	MGJ0141-04	MGJ0141-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			09/10/2025	09/10/2025	09/10/2025	08/10/2025	08/10/2025
Total Coliforms	MPN/100mL	1.0	>2400	1000	2400	660	2400

Envirolab ID	Units	PQL	MGJ0141-06	MGJ0141-07	MGJ0141-08	MGJ0141-09	MGJ0141-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			08/10/2025	08/10/2025	08/10/2025	08/10/2025	09/10/2025
Total Coliforms	MPN/100mL	1.0	1700	2000	>2400	2400	>2400

Envirolab ID	Units	PQL	MGJ0141-11	MGJ0141-12	MGJ0141-13	MGJ0141-14	MGJ0141-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			09/10/2025	09/10/2025	08/10/2025	08/10/2025	08/10/2025
Total Coliforms	MPN/100mL	1.0	>2400	>2400	1300	2000	1100

Envirolab ID	Units	PQL	MGJ0141-16	MGJ0141-17	MGJ0141-18	MGJ0141-19	MGJ0141-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			08/10/2025	08/10/2025	08/10/2025	09/10/2025	09/10/2025
Total Coliforms	MPN/100mL	1.0	980	390	610	>2400	1700

Envirolab ID	Units	PQL	MGJ0141-21	MGJ0141-22	MGJ0141-23	MGJ0141-24	MGJ0141-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			09/10/2025	09/10/2025	09/10/2025	09/10/2025	09/10/2025
Total Coliforms	MPN/100mL	1.0	1500	2400	>2400	2400	>2400

Envirolab ID	Units	PQL	MGJ0141-26	MGJ0141-27	MGJ0141-28	MGJ0141-29	MGJ0141-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			09/10/2025	09/10/2025	09/10/2025	09/10/2025	09/10/2025
Total Coliforms	MPN/100mL	1.0	2400	2400	>2400	>2400	2400

Envirolab ID	Units	PQL	MGJ0141-31	MGJ0141-32	MGJ0141-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			09/10/2025	09/10/2025	09/10/2025
Total Coliforms	MPN/100mL	1.0	2000	2000	>2400

Method Summary

Method ID	Methodology Summary
INORG-001	pH - Measured using pH meter and electrode. Please note that the results for water analyses are indicative only, as analysis can be completed outside of the recommended holding times. Solids are reported from a 1:5 water extract unless otherwise specified. Alternatively, pH is determined in a 1:5 extract using 0.01M calcium chloride or a solid is extracted at a ratio of 1:2.5 (AS1289.4.3.1), pH is measured in the extract.
INORG-002	Conductivity and Salinity - measured using a conductivity cell at 25°C. Soil results reported from a 1:5 Soil:Water extract unless otherwise specified. Please note Resistivity is estimated by calculation and may not correlate with results otherwise obtained using the Resistivity current method (based on AS 1289.4.4.1), depending on the nature of the soil being analysed. Blanks may yield EC readings >1µS/cm, this is likely due to adsorption of Carbon Dioxide while the blank sample is sat on the instrument autosampler prior to analysis. The values are generally insignificant (<5µS/cm) compared to most actual sample conductivities.
INORG-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180±10°C. NOTE: Where the EC of the sample is <100µS/cm, the TDS will typically be below 70mg/L (as the sample is very likely to be at least drinking water quality). Therefore to ensure data quality for TDS, the TDS is typically calculated as per the equation: TDS = EC*0.6
INORG-019	Suspended Solids - determined gravimetrically by filtration of the sample. The solids are dried at 104±5°C
INORG-119	Chlorophyll A based on APHA 10200 H latest edition.
SUB-021	Subcontracted to Marine & Freshwater Research - Accreditation number 10603
SUB-041_CA	Subcontracted to SA Pathology

Result Definitions

Identifier	Description
NR	Not reported
NEPM	National Environment Protection Measure
NS	Not specified
LCS	Laboratory Control Sample
RPD	Relative Percent Difference
>	Greater than
<	Less than
PQL	Practical Quantitation Limit
INS	Insufficient sample for this test
NA	Test not required
NT	Not tested
DOL	Samples rejected due to particulate overload (air filters only)
RFD	Samples rejected due to filter damage (air filters only)
RUD	Samples rejected due to uneven deposition (air filters only)
##	Indicates a laboratory acceptance criteria outlier, for further details, see Result Comments and/or QC Comments

Quality Control Definitions

Blank

This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, and is determined by processing solvents and reagents in exactly the same manner as for samples.

Surrogate Spike

Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

LCS (Laboratory Control Sample)

This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Matrix Spike

A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

Duplicate

This is the complete duplicate analysis of a sample from the process batch. The sample selected should be one where the analyte concentration is easily measurable.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria. Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction. Spikes for Physical and Aggregate Tests are not applicable. For VOCs in water samples, three vials are required for duplicate or spike analysis.

General Acceptance Criteria (GAC) - Analyte specific criteria applies for some analytes and is reflected in QC recovery tables.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% - see ELN-P05 QAQC tables for details (available on request); <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase. Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was typically insufficient in order to satisfy laboratory QA/QC protocols.

Miscellaneous Information

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached. We have taken the sampling date as being the date received at the laboratory.

Two significant figures are reported for the majority of tests and with a high degree of confidence, for results <10*PQL, the second significant figure may be in doubt i.e. has a relatively high degree of uncertainty and is provided for information only.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS where sediment/solids are included by default.

Urine Analysis - The BEI values listed are taken from the 2022 edition of *TLVs and BEIs Threshold Limits by ACGIH*.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volume(s) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

Data Quality Assessment Summary MGJ0141

Client Details

Client	South Australian Research & Development Institute
Your Reference	NWP Mullaquana Monthly Sampling
Date Issued	31/10/2025

Recommended Holding Time Compliance

Recommended holding time exceedances exist - See detailed list below

Quality Control and QC Frequency

QC Type	Compliant	Details
Blank	Yes	No Outliers
LCS	Yes	No Outliers
Duplicates	Yes	No Outliers
Matrix Spike	Yes	No Outliers
Surrogates / Extracted Internal Standards	Yes	No Outliers
QC Frequency	No	QC Frequency Outliers Exist - See detailed list below

Surrogates/Extracted Internal Standards, Duplicates and/or Matrix Spikes are not always relevant/applicable to certain analyses and matrices. Therefore, said QC measures are deemed compliant in these situations by default. See Laboratory Acceptance Criteria for more information

Data Quality Assessment Summary MGJ0141

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
EC | Water	4-9, 13-18	08/10/2025	10/10/2025	10/10/2025	Yes
	1-3, 10-12, 19-32	09/10/2025	14/10/2025	14/10/2025	Yes
	33	09/10/2025	14/10/2025	16/10/2025	Yes
pH | Water	4-9, 13-18	08/10/2025	10/10/2025	10/10/2025	No
	1-3, 10-12, 19-32	09/10/2025	14/10/2025	14/10/2025	No
	33	09/10/2025	14/10/2025	16/10/2025	No
Salinity | Water	4-9, 13-18	08/10/2025	10/10/2025	10/10/2025	Yes
	1-3, 10-12, 19-32	09/10/2025	14/10/2025	14/10/2025	Yes
	33	09/10/2025	14/10/2025	16/10/2025	Yes
TDS | Water	4-9, 13-18	08/10/2025	15/10/2025	29/10/2025	Yes
	3, 10-12, 19-33	09/10/2025	15/10/2025	28/10/2025	Yes
	1-2	09/10/2025	15/10/2025	29/10/2025	Yes
TSS (LL) | Water	4-9, 13-18	08/10/2025	14/10/2025	30/10/2025	Yes
	3, 10-12, 19-33	09/10/2025	14/10/2025	27/10/2025	Yes
	1-2	09/10/2025	14/10/2025	30/10/2025	Yes
Chlorophyll a (LL) - Frozen | Water	4-9, 13-18	08/10/2025	15/10/2025	22/10/2025	Yes
	1-3, 10-12, 19-33	09/10/2025	15/10/2025	22/10/2025	Yes
Ammonia as N | Water	4-9, 13-18	08/10/2025	27/10/2025	27/10/2025	Yes
	1-3, 10-12, 19-33	09/10/2025	27/10/2025	27/10/2025	Yes
Nitrate as N (LL) | Water	4-9, 13-18	08/10/2025	27/10/2025	27/10/2025	Yes
	1-3, 10-12, 19-33	09/10/2025	27/10/2025	27/10/2025	Yes
Nitrite as N (LL) | Water	4-9, 13-18	08/10/2025	17/10/2025	17/10/2025	Yes
	1-3, 10-12, 19-33	09/10/2025	17/10/2025	17/10/2025	Yes
NOx as N (LL) | Water	4-9, 13-18	08/10/2025	27/10/2025	27/10/2025	Yes
	1-3, 10-12, 19-33	09/10/2025	27/10/2025	27/10/2025	Yes
Phosphate as P (LL) | Water	4-9, 13-18	08/10/2025	27/10/2025	27/10/2025	Yes
	1-3, 10-12, 19-33	09/10/2025	27/10/2025	27/10/2025	Yes
TKN as N calc (LL) | Water	4-9, 13-18	08/10/2025	22/10/2025	23/10/2025	Yes
	1-3, 10-12, 19-33	09/10/2025	22/10/2025	23/10/2025	Yes
Total N and P (LL) | Water	4-9, 13-18	08/10/2025	22/10/2025	23/10/2025	Yes
	1-3, 10-12, 19-33	09/10/2025	22/10/2025	23/10/2025	Yes
Reactive Silica (LL) | Water	4-9, 13-18	08/10/2025	24/10/2025	24/10/2025	Yes
	1-3, 10-12, 19-33	09/10/2025	24/10/2025	24/10/2025	Yes
Total Coliforms | Water	4-9, 13-18	08/10/2025	10/10/2025	10/10/2025	Yes
	1-3, 10-12, 19-33	09/10/2025	10/10/2025	10/10/2025	Yes

Data Quality Assessment Summary MGJ0141

Outliers: QC Frequency

INORG-119 | Inorganics - Nutrients (Water) | Batch BGJ2539

Analysis	QC Type	Expected	Reported
Chlorophyll a (LL) - Frozen	Duplicate	2	0

INORG-119 | Inorganics - Nutrients (Water) | Batch BGJ2540

Analysis	QC Type	Expected	Reported
Chlorophyll a (LL) - Frozen	Duplicate	2	0

Quality Control MGJ0141

INORG-001 | Inorganics - Physical Parameters (Water) | Batch BGJ1911

Analyte	Units	PQL	Blank	DUP1 BGJ1911-DUP1# Samp | QC | RPD %	DUP2 MGJ0141-07 Samp | QC | RPD %	LCS %
pH	pH units		4.9	7.9 | 7.9 | 0.126	8.0 | 8.0 | 0.874	98.7
Electrical Conductivity	µS/cm	2.0	<2.0	56400 | 57300 | 1.67	57500 | 57800 | 0.522	105
Estimated Salinity	mg/L	1.0	<1.0	36100 | 36700 | 1.67	36800 | 37000 | 0.522	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-019 | Inorganics - Physical Parameters (Water) | Batch BGJ2243

Analyte	Units	PQL	Blank	DUP1 BGJ2243-DUP1# Samp | QC | RPD %	DUP2 MGJ0141-08 Samp | QC | RPD %	LCS %
Total Suspended Solids	mg/L	1.0	<1.0	2.80 | 3.20 | [NA]	2.40 | 2.80 | [NA]	99.0

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-019 | Inorganics - Physical Parameters (Water) | Batch BGJ2244

Analyte	Units	PQL	Blank	DUP1 MGJ0141-03 Samp | QC | RPD %	DUP2 MGJ0141-24 Samp | QC | RPD %	LCS %
Total Suspended Solids	mg/L	1.0	<1.0	2.40 | 2.80 | [NA]	3.20 | 2.60 | [NA] [1]	97.0

INORG-001 | Inorganics - Physical Parameters (Water) | Batch BGJ2343

Analyte	Units	PQL	Blank	DUP1 MGJ0141-01 Samp | QC | RPD %	DUP2 MGJ0141-23 Samp | QC | RPD %	LCS %
pH	pH units		6.1	8.0 | 8.0 | 0.251	8.0 | 8.0 | 0.00	99.7
Electrical Conductivity	µS/cm	2.0	<2.0	57000 | 56100 | 1.53	57800 | 57200 | 1.19	104
Estimated Salinity	mg/L	1.0	<1.0	36500 | 35900 | 1.53	37000 | 36600 | 1.19	[NA]

INORG-001 | Inorganics - Physical Parameters (Water) | Batch BGJ2344

Analyte	Units	PQL	Blank	DUP1 MGJ0141-33 Samp | QC | RPD %	LCS %
pH	pH units		4.7	7.8 | 7.9 | 0.637	98.0
Electrical Conductivity	µS/cm	2.0	2.00	58300 | 57800 | 0.890	104
Estimated Salinity	mg/L	1.0	1.28	37300 | 37000 | 0.890	[NA]

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BGJ2474

Analyte	Units	PQL	Blank	DUP1 BGJ2474-DUP1# Samp | QC | RPD %	DUP2 MGJ0141-08 Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	40400 | 43200 | 6.70	40900 | 42700 | 4.31	108

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BGJ2475

Analyte	Units	PQL	Blank	DUP1 MGJ0141-03 Samp | QC | RPD %	DUP2 MGJ0141-25 Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	41900 | 41700 | 0.478	42300 | 41300 | 2.39	93.9

INORG-119 | Inorganics - Nutrients (Water) | Batch BGJ2539

Analyte	Units	PQL	Blank	LCS %
Chlorophyll a	mg/m3	0.20	<0.20	99.0

Quality Control MGJ0141

INORG-119|Inorganics - Nutrients (Water) | Batch BGJ2540

Analyte	Units	PQL	Blank	LCS %
Chlorophyll a	mg/m3	0.20	<0.20	104

QC Comments

Identifier	Description
[1]	Duplicate %RPD may be flagged as an outlier to routine laboratory acceptance, however, where one or both results are <10*PQL, the RPD acceptance criteria increases exponentially.

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Certificate of Analysis MGK0036

Client Details

Client	South Australian Research & Development Institute
Contact	Ian Moody
Address	SARDI Aquatic Science Centre, 2 Hamra Avenue, WEST BEACH, SA, 5024

Sample Details

Your Reference	NWP Mullaquana Monthly Sampling
Number of Samples	33 Water
Date Samples Received	07/11/2025
Date Instructions Received	10/11/2025

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for soils and on an as received basis for other matrices.

Report Details

Date Final Results Expected	28/11/2025
Date of Issue	28/11/2025

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Authorisation Details

Results Approved By	Chaminda Gunasekara, Inorganics Supervisor Chris De Luca, Lab Manager Diego Bigolin, Supervisor, Inorganics
Laboratory Manager	Chris De Luca

Samples in this Report

Envirolab ID	Sample ID	Matrix	Date Sampled	Date Received
MGK0036-01	MQ01 R1 Comp	Water	06/11/2025	10/11/2025
MGK0036-02	MQ01 R2 Comp	Water	06/11/2025	10/11/2025
MGK0036-03	MQ01 R3 Comp	Water	06/11/2025	10/11/2025
MGK0036-04	MQ02 R1 Comp	Water	05/11/2025	10/11/2025
MGK0036-05	MQ02 R2 Comp	Water	05/11/2025	10/11/2025
MGK0036-06	MQ02 R3 Comp	Water	05/11/2025	10/11/2025
MGK0036-07	MQ03 R1 Comp	Water	05/11/2025	10/11/2025
MGK0036-08	MQ03 R2 Comp	Water	05/11/2025	10/11/2025
MGK0036-09	MQ03 R3 Comp	Water	05/11/2025	10/11/2025
MGK0036-10	MQ04 R1 Comp	Water	06/11/2025	10/11/2025
MGK0036-11	MQ04 R2 Comp	Water	06/11/2025	10/11/2025
MGK0036-12	MQ04 R3 Comp	Water	06/11/2025	10/11/2025
MGK0036-13	MQ05 R1 Comp	Water	05/11/2025	10/11/2025
MGK0036-14	MQ05 R2 Comp	Water	05/11/2025	10/11/2025
MGK0036-15	MQ05 R3 Comp	Water	05/11/2025	10/11/2025
MGK0036-16	MQ06 R1 Comp	Water	05/11/2025	10/11/2025
MGK0036-17	MQ06 R2 Comp	Water	05/11/2025	10/11/2025
MGK0036-18	MQ06 R3 Comp	Water	05/11/2025	10/11/2025
MGK0036-19	MQ07 R1 Comp	Water	06/11/2025	10/11/2025
MGK0036-20	MQ07 R2 Comp	Water	06/11/2025	10/11/2025
MGK0036-21	MQ07 R3 Comp	Water	06/11/2025	10/11/2025
MGK0036-22	MQ08 R1 Comp	Water	06/11/2025	10/11/2025
MGK0036-23	MQ08 R2 Comp	Water	06/11/2025	10/11/2025
MGK0036-24	MQ08 R3 Comp	Water	06/11/2025	10/11/2025
MGK0036-25	MQ08 R1 Surface	Water	06/11/2025	10/11/2025
MGK0036-26	MQ08 R2 Surface	Water	06/11/2025	10/11/2025
MGK0036-27	MQ08 R3 Surface	Water	06/11/2025	10/11/2025
MGK0036-28	MQ08 R1 Bottom	Water	06/11/2025	10/11/2025
MGK0036-29	MQ08 R2 Bottom	Water	06/11/2025	10/11/2025
MGK0036-30	MQ08 R3 Bottom	Water	06/11/2025	10/11/2025
MGK0036-31	MQ09 R1 Comp	Water	06/11/2025	10/11/2025
MGK0036-32	MQ09 R2 Comp	Water	06/11/2025	10/11/2025
MGK0036-33	MQ09 R3 Comp	Water	06/11/2025	10/11/2025

Certificate of Analysis MGK0036

Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	MGK0036-01	MGK0036-02	MGK0036-03	MGK0036-04	MGK0036-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			06/11/2025	06/11/2025	06/11/2025	05/11/2025	05/11/2025
pH	pH units		7.9	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	52000	54000	53000	55000	54000
Total Dissolved Solids	mg/L	5.0	39000	39000	41000	41000	40000
Estimated Salinity*	mg/L	1.0	33000	33000	34000	35000	35000
Total Suspended Solids	mg/L	1.0	2.7	2.4	3.6	2.1	2.8

Envirolab ID	Units	PQL	MGK0036-06	MGK0036-07	MGK0036-08	MGK0036-09	MGK0036-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			05/11/2025	05/11/2025	05/11/2025	05/11/2025	06/11/2025
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	55000	54000	54000	54000	52000
Total Dissolved Solids	mg/L	5.0	40000	41000	42000	41000	41000
Estimated Salinity*	mg/L	1.0	35000	35000	35000	35000	33000
Total Suspended Solids	mg/L	1.0	3.0	1.9	3.6	3.0	7.2

Envirolab ID	Units	PQL	MGK0036-11	MGK0036-12	MGK0036-13	MGK0036-14	MGK0036-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			06/11/2025	06/11/2025	05/11/2025	05/11/2025	05/11/2025
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	52000	52000	55000	55000	55000
Total Dissolved Solids	mg/L	5.0	41000	38000	41000	41000	41000
Estimated Salinity*	mg/L	1.0	33000	33000	35000	35000	35000
Total Suspended Solids	mg/L	1.0	6.2	5.0	3.7	3.1	3.2

Envirolab ID	Units	PQL	MGK0036-16	MGK0036-17	MGK0036-18	MGK0036-19	MGK0036-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			05/11/2025	05/11/2025	05/11/2025	06/11/2025	06/11/2025
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	55000	55000	53000	52000	52000
Total Dissolved Solids	mg/L	5.0	40000	41000	40000	40000	41000
Estimated Salinity*	mg/L	1.0	35000	35000	34000	33000	33000
Total Suspended Solids	mg/L	1.0	3.3	2.4	3.0	4.3	3.3

Envirolab ID	Units	PQL	MGK0036-21	MGK0036-22	MGK0036-23	MGK0036-24	MGK0036-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			06/11/2025	06/11/2025	06/11/2025	06/11/2025	06/11/2025
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	52000	52000	52000	52000	52000
Total Dissolved Solids	mg/L	5.0	41000	41000	39000	41000	40000
Estimated Salinity*	mg/L	1.0	33000	33000	33000	33000	33000
Total Suspended Solids	mg/L	1.0	4.2	3.0	3.3	4.4	2.2

Envirolab ID	Units	PQL	MGK0036-26	MGK0036-27	MGK0036-28	MGK0036-29	MGK0036-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			06/11/2025	06/11/2025	06/11/2025	06/11/2025	06/11/2025
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	52000	52000	52000	52000	52000
Total Dissolved Solids	mg/L	5.0	37000	41000	40000	40000	40000

Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	MGK0036-26	MGK0036-27	MGK0036-28	MGK0036-29	MGK0036-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			06/11/2025	06/11/2025	06/11/2025	06/11/2025	06/11/2025
Estimated Salinity*	mg/L	1.0	33000	33000	33000	33000	33000
Total Suspended Solids	mg/L	1.0	1.4	1.7	1.8	2.9	1.4

Envirolab ID	Units	PQL	MGK0036-31	MGK0036-32	MGK0036-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			06/11/2025	06/11/2025	06/11/2025
pH	pH units		8.0	8.0	8.1
Electrical Conductivity	µS/cm	2.0	52000	52000	52000
Total Dissolved Solids	mg/L	5.0	39000	41000	41000
Estimated Salinity*	mg/L	1.0	33000	33000	33000
Total Suspended Solids	mg/L	1.0	1.8	2.3	1.5

Certificate of Analysis MGK0036

Inorganics - Nutrients (Water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	MGK0036-01	MGK0036-02	MGK0036-03	MGK0036-04	MGK0036-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			06/11/2025	06/11/2025	06/11/2025	05/11/2025	05/11/2025
Chlorophyll a	mg/m3	0.20	1.5	1.7	1.6	1.5	1.2

Envirolab ID	Units	PQL	MGK0036-06	MGK0036-07	MGK0036-08	MGK0036-09	MGK0036-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			05/11/2025	05/11/2025	05/11/2025	05/11/2025	06/11/2025
Chlorophyll a	mg/m3	0.20	1.5	1.6	1.5	2.1	1.2

Envirolab ID	Units	PQL	MGK0036-11	MGK0036-12	MGK0036-13	MGK0036-14	MGK0036-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			06/11/2025	06/11/2025	05/11/2025	05/11/2025	05/11/2025
Chlorophyll a	mg/m3	0.20	1.5	1.3	1.5	1.1	1.1

Envirolab ID	Units	PQL	MGK0036-16	MGK0036-17	MGK0036-18	MGK0036-19	MGK0036-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			05/11/2025	05/11/2025	05/11/2025	06/11/2025	06/11/2025
Chlorophyll a	mg/m3	0.20	0.90	0.90	0.70	0.70	1.2

Envirolab ID	Units	PQL	MGK0036-21	MGK0036-22	MGK0036-23	MGK0036-24	MGK0036-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			06/11/2025	06/11/2025	06/11/2025	06/11/2025	06/11/2025
Chlorophyll a	mg/m3	0.20	1.1	1.1	0.90	0.80	1.1

Envirolab ID	Units	PQL	MGK0036-26	MGK0036-27	MGK0036-28	MGK0036-29	MGK0036-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			06/11/2025	06/11/2025	06/11/2025	06/11/2025	06/11/2025
Chlorophyll a	mg/m3	0.20	0.90	0.80	0.70	0.70	0.70

Envirolab ID	Units	PQL	MGK0036-31	MGK0036-32	MGK0036-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			06/11/2025	06/11/2025	06/11/2025
Chlorophyll a	mg/m3	0.20	0.80	0.90	0.80

Subcontracted Inorganics - Certificate: ENVL25-20 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MGK0036-01	MGK0036-02	MGK0036-03	MGK0036-04	MGK0036-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			06/11/2025	06/11/2025	06/11/2025	05/11/2025	05/11/2025
Ammonia as N	µg/L	3.0	12	6	5	4	4
Nitrate as N	µg/L	2.0	7	2	2	5	5
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	280	270	230	180	200
Phosphate as P	µg/L	2.0	3	3	3	<2	4
Total Phosphorus	µg/L	5.0	21	20	20	15	15
NOx as N	µg/L	2.0	8	3	2	5	5
TKN as N*	µg/L	50	270	270	220	180	200

Envirolab ID	Units	PQL	MGK0036-06	MGK0036-07	MGK0036-08	MGK0036-09	MGK0036-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			05/11/2025	05/11/2025	05/11/2025	05/11/2025	06/11/2025
Ammonia as N	µg/L	3.0	<3	<3	5	6	<3
Nitrate as N	µg/L	2.0	5	4	3	2	3
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	170	190	170	180	210
Phosphate as P	µg/L	2.0	3	3	2	2	<2
Total Phosphorus	µg/L	5.0	14	16	14	16	20
NOx as N	µg/L	2.0	5	4	3	3	3
TKN as N*	µg/L	50	170	180	160	180	210

Envirolab ID	Units	PQL	MGK0036-11	MGK0036-12	MGK0036-13	MGK0036-14	MGK0036-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			06/11/2025	06/11/2025	05/11/2025	05/11/2025	05/11/2025
Ammonia as N	µg/L	3.0	<3	<3	<3	<3	<3
Nitrate as N	µg/L	2.0	2	3	8	8	8
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	200	200	160	170	160
Phosphate as P	µg/L	2.0	4	3	3	2	2
Total Phosphorus	µg/L	5.0	18	15	14	14	14
NOx as N	µg/L	2.0	3	3	8	8	8
TKN as N*	µg/L	50	200	200	150	160	150

Envirolab ID	Units	PQL	MGK0036-16	MGK0036-17	MGK0036-18	MGK0036-19	MGK0036-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			05/11/2025	05/11/2025	05/11/2025	06/11/2025	06/11/2025
Ammonia as N	µg/L	3.0	<3	<3	<3	<3	<3

Subcontracted Inorganics - Certificate: ENVL25-20 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MGK0036-16	MGK0036-17	MGK0036-18	MGK0036-19	MGK0036-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			05/11/2025	05/11/2025	05/11/2025	06/11/2025	06/11/2025
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	170	140	150	250	180
Phosphate as P	µg/L	2.0	3	3	<2	<2	<2
Total Phosphorus	µg/L	5.0	13	12	11	15	14
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	170	140	150	250	180

Envirolab ID	Units	PQL	MGK0036-21	MGK0036-22	MGK0036-23	MGK0036-24	MGK0036-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			06/11/2025	06/11/2025	06/11/2025	06/11/2025	06/11/2025
Ammonia as N	µg/L	3.0	<3	<3	<3	<3	<3
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	170	160	170	150	170
Phosphate as P	µg/L	2.0	<2	3	2	2	3
Total Phosphorus	µg/L	5.0	15	14	13	13	14
NOx as N	µg/L	2.0	<2	2	<2	<2	<2
TKN as N*	µg/L	50	170	160	170	150	170

Envirolab ID	Units	PQL	MGK0036-26	MGK0036-27	MGK0036-28	MGK0036-29	MGK0036-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			06/11/2025	06/11/2025	06/11/2025	06/11/2025	06/11/2025
Ammonia as N	µg/L	3.0	<3	<3	<3	<3	<3
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	160	170	150	170	140
Phosphate as P	µg/L	2.0	2	3	2	4	<2
Total Phosphorus	µg/L	5.0	14	14	13	12	11
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	160	170	150	170	130

Envirolab ID	Units	PQL	MGK0036-31	MGK0036-32	MGK0036-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			06/11/2025	06/11/2025	06/11/2025
Ammonia as N	µg/L	3.0	<3	<3	<3

Subcontracted Inorganics - Certificate: ENVL25-20 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MGK0036-31	MGK0036-32	MGK0036-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			06/11/2025	06/11/2025	06/11/2025
Nitrate as N	µg/L	2.0	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2
Total Nitrogen	µg/L	50	160	150	150
Phosphate as P	µg/L	2.0	4	2	4
Total Phosphorus	µg/L	5.0	14	14	12
NOx as N	µg/L	2.0	<2	<2	<2
TKN as N*	µg/L	50	160	150	140

Subcontracted Metals - Certificate: ENVL25-20 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MGK0036-01	MGK0036-02	MGK0036-03	MGK0036-04	MGK0036-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			06/11/2025	06/11/2025	06/11/2025	05/11/2025	05/11/2025
Reactive Silica	µg/L	2.0	18	19	18	21	21

Envirolab ID	Units	PQL	MGK0036-06	MGK0036-07	MGK0036-08	MGK0036-09	MGK0036-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			05/11/2025	05/11/2025	05/11/2025	05/11/2025	06/11/2025
Reactive Silica	µg/L	2.0	21	21	21	20	19

Envirolab ID	Units	PQL	MGK0036-11	MGK0036-12	MGK0036-13	MGK0036-14	MGK0036-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			06/11/2025	06/11/2025	05/11/2025	05/11/2025	05/11/2025
Reactive Silica	µg/L	2.0	18	18	20	21	20

Envirolab ID	Units	PQL	MGK0036-16	MGK0036-17	MGK0036-18	MGK0036-19	MGK0036-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			05/11/2025	05/11/2025	05/11/2025	06/11/2025	06/11/2025
Reactive Silica	µg/L	2.0	20	20	19	17	17

Envirolab ID	Units	PQL	MGK0036-21	MGK0036-22	MGK0036-23	MGK0036-24	MGK0036-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			06/11/2025	06/11/2025	06/11/2025	06/11/2025	06/11/2025
Reactive Silica	µg/L	2.0	17	17	17	17	17

Envirolab ID	Units	PQL	MGK0036-26	MGK0036-27	MGK0036-28	MGK0036-29	MGK0036-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			06/11/2025	06/11/2025	06/11/2025	06/11/2025	06/11/2025
Reactive Silica	µg/L	2.0	16	17	17	17	18

Envirolab ID	Units	PQL	MGK0036-31	MGK0036-32	MGK0036-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			06/11/2025	06/11/2025	06/11/2025
Reactive Silica	µg/L	2.0	17	17	16

Certificate of Analysis MGK0036

Subcontracted Micro - Certificate: 1879153209-29,1877610600-11 - Analysed By SA Pathology (Water)

Envirolab ID	Units	PQL	MGK0036-01	MGK0036-02	MGK0036-03	MGK0036-04	MGK0036-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			06/11/2025	06/11/2025	06/11/2025	05/11/2025	05/11/2025
Total Coliforms	MPN/100mL	1.0	<1	<1	<1	<1	<1

Envirolab ID	Units	PQL	MGK0036-06	MGK0036-07	MGK0036-08	MGK0036-09	MGK0036-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			05/11/2025	05/11/2025	05/11/2025	05/11/2025	06/11/2025
Total Coliforms	MPN/100mL	1.0	<1	<1	<1	<1	<1

Envirolab ID	Units	PQL	MGK0036-11	MGK0036-12	MGK0036-13	MGK0036-14	MGK0036-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			06/11/2025	06/11/2025	05/11/2025	05/11/2025	05/11/2025
Total Coliforms	MPN/100mL	1.0	<1	<1	<1	<1	<1

Envirolab ID	Units	PQL	MGK0036-16	MGK0036-17	MGK0036-18	MGK0036-19	MGK0036-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			05/11/2025	05/11/2025	05/11/2025	06/11/2025	06/11/2025
Total Coliforms	MPN/100mL	1.0	<1	<1	<1	<1	<1

Envirolab ID	Units	PQL	MGK0036-21	MGK0036-22	MGK0036-23	MGK0036-24	MGK0036-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			06/11/2025	06/11/2025	06/11/2025	06/11/2025	06/11/2025
Total Coliforms	MPN/100mL	1.0	<1	<1	<1	<1	<1

Envirolab ID	Units	PQL	MGK0036-26	MGK0036-27	MGK0036-28	MGK0036-29	MGK0036-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			06/11/2025	06/11/2025	06/11/2025	06/11/2025	06/11/2025
Total Coliforms	MPN/100mL	1.0	<1	<1	<1	<1	<1

Envirolab ID	Units	PQL	MGK0036-31	MGK0036-32	MGK0036-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			06/11/2025	06/11/2025	06/11/2025
Total Coliforms	MPN/100mL	1.0	<1	<1	<1

Method Summary

Method ID	Methodology Summary
INORG-001	pH - Measured using pH meter and electrode. Please note that the results for water analyses are indicative only, as analysis can be completed outside of the recommended holding times. Solids are reported from a 1:5 water extract unless otherwise specified. Alternatively, pH is determined in a 1:5 extract using 0.01M calcium chloride or a solid is extracted at a ratio of 1:2.5 (AS1289.4.3.1), pH is measured in the extract.
INORG-002	Conductivity and Salinity - measured using a conductivity cell at 25°C. Soil results reported from a 1:5 Soil:Water extract unless otherwise specified. Please note Resistivity is estimated by calculation and may not correlate with results otherwise obtained using the Resistivity current method (based on AS 1289.4.4.1), depending on the nature of the soil being analysed. Blanks may yield EC readings >1µS/cm, this is likely due to adsorption of Carbon Dioxide while the blank sample is sat on the instrument autosampler prior to analysis. The values are generally insignificant (<5µS/cm) compared to most actual sample conductivities.
INORG-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180±10°C. NOTE: Where the EC of the sample is <100µS/cm, the TDS will typically be below 70mg/L (as the sample is very likely to be at least drinking water quality). Therefore to ensure data quality for TDS, the TDS is typically calculated as per the equation: TDS = EC*0.6
INORG-019	Suspended Solids - determined gravimetrically by filtration of the sample. The solids are dried at 104±5°C
INORG-119	Chlorophyll A based on APHA 10200 H latest edition.
SUB-021	Subcontracted to Marine & Freshwater Research - Accreditation number 10603
SUB-041_CA	Subcontracted to SA Pathology

Result Definitions

Identifier	Description
NR	Not reported
NEPM	National Environment Protection Measure
NS	Not specified
LCS	Laboratory Control Sample
RPD	Relative Percent Difference
>	Greater than
<	Less than
PQL	Practical Quantitation Limit
INS	Insufficient sample for this test
NA	Test not required
NT	Not tested
DOL	Samples rejected due to particulate overload (air filters only)
RFD	Samples rejected due to filter damage (air filters only)
RUD	Samples rejected due to uneven deposition (air filters only)
##	Indicates a laboratory acceptance criteria outlier, for further details, see Result Comments and/or QC Comments

Quality Control Definitions

Blank

This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, and is determined by processing solvents and reagents in exactly the same manner as for samples.

Surrogate Spike

Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

LCS (Laboratory Control Sample)

This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Matrix Spike

A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

Duplicate

This is the complete duplicate analysis of a sample from the process batch. The sample selected should be one where the analyte concentration is easily measurable.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria. Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction. Spikes for Physical and Aggregate Tests are not applicable. For VOCs in water samples, three vials are required for duplicate or spike analysis.

General Acceptance Criteria (GAC) - Analyte specific criteria applies for some analytes and is reflected in QC recovery tables.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% - see ELN-P05 QAQC tables for details (available on request); <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase. Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was typically insufficient in order to satisfy laboratory QA/QC protocols.

Miscellaneous Information

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached. We have taken the sampling date as being the date received at the laboratory.

Two significant figures are reported for the majority of tests and with a high degree of confidence, for results <10*PQL, the second significant figure may be in doubt i.e. has a relatively high degree of uncertainty and is provided for information only.

Measurement Uncertainty estimates can be downloaded from the Envirolab Resources website or obtained directly by contacting the laboratory.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS where sediment/solids are included by default.

Urine Analysis - The BEI values listed are taken from the 2022 edition of *TLVs and BEIs Threshold Limits by ACGIH*.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volume(s) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

Data Quality Assessment Summary MGK0036

Client Details

Client	South Australian Research & Development Institute
Your Reference	NWP Mullaquana Monthly Sampling
Date Issued	28/11/2025

Recommended Holding Time Compliance

Recommended holding time exceedances exist - See detailed list below

Quality Control and QC Frequency

QC Type	Compliant	Details
Blank	Yes	No Outliers
LCS	Yes	No Outliers
Duplicates	Yes	No Outliers
Matrix Spike	Yes	No Outliers
Surrogates / Extracted Internal Standards	Yes	No Outliers
QC Frequency	No	QC Frequency Outliers Exist - See detailed list below

Surrogates/Extracted Internal Standards, Duplicates and/or Matrix Spikes are not always relevant/applicable to certain analyses and matrices. Therefore, said QC measures are deemed compliant in these situations by default. See Laboratory Acceptance Criteria for more information

Data Quality Assessment Summary MGK0036

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
EC | Water	4-9, 13-17	05/11/2025	10/11/2025	10/11/2025	Yes
	18	05/11/2025	10/11/2025	11/11/2025	Yes
	2-3	06/11/2025	10/11/2025	11/11/2025	Yes
	1, 10-12, 19-33	06/11/2025	11/11/2025	12/11/2025	Yes
pH | Water	4-9, 13-17	05/11/2025	10/11/2025	10/11/2025	No
	18	05/11/2025	10/11/2025	11/11/2025	No
	3	06/11/2025	10/11/2025	11/11/2025	No
	1-2, 10-12, 19-33	06/11/2025	11/11/2025	12/11/2025	No
Salinity | Water	4-9, 13-17	05/11/2025	10/11/2025	10/11/2025	Yes
	18	05/11/2025	10/11/2025	11/11/2025	Yes
	3	06/11/2025	10/11/2025	11/11/2025	Yes
	1-2, 10-12, 19-33	06/11/2025	11/11/2025	12/11/2025	Yes
TDS | Water	4-9, 13-18	05/11/2025	13/11/2025	14/11/2025	No
	1-3, 10-12, 19-33	06/11/2025	13/11/2025	14/11/2025	Yes
TSS (LL) | Water	4-9, 13-18	05/11/2025	12/11/2025	17/11/2025	Yes
	1-2	06/11/2025	12/11/2025	17/11/2025	Yes
	3, 10-12, 19-33	06/11/2025	13/11/2025	17/11/2025	Yes
Chlorophyll a (LL) - Frozen | Water	4-9, 13-18	05/11/2025	12/11/2025	14/11/2025	Yes
	2-3, 10-12, 19-33	06/11/2025	12/11/2025	14/11/2025	Yes
	1	06/11/2025	14/11/2025	14/11/2025	Yes
Ammonia as N | Water	4-9, 13-18	05/11/2025	17/11/2025	17/11/2025	Yes
	1-3, 10-12, 19-33	06/11/2025	17/11/2025	17/11/2025	Yes
Nitrate as N (LL) | Water	4-9, 13-18	05/11/2025	17/11/2025	17/11/2025	Yes
	1-3, 10-12, 19-33	06/11/2025	17/11/2025	17/11/2025	Yes
Nitrite as N (LL) | Water	4-9, 13-18	05/11/2025	12/11/2025	12/11/2025	Yes
	1-3, 10-12, 19-33	06/11/2025	12/11/2025	12/11/2025	Yes
NOx as N (LL) | Water	4-9, 13-18	05/11/2025	17/11/2025	17/11/2025	Yes
	1-3, 10-12, 19-33	06/11/2025	17/11/2025	17/11/2025	Yes
Phosphate as P (LL) | Water	4-9, 13-18	05/11/2025	17/11/2025	17/11/2025	Yes
	1-3, 10-12, 19-33	06/11/2025	17/11/2025	17/11/2025	Yes
TKN as N calc (LL) | Water	4-9, 13-18	05/11/2025	18/11/2025	19/11/2025	Yes
	1-3, 10-12, 19-33	06/11/2025	18/11/2025	19/11/2025	Yes
Total N and P (LL) | Water	4-9, 13-18	05/11/2025	18/11/2025	19/11/2025	Yes
	1-3, 10-12, 19-33	06/11/2025	18/11/2025	19/11/2025	Yes
Reactive Silica (LL) | Water	4-9, 13-18	05/11/2025	13/11/2025	13/11/2025	Yes
	1-3, 10-12, 19-33	06/11/2025	13/11/2025	13/11/2025	Yes
Total Coliforms | Water	4-9, 13-18	05/11/2025	05/11/2025	06/11/2025	Yes
	1-3, 10-12, 19-33	06/11/2025	06/11/2025	07/11/2025	Yes

Data Quality Assessment Summary MGK0036

Outliers: QC Frequency

INORG-119 | Inorganics - Nutrients (Water) | Batch BGK1631

Analysis	QC Type	Expected	Reported
Chlorophyll a (LL) - Frozen	Duplicate	2	0

INORG-119 | Inorganics - Nutrients (Water) | Batch BGK1632

Analysis	QC Type	Expected	Reported
Chlorophyll a (LL) - Frozen	Duplicate	2	0

INORG-119 | Inorganics - Nutrients (Water) | Batch BGK2158

Analysis	QC Type	Expected	Reported
Chlorophyll a (LL) - Frozen	Duplicate	1	0

Quality Control MGK0036

INORG-001 | Inorganics - Physical Parameters (Water) | Batch BGK1307

Analyte	Units	PQL	Blank	DUP1 BGK1307-DUP1# Samp | QC | RPD %	DUP2 MGK0036-05 Samp | QC | RPD %	LCS %
pH	pH units		4.7	6.8 | 6.7 | 1.92	8.0 | 8.0 | 0.501	98.0
Electrical Conductivity	µS/cm	2.0	<2.0	71.0 | 70.6 | 0.565	54400 | 54700 | 0.437	99.2
Estimated Salinity	mg/L	1.0	<1.0	45.4 | 45.2 | 0.565	34800 | 35000 | 0.437	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-001 | Inorganics - Physical Parameters (Water) | Batch BGK1308

Analyte	Units	PQL	Blank	DUP1 MGK0036-18 Samp | QC | RPD %	DUP2 BGK1308-DUP2# Samp | QC | RPD %	LCS %
pH	pH units		5.3	8.0 | 7.9 | 0.377	7.0 | 6.5 | 8.43	98.3
Electrical Conductivity	µS/cm	2.0	<2.0	52500 | 53400 | 1.72	272 | 273 | 0.513	98.3
Estimated Salinity	mg/L	1.0	<1.0	33600 | 34200 | 1.72	174 | 175 | 0.513	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-002 | Inorganics - Physical Parameters (Water) | Batch BGK1309

Analyte	Units	PQL	Blank	DUP1 BGK1309-DUP1# Samp | QC | RPD %	LCS %
Electrical Conductivity	µS/cm	2.0	<2.0	114 | 112 | 1.59	98.9

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-001 | Inorganics - Physical Parameters (Water) | Batch BGK1426

Analyte	Units	PQL	Blank	DUP1 MGK0036-01 Samp | QC | RPD %	DUP2 MGK0036-24 Samp | QC | RPD %	LCS %
pH	pH units		4.4	7.9 | 8.0 | 0.629	8.0 | 8.0 | 0.124	98.0
Electrical Conductivity	µS/cm	2.0	<2.0	51900 | 50900 | 2.11	51600 | 50700 | 1.82	92.1
Estimated Salinity	mg/L	1.0	<1.0	33200 | 32600 | 2.11	33000 | 32400 | 1.82	[NA]

INORG-019 | Inorganics - Physical Parameters (Water) | Batch BGK1865

Analyte	Units	PQL	Blank	DUP1 BGK1865-DUP1# Samp | QC | RPD %	DUP2 MGK0036-08 Samp | QC | RPD %	LCS %
Total Suspended Solids	mg/L	1.0	<1.0	3.80 | 3.20 | [NA]	3.60 | 3.40 | [NA]	93.0

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-019 | Inorganics - Physical Parameters (Water) | Batch BGK1866

Analyte	Units	PQL	Blank	DUP1 MGK0036-03 Samp | QC | RPD %	DUP2 MGK0036-24 Samp | QC | RPD %	LCS %
Total Suspended Solids	mg/L	1.0	<1.0	3.60 | 3.20 | [NA]	4.40 | 4.00 | [NA]	85.0

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BGK1869

Analyte	Units	PQL	Blank	DUP1 MGK0036-04 Samp | QC | RPD %	DUP2 MGK0036-17 Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	41400 | 40500 | 2.20	40700 | 39800 | 2.24	95.6

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BGK1870

Analyte	Units	PQL	Blank	DUP1 MGK0036-21 Samp | QC | RPD %	DUP2 MGK0036-27 Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	41100 | 40200 | 2.21	41000 | 37700 | 8.39	104

Quality Control MGK0036

INORG-119 | Inorganics - Nutrients (Water) | Batch BGK1631

Analyte	Units	PQL	Blank	LCS %
Chlorophyll a	mg/m3	0.20	<0.20	96.0

INORG-119 | Inorganics - Nutrients (Water) | Batch BGK1632

Analyte	Units	PQL	Blank	LCS %
Chlorophyll a	mg/m3	0.20	<0.20	80.0

INORG-119 | Inorganics - Nutrients (Water) | Batch BGK2158

Analyte	Units	PQL	Blank	LCS %
Chlorophyll a	mg/m3	0.20	<0.20	90.0

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Certificate of Analysis MGL0020

Client Details

Client	South Australian Research & Development Institute
Contact	Ian Moody
Address	SARDI Aquatic Science Centre, 2 Hamra Avenue, WEST BEACH, SA, 5024

Sample Details

Your Reference	NWP Mullaquana Environmental Seasonal - December
Number of Samples	33 Water
Date Samples Received	04/12/2025
Date Instructions Received	04/12/2025

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for soils and on an as received basis for other matrices.

Report Details

Date Final Results Expected	30/01/2026
Date of Issue	04/02/2026

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Authorisation Details

Results Approved By	Chris De Luca, Lab Manager Diego Bigolin, Supervisor, Inorganics Jenny Xin He, Chemist Maggie Hu, Organics Supervisor
Laboratory Manager	Chris De Luca

Certificate of Analysis MGL0020

Samples in this Report

Envirolab ID	Sample ID	Matrix	Date Sampled	Date Received
MGL0020-01	MQ01 R1 Comp	Water	03/12/2025	04/12/2025
MGL0020-02	MQ01 R2 Comp	Water	03/12/2025	04/12/2025
MGL0020-03	MQ01 R3 Comp	Water	03/12/2025	04/12/2025
MGL0020-04	MQ02 R1 Comp	Water	02/12/2025	04/12/2025
MGL0020-05	MQ02 R2 Comp	Water	02/12/2025	04/12/2025
MGL0020-06	MQ02 R3 Comp	Water	02/12/2025	04/12/2025
MGL0020-07	MQ03 R1 Comp	Water	02/12/2025	04/12/2025
MGL0020-08	MQ03 R2 Comp	Water	02/12/2025	04/12/2025
MGL0020-09	MQ03 R3 Comp	Water	02/12/2025	04/12/2025
MGL0020-10	MQ04 R1 Comp	Water	03/12/2025	04/12/2025
MGL0020-11	MQ04 R2 Comp	Water	03/12/2025	04/12/2025
MGL0020-12	MQ04 R3 Comp	Water	03/12/2025	04/12/2025
MGL0020-13	MQ05 R1 Comp	Water	02/12/2025	04/12/2025
MGL0020-14	MQ05 R2 Comp	Water	02/12/2025	04/12/2025
MGL0020-15	MQ05 R3 Comp	Water	02/12/2025	04/12/2025
MGL0020-16	MQ06 R1 Comp	Water	02/12/2025	04/12/2025
MGL0020-17	MQ06 R2 Comp	Water	02/12/2025	04/12/2025
MGL0020-18	MQ06 R3 Comp	Water	02/12/2025	04/12/2025
MGL0020-19	MQ07 R1 Comp	Water	03/12/2025	04/12/2025
MGL0020-20	MQ07 R2 Comp	Water	03/12/2025	04/12/2025
MGL0020-21	MQ07 R3 Comp	Water	03/12/2025	04/12/2025
MGL0020-22	MQ08 R1 Comp	Water	03/12/2025	04/12/2025
MGL0020-23	MQ08 R2 Comp	Water	03/12/2025	04/12/2025
MGL0020-24	MQ08 R3 Comp	Water	03/12/2025	04/12/2025
MGL0020-25	MQ08 R1 Surface	Water	03/12/2025	04/12/2025
MGL0020-26	MQ08 R2 Surface	Water	03/12/2025	04/12/2025
MGL0020-27	MQ08 R3 Surface	Water	03/12/2025	04/12/2025
MGL0020-28	MQ08 R1 Bottom	Water	03/12/2025	04/12/2025
MGL0020-29	MQ08 R2 Bottom	Water	03/12/2025	04/12/2025
MGL0020-30	MQ08 R3 Bottom	Water	03/12/2025	04/12/2025
MGL0020-31	MQ09 R1 Comp	Water	03/12/2025	04/12/2025
MGL0020-32	MQ09 R2 Comp	Water	03/12/2025	04/12/2025
MGL0020-33	MQ09 R3 Comp	Water	03/12/2025	04/12/2025

Sample Comments

General Comment	Samples 1-3, 10-12, 19-33 rec on 5/12 8:30am 16C icepack seal intact

Volatile TRH and BTEX (Water)

Envirolab ID	Units	PQL	MGL0020-01	MGL0020-02	MGL0020-03	MGL0020-04	MGL0020-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			03/12/2025	03/12/2025	03/12/2025	02/12/2025	02/12/2025
TRH C6-C9	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	<10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve Xylenes	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve BTEX	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*130*	*148 [2]*	*135*	*145 [2]*	*141 [2]*
Surrogate Toluene-D8	%		*109*	*112*	*110*	*112*	*110*
Surrogate 4-Bromofluorobenzene	%		*115*	*119*	*116*	*118*	*117*

Envirolab ID	Units	PQL	MGL0020-06	MGL0020-07	MGL0020-08	MGL0020-09	MGL0020-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			02/12/2025	02/12/2025	02/12/2025	02/12/2025	03/12/2025
TRH C6-C9	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	<10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve Xylenes	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve BTEX	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*141 [2]*	*132*	*161 [2]*	*144 [2]*	*138*
Surrogate Toluene-D8	%		*111*	*109*	*117*	*112*	*109*
Surrogate 4-Bromofluorobenzene	%		*118*	*116*	*122*	*119*	*118*

Envirolab ID	Units	PQL	MGL0020-11	MGL0020-12	MGL0020-13	MGL0020-14	MGL0020-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			03/12/2025	03/12/2025	02/12/2025	02/12/2025	02/12/2025
TRH C6-C9	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	<10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Volatile TRH and BTEX (Water)

Envirolab ID	Units	PQL	MGL0020-11	MGL0020-12	MGL0020-13	MGL0020-14	MGL0020-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			03/12/2025	03/12/2025	02/12/2025	02/12/2025	02/12/2025
Total +ve Xylenes	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve BTEX	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*164 [2]*	*166 [2]*	*151 [2]*	*153 [2]*	*146 [2]*
Surrogate Toluene-D8	%		*117*	*113*	*111*	*109*	*110*
Surrogate 4-Bromofluorobenzene	%		*116*	*127*	*126*	*124*	*120*

Envirolab ID	Units	PQL	MGL0020-16	MGL0020-17	MGL0020-18	MGL0020-19	MGL0020-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			02/12/2025	02/12/2025	02/12/2025	03/12/2025	03/12/2025
TRH C6-C9	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	<10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve Xylenes	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve BTEX	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*161 [2]*	*136*	*164 [2]*	*157 [2]*	*138*
Surrogate Toluene-D8	%		*113*	*108*	*110*	*106*	*108*
Surrogate 4-Bromofluorobenzene	%		*121*	*115*	*124*	*122*	*117*

Envirolab ID	Units	PQL	MGL0020-21	MGL0020-22	MGL0020-23	MGL0020-24	MGL0020-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			03/12/2025	03/12/2025	03/12/2025	03/12/2025	03/12/2025
TRH C6-C9	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	<10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve Xylenes	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve BTEX	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*111*	*124*	*121*	*126*	*124*
Surrogate Toluene-D8	%		*105*	*106*	*105*	*107*	*106*
Surrogate 4-Bromofluorobenzene	%		*106*	*111*	*109*	*112*	*110*

Volatile TRH and BTEX (Water)

Envirolab ID	Units	PQL	MGL0020-26	MGL0020-27	MGL0020-28	MGL0020-29	MGL0020-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			03/12/2025	03/12/2025	03/12/2025	03/12/2025	03/12/2025
TRH C6-C9	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	<10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve Xylenes	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve BTEX	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*129*	*137*	*133*	*130*	*132*
Surrogate Toluene-D8	%		*107*	*109*	*107*	*107*	*109*
Surrogate 4-Bromofluorobenzene	%		*113*	*115*	*114*	*113*	*114*

Envirolab ID	Units	PQL	MGL0020-31	MGL0020-32	MGL0020-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			03/12/2025	03/12/2025	03/12/2025
TRH C6-C9	µg/L	10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0
Total +ve Xylenes	µg/L	1.0	<1.0	<1.0	<1.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0
Total +ve BTEX	µg/L	1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*137*	*139*	*134*
Surrogate Toluene-D8	%		*110*	*110*	*108*
Surrogate 4-Bromofluorobenzene	%		*115*	*116*	*114*

Semi-volatile TRH (Water)

Envirolab ID	Units	PQL	MGL0020-01	MGL0020-02	MGL0020-03	MGL0020-04	MGL0020-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			03/12/2025	03/12/2025	03/12/2025	02/12/2025	02/12/2025
TRH C10-C14	µg/L	50	<50	<50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%		*81.6*	*67.9*	*82.7*	*76.6*	*84.6*

Envirolab ID	Units	PQL	MGL0020-06	MGL0020-07	MGL0020-08	MGL0020-09	MGL0020-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			02/12/2025	02/12/2025	02/12/2025	02/12/2025	03/12/2025
TRH C10-C14	µg/L	50	<50	<50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%		*63.3*	*64.6*	*73.4*	*66.5*	*77.0*

Envirolab ID	Units	PQL	MGL0020-11	MGL0020-12	MGL0020-13	MGL0020-14	MGL0020-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			03/12/2025	03/12/2025	02/12/2025	02/12/2025	02/12/2025
TRH C10-C14	µg/L	50	<50	<50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%		*70.0*	*70.2*	*74.7*	*66.7*	*79.0*

Envirolab ID	Units	PQL	MGL0020-16	MGL0020-17	MGL0020-18	MGL0020-19	MGL0020-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			02/12/2025	02/12/2025	02/12/2025	03/12/2025	03/12/2025
TRH C10-C14	µg/L	50	<50	<50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50	<50	<50

Semi-volatile TRH (Water)

Envirolab ID	Units	PQL	MGL0020-16	MGL0020-17	MGL0020-18	MGL0020-19	MGL0020-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			02/12/2025	02/12/2025	02/12/2025	03/12/2025	03/12/2025
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%		*73.5*	*73.5*	*89.2*	*75.9*	*65.6*

Envirolab ID	Units	PQL	MGL0020-21	MGL0020-22	MGL0020-23	MGL0020-24	MGL0020-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			03/12/2025	03/12/2025	03/12/2025	03/12/2025	03/12/2025
TRH C10-C14	µg/L	50	<50	<50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%		*83.9*	*82.9*	*91.7*	*78.3*	*79.3*

Envirolab ID	Units	PQL	MGL0020-26	MGL0020-27	MGL0020-28	MGL0020-29	MGL0020-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			03/12/2025	03/12/2025	03/12/2025	03/12/2025	03/12/2025
TRH C10-C14	µg/L	50	<50	<50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%		*73.3*	*80.7*	*83.2*	*61.3*	*91.5*

Envirolab ID	Units	PQL	MGL0020-31	MGL0020-32	MGL0020-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			03/12/2025	03/12/2025	03/12/2025
TRH C10-C14	µg/L	50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100

Semi-volatile TRH (Water)

Envirolab ID	Units	PQL	MGL0020-31	MGL0020-32	MGL0020-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			03/12/2025	03/12/2025	03/12/2025
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50
Surrogate o-Terphenyl	%		*62.9*	*69.0*	*86.8*

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Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	MGL0020-01	MGL0020-02	MGL0020-03	MGL0020-04	MGL0020-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			03/12/2025	03/12/2025	03/12/2025	02/12/2025	02/12/2025
pH	pH units		7.9	8.0	8.1	8.0	8.1
Electrical Conductivity	µS/cm	2.0	55000	55000	55000	55000	56000
Total Dissolved Solids	mg/L	5.0	43000	42000	43000	41000	43000
Estimated Salinity*	mg/L	1.0	35000	35000	35000	36000	36000
Total Suspended Solids	mg/L	1.0	1.7	2.2	4.4	3.2	1.9

Envirolab ID	Units	PQL	MGL0020-06	MGL0020-07	MGL0020-08	MGL0020-09	MGL0020-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			02/12/2025	02/12/2025	02/12/2025	02/12/2025	03/12/2025
pH	pH units		8.1	8.1	8.1	8.1	8.1
Electrical Conductivity	µS/cm	2.0	55000	56000	55000	55000	55000
Total Dissolved Solids	mg/L	5.0	44000	42000	42000	42000	43000
Estimated Salinity*	mg/L	1.0	36000	36000	35000	36000	35000
Total Suspended Solids	mg/L	1.0	3.0	3.1	2.2	1.6	2.7

Envirolab ID	Units	PQL	MGL0020-11	MGL0020-12	MGL0020-13	MGL0020-14	MGL0020-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			03/12/2025	03/12/2025	02/12/2025	02/12/2025	02/12/2025
pH	pH units		4.3	4.1	8.0	8.1	8.1
Electrical Conductivity	µS/cm	2.0	54000	54000	56000	56000	56000
Total Dissolved Solids	mg/L	5.0	42000	42000	44000	42000	42000
Estimated Salinity*	mg/L	1.0	35000	35000	36000	36000	36000
Total Suspended Solids	mg/L	1.0	3.5	3.7	1.2	3.8	<1.0

Envirolab ID	Units	PQL	MGL0020-16	MGL0020-17	MGL0020-18	MGL0020-19	MGL0020-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			02/12/2025	02/12/2025	02/12/2025	03/12/2025	03/12/2025
pH	pH units		8.1	8.1	8.1	8.1	8.1
Electrical Conductivity	µS/cm	2.0	56000	56000	56000	56000	56000
Total Dissolved Solids	mg/L	5.0	44000	43000	42000	42000	41000
Estimated Salinity*	mg/L	1.0	36000	36000	36000	36000	36000
Total Suspended Solids	mg/L	1.0	2.4	1.8	1.8	3.7	3.5

Envirolab ID	Units	PQL	MGL0020-21	MGL0020-22	MGL0020-23	MGL0020-24	MGL0020-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			03/12/2025	03/12/2025	03/12/2025	03/12/2025	03/12/2025
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	53000	53000	55000	55000	55000
Total Dissolved Solids	mg/L	5.0	40000	39000	38000	39000	39000
Estimated Salinity*	mg/L	1.0	34000	34000	35000	35000	35000
Total Suspended Solids	mg/L	1.0	2.6	1.8	3.4	3.6	2.6

Envirolab ID	Units	PQL	MGL0020-26	MGL0020-27	MGL0020-28	MGL0020-29	MGL0020-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			03/12/2025	03/12/2025	03/12/2025	03/12/2025	03/12/2025
pH	pH units		8.1	8.1	8.1	8.1	8.1
Electrical Conductivity	µS/cm	2.0	55000	55000	55000	55000	55000
Total Dissolved Solids	mg/L	5.0	39000	38000	38000	38000	37000

Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	MGL0020-26	MGL0020-27	MGL0020-28	MGL0020-29	MGL0020-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			03/12/2025	03/12/2025	03/12/2025	03/12/2025	03/12/2025
Estimated Salinity*	mg/L	1.0	35000	35000	35000	35000	35000
Total Suspended Solids	mg/L	1.0	3.4	2.3	5.7	4.3	3.2

Envirolab ID	Units	PQL	MGL0020-31	MGL0020-32	MGL0020-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			03/12/2025	03/12/2025	03/12/2025
pH	pH units		8.1	8.0	8.1
Electrical Conductivity	µS/cm	2.0	55000	55000	55000
Total Dissolved Solids	mg/L	5.0	32000	39000	39000
Estimated Salinity*	mg/L	1.0	35000	35000	35000
Total Suspended Solids	mg/L	1.0	5.0	2.7	4.0

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Inorganics - Carbon, Nitrogen and Sulfur Species (Water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	MGL0020-01	MGL0020-02	MGL0020-03	MGL0020-04	MGL0020-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			03/12/2025	03/12/2025	03/12/2025	02/12/2025	02/12/2025
Total Organic Carbon	mg/L	1.0	2.0	1.5	2.2	1.6	1.2

Envirolab ID	Units	PQL	MGL0020-06	MGL0020-07	MGL0020-08	MGL0020-09	MGL0020-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			02/12/2025	02/12/2025	02/12/2025	02/12/2025	03/12/2025
Total Organic Carbon	mg/L	1.0	1.2	1.3	1.1	1.1	1.6

Envirolab ID	Units	PQL	MGL0020-11	MGL0020-12	MGL0020-13	MGL0020-14	MGL0020-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			03/12/2025	03/12/2025	02/12/2025	02/12/2025	02/12/2025
Total Organic Carbon	mg/L	1.0	4.0	1.9	1.1	<1.0	<1.0

Envirolab ID	Units	PQL	MGL0020-16	MGL0020-17	MGL0020-18	MGL0020-19	MGL0020-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			02/12/2025	02/12/2025	02/12/2025	03/12/2025	03/12/2025
Total Organic Carbon	mg/L	1.0	1.3	<1.0	<1.0	1.8	1.5

Envirolab ID	Units	PQL	MGL0020-21	MGL0020-22	MGL0020-23	MGL0020-24	MGL0020-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			03/12/2025	03/12/2025	03/12/2025	03/12/2025	03/12/2025
Total Organic Carbon	mg/L	1.0	2.8	1.9	1.6	1.6	1.5

Envirolab ID	Units	PQL	MGL0020-26	MGL0020-27	MGL0020-28	MGL0020-29	MGL0020-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			03/12/2025	03/12/2025	03/12/2025	03/12/2025	03/12/2025
Total Organic Carbon	mg/L	1.0	1.3	1.7	1.9	1.9	1.4

Envirolab ID	Units	PQL	MGL0020-31	MGL0020-32	MGL0020-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			03/12/2025	03/12/2025	03/12/2025
Total Organic Carbon	mg/L	1.0	2.5	2.2	2.2

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Inorganics - Nutrients (Water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	MGL0020-01	MGL0020-02	MGL0020-03	MGL0020-04	MGL0020-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			03/12/2025	03/12/2025	03/12/2025	02/12/2025	02/12/2025
Chlorophyll a	mg/m3	0.20	1.7	2.3	2.3	1.6	1.2

Envirolab ID	Units	PQL	MGL0020-06	MGL0020-07	MGL0020-08	MGL0020-09	MGL0020-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			02/12/2025	02/12/2025	02/12/2025	02/12/2025	03/12/2025
Chlorophyll a	mg/m3	0.20	1.5	1.7	1.7	2.0	2.7

Envirolab ID	Units	PQL	MGL0020-11	MGL0020-12	MGL0020-13	MGL0020-14	MGL0020-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			03/12/2025	03/12/2025	02/12/2025	02/12/2025	02/12/2025
Chlorophyll a	mg/m3	0.20	3.5	2.3	1.7	0.80	1.2

Envirolab ID	Units	PQL	MGL0020-16	MGL0020-17	MGL0020-18	MGL0020-19	MGL0020-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			02/12/2025	02/12/2025	02/12/2025	03/12/2025	03/12/2025
Chlorophyll a	mg/m3	0.20	1.7	2.1	2.1	0.93	1.3

Envirolab ID	Units	PQL	MGL0020-21	MGL0020-22	MGL0020-23	MGL0020-24	MGL0020-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			03/12/2025	03/12/2025	03/12/2025	03/12/2025	03/12/2025
Chlorophyll a	mg/m3	0.20	1.3	0.80	0.80	0.67	0.67

Envirolab ID	Units	PQL	MGL0020-26	MGL0020-27	MGL0020-28	MGL0020-29	MGL0020-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			03/12/2025	03/12/2025	03/12/2025	03/12/2025	03/12/2025
Chlorophyll a	mg/m3	0.20	0.53	0.53	0.67	0.53	0.80

Envirolab ID	Units	PQL	MGL0020-31	MGL0020-32	MGL0020-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			03/12/2025	03/12/2025	03/12/2025
Chlorophyll a	mg/m3	0.20	0.80	0.93	0.80

Subcontracted Inorganics - Certificate: ENVL25-22 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MGL0020-01	MGL0020-02	MGL0020-03	MGL0020-04	MGL0020-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			03/12/2025	03/12/2025	03/12/2025	02/12/2025	02/12/2025
Ammonia as N	µg/L	3.0	4	3	3	<3	<3
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	160	160	170	180	160
Phosphate as P	µg/L	2.0	<2	<2	<2	<2	<2
Total Phosphorus	µg/L	5.0	10	9	10	12	11
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	160	160	180	190	160

Envirolab ID	Units	PQL	MGL0020-06	MGL0020-07	MGL0020-08	MGL0020-09	MGL0020-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			02/12/2025	02/12/2025	02/12/2025	02/12/2025	03/12/2025
Ammonia as N	µg/L	3.0	<3	<3	3	4	<3
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	160	190	170	170	170
Phosphate as P	µg/L	2.0	<2	<2	<2	<2	<2
Total Phosphorus	µg/L	5.0	10	11	10	10	8
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	160	190	180	180	170

Envirolab ID	Units	PQL	MGL0020-11	MGL0020-12	MGL0020-13	MGL0020-14	MGL0020-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			03/12/2025	03/12/2025	02/12/2025	02/12/2025	02/12/2025
Ammonia as N	µg/L	3.0	<3	<3	<3	9	<3
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	4
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	150	160	150	170	160
Phosphate as P	µg/L	2.0	<2	<2	<2	<2	<2
Total Phosphorus	µg/L	5.0	9	11	9	10	9
NOx as N	µg/L	2.0	<2	<2	<2	<2	4
TKN as N*	µg/L	50	150	160	150	180	160

Envirolab ID	Units	PQL	MGL0020-16	MGL0020-17	MGL0020-18	MGL0020-19	MGL0020-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			02/12/2025	02/12/2025	02/12/2025	03/12/2025	03/12/2025
Ammonia as N	µg/L	3.0	<3	<3	<3	<3	<3

Subcontracted Inorganics - Certificate: ENVL25-22 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MGL0020-16	MGL0020-17	MGL0020-18	MGL0020-19	MGL0020-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			02/12/2025	02/12/2025	02/12/2025	03/12/2025	03/12/2025
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	180	170	160	120	170
Phosphate as P	µg/L	2.0	<2	<2	<2	<2	<2
Total Phosphorus	µg/L	5.0	9	9	8	8	8
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	180	170	160	120	170

Envirolab ID	Units	PQL	MGL0020-21	MGL0020-22	MGL0020-23	MGL0020-24	MGL0020-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			03/12/2025	03/12/2025	03/12/2025	03/12/2025	03/12/2025
Ammonia as N	µg/L	3.0	<3	<3	<3	<3	<3
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	150	150	180	150	160
Phosphate as P	µg/L	2.0	<2	<2	<2	<2	<2
Total Phosphorus	µg/L	5.0	9	9	9	9	7
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	160	150	180	150	160

Envirolab ID	Units	PQL	MGL0020-26	MGL0020-27	MGL0020-28	MGL0020-29	MGL0020-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			03/12/2025	03/12/2025	03/12/2025	03/12/2025	03/12/2025
Ammonia as N	µg/L	3.0	<3	<3	<3	<3	<3
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	130	160	110	110	110
Phosphate as P	µg/L	2.0	<2	<2	<2	<2	<2
Total Phosphorus	µg/L	5.0	7	7	7	6	6
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	130	160	120	110	110

Envirolab ID	Units	PQL	MGL0020-31	MGL0020-32	MGL0020-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			03/12/2025	03/12/2025	03/12/2025
Ammonia as N	µg/L	3.0	<3	<3	<3

Subcontracted Inorganics - Certificate: ENVL25-22 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MGL0020-31	MGL0020-32	MGL0020-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			03/12/2025	03/12/2025	03/12/2025
Nitrate as N	µg/L	2.0	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2
Total Nitrogen	µg/L	50	130	130	120
Phosphate as P	µg/L	2.0	<2	<2	<2
Total Phosphorus	µg/L	5.0	6	6	7
NOx as N	µg/L	2.0	<2	<2	<2
TKN as N*	µg/L	50	130	140	120

Subcontracted Metals - Total - Certificate: 2447.0/2524470 - Analysed By Intertek Australia - Genalysis (Minerals) (Water)

Envirolab ID	Units	PQL	MGL0020-01	MGL0020-02	MGL0020-03	MGL0020-04	MGL0020-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			03/12/2025	03/12/2025	03/12/2025	02/12/2025	02/12/2025
Aluminium	µg/L	0.50	3.4	3.5	3.6	4.9	3.3
Antimony	µg/L	0.020	0.19	0.18	0.17	0.18	0.19
Arsenic	µg/L	0.050	1.7	1.7	1.7	1.8	1.8
Barium	µg/L	0.10	6.5	6.5	6.6	6.7	6.7
Boron	µg/L	10	5100	5000	5300	5300	5200
Cadmium	µg/L	0.0050	0.014	0.013	0.011	0.008	0.011
Chromium	µg/L	0.050	0.09	0.08	0.06	0.08	0.05
Cobalt	µg/L	0.020	<0.02	<0.02	<0.02	<0.02	<0.02
Copper	µg/L	0.10	0.3	0.2	0.2	0.2	0.2
Iron	µg/L	0.20	1.6	1.9	1.5	3.8	1.2
Lead	µg/L	0.020	0.16	0.11	0.14	0.15	0.13
Manganese	µg/L	0.020	0.37	0.38	0.36	0.38	0.35
Mercury	µg/L	0.020	<0.02	<0.02	<0.02	<0.02	<0.02
Molybdenum	µg/L	0.050	12	12	13	12	13
Nickel	µg/L	0.050	0.2	0.14	0.14	0.17	0.16
Selenium	µg/L	0.10	<0.1	<0.1	<0.1	0.1	<0.1
Silicon	µg/L	0.10	<0.1	<0.1	<0.1	<0.1	<0.1
Silver	µg/L	0.020	<0.02	<0.02	<0.02	<0.02	<0.02
Strontium	µg/L	0.20	8400	8500	8500	8600	8500
Thallium	µg/L	0.0010	0.019	0.021	0.02	0.02	0.021
Thorium	µg/L	0.0050	<0.005	<0.005	<0.005	<0.005	<0.005
Uranium	µg/L	0.0010	3.7	3.7	3.8	3.7	3.8
Vanadium	µg/L	0.10	1.7	1.7	1.7	1.8	1.7
Zinc	µg/L	0.10	0.6	0.5	0.6	0.6	1.3

Envirolab ID	Units	PQL	MGL0020-06	MGL0020-07	MGL0020-08	MGL0020-09	MGL0020-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			02/12/2025	02/12/2025	02/12/2025	02/12/2025	03/12/2025
Aluminium	µg/L	0.50	4.2	4	3.9	3.8	3
Antimony	µg/L	0.020	0.21	0.22	0.2	0.18	0.2
Arsenic	µg/L	0.050	1.7	1.7	1.8	1.7	1.7
Barium	µg/L	0.10	6.4	6.5	6.5	6.3	6.3
Boron	µg/L	10	5200	5200	5500	5200	5300
Cadmium	µg/L	0.0050	0.015	0.009	0.009	0.011	0.009
Chromium	µg/L	0.050	0.05	0.06	0.05	0.05	0.07
Cobalt	µg/L	0.020	<0.02	<0.02	<0.02	<0.02	<0.02

Subcontracted Metals - Total - Certificate: 2447.0/2524470 - Analysed By Intertek Australia - Genalysis (Minerals) (Water)

Envirolab ID	Units	PQL	MGL0020-06	MGL0020-07	MGL0020-08	MGL0020-09	MGL0020-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			02/12/2025	02/12/2025	02/12/2025	02/12/2025	03/12/2025
Copper	µg/L	0.10	0.2	0.2	0.2	0.2	0.2
Iron	µg/L	0.20	1.7	2.3	2.1	1.9	1.2
Lead	µg/L	0.020	0.16	0.12	0.11	0.11	0.08
Manganese	µg/L	0.020	0.35	0.27	0.31	0.35	0.39
Mercury	µg/L	0.020	<0.02	<0.02	<0.02	<0.02	<0.02
Molybdenum	µg/L	0.050	13	13	12	12	12
Nickel	µg/L	0.050	0.17	0.19	0.13	0.13	0.18
Selenium	µg/L	0.10	<0.1	<0.1	0.1	<0.1	<0.1
Silicon	µg/L	0.10	<0.1	<0.1	<0.1	<0.1	<0.1
Silver	µg/L	0.020	<0.02	<0.02	<0.02	<0.02	<0.02
Strontium	µg/L	0.20	8500	8800	8500	8600	8600
Thallium	µg/L	0.0010	0.022	0.021	0.021	0.02	0.021
Thorium	µg/L	0.0050	<0.005	<0.005	<0.005	<0.005	<0.005
Uranium	µg/L	0.0010	3.8	3.8	3.7	3.7	3.7
Vanadium	µg/L	0.10	1.7	1.8	1.7	1.7	1.7
Zinc	µg/L	0.10	0.8	0.6	0.5	0.6	0.6

Envirolab ID	Units	PQL	MGL0020-11	MGL0020-12	MGL0020-13	MGL0020-14	MGL0020-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			03/12/2025	03/12/2025	02/12/2025	02/12/2025	02/12/2025
Aluminium	µg/L	0.50	3.6	3.8	2.7	3.1	3.4
Antimony	µg/L	0.020	0.21	0.23	0.19	0.19	0.21
Arsenic	µg/L	0.050	1.7	1.7	1.7	1.6	1.5
Barium	µg/L	0.10	6.3	6.3	6.7	6.5	6.5
Boron	µg/L	10	5400	5200	5600	5500	5400
Cadmium	µg/L	0.0050	0.015	0.013	0.012	0.011	0.01
Chromium	µg/L	0.050	0.08	0.07	0.07	0.06	0.07
Cobalt	µg/L	0.020	<0.02	<0.02	<0.02	<0.02	<0.02
Copper	µg/L	0.10	0.2	0.2	0.2	0.2	0.2
Iron	µg/L	0.20	2	2.3	0.7	0.8	1.9
Lead	µg/L	0.020	0.08	0.07	0.12	0.12	0.14
Manganese	µg/L	0.020	0.43	0.46	0.35	0.38	0.44
Mercury	µg/L	0.020	<0.02	<0.02	<0.02	<0.02	<0.02
Molybdenum	µg/L	0.050	12	13	12	12	13
Nickel	µg/L	0.050	0.16	0.18	0.17	0.21	0.16
Selenium	µg/L	0.10	<0.1	0.1	<0.1	<0.1	<0.1

Subcontracted Metals - Total - Certificate: 2447.0/2524470 - Analysed By Intertek Australia - Genalysis (Minerals) (Water)

Envirolab ID	Units	PQL	MGL0020-11	MGL0020-12	MGL0020-13	MGL0020-14	MGL0020-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			03/12/2025	03/12/2025	02/12/2025	02/12/2025	02/12/2025
Silicon	µg/L	0.10	<0.1	<0.1	<0.1	<0.1	<0.1
Silver	µg/L	0.020	<0.02	<0.02	<0.02	<0.02	<0.02
Strontium	µg/L	0.20	8500	8600	8700	8700	8700
Thallium	µg/L	0.0010	0.021	0.021	0.023	0.021	0.022
Thorium	µg/L	0.0050	<0.005	<0.005	0.006	<0.005	<0.005
Uranium	µg/L	0.0010	3.7	3.7	3.7	3.7	3.7
Vanadium	µg/L	0.10	1.6	1.6	1.7	1.6	1.7
Zinc	µg/L	0.10	0.7	0.6	0.7	0.8	0.7

Envirolab ID	Units	PQL	MGL0020-16	MGL0020-17	MGL0020-18	MGL0020-19	MGL0020-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			02/12/2025	02/12/2025	02/12/2025	03/12/2025	03/12/2025
Aluminium	µg/L	0.50	4.1	3.7	3.1	2.8	3.2
Antimony	µg/L	0.020	0.22	0.2	0.17	0.17	0.17
Arsenic	µg/L	0.050	1.8	1.7	1.6	1.7	1.6
Barium	µg/L	0.10	6.6	6.4	6.4	6.3	6.6
Boron	µg/L	10	5700	5500	5500	5500	5600
Cadmium	µg/L	0.0050	0.016	0.013	0.016	0.016	0.011
Chromium	µg/L	0.050	0.06	0.07	<0.05	0.09	<0.05
Cobalt	µg/L	0.020	<0.02	<0.02	<0.02	<0.02	<0.02
Copper	µg/L	0.10	0.2	0.2	0.3	0.2	0.2
Iron	µg/L	0.20	2.6	2	1.3	1.5	1.7
Lead	µg/L	0.020	0.16	0.15	0.13	0.1	0.1
Manganese	µg/L	0.020	0.35	0.34	0.33	0.39	0.41
Mercury	µg/L	0.020	<0.02	<0.02	<0.02	<0.02	<0.02
Molybdenum	µg/L	0.050	12	12	13	12	13
Nickel	µg/L	0.050	0.19	0.18	0.18	0.16	0.17
Selenium	µg/L	0.10	<0.1	<0.1	<0.1	<0.1	<0.1
Silicon	µg/L	0.10	<0.1	<0.1	<0.1	<0.1	<0.1
Silver	µg/L	0.020	<0.02	<0.02	<0.02	<0.02	<0.02
Strontium	µg/L	0.20	8800	8700	8700	8700	8600
Thallium	µg/L	0.0010	0.022	0.024	0.023	0.021	0.021
Thorium	µg/L	0.0050	<0.005	<0.005	<0.005	<0.005	<0.005
Uranium	µg/L	0.0010	3.6	3.7	3.7	3.7	3.7
Vanadium	µg/L	0.10	1.7	1.6	1.7	1.7	1.6
Zinc	µg/L	0.10	0.8	0.7	0.6	0.9	0.6

Subcontracted Metals - Total - Certificate: 2447.0/2524470 - Analysed By Intertek Australia - Genalysis (Minerals) (Water)

Envirolab ID	Units	PQL	MGL0020-21	MGL0020-22	MGL0020-23	MGL0020-24	MGL0020-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			03/12/2025	03/12/2025	03/12/2025	03/12/2025	03/12/2025
Aluminium	µg/L	0.50	2.9	2.8	2.7	3	3.2
Antimony	µg/L	0.020	0.18	0.23	0.18	0.18	0.19
Arsenic	µg/L	0.050	1.6	1.6	1.5	1.6	1.7
Barium	µg/L	0.10	6.5	6.1	5.9	5.8	5.6
Boron	µg/L	10	5600	5600	5600	5700	4900
Cadmium	µg/L	0.0050	0.016	0.011	0.013	0.016	0.013
Chromium	µg/L	0.050	0.06	<0.05	0.08	<0.05	0.06
Cobalt	µg/L	0.020	<0.02	<0.02	<0.02	<0.02	<0.02
Copper	µg/L	0.10	0.2	0.3	0.2	0.4	0.4
Iron	µg/L	0.20	1.4	1.2	1.2	1.2	0.6
Lead	µg/L	0.020	0.12	0.32	0.19	0.21	0.44
Manganese	µg/L	0.020	0.36	0.48	0.47	0.5	0.5
Mercury	µg/L	0.020	<0.02	<0.02	<0.02	<0.02	<0.02
Molybdenum	µg/L	0.050	12	12	12	13	13
Nickel	µg/L	0.050	0.16	0.16	0.18	0.17	0.12
Selenium	µg/L	0.10	<0.1	<0.1	0.2	0.2	0.2
Silicon	µg/L	0.10	<0.1	<0.1	<0.1	<0.1	<0.1
Silver	µg/L	0.020	<0.02	<0.02	<0.02	<0.02	<0.02
Strontium	µg/L	0.20	8700	8600	8600	8700	8400
Thallium	µg/L	0.0010	0.022	0.022	0.022	0.023	0.022
Thorium	µg/L	0.0050	<0.005	<0.005	<0.005	<0.005	<0.005
Uranium	µg/L	0.0010	3.7	3.7	3.7	3.7	3.9
Vanadium	µg/L	0.10	1.7	1.6	1.6	1.6	1.7
Zinc	µg/L	0.10	0.6	0.8	0.8	0.8	0.7

Envirolab ID	Units	PQL	MGL0020-26	MGL0020-27	MGL0020-28	MGL0020-29	MGL0020-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			03/12/2025	03/12/2025	03/12/2025	03/12/2025	03/12/2025
Aluminium	µg/L	0.50	3.4	4.2	5.3	4.7	3.3
Antimony	µg/L	0.020	0.19	0.18	0.21	0.19	0.22
Arsenic	µg/L	0.050	1.5	1.5	1.6	1.6	1.7
Barium	µg/L	0.10	5.9	5.8	6.3	6.7	6.3
Boron	µg/L	10	4800	4500	4500	4500	4500
Cadmium	µg/L	0.0050	0.013	0.013	0.014	0.02	0.017
Chromium	µg/L	0.050	0.08	0.05	0.06	0.07	0.05

Subcontracted Metals - Total - Certificate: 2447.0/2524470 - Analysed By Intertek Australia - Genalysis (Minerals) (Water)

Envirolab ID	Units	PQL	MGL0020-26	MGL0020-27	MGL0020-28	MGL0020-29	MGL0020-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			03/12/2025	03/12/2025	03/12/2025	03/12/2025	03/12/2025
Cobalt	µg/L	0.020	0.02	<0.02	<0.02	<0.02	<0.02
Copper	µg/L	0.10	0.4	0.8	0.3	0.3	0.6
Iron	µg/L	0.20	0.8	0.9	3.3	2.3	1.1
Lead	µg/L	0.020	0.51	0.53	0.11	0.1	0.09
Manganese	µg/L	0.020	0.49	0.48	0.5	0.47	0.42
Mercury	µg/L	0.020	<0.02	<0.02	<0.02	<0.02	<0.02
Molybdenum	µg/L	0.050	13	13	13	13	13
Nickel	µg/L	0.050	0.18	0.21	0.17	0.15	0.2
Selenium	µg/L	0.10	0.4	0.3	0.3	0.4	0.3
Silicon	µg/L	0.10	<0.1	<0.1	<0.1	<0.1	<0.1
Silver	µg/L	0.020	<0.02	<0.02	<0.02	<0.02	<0.02
Strontium	µg/L	0.20	8800	8600	8600	8700	8800
Thallium	µg/L	0.0010	0.022	0.023	0.025	0.023	0.026
Thorium	µg/L	0.0050	<0.005	<0.005	<0.005	<0.005	<0.005
Uranium	µg/L	0.0010	4	3.9	3.9	3.9	3.8
Vanadium	µg/L	0.10	1.6	1.7	1.7	1.7	1.7
Zinc	µg/L	0.10	0.7	1	1.1	0.9	1.6

Envirolab ID	Units	PQL	MGL0020-31	MGL0020-32	MGL0020-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			03/12/2025	03/12/2025	03/12/2025
Aluminium	µg/L	0.50	3.3	3.4	3.6
Antimony	µg/L	0.020	0.2	0.19	0.22
Arsenic	µg/L	0.050	1.7	1.5	1.6
Barium	µg/L	0.10	6	5.6	5.8
Boron	µg/L	10	4400	4600	4500
Cadmium	µg/L	0.0050	0.018	0.021	0.017
Chromium	µg/L	0.050	0.06	0.05	0.05
Cobalt	µg/L	0.020	<0.02	<0.02	<0.02
Copper	µg/L	0.10	0.3	0.3	0.3
Iron	µg/L	0.20	1.1	1.2	1.6
Lead	µg/L	0.020	0.21	0.22	0.23
Manganese	µg/L	0.020	0.44	0.49	0.47
Mercury	µg/L	0.020	<0.02	<0.02	<0.02
Molybdenum	µg/L	0.050	13	13	13

Subcontracted Metals - Total - Certificate: 2447.0/2524470 - Analysed By Intertek Australia - Genalysis (Minerals) (Water)

Envirolab ID	Units	PQL	MGL0020-31	MGL0020-32	MGL0020-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			03/12/2025	03/12/2025	03/12/2025
Nickel	µg/L	0.050	0.15	0.18	0.22
Selenium	µg/L	0.10	0.2	0.2	0.1
Silicon	µg/L	0.10	<0.1	<0.1	<0.1
Silver	µg/L	0.020	<0.02	<0.02	<0.02
Strontium	µg/L	0.20	8600	8600	8700
Thallium	µg/L	0.0010	0.022	0.026	0.024
Thorium	µg/L	0.0050	<0.005	<0.005	<0.005
Uranium	µg/L	0.0010	3.8	3.9	3.9
Vanadium	µg/L	0.10	1.6	1.7	1.6
Zinc	µg/L	0.10	0.8	0.6	0.6

Certificate of Analysis MGL0020

Subcontracted Micro - Certificate: Various - Analysed By SA Pathology (Water)

Envirolab ID	Units	PQL	MGL0020-01	MGL0020-02	MGL0020-03	MGL0020-04	MGL0020-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			03/12/2025	03/12/2025	03/12/2025	02/12/2025	02/12/2025
Total Coliforms	MPN/100mL	1.0	<1	<1	<1	<1	<1

Envirolab ID	Units	PQL	MGL0020-06	MGL0020-07	MGL0020-08	MGL0020-09	MGL0020-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			02/12/2025	02/12/2025	02/12/2025	02/12/2025	03/12/2025
Total Coliforms	MPN/100mL	1.0	<1	<1	<1	<1	<1

Envirolab ID	Units	PQL	MGL0020-11	MGL0020-12	MGL0020-13	MGL0020-14	MGL0020-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			03/12/2025	03/12/2025	02/12/2025	02/12/2025	02/12/2025
Total Coliforms	MPN/100mL	1.0	<1	<1	<1	<1	<1

Envirolab ID	Units	PQL	MGL0020-16	MGL0020-17	MGL0020-18	MGL0020-19	MGL0020-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			02/12/2025	02/12/2025	02/12/2025	03/12/2025	03/12/2025
Total Coliforms	MPN/100mL	1.0	<1	<1	<1	<1	<1

Envirolab ID	Units	PQL	MGL0020-21	MGL0020-22	MGL0020-23	MGL0020-24	MGL0020-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			03/12/2025	03/12/2025	03/12/2025	03/12/2025	03/12/2025
Total Coliforms	MPN/100mL	1.0	<1	<1	<1	<1	<1

Envirolab ID	Units	PQL	MGL0020-26	MGL0020-27	MGL0020-28	MGL0020-29	MGL0020-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			03/12/2025	03/12/2025	03/12/2025	03/12/2025	03/12/2025
Total Coliforms	MPN/100mL	1.0	<1	<1	<1	<1	<1

Envirolab ID	Units	PQL	MGL0020-31	MGL0020-32	MGL0020-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			03/12/2025	03/12/2025	03/12/2025
Total Coliforms	MPN/100mL	1.0	<1	<1	<1

Result Comments

Identifier	Description
[2]	Surrogate recovery was outside routine acceptance criteria (60-140%) due to sample matrix effects. This may be due to the presence of carbon and/or other artefacts. An acceptable recovery was achieved for the LCS surrogates.

Method Summary

Method ID	Methodology Summary
INORG-001	pH - Measured using pH meter and electrode. Please note that the results for water analyses are indicative only, as analysis can be completed outside of the recommended holding times. Solids are reported from a 1:5 water extract unless otherwise specified. Alternatively, pH is determined in a 1:5 extract using 0.01M calcium chloride or a solid is extracted at a ratio of 1:2.5 (AS1289.4.3.1), pH is measured in the extract.
INORG-002	Conductivity and Salinity - measured using a conductivity cell at 25°C. Soil results reported from a 1:5 Soil:Water extract unless otherwise specified. Please note Resistivity is estimated by calculation and may not correlate with results otherwise obtained using the Resistivity current method (based on AS 1289.4.4.1), depending on the nature of the soil being analysed. Blanks may yield EC readings >1µS/cm, this is likely due to adsorption of Carbon Dioxide while the blank sample is sat on the instrument autosampler prior to analysis. The values are generally insignificant (<5µS/cm) compared to most actual sample conductivities.
INORG-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180±10°C. NOTE: Where the EC of the sample is <100µS/cm, the TDS will typically be below 70mg/L (as the sample is very likely to be at least drinking water quality). Therefore to ensure data quality for TDS, the TDS is typically calculated as per the equation: TDS = EC*0.6
INORG-019	Suspended Solids - determined gravimetrically by filtration of the sample. The solids are dried at 104±5°C
INORG-079	Carbon forms (inorganic, organic, total) determined using a TOC/NDIR analyser via combustion. Dissolved aqueous\forms require filtering prior to determination.
INORG-119	Chlorophyll A based on APHA 10200 H latest edition.
ORG-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
ORG-023_F1_TOT	Determination of volatile organic compounds (VOCs) by P&T-GC-MS. Water samples are analysed directly by purge and trap GC-MS. Solids are extracted with Methanol, diluted and analysed by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.
SUB-017	Subcontracted to Intertek Genalysis - Accreditation number 3244
SUB-021	Subcontracted to Marine & Freshwater Research - Accreditation number 10603
SUB-041_CA	Subcontracted to SA Pathology

Result Definitions

Identifier	Description
NR	Not reported
NEPM	National Environment Protection Measure
NS	Not specified
LCS	Laboratory Control Sample
RPD	Relative Percent Difference
>	Greater than
<	Less than
PQL	Practical Quantitation Limit
INS	Insufficient sample for this test
NA	Test not required
NT	Not tested
DOL	Samples rejected due to particulate overload (air filters only)
RFD	Samples rejected due to filter damage (air filters only)
RUD	Samples rejected due to uneven deposition (air filters only)
##	Indicates a laboratory acceptance criteria outlier, for further details, see Result Comments and/or QC Comments

Quality Control Definitions

Blank

This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, and is determined by processing solvents and reagents in exactly the same manner as for samples.

Surrogate Spike

Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

LCS (Laboratory Control Sample)

This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Matrix Spike

A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

Duplicate

This is the complete duplicate analysis of a sample from the process batch. The sample selected should be one where the analyte concentration is easily measurable.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria. Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction. Spikes for Physical and Aggregate Tests are not applicable. For VOCs in water samples, three vials are required for duplicate or spike analysis.

General Acceptance Criteria (GAC) - Analyte specific criteria applies for some analytes and is reflected in QC recovery tables.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% - see ELN-P05 QAQC tables for details (available on request); <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase. Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was typically insufficient in order to satisfy laboratory QA/QC protocols.

Miscellaneous Information

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached. We have taken the sampling date as being the date received at the laboratory.

Two significant figures are reported for the majority of tests and with a high degree of confidence, for results <10*PQL, the second significant figure may be in doubt i.e. has a relatively high degree of uncertainty and is provided for information only.

Measurement Uncertainty estimates can be downloaded from the Envirolab Resources website or obtained directly by contacting the laboratory.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS where sediment/solids are included by default.

Urine Analysis - The BEI values listed are taken from the 2022 edition of *TLVs and BEIs Threshold Limits by ACGIH*.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volume(s) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

Data Quality Assessment Summary MGL0020

Client Details

Client	South Australian Research & Development Institute
Your Reference	NWP Mullaquana Environmental Seasonal - December
Date Issued	04/02/2026

Recommended Holding Time Compliance

Recommended holding time exceedances exist - See detailed list below

Quality Control and QC Frequency

QC Type	Compliant	Details
Blank	Yes	No Outliers
LCS	Yes	No Outliers
Duplicates	Yes	No Outliers
Matrix Spike	No	Matrix Spike Outliers Exist - See detailed list below
Surrogates / Extracted Internal Standards	No	Surrogates / Extracted ISTD Outliers Exist - See detailed list below
QC Frequency	No	QC Frequency Outliers Exist - See detailed list below

Surrogates/Extracted Internal Standards, Duplicates and/or Matrix Spikes are not always relevant/applicable to certain analyses and matrices. Therefore, said QC measures are deemed compliant in these situations by default. See Laboratory Acceptance Criteria for more information

Data Quality Assessment Summary MGL0020

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
vTRH&MBTEXN | Water	4-9, 13-18	02/12/2025	09/12/2025	11/12/2025	Yes
	1-3, 10-12, 19-20	03/12/2025	09/12/2025	11/12/2025	Yes
	21-31	03/12/2025	10/12/2025	10/12/2025	Yes
	32-33	03/12/2025	10/12/2025	11/12/2025	Yes
sTRH | Water	4-9, 13-17	02/12/2025	08/12/2025	09/12/2025	Yes
	18	02/12/2025	08/12/2025	11/12/2025	Yes
	1-3, 10-12	03/12/2025	08/12/2025	09/12/2025	Yes
	19-33	03/12/2025	08/12/2025	11/12/2025	Yes
EC | Water	4-9, 13-18	02/12/2025	04/12/2025	10/12/2025	Yes
	1-3, 10-12, 19-20	03/12/2025	04/12/2025	10/12/2025	Yes
	23-33	03/12/2025	09/12/2025	09/12/2025	Yes
	21-22	03/12/2025	09/12/2025	11/12/2025	Yes
pH | Water	4-9, 13-18	02/12/2025	04/12/2025	10/12/2025	No
	1-3, 10-12, 19-20	03/12/2025	04/12/2025	10/12/2025	Yes
	23-33	03/12/2025	09/12/2025	09/12/2025	No
	21-22	03/12/2025	09/12/2025	11/12/2025	No
Salinity | Water	4-9, 13-18	02/12/2025	04/12/2025	10/12/2025	Yes
	1-3, 10-12, 19-20	03/12/2025	04/12/2025	10/12/2025	Yes
	23-33	03/12/2025	09/12/2025	09/12/2025	Yes
	21-22	03/12/2025	09/12/2025	11/12/2025	Yes
TDS | Water	4-9, 13-18	02/12/2025	08/12/2025	11/12/2025	Yes
	1-3, 10-12, 19-33	03/12/2025	08/12/2025	11/12/2025	Yes
TSS (LL) | Water	4-9, 13-18	02/12/2025	09/12/2025	15/12/2025	Yes
	1-3, 10-12, 19-33	03/12/2025	09/12/2025	15/12/2025	Yes
Total Organic Carbon | Water	4-9, 13-18	02/12/2025	11/12/2025	28/01/2026	Yes
	1-3, 10-12, 19-32	03/12/2025	08/12/2025	11/12/2025	Yes
	33	03/12/2025	11/12/2025	11/12/2025	Yes
Chlorophyll a (LL) - Frozen | Water	4-9, 13-18	02/12/2025	11/12/2025	16/12/2025	Yes
	1-3, 10-12, 19-33	03/12/2025	11/12/2025	16/12/2025	Yes
Ammonia as N | Water	4-9, 13-18	02/12/2025	17/12/2025	17/12/2025	Yes
	1-3, 10-12, 19-33	03/12/2025	17/12/2025	17/12/2025	Yes
Nitrate as N (LL) | Water	4-9, 13-18	02/12/2025	17/12/2025	17/12/2025	Yes
	1-3, 10-12, 19-33	03/12/2025	17/12/2025	17/12/2025	Yes
Nitrite as N (LL) | Water	4-9, 13-18	02/12/2025	10/12/2025	10/12/2025	Yes
	1-3, 10-12, 19-33	03/12/2025	10/12/2025	10/12/2025	Yes
NOx as N (LL) | Water	4-9, 13-18	02/12/2025	17/12/2025	17/12/2025	Yes
	1-3, 10-12, 19-33	03/12/2025	17/12/2025	17/12/2025	Yes
Phosphate as P (LL) | Water	4-9, 13-18	02/12/2025	17/12/2025	17/12/2025	Yes
	1-3, 10-12, 19-33	03/12/2025	17/12/2025	17/12/2025	Yes
TKN as N calc (LL) | Water	4-9, 13-18	02/12/2025	17/12/2025	18/12/2025	Yes
	1-3, 10-12, 19-33	03/12/2025	17/12/2025	18/12/2025	Yes
Total N and P (LL) | Water	4-9, 13-18	02/12/2025	17/12/2025	18/12/2025	Yes

Data Quality Assessment Summary MGL0020

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
	1-3, 10-12, 19-33	03/12/2025	17/12/2025	18/12/2025	Yes
Total Metals (TR) | Water	4-9, 13-18	02/12/2025	22/01/2026	22/01/2026	Yes
	1-3, 10-12, 19-33	03/12/2025	22/01/2026	22/01/2026	Yes
Total Coliforms | Water	4-9, 13-18	02/12/2025	02/12/2025	03/12/2025	Yes
	1-3, 10-12, 19-33	03/12/2025	03/12/2025	04/12/2025	Yes

Outliers: Matrix Spike

ORG-020|Semi-volatile TRH (Water)| Batch BGL1441

Sample ID	Analyte	% Limits	% Recovery
MGL0020-02	TRH >C34-C40 (F4)	60 - 140	153[1]

Outliers: Surrogate / Extracted Internal Standards

ORG-023_F1_TOT|Volatile TRH and BTEX (Matrix)| Batch BGL1516

Sample ID	Analyte	% Limits	% Recovery
MGL0020-02	Dibromofluoromethane	60 - 140	148% [2]
MGL0020-04	Dibromofluoromethane	60 - 140	145% [2]
MGL0020-05	Dibromofluoromethane	60 - 140	141% [2]
MGL0020-06	Dibromofluoromethane	60 - 140	141% [2]
MGL0020-08	Dibromofluoromethane	60 - 140	161% [2]
MGL0020-09	Dibromofluoromethane	60 - 140	144% [2]
MGL0020-11	Dibromofluoromethane	60 - 140	164% [2]
MGL0020-12	Dibromofluoromethane	60 - 140	166% [2]
MGL0020-13	Dibromofluoromethane	60 - 140	151% [2]
MGL0020-14	Dibromofluoromethane	60 - 140	153% [2]
MGL0020-15	Dibromofluoromethane	60 - 140	146% [2]
MGL0020-16	Dibromofluoromethane	60 - 140	161% [2]
MGL0020-18	Dibromofluoromethane	60 - 140	164% [2]
MGL0020-19	Dibromofluoromethane	60 - 140	157% [2]

Data Quality Assessment Summary MGL0020

Outliers: QC Frequency

INORG-079 | Inorganics - Carbon, Nitrogen and Sulfur Species (Water) | Batch BGL1425

Analysis	QC Type	Expected	Reported
Total Organic Carbon	Matrix Spike	1	0

INORG-119 | Inorganics - Nutrients (Water) | Batch BGL2214

Analysis	QC Type	Expected	Reported
Chlorophyll a (LL) - Frozen	Duplicate	2	0

INORG-119 | Inorganics - Nutrients (Water) | Batch BGL2215

Analysis	QC Type	Expected	Reported
Chlorophyll a (LL) - Frozen	Duplicate	2	0

Quality Control MGL0020

ORG-023_F1_TOT|Volatile TRH and BTEX (Water) | Batch BGL1516

Analyte	Units	PQL	Blank	DUP1 MGL0020-01 Samp | QC | RPD %	DUP2 MGL0020-11 Samp | QC | RPD %	LCS %	Spike % MGL0020-02
TRH C6-C9	µg/L	10	<10	<10 | <10 | [NA]	<10 | <10 | [NA]	91.8	105
TRH C6-C10	µg/L	10	<10	<10 | <10 | [NA]	<10 | <10 | [NA]	89.7	103
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
Benzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	110	127
Toluene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	113	129
Ethylbenzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	110	118
meta+para Xylene	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	114	122
ortho-Xylene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	117	129
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
Surrogate Dibromofluoromethane	%		*127*	*130 | 133*	*164 | 129*	*98.8*	*104*
Surrogate Toluene-D8	%		*108*	*109 | 108*	*117 | 106*	*97.3*	*96.0*
Surrogate 4-Bromofluorobenzene	%		*112*	*115 | 116*	*116 | 111*	*98.1*	*99.5*

ORG-023_F1_TOT|Volatile TRH and BTEX (Water) | Batch BGL1769

Analyte	Units	PQL	Blank	DUP1 BGL1769-DUP1# Samp | QC | RPD %	DUP2 BGL1769-DUP2# Samp | QC | RPD %	LCS %	Spike % BGL1769-MS2#
TRH C6-C9	µg/L	10	<10	<10 | <10 | [NA]	<10 | <10 | [NA]	108	87.9
TRH C6-C10	µg/L	10	<10	<10 | <10 | [NA]	<10 | <10 | [NA]	106	86.0
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
Benzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	116	107
Toluene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	118	108
Ethylbenzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	114	101
meta+para Xylene	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	114	101
ortho-Xylene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	118	107
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
Surrogate Dibromofluoromethane	%		*114*	*110 | 114*	*117 | 129*	*93.8*	*101*
Surrogate Toluene-D8	%		*101*	*104 | 108*	*104 | 106*	*96.4*	*98.6*
Surrogate 4-Bromofluorobenzene	%		*102*	*107 | 107*	*108 | 111*	*95.7*	*97.5*

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

ORG-020|Semi-volatile TRH (Water) | Batch BGL1441

Analyte	Units	PQL	Blank	DUP1 MGL0020-01 Samp | QC | RPD %	DUP2 MGL0020-11 Samp | QC | RPD %	LCS %	Spike % MGL0020-02
TRH C10-C14	µg/L	50	<50	<50 | <50 | [NA]	<50 | <50 | [NA]	114	68.2
TRH C15-C28	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	73.3	99.0
TRH C29-C36	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	81.6	107
TRH >C10-C16	µg/L	50	<50	<50 | <50 | [NA]	<50 | <50 | [NA]	95.1	60.7
TRH >C16-C34 (F3)	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	78.0	106
TRH >C34-C40 (F4)	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	79.7	153[1]
Surrogate o-Terphenyl	%		*87.2*	*81.6 | 77.3*	*70.0 | 88.2*	*79.8*	*88.2*

ORG-020|Semi-volatile TRH (Water) | Batch BGL1442

Analyte	Units	PQL	Blank	DUP1 MGL0020-18 Samp | QC | RPD %	DUP2 MGL0020-28 Samp | QC | RPD %	LCS %	Spike % MGL0020-19
TRH C10-C14	µg/L	50	<50	<50 | <50 | [NA]	<50 | <50 | [NA]	72.6	72.9
TRH C15-C28	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	87.7	78.3
TRH C29-C36	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	96.9	80.9
TRH >C10-C16	µg/L	50	<50	<50 | <50 | [NA]	<50 | <50 | [NA]	68.6	66.6
TRH >C16-C34 (F3)	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	90.5	79.8
TRH >C34-C40 (F4)	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	91.4	80.2
Surrogate o-Terphenyl	%		*84.8*	*89.2 | 82.4*	*83.2 | 73.3*	*104*	*101*

Quality Control MGL0020

INORG-019 | Inorganics - Physical Parameters (Water) | Batch BGL1626

Analyte	Units	PQL	Blank	DUP1 BGL1626-DUP1# Samp | QC | RPD %	DUP2 MGL0020-08 Samp | QC | RPD %	LCS %
Total Suspended Solids	mg/L	1.0	<1.0	2.20 | 2.00 | [NA]	2.20 | <2.0 | [NA] [3]	95.0

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-019 | Inorganics - Physical Parameters (Water) | Batch BGL1627

Analyte	Units	PQL	Blank	DUP1 MGL0020-03 Samp | QC | RPD %	DUP2 MGL0020-24 Samp | QC | RPD %	LCS %
Total Suspended Solids	mg/L	1.0	<1.0	4.40 | 4.60 | [NA]	3.60 | 3.00 | [NA]	98.0

INORG-001 | Inorganics - Physical Parameters (Water) | Batch BGL1644

Analyte	Units	PQL	Blank	DUP1 MGL0020-04 Samp | QC | RPD %	DUP2 MGL0020-17 Samp | QC | RPD %	LCS %
pH	pH units		4.4	8.0 | 8.1 | 0.124	8.1 | 8.1 | 0.123	101
Electrical Conductivity	µS/cm	2.0	<2.0	55500 | 54800 | 1.22	56000 | 55200 | 1.46	101
Estimated Salinity	mg/L	1.0	<1.0	35500 | 35100 | 1.22	35800 | 35300 | 1.46	[NA]

INORG-001 | Inorganics - Physical Parameters (Water) | Batch BGL1645

Analyte	Units	PQL	Blank	DUP1 MGL0020-21 Samp | QC | RPD %	DUP2 MGL0020-31 Samp | QC | RPD %	LCS %
pH	pH units		4.4	8.0 | 8.0 | 0.125	8.1 | 8.0 | 0.995	98.5
Electrical Conductivity	µS/cm	2.0	<2.0	53400 | 53400 | 0.00318	55100 | 55400 | 0.454	103
Estimated Salinity	mg/L	1.0	<1.0	34200 | 34200 | 0.00319	35300 | 35400 | 0.454	[NA]

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BGL2055

Analyte	Units	PQL	Blank	DUP1 BGL2055-DUP1# Samp | QC | RPD %	DUP2 MGL0020-16 Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	630 | 650 | 3.12	43600 | 40900 | 6.39	111

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BGL2056

Analyte	Units	PQL	Blank	DUP1 MGL0020-20 Samp | QC | RPD %	DUP2 MGL0020-30 Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	41100 | 39400 | 4.22	36700 | 38100 | 3.74	101

INORG-079 | Inorganics - Carbon, Nitrogen and Sulfur Species (Water) | Batch BGL1424

Analyte	Units	PQL	Blank	DUP1 MGL0020-01 Samp | QC | RPD %	DUP2 MGL0020-23 Samp | QC | RPD %	LCS %	Spike % MGL0020-02
Total Organic Carbon	mg/L	1.0	<1.0	2.03 | 1.90 | [NA]	1.61 | 1.86 | [NA]	80.0	97.4

INORG-079 | Inorganics - Carbon, Nitrogen and Sulfur Species (Water) | Batch BGL1425

Analyte	Units	PQL	Blank	DUP2 MGL0020-33 Samp | QC | RPD %	LCS %
Total Organic Carbon	mg/L	1.0	<1.0	2.22 | 2.73 | [NA]	103

Quality Control MGL0020

INORG-079|Inorganics - Carbon, Nitrogen and Sulfur Species (Water) | Batch BGL2216

Analyte	Units	PQL	Blank	DUP1 MGL0020-04 Samp | QC | RPD %	DUP2 MGL0020-17 Samp | QC | RPD %	LCS %	Spike % MGL0020-05
Total Organic Carbon	mg/L	1.0	<1.0	1.64|1.31|[NA]	<1.0|<1.0|[NA]	89.0	105

INORG-119|Inorganics - Nutrients (Water) | Batch BGL2214

Analyte	Units	PQL	Blank	LCS %
Chlorophyll a	mg/m3	0.20	<0.20	88.0

INORG-119|Inorganics - Nutrients (Water) | Batch BGL2215

Analyte	Units	PQL	Blank	LCS %
Chlorophyll a	mg/m3	0.20	<0.20	104

QC Comments

Identifier	Description
[1]	Spike recovery is outside routine acceptance criteria (60-140%), this may be due to suspected non-homogeneity and/or matrix interference effects. However, an acceptable recovery was achieved for the LCS.
[3]	Duplicate %RPD may be flagged as an outlier to routine laboratory acceptance, however, where one or both results are <10*PQL, the RPD acceptance criteria increases exponentially.

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Certificate of Analysis MHA0063

Client Details

Client	South Australian Research & Development Institute
Contact	Ian Moody
Address	SARDI Aquatic Science Centre, 2 Hamra Avenue, WEST BEACH, SA, 5024

Sample Details

Your Reference	NWP Mullaquana Monthly Sampling
Number of Samples	33 Water
Date Samples Received	14/01/2026
Date Instructions Received	15/01/2026

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for soils and on an as received basis for other matrices.

Report Details

Date Final Results Expected	04/03/2026
Date of Issue	24/02/2026

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Authorisation Details

Results Approved By	Chris De Luca, Lab Manager Jenny Xin He, Chemist Myra Escultor, Senior Chemist
Laboratory Manager	Chris De Luca

Certificate of Analysis MHA0063

Samples in this Report

Envirolab ID	Sample ID	Matrix	Date Sampled	Date Received
MHA0063-01	MQ01 R1 Comp	Water	13/01/2026	15/01/2026
MHA0063-02	MQ01 R2 Comp	Water	13/01/2026	15/01/2026
MHA0063-03	MQ01 R3 Comp	Water	13/01/2026	15/01/2026
MHA0063-04	MQ02 R1 Comp	Water	12/01/2026	15/01/2026
MHA0063-05	MQ02 R2 Comp	Water	12/01/2026	15/01/2026
MHA0063-06	MQ02 R3 Comp	Water	12/01/2026	15/01/2026
MHA0063-07	MQ03 R1 Comp	Water	12/01/2026	15/01/2026
MHA0063-08	MQ03 R2 Comp	Water	12/01/2026	15/01/2026
MHA0063-09	MQ03 R3 Comp	Water	12/01/2026	15/01/2026
MHA0063-10	MQ04 R1 Comp	Water	13/01/2026	15/01/2026
MHA0063-11	MQ04 R2 Comp	Water	13/01/2026	15/01/2026
MHA0063-12	MQ04 R3 Comp	Water	13/01/2026	15/01/2026
MHA0063-13	MQ05 R1 Comp	Water	12/01/2026	15/01/2026
MHA0063-14	MQ05 R2 Comp	Water	12/01/2026	15/01/2026
MHA0063-15	MQ05 R3 Comp	Water	12/01/2026	15/01/2026
MHA0063-16	MQ06 R1 Comp	Water	12/01/2026	15/01/2026
MHA0063-17	MQ06 R2 Comp	Water	12/01/2026	15/01/2026
MHA0063-18	MQ06 R3 Comp	Water	12/01/2026	15/01/2026
MHA0063-19	MQ07 R1 Comp	Water	13/01/2026	15/01/2026
MHA0063-20	MQ07 R2 Comp	Water	13/01/2026	15/01/2026
MHA0063-21	MQ07 R3 Comp	Water	13/01/2026	15/01/2026
MHA0063-22	MQ08 R1 Comp	Water	13/01/2026	15/01/2026
MHA0063-23	MQ08 R2 Comp	Water	13/01/2026	15/01/2026
MHA0063-24	MQ08 R3 Comp	Water	13/01/2026	15/01/2026
MHA0063-25	MQ08 R1 Surface	Water	13/01/2026	15/01/2026
MHA0063-26	MQ08 R2 Surface	Water	13/01/2026	15/01/2026
MHA0063-27	MQ08 R3 Surface	Water	13/01/2026	15/01/2026
MHA0063-28	MQ08 R1 Bottom	Water	13/01/2026	15/01/2026
MHA0063-29	MQ08 R2 Bottom	Water	13/01/2026	15/01/2026
MHA0063-30	MQ08 R3 Bottom	Water	13/01/2026	15/01/2026
MHA0063-31	MQ09 R1 Comp	Water	13/01/2026	15/01/2026
MHA0063-32	MQ09 R2 Comp	Water	13/01/2026	15/01/2026
MHA0063-33	MQ09 R3 Comp	Water	13/01/2026	15/01/2026

Sample Comments

General Comment	Samples 1-3, 10-12, 19-33 rec'd on 15/01/26, 7:30am, icepack, seal intact, 14.6C

Certificate of Analysis MHA0063

Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	MHA0063-01	MHA0063-02	MHA0063-03	MHA0063-04	MHA0063-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			13/01/2026	13/01/2026	13/01/2026	12/01/2026	12/01/2026
pH	pH units		8.0	8.1	8.1	8.1	8.1
Electrical Conductivity	µS/cm	2.0	59000	59000	59000	59000	58000
Total Dissolved Solids	mg/L	5.0	35000	40000	41000	42000	46000
Estimated Salinity*	mg/L	1.0	38000	38000	38000	38000	37000
Total Suspended Solids	mg/L	1.0	1.8	3.0	<1.0	2.0	2.3

Envirolab ID	Units	PQL	MHA0063-06	MHA0063-07	MHA0063-08	MHA0063-09	MHA0063-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			12/01/2026	12/01/2026	12/01/2026	12/01/2026	13/01/2026
pH	pH units		8.1	8.1	8.2	8.2	8.1
Electrical Conductivity	µS/cm	2.0	59000	59000	59000	59000	59000
Total Dissolved Solids	mg/L	5.0	47000	38000	45000	40000	47000
Estimated Salinity*	mg/L	1.0	37000	38000	37000	38000	38000
Total Suspended Solids	mg/L	1.0	3.5	2.6	2.8	2.0	1.2

Envirolab ID	Units	PQL	MHA0063-11	MHA0063-12	MHA0063-13	MHA0063-14	MHA0063-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			13/01/2026	13/01/2026	12/01/2026	12/01/2026	12/01/2026
pH	pH units		8.1	8.1	8.1	8.1	8.1
Electrical Conductivity	µS/cm	2.0	59000	59000	59000	59000	59000
Total Dissolved Solids	mg/L	5.0	38000	43000	45000	43000	42000
Estimated Salinity*	mg/L	1.0	38000	37000	37000	38000	38000
Total Suspended Solids	mg/L	1.0	2.5	<1.0	1.9	2.8	1.3

Envirolab ID	Units	PQL	MHA0063-16	MHA0063-17	MHA0063-18	MHA0063-19	MHA0063-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			12/01/2026	12/01/2026	12/01/2026	13/01/2026	13/01/2026
pH	pH units		8.1	8.1	8.1	8.1	8.1
Electrical Conductivity	µS/cm	2.0	59000	59000	59000	59000	59000
Total Dissolved Solids	mg/L	5.0	41000	43000	45000	43000	43000
Estimated Salinity*	mg/L	1.0	38000	38000	38000	38000	38000
Total Suspended Solids	mg/L	1.0	2.4	3.9	1.6	3.2	2.0

Envirolab ID	Units	PQL	MHA0063-21	MHA0063-22	MHA0063-23	MHA0063-24	MHA0063-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			13/01/2026	13/01/2026	13/01/2026	13/01/2026	13/01/2026
pH	pH units		8.0	8.0	8.0	8.1	8.1
Electrical Conductivity	µS/cm	2.0	59000	60000	60000	60000	60000
Total Dissolved Solids	mg/L	5.0	39000	43000	41000	41000	40000
Estimated Salinity*	mg/L	1.0	38000	38000	38000	38000	38000
Total Suspended Solids	mg/L	1.0	1.7	2.9	1.1	5.2	3.0

Envirolab ID	Units	PQL	MHA0063-26	MHA0063-27	MHA0063-28	MHA0063-29	MHA0063-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			13/01/2026	13/01/2026	13/01/2026	13/01/2026	13/01/2026
pH	pH units		8.1	8.1	8.1	8.1	8.1
Electrical Conductivity	µS/cm	2.0	60000	60000	60000	60000	60000
Total Dissolved Solids	mg/L	5.0	47000	46000	38000	42000	45000

Certificate of Analysis MHA0063

Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	MHA0063-26	MHA0063-27	MHA0063-28	MHA0063-29	MHA0063-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			13/01/2026	13/01/2026	13/01/2026	13/01/2026	13/01/2026
Estimated Salinity*	mg/L	1.0	38000	38000	38000	38000	38000
Total Suspended Solids	mg/L	1.0	5.1	4.0	3.7	4.3	5.0

Envirolab ID	Units	PQL	MHA0063-31	MHA0063-32	MHA0063-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			13/01/2026	13/01/2026	13/01/2026
pH	pH units		8.0	8.1	8.0
Electrical Conductivity	µS/cm	2.0	59000	59000	60000
Total Dissolved Solids	mg/L	5.0	38000	38000	41000
Estimated Salinity*	mg/L	1.0	38000	38000	38000
Total Suspended Solids	mg/L	1.0	3.7	3.9	4.5

Certificate of Analysis MHA0063

Inorganics - Nutrients (Water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	MHA0063-01	MHA0063-02	MHA0063-03	MHA0063-04	MHA0063-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			13/01/2026	13/01/2026	13/01/2026	12/01/2026	12/01/2026
Chlorophyll a	mg/m3	0.20	0.90	0.90	1.0	2.0	2.0

Envirolab ID	Units	PQL	MHA0063-06	MHA0063-07	MHA0063-08	MHA0063-09	MHA0063-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			12/01/2026	12/01/2026	12/01/2026	12/01/2026	13/01/2026
Chlorophyll a	mg/m3	0.20	1.0	1.0	2.0	2.0	1.0

Envirolab ID	Units	PQL	MHA0063-11	MHA0063-12	MHA0063-13	MHA0063-14	MHA0063-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			13/01/2026	13/01/2026	12/01/2026	12/01/2026	12/01/2026
Chlorophyll a	mg/m3	0.20	1.0	1.0	2.0	1.0	1.0

Envirolab ID	Units	PQL	MHA0063-16	MHA0063-17	MHA0063-18	MHA0063-19	MHA0063-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			12/01/2026	12/01/2026	12/01/2026	13/01/2026	13/01/2026
Chlorophyll a	mg/m3	0.20	2.0	1.0	2.0	1.0	1.0

Envirolab ID	Units	PQL	MHA0063-21	MHA0063-22	MHA0063-23	MHA0063-24	MHA0063-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			13/01/2026	13/01/2026	13/01/2026	13/01/2026	13/01/2026
Chlorophyll a	mg/m3	0.20	1.0	1.0	2.0	1.0	0.90

Envirolab ID	Units	PQL	MHA0063-26	MHA0063-27	MHA0063-28	MHA0063-29	MHA0063-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			13/01/2026	13/01/2026	13/01/2026	13/01/2026	13/01/2026
Chlorophyll a	mg/m3	0.20	0.90	0.80	1.0	1.0	2.0

Envirolab ID	Units	PQL	MHA0063-31	MHA0063-32	MHA0063-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			13/01/2026	13/01/2026	13/01/2026
Chlorophyll a	mg/m3	0.20	1.0	1.0	1.0

Subcontracted Inorganics - Certificate: ENVL26-2 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MHA0063-01	MHA0063-02	MHA0063-03	MHA0063-04	MHA0063-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			13/01/2026	13/01/2026	13/01/2026	12/01/2026	12/01/2026
Ammonia as N	µg/L	3.0	5	5	4	4	5
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	180	170	170	190	210
Phosphate as P	µg/L	2.0	<2	<2	<2	<2	3
Total Phosphorus	µg/L	5.0	8	9	8	10	11
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	180	180	180	190	210

Envirolab ID	Units	PQL	MHA0063-06	MHA0063-07	MHA0063-08	MHA0063-09	MHA0063-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			12/01/2026	12/01/2026	12/01/2026	12/01/2026	13/01/2026
Ammonia as N	µg/L	3.0	5	<3	<3	3	3
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	160	160	170	170	170
Phosphate as P	µg/L	2.0	2	<2	<2	<2	<2
Total Phosphorus	µg/L	5.0	9	9	10	9	8
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	170	170	180	170	170

Envirolab ID	Units	PQL	MHA0063-11	MHA0063-12	MHA0063-13	MHA0063-14	MHA0063-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			13/01/2026	13/01/2026	12/01/2026	12/01/2026	12/01/2026
Ammonia as N	µg/L	3.0	<3	<3	<3	5	<3
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	170	170	160	170	160
Phosphate as P	µg/L	2.0	2	<2	<2	2	<2
Total Phosphorus	µg/L	5.0	9	9	8	9	9
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	180	170	160	170	170

Envirolab ID	Units	PQL	MHA0063-16	MHA0063-17	MHA0063-18	MHA0063-19	MHA0063-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			12/01/2026	12/01/2026	12/01/2026	13/01/2026	13/01/2026
Ammonia as N	µg/L	3.0	4	4	3	4	<3

Subcontracted Inorganics - Certificate: ENVL26-2 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MHA0063-16	MHA0063-17	MHA0063-18	MHA0063-19	MHA0063-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			12/01/2026	12/01/2026	12/01/2026	13/01/2026	13/01/2026
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	150	170	160	170	170
Phosphate as P	µg/L	2.0	<2	<2	2	<2	<2
Total Phosphorus	µg/L	5.0	7	9	9	9	8
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	150	170	160	170	170

Envirolab ID	Units	PQL	MHA0063-21	MHA0063-22	MHA0063-23	MHA0063-24	MHA0063-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			13/01/2026	13/01/2026	13/01/2026	13/01/2026	13/01/2026
Ammonia as N	µg/L	3.0	3	4	3	3	5
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	170	160	160	150	160
Phosphate as P	µg/L	2.0	<2	<2	<2	<2	<2
Total Phosphorus	µg/L	5.0	7	8	7	7	8
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	180	160	170	160	170

Envirolab ID	Units	PQL	MHA0063-26	MHA0063-27	MHA0063-28	MHA0063-29	MHA0063-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			13/01/2026	13/01/2026	13/01/2026	13/01/2026	13/01/2026
Ammonia as N	µg/L	3.0	5	4	4	4	5
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	190	170	200	190	200
Phosphate as P	µg/L	2.0	<2	2	2	2	<2
Total Phosphorus	µg/L	5.0	9	8	9	10	8
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	200	180	210	190	200

Envirolab ID	Units	PQL	MHA0063-31	MHA0063-32	MHA0063-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			13/01/2026	13/01/2026	13/01/2026
Ammonia as N	µg/L	3.0	3	4	3

Subcontracted Inorganics - Certificate: ENVL26-2 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MHA0063-31	MHA0063-32	MHA0063-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			13/01/2026	13/01/2026	13/01/2026
Nitrate as N	µg/L	2.0	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2
Total Nitrogen	µg/L	50	180	190	180
Phosphate as P	µg/L	2.0	<2	<2	<2
Total Phosphorus	µg/L	5.0	9	8	8
NOx as N	µg/L	2.0	<2	<2	<2
TKN as N*	µg/L	50	180	190	180

Subcontracted Metals - Certificate: ENVL26-2 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MHA0063-01	MHA0063-02	MHA0063-03	MHA0063-04	MHA0063-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			13/01/2026	13/01/2026	13/01/2026	12/01/2026	12/01/2026
Reactive Silica	µg/L	2.0	57	56	56	53	54

Envirolab ID	Units	PQL	MHA0063-06	MHA0063-07	MHA0063-08	MHA0063-09	MHA0063-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			12/01/2026	12/01/2026	12/01/2026	12/01/2026	13/01/2026
Reactive Silica	µg/L	2.0	53	55	54	54	40

Envirolab ID	Units	PQL	MHA0063-11	MHA0063-12	MHA0063-13	MHA0063-14	MHA0063-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			13/01/2026	13/01/2026	12/01/2026	12/01/2026	12/01/2026
Reactive Silica	µg/L	2.0	40	40	42	43	42

Envirolab ID	Units	PQL	MHA0063-16	MHA0063-17	MHA0063-18	MHA0063-19	MHA0063-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			12/01/2026	12/01/2026	12/01/2026	13/01/2026	13/01/2026
Reactive Silica	µg/L	2.0	42	43	42	24	24

Envirolab ID	Units	PQL	MHA0063-21	MHA0063-22	MHA0063-23	MHA0063-24	MHA0063-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			13/01/2026	13/01/2026	13/01/2026	13/01/2026	13/01/2026
Reactive Silica	µg/L	2.0	24	23	22	22	24

Envirolab ID	Units	PQL	MHA0063-26	MHA0063-27	MHA0063-28	MHA0063-29	MHA0063-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			13/01/2026	13/01/2026	13/01/2026	13/01/2026	13/01/2026
Reactive Silica	µg/L	2.0	24	24	22	22	21

Envirolab ID	Units	PQL	MHA0063-31	MHA0063-32	MHA0063-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			13/01/2026	13/01/2026	13/01/2026
Reactive Silica	µg/L	2.0	32	32	31

Certificate of Analysis MHA0063

Subcontracted Micro - Certificate: Various - Analysed By SA Pathology (Water)

Envirolab ID	Units	PQL	MHA0063-01	MHA0063-02	MHA0063-03	MHA0063-04	MHA0063-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			13/01/2026	13/01/2026	13/01/2026	12/01/2026	12/01/2026
Total Coliforms	MPN/100mL	1.0	140	340	170	200	150

Envirolab ID	Units	PQL	MHA0063-06	MHA0063-07	MHA0063-08	MHA0063-09	MHA0063-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			12/01/2026	12/01/2026	12/01/2026	12/01/2026	13/01/2026
Total Coliforms	MPN/100mL	1.0	220	160	180	180	770

Envirolab ID	Units	PQL	MHA0063-11	MHA0063-12	MHA0063-13	MHA0063-14	MHA0063-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			13/01/2026	13/01/2026	12/01/2026	12/01/2026	12/01/2026
Total Coliforms	MPN/100mL	1.0	220	>2400	200	>2400	320

Envirolab ID	Units	PQL	MHA0063-16	MHA0063-17	MHA0063-18	MHA0063-19	MHA0063-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			12/01/2026	12/01/2026	12/01/2026	13/01/2026	13/01/2026
Total Coliforms	MPN/100mL	1.0	190	250	200	460	430

Envirolab ID	Units	PQL	MHA0063-21	MHA0063-22	MHA0063-23	MHA0063-24	MHA0063-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			13/01/2026	13/01/2026	13/01/2026	13/01/2026	13/01/2026
Total Coliforms	MPN/100mL	1.0	390	260	240	>2400	260

Envirolab ID	Units	PQL	MHA0063-26	MHA0063-27	MHA0063-28	MHA0063-29	MHA0063-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			13/01/2026	13/01/2026	13/01/2026	13/01/2026	13/01/2026
Total Coliforms	MPN/100mL	1.0	770	250	610	320	520

Envirolab ID	Units	PQL	MHA0063-31	MHA0063-32	MHA0063-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			13/01/2026	13/01/2026	13/01/2026
Total Coliforms	MPN/100mL	1.0	63	430	180

Method Summary

Method ID	Methodology Summary
INORG-001	pH - Measured using pH meter and electrode. Please note that the results for water analyses are indicative only, as analysis can be completed outside of the recommended holding times. Solids are reported from a 1:5 water extract unless otherwise specified. Alternatively, pH is determined in a 1:5 extract using 0.01M calcium chloride or a solid is extracted at a ratio of 1:2.5 (AS1289.4.3.1), pH is measured in the extract.
INORG-002	Conductivity and Salinity - measured using a conductivity cell at 25°C. Soil results reported from a 1:5 Soil:Water extract unless otherwise specified. Please note Resistivity is estimated by calculation and may not correlate with results otherwise obtained using the Resistivity current method (based on AS 1289.4.4.1), depending on the nature of the soil being analysed. Blanks may yield EC readings >1µS/cm, this is likely due to adsorption of Carbon Dioxide while the blank sample is sat on the instrument autosampler prior to analysis. The values are generally insignificant (<5µS/cm) compared to most actual sample conductivities.
INORG-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180±10°C. NOTE: Where the EC of the sample is <100µS/cm, the TDS will typically be below 70mg/L (as the sample is very likely to be at least drinking water quality). Therefore to ensure data quality for TDS, the TDS is typically calculated as per the equation: TDS = EC*0.6
INORG-019	Suspended Solids - determined gravimetrically by filtration of the sample. The solids are dried at 104±5°C
INORG-119	Chlorophyll A based on APHA 10200 H latest edition.
SUB-021	Subcontracted to Marine & Freshwater Research - Accreditation number 10603
SUB-041_CA	Subcontracted to SA Pathology

Result Definitions

Identifier	Description
NR	Not reported
NEPM	National Environment Protection Measure
NS	Not specified
LCS	Laboratory Control Sample
RPD	Relative Percent Difference
>	Greater than
<	Less than
PQL	Practical Quantitation Limit
INS	Insufficient sample for this test
NA	Test not required
NT	Not tested
DOL	Samples rejected due to particulate overload (air filters only)
RFD	Samples rejected due to filter damage (air filters only)
RUD	Samples rejected due to uneven deposition (air filters only)
##	Indicates a laboratory acceptance criteria outlier, for further details, see Result Comments and/or QC Comments

Quality Control Definitions

Blank

This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, and is determined by processing solvents and reagents in exactly the same manner as for samples.

Surrogate Spike

Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

LCS (Laboratory Control Sample)

This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Matrix Spike

A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

Duplicate

This is the complete duplicate analysis of a sample from the process batch. The sample selected should be one where the analyte concentration is easily measurable.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria. Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction. Spikes for Physical and Aggregate Tests are not applicable. For VOCs in water samples, three vials are required for duplicate or spike analysis.

General Acceptance Criteria (GAC) - Analyte specific criteria applies for some analytes and is reflected in QC recovery tables.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% - see ELN-P05 QAQC tables for details (available on request); <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase. Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was typically insufficient in order to satisfy laboratory QA/QC protocols.

Miscellaneous Information

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached. We have taken the sampling date as being the date received at the laboratory.

Two significant figures are reported for the majority of tests and with a high degree of confidence, for results <10*PQL, the second significant figure may be in doubt i.e. has a relatively high degree of uncertainty and is provided for information only.

Measurement Uncertainty estimates can be downloaded from the Envirolab Resources website or obtained directly by contacting the laboratory.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS where sediment/solids are included by default.

Urine Analysis - The BEI values listed are taken from the 2022 edition of *TLVs and BEIs Threshold Limits by ACGIH*.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volume(s) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

Data Quality Assessment Summary MHA0063

Client Details

Client	South Australian Research & Development Institute
Your Reference	NWP Mullaquana Monthly Sampling
Date Issued	24/02/2026

Recommended Holding Time Compliance

Recommended holding time exceedances exist - See detailed list below

Quality Control and QC Frequency

QC Type	Compliant	Details
Blank	Yes	No Outliers
LCS	Yes	No Outliers
Duplicates	Yes	No Outliers
Matrix Spike	Yes	No Outliers
Surrogates / Extracted Internal Standards	Yes	No Outliers
QC Frequency	No	QC Frequency Outliers Exist - See detailed list below

Surrogates/Extracted Internal Standards, Duplicates and/or Matrix Spikes are not always relevant/applicable to certain analyses and matrices. Therefore, said QC measures are deemed compliant in these situations by default. See Laboratory Acceptance Criteria for more information

Data Quality Assessment Summary MHA0063

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
EC | Water	4-9, 13-18	12/01/2026	15/01/2026	16/01/2026	Yes
	1-3, 10-12, 19-20	13/01/2026	15/01/2026	16/01/2026	Yes
	31-32	13/01/2026	16/01/2026	16/01/2026	Yes
	21-30	13/01/2026	16/01/2026	19/01/2026	Yes
	33	13/01/2026	20/01/2026	20/01/2026	Yes
pH | Water	4-9, 13-18	12/01/2026	15/01/2026	16/01/2026	No
	1-3, 10-12, 19-20	13/01/2026	15/01/2026	16/01/2026	No
	31-32	13/01/2026	16/01/2026	16/01/2026	No
	21-30	13/01/2026	16/01/2026	19/01/2026	No
	33	13/01/2026	20/01/2026	20/01/2026	No
Salinity | Water	4-9, 13-18	12/01/2026	15/01/2026	16/01/2026	Yes
	1-3, 10-12, 19-20	13/01/2026	15/01/2026	16/01/2026	Yes
	31-32	13/01/2026	16/01/2026	16/01/2026	Yes
	21-30	13/01/2026	16/01/2026	19/01/2026	Yes
	33	13/01/2026	20/01/2026	20/01/2026	Yes
TDS | Water	4-9, 13-18	12/01/2026	16/01/2026	21/01/2026	Yes
	1-3, 10-12, 19-33	13/01/2026	16/01/2026	21/01/2026	Yes
TSS (LL) | Water	4-9, 13-18	12/01/2026	16/01/2026	19/01/2026	Yes
	1	13/01/2026	16/01/2026	19/01/2026	Yes
	2-3, 10-12, 19-33	13/01/2026	16/01/2026	21/01/2026	Yes
Chlorophyll a (LL) - Frozen | Water	4-9, 13-18	12/01/2026	19/01/2026	23/01/2026	Yes
	1-3, 10-12, 19-22, 24-33	13/01/2026	19/01/2026	23/01/2026	Yes
	23	13/01/2026	27/01/2026	24/02/2026	Yes
Ammonia as N | Water	4-9, 13-18	12/01/2026	27/01/2026	27/01/2026	Yes
	1-3, 10-12, 19-33	13/01/2026	27/01/2026	27/01/2026	Yes
Nitrate as N (LL) | Water	4-9, 13-18	12/01/2026	27/01/2026	27/01/2026	Yes
	1-3, 10-12, 19-33	13/01/2026	27/01/2026	27/01/2026	Yes
Nitrite as N (LL) | Water	4-9, 13-18	12/01/2026	16/01/2026	16/01/2026	Yes
	1-3, 10-12, 19-33	13/01/2026	16/01/2026	16/01/2026	Yes
NOx as N (LL) | Water	4-9, 13-18	12/01/2026	27/01/2026	27/01/2026	Yes
	1-3, 10-12, 19-33	13/01/2026	27/01/2026	27/01/2026	Yes
Phosphate as P (LL) | Water	4-9, 13-18	12/01/2026	27/01/2026	27/01/2026	Yes
	1-3, 10-12, 19-33	13/01/2026	27/01/2026	27/01/2026	Yes
TKN as N calc (LL) | Water	4-9, 13-18	12/01/2026	27/01/2026	28/01/2026	Yes
	1-3, 10-12, 19-33	13/01/2026	27/01/2026	28/01/2026	Yes
Total N and P (LL) | Water	4-9, 13-18	12/01/2026	27/01/2026	28/01/2026	Yes
	1-3, 10-12, 19-33	13/01/2026	27/01/2026	28/01/2026	Yes
Reactive Silica (LL) | Water	4-9, 13-18	12/01/2026	22/01/2026	22/01/2026	Yes
	1-3, 10-12, 19-33	13/01/2026	22/01/2026	22/01/2026	Yes
Total Coliforms | Water	4-9, 13-18	12/01/2026	12/01/2026	13/01/2026	Yes
	32	13/01/2026	13/01/2026	13/01/2026	Yes
	1-3, 10-12, 19-23, 25-31, 33	13/01/2026	13/01/2026	14/01/2026	Yes
	24	13/01/2026	13/02/2026	14/02/2026	Yes

Data Quality Assessment Summary MHA0063

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant

Outliers: QC Frequency

INORG-119 | Inorganics - Nutrients (Water) | Batch BHA1650

Analysis	QC Type	Expected	Reported
Chlorophyll a (LL) - Frozen	Duplicate	2	0

INORG-119 | Inorganics - Nutrients (Water) | Batch BHA1651

Analysis	QC Type	Expected	Reported
Chlorophyll a (LL) - Frozen	Duplicate	2	0

INORG-119 | Inorganics - Nutrients (Water) | Batch BHA2768

Analysis	QC Type	Expected	Reported
Chlorophyll a (LL) - Frozen	Duplicate	1	0

Quality Control MHA0063

INORG-001 | Inorganics - Physical Parameters (Water) | Batch BHA1447

Analyte	Units	PQL	Blank	DUP1 MHA0063-04 Samp | QC | RPD %	DUP2 MHA0063-17 Samp | QC | RPD %	LCS %
pH	pH units		4.5	8.1 | 8.1 | 0.493	8.1 | 8.1 | 0.00	98.0
Electrical Conductivity	µS/cm	2.0	<2.0	58800 | 59000 | 0.300	58600 | 58800 | 0.246	107
Estimated Salinity	mg/L	1.0	<1.0	37600 | 37800 | 0.300	37500 | 37600 | 0.246	[NA]

INORG-001 | Inorganics - Physical Parameters (Water) | Batch BHA1448

Analyte	Units	PQL	Blank	DUP1 MHA0063-21 Samp | QC | RPD %	DUP2 BHA1448-DUP2# Samp | QC | RPD %	LCS %
pH	pH units		5.4	8.0 | 8.0 | 0.125	7.2 | 7.2 | 0.277	98.3
Electrical Conductivity	µS/cm	2.0	<2.0	59500 | 59800 | 0.563	2600 | 2610 | 0.349	109
Estimated Salinity	mg/L	1.0	<1.0	38100 | 38300 | 0.563	1670 | 1670 | 0.349	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-019 | Inorganics - Physical Parameters (Water) | Batch BHA1546

Analyte	Units	PQL	Blank	DUP1 BHA1546-DUP1# Samp | QC | RPD %	DUP2 MHA0063-08 Samp | QC | RPD %	LCS %
Total Suspended Solids	mg/L	1.0	<1.0	3.60 | 3.20 | [NA]	2.80 | 3.00 | [NA]	94.0

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-019 | Inorganics - Physical Parameters (Water) | Batch BHA1547

Analyte	Units	PQL	Blank	DUP1 MHA0063-02 Samp | QC | RPD %	DUP2 MHA0063-24 Samp | QC | RPD %	LCS %
Total Suspended Solids	mg/L	1.0	<1.0	3.00 | 2.80 | [NA]	5.20 | 4.40 | [NA]	85.0

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BHA1550

Analyte	Units	PQL	Blank	DUP1 MHA0063-04 Samp | QC | RPD %	DUP2 MHA0063-17 Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	41800 | 46700 | 11.1	42900 | 43600 | 1.62	92.2

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BHA1551

Analyte	Units	PQL	Blank	DUP1 MHA0063-21 Samp | QC | RPD %	DUP2 MHA0063-30 Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	38700 | 38500 | 0.518	45100 | 41900 | 7.36	104

INORG-001 | Inorganics - Physical Parameters (Water) | Batch BHA1569

Analyte	Units	PQL	Blank	DUP1 MHA0063-31 Samp | QC | RPD %	DUP2 BHA1569-DUP2# Samp | QC | RPD %	LCS %
pH	pH units		6.4	8.0 | 8.1 | 0.872	7.4 | 7.5 | 1.34	101
Electrical Conductivity	µS/cm	2.0	<2.0	58800 | 58800 | 0.0272	572 | 564 | 1.48	104
Estimated Salinity	mg/L	1.0	1.15	37600 | 37700 | 0.0272	366 | 361 | 1.48	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-001 | Inorganics - Physical Parameters (Water) | Batch BHA1862

Analyte	Units	PQL	Blank	DUP1 MHA0063-33 Samp | QC | RPD %	DUP2 BHA1862-DUP2# Samp | QC | RPD %	LCS %
pH	pH units		4.4	8.0 | 8.0 | 0.250	7.7 | 7.7 | 0.130	97.8
Electrical Conductivity	µS/cm	2.0	2.80	60100 | 60200 | 0.297	438 | 439 | 0.183	109
Estimated Salinity	mg/L	1.0	1.79	38400 | 38600 | 0.297	280 | 281 | 0.183	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

Quality Control MHA0063

INORG-119|Inorganics - Nutrients (Water) | Batch BHA1650

Analyte	Units	PQL	Blank	LCS %
Chlorophyll a	mg/m3	0.20	<0.20	101

Batch QC Comments: [1]

INORG-119|Inorganics - Nutrients (Water) | Batch BHA1651

Analyte	Units	PQL	Blank	LCS %
Chlorophyll a	mg/m3	0.20	<0.20	93.0

Batch QC Comments: [1]

INORG-119|Inorganics - Nutrients (Water) | Batch BHA2768

Analyte	Units	PQL	Blank	LCS %
Chlorophyll a	mg/m3	0.20	<0.20	93.0

Batch QC Comments: [1]

QC Comments

Identifier	Description
[1]	Unable to perform all QC according to our internal guidelines due to the limited amount of sample(s) available for testing.

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Certificate of Analysis MHB0012

Client Details

Client	South Australian Research & Development Institute
Contact	Ian Moody
Address	SARDI Aquatic Science Centre, 2 Hamra Avenue, WEST BEACH, SA, 5024

Sample Details

Your Reference	NWP Mullaquana Monthly Sampling
Number of Samples	33 Water
Date Samples Received	05/02/2026
Date Instructions Received	06/02/2026

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for soils and on an as received basis for other matrices.

Report Details

Date Final Results Expected	06/03/2026
Date of Issue	25/02/2026

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Authorisation Details

Results Approved By	Chaminda Gunasekara, Inorganics Supervisor Chris De Luca, Lab Manager Priya Samarawickrama, Senior Chemist, Inorganics
Laboratory Manager	Chris De Luca

Certificate of Analysis MHB0012

Samples in this Report

Envirolab ID	Sample ID	Matrix	Date Sampled	Date Received
MHB0012-01	MQ01 R1 Comp	Water	04/02/2026	06/02/2026
MHB0012-02	MQ01 R2 Comp	Water	04/02/2026	06/02/2026
MHB0012-03	MQ01 R3 Comp	Water	04/02/2026	06/02/2026
MHB0012-04	MQ02 R1 Comp	Water	03/02/2026	06/02/2026
MHB0012-05	MQ02 R2 Comp	Water	03/02/2026	06/02/2026
MHB0012-06	MQ02 R3 Comp	Water	03/02/2026	06/02/2026
MHB0012-07	MQ03 R1 Comp	Water	03/02/2026	06/02/2026
MHB0012-08	MQ03 R2 Comp	Water	03/02/2026	06/02/2026
MHB0012-09	MQ03 R3 Comp	Water	03/02/2026	06/02/2026
MHB0012-10	MQ04 R1 Comp	Water	04/02/2026	06/02/2026
MHB0012-11	MQ04 R2 Comp	Water	04/02/2026	06/02/2026
MHB0012-12	MQ04 R3 Comp	Water	04/02/2026	06/02/2026
MHB0012-13	MQ05 R1 Comp	Water	03/02/2026	06/02/2026
MHB0012-14	MQ05 R2 Comp	Water	03/02/2026	06/02/2026
MHB0012-15	MQ05 R3 Comp	Water	03/02/2026	06/02/2026
MHB0012-16	MQ06 R1 Comp	Water	03/02/2026	06/02/2026
MHB0012-17	MQ06 R2 Comp	Water	03/02/2026	06/02/2026
MHB0012-18	MQ06 R3 Comp	Water	03/02/2026	06/02/2026
MHB0012-19	MQ07 R1 Comp	Water	04/02/2026	06/02/2026
MHB0012-20	MQ07 R2 Comp	Water	04/02/2026	06/02/2026
MHB0012-21	MQ07 R3 Comp	Water	04/02/2026	06/02/2026
MHB0012-22	MQ08 R1 Comp	Water	04/02/2026	06/02/2026
MHB0012-23	MQ08 R2 Comp	Water	04/02/2026	06/02/2026
MHB0012-24	MQ08 R3 Comp	Water	04/02/2026	06/02/2026
MHB0012-25	MQ08 R1 Surface	Water	04/02/2026	06/02/2026
MHB0012-26	MQ08 R2 Surface	Water	04/02/2026	06/02/2026
MHB0012-27	MQ08 R3 Surface	Water	04/02/2026	06/02/2026
MHB0012-28	MQ08 R1 Bottom	Water	04/02/2026	06/02/2026
MHB0012-29	MQ08 R2 Bottom	Water	04/02/2026	06/02/2026
MHB0012-30	MQ08 R3 Bottom	Water	04/02/2026	06/02/2026
MHB0012-31	MQ09 R1 Comp	Water	04/02/2026	06/02/2026
MHB0012-32	MQ09 R2 Comp	Water	04/02/2026	06/02/2026
MHB0012-33	MQ09 R3 Comp	Water	04/02/2026	06/02/2026

Sample Comments

General Comment	Samples 1-3, 10-12, 19-33 received 6/02/26, 8:00am, icepack, seal intact, 11.4 degrees.

Certificate of Analysis MHB0012

Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	MHB0012-01	MHB0012-02	MHB0012-03	MHB0012-04	MHB0012-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			04/02/2026	04/02/2026	04/02/2026	03/02/2026	03/02/2026
pH	pH units		8.0	8.0	8.0	8.0	8.1
Electrical Conductivity	µS/cm	2.0	54000	54000	54000	58000	58000
Total Dissolved Solids	mg/L	5.0	42000	43000	41000	33000	36000
Estimated Salinity*	mg/L	1.0	34000	35000	35000	37000	37000
Total Suspended Solids	mg/L	1.0	2.6	3.7	2.8	8.5	3.5

Envirolab ID	Units	PQL	MHB0012-06	MHB0012-07	MHB0012-08	MHB0012-09	MHB0012-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			03/02/2026	03/02/2026	03/02/2026	03/02/2026	04/02/2026
pH	pH units		8.1	8.1	8.1	8.0	8.1
Electrical Conductivity	µS/cm	2.0	58000	58000	58000	58000	55000
Total Dissolved Solids	mg/L	5.0	35000	39000	35000	37000	42000
Estimated Salinity*	mg/L	1.0	37000	37000	37000	37000	35000
Total Suspended Solids	mg/L	1.0	1.7	6.6	2.2	2.3	4.9

Envirolab ID	Units	PQL	MHB0012-11	MHB0012-12	MHB0012-13	MHB0012-14	MHB0012-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			04/02/2026	04/02/2026	03/02/2026	03/02/2026	03/02/2026
pH	pH units		8.1	8.1	8.1	8.1	8.1
Electrical Conductivity	µS/cm	2.0	55000	55000	58000	58000	58000
Total Dissolved Solids	mg/L	5.0	41000	42000	36000	36000	36000
Estimated Salinity*	mg/L	1.0	35000	35000	37000	37000	37000
Total Suspended Solids	mg/L	1.0	3.3	1.0	3.4	3.0	7.0

Envirolab ID	Units	PQL	MHB0012-16	MHB0012-17	MHB0012-18	MHB0012-19	MHB0012-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			03/02/2026	03/02/2026	03/02/2026	04/02/2026	04/02/2026
pH	pH units		8.1	8.1	8.1	8.1	8.1
Electrical Conductivity	µS/cm	2.0	58000	58000	58000	55000	55000
Total Dissolved Solids	mg/L	5.0	35000	34000	38000	42000	41000
Estimated Salinity*	mg/L	1.0	37000	37000	37000	35000	35000
Total Suspended Solids	mg/L	1.0	2.2	3.2	1.9	4.6	9.5

Envirolab ID	Units	PQL	MHB0012-21	MHB0012-22	MHB0012-23	MHB0012-24	MHB0012-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			04/02/2026	04/02/2026	04/02/2026	04/02/2026	04/02/2026
pH	pH units		8.1	8.1	8.1	8.1	8.1
Electrical Conductivity	µS/cm	2.0	55000	55000	55000	55000	55000
Total Dissolved Solids	mg/L	5.0	41000	42000	41000	42000	42000
Estimated Salinity*	mg/L	1.0	35000	35000	35000	35000	35000
Total Suspended Solids	mg/L	1.0	5.6	4.2	6.6	4.0	1.1

Envirolab ID	Units	PQL	MHB0012-26	MHB0012-27	MHB0012-28	MHB0012-29	MHB0012-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			04/02/2026	04/02/2026	04/02/2026	04/02/2026	04/02/2026
pH	pH units		8.1	8.1	8.1	8.1	8.1
Electrical Conductivity	µS/cm	2.0	55000	55000	55000	55000	55000
Total Dissolved Solids	mg/L	5.0	42000	42000	40000	42000	44000

Certificate of Analysis MHB0012

Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	MHB0012-26	MHB0012-27	MHB0012-28	MHB0012-29	MHB0012-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			04/02/2026	04/02/2026	04/02/2026	04/02/2026	04/02/2026
Estimated Salinity*	mg/L	1.0	35000	35000	35000	35000	35000
Total Suspended Solids	mg/L	1.0	2.0	<1.0	6.7	9.9	3.7

Envirolab ID	Units	PQL	MHB0012-31	MHB0012-32	MHB0012-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			04/02/2026	04/02/2026	04/02/2026
pH	pH units		8.1	8.0	8.0
Electrical Conductivity	µS/cm	2.0	55000	56000	55000
Total Dissolved Solids	mg/L	5.0	42000	44000	43000
Estimated Salinity*	mg/L	1.0	35000	36000	35000
Total Suspended Solids	mg/L	1.0	12	5.2	5.4

Certificate of Analysis MHB0012

Inorganics - Nutrients (Water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	MHB0012-01	MHB0012-02	MHB0012-03	MHB0012-04	MHB0012-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			04/02/2026	04/02/2026	04/02/2026	03/02/2026	03/02/2026
Chlorophyll a	mg/m3	0.20	0.80	1.2	1.1	0.80	1.1

Envirolab ID	Units	PQL	MHB0012-06	MHB0012-07	MHB0012-08	MHB0012-09	MHB0012-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			03/02/2026	03/02/2026	03/02/2026	03/02/2026	04/02/2026
Chlorophyll a	mg/m3	0.20	1.2	1.3	0.93	0.80	1.2

Envirolab ID	Units	PQL	MHB0012-11	MHB0012-12	MHB0012-13	MHB0012-14	MHB0012-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			04/02/2026	04/02/2026	03/02/2026	03/02/2026	03/02/2026
Chlorophyll a	mg/m3	0.20	1.2	1.1	1.1	1.1	0.80

Envirolab ID	Units	PQL	MHB0012-16	MHB0012-17	MHB0012-18	MHB0012-19	MHB0012-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			03/02/2026	03/02/2026	03/02/2026	04/02/2026	04/02/2026
Chlorophyll a	mg/m3	0.20	1.1	1.2	0.93	1.3	1.2

Envirolab ID	Units	PQL	MHB0012-21	MHB0012-22	MHB0012-23	MHB0012-24	MHB0012-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			04/02/2026	04/02/2026	04/02/2026	04/02/2026	04/02/2026
Chlorophyll a	mg/m3	0.20	1.1	1.3	1.2	1.2	1.1

Envirolab ID	Units	PQL	MHB0012-26	MHB0012-27	MHB0012-28	MHB0012-29	MHB0012-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			04/02/2026	04/02/2026	04/02/2026	04/02/2026	04/02/2026
Chlorophyll a	mg/m3	0.20	0.80	0.80	1.6	1.5	0.80

Envirolab ID	Units	PQL	MHB0012-31	MHB0012-32	MHB0012-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			04/02/2026	04/02/2026	04/02/2026
Chlorophyll a	mg/m3	0.20	1.2	1.3	1.5

Subcontracted Inorganics - Certificate: ENVL26-4 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MHB0012-01	MHB0012-02	MHB0012-03	MHB0012-04	MHB0012-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			04/02/2026	04/02/2026	04/02/2026	03/02/2026	03/02/2026
Ammonia as N	µg/L	3.0	6	8	10	10	8
Nitrate as N	µg/L	2.0	2	<2	<2	2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	150	180	160	180	180
Phosphate as P	µg/L	2.0	<2	<2	<2	<2	<2
Total Phosphorus	µg/L	5.0	7	8	8	8	8
NOx as N	µg/L	2.0	2	<2	<2	2	<2
TKN as N*	µg/L	50	150	170	160	180	180

Envirolab ID	Units	PQL	MHB0012-06	MHB0012-07	MHB0012-08	MHB0012-09	MHB0012-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			03/02/2026	03/02/2026	03/02/2026	03/02/2026	04/02/2026
Ammonia as N	µg/L	3.0	9	6	6	6	7
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	180	160	180	170	180
Phosphate as P	µg/L	2.0	<2	<2	<2	<2	<2
Total Phosphorus	µg/L	5.0	7	8	8	9	6
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	170	160	180	170	180

Envirolab ID	Units	PQL	MHB0012-11	MHB0012-12	MHB0012-13	MHB0012-14	MHB0012-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			04/02/2026	04/02/2026	03/02/2026	03/02/2026	03/02/2026
Ammonia as N	µg/L	3.0	7	7	10	10	9
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	170	140	170	180	180
Phosphate as P	µg/L	2.0	<2	<2	<2	<2	<2
Total Phosphorus	µg/L	5.0	7	6	8	8	8
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	170	140	170	180	180

Envirolab ID	Units	PQL	MHB0012-16	MHB0012-17	MHB0012-18	MHB0012-19	MHB0012-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			03/02/2026	03/02/2026	03/02/2026	04/02/2026	04/02/2026
Ammonia as N	µg/L	3.0	7	7	9	6	4

Subcontracted Inorganics - Certificate: ENVL26-4 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MHB0012-16	MHB0012-17	MHB0012-18	MHB0012-19	MHB0012-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			03/02/2026	03/02/2026	03/02/2026	04/02/2026	04/02/2026
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	170	150	150	140	180
Phosphate as P	µg/L	2.0	<2	<2	<2	<2	<2
Total Phosphorus	µg/L	5.0	8	9	9	8	9
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	170	150	150	140	180

Envirolab ID	Units	PQL	MHB0012-21	MHB0012-22	MHB0012-23	MHB0012-24	MHB0012-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			04/02/2026	04/02/2026	04/02/2026	04/02/2026	04/02/2026
Ammonia as N	µg/L	3.0	5	5	7	5	6
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	180	120	220	130	150
Phosphate as P	µg/L	2.0	<2	<2	<2	<2	<2
Total Phosphorus	µg/L	5.0	8	8	9	7	8
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	180	120	220	130	150

Envirolab ID	Units	PQL	MHB0012-26	MHB0012-27	MHB0012-28	MHB0012-29	MHB0012-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			04/02/2026	04/02/2026	04/02/2026	04/02/2026	04/02/2026
Ammonia as N	µg/L	3.0	5	6	6	7	7
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	170	140	160	160	160
Phosphate as P	µg/L	2.0	<2	<2	<2	<2	<2
Total Phosphorus	µg/L	5.0	8	8	10	8	8
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	160	140	160	150	160

Envirolab ID	Units	PQL	MHB0012-31	MHB0012-32	MHB0012-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			04/02/2026	04/02/2026	04/02/2026
Ammonia as N	µg/L	3.0	4	4	4

Subcontracted Inorganics - Certificate: ENVL26-4 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MHB0012-31	MHB0012-32	MHB0012-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			04/02/2026	04/02/2026	04/02/2026
Nitrate as N	µg/L	2.0	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2
Total Nitrogen	µg/L	50	160	160	160
Phosphate as P	µg/L	2.0	<2	<2	<2
Total Phosphorus	µg/L	5.0	10	8	9
NOx as N	µg/L	2.0	<2	<2	<2
TKN as N*	µg/L	50	160	160	160

Subcontracted Metals - Certificate: ENVL26-4 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MHB0012-01	MHB0012-02	MHB0012-03	MHB0012-04	MHB0012-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			04/02/2026	04/02/2026	04/02/2026	03/02/2026	03/02/2026
Reactive Silica	µg/L	2.0	34	34	33	30	30

Envirolab ID	Units	PQL	MHB0012-06	MHB0012-07	MHB0012-08	MHB0012-09	MHB0012-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			03/02/2026	03/02/2026	03/02/2026	03/02/2026	04/02/2026
Reactive Silica	µg/L	2.0	30	30	30	31	18

Envirolab ID	Units	PQL	MHB0012-11	MHB0012-12	MHB0012-13	MHB0012-14	MHB0012-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			04/02/2026	04/02/2026	03/02/2026	03/02/2026	03/02/2026
Reactive Silica	µg/L	2.0	18	18	25	26	26

Envirolab ID	Units	PQL	MHB0012-16	MHB0012-17	MHB0012-18	MHB0012-19	MHB0012-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			03/02/2026	03/02/2026	03/02/2026	04/02/2026	04/02/2026
Reactive Silica	µg/L	2.0	22	23	22	17	17

Envirolab ID	Units	PQL	MHB0012-21	MHB0012-22	MHB0012-23	MHB0012-24	MHB0012-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			04/02/2026	04/02/2026	04/02/2026	04/02/2026	04/02/2026
Reactive Silica	µg/L	2.0	17	19	19	19	21

Envirolab ID	Units	PQL	MHB0012-26	MHB0012-27	MHB0012-28	MHB0012-29	MHB0012-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			04/02/2026	04/02/2026	04/02/2026	04/02/2026	04/02/2026
Reactive Silica	µg/L	2.0	21	21	17	18	17

Envirolab ID	Units	PQL	MHB0012-31	MHB0012-32	MHB0012-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			04/02/2026	04/02/2026	04/02/2026
Reactive Silica	µg/L	2.0	19	20	20

Certificate of Analysis MHB0012

Subcontracted Micro - Certificate: Various - Analysed By SA Pathology (Water)

Envirolab ID	Units	PQL	MHB0012-01	MHB0012-02	MHB0012-03	MHB0012-04	MHB0012-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			04/02/2026	04/02/2026	04/02/2026	03/02/2026	03/02/2026
Total Coliforms	MPN/100mL	1.0	2400	820	870	520	650

Envirolab ID	Units	PQL	MHB0012-06	MHB0012-07	MHB0012-08	MHB0012-09	MHB0012-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			03/02/2026	03/02/2026	03/02/2026	03/02/2026	04/02/2026
Total Coliforms	MPN/100mL	1.0	2400	1400	310	2400	>2400

Envirolab ID	Units	PQL	MHB0012-11	MHB0012-12	MHB0012-13	MHB0012-14	MHB0012-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			04/02/2026	04/02/2026	03/02/2026	03/02/2026	03/02/2026
Total Coliforms	MPN/100mL	1.0	2000	870	1700	360	820

Envirolab ID	Units	PQL	MHB0012-16	MHB0012-17	MHB0012-18	MHB0012-19	MHB0012-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			03/02/2026	03/02/2026	03/02/2026	04/02/2026	04/02/2026
Total Coliforms	MPN/100mL	1.0	2000	250	770	410	690

Envirolab ID	Units	PQL	MHB0012-21	MHB0012-22	MHB0012-23	MHB0012-24	MHB0012-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			04/02/2026	04/02/2026	04/02/2026	04/02/2026	04/02/2026
Total Coliforms	MPN/100mL	1.0	300	2400	1400	2000	2000

Envirolab ID	Units	PQL	MHB0012-26	MHB0012-27	MHB0012-28	MHB0012-29	MHB0012-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			04/02/2026	04/02/2026	04/02/2026	04/02/2026	04/02/2026
Total Coliforms	MPN/100mL	1.0	1500	2400	340	390	610

Envirolab ID	Units	PQL	MHB0012-31	MHB0012-32	MHB0012-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			04/02/2026	04/02/2026	04/02/2026
Total Coliforms	MPN/100mL	1.0	130	170	200

Method Summary

Method ID	Methodology Summary
INORG-001	pH - Measured using pH meter and electrode. Please note that the results for water analyses are indicative only, as analysis can be completed outside of the recommended holding times. Solids are reported from a 1:5 water extract unless otherwise specified. Alternatively, pH is determined in a 1:5 extract using 0.01M calcium chloride or a solid is extracted at a ratio of 1:2.5 (AS1289.4.3.1), pH is measured in the extract.
INORG-002	Conductivity and Salinity - measured using a conductivity cell at 25°C. Soil results reported from a 1:5 Soil:Water extract unless otherwise specified. Please note Resistivity is estimated by calculation and may not correlate with results otherwise obtained using the Resistivity current method (based on AS 1289.4.4.1), depending on the nature of the soil being analysed. Blanks may yield EC readings >1µS/cm, this is likely due to adsorption of Carbon Dioxide while the blank sample is sat on the instrument autosampler prior to analysis. The values are generally insignificant (<5µS/cm) compared to most actual sample conductivities.
INORG-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180±10°C. NOTE: Where the EC of the sample is <100µS/cm, the TDS will typically be below 70mg/L (as the sample is very likely to be at least drinking water quality). Therefore to ensure data quality for TDS, the TDS is typically calculated as per the equation: TDS = EC*0.6
INORG-019	Suspended Solids - determined gravimetrically by filtration of the sample. The solids are dried at 104±5°C
INORG-119	Chlorophyll A based on APHA 10200 H latest edition.
SUB-021	Subcontracted to Marine & Freshwater Research - Accreditation number 10603
SUB-041_CA	Subcontracted to SA Pathology

Result Definitions

Identifier	Description
NR	Not reported
NEPM	National Environment Protection Measure
NS	Not specified
LCS	Laboratory Control Sample
RPD	Relative Percent Difference
>	Greater than
<	Less than
PQL	Practical Quantitation Limit
INS	Insufficient sample for this test
NA	Test not required
NT	Not tested
DOL	Samples rejected due to particulate overload (air filters only)
RFD	Samples rejected due to filter damage (air filters only)
RUD	Samples rejected due to uneven deposition (air filters only)
##	Indicates a laboratory acceptance criteria outlier, for further details, see Result Comments and/or QC Comments

Quality Control Definitions

Blank

This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, and is determined by processing solvents and reagents in exactly the same manner as for samples.

Surrogate Spike

Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

LCS (Laboratory Control Sample)

This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Matrix Spike

A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

Duplicate

This is the complete duplicate analysis of a sample from the process batch. The sample selected should be one where the analyte concentration is easily measurable.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria. Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction. Spikes for Physical and Aggregate Tests are not applicable. For VOCs in water samples, three vials are required for duplicate or spike analysis.

General Acceptance Criteria (GAC) - Analyte specific criteria applies for some analytes and is reflected in QC recovery tables.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% - see ELN-P05 QAQC tables for details (available on request); <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase. Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was typically insufficient in order to satisfy laboratory QA/QC protocols.

Miscellaneous Information

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached. We have taken the sampling date as being the date received at the laboratory.

Two significant figures are reported for the majority of tests and with a high degree of confidence, for results <10*PQL, the second significant figure may be in doubt i.e. has a relatively high degree of uncertainty and is provided for information only.

Measurement Uncertainty estimates can be downloaded from the Envirolab Resources website or obtained directly by contacting the laboratory.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS where sediment/solids are included by default.

Urine Analysis - The BEI values listed are taken from the 2022 edition of *TLVs and BEIs Threshold Limits by ACGIH*.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volume(s) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

Data Quality Assessment Summary MHB0012

Client Details

Client	South Australian Research & Development Institute
Your Reference	NWP Mullaquana Monthly Sampling
Date Issued	25/02/2026

Recommended Holding Time Compliance

Recommended holding time exceedances exist - See detailed list below

Quality Control and QC Frequency

QC Type	Compliant	Details
Blank	Yes	No Outliers
LCS	Yes	No Outliers
Duplicates	Yes	No Outliers
Matrix Spike	Yes	No Outliers
Surrogates / Extracted Internal Standards	Yes	No Outliers
QC Frequency	No	QC Frequency Outliers Exist - See detailed list below

Surrogates/Extracted Internal Standards, Duplicates and/or Matrix Spikes are not always relevant/applicable to certain analyses and matrices. Therefore, said QC measures are deemed compliant in these situations by default. See Laboratory Acceptance Criteria for more information

Data Quality Assessment Summary MHB0012

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
EC | Water	4-9, 13-18	03/02/2026	06/02/2026	06/02/2026	Yes
	1-3, 10-11	04/02/2026	06/02/2026	10/02/2026	Yes
	12, 19-31	04/02/2026	06/02/2026	11/02/2026	Yes
	32-33	04/02/2026	10/02/2026	10/02/2026	Yes
pH | Water	4-9, 13-18	03/02/2026	06/02/2026	06/02/2026	No
	1-3, 10-11	04/02/2026	06/02/2026	10/02/2026	No
	12, 19-31	04/02/2026	06/02/2026	11/02/2026	No
	32-33	04/02/2026	10/02/2026	10/02/2026	No
Salinity | Water	4-9, 13-18	03/02/2026	06/02/2026	06/02/2026	Yes
	1-3, 10-11	04/02/2026	06/02/2026	10/02/2026	Yes
	12, 19-31	04/02/2026	06/02/2026	11/02/2026	Yes
	32-33	04/02/2026	10/02/2026	10/02/2026	Yes
TDS | Water	4-9, 13-18	03/02/2026	09/02/2026	10/02/2026	Yes
	1-3, 10-12, 19-31	04/02/2026	09/02/2026	11/02/2026	Yes
	32-33	04/02/2026	09/02/2026	12/02/2026	Yes
TSS (LL) | Water	4-9, 13-18	03/02/2026	09/02/2026	20/02/2026	Yes
	1-3, 10-12, 19-33	04/02/2026	09/02/2026	20/02/2026	Yes
Chlorophyll a (LL) - Frozen | Water	4-9, 13-18	03/02/2026	11/02/2026	17/02/2026	Yes
	1-3, 10-12, 19-33	04/02/2026	11/02/2026	17/02/2026	Yes
Ammonia as N | Water	4-9, 13-18	03/02/2026	19/02/2026	19/02/2026	Yes
	1-3, 10-12, 19-33	04/02/2026	19/02/2026	19/02/2026	Yes
Nitrate as N (LL) | Water	4-9, 13-18	03/02/2026	19/02/2026	19/02/2026	Yes
	1-3, 10-12, 19-33	04/02/2026	19/02/2026	19/02/2026	Yes
Nitrite as N (LL) | Water	4-9, 13-18	03/02/2026	09/02/2026	09/02/2026	Yes
	1-3, 10-12, 19-33	04/02/2026	09/02/2026	09/02/2026	Yes
NOx as N (LL) | Water	4-9, 13-18	03/02/2026	19/02/2026	19/02/2026	Yes
	1-3, 10-12, 19-33	04/02/2026	19/02/2026	19/02/2026	Yes
Phosphate as P (LL) | Water	4-9, 13-18	03/02/2026	19/02/2026	19/02/2026	Yes
	1-3, 10-12, 19-33	04/02/2026	19/02/2026	19/02/2026	Yes
TKN as N calc (LL) | Water	4-9, 13-18	03/02/2026	10/02/2026	11/02/2026	Yes
	1-3, 10-12, 19-33	04/02/2026	10/02/2026	11/02/2026	Yes
Total N and P (LL) | Water	4-9, 13-18	03/02/2026	10/02/2026	11/02/2026	Yes
	1-3, 10-12, 19-33	04/02/2026	10/02/2026	11/02/2026	Yes
Reactive Silica (LL) | Water	4-9, 13-18	03/02/2026	17/02/2026	17/02/2026	Yes
	1-3, 10-12, 19-33	04/02/2026	17/02/2026	17/02/2026	Yes
Total Coliforms | Water	4-9, 13-18	03/02/2026	03/02/2026	04/02/2026	Yes
	1-3, 10-12, 19-33	04/02/2026	04/02/2026	05/02/2026	Yes

Data Quality Assessment Summary MHB0012

Outliers: QC Frequency

INORG-119 | Inorganics - Nutrients (Water) | Batch BHB1783

Analysis	QC Type	Expected	Reported
Chlorophyll a (LL) - Frozen	Duplicate	2	0

INORG-119 | Inorganics - Nutrients (Water) | Batch BHB1784

Analysis	QC Type	Expected	Reported
Chlorophyll a (LL) - Frozen	Duplicate	2	0

Quality Control MHB0012

INORG-001 | Inorganics - Physical Parameters (Water) | Batch BHB1059

Analyte	Units	PQL	Blank	DUP1 BHB1059-DUP1# Samp | QC | RPD %	DUP2 MHB0012-08 Samp | QC | RPD %	LCS %
pH	pH units		4.1	7.9 | 7.9 | 0.505	8.1 | 8.0 | 0.869	97.5
Electrical Conductivity	µS/cm	2.0	2.20	58300 | 58300 | 0.0982	57600 | 58400 | 1.46	108
Estimated Salinity	mg/L	1.0	1.41	37300 | 37300 | 0.0983	36900 | 37400 | 1.46	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-019 | Inorganics - Physical Parameters (Water) | Batch BHB1166

Analyte	Units	PQL	Blank	DUP1 BHB1166-DUP1# Samp | QC | RPD %	DUP2 MHB0012-08 Samp | QC | RPD %	LCS %
Total Suspended Solids	mg/L	1.0	<1.0	2.80 | 3.20 | [NA]	2.20 | 2.40 | [NA]	96.0

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-019 | Inorganics - Physical Parameters (Water) | Batch BHB1167

Analyte	Units	PQL	Blank	DUP1 MHB0012-03 Samp | QC | RPD %	DUP2 MHB0012-24 Samp | QC | RPD %	LCS %
Total Suspended Solids	mg/L	1.0	<1.0	2.80 | 2.40 | [NA]	4.00 | 3.40 | [NA]	102

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BHB1168

Analyte	Units	PQL	Blank	DUP1 BHB1168-DUP1# Samp | QC | RPD %	DUP2 MHB0012-07 Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	470 | 440 | 6.59	38800 | 36100 | 7.21	108

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BHB1169

Analyte	Units	PQL	Blank	DUP1 BHB1169-DUP1# Samp | QC | RPD %	DUP2 MHB0012-22 Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	3690 | 3520 | 4.57	41500 | 41500 | 0.00	97.3

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BHB1170

Analyte	Units	PQL	Blank	DUP1 MHB0012-32 Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	43500 | 42400 | 2.56	104

INORG-001 | Inorganics - Physical Parameters (Water) | Batch BHB1294

Analyte	Units	PQL	Blank	DUP1 MHB0012-01 Samp | QC | RPD %	DUP2 MHB0012-23 Samp | QC | RPD %	LCS %
pH	pH units		4.5	8.0 | 8.0 | 0.125	8.1 | 8.1 | 0.00	98.3
Electrical Conductivity	µS/cm	2.0	<2.0	53800 | 53000 | 1.42	54800 | 54200 | 1.10	94.3
Estimated Salinity	mg/L	1.0	<1.0	34400 | 33900 | 1.42	35100 | 34700 | 1.10	[NA]

INORG-001 | Inorganics - Physical Parameters (Water) | Batch BHB1535

Analyte	Units	PQL	Blank	DUP1 BHB1535-DUP1# Samp | QC | RPD %	DUP2 BHB1535-DUP2# Samp | QC | RPD %	LCS %
pH	pH units		4.7	6.0 | 5.9 | 2.34	7.9 | 8.0 | 0.504	98.7
Electrical Conductivity	µS/cm	2.0	<2.0	12.7 | 11.0 | 14.3	1160 | 1160 | 0.516	102
Estimated Salinity	mg/L	1.0	<1.0	8.13 | 7.04 | 14.3	745 | 742 | 0.516	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

Quality Control MHB0012

INORG-119|Inorganics - Nutrients (Water) | Batch BHB1783

Analyte	Units	PQL	Blank	LCS %
Chlorophyll a	mg/m3	0.20	<0.20	98.0

INORG-119|Inorganics - Nutrients (Water) | Batch BHB1784

Analyte	Units	PQL	Blank	LCS %
Chlorophyll a	mg/m3	0.20	<0.20	92.0

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Certificate of Analysis MHC0057

Client Details

Client	South Australian Research & Development Institute
Contact	Ian Moody
Address	SARDI Aquatic Science Centre, 2 Hamra Avenue, WEST BEACH, SA, 5024

Sample Details

Your Reference	NWP Mullaquana Monthly Sampling
Number of Samples	33 Water
Date Samples Received	06/03/2026
Date Instructions Received	10/03/2026

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for soils and on an as received basis for other matrices.

Report Details

Date Final Results Expected	10/04/2026
Date of Issue	02/04/2026

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Authorisation Details

Results Approved By	Chris De Luca, Lab Manager Jenny Xin He, Chemist Maggie Hu, Organics Supervisor Priya Samarawickrama, Senior Chemist, Inorganics Tara White, Metals Supervisor Tianna Milburn, Operations Manager
Laboratory Manager	Chris De Luca

Samples in this Report

Envirolab ID	Sample ID	Matrix	Date Sampled	Date Received
MHC0057-01	MQ01 R1 Comp	Water	05/03/2026	10/03/2026
MHC0057-02	MQ01 R2 Comp	Water	05/03/2026	10/03/2026
MHC0057-03	MQ01 R3 Comp	Water	05/03/2026	10/03/2026
MHC0057-04	MQ02 R1 Comp	Water	04/03/2026	10/03/2026
MHC0057-05	MQ02 R2 Comp	Water	04/03/2026	10/03/2026
MHC0057-06	MQ02 R3 Comp	Water	04/03/2026	10/03/2026
MHC0057-07	MQ03 R1 Comp	Water	04/03/2026	10/03/2026
MHC0057-08	MQ03 R2 Comp	Water	04/03/2026	10/03/2026
MHC0057-09	MQ03 R3 Comp	Water	04/03/2026	10/03/2026
MHC0057-10	MQ04 R1 Comp	Water	05/03/2026	10/03/2026
MHC0057-11	MQ04 R2 Comp	Water	05/03/2026	10/03/2026
MHC0057-12	MQ04 R3 Comp	Water	05/03/2026	10/03/2026
MHC0057-13	MQ05 R1 Comp	Water	04/03/2026	10/03/2026
MHC0057-14	MQ05 R2 Comp	Water	04/03/2026	10/03/2026
MHC0057-15	MQ05 R3 Comp	Water	04/03/2026	10/03/2026
MHC0057-16	MQ06 R1 Comp	Water	04/03/2026	10/03/2026
MHC0057-17	MQ06 R2 Comp	Water	04/03/2026	10/03/2026
MHC0057-18	MQ06 R3 Comp	Water	04/03/2026	10/03/2026
MHC0057-19	MQ07 R1 Comp	Water	05/03/2026	10/03/2026
MHC0057-20	MQ07 R2 Comp	Water	05/03/2026	10/03/2026
MHC0057-21	MQ07 R3 Comp	Water	05/03/2026	10/03/2026
MHC0057-22	MQ08 R1 Comp	Water	05/03/2026	10/03/2026
MHC0057-23	MQ08 R2 Comp	Water	05/03/2026	10/03/2026
MHC0057-24	MQ08 R3 Comp	Water	05/03/2026	10/03/2026
MHC0057-25	MQ08 R1 Surface	Water	05/03/2026	10/03/2026
MHC0057-26	MQ08 R2 Surface	Water	05/03/2026	10/03/2026
MHC0057-27	MQ08 R3 Surface	Water	05/03/2026	10/03/2026
MHC0057-28	MQ08 R1 Bottom	Water	05/03/2026	10/03/2026
MHC0057-29	MQ08 R2 Bottom	Water	05/03/2026	10/03/2026
MHC0057-30	MQ08 R3 Bottom	Water	05/03/2026	10/03/2026
MHC0057-31	MQ09 R1 Comp	Water	05/03/2026	10/03/2026
MHC0057-32	MQ09 R2 Comp	Water	05/03/2026	10/03/2026
MHC0057-33	MQ09 R3 Comp	Water	05/03/2026	10/03/2026

Sample Comments

General Comment	Samples 1-3, 10-12, 19-33, rec 10/03, 8:20am icepack, seal

Volatile TRH and BTEX (Water)

Envirolab ID	Units	PQL	MHC0057-01	MHC0057-02	MHC0057-03	MHC0057-04	MHC0057-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			05/03/2026	05/03/2026	05/03/2026	04/03/2026	04/03/2026
TRH C6-C9	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	<10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve Xylenes	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve BTEX	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*111*	*107*	*112*	*113*	*115*
Surrogate Toluene-D8	%		*109*	*107*	*111*	*111*	*112*
Surrogate 4-Bromofluorobenzene	%		*96.0*	*96.1*	*110*	*98.3*	*96.3*

Envirolab ID	Units	PQL	MHC0057-06	MHC0057-07	MHC0057-08	MHC0057-09	MHC0057-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			04/03/2026	04/03/2026	04/03/2026	04/03/2026	05/03/2026
TRH C6-C9	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	<10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve Xylenes	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve BTEX	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*112*	*115*	*115*	*114*	*114*
Surrogate Toluene-D8	%		*112*	*113*	*113*	*111*	*112*
Surrogate 4-Bromofluorobenzene	%		*95.8*	*96.1*	*115*	*116*	*121*

Envirolab ID	Units	PQL	MHC0057-11	MHC0057-12	MHC0057-13	MHC0057-14	MHC0057-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			05/03/2026	05/03/2026	04/03/2026	04/03/2026	04/03/2026
TRH C6-C9	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	<10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Volatile TRH and BTEX (Water)

Envirolab ID	Units	PQL	MHC0057-11	MHC0057-12	MHC0057-13	MHC0057-14	MHC0057-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			05/03/2026	05/03/2026	04/03/2026	04/03/2026	04/03/2026
Total +ve Xylenes	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve BTEX	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*111*	*115*	*115*	*114*	*115*
Surrogate Toluene-D8	%		*110*	*114*	*113*	*112*	*112*
Surrogate 4-Bromofluorobenzene	%		*95.7*	*96.3*	*98.2*	*95.9*	*95.4*

Envirolab ID	Units	PQL	MHC0057-16	MHC0057-17	MHC0057-18	MHC0057-19	MHC0057-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			04/03/2026	04/03/2026	04/03/2026	05/03/2026	05/03/2026
TRH C6-C9	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	<10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve Xylenes	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve BTEX	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*113*	*113*	*114*	*113*	*116*
Surrogate Toluene-D8	%		*112*	*111*	*112*	*111*	*113*
Surrogate 4-Bromofluorobenzene	%		*119*	*95.2*	*95.7*	*96.0*	*96.1*

Envirolab ID	Units	PQL	MHC0057-21	MHC0057-22	MHC0057-23	MHC0057-24	MHC0057-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			05/03/2026	05/03/2026	05/03/2026	05/03/2026	05/03/2026
TRH C6-C9	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	<10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve Xylenes	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve BTEX	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*115*	*115*	*114*	*120*	*115*
Surrogate Toluene-D8	%		*113*	*112*	*112*	*116*	*113*
Surrogate 4-Bromofluorobenzene	%		*96.0*	*96.7*	*96.3*	*96.6*	*95.9*

Volatile TRH and BTEX (Water)

Envirolab ID	Units	PQL	MHC0057-26	MHC0057-27	MHC0057-28	MHC0057-29	MHC0057-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			05/03/2026	05/03/2026	05/03/2026	05/03/2026	05/03/2026
TRH C6-C9	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	<10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve Xylenes	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total +ve BTEX	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*116*	*117*	*115*	*121*	*119*
Surrogate Toluene-D8	%		*113*	*114*	*113*	*117*	*115*
Surrogate 4-Bromofluorobenzene	%		*96.5*	*95.6*	*96.2*	*97.2*	*96.0*

Envirolab ID	Units	PQL	MHC0057-31	MHC0057-32	MHC0057-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			05/03/2026	05/03/2026	05/03/2026
TRH C6-C9	µg/L	10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0
Total +ve Xylenes	µg/L	1.0	<1.0	<1.0	<1.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0
Total +ve BTEX	µg/L	1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*107*	*109*	*109*
Surrogate Toluene-D8	%		*103*	*103*	*103*
Surrogate 4-Bromofluorobenzene	%		*110*	*112*	*112*

Semi-volatile TRH (Water)

Envirolab ID	Units	PQL	MHC0057-01	MHC0057-02	MHC0057-03	MHC0057-04	MHC0057-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			05/03/2026	05/03/2026	05/03/2026	04/03/2026	04/03/2026
TRH C10-C14	µg/L	50	<50	<50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%		*107*	*73.0*	*84.2*	*61.5*	*70.2*

Envirolab ID	Units	PQL	MHC0057-06	MHC0057-07	MHC0057-08	MHC0057-09	MHC0057-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			04/03/2026	04/03/2026	04/03/2026	04/03/2026	05/03/2026
TRH C10-C14	µg/L	50	<50	<50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%		*72.7*	*74.3*	*62.7*	*75.3*	*60.3*

Envirolab ID	Units	PQL	MHC0057-11	MHC0057-12	MHC0057-13	MHC0057-14	MHC0057-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			05/03/2026	05/03/2026	04/03/2026	04/03/2026	04/03/2026
TRH C10-C14	µg/L	50	<50	<50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%		*60.5*	*68.9*	*61.9*	*62.7*	*62.8*

Envirolab ID	Units	PQL	MHC0057-16	MHC0057-17	MHC0057-18	MHC0057-19	MHC0057-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			04/03/2026	04/03/2026	04/03/2026	05/03/2026	05/03/2026
TRH C10-C14	µg/L	50	<50	<50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50	<50	<50

Semi-volatile TRH (Water)

Envirolab ID	Units	PQL	MHC0057-16	MHC0057-17	MHC0057-18	MHC0057-19	MHC0057-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			04/03/2026	04/03/2026	04/03/2026	05/03/2026	05/03/2026
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%		*82.3*	*63.0*	*77.0*	*76.7*	*79.4*

Envirolab ID	Units	PQL	MHC0057-21	MHC0057-22	MHC0057-23	MHC0057-24	MHC0057-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			05/03/2026	05/03/2026	05/03/2026	05/03/2026	05/03/2026
TRH C10-C14	µg/L	50	<50	<50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%		*87.5*	*71.7*	*101*	*68.7*	*86.4*

Envirolab ID	Units	PQL	MHC0057-26	MHC0057-27	MHC0057-28	MHC0057-29	MHC0057-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			05/03/2026	05/03/2026	05/03/2026	05/03/2026	05/03/2026
TRH C10-C14	µg/L	50	<50	<50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%		*85.1*	*81.9*	*84.4*	*73.3*	*75.1*

Envirolab ID	Units	PQL	MHC0057-31	MHC0057-32	MHC0057-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			05/03/2026	05/03/2026	05/03/2026
TRH C10-C14	µg/L	50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100

Semi-volatile TRH (Water)

Envirolab ID	Units	PQL	MHC0057-31	MHC0057-32	MHC0057-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			05/03/2026	05/03/2026	05/03/2026
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50
Surrogate o-Terphenyl	%		*60.9*	*62.8*	*66.6*

Acid Extractable Metals (Water)

Envirolab ID	Units	PQL	MHC0057-01	MHC0057-02	MHC0057-03	MHC0057-04	MHC0057-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			05/03/2026	05/03/2026	05/03/2026	04/03/2026	04/03/2026
Calcium	mg/L	0.50	430	420	420	440	440
Magnesium	mg/L	0.50	1400	1400	1400	1400	1400
Potassium	mg/L	0.50	630	590	610	630	620
Sodium	mg/L	0.50	12000	13000	12000	13000	13000
Hardness (calc) equivalent CaCO3	mg/L	3.0	6800	6900	6800	7100	6900

Envirolab ID	Units	PQL	MHC0057-06	MHC0057-07	MHC0057-08	MHC0057-09	MHC0057-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			04/03/2026	04/03/2026	04/03/2026	04/03/2026	05/03/2026
Calcium	mg/L	0.50	430	430	420	430	420
Magnesium	mg/L	0.50	1400	1400	1400	1400	1400
Potassium	mg/L	0.50	610	610	600	600	610
Sodium	mg/L	0.50	12000	13000	12000	13000	13000
Hardness (calc) equivalent CaCO3	mg/L	3.0	6700	6900	6700	7000	6900

Envirolab ID	Units	PQL	MHC0057-11	MHC0057-12	MHC0057-13	MHC0057-14	MHC0057-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			05/03/2026	05/03/2026	04/03/2026	04/03/2026	04/03/2026
Calcium	mg/L	0.50	420	430	430	430	440
Magnesium	mg/L	0.50	1500	1500	1500	1400	1400
Potassium	mg/L	0.50	600	610	610	620	630
Sodium	mg/L	0.50	13000	13000	13000	13000	13000
Hardness (calc) equivalent CaCO3	mg/L	3.0	7100	7000	7100	7000	7100

Envirolab ID	Units	PQL	MHC0057-16	MHC0057-17	MHC0057-18	MHC0057-19	MHC0057-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			04/03/2026	04/03/2026	04/03/2026	05/03/2026	05/03/2026
Calcium	mg/L	0.50	430	440	440	430	430
Magnesium	mg/L	0.50	1400	1500	1500	1400	1400
Potassium	mg/L	0.50	590	630	620	600	610
Sodium	mg/L	0.50	13000	14000	13000	13000	12000
Hardness (calc) equivalent CaCO3	mg/L	3.0	7000	7400	7200	6900	6800

Envirolab ID	Units	PQL	MHC0057-21	MHC0057-22	MHC0057-23	MHC0057-24	MHC0057-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			05/03/2026	05/03/2026	05/03/2026	05/03/2026	05/03/2026
Calcium	mg/L	0.50	440	430	420	440	420
Magnesium	mg/L	0.50	1400	1500	1400	1500	1500
Potassium	mg/L	0.50	630	620	600	620	600
Sodium	mg/L	0.50	13000	13000	12000	13000	13000
Hardness (calc) equivalent CaCO3	mg/L	3.0	7000	7100	6800	7300	7000

Envirolab ID	Units	PQL	MHC0057-26	MHC0057-27	MHC0057-28	MHC0057-29	MHC0057-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			05/03/2026	05/03/2026	05/03/2026	05/03/2026	05/03/2026
Calcium	mg/L	0.50	410	430	450	440	430
Magnesium	mg/L	0.50	1400	1500	1500	1500	1400
Potassium	mg/L	0.50	600	620	640	620	610

Acid Extractable Metals (Water)

Envirolab ID	Units	PQL	MHC0057-26	MHC0057-27	MHC0057-28	MHC0057-29	MHC0057-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			05/03/2026	05/03/2026	05/03/2026	05/03/2026	05/03/2026
Sodium	mg/L	0.50	13000	13000	15000	14000	14000
Hardness (calc) equivalent CaCO3	mg/L	3.0	6800	7200	7300	7100	7000

Envirolab ID	Units	PQL	MHC0057-31	MHC0057-32	MHC0057-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			05/03/2026	05/03/2026	05/03/2026
Calcium	mg/L	0.50	440	440	440
Magnesium	mg/L	0.50	1400	1400	1400
Potassium	mg/L	0.50	610	620	620
Sodium	mg/L	0.50	14000	14000	14000
Hardness (calc) equivalent CaCO3	mg/L	3.0	7000	7000	7000

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Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	MHC0057-01	MHC0057-02	MHC0057-03	MHC0057-04	MHC0057-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			05/03/2026	05/03/2026	05/03/2026	04/03/2026	04/03/2026
pH	pH units		7.8	7.9	8.0	8.0	7.9
Electrical Conductivity	µS/cm	2.0	59000	59000	59000	59000	59000
Total Dissolved Solids	mg/L	5.0	41000	45000	39000	40000	45000
Estimated Salinity*	mg/L	1.0	38000	38000	38000	38000	38000
Total Suspended Solids	mg/L	1.0	1.7	1.3	1.8	3.2	3.5

Envirolab ID	Units	PQL	MHC0057-06	MHC0057-07	MHC0057-08	MHC0057-09	MHC0057-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			04/03/2026	04/03/2026	04/03/2026	04/03/2026	05/03/2026
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	59000	59000	59000	59000	59000
Total Dissolved Solids	mg/L	5.0	43000	42000	38000	47000	41000
Estimated Salinity*	mg/L	1.0	38000	38000	38000	38000	38000
Total Suspended Solids	mg/L	1.0	1.7	1.2	2.0	2.8	3.0

Envirolab ID	Units	PQL	MHC0057-11	MHC0057-12	MHC0057-13	MHC0057-14	MHC0057-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			05/03/2026	05/03/2026	04/03/2026	04/03/2026	04/03/2026
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	59000	59000	59000	59000	59000
Total Dissolved Solids	mg/L	5.0	40000	46000	42000	43000	42000
Estimated Salinity*	mg/L	1.0	38000	38000	38000	38000	38000
Total Suspended Solids	mg/L	1.0	3.0	4.5	5.3	4.4	6.3

Envirolab ID	Units	PQL	MHC0057-16	MHC0057-17	MHC0057-18	MHC0057-19	MHC0057-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			04/03/2026	04/03/2026	04/03/2026	05/03/2026	05/03/2026
pH	pH units		8.0	8.0	8.0	8.0	7.9
Electrical Conductivity	µS/cm	2.0	59000	59000	60000	59000	58000
Total Dissolved Solids	mg/L	5.0	38000	41000	40000	44000	45000
Estimated Salinity*	mg/L	1.0	38000	38000	38000	38000	37000
Total Suspended Solids	mg/L	1.0	3.4	4.6	3.7	5.9	5.9

Envirolab ID	Units	PQL	MHC0057-21	MHC0057-22	MHC0057-23	MHC0057-24	MHC0057-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			05/03/2026	05/03/2026	05/03/2026	05/03/2026	05/03/2026
pH	pH units		8.0	8.0	8.1	8.1	8.1
Electrical Conductivity	µS/cm	2.0	59000	58000	58000	59000	58000
Total Dissolved Solids	mg/L	5.0	39000	40000	41000	41000	46000
Estimated Salinity*	mg/L	1.0	37000	37000	37000	37000	37000
Total Suspended Solids	mg/L	1.0	5.6	3.4	7.5	4.0	2.6

Envirolab ID	Units	PQL	MHC0057-26	MHC0057-27	MHC0057-28	MHC0057-29	MHC0057-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			05/03/2026	05/03/2026	05/03/2026	05/03/2026	05/03/2026
pH	pH units		8.1	8.1	8.1	8.1	8.0
Electrical Conductivity	µS/cm	2.0	58000	58000	59000	59000	59000
Total Dissolved Solids	mg/L	5.0	38000	45000	44000	43000	44000

Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	MHC0057-26	MHC0057-27	MHC0057-28	MHC0057-29	MHC0057-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			05/03/2026	05/03/2026	05/03/2026	05/03/2026	05/03/2026
Estimated Salinity*	mg/L	1.0	37000	37000	38000	38000	38000
Total Suspended Solids	mg/L	1.0	3.3	<2.0	2.5	5.9	2.4

Envirolab ID	Units	PQL	MHC0057-31	MHC0057-32	MHC0057-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			05/03/2026	05/03/2026	05/03/2026
pH	pH units		8.1	8.1	8.1
Electrical Conductivity	µS/cm	2.0	58000	58000	59000
Total Dissolved Solids	mg/L	5.0	46000	46000	42000
Estimated Salinity*	mg/L	1.0	37000	37000	37000
Total Suspended Solids	mg/L	1.0	3.8	3.6	4.2

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Inorganics - Carbon, Nitrogen and Sulfur Species (Water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	MHC0057-01	MHC0057-02	MHC0057-03	MHC0057-04	MHC0057-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			05/03/2026	05/03/2026	05/03/2026	04/03/2026	04/03/2026
Total Organic Carbon	mg/L	1.0	2.7	2.3	2.1	2.4	2.2

Envirolab ID	Units	PQL	MHC0057-06	MHC0057-07	MHC0057-08	MHC0057-09	MHC0057-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			04/03/2026	04/03/2026	04/03/2026	04/03/2026	05/03/2026
Total Organic Carbon	mg/L	1.0	2.4	2.2	2.0	2.1	2.0

Envirolab ID	Units	PQL	MHC0057-11	MHC0057-12	MHC0057-13	MHC0057-14	MHC0057-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			05/03/2026	05/03/2026	04/03/2026	04/03/2026	04/03/2026
Total Organic Carbon	mg/L	1.0	2.2	2.0	2.0	2.3	2.3

Envirolab ID	Units	PQL	MHC0057-16	MHC0057-17	MHC0057-18	MHC0057-19	MHC0057-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			04/03/2026	04/03/2026	04/03/2026	05/03/2026	05/03/2026
Total Organic Carbon	mg/L	1.0	2.1	2.3	2.0	2.3	1.6

Envirolab ID	Units	PQL	MHC0057-21	MHC0057-22	MHC0057-23	MHC0057-24	MHC0057-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			05/03/2026	05/03/2026	05/03/2026	05/03/2026	05/03/2026
Total Organic Carbon	mg/L	1.0	3.1	2.1	2.0	2.1	2.0

Envirolab ID	Units	PQL	MHC0057-26	MHC0057-27	MHC0057-28	MHC0057-29	MHC0057-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			05/03/2026	05/03/2026	05/03/2026	05/03/2026	05/03/2026
Total Organic Carbon	mg/L	1.0	2.0	2.1	1.8	1.9	1.9

Envirolab ID	Units	PQL	MHC0057-31	MHC0057-32	MHC0057-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			05/03/2026	05/03/2026	05/03/2026
Total Organic Carbon	mg/L	1.0	1.8	2.1	1.8

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Inorganics - Nutrients (Water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	MHC0057-01	MHC0057-02	MHC0057-03	MHC0057-04	MHC0057-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			05/03/2026	05/03/2026	05/03/2026	04/03/2026	04/03/2026
Chlorophyll a	mg/m3	0.20	1.2	1.2	1.1	1.3	0.93

Envirolab ID	Units	PQL	MHC0057-06	MHC0057-07	MHC0057-08	MHC0057-09	MHC0057-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			04/03/2026	04/03/2026	04/03/2026	04/03/2026	05/03/2026
Chlorophyll a	mg/m3	0.20	0.80	1.1	0.93	0.93	1.9

Envirolab ID	Units	PQL	MHC0057-11	MHC0057-12	MHC0057-13	MHC0057-14	MHC0057-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			05/03/2026	05/03/2026	04/03/2026	04/03/2026	04/03/2026
Chlorophyll a	mg/m3	0.20	1.6	2.5	1.6	2.1	2.3

Envirolab ID	Units	PQL	MHC0057-16	MHC0057-17	MHC0057-18	MHC0057-19	MHC0057-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			04/03/2026	04/03/2026	04/03/2026	05/03/2026	05/03/2026
Chlorophyll a	mg/m3	0.20	1.5	1.2	1.6	1.6	1.9

Envirolab ID	Units	PQL	MHC0057-21	MHC0057-22	MHC0057-23	MHC0057-24	MHC0057-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			05/03/2026	05/03/2026	05/03/2026	05/03/2026	05/03/2026
Chlorophyll a	mg/m3	0.20	1.5	1.5	1.1	1.5	1.3

Envirolab ID	Units	PQL	MHC0057-26	MHC0057-27	MHC0057-28	MHC0057-29	MHC0057-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			05/03/2026	05/03/2026	05/03/2026	05/03/2026	05/03/2026
Chlorophyll a	mg/m3	0.20	1.1	1.2	0.80	0.93	0.80

Envirolab ID	Units	PQL	MHC0057-31	MHC0057-32	MHC0057-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			05/03/2026	05/03/2026	05/03/2026
Chlorophyll a	mg/m3	0.20	1.2	1.3	1.5

Subcontracted Inorganics - Certificate: ENVL26-6 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MHC0057-01	MHC0057-02	MHC0057-03	MHC0057-04	MHC0057-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			05/03/2026	05/03/2026	05/03/2026	04/03/2026	04/03/2026
Ammonia as N	µg/L	3.0	4	4	4	7	6
Nitrate as N	µg/L	2.0	<2	<2	<2	3	2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	160	130	140	130	160
Phosphate as P	µg/L	2.0	<2	<2	<2	<2	<2
Total Phosphorus	µg/L	5.0	7	7	6	7	7
NOx as N	µg/L	2.0	<2	<2	2	3	3
TKN as N*	µg/L	50	160	130	140	130	160

Envirolab ID	Units	PQL	MHC0057-06	MHC0057-07	MHC0057-08	MHC0057-09	MHC0057-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			04/03/2026	04/03/2026	04/03/2026	04/03/2026	05/03/2026
Ammonia as N	µg/L	3.0	8	8	7	6	8
Nitrate as N	µg/L	2.0	3	3	3	3	2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	110	140	110	120	150
Phosphate as P	µg/L	2.0	<2	<2	<2	<2	<2
Total Phosphorus	µg/L	5.0	6	6	5	6	7
NOx as N	µg/L	2.0	3	4	4	4	3
TKN as N*	µg/L	50	110	130	110	110	150

Envirolab ID	Units	PQL	MHC0057-11	MHC0057-12	MHC0057-13	MHC0057-14	MHC0057-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			05/03/2026	05/03/2026	04/03/2026	04/03/2026	04/03/2026
Ammonia as N	µg/L	3.0	7	6	11	15	12
Nitrate as N	µg/L	2.0	3	2	6	5	5
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	160	150	160	140	160
Phosphate as P	µg/L	2.0	<2	<2	3	3	4
Total Phosphorus	µg/L	5.0	7	8	12	10	10
NOx as N	µg/L	2.0	3	3	7	6	6
TKN as N*	µg/L	50	160	150	160	140	150

Envirolab ID	Units	PQL	MHC0057-16	MHC0057-17	MHC0057-18	MHC0057-19	MHC0057-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			04/03/2026	04/03/2026	04/03/2026	05/03/2026	05/03/2026
Ammonia as N	µg/L	3.0	11	8	10	12	11

Subcontracted Inorganics - Certificate: ENVL26-6 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MHC0057-16	MHC0057-17	MHC0057-18	MHC0057-19	MHC0057-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			04/03/2026	04/03/2026	04/03/2026	05/03/2026	05/03/2026
Nitrate as N	µg/L	2.0	4	3	<2	5	5
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	140	130	140	160	170
Phosphate as P	µg/L	2.0	4	<2	<2	<2	<2
Total Phosphorus	µg/L	5.0	9	9	9	8	8
NOx as N	µg/L	2.0	5	4	3	6	6
TKN as N*	µg/L	50	130	130	130	160	170

Envirolab ID	Units	PQL	MHC0057-21	MHC0057-22	MHC0057-23	MHC0057-24	MHC0057-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			05/03/2026	05/03/2026	05/03/2026	05/03/2026	05/03/2026
Ammonia as N	µg/L	3.0	10	12	13	14	9
Nitrate as N	µg/L	2.0	6	6	5	6	5
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	170	170	190	190	160
Phosphate as P	µg/L	2.0	<2	<2	<2	<2	<2
Total Phosphorus	µg/L	5.0	7	7	8	8	8
NOx as N	µg/L	2.0	7	7	6	6	6
TKN as N*	µg/L	50	160	160	180	180	150

Envirolab ID	Units	PQL	MHC0057-26	MHC0057-27	MHC0057-28	MHC0057-29	MHC0057-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			05/03/2026	05/03/2026	05/03/2026	05/03/2026	05/03/2026
Ammonia as N	µg/L	3.0	10	10	12	11	14
Nitrate as N	µg/L	2.0	5	6	5	5	6
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	180	160	180	160	180
Phosphate as P	µg/L	2.0	<2	<2	<2	<2	<2
Total Phosphorus	µg/L	5.0	7	7	8	7	7
NOx as N	µg/L	2.0	6	6	6	6	7
TKN as N*	µg/L	50	170	150	180	160	170

Envirolab ID	Units	PQL	MHC0057-31	MHC0057-32	MHC0057-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			05/03/2026	05/03/2026	05/03/2026
Ammonia as N	µg/L	3.0	7	4	7

Subcontracted Inorganics - Certificate: ENVL26-6 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MHC0057-31	MHC0057-32	MHC0057-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			05/03/2026	05/03/2026	05/03/2026
Nitrate as N	µg/L	2.0	5	2	3
Nitrite as N	µg/L	2.0	<2	<2	<2
Total Nitrogen	µg/L	50	180	120	130
Phosphate as P	µg/L	2.0	<2	<2	<2
Total Phosphorus	µg/L	5.0	8	6	6
NOx as N	µg/L	2.0	6	3	4
TKN as N*	µg/L	50	170	120	120

Subcontracted Metals - Certificate: ENVL26-6 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MHC0057-01	MHC0057-02	MHC0057-03	MHC0057-04	MHC0057-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			05/03/2026	05/03/2026	05/03/2026	04/03/2026	04/03/2026
Reactive Silica	µg/L	2.0	83	83	79	85	91

Envirolab ID	Units	PQL	MHC0057-06	MHC0057-07	MHC0057-08	MHC0057-09	MHC0057-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			04/03/2026	04/03/2026	04/03/2026	04/03/2026	05/03/2026
Reactive Silica	µg/L	2.0	93	94	94	97	100

Envirolab ID	Units	PQL	MHC0057-11	MHC0057-12	MHC0057-13	MHC0057-14	MHC0057-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			05/03/2026	05/03/2026	04/03/2026	04/03/2026	04/03/2026
Reactive Silica	µg/L	2.0	100	98	110	100	110

Envirolab ID	Units	PQL	MHC0057-16	MHC0057-17	MHC0057-18	MHC0057-19	MHC0057-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			04/03/2026	04/03/2026	04/03/2026	05/03/2026	05/03/2026
Reactive Silica	µg/L	2.0	110	110	100	110	110

Envirolab ID	Units	PQL	MHC0057-21	MHC0057-22	MHC0057-23	MHC0057-24	MHC0057-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			05/03/2026	05/03/2026	05/03/2026	05/03/2026	05/03/2026
Reactive Silica	µg/L	2.0	110	110	110	110	110

Envirolab ID	Units	PQL	MHC0057-26	MHC0057-27	MHC0057-28	MHC0057-29	MHC0057-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			05/03/2026	05/03/2026	05/03/2026	05/03/2026	05/03/2026
Reactive Silica	µg/L	2.0	110	110	110	110	110

Envirolab ID	Units	PQL	MHC0057-31	MHC0057-32	MHC0057-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			05/03/2026	05/03/2026	05/03/2026
Reactive Silica	µg/L	2.0	110	110	110

Subcontracted Metals - Total - Certificate: Various - Analysed By Intertek Australia - Genalysis (Minerals) (Water)

Envirolab ID	Units	PQL	MHC0057-01	MHC0057-02	MHC0057-03	MHC0057-04	MHC0057-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			05/03/2026	05/03/2026	05/03/2026	04/03/2026	04/03/2026
Aluminium	µg/L	0.50	4	3	4	4	5
Antimony	µg/L	0.020	0.18	0.2	0.19	0.2	0.2
Arsenic	µg/L	0.050	2.1	2.1	2.1	2.1	2.2
Barium	µg/L	0.10	6.4	6.5	6.5	6.4	6.8
Boron	µg/L	10	4700	4600	4800	4600	4900
Cadmium	µg/L	0.0050	0.01	0.008	<0.005	0.012	0.01
Chromium	µg/L	0.050	0.11	0.09	0.09	0.08	0.09
Cobalt	µg/L	0.020	<0.02	<0.02	0.02	0.03	<0.02
Copper	µg/L	0.10	0.3	0.3	0.3	0.6	0.6
Iron	µg/L	0.20	<0.2	0.2	<0.2	0.6	0.7
Lead	µg/L	0.020	0.24	0.25	0.25	0.56	0.62
Manganese	µg/L	0.020	0.4	0.41	0.37	0.33	0.35
Mercury	µg/L	0.020	<0.02	<0.02	0.06	<0.02	0.1
Molybdenum	µg/L	0.050	12	12	13	13	12
Nickel	µg/L	0.050	0.19	0.19	0.15	0.17	0.2
Selenium	µg/L	0.10	<0.1	<0.1	0.1	<0.1	<0.1
Silicon	µg/L	0.10	0.1	0.1	0.1	0.1	0.1
Silver	µg/L	0.020	<0.02	<0.02	<0.02	<0.02	<0.02
Strontium	µg/L	0.20	8700	8800	8700	8800	8700
Thallium	µg/L	0.0050	0.018	0.017	0.019	0.017	0.02
Thorium	µg/L	0.0050	<0.005	<0.005	<0.005	<0.005	<0.005
Uranium	µg/L	0.0010	3.5	3.4	3.5	3.5	3.6
Vanadium	µg/L	0.10	1.8	1.8	1.9	2	2.1
Zinc	µg/L	0.10	0.5	0.7	0.6	2.9	3.4

Envirolab ID	Units	PQL	MHC0057-06	MHC0057-07	MHC0057-08	MHC0057-09	MHC0057-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			04/03/2026	04/03/2026	04/03/2026	04/03/2026	05/03/2026
Aluminium	µg/L	0.50	5	4	4	3	4
Antimony	µg/L	0.020	0.16	0.19	0.2	0.2	0.21
Arsenic	µg/L	0.050	2.2	2.2	2.1	2.2	2.2
Barium	µg/L	0.10	6.6	6.4	6.3	6.6	6.6
Boron	µg/L	10	4800	4800	4600	4800	4800
Cadmium	µg/L	0.0050	0.007	0.013	0.009	0.01	0.008
Chromium	µg/L	0.050	0.12	0.11	0.1	0.07	0.09
Cobalt	µg/L	0.020	0.02	<0.02	0.04	0.02	0.03

Subcontracted Metals - Total - Certificate: Various - Analysed By Intertek Australia - Genalysis (Minerals) (Water)

Envirolab ID	Units	PQL	MHC0057-06	MHC0057-07	MHC0057-08	MHC0057-09	MHC0057-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			04/03/2026	04/03/2026	04/03/2026	04/03/2026	05/03/2026
Copper	µg/L	0.10	0.6	0.3	0.3	0.3	0.3
Iron	µg/L	0.20	1	0.2	0.3	0.4	0.7
Lead	µg/L	0.020	0.55	0.24	0.25	0.26	0.3
Manganese	µg/L	0.020	0.26	0.25	0.21	0.31	0.29
Mercury	µg/L	0.020	<0.02	<0.02	<0.02	<0.02	<0.02
Molybdenum	µg/L	0.050	13	12	13	12	13
Nickel	µg/L	0.050	0.18	0.18	0.19	0.14	0.17
Selenium	µg/L	0.10	<0.1	<0.1	<0.1	<0.1	<0.1
Silicon	µg/L	0.10	0.1	0.1	0.1	0.1	0.2
Silver	µg/L	0.020	<0.02	<0.02	<0.02	<0.02	<0.02
Strontium	µg/L	0.20	8900	8800	8800	8900	8800
Thallium	µg/L	0.0050	0.02	0.022	0.018	0.027	0.021
Thorium	µg/L	0.0050	<0.005	<0.005	<0.005	0.006	<0.005
Uranium	µg/L	0.0010	3.5	3.5	3.6	3.5	3.5
Vanadium	µg/L	0.10	2.1	2.1	2	2.1	2
Zinc	µg/L	0.10	3.4	0.8	0.7	0.6	0.6

Envirolab ID	Units	PQL	MHC0057-11	MHC0057-12	MHC0057-13	MHC0057-14	MHC0057-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			05/03/2026	05/03/2026	04/03/2026	04/03/2026	04/03/2026
Aluminium	µg/L	0.50	4	5	10	11	8
Antimony	µg/L	0.020	0.19	0.21	0.2	0.18	0.17
Arsenic	µg/L	0.050	2.1	2.2	2	2	2.3
Barium	µg/L	0.10	6.5	6.6	6.6	6.5	6.4
Boron	µg/L	10	4800	4700	4800	4600	5100
Cadmium	µg/L	0.0050	0.009	0.011	0.011	0.018	0.018
Chromium	µg/L	0.050	0.11	0.1	0.09	0.13	0.11
Cobalt	µg/L	0.020	<0.02	<0.02	<0.02	<0.02	0.04
Copper	µg/L	0.10	0.3	0.3	0.9	1.9	0.9
Iron	µg/L	0.20	1.1	1.5	6	6.6	3.5
Lead	µg/L	0.020	0.29	0.62	0.54	0.52	0.42
Manganese	µg/L	0.020	0.25	0.28	0.4	0.37	0.29
Mercury	µg/L	0.020	<0.02	<0.02	<0.02	0.05	<0.02
Molybdenum	µg/L	0.050	12	13	12	13	13
Nickel	µg/L	0.050	0.15	0.18	0.18	0.31	0.26
Selenium	µg/L	0.10	0.2	0.1	0.1	0.2	0.4

Subcontracted Metals - Total - Certificate: Various - Analysed By Intertek Australia - Genalysis (Minerals) (Water)

Envirolab ID	Units	PQL	MHC0057-11	MHC0057-12	MHC0057-13	MHC0057-14	MHC0057-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			05/03/2026	05/03/2026	04/03/2026	04/03/2026	04/03/2026
Silicon	µg/L	0.10	0.2	0.2	0.2	0.2	0.2
Silver	µg/L	0.020	<0.02	<0.02	<0.02	<0.02	<0.02
Strontium	µg/L	0.20	8800	9000	8500	8900	9000
Thallium	µg/L	0.0050	0.022	0.021	0.02	0.023	0.02
Thorium	µg/L	0.0050	<0.005	<0.005	<0.005	<0.005	<0.005
Uranium	µg/L	0.0010	3.5	3.6	3.6	3.7	3.6
Vanadium	µg/L	0.10	2	2	2	1.9	2.1
Zinc	µg/L	0.10	0.6	1.6	13	15	14

Envirolab ID	Units	PQL	MHC0057-16	MHC0057-17	MHC0057-18	MHC0057-19	MHC0057-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			04/03/2026	04/03/2026	04/03/2026	05/03/2026	05/03/2026
Aluminium	µg/L	0.50	8	8	5	4	6
Antimony	µg/L	0.020	0.21	0.23	0.18	0.19	0.21
Arsenic	µg/L	0.050	2.2	2.3	2.1	2	2
Barium	µg/L	0.10	6.5	6.8	6.7	6.4	6.3
Boron	µg/L	10	5000	5200	4300	3800	3700
Cadmium	µg/L	0.0050	0.018	0.013	0.008	0.008	0.008
Chromium	µg/L	0.050	0.11	0.1	0.1	0.09	0.09
Cobalt	µg/L	0.020	0.03	<0.02	<0.02	0.02	<0.02
Copper	µg/L	0.10	0.7	0.7	0.7	0.2	0.2
Iron	µg/L	0.20	3.2	2.4	2.6	3	4.7
Lead	µg/L	0.020	0.71	0.72	0.74	0.08	0.08
Manganese	µg/L	0.020	0.37	0.39	0.45	0.32	0.38
Mercury	µg/L	0.020	<0.02	<0.02	<0.02	<0.02	<0.02
Molybdenum	µg/L	0.050	13	12	13	12	12
Nickel	µg/L	0.050	0.21	0.2	0.21	0.16	0.17
Selenium	µg/L	0.10	0.2	0.1	<0.1	<0.1	<0.1
Silicon	µg/L	0.10	0.2	0.2	0.1	0.1	0.1
Silver	µg/L	0.020	<0.02	<0.02	<0.02	<0.02	<0.02
Strontium	µg/L	0.20	9000	9000	8800	8800	8700
Thallium	µg/L	0.0050	0.02	0.021	0.02	0.019	0.021
Thorium	µg/L	0.0050	<0.005	<0.005	<0.005	<0.005	<0.005
Uranium	µg/L	0.0010	3.6	3.7	3.4	3.4	3.4
Vanadium	µg/L	0.10	2	2	2.1	1.9	2
Zinc	µg/L	0.10	11	10	11	0.3	0.3

Subcontracted Metals - Total - Certificate: Various - Analysed By Intertek Australia - Genalysis (Minerals) (Water)

Envirolab ID	Units	PQL	MHC0057-21	MHC0057-22	MHC0057-23	MHC0057-24	MHC0057-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			05/03/2026	05/03/2026	05/03/2026	05/03/2026	05/03/2026
Aluminium	µg/L	0.50	4	3	4	4	4
Antimony	µg/L	0.020	0.18	0.19	0.19	0.22	0.23
Arsenic	µg/L	0.050	2.1	2.1	2.2	2.1	2.2
Barium	µg/L	0.10	6.6	6.5	6.8	6.6	6.7
Boron	µg/L	10	4100	3900	4100	4100	4200
Cadmium	µg/L	0.0050	0.011	0.006	0.014	0.012	0.012
Chromium	µg/L	0.050	0.08	0.09	0.1	0.1	0.08
Cobalt	µg/L	0.020	<0.02	0.02	<0.02	<0.02	0.02
Copper	µg/L	0.10	0.2	0.5	0.5	0.5	0.3
Iron	µg/L	0.20	1.8	0.8	2	1.9	2.7
Lead	µg/L	0.020	0.1	0.1	0.11	0.11	0.24
Manganese	µg/L	0.020	0.34	0.34	0.34	0.36	0.38
Mercury	µg/L	0.020	<0.02	<0.02	<0.02	0.06	0.08
Molybdenum	µg/L	0.050	12	12	12	12	12
Nickel	µg/L	0.050	0.16	0.19	0.14	0.18	0.17
Selenium	µg/L	0.10	<0.1	0.1	<0.1	<0.1	<0.1
Silicon	µg/L	0.10	0.1	0.1	0.1	0.1	0.1
Silver	µg/L	0.020	<0.02	<0.02	<0.02	<0.02	<0.02
Strontium	µg/L	0.20	8700	8800	8800	8700	8700
Thallium	µg/L	0.0050	0.021	0.022	0.021	0.021	0.018
Thorium	µg/L	0.0050	<0.005	<0.005	<0.005	<0.005	<0.005
Uranium	µg/L	0.0010	3.4	3.5	3.4	3.4	3.4
Vanadium	µg/L	0.10	2.1	2	2.1	2	2.1
Zinc	µg/L	0.10	0.4	0.4	0.4	0.3	0.4

Envirolab ID	Units	PQL	MHC0057-26	MHC0057-27	MHC0057-28	MHC0057-29	MHC0057-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			05/03/2026	05/03/2026	05/03/2026	05/03/2026	05/03/2026
Aluminium	µg/L	0.50	4	3	3	3	4
Antimony	µg/L	0.020	0.23	0.22	0.21	0.2	0.21
Arsenic	µg/L	0.050	2.2	2.1	2.2	2.2	2.2
Barium	µg/L	0.10	6.8	6.6	6.7	6.8	6.9
Boron	µg/L	10	4300	4300	4300	4500	4400
Cadmium	µg/L	0.0050	0.012	0.014	0.015	0.018	0.011
Chromium	µg/L	0.050	0.09	0.09	0.08	0.07	0.11

Subcontracted Metals - Total - Certificate: Various - Analysed By Intertek Australia - Genalysis (Minerals) (Water)

Envirolab ID	Units	PQL	MHC0057-26	MHC0057-27	MHC0057-28	MHC0057-29	MHC0057-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			05/03/2026	05/03/2026	05/03/2026	05/03/2026	05/03/2026
Cobalt	µg/L	0.020	<0.02	<0.02	<0.02	0.04	0.02
Copper	µg/L	0.10	0.3	0.3	0.9	0.9	1
Iron	µg/L	0.20	1.4	1.2	0.6	0.9	0.9
Lead	µg/L	0.020	0.23	0.23	0.22	0.23	0.22
Manganese	µg/L	0.020	0.3	0.33	0.37	0.38	0.33
Mercury	µg/L	0.020	<0.02	0.05	<0.02	<0.02	<0.02
Molybdenum	µg/L	0.050	12	12	12	13	13
Nickel	µg/L	0.050	0.15	0.15	0.21	0.18	0.26
Selenium	µg/L	0.10	0.1	0.1	0.1	0.1	0.1
Silicon	µg/L	0.10	0.1	0.1	0.1	0.1	0.1
Silver	µg/L	0.020	<0.02	<0.02	<0.02	<0.02	<0.02
Strontium	µg/L	0.20	8600	8600	8800	8900	8900
Thallium	µg/L	0.0050	0.019	0.029	0.023	0.024	0.022
Thorium	µg/L	0.0050	<0.005	<0.005	<0.005	<0.005	<0.005
Uranium	µg/L	0.0010	3.4	3.5	3.6	3.6	3.6
Vanadium	µg/L	0.10	2.1	2.1	2.1	2.2	2.1
Zinc	µg/L	0.10	0.4	0.3	0.7	0.8	1.3

Envirolab ID	Units	PQL	MHC0057-31	MHC0057-32	MHC0057-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			05/03/2026	05/03/2026	05/03/2026
Aluminium	µg/L	0.50	5	4	3
Antimony	µg/L	0.020	0.19	0.2	0.21
Arsenic	µg/L	0.050	2	2	2
Barium	µg/L	0.10	6.7	6.5	6.6
Boron	µg/L	10	4300	4200	4400
Cadmium	µg/L	0.0050	0.009	0.01	0.012
Chromium	µg/L	0.050	0.1	0.1	0.09
Cobalt	µg/L	0.020	<0.02	<0.02	<0.02
Copper	µg/L	0.10	0.3	0.2	0.2
Iron	µg/L	0.20	1.5	1	0.5
Lead	µg/L	0.020	0.31	0.26	0.26
Manganese	µg/L	0.020	0.51	0.33	0.34
Mercury	µg/L	0.020	<0.02	<0.02	<0.02
Molybdenum	µg/L	0.050	13	12	12

Subcontracted Metals - Total - Certificate: Various - Analysed By Intertek Australia - Genalysis (Minerals) (Water)

Envirolab ID	Units	PQL	MHC0057-31	MHC0057-32	MHC0057-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			05/03/2026	05/03/2026	05/03/2026
Nickel	µg/L	0.050	0.23	0.12	0.18
Selenium	µg/L	0.10	0.1	0.2	0.1
Silicon	µg/L	0.10	0.1	0.1	0.1
Silver	µg/L	0.020	<0.02	<0.02	<0.02
Strontium	µg/L	0.20	8900	8700	8800
Thallium	µg/L	0.0050	0.023	0.023	0.024
Thorium	µg/L	0.0050	<0.005	<0.005	<0.005
Uranium	µg/L	0.0010	3.6	3.6	3.6
Vanadium	µg/L	0.10	2	2	2
Zinc	µg/L	0.10	0.8	0.7	0.5

Certificate of Analysis MHC0057

Subcontracted Micro - Certificate: Various - Analysed By SA Pathology (Water)

Envirolab ID	Units	PQL	MHC0057-01	MHC0057-02	MHC0057-03	MHC0057-04	MHC0057-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			05/03/2026	05/03/2026	05/03/2026	04/03/2026	04/03/2026
Total Coliforms	MPN/100mL	1.0	2400	1300	1200	>2400	>2400

Envirolab ID	Units	PQL	MHC0057-06	MHC0057-07	MHC0057-08	MHC0057-09	MHC0057-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			04/03/2026	04/03/2026	04/03/2026	04/03/2026	05/03/2026
Total Coliforms	MPN/100mL	1.0	>2400	1500	2000	2000	1100

Envirolab ID	Units	PQL	MHC0057-11	MHC0057-12	MHC0057-13	MHC0057-14	MHC0057-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			05/03/2026	05/03/2026	04/03/2026	04/03/2026	04/03/2026
Total Coliforms	MPN/100mL	1.0	1500	2400	>2400	>2400	>2400

Envirolab ID	Units	PQL	MHC0057-16	MHC0057-17	MHC0057-18	MHC0057-19	MHC0057-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			04/03/2026	04/03/2026	04/03/2026	05/03/2026	05/03/2026
Total Coliforms	MPN/100mL	1.0	>2400	>2400	>2400	1200	520

Envirolab ID	Units	PQL	MHC0057-21	MHC0057-22	MHC0057-23	MHC0057-24	MHC0057-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			05/03/2026	05/03/2026	05/03/2026	05/03/2026	05/03/2026
Total Coliforms	MPN/100mL	1.0	>2400	>2400	>2400	>2400	>2400

Envirolab ID	Units	PQL	MHC0057-26	MHC0057-27	MHC0057-28	MHC0057-29	MHC0057-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			05/03/2026	05/03/2026	05/03/2026	05/03/2026	05/03/2026
Total Coliforms	MPN/100mL	1.0	>2400	>2400	>2400	>2400	>2400

Envirolab ID	Units	PQL	MHC0057-31	MHC0057-32	MHC0057-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			05/03/2026	05/03/2026	05/03/2026
Total Coliforms	MPN/100mL	1.0	920	1100	1500

Method Summary

Method ID	Methodology Summary
INORG-001	pH - Measured using pH meter and electrode. Please note that the results for water analyses are indicative only, as analysis can be completed outside of the recommended holding times. Solids are reported from a 1:5 water extract unless otherwise specified. Alternatively, pH is determined in a 1:5 extract using 0.01M calcium chloride or a solid is extracted at a ratio of 1:2.5 (AS1289.4.3.1), pH is measured in the extract.
INORG-002	Conductivity and Salinity - measured using a conductivity cell at 25°C. Soil results reported from a 1:5 Soil:Water extract unless otherwise specified. Please note Resistivity is estimated by calculation and may not correlate with results otherwise obtained using the Resistivity current method (based on AS 1289.4.4.1), depending on the nature of the soil being analysed. Blanks may yield EC readings >1µS/cm, this is likely due to adsorption of Carbon Dioxide while the blank sample is sat on the instrument autosampler prior to analysis. The values are generally insignificant (<5µS/cm) compared to most actual sample conductivities.
INORG-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180±10°C. NOTE: Where the EC of the sample is <100µS/cm, the TDS will typically be below 70mg/L (as the sample is very likely to be at least drinking water quality). Therefore to ensure data quality for TDS, the TDS is typically calculated as per the equation: TDS = EC*0.6
INORG-019	Suspended Solids - determined gravimetrically by filtration of the sample. The solids are dried at 104±5°C
INORG-079	Carbon forms (inorganic, organic, total) determined using a TOC/NDIR analyser via combustion. Dissolved aqueous\forms require filtering prior to determination.
INORG-119	Chlorophyll A based on APHA 10200 H latest edition.
METALS-020	Determination of various metals by ICP-AES. Where salts (oxides, chlorides etc.) are calculated from the element concentration stoichiometrically, there is no guarantee that the salt form is completely soluble in the acids used in the preparation. Where molecular anion forms are calculated from an element (e.g. SO4 from S or PO4 from P stoichiometrically), the assumption is that the element is only present in that molecular anion form. Submission of low masses of sample e.g. for dust samples, may result in raised PQLs.
ORG-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
ORG-023_F1_TOT	Determination of volatile organic compounds (VOCs) by P&T-GC-MS. Water samples are analysed directly by purge and trap GC-MS. Solids are extracted with Methanol, diluted and analysed by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.
SUB-017	Subcontracted to Intertek Genalysis - Accreditation number 3244
SUB-021	Subcontracted to Marine & Freshwater Research - Accreditation number 10603
SUB-041_CA	Subcontracted to SA Pathology

Result Definitions

Identifier	Description
NR	Not reported
NEPM	National Environment Protection Measure
NS	Not specified
LCS	Laboratory Control Sample
RPD	Relative Percent Difference
>	Greater than
<	Less than
PQL	Practical Quantitation Limit
INS	Insufficient sample for this test
NA	Test not required
NT	Not tested
DOL	Samples rejected due to particulate overload (air filters only)
RFD	Samples rejected due to filter damage (air filters only)
RUD	Samples rejected due to uneven deposition (air filters only)
##	Indicates a laboratory acceptance criteria outlier, for further details, see Result Comments and/or QC Comments

Quality Control Definitions

Blank

This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, and is determined by processing solvents and reagents in exactly the same manner as for samples.

Surrogate Spike

Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

LCS (Laboratory Control Sample)

This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Matrix Spike

A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

Duplicate

This is the complete duplicate analysis of a sample from the process batch. The sample selected should be one where the analyte concentration is easily measurable.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria. Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction. Spikes for Physical and Aggregate Tests are not applicable. For VOCs in water samples, three vials are required for duplicate or spike analysis.

General Acceptance Criteria (GAC) - Analyte specific criteria applies for some analytes and is reflected in QC recovery tables.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% - see ELN-P05 QAQC tables for details (available on request); <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase. Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was typically insufficient in order to satisfy laboratory QA/QC protocols.

Miscellaneous Information

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached. We have taken the sampling date as being the date received at the laboratory.

Two significant figures are reported for the majority of tests and with a high degree of confidence, for results <10*PQL, the second significant figure may be in doubt i.e. has a relatively high degree of uncertainty and is provided for information only.

Measurement Uncertainty estimates can be downloaded from the Envirolab Resources website or obtained directly by contacting the laboratory.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS where sediment/solids are included by default.

Urine Analysis - The BEI values listed are taken from the 2022 edition of *TLVs and BEIs Threshold Limits by ACGIH*.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volume(s) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

Data Quality Assessment Summary MHC0057

Client Details

Client	South Australian Research & Development Institute
Your Reference	NWP Mullaquana Monthly Sampling
Date Issued	02/04/2026

Recommended Holding Time Compliance

Recommended holding time exceedances exist - See detailed list below

Quality Control and QC Frequency

QC Type	Compliant	Details
Blank	Yes	No Outliers
LCS	Yes	No Outliers
Duplicates	Yes	No Outliers
Matrix Spike	No	Matrix Spike Outliers Exist - See detailed list below
Surrogates / Extracted Internal Standards	Yes	No Outliers
QC Frequency	No	QC Frequency Outliers Exist - See detailed list below

Surrogates/Extracted Internal Standards, Duplicates and/or Matrix Spikes are not always relevant/applicable to certain analyses and matrices. Therefore, said QC measures are deemed compliant in these situations by default. See Laboratory Acceptance Criteria for more information

Data Quality Assessment Summary MHC0057

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
vTRH&MBTEXN | Water	4-9	04/03/2026	11/03/2026	12/03/2026	Yes
	13-18	04/03/2026	11/03/2026	13/03/2026	Yes
	1-3	05/03/2026	11/03/2026	12/03/2026	Yes
	10-12, 19-33	05/03/2026	11/03/2026	13/03/2026	Yes
sTRH | Water	4-9, 13-18	04/03/2026	11/03/2026	13/03/2026	Yes
	1-3, 10-12, 19-33	05/03/2026	11/03/2026	13/03/2026	Yes
Total Cations | Water	4-9, 13-18	04/03/2026	11/03/2026	13/03/2026	Yes
	1-3, 10-12, 19-33	05/03/2026	11/03/2026	13/03/2026	Yes
EC | Water	4-9, 13-18	04/03/2026	11/03/2026	11/03/2026	Yes
	1-3, 10-12, 19	05/03/2026	11/03/2026	11/03/2026	Yes
	20-33	05/03/2026	11/03/2026	12/03/2026	Yes
pH | Water	4-9, 13-18	04/03/2026	11/03/2026	11/03/2026	No
	1-3, 10-12, 19	05/03/2026	11/03/2026	11/03/2026	No
	20-33	05/03/2026	11/03/2026	12/03/2026	No
Salinity | Water	4-9, 13-18	04/03/2026	11/03/2026	11/03/2026	Yes
	1-3, 10-12, 19	05/03/2026	11/03/2026	11/03/2026	Yes
	20-33	05/03/2026	11/03/2026	12/03/2026	Yes
TDS | Water	4-9, 13-18	04/03/2026	10/03/2026	12/03/2026	Yes
	1-3, 10-11	05/03/2026	10/03/2026	12/03/2026	Yes
	12, 19-33	05/03/2026	12/03/2026	12/03/2026	Yes
TSS (LL) | Water	4-9, 13-18	04/03/2026	11/03/2026	18/03/2026	Yes
	1-3, 10-12, 19-20	05/03/2026	11/03/2026	18/03/2026	Yes
	21-33	05/03/2026	12/03/2026	18/03/2026	Yes
Total Organic Carbon | Water	4-9, 13-18	04/03/2026	13/03/2026	16/03/2026	Yes
	1-3, 10-12, 19-33	05/03/2026	13/03/2026	16/03/2026	Yes
Chlorophyll a (LL) - Frozen | Water	4-9, 13-18	04/03/2026	13/03/2026	18/03/2026	Yes
	1-3, 10-12, 19-33	05/03/2026	13/03/2026	18/03/2026	Yes
Ammonia as N | Water	4-9, 13-18	04/03/2026	17/03/2026	17/03/2026	Yes
	1-3, 10-12, 19-33	05/03/2026	17/03/2026	17/03/2026	Yes
Nitrate as N (LL) | Water	4-9, 13-18	04/03/2026	17/03/2026	17/03/2026	Yes
	1-3, 10-12, 19-33	05/03/2026	17/03/2026	17/03/2026	Yes
Nitrite as N (LL) | Water	4-9, 13-18	04/03/2026	17/03/2026	17/03/2026	Yes
	1-3, 10-12, 19-33	05/03/2026	17/03/2026	17/03/2026	Yes
NOx as N (LL) | Water	4-9, 13-18	04/03/2026	17/03/2026	17/03/2026	Yes
	1-3, 10-12, 19-33	05/03/2026	17/03/2026	17/03/2026	Yes
Phosphate as P (LL) | Water	4-9, 13-18	04/03/2026	17/03/2026	17/03/2026	Yes
	1-3, 10-12, 19-33	05/03/2026	17/03/2026	17/03/2026	Yes
TKN as N calc (LL) | Water	4-9, 13-18	04/03/2026	17/03/2026	18/03/2026	Yes
	1-3, 10-12, 19-33	05/03/2026	17/03/2026	18/03/2026	Yes
Total N and P (LL) | Water	4-9, 13-18	04/03/2026	17/03/2026	18/03/2026	Yes
	1-3, 10-12, 19-33	05/03/2026	17/03/2026	18/03/2026	Yes
Reactive Silica (LL) | Water	4-9, 13-18	04/03/2026	19/03/2026	19/03/2026	Yes

Data Quality Assessment Summary MHC0057

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
	1-3, 10-12, 19-33	05/03/2026	19/03/2026	19/03/2026	Yes
Total Metals (TR) | Water	4-9, 13-18	04/03/2026	02/04/2026	02/04/2026	Yes
	1-3, 10-12, 19-33	05/03/2026	02/04/2026	02/04/2026	Yes
Total Coliforms | Water	4-9, 13-18	04/03/2026	06/03/2026	06/03/2026	Yes
	1-3, 10-12, 19-33	05/03/2026	06/03/2026	06/03/2026	Yes

Outliers: Matrix Spike

METALS-020|Acid Extractable Metals (Water)| Batch BHC1575

Sample ID	Analyte	% Limits	% Recovery
MHC0057-01	Calcium	70 - 130	##[1]
MHC0057-01	Magnesium	70 - 130	##[1]
MHC0057-01	Potassium	70 - 130	##[1]
MHC0057-01	Sodium	70 - 130	##[1]

METALS-020|Acid Extractable Metals (Water)| Batch BHC1576

Sample ID	Analyte	% Limits	% Recovery
MHC0057-21	Calcium	70 - 130	##[1]
MHC0057-21	Magnesium	70 - 130	##[1]
MHC0057-21	Potassium	70 - 130	##[1]
MHC0057-21	Sodium	70 - 130	##[1]

Outliers: QC Frequency

INORG-119|Inorganics - Nutrients (Water)| Batch BHC2199

Analysis	QC Type	Expected	Reported
Chlorophyll a (LL) - Frozen	Duplicate	2	0

INORG-119|Inorganics - Nutrients (Water)| Batch BHC2200

Analysis	QC Type	Expected	Reported
Chlorophyll a (LL) - Frozen	Duplicate	2	0

Quality Control MHC0057

ORG-023_F1_TOT|Volatile TRH and BTEX (Water) | Batch BHC1573

Analyte	Units	PQL	Blank	DUP1 MHC0057-01 Samp | QC | RPD %	DUP2 MHC0057-11 Samp | QC | RPD %	LCS %	Spike % MHC0057-02
TRH C6-C9	µg/L	10	<10	<10 | <10 | [NA]	<10 | <10 | [NA]	104	82.1
TRH C6-C10	µg/L	10	<10	<10 | <10 | [NA]	<10 | <10 | [NA]	95.7	80.9
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
Benzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	97.3	96.2
Toluene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	119	95.7
Ethylbenzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	104	96.7
meta+para Xylene	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	95.8	89.7
ortho-Xylene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	83.6	91.6
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
Surrogate Dibromofluoromethane	*%*		*104*	*111 / 139*	*111 / 115*	*98.9*	*106*
Surrogate Toluene-D8	*%*		*109*	*109 / 109*	*110 / 112*	*129*	*105*
Surrogate 4-Bromofluorobenzene	*%*		*92.1*	*96.0 / 96.0*	*95.7 / 96.3*	*82.4*	*109*

ORG-023_F1_TOT|Volatile TRH and BTEX (Water) | Batch BHC1574

Analyte	Units	PQL	Blank	DUP1 MHC0057-21 Samp | QC | RPD %	DUP2 MHC0057-31 Samp | QC | RPD %	LCS %	Spike % MHC0057-22
TRH C6-C9	µg/L	10	<10	<10 | <10 | [NA]	<10 | <10 | [NA]	80.0	72.2
TRH C6-C10	µg/L	10	<10	<10 | <10 | [NA]	<10 | <10 | [NA]	80.1	71.0
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
Benzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	98.3	94.1
Toluene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	98.9	94.8
Ethylbenzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	102	89.3
meta+para Xylene	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	95.7	84.1
ortho-Xylene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	87.8	80.5
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	[NA]	[NA]
Surrogate Dibromofluoromethane	*%*		*108*	*115 / 115*	*107 / 106*	*102*	*108*
Surrogate Toluene-D8	*%*		*113*	*113 / 112*	*103 / 102*	*106*	*107*
Surrogate 4-Bromofluorobenzene	*%*		*101*	*96.0 / 95.6*	*110 / 110*	*96.5*	*100*

ORG-020|Semi-volatile TRH (Water) | Batch BHC1554

Analyte	Units	PQL	Blank	DUP1 MHC0057-01 Samp | QC | RPD %	DUP2 MHC0057-11 Samp | QC | RPD %	LCS %	Spike % MHC0057-02
TRH C10-C14	µg/L	50	<50	<50 | <50 | [NA]	<50 | <50 | [NA]	93.4	123
TRH C15-C28	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	98.0	119
TRH C29-C36	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	110	133
TRH >C10-C16	µg/L	50	<50	<50 | <50 | [NA]	<50 | <50 | [NA]	80.9	103
TRH >C16-C34 (F3)	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	102	124
TRH >C34-C40 (F4)	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	95.0	115
Surrogate o-Terphenyl	*%*		*70.5*	*107 / 69.9*	*60.5 / 66.0*	*100*	*106*

ORG-020|Semi-volatile TRH (Water) | Batch BHC1555

Analyte	Units	PQL	Blank	DUP1 MHC0057-18 Samp | QC | RPD %	DUP2 MHC0057-28 Samp | QC | RPD %	LCS %	Spike % MHC0057-19
TRH C10-C14	µg/L	50	<50	<50 | <50 | [NA]	<50 | <50 | [NA]	118	111
TRH C15-C28	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	116	101
TRH C29-C36	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	132	114
TRH >C10-C16	µg/L	50	<50	<50 | <50 | [NA]	<50 | <50 | [NA]	102	93.2
TRH >C16-C34 (F3)	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	121	105
TRH >C34-C40 (F4)	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	116	99.1
Surrogate o-Terphenyl	*%*		*98.0*	*77.0 / 82.1*	*84.4 / 86.7*	*112*	*106*

Quality Control MHC0057

METALS-020|Acid Extractable Metals (Water) | Batch BHC1575

Analyte	Units	PQL	Blank	DUP1 BHC1575-DUP1# Samp | QC | RPD %	DUP2 MHC0057-10 Samp | QC | RPD %	LCS %	Spike % MHC0057-01
Calcium	mg/L	0.50	<0.50	135 | 146 | 7.76	423 | 417 | 1.48	97.8	##[1]
Magnesium	mg/L	0.50	<0.50	49.6 | 51.1 | 2.95	1410 | 1410 | 0.00	98.5	##[1]
Potassium	mg/L	0.50	<0.50	165 | 168 | 1.60	612 | 593 | 3.12	101	##[1]
Sodium	mg/L	0.50	<0.50	5130 | 5490 | 6.73	12700 | 12700 | 0.0628	116	##[1]
Hardness (calc) equivalent CaCO3	mg/L	3.0	<3.0	541 | 575 | 5.98	6870 | 6850 | 0.226	[NA]	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

METALS-020|Acid Extractable Metals (Water) | Batch BHC1576

Analyte	Units	PQL	Blank	DUP1 MHC0057-20 Samp | QC | RPD %	DUP2 MHC0057-27 Samp | QC | RPD %	LCS %	Spike % MHC0057-21
Calcium	mg/L	0.50	<0.50	431 | 429 | 0.512	433 | 434 | 0.101	98.6	##[1]
Magnesium	mg/L	0.50	<0.50	1400 | 1370 | 1.85	1500 | 1470 | 1.43	99.4	##[1]
Potassium	mg/L	0.50	<0.50	606 | 607 | 0.0363	618 | 621 | 0.458	102	##[1]
Sodium	mg/L	0.5		12400 | 12200 | 2.13	13300 | 13200 | 0.678	113	##[1]
Hardness (calc) equivalent CaCO3	mg/L	3.0	<3.0	6840 | 6730 | 1.64	7240 | 7150 | 1.20	[NA]	[NA]

INORG-001|Inorganics - Physical Parameters (Water) | Batch BHC1584

Analyte	Units	PQL	Blank	DUP1 MHC0057-04 Samp | QC | RPD %	DUP2 MHC0057-17 Samp | QC | RPD %	LCS %
pH	pH units		4.9	8.0 | 7.9 | 1.13	8.0 | 8.0 | 1.00	100
Electrical Conductivity	µS/cm	2.0	<2.0	58800 | 59200 | 0.751	59100 | 59400 | 0.571	109
Estimated Salinity	mg/L	1.0	1.09	37600 | 37900 | 0.751	37800 | 38000 | 0.571	[NA]

INORG-001|Inorganics - Physical Parameters (Water) | Batch BHC1585

Analyte	Units	PQL	Blank	DUP1 MHC0057-20 Samp | QC | RPD %	DUP2 MHC0057-29 Samp | QC | RPD %	LCS %
pH	pH units		4.8	7.9 | 7.9 | 0.506	8.1 | 8.0 | 1.24	99.4
Electrical Conductivity	µS/cm	2.0	<2.0	58300 | 58500 | 0.480	58700 | 58900 | 0.383	109
Estimated Salinity	mg/L	1.0	<1.0	37300 | 37500 | 0.480	37600 | 37700 | 0.383	[NA]

INORG-018|Inorganics - Physical Parameters (Water) | Batch BHC1834

Analyte	Units	PQL	Blank	DUP1 BHC1834-DUP1# Samp | QC | RPD %	DUP2 MHC0057-06 Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	22700 | 23700 | 4.31	43200 | 41900 | 3.06	114

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-018|Inorganics - Physical Parameters (Water) | Batch BHC1835

Analyte	Units	PQL	Blank	DUP1 BHC1835-DUP1# Samp | QC | RPD %	DUP2 BHC1835-DUP2# Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	100 | 115 | 14.0	470 | 455 | 3.24	114

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-018|Inorganics - Physical Parameters (Water) | Batch BHC1836

Analyte	Units	PQL	Blank	DUP1 MHC0057-12 Samp | QC | RPD %	DUP2 MHC0057-28 Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	45700 | 42500 | 7.26	43900 | 39600 | 10.3	114

Quality Control MHC0057

INORG-019|Inorganics - Physical Parameters (Water) | Batch BHC1856

Analyte	Units	PQL	Blank	DUP1 MHC0057-04 Samp | QC | RPD %	DUP2 MHC0057-17 Samp | QC | RPD %	LCS %
Total Suspended Solids	mg/L	1.0	<1.0	3.20 | 3.60 | [NA]	4.60 | 4.80 | [NA]	94.0

INORG-019|Inorganics - Physical Parameters (Water) | Batch BHC1857

Analyte	Units	PQL	Blank	DUP1 MHC0057-21 Samp | QC | RPD %	DUP2 MHC0057-27 Samp | QC | RPD %	LCS %
Total Suspended Solids	mg/L	1.0	<1.0	5.60 | 5.20 | [NA]	<2.0 | <2.0 | [NA]	86.0

INORG-079|Inorganics - Carbon, Nitrogen and Sulfur Species (Water) | Batch BHC2201

Analyte	Units	PQL	Blank	DUP1 MHC0057-01 Samp | QC | RPD %	DUP2 MHC0057-11 Samp | QC | RPD %	LCS %	Spike % MHC0057-02
Total Organic Carbon	mg/L	1.0	<1.0	2.66 | <1.0 | [NA] [2]	2.18 | 2.23 | [NA]	102	80.3

INORG-079|Inorganics - Carbon, Nitrogen and Sulfur Species (Water) | Batch BHC2202

Analyte	Units	PQL	Blank	DUP1 MHC0057-21 Samp | QC | RPD %	DUP2 MHC0057-31 Samp | QC | RPD %	LCS %	Spike % MHC0057-22
Total Organic Carbon	mg/L	1.0	<1.0	3.08 | 2.38 | [NA]	1.79 | 1.93 | [NA]	90.0	90.9

INORG-119|Inorganics - Nutrients (Water) | Batch BHC2199

Analyte	Units	PQL	Blank	LCS %
Chlorophyll a	mg/m3	0.20	<0.20	104

Batch QC Comments: [3]

INORG-119|Inorganics - Nutrients (Water) | Batch BHC2200

Analyte	Units	PQL	Blank	LCS %
Chlorophyll a	mg/m3	0.20	<0.20	101

Batch QC Comments: [3]

QC Comments

Identifier	Description
[1]	Spike recovery is not applicable due to the relatively high analyte background in the sample (>3* spike level). However, the LCS recovery is within acceptance criteria.
[2]	Duplicate %RPD may be flagged as an outlier to routine laboratory acceptance, however, where one or both results are <10*PQL, the RPD acceptance criteria increases exponentially.
[3]	Unable to perform all QC according to our internal guidelines due to the limited amount of sample(s) available for testing.

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Certificate of Analysis MHD0196

Client Details

Client	South Australian Research & Development Institute
Contact	Ian Moody
Address	SARDI Aquatic Science Centre, 2 Hamra Avenue, WEST BEACH, SA, 5024

Sample Details

Your Reference	NWP Mullaquana Monthly Sampling
Number of Samples	33 Water
Date Samples Received	14/04/2026
Date Instructions Received	14/04/2026

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for soils and on an as received basis for other matrices.

Report Details

Date Final Results Expected	30/04/2026
Date of Issue	04/05/2026

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Authorisation Details

Results Approved By	Chris De Luca, Lab Manager Tianna Milburn, Operations Manager
Laboratory Manager	Chris De Luca

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Samples in this Report

Envirolab ID	Sample ID	Matrix	Date Sampled	Date Received
MHD0196-01	MQ01 R1 Comp	Water	15/04/2026	14/04/2026
MHD0196-02	MQ01 R2 Comp	Water	15/04/2026	14/04/2026
MHD0196-03	MQ01 R3 Comp	Water	15/04/2026	14/04/2026
MHD0196-04	MQ02 R1 Comp	Water	14/04/2026	14/04/2026
MHD0196-05	MQ02 R2 Comp	Water	14/04/2026	14/04/2026
MHD0196-06	MQ02 R3 Comp	Water	14/04/2026	14/04/2026
MHD0196-07	MQ03 R1 Comp	Water	14/04/2026	14/04/2026
MHD0196-08	MQ03 R2 Comp	Water	14/04/2026	14/04/2026
MHD0196-09	MQ03 R3 Comp	Water	14/04/2026	14/04/2026
MHD0196-10	MQ04 R1 Comp	Water	15/04/2026	14/04/2026
MHD0196-11	MQ04 R2 Comp	Water	15/04/2026	14/04/2026
MHD0196-12	MQ04 R3 Comp	Water	15/04/2026	14/04/2026
MHD0196-13	MQ05 R1 Comp	Water	14/04/2026	14/04/2026
MHD0196-14	MQ05 R2 Comp	Water	14/04/2026	14/04/2026
MHD0196-15	MQ05 R3 Comp	Water	14/04/2026	14/04/2026
MHD0196-16	MQ06 R1 Comp	Water	14/04/2026	14/04/2026
MHD0196-17	MQ06 R2 Comp	Water	14/04/2026	14/04/2026
MHD0196-18	MQ06 R3 Comp	Water	14/04/2026	14/04/2026
MHD0196-19	MQ07 R1 Comp	Water	15/04/2026	14/04/2026
MHD0196-20	MQ07 R2 Comp	Water	15/04/2026	14/04/2026
MHD0196-21	MQ07 R3 Comp	Water	15/04/2026	14/04/2026
MHD0196-22	MQ08 R1 Comp	Water	15/04/2026	14/04/2026
MHD0196-23	MQ08 R2 Comp	Water	15/04/2026	14/04/2026
MHD0196-24	MQ08 R3 Comp	Water	15/04/2026	14/04/2026
MHD0196-25	MQ08 R1 Surface	Water	15/04/2026	14/04/2026
MHD0196-26	MQ08 R2 Surface	Water	15/04/2026	14/04/2026
MHD0196-27	MQ08 R3 Surface	Water	15/04/2026	14/04/2026
MHD0196-28	MQ08 R1 Bottom	Water	15/04/2026	14/04/2026
MHD0196-29	MQ08 R2 Bottom	Water	15/04/2026	14/04/2026
MHD0196-30	MQ08 R3 Bottom	Water	15/04/2026	14/04/2026
MHD0196-31	MQ09 R1 Comp	Water	15/04/2026	14/04/2026
MHD0196-32	MQ09 R2 Comp	Water	15/04/2026	14/04/2026
MHD0196-33	MQ09 R3 Comp	Water	15/04/2026	14/04/2026

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Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	MHD0196-01	MHD0196-02	MHD0196-03	MHD0196-04	MHD0196-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			15/04/2026	15/04/2026	15/04/2026	14/04/2026	14/04/2026
pH	pH units		7.8	7.9	7.9	7.9	8.0
Electrical Conductivity	µS/cm	2.0	56000	56000	56000	56000	56000
Total Dissolved Solids	mg/L	5.0	36000	43000	38000	42000	41000
Estimated Salinity*	mg/L	1.0	36000	36000	36000	36000	36000
Total Suspended Solids	mg/L	1.0	1.3	1.2	3.0	11	1.4

Envirolab ID	Units	PQL	MHD0196-06	MHD0196-07	MHD0196-08	MHD0196-09	MHD0196-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			14/04/2026	14/04/2026	14/04/2026	14/04/2026	15/04/2026
pH	pH units		8.0	7.9	7.9	8.0	8.0
Electrical Conductivity	µS/cm	2.0	57000	57000	57000	57000	57000
Total Dissolved Solids	mg/L	5.0	40000	32000	32000	37000	41000
Estimated Salinity*	mg/L	1.0	36000	36000	36000	36000	36000
Total Suspended Solids	mg/L	1.0	3.0	5.9	2.8	1.5	1.1

Envirolab ID	Units	PQL	MHD0196-11	MHD0196-12	MHD0196-13	MHD0196-14	MHD0196-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			15/04/2026	15/04/2026	14/04/2026	14/04/2026	14/04/2026
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	57000	57000	57000	57000	57000
Total Dissolved Solids	mg/L	5.0	43000	37000	37000	42000	45000
Estimated Salinity*	mg/L	1.0	36000	36000	36000	36000	36000
Total Suspended Solids	mg/L	1.0	2.1	<1.0	1.4	1.9	3.0

Envirolab ID	Units	PQL	MHD0196-16	MHD0196-17	MHD0196-18	MHD0196-19	MHD0196-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			14/04/2026	14/04/2026	14/04/2026	15/04/2026	15/04/2026
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	57000	57000	57000	57000	57000
Total Dissolved Solids	mg/L	5.0	39000	44000	43000	44000	44000
Estimated Salinity*	mg/L	1.0	36000	36000	36000	36000	36000
Total Suspended Solids	mg/L	1.0	3.6	2.6	1.6	<1.0	3.1

Envirolab ID	Units	PQL	MHD0196-21	MHD0196-22	MHD0196-23	MHD0196-24	MHD0196-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			15/04/2026	15/04/2026	15/04/2026	15/04/2026	15/04/2026
pH	pH units		7.8	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	58000	58000	58000	58000	58000
Total Dissolved Solids	mg/L	5.0	38000	43000	45000	43000	40000
Estimated Salinity*	mg/L	1.0	37000	37000	37000	37000	37000
Total Suspended Solids	mg/L	1.0	2.7	1.4	2.4	3.6	1.2

Envirolab ID	Units	PQL	MHD0196-26	MHD0196-27	MHD0196-28	MHD0196-29	MHD0196-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			15/04/2026	15/04/2026	15/04/2026	15/04/2026	15/04/2026
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	58000	58000	58000	58000	58000
Total Dissolved Solids	mg/L	5.0	39000	46000	46000	39000	44000

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Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	MHD0196-26	MHD0196-27	MHD0196-28	MHD0196-29	MHD0196-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			15/04/2026	15/04/2026	15/04/2026	15/04/2026	15/04/2026
Estimated Salinity*	mg/L	1.0	37000	37000	37000	37000	37000
Total Suspended Solids	mg/L	1.0	2.6	4.2	<1.0	3.2	1.3

Envirolab ID	Units	PQL	MHD0196-31	MHD0196-32	MHD0196-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			15/04/2026	15/04/2026	15/04/2026
pH	pH units		8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	58000	58000	58000
Total Dissolved Solids	mg/L	5.0	45000	43000	41000
Estimated Salinity*	mg/L	1.0	37000	37000	37000
Total Suspended Solids	mg/L	1.0	2.9	1.9	1.6

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Inorganics - Nutrients (Water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	MHD0196-01	MHD0196-02	MHD0196-03	MHD0196-04	MHD0196-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			15/04/2026	15/04/2026	15/04/2026	14/04/2026	14/04/2026
Chlorophyll a	mg/m3	0.20	0.80	1.0	0.70	0.70	0.50

Envirolab ID	Units	PQL	MHD0196-06	MHD0196-07	MHD0196-08	MHD0196-09	MHD0196-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			14/04/2026	14/04/2026	14/04/2026	14/04/2026	15/04/2026
Chlorophyll a	mg/m3	0.20	0.70	1.0	0.50	0.70	0.70

Envirolab ID	Units	PQL	MHD0196-11	MHD0196-12	MHD0196-13	MHD0196-14	MHD0196-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			15/04/2026	15/04/2026	14/04/2026	14/04/2026	14/04/2026
Chlorophyll a	mg/m3	0.20	0.70	0.70	0.80	1.0	0.90

Envirolab ID	Units	PQL	MHD0196-16	MHD0196-17	MHD0196-18	MHD0196-19	MHD0196-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			14/04/2026	14/04/2026	14/04/2026	15/04/2026	15/04/2026
Chlorophyll a	mg/m3	0.20	1.0	0.70	0.80	1.0	1.0

Envirolab ID	Units	PQL	MHD0196-21	MHD0196-22	MHD0196-23	MHD0196-24	MHD0196-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			15/04/2026	15/04/2026	15/04/2026	15/04/2026	15/04/2026
Chlorophyll a	mg/m3	0.20	0.90	2.0	0.70	0.90	1.0

Envirolab ID	Units	PQL	MHD0196-26	MHD0196-27	MHD0196-28	MHD0196-29	MHD0196-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			15/04/2026	15/04/2026	15/04/2026	15/04/2026	15/04/2026
Chlorophyll a	mg/m3	0.20	1.0	1.0	1.0	1.0	1.0

Envirolab ID	Units	PQL	MHD0196-31	MHD0196-32	MHD0196-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			15/04/2026	15/04/2026	15/04/2026
Chlorophyll a	mg/m3	0.20	1.0	0.80	0.80

Subcontracted Inorganics - Certificate: ENVL26-8 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MHD0196-01	MHD0196-02	MHD0196-03	MHD0196-04	MHD0196-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			15/04/2026	15/04/2026	15/04/2026	14/04/2026	14/04/2026
Ammonia as N	µg/L	3.0	5	6	6	4	4
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	140	150	150	150	140
Phosphate as P	µg/L	2.0	<2	<2	<2	<2	<2
Total Phosphorus	µg/L	5.0	7	8	9	9	7
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	140	150	150	150	140

Envirolab ID	Units	PQL	MHD0196-06	MHD0196-07	MHD0196-08	MHD0196-09	MHD0196-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			14/04/2026	14/04/2026	14/04/2026	14/04/2026	15/04/2026
Ammonia as N	µg/L	3.0	6	<3	<3	<3	4
Nitrate as N	µg/L	2.0	2	2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	150	160	160	170	150
Phosphate as P	µg/L	2.0	<2	<2	<2	<2	<2
Total Phosphorus	µg/L	5.0	8	9	9	11	8
NOx as N	µg/L	2.0	2	2	<2	2	<2
TKN as N*	µg/L	50	150	160	160	160	140

Envirolab ID	Units	PQL	MHD0196-11	MHD0196-12	MHD0196-13	MHD0196-14	MHD0196-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			15/04/2026	15/04/2026	14/04/2026	14/04/2026	14/04/2026
Ammonia as N	µg/L	3.0	4	5	7	6	7
Nitrate as N	µg/L	2.0	<2	<2	2	2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	150	140	170	170	190
Phosphate as P	µg/L	2.0	<2	<2	<2	<2	<2
Total Phosphorus	µg/L	5.0	7	8	10	10	8
NOx as N	µg/L	2.0	<2	<2	2	2	2
TKN as N*	µg/L	50	150	140	170	170	180

Envirolab ID	Units	PQL	MHD0196-16	MHD0196-17	MHD0196-18	MHD0196-19	MHD0196-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			14/04/2026	14/04/2026	14/04/2026	15/04/2026	15/04/2026
Ammonia as N	µg/L	3.0	<3	<3	<3	3	4

Subcontracted Inorganics - Certificate: ENVL26-8 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MHD0196-16	MHD0196-17	MHD0196-18	MHD0196-19	MHD0196-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			14/04/2026	14/04/2026	14/04/2026	15/04/2026	15/04/2026
Nitrate as N	µg/L	2.0	<2	6	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	170	180	170	150	150
Phosphate as P	µg/L	2.0	<2	<2	<2	<2	<2
Total Phosphorus	µg/L	5.0	9	8	10	10	10
NOx as N	µg/L	2.0	<2	6	<2	<2	2
TKN as N*	µg/L	50	170	170	170	150	150

Envirolab ID	Units	PQL	MHD0196-21	MHD0196-22	MHD0196-23	MHD0196-24	MHD0196-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			15/04/2026	15/04/2026	15/04/2026	15/04/2026	15/04/2026
Ammonia as N	µg/L	3.0	3	4	3	3	<3
Nitrate as N	µg/L	2.0	2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	150	160	170	140	160
Phosphate as P	µg/L	2.0	<2	<2	<2	<2	<2
Total Phosphorus	µg/L	5.0	9	10	8	8	9
NOx as N	µg/L	2.0	2	<2	<2	<2	<2
TKN as N*	µg/L	50	150	150	160	140	160

Envirolab ID	Units	PQL	MHD0196-26	MHD0196-27	MHD0196-28	MHD0196-29	MHD0196-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			15/04/2026	15/04/2026	15/04/2026	15/04/2026	15/04/2026
Ammonia as N	µg/L	3.0	<3	3	5	4	4
Nitrate as N	µg/L	2.0	<2	<2	<2	2	2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	160	150	160	160	140
Phosphate as P	µg/L	2.0	<2	<2	<2	<2	<2
Total Phosphorus	µg/L	5.0	9	7	9	8	7
NOx as N	µg/L	2.0	<2	<2	<2	2	2
TKN as N*	µg/L	50	160	150	160	160	140

Envirolab ID	Units	PQL	MHD0196-31	MHD0196-32	MHD0196-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			15/04/2026	15/04/2026	15/04/2026
Ammonia as N	µg/L	3.0	4	4	3

Subcontracted Inorganics - Certificate: ENVL26-8 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MHD0196-31	MHD0196-32	MHD0196-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			15/04/2026	15/04/2026	15/04/2026
Nitrate as N	µg/L	2.0	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2
Total Nitrogen	µg/L	50	160	150	160
Phosphate as P	µg/L	2.0	<2	<2	<2
Total Phosphorus	µg/L	5.0	8	9	9
NOx as N	µg/L	2.0	<2	<2	<2
TKN as N*	µg/L	50	160	150	160

Certificate of Analysis MHD0196

Subcontracted Metals - Certificate: ENVL26-8 - Analysed By Marine and Freshwater Research Lab (Water)

Envirolab ID	Units	PQL	MHD0196-01	MHD0196-02	MHD0196-03	MHD0196-04	MHD0196-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			15/04/2026	15/04/2026	15/04/2026	14/04/2026	14/04/2026
Reactive Silica	µg/L	2.0	68	67	66	66	66

Envirolab ID	Units	PQL	MHD0196-06	MHD0196-07	MHD0196-08	MHD0196-09	MHD0196-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			14/04/2026	14/04/2026	14/04/2026	14/04/2026	15/04/2026
Reactive Silica	µg/L	2.0	67	72	71	70	67

Envirolab ID	Units	PQL	MHD0196-11	MHD0196-12	MHD0196-13	MHD0196-14	MHD0196-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			15/04/2026	15/04/2026	14/04/2026	14/04/2026	14/04/2026
Reactive Silica	µg/L	2.0	67	68	77	76	77

Envirolab ID	Units	PQL	MHD0196-16	MHD0196-17	MHD0196-18	MHD0196-19	MHD0196-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			14/04/2026	14/04/2026	14/04/2026	15/04/2026	15/04/2026
Reactive Silica	µg/L	2.0	73	73	74	70	70

Envirolab ID	Units	PQL	MHD0196-21	MHD0196-22	MHD0196-23	MHD0196-24	MHD0196-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			15/04/2026	15/04/2026	15/04/2026	15/04/2026	15/04/2026
Reactive Silica	µg/L	2.0	70	72	72	72	70

Envirolab ID	Units	PQL	MHD0196-26	MHD0196-27	MHD0196-28	MHD0196-29	MHD0196-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			15/04/2026	15/04/2026	15/04/2026	15/04/2026	15/04/2026
Reactive Silica	µg/L	2.0	68	68	79	79	78

Envirolab ID	Units	PQL	MHD0196-31	MHD0196-32	MHD0196-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			15/04/2026	15/04/2026	15/04/2026
Reactive Silica	µg/L	2.0	75	76	76

Certificate of Analysis MHD0196

Subcontracted Micro - Certificate: Various - Analysed By SA Pathology (Water)

Envirolab ID	Units	PQL	MHD0196-01	MHD0196-02	MHD0196-03	MHD0196-04	MHD0196-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			15/04/2026	15/04/2026	15/04/2026	14/04/2026	14/04/2026
Total Coliforms	MPN/100mL	1.0	110	30	40	550	320

Envirolab ID	Units	PQL	MHD0196-06	MHD0196-07	MHD0196-08	MHD0196-09	MHD0196-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			14/04/2026	14/04/2026	14/04/2026	14/04/2026	15/04/2026
Total Coliforms	MPN/100mL	1.0	430	520	320	610	80

Envirolab ID	Units	PQL	MHD0196-11	MHD0196-12	MHD0196-13	MHD0196-14	MHD0196-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			15/04/2026	15/04/2026	14/04/2026	14/04/2026	14/04/2026
Total Coliforms	MPN/100mL	1.0	50	40	2400	>2400	>2400

Envirolab ID	Units	PQL	MHD0196-16	MHD0196-17	MHD0196-18	MHD0196-19	MHD0196-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			14/04/2026	14/04/2026	14/04/2026	15/04/2026	15/04/2026
Total Coliforms	MPN/100mL	1.0	240	320	230	20	30

Envirolab ID	Units	PQL	MHD0196-21	MHD0196-22	MHD0196-23	MHD0196-24	MHD0196-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			15/04/2026	15/04/2026	15/04/2026	15/04/2026	15/04/2026
Total Coliforms	MPN/100mL	1.0	3	30	20	7	30

Envirolab ID	Units	PQL	MHD0196-26	MHD0196-27	MHD0196-28	MHD0196-29	MHD0196-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			15/04/2026	15/04/2026	15/04/2026	15/04/2026	15/04/2026
Total Coliforms	MPN/100mL	1.0	3	2	70	30	10

Envirolab ID	Units	PQL	MHD0196-31	MHD0196-32	MHD0196-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			15/04/2026	15/04/2026	15/04/2026
Total Coliforms	MPN/100mL	1.0	20	4	20

Method Summary

Method ID	Methodology Summary
INORG-001	pH - Measured using pH meter and electrode. Please note that the results for water analyses are indicative only, as analysis can be completed outside of the recommended holding times. Solids are reported from a 1:5 water extract unless otherwise specified. Alternatively, pH is determined in a 1:5 extract using 0.01M calcium chloride or a solid is extracted at a ratio of 1:2.5 (AS1289.4.3.1), pH is measured in the extract.
INORG-002	Conductivity and Salinity - measured using a conductivity cell at 25°C. Soil results reported from a 1:5 Soil:Water extract unless otherwise specified. Please note Resistivity is estimated by calculation and may not correlate with results otherwise obtained using the Resistivity current method (based on AS 1289.4.4.1), depending on the nature of the soil being analysed. Blanks may yield EC readings >1µS/cm, this is likely due to adsorption of Carbon Dioxide while the blank sample is sat on the instrument autosampler prior to analysis. The values are generally insignificant (<5µS/cm) compared to most actual sample conductivities.
INORG-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180±10°C. NOTE: Where the EC of the sample is <100µS/cm, the TDS will typically be below 70mg/L (as the sample is very likely to be at least drinking water quality). Therefore to ensure data quality for TDS, the TDS is typically calculated as per the equation: TDS = EC*0.6
INORG-019	Suspended Solids - determined gravimetrically by filtration of the sample. The solids are dried at 104±5°C
INORG-119	Chlorophyll A based on APHA 10200 H latest edition.
SUB-021	Subcontracted to Marine & Freshwater Research - Accreditation number 10603
SUB-041_CA	Subcontracted to SA Pathology

Result Definitions

Identifier	Description
NR	Not reported
NEPM	National Environment Protection Measure
NS	Not specified
LCS	Laboratory Control Sample
RPD	Relative Percent Difference
>	Greater than
<	Less than
PQL	Practical Quantitation Limit
INS	Insufficient sample for this test
NA	Test not required
NT	Not tested
DOL	Samples rejected due to particulate overload (air filters only)
RFD	Samples rejected due to filter damage (air filters only)
RUD	Samples rejected due to uneven deposition (air filters only)
##	Indicates a laboratory acceptance criteria outlier, for further details, see Result Comments and/or QC Comments

Quality Control Definitions

Blank

This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, and is determined by processing solvents and reagents in exactly the same manner as for samples.

Surrogate Spike

Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

LCS (Laboratory Control Sample)

This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Matrix Spike

A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

Duplicate

This is the complete duplicate analysis of a sample from the process batch. The sample selected should be one where the analyte concentration is easily measurable.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria. Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction. Spikes for Physical and Aggregate Tests are not applicable. For VOCs in water samples, three vials are required for duplicate or spike analysis.

General Acceptance Criteria (GAC) - Analyte specific criteria applies for some analytes and is reflected in QC recovery tables.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% - see ELN-P05 QAQC tables for details (available on request); <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase. Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was typically insufficient in order to satisfy laboratory QA/QC protocols.

Miscellaneous Information

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached. We have taken the sampling date as being the date received at the laboratory.

Two significant figures are reported for the majority of tests and with a high degree of confidence, for results <10*PQL, the second significant figure may be in doubt i.e. has a relatively high degree of uncertainty and is provided for information only.

Measurement Uncertainty estimates can be downloaded from the Envirolab Resources website or obtained directly by contacting the laboratory.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS where sediment/solids are included by default.

Urine Analysis - The BEI values listed are taken from the 2022 edition of *TLVs and BEIs Threshold Limits by ACGIH*.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volume(s) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

Where air volumes and/or sampled areas and/or time based sampling data is supplied by customers and the customer is NATA accredited for the sampling activity then calculated concentrations can be reported on the endorsed Certificate of Analysis (CoA). Confirmation of the accreditation must be supplied by the customer and such information is used in good faith. Where the sampling is not covered by NATA accreditation then only the raw data can be reported on the CoA (e.g. mass, fibres per field)

Data Quality Assessment Summary MHD0196

Client Details

Client	South Australian Research & Development Institute
Your Reference	NWP Mullaquana Monthly Sampling
Date Issued	04/05/2026

Recommended Holding Time Compliance

Recommended holding time exceedances exist - See detailed list below

Quality Control and QC Frequency

QC Type	Compliant	Details
Blank	Yes	No Outliers
LCS	Yes	No Outliers
Duplicates	Yes	No Outliers
Matrix Spike	Yes	No Outliers
Surrogates / Extracted Internal Standards	Yes	No Outliers
QC Frequency	No	QC Frequency Outliers Exist - See detailed list below

Surrogates/Extracted Internal Standards, Duplicates and/or Matrix Spikes are not always relevant/applicable to certain analyses and matrices. Therefore, said QC measures are deemed compliant in these situations by default. See Laboratory Acceptance Criteria for more information

Data Quality Assessment Summary MHD0196

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
EC | Water	4-9, 13-18	14/04/2026	15/04/2026	21/04/2026	Yes
	1-2	15/04/2026	15/04/2026	20/04/2026	Yes
	3, 10-12, 19-20	15/04/2026	15/04/2026	21/04/2026	Yes
	21-33	15/04/2026	21/04/2026	21/04/2026	Yes
pH | Water	4-9, 13-18	14/04/2026	15/04/2026	21/04/2026	Yes
	1-2	15/04/2026	15/04/2026	20/04/2026	Yes
	3, 10-12, 19-20	15/04/2026	15/04/2026	21/04/2026	Yes
	21-33	15/04/2026	21/04/2026	21/04/2026	No
Salinity | Water	4-9, 13-18	14/04/2026	15/04/2026	21/04/2026	Yes
	1-2	15/04/2026	15/04/2026	20/04/2026	Yes
	3, 10-12, 19-20	15/04/2026	15/04/2026	21/04/2026	Yes
	21-33	15/04/2026	21/04/2026	21/04/2026	Yes
TDS | Water	4-9, 13-18	14/04/2026	21/04/2026	21/04/2026	Yes
	1-3, 10-12, 19-20	15/04/2026	21/04/2026	21/04/2026	Yes
	21-33	15/04/2026	21/04/2026	22/04/2026	Yes
TSS (LL) | Water	4-9, 13-18	14/04/2026	21/04/2026	30/04/2026	Yes
	1-3, 10-12, 19-33	15/04/2026	21/04/2026	30/04/2026	Yes
Chlorophyll a (LL) - Frozen | Water	4-9, 13-18	14/04/2026	21/04/2026	28/04/2026	Yes
	1-3, 10-12, 19-20	15/04/2026	21/04/2026	28/04/2026	Yes
	21-33	15/04/2026	24/04/2026	24/04/2026	Yes
Ammonia as N | Water	4-9, 13-18	14/04/2026	24/04/2026	24/04/2026	Yes
	1-3, 10-12, 19-33	15/04/2026	24/04/2026	24/04/2026	Yes
Nitrate as N (LL) | Water	4-9, 13-18	14/04/2026	24/04/2026	24/04/2026	Yes
	1-3, 10-12, 19-33	15/04/2026	24/04/2026	24/04/2026	Yes
Nitrite as N (LL) | Water	4-9, 13-18	14/04/2026	20/04/2026	20/04/2026	Yes
	1-3, 10-12, 19-33	15/04/2026	20/04/2026	20/04/2026	Yes
NOx as N (LL) | Water	4-9, 13-18	14/04/2026	24/04/2026	24/04/2026	Yes
	1-3, 10-12, 19-33	15/04/2026	24/04/2026	24/04/2026	Yes
Phosphate as P (LL) | Water	4-9, 13-18	14/04/2026	24/04/2026	24/04/2026	Yes
	1-3, 10-12, 19-33	15/04/2026	24/04/2026	24/04/2026	Yes
TKN as N calc (LL) | Water	4-9, 13-18	14/04/2026	21/04/2026	22/04/2026	Yes
	1-3, 10-12, 19-33	15/04/2026	21/04/2026	22/04/2026	Yes
Total N and P (LL) | Water	4-9, 13-18	14/04/2026	21/04/2026	22/04/2026	Yes
	1-3, 10-12, 19-33	15/04/2026	21/04/2026	22/04/2026	Yes
Reactive Silica (LL) | Water	4-9, 13-18	14/04/2026	28/04/2026	28/04/2026	Yes
	1-3, 10-12, 19-33	15/04/2026	28/04/2026	28/04/2026	Yes
Total Coliforms | Water	4-9, 13-18	14/04/2026	14/04/2026	15/04/2026	Yes
	1-3, 10-12, 19-20, 22-23, 25, 28-31, 33	15/04/2026	15/04/2026	16/04/2026	Yes
	21, 24, 26-27, 32	15/04/2026	16/04/2026	22/04/2026	Yes

Data Quality Assessment Summary MHD0196

Outliers: QC Frequency

INORG-119 | Inorganics - Nutrients (Water) | Batch BHD2970

Analysis	QC Type	Expected	Reported
Chlorophyll a (LL) - Frozen	Duplicate	2	0

INORG-119 | Inorganics - Nutrients (Water) | Batch BHD2971

Analysis	QC Type	Expected	Reported
Chlorophyll a (LL) - Frozen	Duplicate	2	0

Quality Control MHD0196

INORG-001 | Inorganics - Physical Parameters (Water) | Batch BHD2704

Analyte	Units	PQL	Blank	DUP1 MHD0196-04 Samp | QC | RPD %	DUP2 MHD0196-17 Samp | QC | RPD %	LCS %
pH	pH units		4.6	7.9 | 8.0 | 0.126	8.0 | 8.0 | 0.125	98.0
Electrical Conductivity	µS/cm	2.0	<2.0	56400 | 55500 | 1.56	56900 | 56100 | 1.30	104
Estimated Salinity*	mg/L	1.0	<1.0	36100 | 35500 | 1.56	36400 | 35900 | 1.30	[NA]

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BHD2826

Analyte	Units	PQL	Blank	DUP1 MHD0196-04 Samp | QC | RPD %	DUP2 MHD0196-17 Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	42400 | 43100 | 1.64	43900 | 42600 | 3.01	106

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BHD2827

Analyte	Units	PQL	Blank	DUP1 MHD0196-21 Samp | QC | RPD %	DUP2 MHD0196-31 Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	37800 | 44200 | 15.6	44900 | 45400 | 1.11	109

INORG-019 | Inorganics - Physical Parameters (Water) | Batch BHD2832

Analyte	Units	PQL	Blank	DUP1 BHD2832-DUP1# Samp | QC | RPD %	DUP2 MHD0196-08 Samp | QC | RPD %	LCS %
Total Suspended Solids	mg/L	1.0	<1.0	2.80 | 2.60 | [NA]	2.80 | 2.40 | [NA]	91.0

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-019 | Inorganics - Physical Parameters (Water) | Batch BHD2833

Analyte	Units	PQL	Blank	DUP1 MHD0196-03 Samp | QC | RPD %	DUP2 MHD0196-24 Samp | QC | RPD %	LCS %
Total Suspended Solids	mg/L	1.0	<1.0	3.00 | 2.40 | [NA] [1]	3.60 | 3.60 | [NA]	97.0

INORG-001 | Inorganics - Physical Parameters (Water) | Batch BHD2918

Analyte	Units	PQL	Blank	DUP1 BHD2918-DUP1# Samp | QC | RPD %	DUP2 MHD0196-30 Samp | QC | RPD %	LCS %
pH	pH units		4.4	5.0 | 5.2 | 3.74	8.0 | 8.0 | 0.00	99.7
Electrical Conductivity	µS/cm	2.0	<2.0	4.30 | 4.20 | [NA]	57900 | 58000 | 0.103	105
Estimated Salinity*	mg/L	1.0	1.15	2.75 | 2.69 | [NA]	37100 | 37100 | 0.103	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-119 | Inorganics - Nutrients (Water) | Batch BHD2970

Analyte	Units	PQL	Blank	LCS %
Chlorophyll a	mg/m3	0.20	<0.20	99.0

Batch QC Comments: [2]

INORG-119 | Inorganics - Nutrients (Water) | Batch BHD2971

Analyte	Units	PQL	Blank	LCS %
Chlorophyll a	mg/m3	0.20	<0.20	96.0

Batch QC Comments: [2]

Quality Control MHD0196

QC Comments

Identifier	Description
[1]	The result(s) is/are an estimated value(s) as the analyte(s) was/were detected at a level above the linear calibration range(s).
[2]	Unable to perform all QC according to our internal guidelines due to the limited amount of sample(s) available for testing.

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Certificate of Analysis MHE0053

Client Details

Client	South Australian Research & Development Institute
Contact	Ian Moody
Address	SARDI Aquatic Science Centre, 2 Hamra Avenue, WEST BEACH, SA, 5024

Sample Details

Your Reference	NWP Mullaquana Monthly Sampling
Number of Samples	33 Sea water
Date Samples Received	14/05/2026
Date Instructions Received	14/05/2026

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for soils and on an as received basis for other matrices.

Report Details

Date Final Results Expected	12/06/2026
Date of Issue	12/06/2026

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Authorisation Details

Results Approved By	Chaminda Gunasekara, Inorganics Supervisor Chris De Luca, Lab Manager Tianna Milburn, Operations Manager
Laboratory Manager	Chris De Luca

Certificate of Analysis MHE0053

Samples in this Report

Envirolab ID	Sample ID	Matrix	Date Sampled	Date Received
MHE0053-01	MQ01 R1 Comp	Sea water	13/05/2026	14/05/2026
MHE0053-02	MQ01 R2 Comp	Sea water	13/05/2026	14/05/2026
MHE0053-03	MQ01 R3 Comp	Sea water	13/05/2026	14/05/2026
MHE0053-04	MQ02 R1 Comp	Sea water	12/05/2026	14/05/2026
MHE0053-05	MQ02 R2 Comp	Sea water	12/05/2026	14/05/2026
MHE0053-06	MQ02 R3 Comp	Sea water	12/05/2026	14/05/2026
MHE0053-07	MQ03 R1 Comp	Sea water	12/05/2026	14/05/2026
MHE0053-08	MQ03 R2 Comp	Sea water	12/05/2026	14/05/2026
MHE0053-09	MQ03 R3 Comp	Sea water	12/05/2026	14/05/2026
MHE0053-10	MQ04 R1 Comp	Sea water	13/05/2026	14/05/2026
MHE0053-11	MQ04 R2 Comp	Sea water	13/05/2026	14/05/2026
MHE0053-12	MQ04 R3 Comp	Sea water	13/05/2026	14/05/2026
MHE0053-13	MQ05 R1 Comp	Sea water	12/05/2026	14/05/2026
MHE0053-14	MQ05 R2 Comp	Sea water	12/05/2026	14/05/2026
MHE0053-15	MQ05 R3 Comp	Sea water	12/05/2026	14/05/2026
MHE0053-16	MQ06 R1 Comp	Sea water	12/05/2026	14/05/2026
MHE0053-17	MQ06 R2 Comp	Sea water	12/05/2026	14/05/2026
MHE0053-18	MQ06 R3 Comp	Sea water	12/05/2026	14/05/2026
MHE0053-19	MQ07 R1 Comp	Sea water	13/05/2026	14/05/2026
MHE0053-20	MQ07 R2 Comp	Sea water	13/05/2026	14/05/2026
MHE0053-21	MQ07 R3 Comp	Sea water	13/05/2026	14/05/2026
MHE0053-22	MQ08 R1 Comp	Sea water	13/05/2026	14/05/2026
MHE0053-23	MQ08 R2 Comp	Sea water	13/05/2026	14/05/2026
MHE0053-24	MQ08 R3 Comp	Sea water	13/05/2026	14/05/2026
MHE0053-25	MQ08 R1 Surface	Sea water	13/05/2026	14/05/2026
MHE0053-26	MQ08 R2 Surface	Sea water	13/05/2026	14/05/2026
MHE0053-27	MQ08 R3 Surface	Sea water	13/05/2026	14/05/2026
MHE0053-28	MQ08 R1 Bottom	Sea water	13/05/2026	14/05/2026
MHE0053-29	MQ08 R2 Bottom	Sea water	13/05/2026	14/05/2026
MHE0053-30	MQ08 R3 Bottom	Sea water	13/05/2026	14/05/2026
MHE0053-31	MQ09 R1 Comp	Sea water	13/05/2026	14/05/2026
MHE0053-32	MQ09 R2 Comp	Sea water	13/05/2026	14/05/2026
MHE0053-33	MQ09 R3 Comp	Sea water	13/05/2026	14/05/2026

Certificate of Analysis MHE0053

Inorganics - Physical Parameters (Sea water)

Envirolab ID	Units	PQL	MHE0053-01	MHE0053-02	MHE0053-03	MHE0053-04	MHE0053-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			13/05/2026	13/05/2026	13/05/2026	12/05/2026	12/05/2026
pH	pH units		7.8	7.9	7.9	7.9	8.0
Electrical Conductivity	µS/cm	2.0	55000	55000	55000	56000	56000
Total Dissolved Solids	mg/L	5.0	44000	43000	42000	43000	43000
Estimated Salinity*	mg/L	1.0	35000	35000	35000	36000	36000
Total Suspended Solids	mg/L	1.0	<1.0	1.6	5.1	6.6	5.1

Envirolab ID	Units	PQL	MHE0053-06	MHE0053-07	MHE0053-08	MHE0053-09	MHE0053-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			12/05/2026	12/05/2026	12/05/2026	12/05/2026	13/05/2026
pH	pH units		8.0	8.0	7.9	8.0	8.0
Electrical Conductivity	µS/cm	2.0	56000	56000	56000	55000	56000
Total Dissolved Solids	mg/L	5.0	44000	43000	42000	43000	42000
Estimated Salinity*	mg/L	1.0	36000	36000	36000	36000	36000
Total Suspended Solids	mg/L	1.0	12	8.8	5.0	1.3	13

Envirolab ID	Units	PQL	MHE0053-11	MHE0053-12	MHE0053-13	MHE0053-14	MHE0053-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			13/05/2026	13/05/2026	12/05/2026	12/05/2026	12/05/2026
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	56000	56000	56000	56000	56000
Total Dissolved Solids	mg/L	5.0	42000	40000	43000	44000	42000
Estimated Salinity*	mg/L	1.0	36000	36000	36000	36000	36000
Total Suspended Solids	mg/L	1.0	2.4	8.6	2.4	1.9	3.6

Envirolab ID	Units	PQL	MHE0053-16	MHE0053-17	MHE0053-18	MHE0053-19	MHE0053-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			12/05/2026	12/05/2026	12/05/2026	13/05/2026	13/05/2026
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	56000	56000	56000	56000	56000
Total Dissolved Solids	mg/L	5.0	42000	43000	41000	41000	44000
Estimated Salinity*	mg/L	1.0	36000	36000	36000	36000	36000
Total Suspended Solids	mg/L	1.0	8.5	3.2	12	3.2	14

Envirolab ID	Units	PQL	MHE0053-21	MHE0053-22	MHE0053-23	MHE0053-24	MHE0053-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			13/05/2026	13/05/2026	13/05/2026	13/05/2026	13/05/2026
pH	pH units		7.8	7.9	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	55000	55000	55000	55000	55000
Total Dissolved Solids	mg/L	5.0	42000	44000	44000	44000	43000
Estimated Salinity*	mg/L	1.0	35000	35000	35000	35000	35000
Total Suspended Solids	mg/L	1.0	8.2	5.9	9.1	10	1.6

Envirolab ID	Units	PQL	MHE0053-26	MHE0053-27	MHE0053-28	MHE0053-29	MHE0053-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			13/05/2026	13/05/2026	13/05/2026	13/05/2026	13/05/2026
pH	pH units		8.0	8.0	8.0	8.0	8.0
Electrical Conductivity	µS/cm	2.0	55000	55000	56000	56000	56000
Total Dissolved Solids	mg/L	5.0	44000	43000	44000	44000	44000

Certificate of Analysis MHE0053

Inorganics - Physical Parameters (Sea water)

Envirolab ID	Units	PQL	MHE0053-26	MHE0053-27	MHE0053-28	MHE0053-29	MHE0053-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			13/05/2026	13/05/2026	13/05/2026	13/05/2026	13/05/2026
Estimated Salinity*	mg/L	1.0	35000	35000	36000	36000	36000
Total Suspended Solids	mg/L	1.0	3.6	13	7.7	9.8	23

Envirolab ID	Units	PQL	MHE0053-31	MHE0053-32	MHE0053-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			13/05/2026	13/05/2026	13/05/2026
pH	pH units		8.1	8.0	8.0
Electrical Conductivity	µS/cm	2.0	55000	55000	55000
Total Dissolved Solids	mg/L	5.0	44000	42000	44000
Estimated Salinity*	mg/L	1.0	35000	35000	35000
Total Suspended Solids	mg/L	1.0	9.8	3.5	11

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Inorganics - Nutrients (Sea water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	MHE0053-01	MHE0053-02	MHE0053-03	MHE0053-04	MHE0053-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			13/05/2026	13/05/2026	13/05/2026	12/05/2026	12/05/2026
Chlorophyll a	mg/m3	0.20	0.40	0.80	0.40	0.53	0.67

Envirolab ID	Units	PQL	MHE0053-06	MHE0053-07	MHE0053-08	MHE0053-09	MHE0053-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			12/05/2026	12/05/2026	12/05/2026	12/05/2026	13/05/2026
Chlorophyll a	mg/m3	0.20	0.53	0.40	0.27	0.40	0.53

Envirolab ID	Units	PQL	MHE0053-11	MHE0053-12	MHE0053-13	MHE0053-14	MHE0053-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			13/05/2026	13/05/2026	12/05/2026	12/05/2026	12/05/2026
Chlorophyll a	mg/m3	0.20	0.80	0.53	0.67	0.53	0.53

Envirolab ID	Units	PQL	MHE0053-16	MHE0053-17	MHE0053-18	MHE0053-19	MHE0053-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			12/05/2026	12/05/2026	12/05/2026	13/05/2026	13/05/2026
Chlorophyll a	mg/m3	0.20	0.67	0.67	0.40	0.67	0.80

Envirolab ID	Units	PQL	MHE0053-21	MHE0053-22	MHE0053-23	MHE0053-24	MHE0053-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			13/05/2026	13/05/2026	13/05/2026	13/05/2026	13/05/2026
Chlorophyll a	mg/m3	0.20	0.53	0.53	0.40	0.80	0.40

Envirolab ID	Units	PQL	MHE0053-26	MHE0053-27	MHE0053-28	MHE0053-29	MHE0053-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			13/05/2026	13/05/2026	13/05/2026	13/05/2026	13/05/2026
Chlorophyll a	mg/m3	0.20	0.67	0.67	0.40	0.27	0.53

Envirolab ID	Units	PQL	MHE0053-31	MHE0053-32	MHE0053-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			13/05/2026	13/05/2026	13/05/2026
Chlorophyll a	mg/m3	0.20	0.53	0.40	0.67

Subcontracted Inorganics - Certificate: ENVL26-10 - Analysed By Marine and Freshwater Research Lab (Sea water)

Envirolab ID	Units	PQL	MHE0053-01	MHE0053-02	MHE0053-03	MHE0053-04	MHE0053-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			13/05/2026	13/05/2026	13/05/2026	12/05/2026	12/05/2026
Ammonia as N	µg/L	3.0	4	<3	<3	4	5
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	150	150	140	170	170
Phosphate as P	µg/L	2.0	<2	<2	<2	<2	<2
Total Phosphorus	µg/L	5.0	7	8	8	8	8
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	140	150	130	170	170

Envirolab ID	Units	PQL	MHE0053-06	MHE0053-07	MHE0053-08	MHE0053-09	MHE0053-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			12/05/2026	12/05/2026	12/05/2026	12/05/2026	13/05/2026
Ammonia as N	µg/L	3.0	<3	<3	3	4	6
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	160	160	160	180	180
Phosphate as P	µg/L	2.0	<2	<2	<2	<2	2
Total Phosphorus	µg/L	5.0	7	7	6	9	8
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	160	150	160	180	180

Envirolab ID	Units	PQL	MHE0053-11	MHE0053-12	MHE0053-13	MHE0053-14	MHE0053-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			13/05/2026	13/05/2026	12/05/2026	12/05/2026	12/05/2026
Ammonia as N	µg/L	3.0	10	7	4	6	3
Nitrate as N	µg/L	2.0	<2	<2	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	190	180	170	160	170
Phosphate as P	µg/L	2.0	<2	<2	2	<2	<2
Total Phosphorus	µg/L	5.0	8	7	8	7	7
NOx as N	µg/L	2.0	<2	<2	<2	<2	<2
TKN as N*	µg/L	50	190	180	170	160	160

Envirolab ID	Units	PQL	MHE0053-16	MHE0053-17	MHE0053-18	MHE0053-19	MHE0053-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			12/05/2026	12/05/2026	12/05/2026	13/05/2026	13/05/2026
Ammonia as N	µg/L	3.0	<3	<3	5	6	5

Subcontracted Inorganics - Certificate: ENVL26-10 - Analysed By Marine and Freshwater Research Lab (Sea water)

Envirolab ID	Units	PQL	MHE0053-16	MHE0053-17	MHE0053-18	MHE0053-19	MHE0053-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			12/05/2026	12/05/2026	12/05/2026	13/05/2026	13/05/2026
Nitrate as N	µg/L	2.0	<2	<2	<2	2	3
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	160	160	160	160	160
Phosphate as P	µg/L	2.0	<2	<2	<2	<2	3
Total Phosphorus	µg/L	5.0	8	7	9	8	8
NOx as N	µg/L	2.0	<2	<2	<2	3	3
TKN as N*	µg/L	50	150	160	160	150	160

Envirolab ID	Units	PQL	MHE0053-21	MHE0053-22	MHE0053-23	MHE0053-24	MHE0053-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			13/05/2026	13/05/2026	13/05/2026	13/05/2026	13/05/2026
Ammonia as N	µg/L	3.0	4	4	4	4	<3
Nitrate as N	µg/L	2.0	<2	3	<2	2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	160	160	170	160	140
Phosphate as P	µg/L	2.0	2	3	<2	2	<2
Total Phosphorus	µg/L	5.0	9	7	8	8	6
NOx as N	µg/L	2.0	3	3	2	3	<2
TKN as N*	µg/L	50	160	160	170	150	140

Envirolab ID	Units	PQL	MHE0053-26	MHE0053-27	MHE0053-28	MHE0053-29	MHE0053-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			13/05/2026	13/05/2026	13/05/2026	13/05/2026	13/05/2026
Ammonia as N	µg/L	3.0	6	<3	<3	8	8
Nitrate as N	µg/L	2.0	3	<2	<2	6	6
Nitrite as N	µg/L	2.0	<2	<2	<2	<2	<2
Total Nitrogen	µg/L	50	140	160	200	160	170
Phosphate as P	µg/L	2.0	3	2	<2	3	4
Total Phosphorus	µg/L	5.0	7	8	12	8	9
NOx as N	µg/L	2.0	3	<2	<2	7	7
TKN as N*	µg/L	50	130	160	200	150	160

Envirolab ID	Units	PQL	MHE0053-31	MHE0053-32	MHE0053-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			13/05/2026	13/05/2026	13/05/2026
Ammonia as N	µg/L	3.0	10	9	10

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Subcontracted Inorganics - Certificate: ENVL26-10 - Analysed By Marine and Freshwater Research Lab (Sea water)

Envirolab ID	Units	PQL	MHE0053-31	MHE0053-32	MHE0053-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			13/05/2026	13/05/2026	13/05/2026
Nitrate as N	µg/L	2.0	<2	<2	<2
Nitrite as N	µg/L	2.0	<2	<2	<2
Total Nitrogen	µg/L	50	190	200	190
Phosphate as P	µg/L	2.0	<2	<2	2
Total Phosphorus	µg/L	5.0	7	9	8
NOx as N	µg/L	2.0	2	<2	<2
TKN as N*	µg/L	50	180	200	190

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Subcontracted Metals - Certificate: ENVL26-10 - Analysed By Marine and Freshwater Research Lab (Sea water)

Envirolab ID	Units	PQL	MHE0053-01	MHE0053-02	MHE0053-03	MHE0053-04	MHE0053-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			13/05/2026	13/05/2026	13/05/2026	12/05/2026	12/05/2026
Reactive Silica	µg/L	2.0	76	76	76	76	75

Envirolab ID	Units	PQL	MHE0053-06	MHE0053-07	MHE0053-08	MHE0053-09	MHE0053-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			12/05/2026	12/05/2026	12/05/2026	12/05/2026	13/05/2026
Reactive Silica	µg/L	2.0	76	90	90	90	76

Envirolab ID	Units	PQL	MHE0053-11	MHE0053-12	MHE0053-13	MHE0053-14	MHE0053-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			13/05/2026	13/05/2026	12/05/2026	12/05/2026	12/05/2026
Reactive Silica	µg/L	2.0	75	75	80	81	81

Envirolab ID	Units	PQL	MHE0053-16	MHE0053-17	MHE0053-18	MHE0053-19	MHE0053-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			12/05/2026	12/05/2026	12/05/2026	13/05/2026	13/05/2026
Reactive Silica	µg/L	2.0	89	89	88	86	86

Envirolab ID	Units	PQL	MHE0053-21	MHE0053-22	MHE0053-23	MHE0053-24	MHE0053-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			13/05/2026	13/05/2026	13/05/2026	13/05/2026	13/05/2026
Reactive Silica	µg/L	2.0	86	88	87	88	79

Envirolab ID	Units	PQL	MHE0053-26	MHE0053-27	MHE0053-28	MHE0053-29	MHE0053-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			13/05/2026	13/05/2026	13/05/2026	13/05/2026	13/05/2026
Reactive Silica	µg/L	2.0	78	78	100	100	100

Envirolab ID	Units	PQL	MHE0053-31	MHE0053-32	MHE0053-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			13/05/2026	13/05/2026	13/05/2026
Reactive Silica	µg/L	2.0	86	87	86

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Subcontracted Micro - Certificate: 2029721971-73, 2029721956-61, 2029721974-76, 2029721962-67, 20297 - Analysed By SA Pathology (Sea water)

Envirolab ID	Units	PQL	MHE0053-01	MHE0053-02	MHE0053-03	MHE0053-04	MHE0053-05
Your Reference			MQ01 R1 Comp	MQ01 R2 Comp	MQ01 R3 Comp	MQ02 R1 Comp	MQ02 R2 Comp
Date Sampled			13/05/2026	13/05/2026	13/05/2026	12/05/2026	12/05/2026
Total Coliforms	MPN/100mL	1.0	23	23	37	240	99

Envirolab ID	Units	PQL	MHE0053-06	MHE0053-07	MHE0053-08	MHE0053-09	MHE0053-10
Your Reference			MQ02 R3 Comp	MQ03 R1 Comp	MQ03 R2 Comp	MQ03 R3 Comp	MQ04 R1 Comp
Date Sampled			12/05/2026	12/05/2026	12/05/2026	12/05/2026	13/05/2026
Total Coliforms	MPN/100mL	1.0	110	180	91	250	290

Envirolab ID	Units	PQL	MHE0053-11	MHE0053-12	MHE0053-13	MHE0053-14	MHE0053-15
Your Reference			MQ04 R2 Comp	MQ04 R3 Comp	MQ05 R1 Comp	MQ05 R2 Comp	MQ05 R3 Comp
Date Sampled			13/05/2026	13/05/2026	12/05/2026	12/05/2026	12/05/2026
Total Coliforms	MPN/100mL	1.0	410	320	18	18	30

Envirolab ID	Units	PQL	MHE0053-16	MHE0053-17	MHE0053-18	MHE0053-19	MHE0053-20
Your Reference			MQ06 R1 Comp	MQ06 R2 Comp	MQ06 R3 Comp	MQ07 R1 Comp	MQ07 R2 Comp
Date Sampled			12/05/2026	12/05/2026	12/05/2026	13/05/2026	13/05/2026
Total Coliforms	MPN/100mL	1.0	43	35	27	28	13

Envirolab ID	Units	PQL	MHE0053-21	MHE0053-22	MHE0053-23	MHE0053-24	MHE0053-25
Your Reference			MQ07 R3 Comp	MQ08 R1 Comp	MQ08 R2 Comp	MQ08 R3 Comp	MQ08 R1 Surface
Date Sampled			13/05/2026	13/05/2026	13/05/2026	13/05/2026	13/05/2026
Total Coliforms	MPN/100mL	1.0	16	22	23	23	12

Envirolab ID	Units	PQL	MHE0053-26	MHE0053-27	MHE0053-28	MHE0053-29	MHE0053-30
Your Reference			MQ08 R2 Surface	MQ08 R3 Surface	MQ08 R1 Bottom	MQ08 R2 Bottom	MQ08 R3 Bottom
Date Sampled			13/05/2026	13/05/2026	13/05/2026	13/05/2026	13/05/2026
Total Coliforms	MPN/100mL	1.0	2	11	28	36	27

Envirolab ID	Units	PQL	MHE0053-31	MHE0053-32	MHE0053-33
Your Reference			MQ09 R1 Comp	MQ09 R2 Comp	MQ09 R3 Comp
Date Sampled			13/05/2026	13/05/2026	13/05/2026
Total Coliforms	MPN/100mL	1.0	520	250	290

Method Summary

Method ID	Methodology Summary
INORG-001	pH - Measured using pH meter and electrode. Please note that the results for water analyses are indicative only, as analysis can be completed outside of the recommended holding times. Solids are reported from a 1:5 water extract unless otherwise specified. Alternatively, pH is determined in a 1:5 extract using 0.01M calcium chloride or a solid is extracted at a ratio of 1:2.5 (AS1289.4.3.1), pH is measured in the extract.
INORG-002	Conductivity and Salinity - measured using a conductivity cell at 25°C. Soil results reported from a 1:5 Soil:Water extract unless otherwise specified. Please note Resistivity is estimated by calculation and may not correlate with results otherwise obtained using the Resistivity current method (based on AS 1289.4.4.1), depending on the nature of the soil being analysed. Blanks may yield EC readings >1µS/cm, this is likely due to adsorption of Carbon Dioxide while the blank sample is sat on the instrument autosampler prior to analysis. The values are generally insignificant (<5µS/cm) compared to most actual sample conductivities.
INORG-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180±10°C. NOTE: Where the EC of the sample is <100µS/cm, the TDS will typically be below 70mg/L (as the sample is very likely to be at least drinking water quality). Therefore to ensure data quality for TDS, the TDS is typically calculated as per the equation: TDS = EC*0.6
INORG-019	Suspended Solids - determined gravimetrically by filtration of the sample. The solids are dried at 104±5°C
INORG-119	Chlorophyll A based on APHA 10200 H latest edition.
SUB-021	Subcontracted to Marine & Freshwater Research - Accreditation number 10603
SUB-041_CA	Subcontracted to SA Pathology - Accredititation number 1521

Result Definitions

Identifier	Description
NR	Not reported
NEPM	National Environment Protection Measure
NS	Not specified
LCS	Laboratory Control Sample
RPD	Relative Percent Difference
>	Greater than
<	Less than
PQL	Practical Quantitation Limit
INS	Insufficient sample for this test
NA	Test not required
NT	Not tested
DOL	Samples rejected due to particulate overload (air filters only)
RFD	Samples rejected due to filter damage (air filters only)
RUD	Samples rejected due to uneven deposition (air filters only)
##	Indicates a laboratory acceptance criteria outlier, for further details, see Result Comments and/or QC Comments

Quality Control Definitions

Blank

This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, and is determined by processing solvents and reagents in exactly the same manner as for samples.

Surrogate Spike

Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

LCS (Laboratory Control Sample)

This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Matrix Spike

A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

Duplicate

This is the complete duplicate analysis of a sample from the process batch. The sample selected should be one where the analyte concentration is easily measurable.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria. Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction. Spikes for Physical and Aggregate Tests are not applicable. For VOCs in water samples, three vials are required for duplicate or spike analysis.

General Acceptance Criteria (GAC) - Analyte specific criteria applies for some analytes and is reflected in QC recovery tables.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% - see ELN-P05 QAQC tables for details (available on request); <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase. Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was typically insufficient in order to satisfy laboratory QA/QC protocols.

Miscellaneous Information

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached. We have taken the sampling date as being the date received at the laboratory.

Two significant figures are reported for the majority of tests and with a high degree of confidence, for results <10*PQL, the second significant figure may be in doubt i.e. has a relatively high degree of uncertainty and is provided for information only.

Measurement Uncertainty estimates can be downloaded from the Envirolab Resources website or obtained directly by contacting the laboratory.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS where sediment/solids are included by default.

Urine Analysis - The BEI values listed are taken from the 2022 edition of *TLVs and BEIs Threshold Limits by ACGIH*.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volume(s) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

Where air volumes and/or sampled areas and/or time based sampling data is supplied by customers and the customer is NATA accredited for the sampling activity then calculated concentrations can be reported on the endorsed Certificate of Analysis (CoA). Confirmation of the accreditation must be supplied by the customer and such information is used in good faith. Where the sampling is not covered by NATA accreditation then only the raw data can be reported on the CoA (e.g. mass, fibres per field)

Data Quality Assessment Summary MHE0053

Client Details

Client	South Australian Research & Development Institute
Your Reference	NWP Mullaquana Monthly Sampling
Date Issued	12/06/2026

Recommended Holding Time Compliance

Recommended holding time exceedances exist - See detailed list below

Quality Control and QC Frequency

QC Type	Compliant	Details
Blank	Yes	No Outliers
LCS	Yes	No Outliers
Duplicates	Yes	No Outliers
Matrix Spike	Yes	No Outliers
Surrogates / Extracted Internal Standards	Yes	No Outliers
QC Frequency	No	QC Frequency Outliers Exist - See detailed list below

Surrogates/Extracted Internal Standards, Duplicates and/or Matrix Spikes are not always relevant/applicable to certain analyses and matrices. Therefore, said QC measures are deemed compliant in these situations by default. See Laboratory Acceptance Criteria for more information

Data Quality Assessment Summary MHE0053

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
EC | Water	4-9, 13-18	12/05/2026	14/05/2026	09/06/2026	Yes
	1-3, 10-12, 19-20	13/05/2026	14/05/2026	09/06/2026	Yes
	21-33	13/05/2026	18/05/2026	21/05/2026	Yes
pH | Water	4-9, 13-18	12/05/2026	14/05/2026	09/06/2026	No
	1-3, 10-12, 19-20	13/05/2026	14/05/2026	09/06/2026	Yes
	21-33	13/05/2026	18/05/2026	21/05/2026	No
Salinity | Water	4-9, 13-18	12/05/2026	14/05/2026	09/06/2026	Yes
	1-3, 10-12, 19-20	13/05/2026	14/05/2026	09/06/2026	Yes
	21-33	13/05/2026	18/05/2026	21/05/2026	Yes
TDS | Water	4-9, 13-18	12/05/2026	18/05/2026	21/05/2026	Yes
	19-33	13/05/2026	11/06/2026	12/06/2026	No
	1-3, 10-12	13/05/2026	18/05/2026	21/05/2026	Yes
TSS (LL) | Water	4-9, 13-18	12/05/2026	14/05/2026	12/06/2026	Yes
	1-3, 10-12, 19-20	13/05/2026	14/05/2026	12/06/2026	Yes
	21-33	13/05/2026	15/05/2026	11/06/2026	Yes
Chlorophyll a (LL) - Frozen | Water	4-9, 13-18	12/05/2026	19/05/2026	19/05/2026	Yes
	1-3, 10-12, 19-33	13/05/2026	19/05/2026	19/05/2026	Yes
Ammonia as N | Water	4-9, 13-18	12/05/2026	18/05/2026	18/05/2026	Yes
	1-3, 10-12, 19-33	13/05/2026	18/05/2026	18/05/2026	Yes
Nitrate as N (LL) | Water	4-9, 13-18	12/05/2026	18/05/2026	18/05/2026	Yes
	1-3, 10-12, 19-33	13/05/2026	18/05/2026	18/05/2026	Yes
Nitrite as N (LL) | Water	4-9, 13-18	12/05/2026	20/05/2026	20/05/2026	Yes
	1-3, 10-12, 19-33	13/05/2026	20/05/2026	20/05/2026	Yes
NOx as N (LL) | Water	4-9, 13-18	12/05/2026	18/05/2026	18/05/2026	Yes
	1-3, 10-12, 19-33	13/05/2026	18/05/2026	18/05/2026	Yes
Phosphate as P (LL) | Water	4-9, 13-18	12/05/2026	18/05/2026	18/05/2026	Yes
	1-3, 10-12, 19-33	13/05/2026	18/05/2026	18/05/2026	Yes
TKN as N calc (LL) | Water	4-9, 13-18	12/05/2026	20/05/2026	21/05/2026	Yes
	1-3, 10-12, 19-33	13/05/2026	20/05/2026	21/05/2026	Yes
Total N and P (LL) | Water	4-9, 13-18	12/05/2026	20/05/2026	21/05/2026	Yes
	1-3, 10-12, 19-33	13/05/2026	20/05/2026	21/05/2026	Yes
Reactive Silica (LL) | Water	4-9, 13-18	12/05/2026	25/05/2026	25/05/2026	Yes
	1-3, 10-12, 19-33	13/05/2026	25/05/2026	25/05/2026	Yes
Total Coliforms | Water	4-9, 13-18	12/05/2026	12/05/2026	13/05/2026	Yes
	1-3, 10-12, 19-33	13/05/2026	13/05/2026	14/05/2026	Yes

Data Quality Assessment Summary MHE0053

Outliers: QC Frequency

INORG-119 | Inorganics - Nutrients (Water) | Batch BHE3667

Analysis	QC Type	Expected	Reported
Chlorophyll a (LL) - Frozen	Duplicate	2	0

INORG-119 | Inorganics - Nutrients (Water) | Batch BHE3668

Analysis	QC Type	Expected	Reported
Chlorophyll a (LL) - Frozen	Duplicate	2	0

Quality Control MHE0053

INORG-019 | Inorganics - Physical Parameters (Water) | Batch BHE2671

Analyte	Units	PQL	Blank	DUP1 BHE2671-DUP1# Samp | QC | RPD %	DUP2 MHE0053-30 Samp | QC | RPD %	LCS %
Total Suspended Solids	mg/L	1.0	<1.0	3.80 | 4.00 | [NA]	22.6 | 25.4 | 11.7	83.0

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-001 | Inorganics - Physical Parameters (Water) | Batch BHE3022

Analyte	Units	PQL	Blank	DUP1 MHE0053-04 Samp | QC | RPD %	DUP2 MHE0053-17 Samp | QC | RPD %	LCS %
pH	pH units			7.9 | 7.9 | 0.126	8.0 | 8.0 | 0.00	98.1
Electrical Conductivity	µS/cm	2.0	<2.0	55600 | 55600 | 0.0365	55800 | 55700 | 0.0653	101
Estimated Salinity*	mg/L	1.0	<1.0	35600 | 35600 | 0.0365	35700 | 35700 | 0.0653	[NA]

INORG-001 | Inorganics - Physical Parameters (Water) | Batch BHE3023

Analyte	Units	PQL	Blank	DUP1 MHE0053-21 Samp | QC | RPD %	DUP2 MHE0053-31 Samp | QC | RPD %	LCS %
pH	pH units		4.2	7.8 | 7.9 | 0.766	8.1 | 8.0 | 1.37	99.3
Electrical Conductivity	µS/cm	2.0	<2.0	54900 | 55300 | 0.557	55100 | 55500 | 0.636	102
Estimated Salinity*	mg/L	1.0	<1.0	35200 | 35400 | 0.557	35300 | 35500 | 0.636	[NA]

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BHE3385

Analyte	Units	PQL	Blank	DUP1 BHE3385-DUP1# Samp | QC | RPD %	DUP2 MHE0053-16 Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	470 | 470 | 0.00	42200 | 42300 | 0.237	113

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-019 | Inorganics - Physical Parameters (Water) | Batch BHF1922

Analyte	Units	PQL	Blank	DUP1 MHE0053-01 Samp | QC | RPD %	DUP2 MHE0053-11 Samp | QC | RPD %	LCS %
Total Suspended Solids	mg/L	1.0	<1.0	<1.0 | 1.00 | [NA]	2.40 | 2.60 | [NA]	110

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BHF1923

Analyte	Units	PQL	Blank	DUP1 MHE0053-19 Samp | QC | RPD %	DUP2 BHF1923-DUP2# Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	41000 | 44200 | 7.51	63.6 | 63.6 | 0.00	96.9

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-119 | Inorganics - Nutrients (Water) | Batch BHE3667

Analyte	Units	PQL	Blank	LCS %
Chlorophyll a	mg/m3	0.20	<0.20	109

Batch QC Comments: [1]

INORG-119 | Inorganics - Nutrients (Water) | Batch BHE3668

Analyte	Units	PQL	Blank	LCS %
Chlorophyll a	mg/m3	0.20	<0.20	98.8

Batch QC Comments: [1]

Quality Control MHE0053

QC Comments

Identifier	Description
[1]	Unable to perform all QC according to our internal guidelines due to the limited amount of sample(s) available for testing.

Appendix C Phytoplankton taxa reported during cell counts

Group	Genus/species	Cells/L		
		Average*	Min*	Max*
Diatom	*Achnanthes sp.*	14	0	5000
Diatom	*Actinoptychus sp.*	29	0	2500
Diatom	*Amphora sp.*	880	0	20000
Diatom	*Anaulus australis*	25	0	4000
Diatom	*cf. Anaulus sp.*	1	0	500
Diatom	*Asterionellopsis glacialis*	104	0	45000
Diatom	*Asteromphalus heptactis*	1	0	500
Diatom	*Asteromphalus sarcophagus*	8	0	1000
Diatom	*Bacillaria paxillifera*	875	0	140000
Diatom	*Bacteriastrum sp.*	881	0	17500
Diatom	*Bellerochea malleus*	4	0	1000
Diatom	*Biddulphia sp.*	17	0	5000
Diatom	*Bleakeleya sp.*	45	0	4000
Diatom	*Campylodiscus sp.*	1	0	500
Diatom	*Cerataulina pelagica*	254	0	10000
Diatom	*Chaetoceros* spp.	67933	0	2000000
Diatom	*Climacodium frauenfeldianum*	13	0	3000
Diatom	*Cocconeis* spp.	281	0	10000
Diatom	*Coscinodiscus* spp.	48	0	5000
Diatom	*Cyclophora tenuis*	642	0	30000
Diatom	*Cyclotella sp.*	1104	0	35000
Diatom	*Cylindrotheca closterium*	12852	0	180000
Diatom	*cf. Cylindrotheca closterium*	135484	0	9280000
Diatom	*Cymbella sp.*	2	0	500
Diatom	*Dactyliosolen antarcticus*	454	0	25000
Diatom	*Dactyliosolen fragilissimus*	5302	0	75000
Diatom	*Dactyliosolen phukutensis*	120	0	10000
Diatom	*Dactyliosolen sp.*	10	0	5000
Diatom	*Detonula pumilla*	20	0	10000
Diatom	*Diploneis sp.*	500	0	10000
Diatom	*Donkinia sp.*	17	0	2000
Diatom	*Encyonema sp.*	10	0	2000
Diatom	*Ephemera sp.*	2	0	500
Diatom	*Entomoneis* spp.	9246	0	310000
Diatom	*Eucampia sp.*	852	0	25000
Diatom	*Eucampia zodiacus*	4	0	1000
Diatom	*Eunotia sp.*	8	0	2000

Group	Genus/species	Cells/L		
		Average*	Min*	Max*
Diatom	*Fragilaria sp.*	276	0	20000
Diatom	*Fragilariopsis sp.*	16	0	8000
Diatom	*Grammotophora marina*	82	0	7500
Diatom	*Guinardia flaccida*	1465	0	32000
Diatom	*Guinardia striata*	718	0	26000
Diatom	*Gyrosigma* spp.	1	0	500
Diatom	*Haslea ostrearia*	8	0	2500
Diatom	*Haslea wawrikae*	655	0	20000
Diatom	*Helicotheca tamesis*	80	0	5000
Diatom	*Hemiaulus hauckii*	1	0	500
Diatom	*Hemiaulus sp.*	3	0	500
Diatom	*Hemiaulus membranaceus*	16	0	4000
Diatom	*Lauderia annulata*	5	0	2000
Diatom	*Leptocylindrus danicus*	1063	0	50000
Diatom	*Leptocylindrus mediterraneus*	222	0	20000
Diatom	*Leptocylindrus minimus*	5744	0	260000
Diatom	*Licmophora sp.*	533	0	24000
Diatom	*Lioloma pacificum*	22	0	4000
Diatom	*Lithodesmium sp.*	37	0	16000
Diatom	*Lyrella sp.*	1	0	500
Diatom	*Mastogloea sp.*	9	0	1000
Diatom	*Melosira sp.*	16	0	5000
Diatom	*Minidiscus trioculatus*	752	0	16000
Diatom	*Minutocellus scriptus*	61	0	5000
Diatom	*Naviculoid* spp.	4852	0	70000
Diatom	*Neocalyptrella robustum*	51	0	4000
Diatom	*Nitzschia* spp.	1485	0	20000
Diatom	*Nitzschia longissima*	360	0	10000
Diatom	*Nitzschia sigmoidea*	486	0	20000
Diatom	*Odontella sp.*	2	0	1000
Diatom	*Paralia sulcata*	2124	0	110000
Diatom	*Plagiotropis sp.*	1414	0	20000
Diatom	*Pleurosigma sp.*	1002	0	10000
Diatom	*Proboscia alata*	21	0	2000
Diatom	*Pseudo-nitzschia americana*	14	0	1000
Diatom	*Pseudo-nitzschia brasiliana*	8	0	1500
Diatom	*Pseudo-nitzschia delicatissima group*	61	0	10000
Diatom	*Pseudo-nitzschia fraudulenta/australis*	36	0	2000
Diatom	*Pseudo-nitzschia galaxiae*	6	0	2000

Group	Genus/species	Cells/L		
		Average*	Min*	Max*
Diatom	*Pseudo-nitzschia multistriata*	2	0	500
Diatom	*Pseudo-nitzschia pungens/multiseries*	1	0	500
Diatom	*Pseudosolenia calcar-avis*	139	0	6000
Diatom	*Rhizosolenia curvata*	0	0	250
Diatom	*Rhizosolenia setigera*	2200	0	35000
Diatom	*Rhizosolenia sp. (imbricata group)*	180	0	9000
Diatom	*Rhizosolenia* spp.	6	0	2000
Diatom	*Skeletonema costatum complex*	353	0	30000
Diatom	*Stauroneis sp.*	2	0	500
Diatom	*Striatella unipunctata*	45	0	8000
Diatom	*Surirella sp.*	36	0	10000
Diatom	*Synedra sp.*	26	0	5000
Diatom	*Thalassionema sp.*	2266	0	50000
Diatom	*Thalassiophysa sp.*	4	0	2000
Diatom	*Thalassiosira sp.*	838	0	30000
Diatom	*Thalassiosira mala*	4292	0	310000
Diatom	*Thalassiosira cf. mala*	605	0	84000
Diatom	*Thalassiothrix sp.*	135	0	16000
Diatom	*Triceratium spp.*	10	0	2000
Dinoflagellate	*Akashiwo sanguinea*	35	0	750
Dinoflagellate	*Alexandrium australiense*	0	0	50
Dinoflagellate	*Alexandrium cf. fraterculus*	0	0	100
Dinoflagellate	*Alexandrium insuetum*	0	0	50
Dinoflagellate	*Alexandrium leei*	0	0	50
Dinoflagellate	*Alexandrium margalefii*	3	0	200
Dinoflagellate	*Alexandrium cf. margalefii*	0	0	50
Dinoflagellate	*Alexandrium minutum*	2	0	150
Dinoflagellate	*Alexandrium cf. minutum*	0	0	50
Dinoflagellate	*Alexandrium cf. ostenfeldii*	0	0	50
Dinoflagellate	*Alexandrium pacificum*	1	0	100
Dinoflagellate	*Alexandrium cf. pacificum*	0	0	50
Dinoflagellate	*Alexandrium pseudogonyaulax*	1	0	75
Dinoflagellate	*Alexandrium sp.*	6	0	150
Dinoflagellate	*cf. Alexandrium cyst*	1	0	100
Dinoflagellate	*Amphidinium sp.*	51	0	10000
Dinoflagellate	*Amphidinium carterae*	6	0	500
Dinoflagellate	*cf. Azadinium sp.*	1	0	500
Dinoflagellate	*Azadinium sp.*	14	0	1500
Dinoflagellate	*Azadinium/Heterocapsa sp.*	1211	0	29000

Group	Genus/species	Cells/L		
		Average*	Min*	Max*
Dinoflagellate	*Blixaea quinquecornis*	7	0	2000
Dinoflagellate	*cf. Coolia monotis*	1	0	500
Dinoflagellate	*Dinophysis acuminata*	3	0	100
Dinoflagellate	*Dinophysis acuta*	0	0	100
Dinoflagellate	*Dinophysis caudata*	21	0	300
Dinoflagellate	*Dinophysis fortii*	1	0	100
Dinoflagellate	*Dinophysis odiosa*	0	0	50
Dinoflagellate	*Dinophysis tripos*	0	0	50
Dinoflagellate	*Dinophysis schroederii*	1	0	100
Dinoflagellate	*Diplopsalid* spp.	167	0	4000
Dinoflagellate	*Gonyaulax spinifera*	40	0	1500
Dinoflagellate	*Gonyaulax* spp.	118	0	8000
Dinoflagellate	*Gymnodinioid* spp.	56296	2000	300000
Dinoflagellate	*Gyrodinium* spp.	6684	0	72000
Dinoflagellate	*Heterocapsa rotundata*	2813	0	32000
Dinoflagellate	*Heterocapsa triquetra*	1	0	500
Dinoflagellate	*Heterocapsa* spp.	3419	0	32000
Dinoflagellate	*Karenia cristata*	13934	0	450000
Dinoflagellate	*Karenia cf. brevisulcata*	13	0	1000
Dinoflagellate	*Karenia cf. concordia*	1	0	400
Dinoflagellate	*Karenia cf. longicanalis*	118	0	2000
Dinoflagellate	*Karenia mikimotoi*	1150	0	10000
Dinoflagellate	*Karenia papilionacea*	62	0	1000
Dinoflagellate	*Karenia* spp.	3	0	400
Dinoflagellate	*Karlodinium sp.*	185	0	3500
Dinoflagellate	*Katodinium sp.*	6790	0	38000
Dinoflagellate	*Kofoidinium sp.*	16	0	2500
Dinoflagellate	*Kryptoperidinium foliaceum*	2	0	500
Dinoflagellate	*Lessardia elongata*	507	0	15000
Dinoflagellate	*Levanderina fissa*	10	0	500
Dinoflagellate	*Lingulodinium polyedrum*	1	0	500
Dinoflagellate	*Margalefidinium* spp.	42	0	1000
Dinoflagellate	*Mesoporus perforatus*	1898	0	30000
Dinoflagellate	*Nematodinium sp.*	3	0	1000
Dinoflagellate	*Noctiluca scintillans*	0	0	50
Dinoflagellate	*Ostreopsis sp.*	1	0	500
Dinoflagellate	*Oxyphysis sp.*	18	0	5000
Dinoflagellate	*Oxyrrhis marina*	69	0	6000
Dinoflagellate	*Oxytoxum sp.*	659	0	15000

Group	Genus/species	Cells/L		
		Average*	Min*	Max*
Dinoflagellate	*Peridinium sp.*	2084	0	25000
Dinoflagellate	*Phalacroma rotundatum*	1	0	50
Dinoflagellate	*Phalacroma sp.*	0	0	50
Dinoflagellate	*Podolampas palmipes*	1	0	500
Dinoflagellate	*Polykrikos schwartzii*	43	0	10000
Dinoflagellate	*Pronoctiluca spinifera*	204	0	10000
Dinoflagellate	*Prorocentrum compressum*	271	0	10000
Dinoflagellate	*Prorocentrum cordatum*	34	0	1500
Dinoflagellate	*Prorocentrum dentatum*	5	0	500
Dinoflagellate	*Prorocentrum emarginatum*	0	0	50
Dinoflagellate	*Prorocentrum gracile*	133	0	10000
Dinoflagellate	*Prorocentrum lima*	0	0	50
Dinoflagellate	*Prorocentrum micans*	7	0	1000
Dinoflagellate	*Prorocentrum rhathymum*	4	0	500
Dinoflagellate	*Prorocentrum triestinum*	118	0	5000
Dinoflagellate	*Prorocentrum vaginula*	217	0	10000
Dinoflagellate	*Prorocentrum sp.*	281	0	10000
Dinoflagellate	*Protoceratium reticulatum*	15	0	1000
Dinoflagellate	*Protoperidinium* spp.	639	0	8000
Dinoflagellate	*Scrippsiella* spp.	1680	0	26000
Dinoflagellate	*Sinophysis sp.*	2	0	500
Dinoflagellate	*Sinophysis cf. canaliculata*	0	0	50
Dinoflagellate	*Spatulodinium pseudonoctiluca*	11	0	5000
Dinoflagellate	*Takayama* spp.	519	0	13000
Dinoflagellate	*Torodinium robustum*	1197	0	20000
Dinoflagellate	*Torodinium teredo*	51	0	4000
Dinoflagellate	*Torodinium* spp.	54	0	5000
Dinoflagellate	*Tripos (=Ceratium) furca*	77	0	2500
Dinoflagellate	*Tripos (=Ceratium) fusus*	26	0	2500
Dinoflagellate	*Tripos (=Ceratium) lineatus*	404	0	10000
Dinoflagellate	*Tripos (=Ceratium) inflatus*	1	0	500
Dinoflagellate	*Tripos (=Ceratium) macroceros*	1	0	500
Dinoflagellate	*Tripos (=Ceratium) muelleri*	66	0	5000
Dinoflagellate	*Tripos (=Ceratium) pentagonus*	3	0	1000
Dinoflagellate	*Tripos (=Ceratium) tenue (=horridum)*	17	0	1000
Dinoflagellate	*Tripos (=Ceratium) trichoceros*	36	0	5000
Dinoflagellate	*Warnowia* spp.	188	0	5000
Chrysophyte	*Calycomonas sp.*	163	0	20000
Chrysophyte	*Dinobryon sp.*	6146	0	120000

Group	Genus/species	Cells/L		
		Average*	Min*	Max*
Chrysophyte	*Mallomonas sp.*	3	0	1000
Chrysophyte	*Meringosphaera sp.*	325	0	20000
Chrysophyte	*Ochromonas* spp.	115345	0	880000
Chrysophyte	*Paraphysomonas sp.*	218	0	110000
Prymnesiophyte	*Calciopappus caudatus*	50	0	5000
Prymnesiophyte	*Calciopappus sp.*	16	0	8000
Prymnesiophyte	*cf. Calyptrosphaera sp.*	58	0	10000
Prymnesiophyte	*Chrysochromulina* spp.	25929	0	280000
Prymnesiophyte	*Chrysochromulina lanceolata*	345	0	24000
Prymnesiophyte	*Chrysochromulina parkae*	4	0	2000
Prymnesiophyte	*cf. Chrysochromulina pringsheimii*	2	0	1000
Prymnesiophyte	*Emiliania huxleyi*	6271	0	60000
Prymnesiophyte	*Gephyrocapsa oceanica*	24	0	4000
Prymnesiophyte	*Phaeocystis pouchetii cells*	167	0	46000
Prymnesiophyte	*Prymnesium sp.*	3908	0	90000
Prymnesiophyte	*Syracosphaera sp.*	4	0	2000
Prymnesiophyte	*Unidentified Coccolithophore*	9	0	4000
Cryptophyte	*Chroomonas* spp.	320	0	10000
Cryptophyte	*Cryptomonas sp.*	975	0	20000
Cryptophyte	*Hemiselmis sp.*	47256	0	360000
Cryptophyte	*Hillea sp.*	201	0	90000
Cryptophyte	*Leucocryptos marina*	3207	0	88000
Cryptophyte	*Plagioselmis prolonga*	65610	2000	410000
Cryptophyte	*Rhodomonas salina*	371	0	170000
Cryptophyte	*Rhodomonas sp.*	1440	0	30000
Cryptophyte	*Storeatula major*	1	0	500
Cryptophyte	*Teleaulax acuta*	20840	0	400000
Cryptophyte	*Urgorri complanatus*	46	0	21000
Chlorophyte	*Chlamydomonas sp.*	18	0	5000
Chlorophyte	*Closterium sp.*	6	0	1000
Chlorophyte	*Coenochloris sp.*	16	0	8000
Chlorophyte	*Cosmarium sp.*	25	0	8000
Chlorophyte	*Crucigenia sp.*	171	0	16000
Chlorophyte	*Dictyosphaerium sp.*	4	0	2000
Chlorophyte	*Dunaliella sp.*	1368	0	40000
Chlorophyte	*Elakatothrix sp.*	20	0	4000
Chlorophyte	*Kirchneriella sp.*	4	0	2000
Chlorophyte	*Monoraphidium sp.*	25	0	5000
Chlorophyte	*Oocystis sp.*	604	0	20000

Group	Genus/species	Cells/L		
		Average*	Min*	Max*
Chlorophyte	*cf. Pseudodidymocystits sp.*	4	0	2000
Chlorophyte	*cf. Pseudoscourfieldia sp.*	8	0	2000
Chlorophyte	*Scenedesmus sp.*	83	0	30000
Prasinophyte	*cf. Cymbomonas sp.*	108	0	15000
Prasinophyte	*Cymbomonas sp.*	4826	0	90000
Prasinophyte	*Cymbomonas tetramitiformis*	2772	0	100000
Prasinophyte	*Mantoniella sp.*	40	0	10000
Prasinophyte	*Micromonas pusilla*	2484	0	40000
Prasinophyte	*Nephroselmis sp.*	983	0	75000
Prasinophyte	*cf. Pachysphaera sp.*	842	0	50000
Prasinophyte	*Pachysphaera sp.*	2179	0	120000
Prasinophyte	*Pyramimonas* spp.	25981	0	380000
Prasinophyte	*Tetraselmis* spp.	63	0	10000
Euglenophyta	*Euglena* spp.	38	0	10000
Euglenophyta	*Eutreptiella* spp.	938	0	25000
Euglenophyta	*Phacus* spp.	10	0	5000
Cyanoprokaryota	*Aphanocapsa sp.*	278	0	140000
Cyanoprokaryota	*Chroococcus sp.*	8	0	4000
Cyanoprokaryota	*Geitlerinema sp. (filaments)*	53	0	8000
Cyanoprokaryota	*Gloeocapsa sp.*	24	0	12000
Cyanoprokaryota	*Komvophoron sp. (filaments)*	1354	0	32000
Cyanoprokaryota	*Lyngbya sp. (filaments)*	53	0	25000
Cyanoprokaryota	*Merismopedia sp.*	2125	0	100000
Cyanoprokaryota	*Microchaete sp.*	4	0	2000
Cyanoprokaryota	*Myxobaktron sp.*	4	0	2000
Cyanoprokaryota	*Oscillatoria sp. (filaments)*	4	0	500
Cyanoprokaryota	*Phormidium sp. (filaments)*	10	0	2500
Cyanoprokaryota	*Pseudanabaena sp. (filaments)*	195	0	16000
Cyanoprokaryota	*cf. Snowella sp.*	4	0	2000
Cyanoprokaryota	*Spirulina sp. (filaments)*	1	0	500
Cyanoprokaryota	*Synechocystis sp.*	165	0	30000
Cyanoprokaryota	*Trichodesmiumerythraeum (filaments)*	11	0	1500
Cyanoprokaryota	*Trichodesmium sp. (filaments)*	2	0	500
Other	*Chattonella* spp.	8	0	500
Other	*Heterosigma akashiwo*	775	0	33000
Other	*Ebria tripartita*	22	0	2000
Other	*Dictyocha fibula*	15	0	1000
Other	*Dictyocha octonaria*	1	0	500
Other	*Pseudochattonella* spp.	44	0	1500

Group	Genus/species	Cells/L		
		Average*	Min*	Max*
Other	Unidentifed	1	0	500
Other	*Actinomonad sp*	14	0	5000
Other	*Apedinella spinifera*	1178	0	40000
Other	*Pedinella hexacostata*	5132	0	120000
Other	*Pseudopedinella pyriforme*	10	0	5000
Other	*Telonema subtilis*	880	0	40000
Other	*cf. Telonema subtilis*	30	0	5000
Other	Unidentified Amoebae	30	0	5000
Other	Unidentified Bodonids	3589	0	40000
Other	Unidentified Choanoflagellates	3205	0	50000
Other	Unidentified Flagellates	46	0	15000
Other	Unidentified Colonial flagellate	7	0	3500
Other	*Mesodinium rubrum*	7791	0	45000

* Average, minimum and maximum cell counts as reported here (cells/L) are calculated from all samples collected over the duration of the study period.

Appendix D Seasonal and site variability

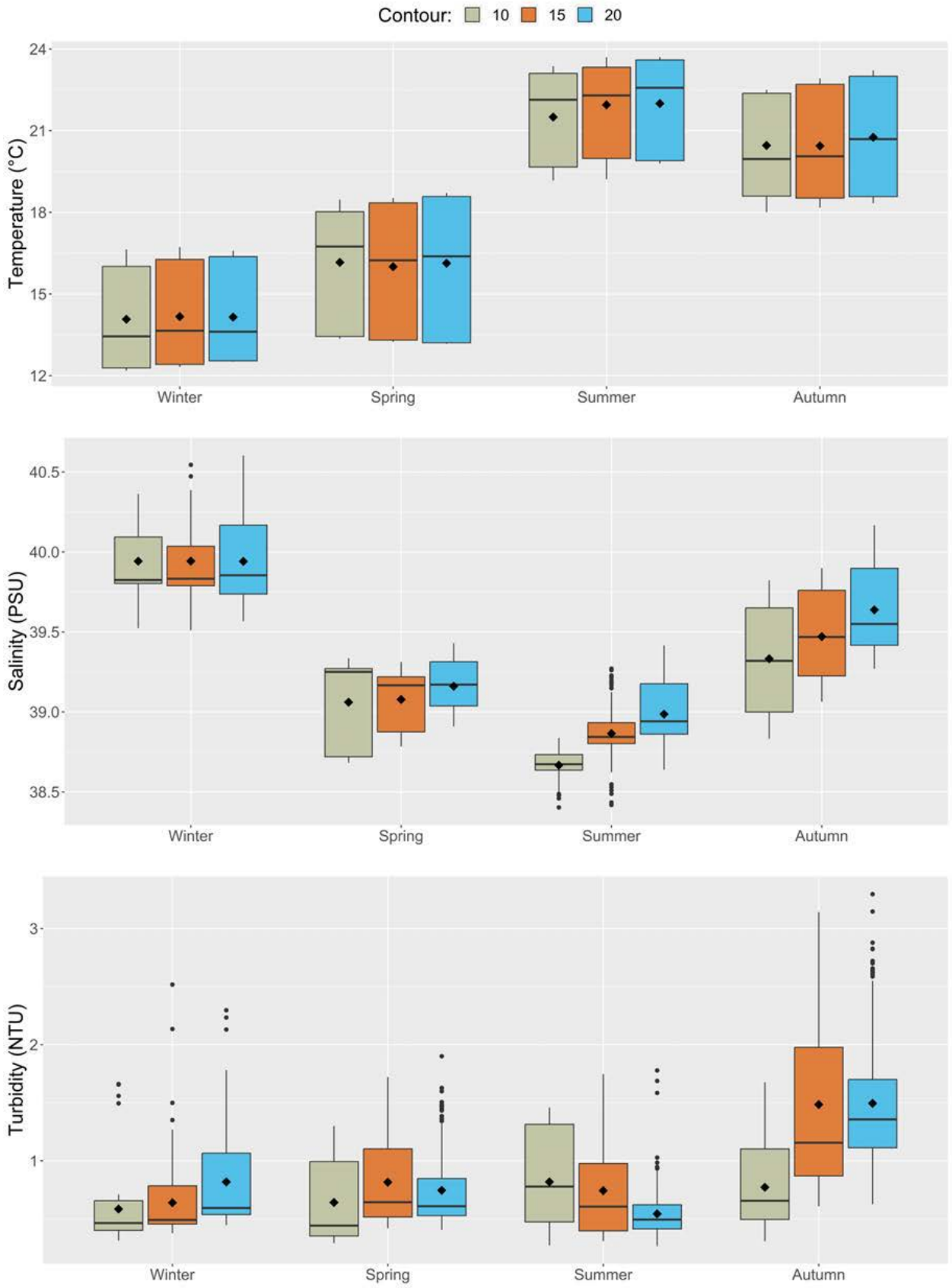


Figure D-1: Seasonal box plots of water column profile data – temperature, salinity and turbidity (as NTU) as a function of depth contour within the marine study area

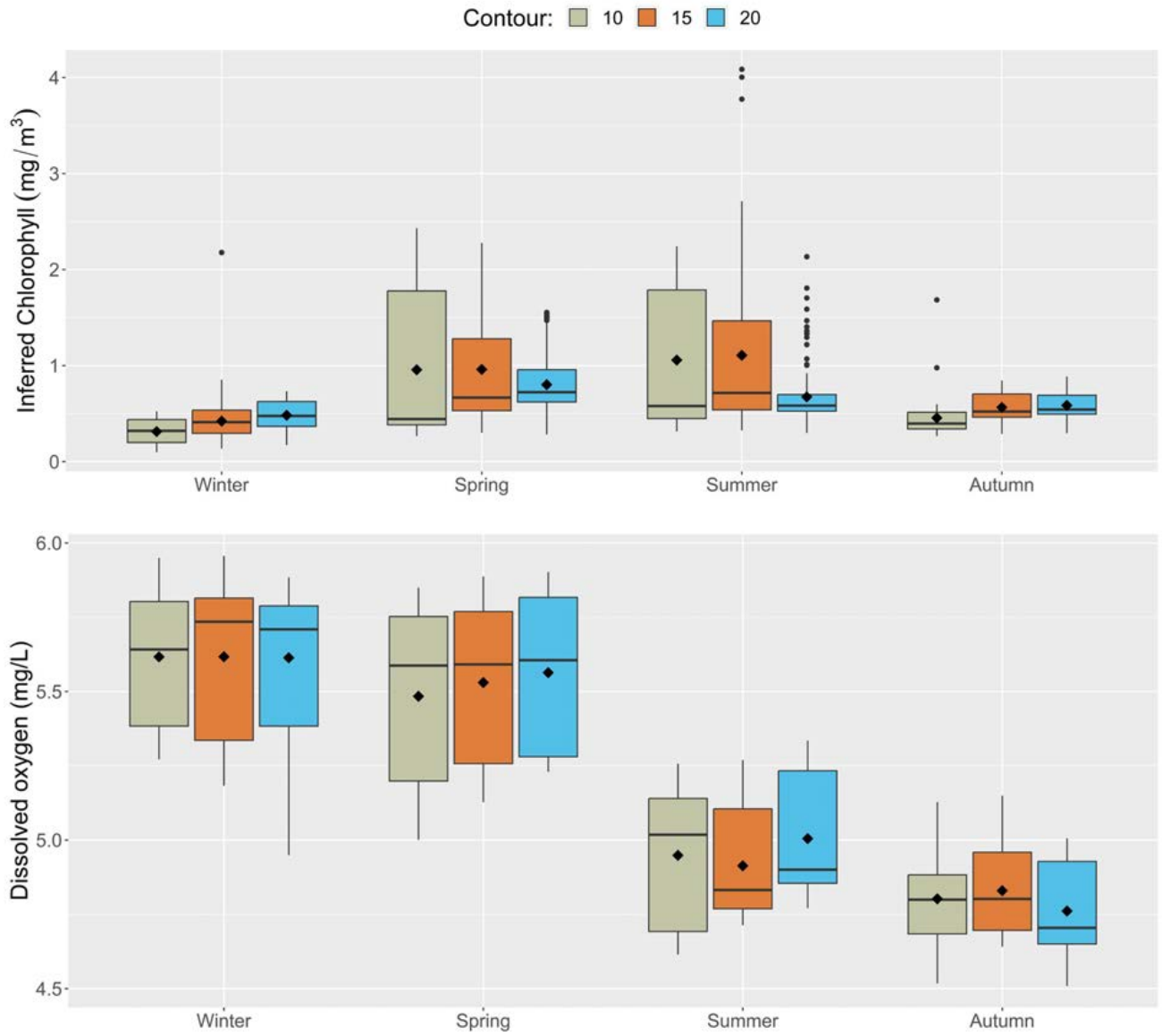


Figure D-2: Seasonal box plots of water column profile data – inferred chlorophyll a and dissolved oxygen as a function of depth contour within the marine study area

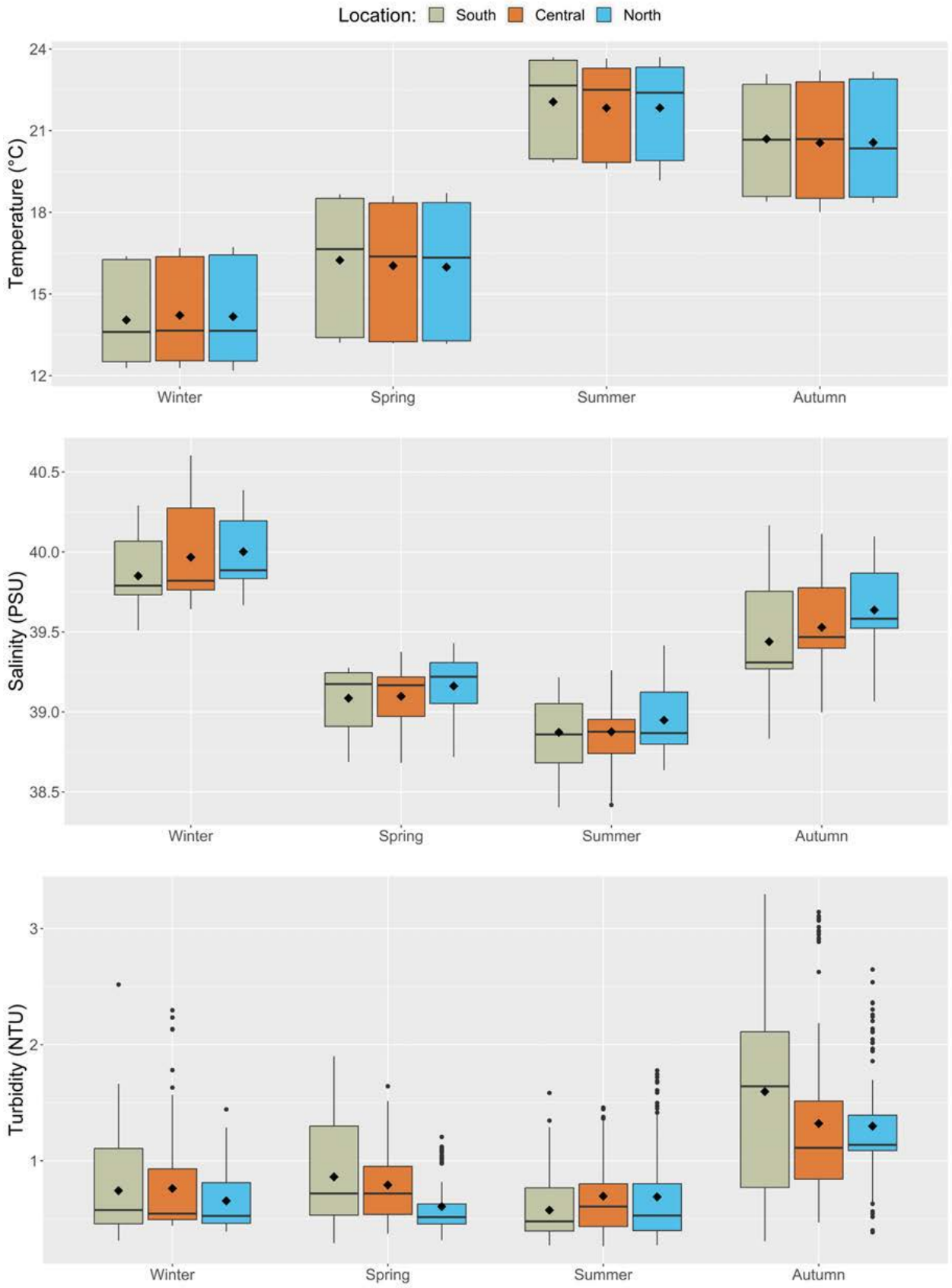


Figure D-3: Seasonal box plots of water column profile data – temperature, salinity and turbidity (as NTU) as a function of location (south, central, north) within the marine study area

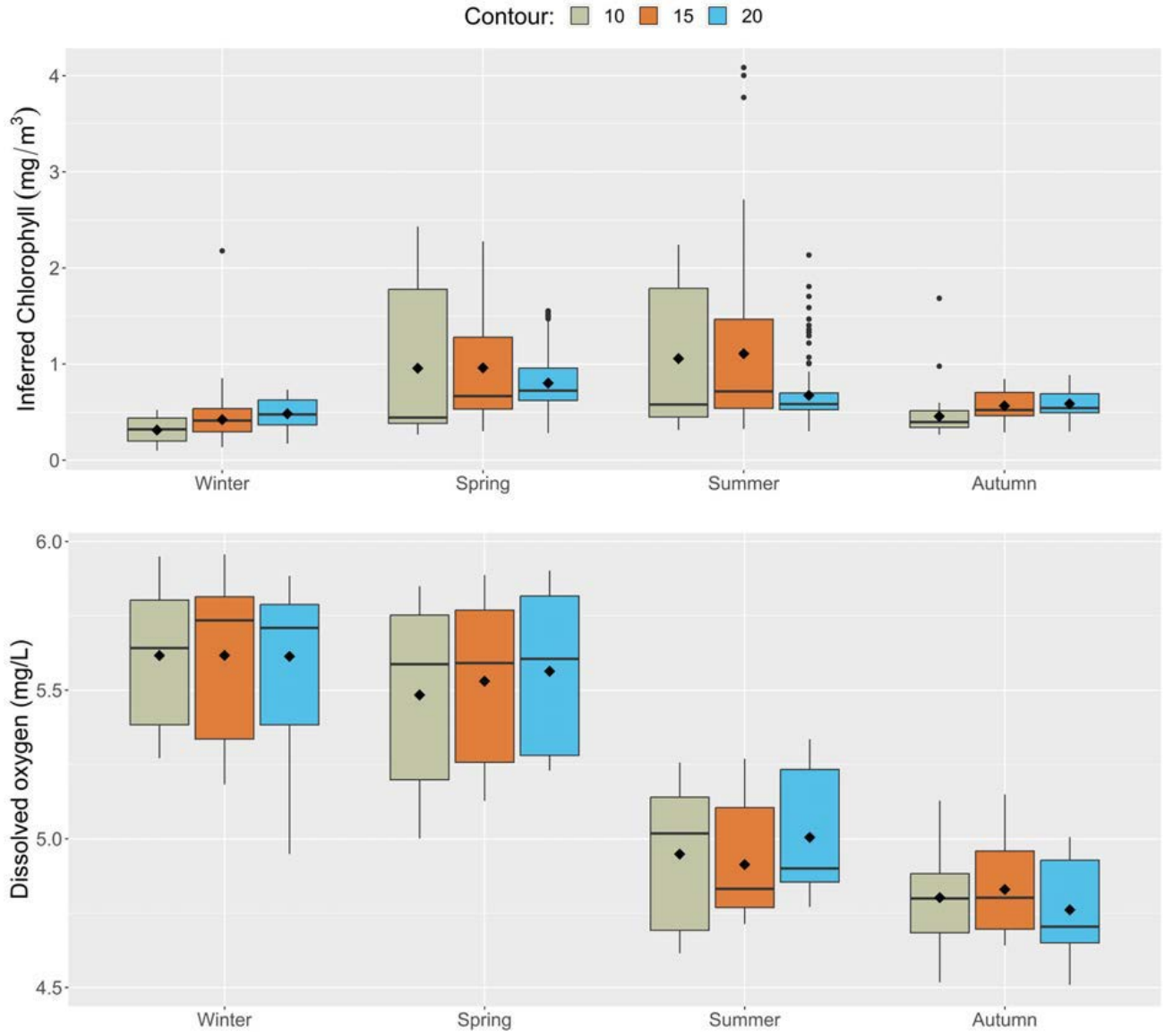


Figure D-4: Seasonal box plots of water column profile data – inferred chlorophyll and dissolved oxygen as a function of location (south, central, north) within the marine study area

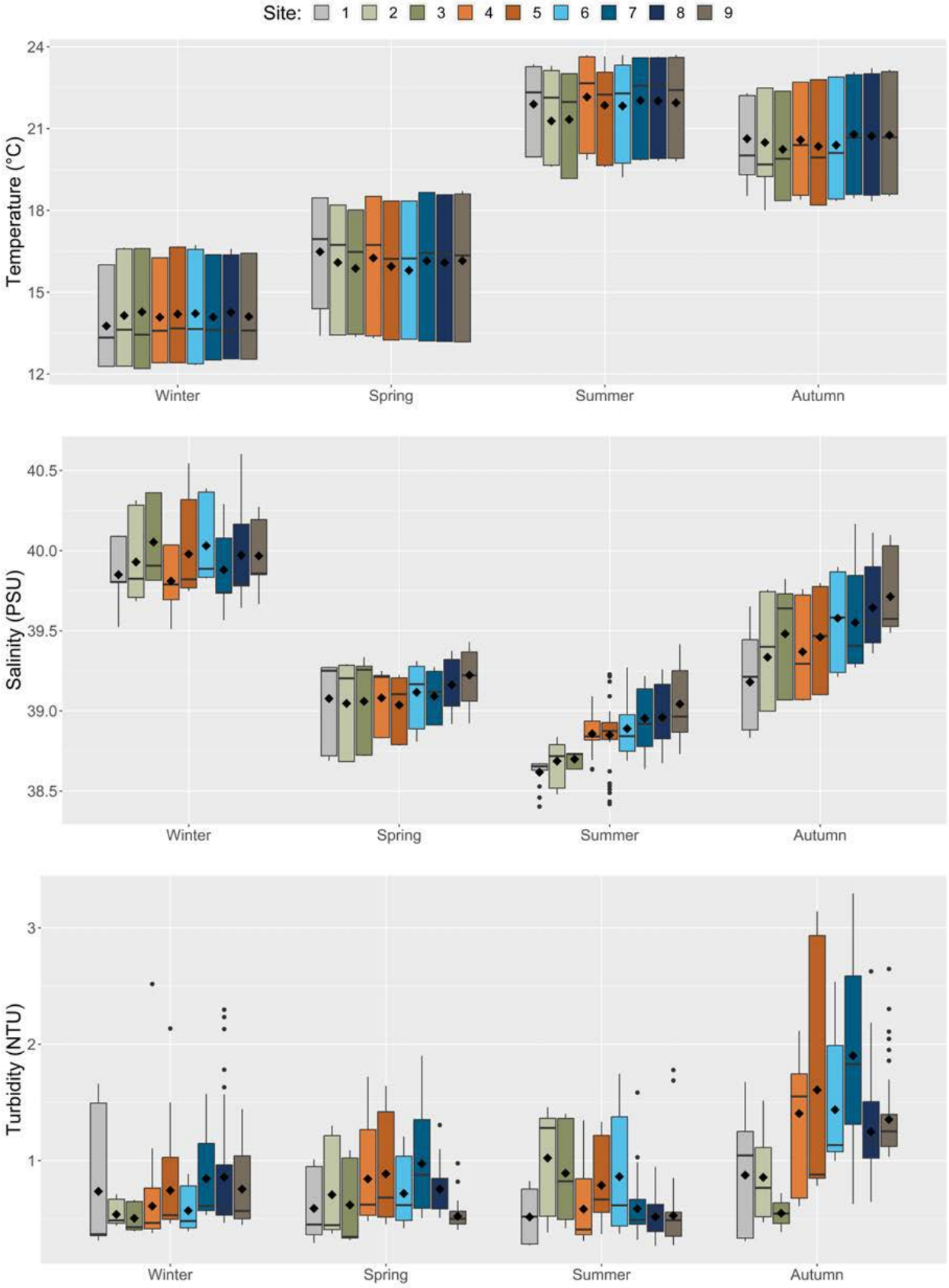


Figure D-5: Seasonal box plots of water column profile data – temperature, salinity and turbidity (as NTU) as a site within the marine study area

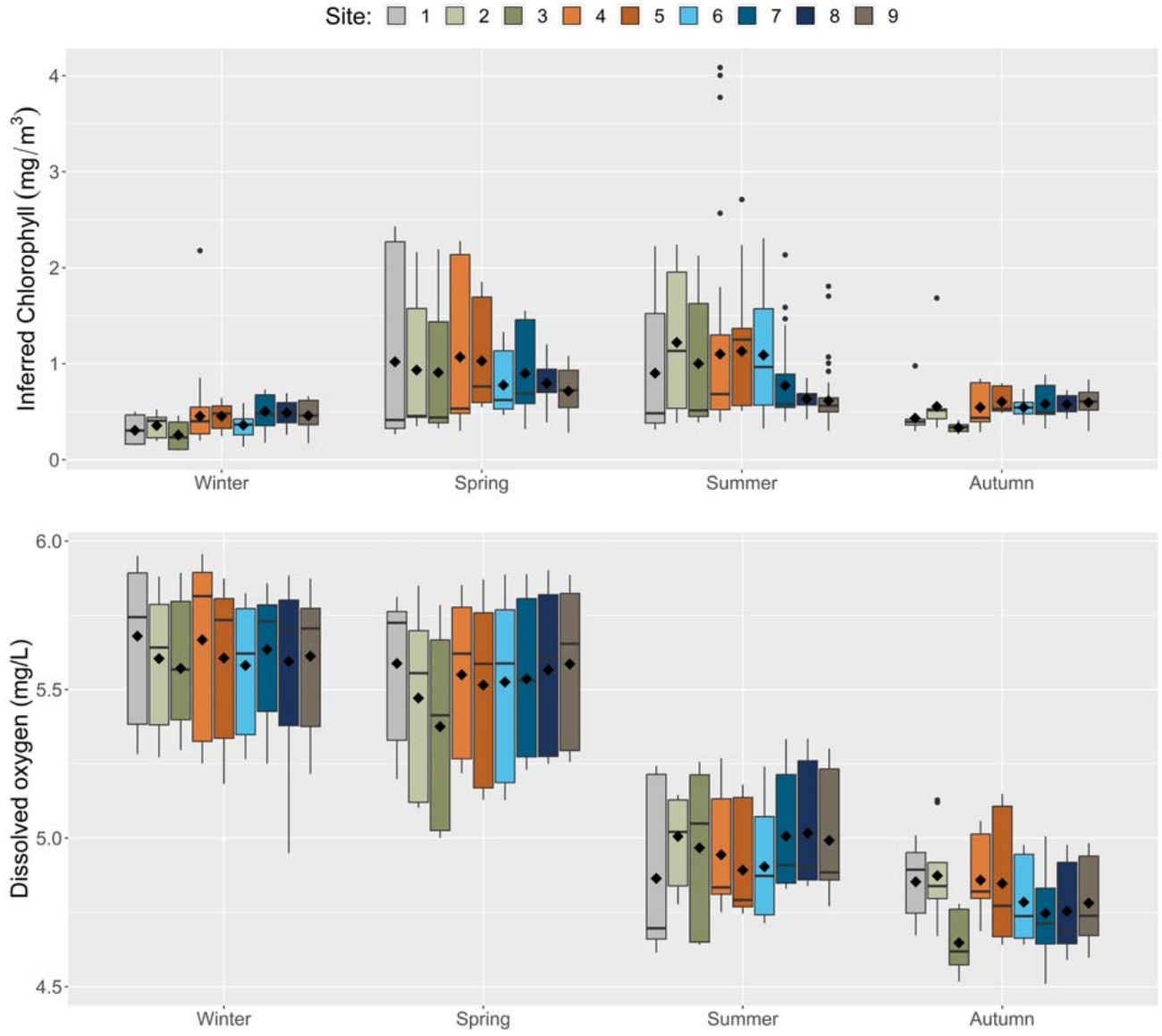


Figure D-6: Seasonal box plots of water column profile data – inferred chlorophyll a and dissolved oxygen as a function of site within the marine study area

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Appendix G-2:

Baseline Habitat Mapping Report

Northern Water

Mullaquana Station Habitat Mapping



J Diversity Pty Ltd

29 May 2025

Report prepared for JBS&G Pty Ltd.

Cover photo: Bryozoan *Steginoporella truncata* in a depth of approximately 20 m. November 2024.

Disclaimer

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1 Introduction

The purpose of this report is to provide information about the benthic habitats in the vicinity of the Mullaquana alternative for the Northern Water desalination plant, identifying main habitat types and producing a habitat map. This report synthesizes towed camera surveys undertaken between November 2023 and April 2025, also using some aerial imagery of inshore areas, to produce a polygon map.

The intake/outfall pipeline alignments, and Marine Study Area (MSA) and nested Detailed Study Area (DSA) specified for the Project in 2025, are shown in Figure **1**, along with previous alignments and study areas that influenced earlier mapping. The MSA extends for approximately 5 km along the shoreline and up to 7.5 km offshore, and the DSA extends for approximately 3 km along the shoreline and up to 5 km offshore. As such the MSA and DSA respectively provide buffers of 2.5 km and 750 m around the marine component of the intake/outfall alignments.

This report supersedes the December 2024 report *Preliminary Habitat Mapping of the Mullaquana Site Option*.

2 Methods

2.1 Survey events and transect locations

Mapping for the Project included the following survey events, with reference to the study areas and alignments in Figure **1**:

- 54 transects on 23 January 2023 at a spacing of approximately 250 m (with some infill) along the alignments proposed at that time
- 222 transects during 20–22 November 2024 in a grid pattern generally with 250 m spacing within DSA and 500 m within the rest of the MSA defined at that time
- 73 transects on 3 February 2025, to fill area in the 2025 MSA not covered by the 2024 mapping, to increase the grid resolution to a spacing of 250 m within the 2025 DSA and to increase the accuracy of boundaries between previously mapped habitats
- 14 transects on 27 February 2025, of which 12 were associated with (and leveraged from) epifauna studies in the deeper sand/silt based habitats and two were targeting a previously mapped *Halophila* seagrass bed
- 17 transects on 2 May 2025, of which 12 were associated with epifauna studies in the deeper sand/silt based habitats and five provided greater detail in the vicinity of the proposed intake.

Transect lengths varied depending on the degree of heterogeneity encountered but were typically 20–50 m.

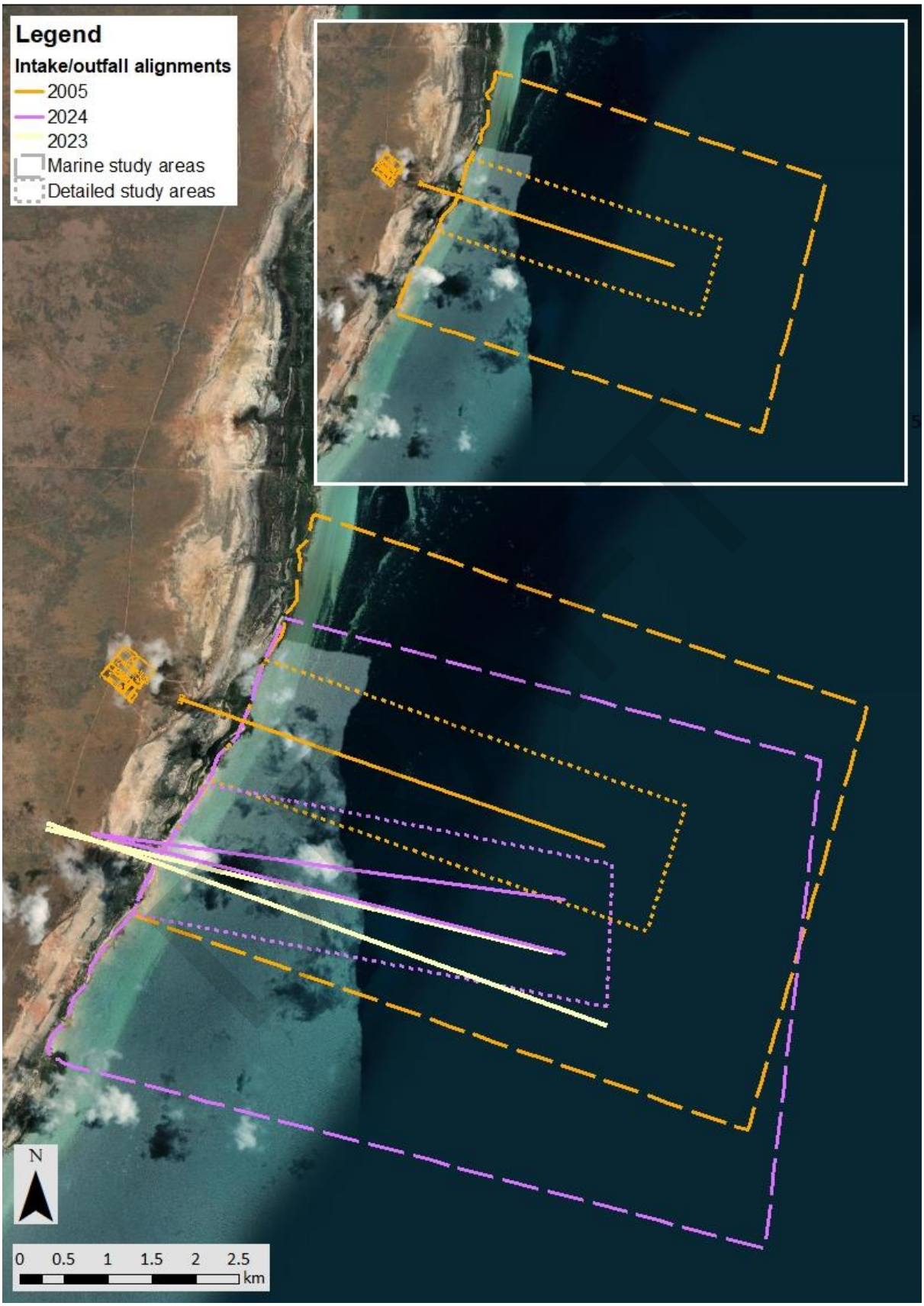


Figure 1**. Benthic habitat mapping survey areas, showing 2025 area alone (inset) and with previous alignments and study areas.**

2.2 *Camera system*

The camera system consisted of:

- a composite standard definition camera aimed 45° below horizontal and streamed to a screen on the vessel
- two high-definition cameras with wide angle lenses (Go Pro Hero 4), one of which also aimed 45° below horizontal and captured video, and the other which faced downward capturing video and still images at five second intervals.

The camera was deployed to a depth of about one metre above the seafloor from a vessel drifting with the current, occasionally using engine bursts to maintain a speed of approximately 0.5–1 knots. Vessel position was recorded throughout each transect using a handheld, non-differential GPS unit. Video subtitles were generated showing time and GPS location (datum WGS84), noting that time is accurate to within one second and distance to within 25 m (allowing for GPS error, the distance moved by the vessel in one second and the lag of the camera, on tether, behind the vessel).

2.3 Map generation

Post-field processing of the 2024 and 2025 video was undertaken to assign a habitat category to each second of video of the seafloor, based on substrate, species mix and density. The outcome was a set of georeferenced habitat points. For the 2023 mapping, a single habitat point representing the entire transect was reused from previous reporting.

Habitat polygons, projected using the Map Grid of Australia (Zone 53), were created manually using the following guidelines:

The inshore sand boundary was based on aerial imagery provided by ESRI and was consistent with mapping in 2023 and 2025.

Other polygons were formed from adjacent transects with predominantly the same habitat type.

Where applicable, e.g. for seagrass which is known to depend on light penetration and therefore depth, boundaries were positioned using bathymetric contours based on navigation charts, digitised by the Department of Environment and Water (DEW 2025). These bathymetry data are considered to be indicative, pending the acquisition of more recent and more accurate data.

Other boundaries were manually drawn through the midpoints between neighbouring transects with different habitat types, or through transects that were represented by two neighbouring habitat types. This algorithm produces “Thiessen” polygons for which every point within them has the same habitat class as the nearest of the points used to generate the polygon.

3 Results & Discussion

Seas were slight to moderate with winds of 0–15 knots, and visibility was approximately 10 metres during all survey events.

3.1 Habitat descriptions

The following habitat classes were identified, in approximate order of increasing depth:

- *Posidonia australis* interspersed with *Zostera* (Plate 1)
- *Posidonia australis* (Plate 2)
- *Mixed P. australis* and *P. sinuosa* (Plate 3)
- *Posidonia sinuosa* (often with moderate to dense epiphytes) (Plate 4)
- *Posidonia*/*Amphibolis antarctica*, either mixed (Plate 5) or in alternating patches
- *Amphibolis antarctica* (Plate 6)
- *Halophila australis*/*Zostera* (Plate 7)
- *Zostera*/*Posidonia sinuosa* (Plate 8)
- *Zostera* (Plate 9)
- *Zostera* sparse (Plate 10)
- Sand with sparse macroalgae (and possibly invertebrates), minimum cover 5% (Plate 11)
- Sand with sparse invertebrates, minimum cover 5% (Plate 12)
- Sand with a monoculture of the bryozoan *Steginoporella truncata*[1] (Plate 13)
- Sand with bioturbation (Plate 14)
- Bare sand (<5% invertebrates/algae).

The habitats that included *Posidonia*, *Amphibolis* and *Halophila* were typically dense, as illustrated in the plates below. *Zostera* was present at variable densities. Sand substrates, even when classified as "bare", had a ubiquitous but sparse cover of small, stalked bryozoans.

During towed camera and/or scuba transects during late summer and autumn *Zostera* was observed to be much sparser (typically 5–10% cover) in areas where it had been mapped in spring 2024 with densities such as shown in Plate 9. The isolated patch of *Halophila* found on two adjacent transects in spring 2024 was not found in several towed camera transects and scuba dives in the same area.

The density and even presence of *Zostera* and *Halophila* can change with time as these genera are relatively short-lived primary colonisers with a low resistance to disturbance but an ability to build up a seed bank from which they can recover (Edgar 2001, Kilminster et al. 2015). *Zostera* leaf and areal production in Victoria were found to be greatest during late spring and summer and late spring (Bulthuis 1983; Bulthuis & Woelkerling 1983, cited by Short et al. 2017; Kerr & Strother 1990), which may explain the apparent decrease between 2024 (late winter) and 2024 (late spring). Interannual variation of *Zostera* cover has also been observed in the Port River (Wiltshire 2010).

[1] This is likely to be the same species as *S. chartacea* which has been recorded in Upper Spencer Gulf (Currie et al. 2009, iNaturalist 2025). However, there is some uncertainty over the taxonomy of this species (Bock 2016) and the SA Museum have labelled it as *Steginoporella truncata* Harmer, 1900 (S. Sorokin, Collection Manager, Marine Invertebrates, pers. comm. 27 March 2025).



Plate 1. *Posidonia australis* interspersed with *Zostera*

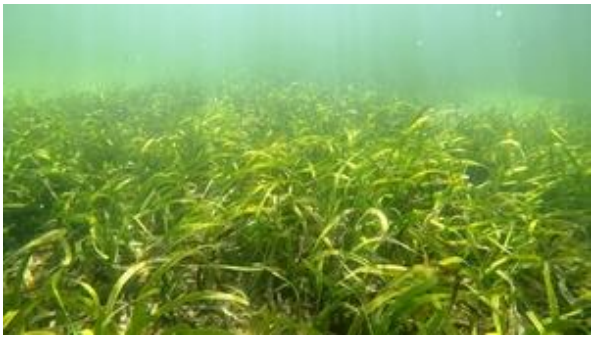


Plate 2. *Posidonia australis*



Plate 3. Mixed *P. australis* and *P. sinuosa*



Plate 4. *Posidonia sinuosa*



Plate 5. Mixed *P. sinuosa* and *Amphibolis antarctica*



Plate 6. *Amphibolis antarctica*



Plate 7. *Halophila australis* with sparse *Zostera*

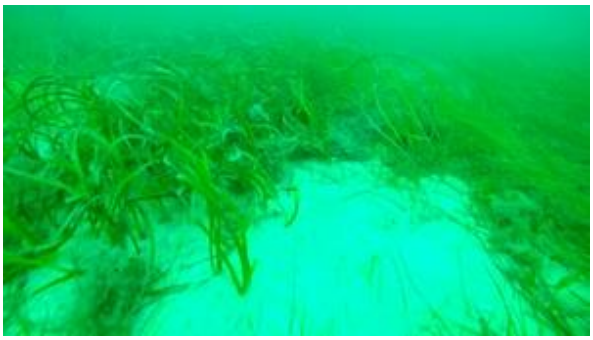


Plate 8. *Posidonia sinuosa* with sparse *Zostera*



Plate 9. *Zostera*



Plate 10. Sparse *Zostera*



Plate 11. Bare sand with sparse macroalgae and invertebrates

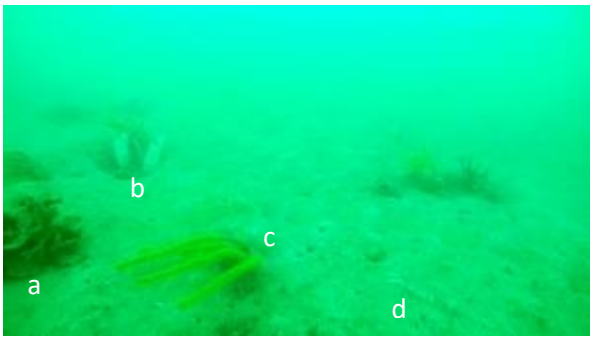


Plate 12. Sand with sparse invertebrates, including bryozoan *Steginoporella truncata* (a), obese ascidian *Phallusa obesa* (b), soft coral *Echinogorgia* sp. (c) and western king prawn *Melicertus latisulcatus* (d).



Plate 13. Bryozoans *Steginoporella truncata*



Plate 14. Sand with bioturbation (worm holes and mounds)

3.2 Maps

Habitat point data using these classifications are presented in Figure 2. The habitat polygons, constructed using the guidelines described in Section 2.3, are presented in Figure 3. This map used 12 habitat classes. The *Zostera*/*Posidonia* habitat was excluded because it did not represent a significant area, and the *Zostera* and sparse *Zostera* habitats were combined, because the latter was mainly near the *Zostera*/sand boundary.

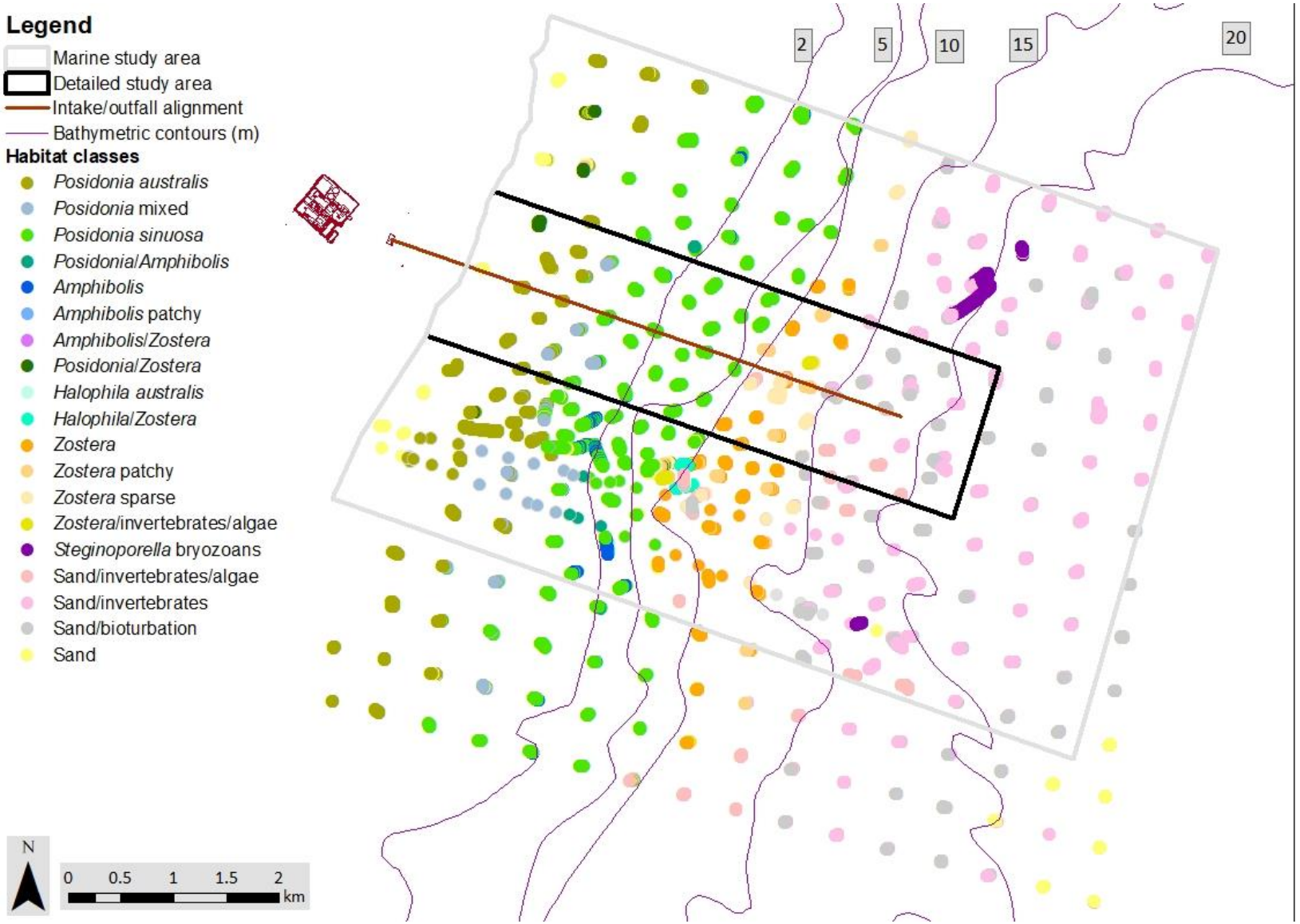


Figure 2. Habitat points. Bathymetry data provided by DEW (2025).

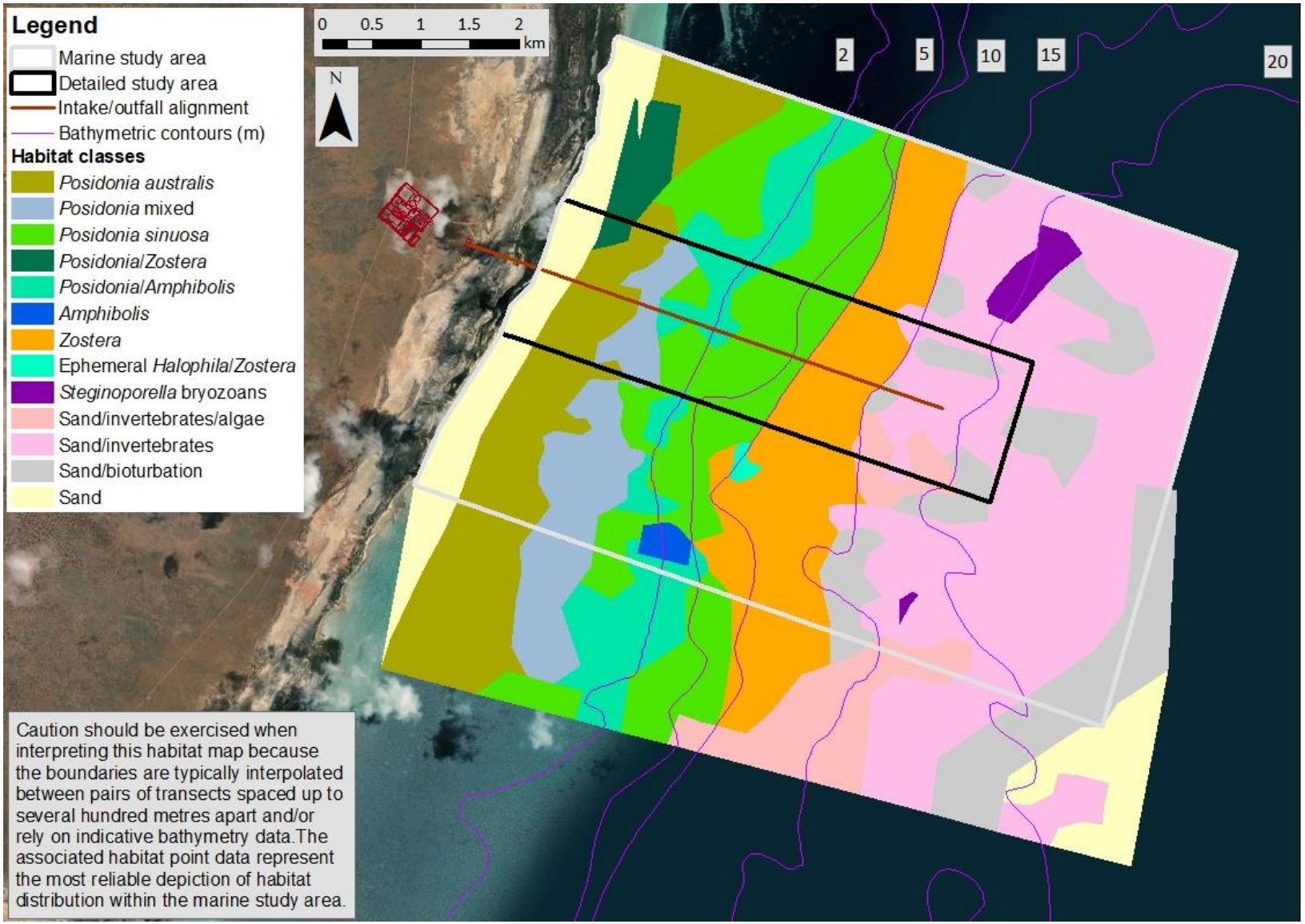


Figure 3. Habitat polygons.

4 Conclusion

Habitats within the MSA varied mainly along a depth gradient and were generally consistent within each depth range. The communities, from shallow to deep, were: sand; dense *Posidonia australis* interspersed with *Zostera*; dense monospecific *Posidonia australis*; a dense mixture of *P. australis* and *P. sinuosa*; dense mixed or alternating patches of *P. sinuosa* and *Amphibolis antarctica*; dense monospecific *P. sinuosa*; patches of monospecific *Amphibolis antarctica* and a patch of dense *Halophila australis* mixed with sparse *Zostera*, each based on single transects; *Zostera;* bare sand with macroalgae and invertebrates; bare sand with invertebrates; a large and a small area of bryozoan monoculture (*Steginoporella truncata*); bare sand with bioturbation; and bare sand. *Posidonia* species dominated depths (below lowest astronomical tide) less than 10 m, and *Zostera* dominated depths of 10–15 m. Negligible seagrass was observed beyond the 15 m depth contour.

The nine most extensive habitats were represented within the DSA (although only shallow and not deep bare sand). The bryozoan, dense *Amphibolis* and ephermeral *Halophila* habitats were represented in relatively small areas outside the DSA.

Caution should be exercised when interpreting this habitat map because the boundaries are typically interpolated between pairs of transects spaced up to several hundred metres apart and/or rely on indicative bathymetry data. The associated habitat point data (Figure 2) represent the most reliable depiction of habitat distribution within the MSA.

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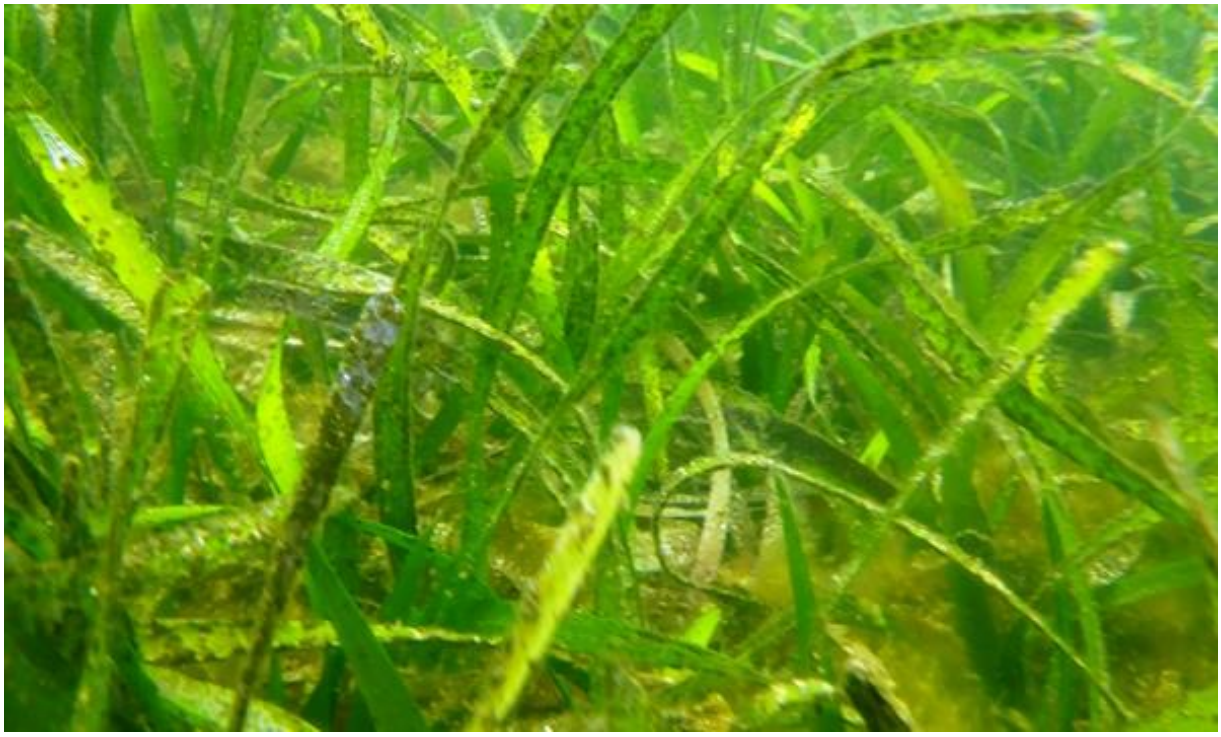
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Appendix G-3:

Marine Ecology Assessment

The Northern Water Project
Marine Ecology Assessment



Report prepared for JBS&G Pty Ltd
By J Diversity Pty Ltd

Revision 0
7 September 2026

Cover photo: smooth strapweed *Posidonia sinuosa* near Mullaquana Station in October 2025.

Disclaimer

The findings and opinions expressed in this publication are those of the author and do not necessarily reflect those of JBS&G or the Department for Infrastructure and Transport. While reasonable efforts have been made to ensure the contents of this report are factually correct, the author does not accept responsibility for the accuracy and completeness of the contents. The author does not accept liability for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the contents of this report.

Revision history

Revision	Date	Description	Author	Reviewed/ approved
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Key terms / Definitions

Key term	Definition
Abundance	The number of individuals within a defined area or habitat
Benthic	Organisms living on the seabed or in the bottom of sediments
Biomass	The total mass of living organisms in a given area or ecosystem
Bray–Curtis dissimilarity	A measure of compositional dissimilarity between samples based on species abundances or cover values, ranging from 0 (identical composition) to 1 (completely different)
Crossed factors	Factors for which every level of one factor occurs in combination with every level of the other factor
Ecotype	A genetically distinct population within a species that is adapted to particular environmental conditions and exhibits characteristic ecological, behavioural, physiological or morphological traits.
Elasmobranch	A cartilaginous fish of a group that comprises sharks, rays, and skates
Epibenthic fauna	Animals living on or near the seafloor
Epiphytes	Plants or algae that grow on other plants and obtain nutrients from the surrounding environment
Euclidian distance	A measure of dissimilarity, commonly used for univariate or continuous environmental data, calculated as the straight-line distance between samples in multidimensional space based on their measured variables
Fixed factor	An experimental factor whose levels are specifically chosen by the investigator and are the only levels about which conclusions are intended to be drawn
Infauna	Small invertebrate species living in sediments of aquatic habitats
Intake	A structure through which seawater is admitted to a desalination plant
Macrofauna	Infauna larger than 500 µm
Meiofauna	Infauna smaller than 500 µm and larger than 53 µm
Nested factor	An experimental factor whose levels are unique to, and occur only within, levels or combinations of levels of one or more other factors
Outfall	A structure through which return water is discharged into a water body
PERMANOVA	A non-parametric procedure that tests for differences among groups using a dissimilarity matrix and permutation tests
Random factor	An experimental factor whose levels are considered a random sample from a larger population of possible levels, allowing conclusions to be generalized beyond the sampled levels
Richness	The number of species present within a defined area or habitat
Standard error of mean	A measure of variability of a sample
Taxon (plural taxa)	A group or category of organisms within a biological classification system. Groups relevant to this report include phylum, class, order, family, genus and species

Acronyms and Abbreviations

Acronym	Full form
µm	Micrometres (or microns)
AHD	Australian Height Datum
ALA	Atlas of Living Australia
AO	*Amphibolis* (a habitat)
BRUV	Baited Remote Underwater Video
cm	Centimetres
CPCe	Coral Point Count with Excel
DIT	Department for Infrastructure and Transport
EIS	Environmental Impact Statement
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
GL/y	Gigalitres per year
km	Kilometres
m	Metres. See also cm, µm, mm, km, m/s.
MDS	Non metric Multi-Dimensional Scaling
ML/day	Megalitres per day
mm	Millimetres
MSA	Marine Study Area
NW	Northern Water (the Northern Water project)
PA	*Posidonia australis* (a habitat)
PIRSA	Primary Industries and Regions South Australia
PMST	Protected Matters Search Tool
PRIMER	Plymouth Routines In Multivariate Ecological Research
PS	*Posidonia sinuosa* (a habitat)
PZ	*Posidonia australis*/*Zostera* (a habitat) (or *Posidonia*/*Zostera*)
SARDI	South Australian Research and Development Institute
SB	Sand with bioturbation (a habitat) (or Sand/bioturbation)
scuba	Self-contained underwater breathing apparatus
SI	Sand with sparse invertebrates (a habitat) (or Sand/invertebrates)
USG	Upper Spencer Gulf
VLC	VideoLAN Client

Executive Summary

Introduction

The Northern Water Project (the Project) aims to provide a new sustainable, climate-resilient water source for industry in the Upper Spencer Gulf (USG) and Far North of South Australia, enabling growth of the industries and key mining resources that will contribute to State and national decarbonisation initiatives.

Delivery of the Project will involve the construction and operation of a 51 GL/y seawater reverse osmosis desalination plant located at Mullaquana Station, approximately 25 km south-west of Whyalla in Upper Spencer Gulf. The Project includes the construction of a desalination plant, intake pump station, intake and outfall tunnels extending beneath the seabed into Spencer Gulf and diffuser structures for discharge of return water into the Gulf.

JBS&G, on behalf of the Department for Infrastructure and Transport (DIT), engaged J Diversity Pty Ltd (J Diversity) to undertake seasonal marine ecological surveys near Mullaquana Station, to inform Project siting, engineering, planning, flora and fauna impact assessments and other required environmental approvals. This technical report documents the outcomes of marine ecological assessments and impact assessment of the return water discharge undertaken by J Diversity as part of the preparation of the Environmental Impact Statement (EIS).

The objectives of the marine ecological assessment were to:

- identify and classify the distribution and abundance of marine habitats, species and communities, covering the full range of depths in the vicinity of the potential discharge and intake zone within a Marine Study Area (MSA) defined by DIT
- review existing data and literature regarding commercial and recreational fish species, listed and protected species and priority marine flora and fauna
- assess the likely impacts on marine ecology from the Project's return water discharge
- recommend mitigation measures to reduce impacts on the marine ecology within and in the vicinity of the MSA.

Studies undertaken

Seasonal field surveys were undertaken in seagrass habitats and deep-water silty sand habitats identified during previous mapping. Primary survey habitats, each with five survey sites, were:

- *Posidonia australis* seagrass
- *Posidonia sinuosa* seagrass
- *Amphibolis*/*Posidonia* (patchy) seagrass ("*Amphibolis*/*Posidonia*")
- *Zostera* seagrass
- Silty sand with sparse invertebrates and/or macroalgae ("Sand/invertebrates")
- Silty sand with bioturbation ("Sand/bioturbation").

Limited surveys were also undertaken at one or two sites selected within less extensive habitats including:

- Bryozoan beds
- *Posidonia australis*/*Zostera* seagrass
- *Amphibolis*/*Posidonia* (mixed) seagrass
- *Amphibolis* seagrass.

Field survey methods included:

- Scuba surveys of seagrass habitats to characterise flora cover and fish and invertebrate communities
- Towed camera surveys of deeper, sandy habitats to characterise fish and invertebrate communities
- Baited Remote Underwater Video surveys to characterise fish and invertebrate communities in all primary habitats
- Infauna surveys in all primary habitats, including meiofauna (< 53 µm) and macrofauna (< 500 µm).

Desktop studies included:

- assessments of the likelihood of interaction of the Project with:
    - listed species and other priority species including giant Australian cuttlefish, sponges and vulnerable macroalgae.
    - fisheries and aquaculture in Spencer Gulf
- a review of trawl studies near Mullaquana Station.

Results of field studies

Habitat type was the primary driver of variation in community composition, abundance and richness, with consistent distinctions between shallow seagrass and deep sand environments. Seasonal variation was evident within some habitats but was generally secondary to spatial (habitat-related) differences.

*Posidonia australi*s cover was generally dense with moderate to dense epiphyte cover. There was no clear seasonal pattern of seagrass cover despite seasonal variation in structural and biomass characteristics. Canopy height, the number of shoots and leaves, and leaf length were greatest in spring, and leaf mass was greatest in summer and autumn. Rhizome mass was greater, but more variable, in autumn and spring than summer and winter. There was a general consistency of seagrass characteristics across sites, with the exception of seagrass leaves being 1–2 mm narrower at PA1. Epiphyte cover, as determined from photoquadrats, was generally greatest in winter, but the epiphyte mass determined from seagrass cores in spring was approximately double that of other seasons.

The epibenthic fauna community in the *Posidonia australis* habitat was distinct from other habitats surveyed and had very low abundance relative to other seagrass habitats. There was no consistent seasonal pattern within that community. The community recorded using BRUV had a similar abundance and community structure to other seagrass habitats, and seasonal differences in community structure. Richness was greatest in autumn, and abundances greatest in summer, driven by large schools of western striped trumpeter. The macrofauna community was distinct from other habitats and had a moderate abundance and richness relative to other seagrass habitats. The

meiofauna community was similar to other shallow seagrass habitats. Summer meiofauna samples generally differed in community structure from the other seasons.

Amphibolis antarctica and *Posidonia sinuosa* habitat was a patchy mix of the two species with generally dense cover and moderate to dense epiphyte cover. The proportion of *Amphibolis* was about 25–100% across the sites. The epibenthic fauna community recorded using scuba was distinct from other habitats and had a moderate to high abundance relative to other seagrass habitats. There was no consistent seasonal pattern within that community. The community recorded using BRUV had a similar abundance and community structure to other seagrass habitats, and seasonal differences in community structure. The macrofauna community was distinct from other habitats and had a high abundance and richness relative to other seagrass habitats. The meiofauna community was similar to other shallow seagrass communities but had a relatively high abundance. Summer meiofauna samples generally differed in community structure from the other seasons.

Posidonia sinuosa cover was moderate to dense with sparse to moderate epiphyte cover. One site (PS5) differed from the other sites, with a greater cover of epiphytes, greater epiphyte mass, longer leaves, generally less shoots and leaves, and some seasonal differences in canopy height. The epibenthic fauna community recorded using scuba in *Posidonia sinuosa* habitat was distinct from other habitats and had a high abundance and richness relative to other seagrass habitats. There was no consistent seasonal pattern within that community. The community recorded using BRUV had a similar abundance and community structure to other seagrass habitats and seasonal differences in community structure. Richness was greatest in autumn, and abundances greatest in summer, driven by large schools of western striped trumpeter. The macrofauna community was distinct from other habitats and had a low abundance and moderate richness relative to other seagrass habitats. The meiofauna community was similar to other shallow seagrass communities but had a generally lower abundance and richness than other seagrass habitats. Summer meiofauna samples generally differed in community structure from the other seasons.

Zostera cover had distinct seasonal differences in cover, which was generally lowest in autumn, increased in winter and spring, then decreased in summer. Cover at two sites (ZO1 and ZO3) was generally lower than the other three sites. The epibenthic fauna community recorded using scuba in Zostera habitat was distinct from other habitats and had a moderate abundance and high richness relative to other seagrass habitats. There was no consistent seasonal pattern in community structure, but both abundance and richness declined in winter and spring as the cover in *Zostera* increased, for reasons unknown. The community recorded using BRUV had a similar abundance and richness to other seagrass habitats but a largely distinct community structure, with seasonal differences. The macrofauna community had a moderate to high (in summer) abundance and richness relative to other seagrass habitats and its community structure was largely distinct from other habitats. The meiofauna community was similar to other habitats but had a generally low abundance and moderate richness relative to other habitats.

Surveys using towed camera and BRUV, and infauna surveys, showed that there was generally little distinction in fauna community structure, abundance or richness between areas previously mapped as Sand/invertebrates and Sand/bioturbation. Consequently, these habitats were considered to comprise a single habitat class for the purpose of impact assessment. There was a pattern of increasing seasonal abundance from summer to winter followed by a decrease in spring, but no obvious seasonal pattern in richness or community structure.

The *Steginoporella truncata* bryozoan habitat had a distinct community structure compared with other deep sand habitats, and low diversity.

The European fan worm*Sabella spallanzanii*, a pest species, was recorded during towed camera surveys at almost every deep sand site in every season with mean abundance of about nine per transect, suggesting that it is well established within deep sand habitats of the study area, extending its previously documented distribution.

Results of desktop studies

A total of 48 marine mammals, turtles, sharks and fish species that are protected by the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or South Australian legislation were identified by the Protected Matters Search Tool or from Atlas of Living Australia records. Of these, 31 species including 12 marine mammals, three marine turtles, two sharks and 14 Syngnathids were assessed as having a likely or possible interaction with the Project based on their distribution, habitat and records within Spencer Gulf. Several pipefish *Stigmatopora* spp. (representing three of the 14 Syngnathids at genus level) were recorded during BRUV surveys and bottlenose dolphins were regularly observed.

Giant Australian cuttlefish were not recorded during field studies but it is known that the cuttlefish that migrate to the breeding aggregation at Point Lowly during May to September have a widespread distribution in Spencer Gulf north of Wallaroo.

No dense sponge communities were found within the MSA, but some sponges were recorded in all habitats and were a significant component of the fauna in several seagrass habitats and the MSA is adjacent to one of two broad areas of relatively high sponge biomass and richness in Spencer Gulf.

No macroalgae considered to be vulnerable due to their paucity of records or restricted range were identified within 25 km of the MSA. No macroalgae species were recorded to species level during field studies, but several species were identified from trawl studies (Appendix D).

Spencer Gulf fisheries that overlap spatially with the MSA include the Marine Scalefish, Charter Boat, Spencer Gulf Prawn and Blue Crab Fisheries (Section 8).

The Marine Scalefish Fishery reporting area surrounds the MSA and has an area more than 50 times greater than it. During 2012–2022, this fishery reported catches of King George whiting, southern sea garfish, southern calamari, snapper, yellowfin whiting, Western Australian salmon, Australian herring, snook, yelloweye mullet, silver trevally, leatherjackets, gummy shark, whaler sharks, rays and skates and cuttlefish. Many of these species, and red mullet, are also taken by the Charter Boat Fishery in Spencer Gulf.

The Spencer Gulf Prawn Fishery has reporting areas surrounding the MSA and an area collectively 4 times greater than it. During the 2016/17–2023/24 seasons, there were relatively small catches reported, and there has historically been negligible trawl effort within the MSA. Important byproduct species include Balmain bugs and southern calamari.

There was no catch for the Blue Crab Fishery within the MSA during the 2014/15–2023/24 fishing seasons, but there had been significant catches prior to that.

Assessments of the Northern Zone Rock Lobster Fishery indicate that there has been no catch, explicitly during 1993–2011 and implicitly since then up to 2022/23 from the reporting area which surrounds the MSA and has an area more than 50 times greater.

No catches have ever been recorded within the MSA for the Western Zone Abalone and Sardine Fisheries and the MSA is situated outside the reporting areas for these fisheries.

The area near Mullaquana Station provides important breeding and/or nursery habitat for blue crabs, western king prawn and a variety of species relevant to the Marine Scalefish Fishery. In particular, there is an important spawning and nursery area for snapper at Western Shoal and a recognised nursery area for King George whiting at Cowleds Landing.

There are aquaculture zones at least 40 km from the MSA but they currently have no leases or unstocked leases (which previously held yellowtail kingfish). There are land-based aquaculture leases 30 km north of the MSA in False Bay and 40 km south-east at Port Broughton.

A total of 149 species were identified from the review of trawl studies near Mullaquana Station and ALA records within the MSA, of which 109 were not identified during field studies.

Impact assessment

Assessment of the impact of the desalination return water on the marine environment used at least three lines of evidence.

- Whole effluent toxicity testing of the return water can be used to determine effects on species, including those unrelated to or synergistic with elevated salinity. A chronic toxicity dataset comprising 17 species from seven taxonomic groups was derived from studies associated with Australian desalination plants, mainly BHP Billiton's proposed Olympic Dam Expansion and the Adelaide Desalination Plant. At least seven of these ten species, or their genera, are likely to occur within or near the MSA. Using this dataset, preliminary safe dilutions were established for the Project of 1.9% (1 in 53) and 3.9% (1 in 26) for protection of 99% and 95% of species, respectively. These preliminary safe dilutions are expected to be conservative (i.e. protective) for the proposed site at Mullaquana Station, largely due to the conservative relevance criteria that were adopted for the return water salinity. Based on predictions from hydrodynamic modelling for the 51 GL/y capacity, return water would be sufficiently diluted beyond an area of 13 ha surrounding the diffuser, to achieve the safe dilutions for protecting 95% of all species from chronic impacts (note, the EIS Assessment Requirements stipulate that 95% species protection is relevant to the Project). This area is a union of all reported midfield modelling seasonal results and represents the maximum spatial extent beyond which species protection would be consistently achieved. At any particular time, however, the plume (defined by the relevant safe dilution) occupies a smaller portion of the area enclosed by the seasonal contour.
- Analysis of the seasonal variation in ambient salinity near Mullaquana Station indicates that salinity corresponding to the 95% safe dilution would exceed the annual maximum ambient salinity only during April to July. The main inference is that even where safe dilution values are not achieved, the corresponding salinity will not always exceed the maximum value naturally experienced by biota within those areas.
- Many of the species found near Mullaquana Station are also found in areas further north or east in Upper Spencer Gulf where salinities are higher than would be experienced by organisms as a result of return water discharge near Mullaquana Station.

Impacts on seagrass habitats, Bryozoan habitat and related communities are expected to be negligible because:

- no examples were identified in the literature of desalination plants negatively impacting seagrass or bryozoan communities,
- plume dispersion modelling predicts that return water dilutions would achieve safe protection levels, determined from ecotoxicology studies, often enough to protect all seagrass habitats and the Bryozoan habitat from chronic impacts (at 51 GL/y capacity),
- salinity outside the 95% protection footprint is predicted to remain within the range of natural seasonal variability near Mullaquana Station for most of the year,
- the key habitat-forming seagrasses, including *Posidonia*, *Amphibolis* and *Zostera*, have a demonstrated tolerance for higher levels of salinity than would be experienced as a result of return water discharge, as inferred from their established distribution within Upper Spencer Gulf.

The discharge of return water is expected to have localised, minor, temporary but recurring impacts on deep water silty sand habitats because:

- examples were identified in the literature of desalination plants negatively impacting sponges and macroalgae,
- return water dilutions are predicted to achieve safe protection levels often enough to protect more than 95% of species except within about 13 ha of the diffuser, representing 0.02% of that general habitat type (at 51 GL/y capacity),
- salinity outside the 95% protection footprint is predicted to remain within the range of natural seasonal variability near Mullaquana Station for most of the year.

The discharge of return water is expected to have negligible impact on megafauna and fish, including listed Syngnathids and species relevant to fisheries, because:

- no examples were identified in the literature of desalination plants negatively impacting fish communities,
- most fish species recorded near Mullaquana Station are likely to tolerate salinities higher than those predicted from return water discharge, as inferred from their distribution in Spencer Gulf,
- plume dispersion modelling predicts that return water dilutions would achieve safe protection levels, determined from ecotoxicology studies, often enough to protect more than 99% of species within most habitats, including seagrass habitats,
- megafauna and fish have the ability to move or osmoregulate (in the case of fish) in response to elevated salinity in the small areas of deep-water silty sand habitat where safe dilutions may not be achieved sufficiently often.

The discharge of return water (51 GL/y capacity) is expected to have localised, minor, temporary but recurring impacts on epibenthic invertebrate communities and infauna, in areas of deep water silty sand habitat of about 13 ha near the diffuser, representing 0.02% of that general habitat type where return water dilutions may not achieve safe protection levels often enough to protect more than 95% of species respectively.

The discharge of return water is expected to have negligible impact on giant Australian cuttlefish from the northern Spencer Gulf population because:

- the northern Spencer Gulf population of giant Australian cuttlefish has a tolerance for higher salinity than predicted to occur as a result of return water discharge, as inferred from its distribution in Spencer Gulf
- ecotoxicity testing suggests that giant Australian cuttlefish would be resilient to salinities predicted to occur as a result of return water discharge near Mullaquana Station. Even based on the most conservative safe dilution for cuttlefish derived from ecotoxicity studies, chronic effects on giant Australian cuttlefish would be limited to the 95% safe dilution footprint, i.e. 13 ha near the diffuser at 51 GL/y capacity
- cuttlefish have the ability to move away from elevated salinity.

The discharge of return water is expected to have negligible impact on fisheries or aquaculture species because:

- all of the species most relevant to fisheries near Mullaquana Station have a tolerance for higher salinity than would be experienced as a result of return water discharge, as inferred from their distribution in Spencer Gulf
- dilution of return water within all seagrass and mangrove habitats would be sufficiently high often enough to protect more than 99% of species from chronic impacts, resulting in negligible risk to these ecosystems
- chronic impacts to species within silty sand habitats near Mullaquana Station would be limited to 13 ha for 95% of species and 83 ha for 99% of species (51 GL/y capacity), representing a small fractional percentage of similar habitat mapped in the area
- fish have the ability to move or osmoregulate in response to elevated salinity
- aquaculture leases and zones currently are too far from the outfall for permitted species including yellowtail kingfish, molluscs and macroalgae to be impacted by return water. The microalgae aquaculture lease at the top of False Bay is also too far to be impacted by the return water and in any case relies on hypersaline water.

Conclusion

Impacts on marine receptors are not anticipated across most of the marine environment adjacent to the outfall. However, for some receptors (deep-water silty sand habitat and associated epibenthic fauna and infauna), minor and highly localised impacts may occur. The requirement to protect 95% of species would be achieved everywhere except within approximately 13 ha of deep-water silty sand habitat, representing 0.02% of similar habitat in Spencer Gulf (based on the 51GL/y desalination plant capacity for which approval is sought).

It is recommended that a monitoring program be established that is informed by the studies presented in this report, and:

- includes the six major habitat classes defined in this report, to confirm that impacts on these habitats are negligible outside the 95% footprint
- includes reference sites to enable a Before-After, Control-Impact (BACI) analysis
- has sufficient replication within the potentially impacted and reference areas for each habitat to ensure sufficient power to measure unacceptable change.

PART 1: Introduction and Background

1. Introduction

1.1 Background

The Northern Water Project (the Project) aims to provide a new sustainable, climate-resilient water source for industry in the Upper Spencer Gulf (USG) and Far North of South Australia, enabling growth of the industries and key mining resources that will contribute to State and national decarbonisation initiatives.

Delivery of the Project will involve the construction and operation of a 51 GL/y seawater reverse osmosis desalination plant located at Mullaquana Station, approximately 25 km south-west of Whyalla in USG. The Project includes the construction of a desalination plant, intake pump station, intake and outfall tunnels extending beneath the seabed into Spencer Gulf and diffuser structures for discharge of return water into the Gulf. The transfer system consists of a ~360 km main transfer pipeline, a ~46 km Carrapateena lateral branch pipeline and associated transfer pump stations and storage tanks to transfer desalinated water to the delivery point at the Olympic Dam copper-gold mine. Electricity infrastructure includes high voltage electricity supply including powerlines, and network and facility substations to provide power to the desalination plant and transfer pump stations.

JBS&G, on behalf of the Department for Infrastructure and Transport (DIT), engaged J Diversity Pty Ltd (J Diversity) to undertake seasonal marine ecological surveys near Mullaquana Station, to inform Project siting, engineering, planning, flora and fauna impact assessments and other required environmental approvals.

This technical report documents the outcomes of marine ecological assessments and impact assessment of the return water discharge undertaken by J Diversity as part of the preparation of the Environmental Impact Statement (EIS).

It should be noted that the marine ecological surveys undertaken during 2025 occurred before the harmful algal bloom within South Australian gulfs reached Mullaquana Station during summer 2025/26.

1.2 Objective

The objectives of the marine ecological assessment were to:

- identify and classify the distribution and abundance of marine habitats, species and communities, covering the full range of depths in the vicinity of the potential discharge and intake zone within a Marine Study Area (MSA) defined by DIT
- review existing data and literature regarding commercial and recreational fish species, listed and protected species and priority marine flora and fauna
- assess the likely impacts on marine ecology from the Project's return water discharge
- recommend mitigation measures to reduce impacts on the marine ecology within and in the vicinity of the MSA.

1.3 Regulatory context

The legislation relevant to the marine and coastal environment during the construction and/or operational phases of the Project is listed below.

Commonwealth legislation

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- *Biosecurity Act 2015*

South Australian legislation and policy

- *Planning, Development and Infrastructure Act 2016*
- *Harbours and Navigation Act 1993*
- *National Parks and Wildlife Act 1972*
- *Native Vegetation Act 1991*
- *Fisheries Management Act 2007*
- *Marine Parks Act 2007*
- *Aquaculture Act 2001*
- *Protection of Marine Waters (Prevention of Pollution from Ships) Act 1987*
- *Coast Protection Act 1972*
- *Landscape South Australia Act 2019*
- *Environment Protection Act 1993*
- *Biodiversity Act 2025.*

1.4 Assessment Requirements

The Assessment Requirements set out matters that are to be addressed in an EIS for all components of the Project. Table 1 indicates the requirements relevant to the marine and coastal environment and addressed in this report.

Table 1. Relevant clauses of the EIS Assessment Requirements

Item	EIS Assessment Requirements
BE2	Marine Flora and Fauna - Detailed Assessment
BE2-2	Provide an assessment undertaken by an appropriately qualified specialist of the direct, indirect and cumulative impacts of the development on marine flora and fauna, ecological communities and populations, that may occur over the life of the development.
BE2-2.1	Describe the existing marine environment at a regional scale (in relation to the location of the intake and outfall infrastructure at Mullaquana Station) using existing publicly available data, including a description of nearby Marine Protected Areas.
BE2-2.2	Describe the distribution, abundance, condition and significance of flora and fauna species, populations, and marine habitats at Mullaquana Station and adjacent marine environment (defined as the EIS Marine Study Area). The assessment should consider and/or include, where relevant:
BE2-2.2a	a) benthic habitat and plankton surveys, including potential harmful algal species;
BE2-2.2b	b) ecologically important species;
BE2-2.2c	c) economically important species, particularly for the commercial and recreational fisheries and aquaculture industries (both existing and potential future sites in the region) including spat survival / collection;
BE2-2.2d	d) species that are totemic and/or of significance to the cultural traditions of Traditional Owners.
BE2-2.3	Describe the ability of communities, populations or individual species to recover, regenerate or be rehabilitated during construction and operation including maintenance.
BE2-2.4	Describe the measures that will be taken to address displaced flora and fauna (if any).
PE1	Coastal and Marine - Detailed Assessment: Describe the likely constituents and toxicity of any chemical treatments, additives, or any other chemicals (including brine) that may be discharged to the marine environment. Outline the degree of dilution required to ensure that “95% protection level” of representative local species are protected from any chronic impacts from the discharge.

2. Project description

The Project, as per the Reference Design (GHD 2025), comprises a 51 GL/y seawater reverse osmosis desalination plant at Mullaquana Station, together with associated water transfer and electricity infrastructure. This report assesses the marine environmental impacts of the desalination plant return water from the 51 GL/y Reference Design capacity, as well as a hypothetical high-capacity scenario of 73 GL/y and a minimum capacity (turn down) scenario of 40 ML/day[1].

The desalination plant will discharge return water (i.e. concentrated seawater with residual chemical additives) into Spencer Gulf. The proposed infrastructure associated with return water discharge includes tunnelled intake and outfall pipelines extending under the seabed. Marine intake and outfall structures are likely to be located in a minimum approximate water depth of 13 m to maximum of 17 m from Lowest Astronomical tide (approximately -15m to -19m from Australian Height Datum), and no less than 3 km and no more than 5 km from the onshore intake pump station. The intake structure(s) is likely to be located in shallower water and closer to shore than the outfall structure. The intake and outfall structures would also be sufficient distance apart to avoid unacceptable recirculation of return water back into the plant (GHD 2025).

The diffuser structure adopted for the Reference Design is a linear multiport diffuser array, i.e. a long pipeline or manifold with a flexible number of small ports at optimised intervals along its length, making it easy to scale capacity by lengthening the pipe (GHD 2025). The Reference Design configuration was eight ports with 12 m spacing, oriented at 45° from vertical and positioned 3 m above the seabed (GHD 2025). As part of the Reference Design process, hydrodynamic modelling was undertaken to optimise the diffuser design to ensure the best engineering and environmental performance. This resulted in 10, 12 and 6 ports being adopted for midfield modelling of the 51 GL/y Reference Design capacity, hypothetical 73 GL/y high-capacity scenario and the 40 ML/d turndown scenario, respectively (Water Technology 2026).

[1] Equivalent to 15 GL/y. Note also that the 51 and 73 GL/y rates are equivalent to 140 and 200 ML/day, respectively.

3. Methods

The following section provides an overview of the methodology employed to meet the Assessment Requirements set out to guide the preparation of the marine and coastal sections of the EIS.

3.1 Overview

A number of marine studies were undertaken to characterise the environmental values of the MSA and inform impact assessment for the Project, including the impact assessment of the return water plume in this report. The marine studies, including field and desktop studies, and are listed in Table 2.

The field studies were conducted over a full year with sampling occurring across all four seasons. These sampling events are referred to hereafter as 'seasonal' surveys, but this does not intend to imply that they provide for a statistical comparison of seasonal variability, which would require multiple sampling events per season.

Additional marine studies (undertaken by other specialists) that contribute to the assessments presented in this technical report include water quality monitoring, ecotoxicology, plume dispersion modelling, larvae surveys, juvenile prawn surveys, a summary of important habitats for particular fisheries, an assessment of significant impacts on species listed under the EPBC Act, and an assessment of potential impacts on giant Australian cuttlefish (JBS&G 2026a, van Dam 2026, Water Technology 2026, SARDI 2026a, b, Rogers 2025, JBS&G 2026b, c).

Table 2. Summary of investigations undertaken for this report

General topic	Study	Nature of study
Subtidal habitats	Benthic habitat mapping	Field
	Seagrass habitat characteristics	Field
Subtidal epibenthic fauna	Scuba surveys (seagrass)	Field
	Towed camera surveys (deeper water sand habitats)	Field
	Baited underwater video (all habitats)	Field
Subtidal infauna	Macrofauna sampling	Field
	Meiofauna sampling	Field
Priority species (conservation or socio-economic importance)	Fisheries	Desktop
	Listed and other priority species	Desktop

The MSA comprises a buffer of 2.5 km around the proposed intake/outfall alignment, extending for approximately 5 km along the shoreline and 7 km offshore, and covering 3,471 ha (Figure 1).

Habitats were mapped within the MSA prior to the studies reported herein (Figure 1, J Diversity 2025). Six of the more extensive habitats were selected as primary survey habitats, including:

- *Posidonia australis* seagrass
- *Posidonia sinuosa* seagrass
- *Amphibolis*/*Posidonia* (patchy) seagrass ("*Amphibolis*/*Posidonia*")
- *Zostera* seagrass
- Silty sand[2] with sparse invertebrates and/or macroalgae ("Sand/invertebrates")
- Silty sand with bioturbation ("Sand/bioturbation").

Five sites were selected in each of these primary survey habitats (Figure 1).

Limited surveys were also undertaken at one or two sites selected within each of several less extensive habitats including (Figure 1):

- Bryozoan beds
- *Posidonia australis*/*Zostera* seagrass
- *Amphibolis*/*Posidonia* (mixed) seagrass
- *Amphibolis* seagrass.

A survey was also attempted within the *Halophila/Zostera* habitat during summer 2024/25, but no example of that habitat could be found in the area where it had been mapped in spring 2024.

The GPS coordinates for the survey sites are provided in Appendix A. Star droppers were deployed in the shallow seagrass sites to mark the start of the transect, which was oriented in a cardinal direction.

A number of survey methods were used (Table 3):

- At each seagrass site, photoquadrats were used to estimate percentage cover of seagrass and epiphytes, and in *Posidonia* habitats, seagrass material was sampled and measured at several locations along each transect, providing for an assessment of seagrass condition and statistical comparison between seasons.
- Epibenthic fauna were surveyed using baited remote underwater video (BRUV) at all six primary habitats, scuba transects in the shallow seagrass habitats, and towed camera in the Bryozoan and deep-water silty sand habitats, providing for description of similarities/ differences between survey areas (habitats) and seasons.
- Infauna were sampled at all six primary habitats for laboratory processing and description of similarities/differences between survey areas (habitats) and seasons.

[2] Based on particle size analysis of six sediment samples showing about 5–25% silt, which was consistent with observations at all deep sand sites.

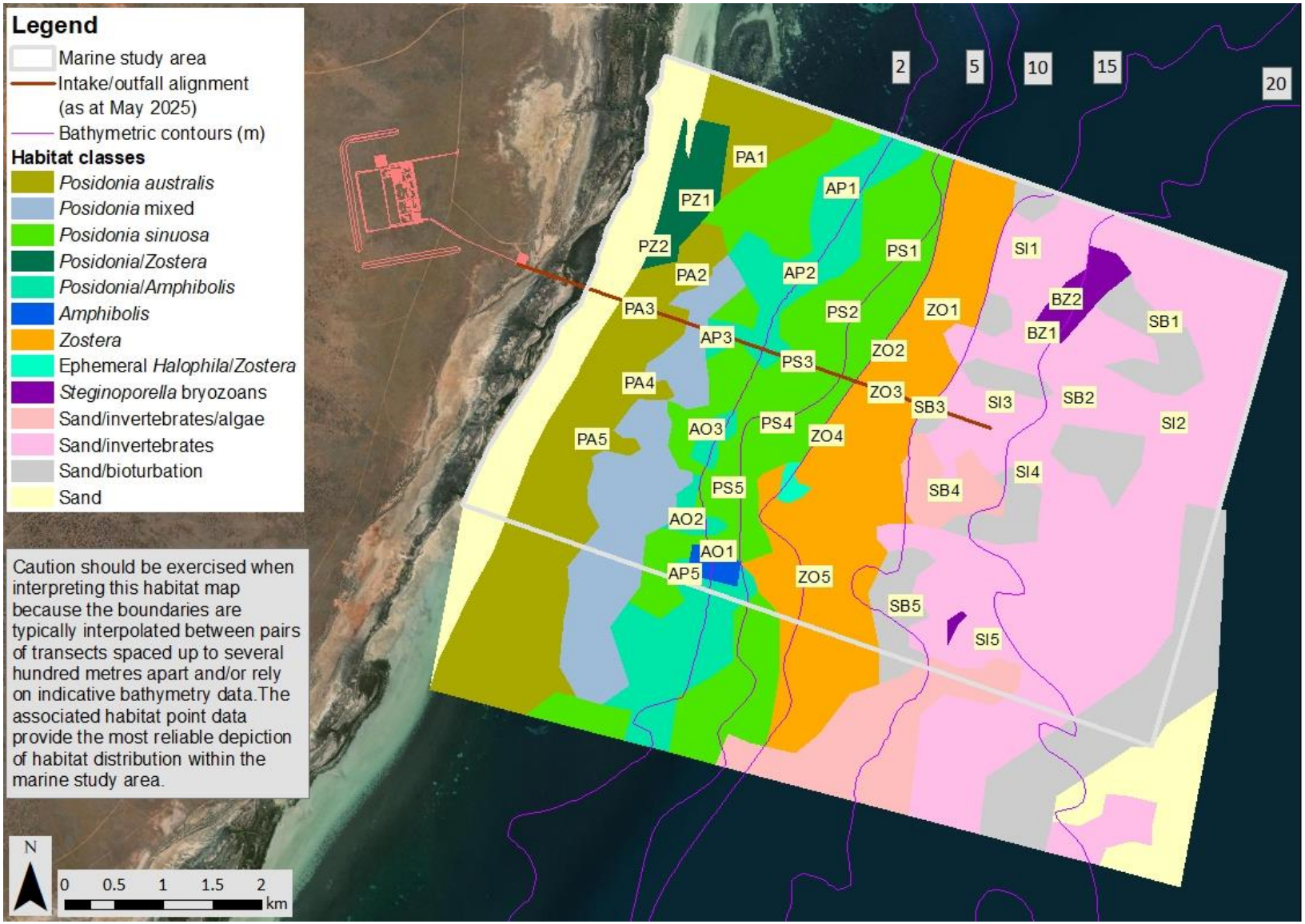


Figure 1. Marine Study Area, mapped habitats and representative sites

Table 3. Overview of methods used and number of sites for each habitat surveyed

Habitat	Acronym	Number of sites	Methods						
			Photoquadrats	Seagrass cores	Canopy measurement	Invertebrate searches	Towed camera	BRUV	Infauna sampling
Posidonia australis	PA	5	Yes	Yes	Yes	Yes	-	Yes	Yes
Posidonia sinuosa	PS	5	Yes	Yes	Yes	Yes	-	Yes	Yes
Amphibolis/Posidonia patchy	AP	5	Yes	-	Yes	Yes	-	Yes	Yes
Zostera	ZO	5	Yes	-	-	Yes	-	Yes	Yes
Sand/algae/invertebrates	SI	5	-	-	-	-	Yes	Yes	Yes
Sand/bioturbation	SB	5	-	-	-	-	Yes	Yes	Yes
Posidonia/Zostera	PZ	2	Yes	-	-	Yes	-	-	-
Bryozoan beds	BZ	2	-	-	-	-	Yes	-	-
Amphibolis/Posidonia mixed	AM	1	Yes	-	-	Yes	-	-	-
Amphibolis	AO	1	Yes	-	-	Yes	-	-	-

3.2 Seagrass habitat characteristics

Surveys were undertaken by scuba along a 50 m transect at each of the sites representing the four major and three minor seagrass habitats (Section 3.1).

The surveys were conducted on the following dates in 2025:

- 17–18 and 25–26 February (summer), with smooth to moderate seas and visibility of 9–10 m
- 28–30 April and 1 May (autumn), with smooth to moderate seas and visibility of 6–10 m
- 22–24 and 28 July (winter), with smooth to moderate seas and visibility of 5–10 m
- 20-21 and 23–24 October (spring), with smooth to moderate seas and visibility of 5–6 m.

The following was undertaken on each transect:

- Landscape orientated photoquadrats perpendicular to the transect line were undertaken at 2.5 m intervals, each encompassing 30–50 cm of tape (a total of 21 images per transect).
- For sites with *Posidonia* or *Amphibolis* habitat, at each of five randomly selected points along the transect line:
    - Five measurements were made of canopy height (from the substrate to the highest point of the leaves, which were generally bent over)
    - For *Posidonia australis* and *P. sinuosa* habitats, a corer of diameter 110 mm and depth 300 mm was used to extract all seagrass material (Plate 1), which was placed into a labelled bag and frozen for post-field processing.

Post-field processing included:

- Estimating the percentage cover of benthic plants and epiphytes from photoquadrats using point intercepts. The Coral Point Count with Excel extensions (CPCe) software developed by Kohler & Gill (2006) was used to overlay five points, arranged in a quincunx[3] formation, on each photoquadrat and record the biota under each point (Plate 2). For epiphytes, a distinction was made if it was clear from the surrounding context that they were growing on seagrass, allowing these points to be included when calculating the overall seagrass cover.
- Defrosting each seagrass core, counting the number of leaves and shoots, and measuring the length and width of five haphazardly selected unbroken leaves and the dry mass of leaves, epiphytes and rhizomes, according to the protocol in Appendix B. This work was undertaken by Dr Warwick Noble of Aquatic Assessments Pty Ltd.

For canopy height, leaf length and leaf width, the mean of the five measurements from each of the five random points along the transect line was used to represent the value for each parameter at that point.

Discussion of seagrass and epiphyte density in this report follows classifications by Gaylard et al. (2013) of sparse, moderate and dense divided by thresholds of 35% and 70%.

[3] Like the dots on the “5” face of typical dice



Plate 1. Corers used to extract seagrass material from the seafloor

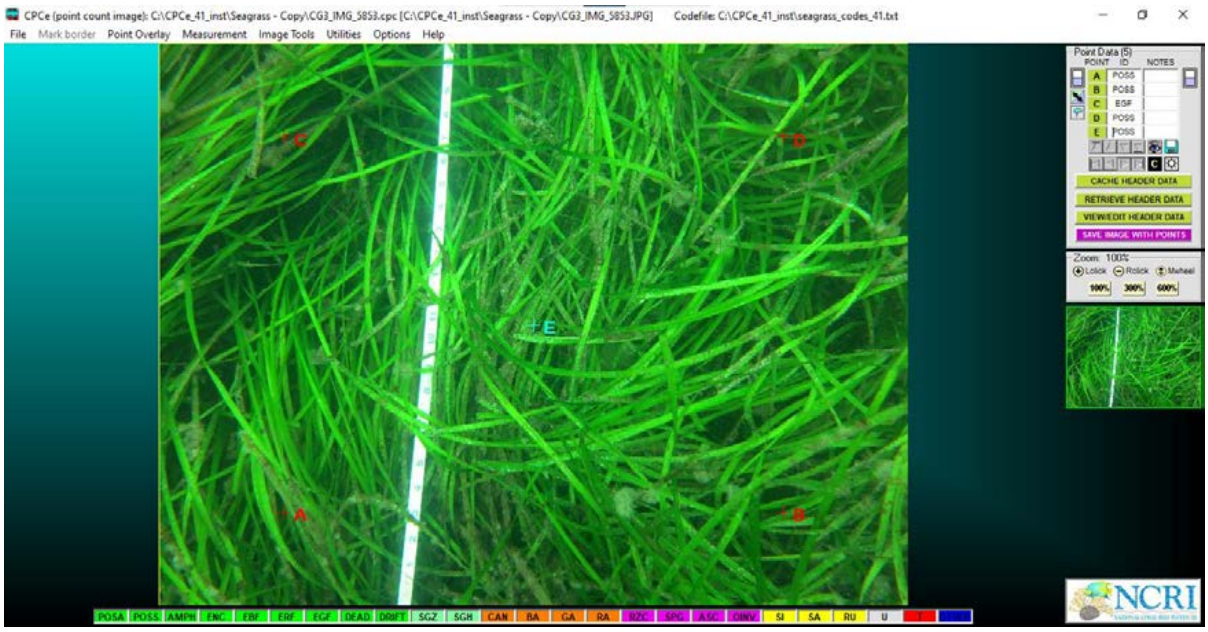


Plate 2. Screenshot from CPCe showing point overlay and scoring of a photoquadrat

3.3 Epibenthic fauna

3.3.1 Scuba surveys (seagrass habitats)

Surveys were undertaken by scuba along a 50 m transect at each of the four major and three minor seagrass habitats (Section 3.1). The surveys were conducted in conjunction with the benthic habitat characteristics survey (Section 3.2), i.e. on the following dates in 2025:

- 17–18 and 25–26 February (summer), with smooth to moderate seas and visibility of 9–10 m
- 28–30 April and 1 May (autumn), with smooth to moderate seas and visibility of 6–10 m
- 22–24 and 28 July (winter), with smooth to moderate seas and visibility of 5–10 m
- 20-21 and 23–24 October (spring), with smooth to moderate seas and visibility of 5–6 m.

Each transect comprised a search for invertebrates and cryptic fish within one metre to one side of the transect line. Divers used their hands to sweep through thick seagrass if necessary. All fish, mobile and solitary sessile invertebrates with an adult size typically >5cm, and all colonial sessile invertebrates >10 cm were recorded.

3.3.2 Towed camera surveys (deep water habitats)

Towed camera surveys were undertaken on the following dates in 2025:

- 27 February (summer), with smooth to moderate seas and visibility of approximately 10 m.
- 2 May (autumn), with smooth seas and visibility of approximately 10 m
- 1 August (winter), with smooth to slight seas and visibility of approximately 10 m
- 29 October (spring), with smooth seas and visibility of approximately 5 m.

A 50 m transect was undertaken using a towed camera system at each of the representative sites in Sand/bioturbation, Sand/invertebrates and Bryozoan habitats (Section 3.1).

The camera system comprised a standard definition camera with a live feed to the vessel and a Go Pro Hero 4 used to capture high definition, wide screen video footage. Both cameras were aimed 45° below horizontal. The camera system was deployed at about 1 m above the seafloor in depths of approximately 15–25 m, from a vessel drifting with the current, occasionally using engine bursts to maintain a speed of approximately 0.5–1 knots. Vessel position was recorded throughout each transect using a handheld, non-differential GPS unit.

All discernible fish and invertebrate species were recorded during post-field video analysis, which was truncated after a distance of 50 m, as calculated from the sum of distances between GPS marks for each second of the video.

3.3.3 Baited Remote Underwater Video (BRUV) surveys (all primary habitats)

Baited Remote Underwater Video (BRUV) units were deployed at the five representative sites for each of the six primary habitats (Section 3.1), i.e. 30 sites in total. The BRUV units were deployed on the following dates in 2025:

- 27 February (summer), with smooth to moderate seas and visibility of approximately 10 m.
- 1–2 May (autumn), with smooth to slight seas and visibility of approximately 10 m
- 28–29 July (winter), with smooth to slight seas and visibility of 5–10 m
- 29–30 October (spring), with smooth seas and visibility of 5–10 m.

Each BRUV unit consisted of a high-definition GoPro Hero 4 Silver video camera mounted on a metallic frame (Figure 2). These cameras were selected due to their relatively low cost, ability to record in high definition, long battery life, wide-angle viewing, and image quality in low-light conditions (Whitmarsh et al. 2021). Only one camera was used on each unit because fish length measurement was not required. The camera was directed parallel to the seafloor along a 1.5 m pole terminated by a meshed bait basket with 500 g of Australian sardine *Sardinops sagax*, previously minced, frozen then defrosted (Figure 2). The sardines created an odour plume which served as an attractant. Each BRUV unit was linked to the sea surface via a floating rope and buoy to facilitate retrieval.

Sites were surveyed in an order that ensured that concurrent BRUV unit deployments were spaced at least 200 m apart to avoid bait plume overlap and animals moving between cameras, consistent with state and national guidelines (Miller et al. 2017, Langlois et al. 2018). Each BRUV unit was deployed for at least one hour during the window between one hour after sunrise and one hour before sunset, consistent with national guidelines (Langlois et al. 2018).

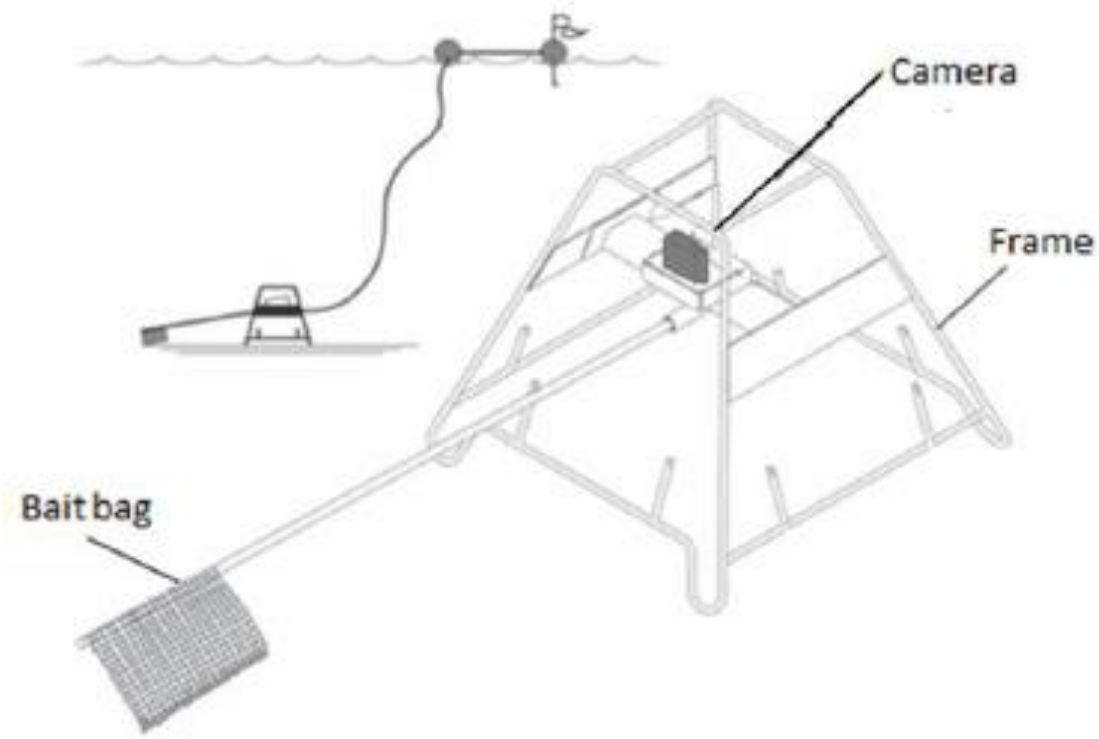


Figure 2. Baited remote underwater video system (BRUV) unit. Source: adapted from Cappo et al. (2007).

This BRUV configuration has been used to monitor the Adelaide Desalination Plant since 2015 (Jacobs 2015, Brook 2018, 2022, 2024, Whitmarsh et al. 2021) and its operation near Mullaquana Station was consistent with standards developed by Miller et al. (2017) and, where applicable to single-camera BRUV units, Langlois et al. (2018).

One hour of video from each BRUV unit deployment (starting from when sediment settled after the BRUV unit reached the bottom) was analysed using VLC media player in conjunction with a spreadsheet, to log observations of mobile epibenthic fauna including fish, crustaceans, cephalopods, mammals and birds (hereafter collectively known as 'fish').

Fish identification was carried out with the assistance of reference books and websites (Edgar 2008, Gomon et al. 2008, Hutchins and Swainston 1986, Bray & Gomon 2026). For each taxon at each site, the abundance was recorded as MaxN, which is the maximum number of individuals observed in a single frame throughout the deployment duration. MaxN is a conservative estimate of abundance, because counts are limited to those in the field of view at any one time, and when large numbers of fish are present, fish in the foreground can obscure others in the background (Willis et al. 2000, Cappo et al. 2003, 2004).

3.4 Infauna

Samples of macrofauna (animals greater than 500 µm in size) and meiofauna (animals 53– 500 µm in size) were taken at the five representative sites for each of the six primary habitats, i.e. 30 sites in total (Section 3.1). Sampling was undertaken on the following dates in 2025:

- 17–18 and 25–26 February (summer), with smooth to moderate seas and visibility of approximately 10 m
- 28–30 April and 1 May (autumn), with smooth to moderate seas and visibility of 6–10 m
- 22–24 and 28 July (winter), with smooth to moderate seas and visibility of 5–10 m
- 20-21 and 23–24 October (spring), with smooth to moderate seas and visibility of 5–6 m.

3.4.1 Macrofauna

Sediment samples for macrofauna analysis were collected by divers using hand-held corers (67 mm internal diameter) to collect five sediment samples to a depth of 100 mm into the sediment at each site, with each sample haphazardly located within 2 m of a shotline deployed at the site. The hand-held corers provided a consistent sample size, without loss of sediment, thereby allowing quantitative assessment of infaunal assemblages. The samples were processed on shore using a 500 µm sieve, labelled and preserved in 70–90% ethanol.

Macrofauna picking and identification to the lowest possible taxonomic resolution were undertaken by Benthic Australia Pty Ltd. Samples were drained, rinsed with tap water through a 250 µm sieve and placed into a petri dish. Laboratory picking was conducted under a dissection-microscope, with all benthic fauna being removed from the sediment. Picking quality assurance checks were undertaken, whereby 10% of the total samples were checked to determine if any animals had been missed when first picked, and as many additional samples checked as necessary to achieve a picking error rate less than 5%.

Picked fauna were stored in separate sample vials with 70% ethanol and identified using a dissection microscope, assisted by Benthic Australia's specimen reference collection assembled from work around Australia over 11 years.

3.4.2 Meiofauna

Meiofauna samples were collected in the same manner and location as the macrofauna samples but using smaller corers (30 mm internal diameter), and without sieving the samples before preserving them in ethanol for transport to the laboratory.

The meiofauna samples were processed by Flinders University, according to the following protocol. Preserved meiofauna samples were extracted from sediments using the Ludox™ floatation method (Somerfield and Warwick 2013). Sediment was decanted in fresh water, firstly through a 500 µm mesh sieve and secondly with the remaining supernatant poured through a finer 53 µm mesh sieve

to separate the meiofauna and unicellular (ciliates) organisms from larger sediment particles. As the sediment in samples was mostly sized between 500 – 53 µm, large amounts remained in the second sieve, limiting the flow of freshwater through the mesh. To advance the process, rather than draining all freshwater out and rinsing the sediment, all sediment was gently scooped out of the sieve with a metal laboratory spoon/spatula and processed with Ludox™ to float off and isolate the meiofauna from sediments and detritus.

The extracted meiofauna samples were set onto glass slides with remaining moisture evaporated and meiofauna preserved with a 5% pure glycerol and 70% ethanol mixture. Cover slides were added to microscope slides and sealed with paraffin wax for identification and enumeration of individual meiofauna taxa under a compound microscope at 40x magnification. Taxa were identified to higher taxonomic levels (e.g. Class Ostracoda) as taxonomic knowledge of meiofauna species, especially for Australian sediments, is limited (Bouwman 1987).

3.5 Analyses

Univariate analyses

Univariate measures of subtidal fauna communities reported for each survey method were:

- abundance (count of individuals)
- taxonomic richness, i.e. the number of distinct taxa (species or higher-level classification from genus to phylum) or morphologies, e.g. for sponges.

These measures were reported as overall totals for each method (across all seasons and sites), as mean and standard error of mean for each taxon (abundance only) and as site mean and standard error of mean for each combination of habitat and season. For the infauna surveys, abundance was averaged and richness was accumulated over five replicate samples at each site prior to calculating site mean and standard error of mean.

The standard error of mean is a measure of variability of a sample. A high standard error shows that samples are widely spread around the population mean and may not closely represent the sampled population, whereas a low standard error shows that samples are closely distributed around the population mean and are representative of the population.

Mean and standard error of mean were also reported for the seagrass characteristics recorded at different positions along the transect line at each site (Section 3.2). Statistical tests for seasonal differences were undertaken using the PERMANOVA+ add-on (Anderson 2001, Anderson et al. 2008) of the PRIMER software suite (Version 6) (Clarke & Warwick 2001, Clarke & Gorley 2006). The dissimilarity matrix was prepared using Euclidean distance. Season as a fixed factor was crossed with Site as a random factor, with the position along the transect line nested within the Season and Site factors.

Multivariate analysis

The structure of fauna communities recorded during the various surveys was analysed using the PRIMER software suite, Version 6 (Clarke & Warwick 2001, Clarke & Gorley 2006). Abundances were fourth-root-transformed to reduce the influence of highly abundant species (Clarke & Warwick 2001). Most studies involved sampling of multiple habitats, seasons and sites. For the infauna studies, there were replicate samples from each site, but for some multivariate analyses they were averaged to provide a single value for each site.

A matrix of dissimilarities between each sample was created based on the Bray-Curtis dissimilarity index, which is considered suitable for ecological community data (Clarke & Warwick 2001). The non-metric multi-dimensional scaling (MDS) routine was applied to the dissimilarity matrix to create a scatter plot, which arranges samples according to their dissimilarity (or similarity) in two- or three-dimensional space. The closer together two samples are on the plot, the more alike they are in terms of species composition and relative abundance. Each scatter plot displays a 'stress' value, which is an indication of how well the scatter plot represents the overall multivariate dataset. A stress level of <0.2 is considered to be acceptable (Clarke & Warwick 2001). Where the stress level is ≥0.2 for a two-dimensional scatter plot, a three-dimensional scatter plot has been presented.

Symbology for the subtidal studies uses colour (arguably the most visually discernible attribute) to distinguish habitats, shape to distinguish seasons, and labels to distinguish sites (where relevant).

Many of the scatter plots are overlaid with blue vectors showing the areas of the plot that are strongly correlated with particular species. The strength of the correlation is indicated by the length of the vector within a circle indicating perfect correlation (1.0).

3.6 Desktop studies

3.6.1 Priority species

The study of listed species (megafauna and Syngnathids) used the Protected Matters Search Tool (PMST) (DCCEEW 2026) and Atlas of Living Australia (ALA 2026) to identify listed species that may be present within Spencer Gulf, north of Cowell and Wallaroo (Figure 3), which exceeds the area used to assess significant impacts on Matters of National Environmental Significance (MNES) for the Project (JBS&G 2026c). The reason for this is that many of the relevant species are wide ranging and/or that the general paucity of records for these species likely reflects a low level of targeted observation effort. The suite of species searched included those listed under various threatened categories, or as Migratory, Marine or Cetacean under the EPBC Act 1999, as Endangered, Vulnerable or Rare under the South Australian *National Parks and Wildlife Act 1972*, or as Protected Species under the South Australian *Fisheries Management Act 2007*.

The PMST generates a report of MNES (including the megafauna and Syngnathids of interest to the Project) that may occur in an area of interest (DCCEEW 2026). Each reported species and/or its habitat is classified as "may", "is likely to" or "is known to" occur. Information provided through the PMST is indicative only, and local knowledge and information should also be sought where possible (DCCEEW 2026).

ALA records have a variety of source databases, including museum and herbarium records, the Biological Database of South Australia and citizen science programs including iNaturalist[4] (ALA 2026). All historical records within the search area were considered to be evidence of potential future occurrence near Mullaquana Station.

[4] These records are considered to be highly reliable as they are supported by photographs, were mostly submitted by 'citizen scientists' with peer reviewed publications on cryptic fish and were cross-checked by other experts.

An assessment was made of the likelihood of interaction with the Project for each species identified using the PMST and ALA. The assessment was informed by information from the former Species Profile and Threats database (DCCEEW 2024).

3.6.2 Fisheries and aquaculture

The studies of fisheries and aquaculture relied heavily on fisheries stock assessments undertaken by the South Australian Research and Development Institute (SARDI) Aquatic Sciences Division, public registers of licences and policy documents.



Figure 3. Search extent for Protected Matters Search Tool and Atlas of Living Australia records, with placenames referred to in the report.

3.6.3 Trawl studies

The epibenthic surveys undertaken for the Project were non-destructive, which resulted in some inherent limitations to the range of species recorded during those surveys. However, three trawl studies were conducted during the mid- to late 2000s with sites near the MSA and areas of elevated salinity elsewhere in Upper Spencer Gulf (Figure 4), which is relevant to the impact assessment (see Section 3.7). The studies include (Figure 4):

- otter (prawn) trawl bycatch surveys across 120 sites in Spencer Gulf in 2007 and a subset of 65 sites in 2013 (Currie et al. 2009, Burnell et al. 2015). This included five sites within 10 km of the outfall and three sites near Point Lowly.
- beam trawl surveys in Upper Spencer Gulf, including near Western Shoal, Point Lowly and Ward Spit (Saunders 2009).
- beam trawl surveys in Upper Spencer Gulf, including at Cowleds Landing and at Fifth Creek, near Port Pirie (McDonald 2008).

The relevant publications (and additional raw data provided by Saunders and McDonald) were reviewed to augment species lists for Mullaquana Station and for areas of naturally elevated salinity. All species names were reconciled with the accepted names in the World Register of Marine Species (WoRMS Editorial Board 2026).

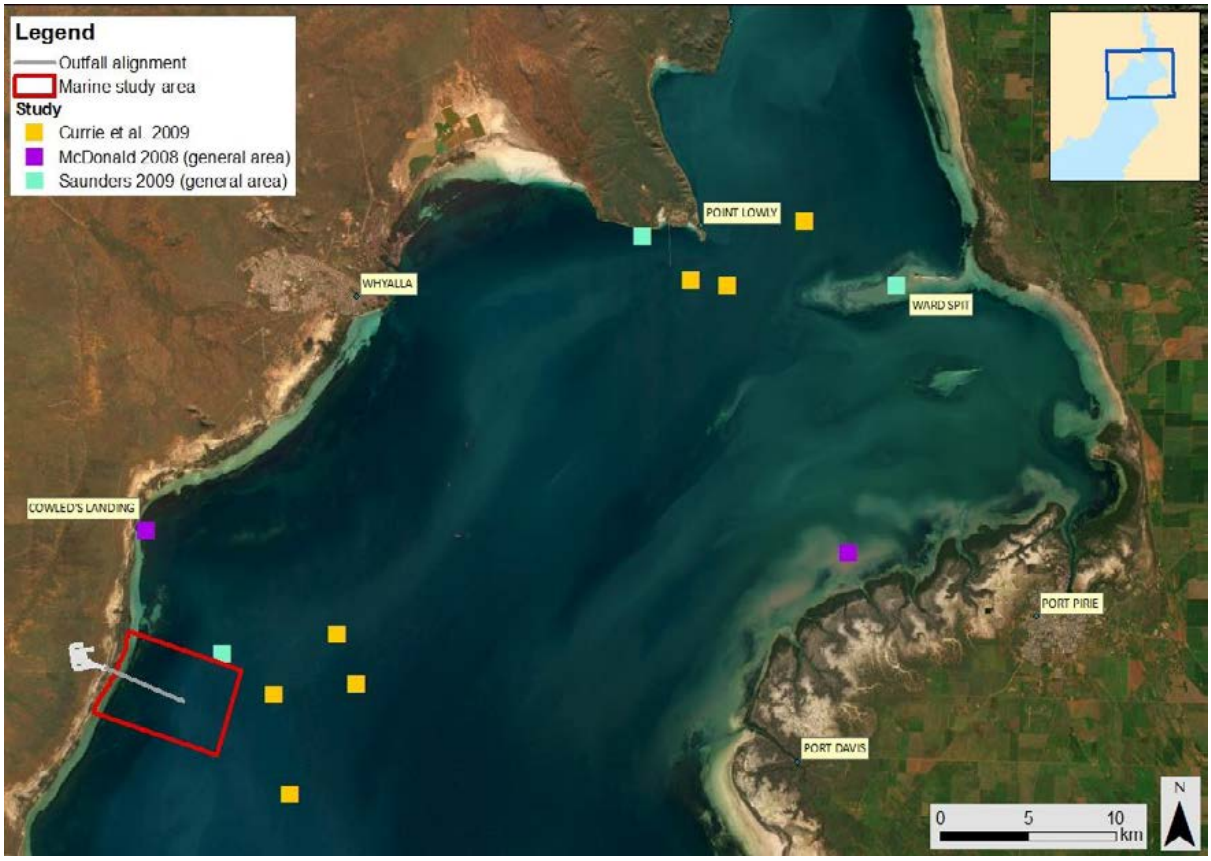


Figure 4. Location of independent trawl surveys.

3.7 Approach to impact assessment

Assessment of the likely impacts on marine ecology and fisheries is informed by the desktop and field studies listed in Section 3.1.

The impact assessment undertaken for this report is focused on impacts associated with the discharge of the return water. Other components of the impact assessment are beyond the scope of this report and have been undertaken separately, including construction, noise (Resonate 2026), introduced marine pests (Aquatic Biosecurity 2026) and larval entrainment (SARDI 2026c).

Assessment of the impact of hypersaline return water used several lines of evidence, including:

- safe dilution contours, based on the desktop ecotoxicity study (van Dam 2026) and hydrodynamic modelling of the return water dispersion (Water Technology 2026)
- natural variability of salinity near Mullaquana Station, based on water quality monitoring undertaken over a 12-month period
- distribution of taxa along the Spencer Gulf salinity gradient, based on a previous summary of species recorded in Upper Spencer Gulf (BHP Billiton 2011b), more recent reports of ecological surveys in Spencer Gulf, data from the Reef Life Survey program (RLS 2026) and ALA records (ALA 2026).

Impacts were described in terms of:

- duration
- spatial extent
- intensity
- percentage of species affected.

Other modifications to the marine environment potentially arising from return water discharge from desalination plants include increased water temperatures, acidification and deoxygenation (Gillanders & Stockbridge 2022).

The potential impacts associated with these aspects of the discharge are addressed within the Environmental Impact Statement.

PART 2: FIELD STUDY RESULTS

4. Seagrass habitat characteristics

4.1 *Posidonia australis* and *Posidonia/Zostera* habitats

Epiphyte cover ranged from 37% at PA3 in summer to 90% at PZ2 in winter (Figure 5). Cover was greatest in winter at all *Posidonia australis* and mixed *Posidonia australis/Zostera* sites except PA5, where it was lowest in winter and greatest in summer, and PA1 where cover was slightly greater in summer than winter (Figure 5). When the seagrass beneath epiphytes was accounted for, seagrass cover exceeded 60% for all sites and seasons and was greatest at PA1 in spring, PA2 in summer and PZ2 in winter, each with approximately 95% cover (Figure 6). There were no clear patterns or trends in overall seagrass cover across sites and seasons (Figure 6). *Zostera* was the dominant species in the *Posidonia*/*Zostera* habitat, with >57% cover at each site and greatest cover in spring but was not present in the *Posidonia australis* habitat except for traces (<3%) at PA3 in summer and winter (Figure 6).

Mean canopy height ranges in *Posidonia australis* habitat were 260–300 mm in summer, 260–330 mm in autumn, 250–350 mm in winter and 370–400 mm in spring, with the upper bound of the overall site ranges increasing from summer to spring (Figure 7). PERMANOVA detected a significant Season × Site interaction (P<0.001), indicating that seasonal patterns differed among sites. Pairwise comparisons for the interaction showed that canopy height in spring exceeded all other seasons at all sites except PA5, where winter and spring did not differ but were both greater than summer and autumn. Additional pairwise differences were observed at some sites (Appendix B). There was also significant overall seasonal variation (P<0.001).

The mean number of shoots and leaves had similar patterns and trends across sites and seasons, with greatest values at PA2, PA3 and PA5 in spring, and lowest at PA4 in autumn (Figure 8, Figure 9). PERMANOVA detected a significant interaction (P<0.001) for number of shoots, indicating that seasonal patterns differed among sites. Pairwise comparisons for the interaction showed that the number of shoots was greater in spring than all other seasons at PA2 and PA3, lower in autumn than all other seasons at PA4, and was greater in autumn and spring than summer or winter at PA5 (Figure 8, Appendix B). No significant overall seasonal or spatial variation was detected.

PERMANOVA detected a significant Season × Site interaction for number of leaves (P<0.001), indicating that seasonal patterns differed among sites. Pairwise comparisons for the interaction showed the same significant differences between pairs of seasons as for the number of shoots (Figure 9, Appendix B). There was also significant overall seasonal variation (P<0.05).

Mean leaf length was greatest in spring at all sites (about 310–360 mm) and lowest at PA1 and PA4 in autumn (Figure 10). PERMANOVA detected a significant Season × Site interaction (P=0.05), indicating that seasonal patterns differed among sites. Pairwise comparisons showed that leaf length in spring exceeded all other seasons at all sites except PA2 and PA3, where spring did not differ from winter and summer, respectively. There was also significant overall seasonal variation (P<0.001), while no significant overall differences among sites were detected (Appendix B).

Mean leaf width ranged from about 10 mm at PA1 in winter to about 13 mm at PA3 in winter, PA4 in summer and spring and PA5 in autumn, with no clear seasonal trend (Figure 11). PERMANOVA detected no significant seasonal differences but there was significant spatial variability among sites (P<0.001) (Appendix B).

Mean leaf mass ranges were about 8–15 g in summer, 8–22 g in autumn, 3–5 g in winter and 4–8 g in spring, thus showing a seasonal trend of increasing upper bound from winter to autumn (Figure 12). The greatest mean left mass of about 22 g at PA5 in autumn was about 50% greater than the summer mass at PA3 and PA4 and more than double all other sites and seasons (Figure 12). PERMANOVA detected a significant Season × Site interaction (P<0.001), indicating that seasonal patterns differed among sites. Pairwise comparisons showed that leaf mass in spring exceeded all other seasons at all sites except PA1 and PA4, where winter and spring did not differ, and PA5, where autumn and spring did not differ. Additional pairwise differences were observed at some sites (Appendix B). There was also significant overall seasonal variation (P<0.001).

Mean epiphyte mass was greatest in spring at most sites, in contrast with the general pattern of greatest epiphyte cover in winter and relatively low cover in spring. The exception was PA4, where a single replicate outlier in winter drove the mean epiphyte mass above 2.5 g, more than twice for any site in any season (Figure 13). PERMANOVA detected no significant overall seasonal or spatial variation, or Season × Site interaction (Appendix B).

Mean rhizome mass showed an oscillating seasonal pattern with 10–17 g in summer and winter, and 18–35 g in autumn and spring, noting that there was high variability particularly in the autumn and spring surveys (Figure 14). PERMANOVA detected significant seasonal variation (P<0.001), but no significant spatial variation among sites or Season × Site interaction. Pairwise comparisons showed that rhizome mass was significantly greater in summer and autumn than in winter and spring (Figure 14, Appendix B).

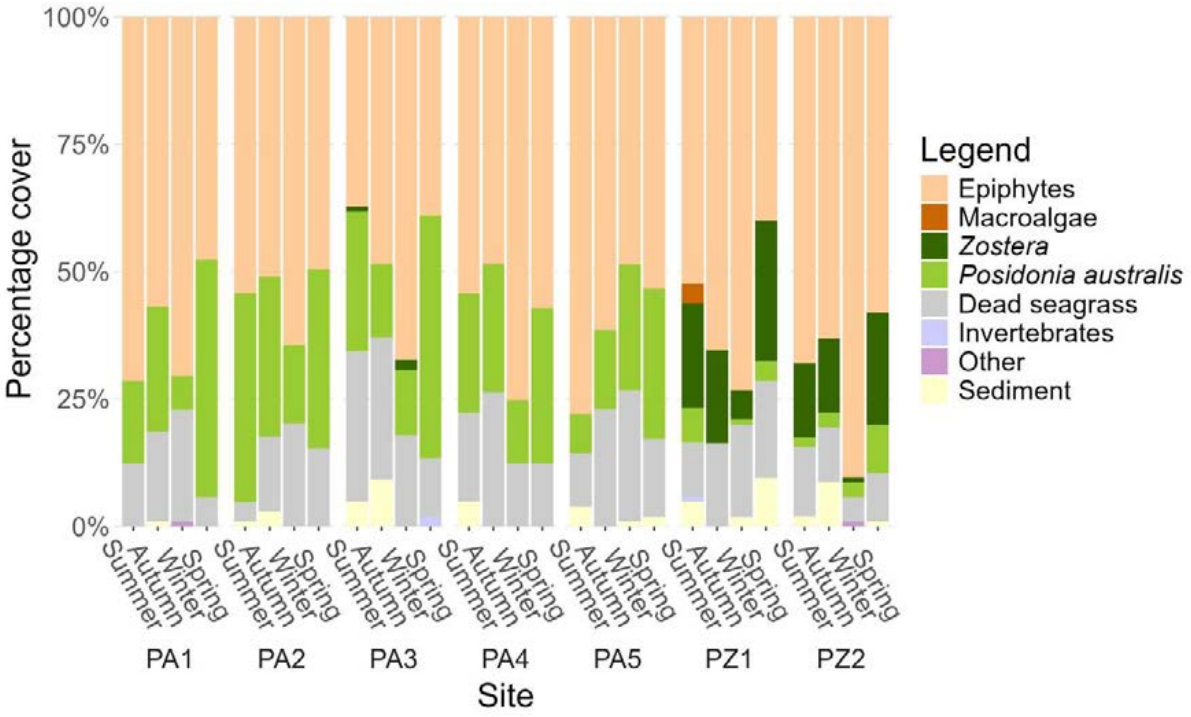


Figure 5. Community composition of *Posidonia australis*-dominated seagrass habitat recorded during surveys across all seasons in 2025. Note that epiphytes include those masking seagrass.

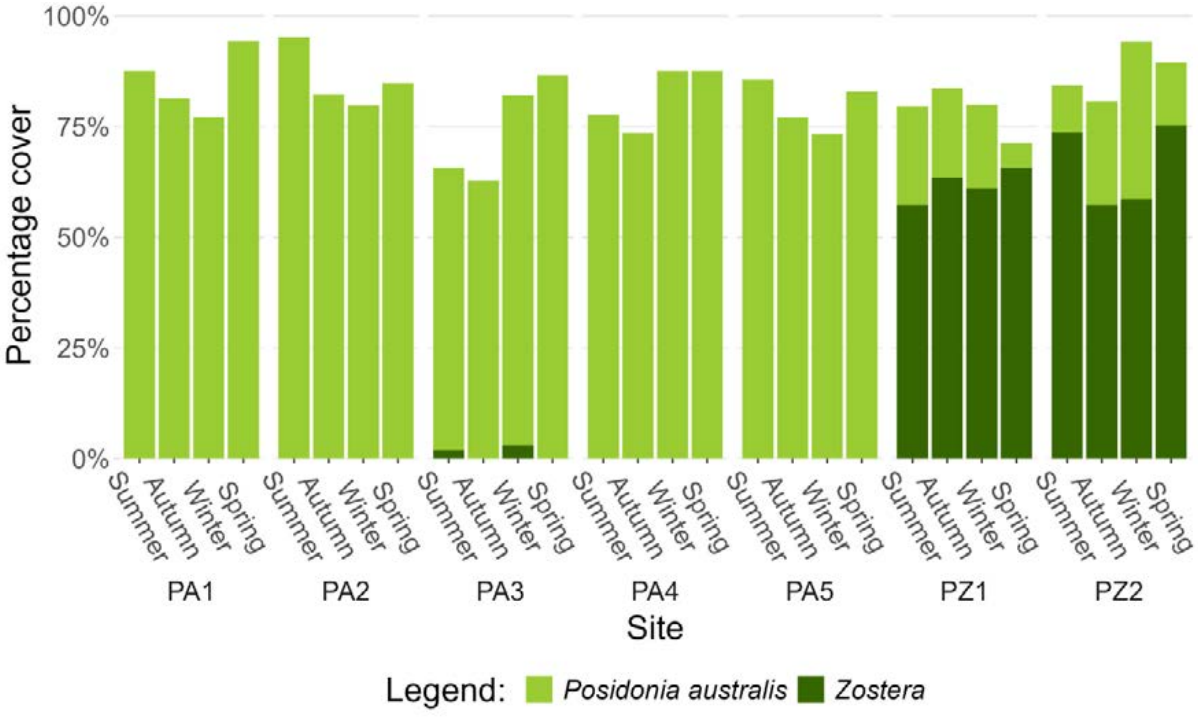


Figure 6. Percentage cover of seagrass in *Posidonia australis* and *Posidonia australis*/*Zostera* habitats, including that assumed to be covered by epiphytes, recorded during surveys across all seasons in 2025.

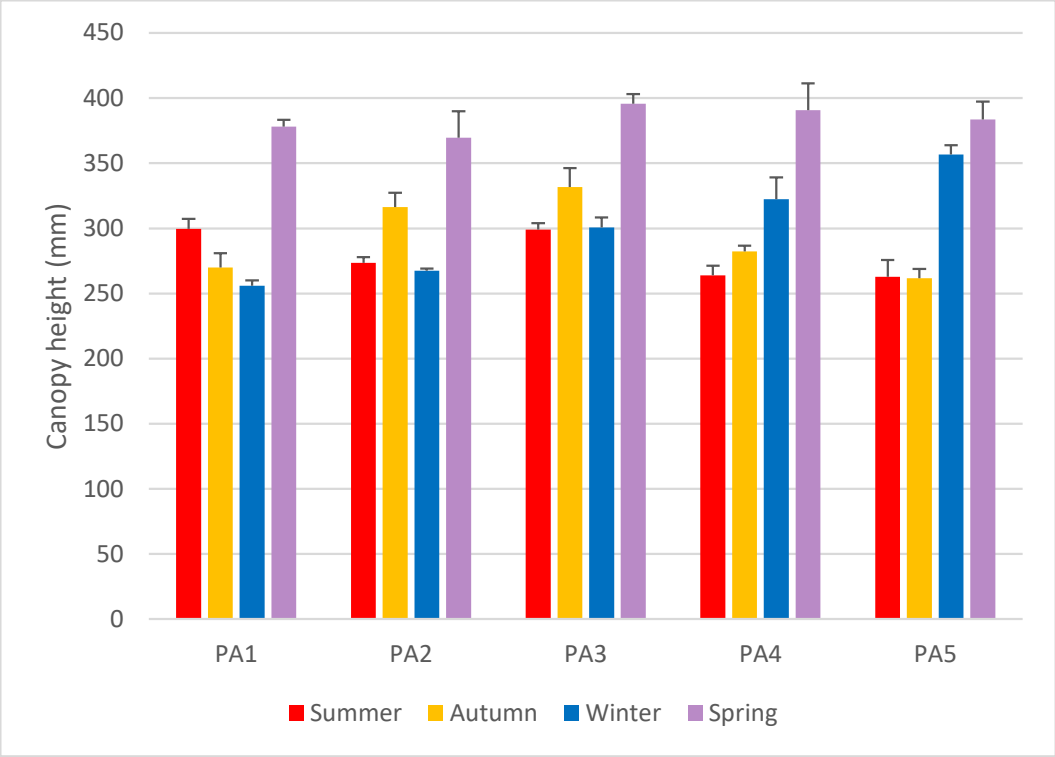


Figure 7. Mean *Posidonia australis* canopy height recorded during surveys across all seasons in 2025. Error bars show standard error of mean.

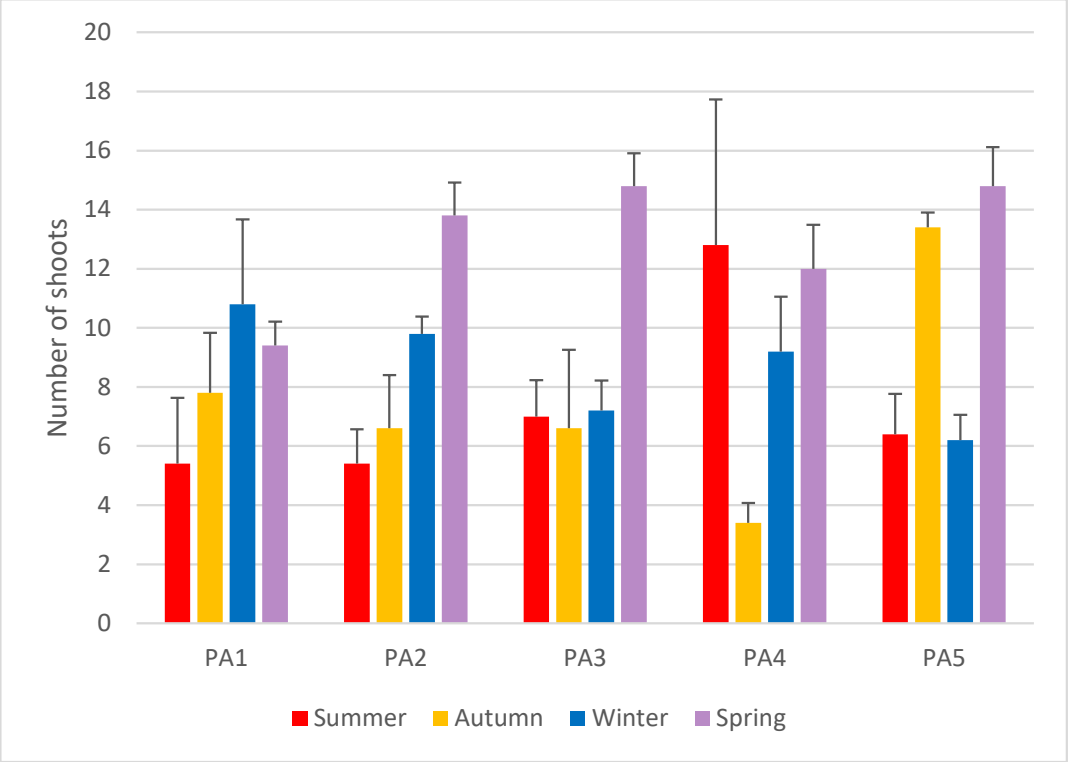


Figure 8. Mean number of *Posidonia australis* shoots per core sample during surveys across all seasons in 2025. Error bars show standard error of mean.

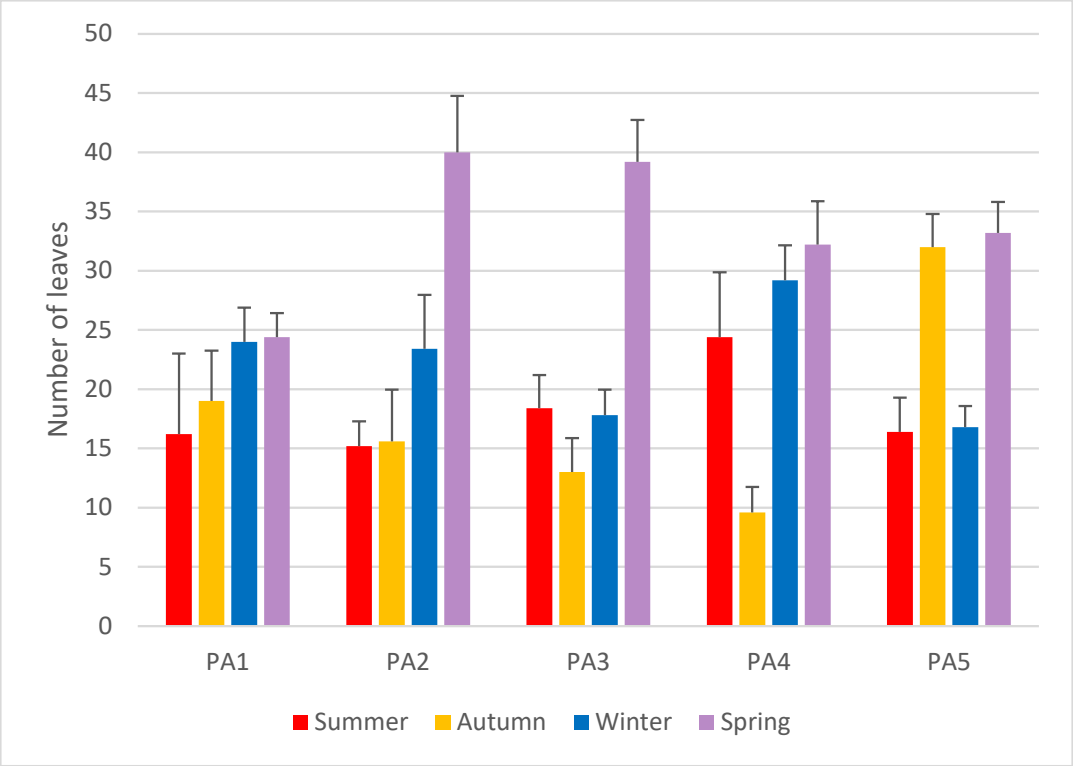


Figure 9. Mean number of *Posidonia australis* leaves per core sample during surveys across all seasons in 2025. Error bars show standard error of mean.

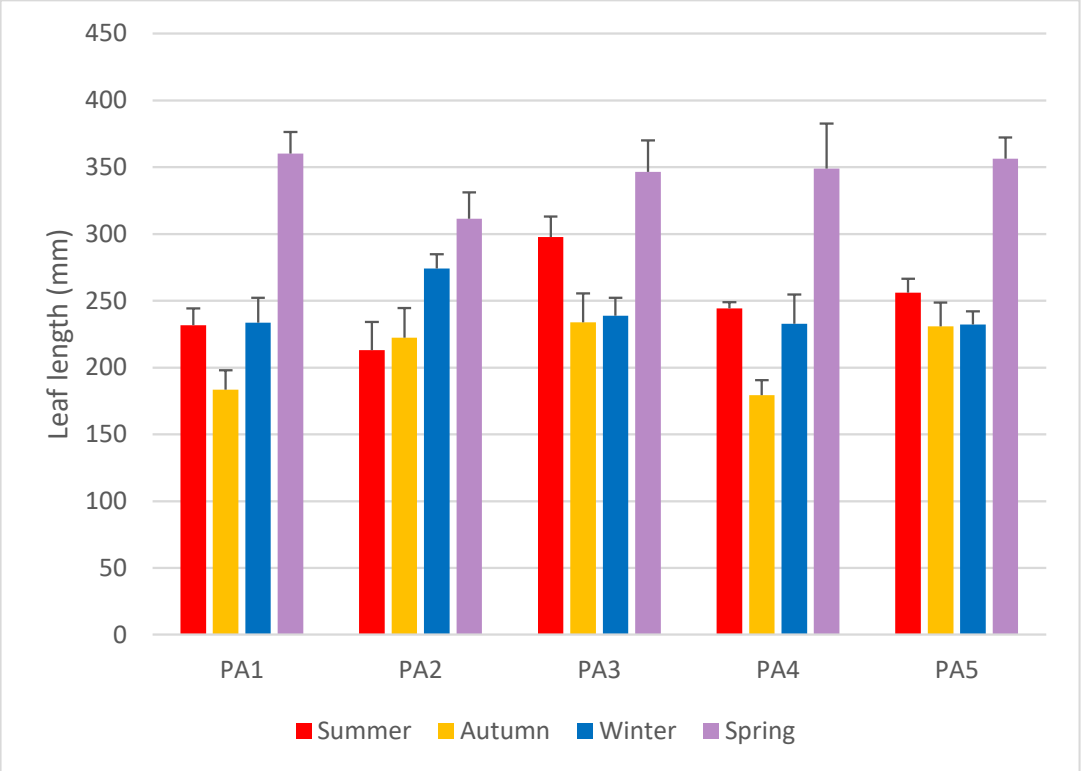


Figure 10. Mean length of *Posidonia australis* leaves per core sample during surveys across all seasons in 2025. Error bars show standard error of mean.

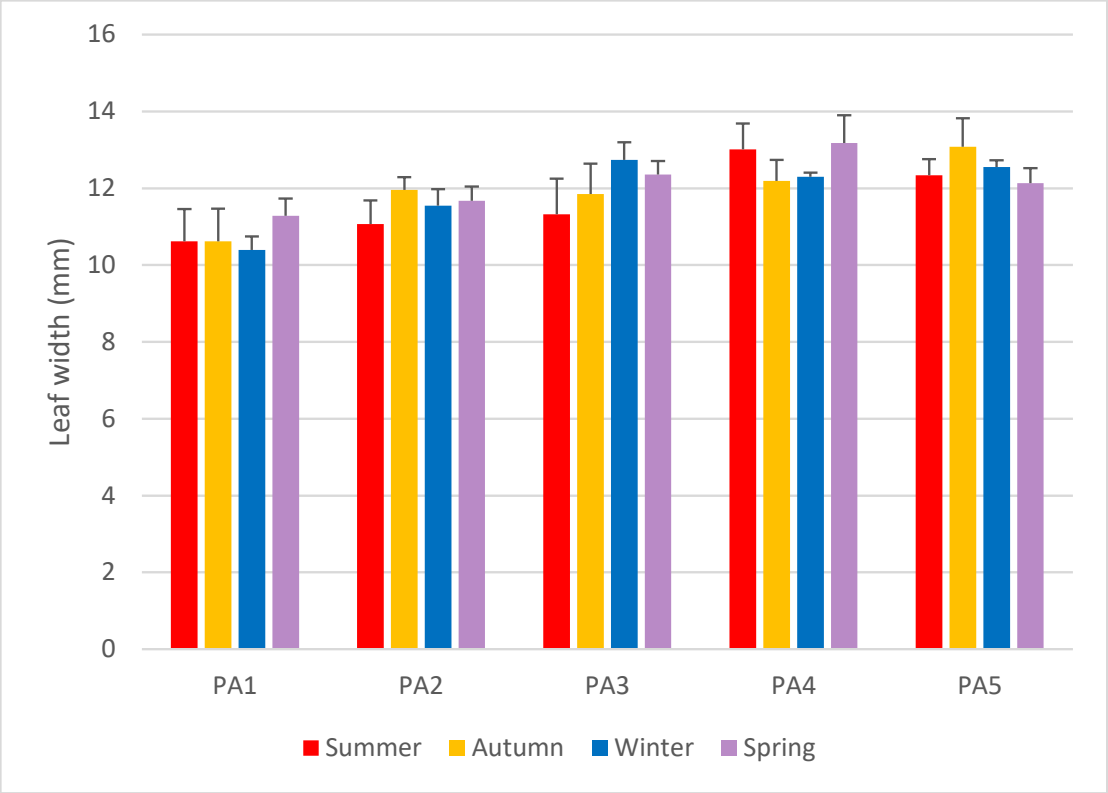


Figure 11. Mean width of *Posidonia australis* leaves per core sample during surveys across all seasons in 2025. Error bars show standard error of mean.

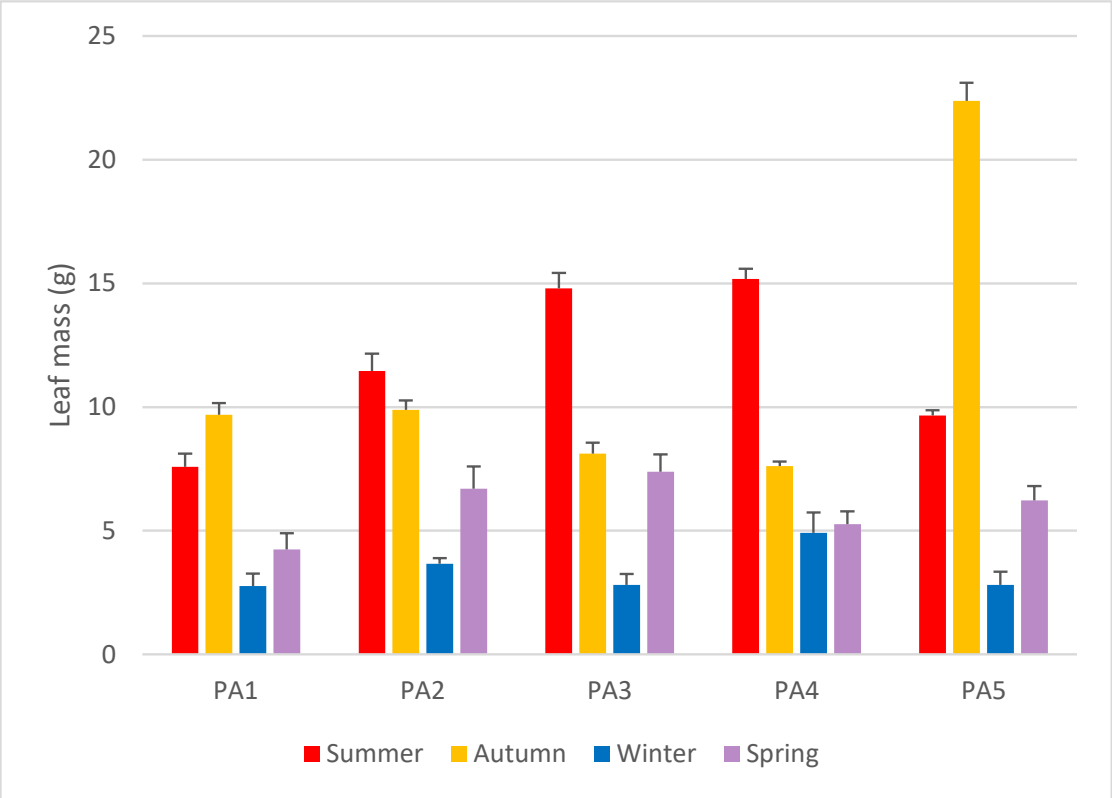


Figure 12. Mean mass of *Posidonia australis* leaves per core sample during surveys across all seasons in 2025. Error bars show standard error of mean.

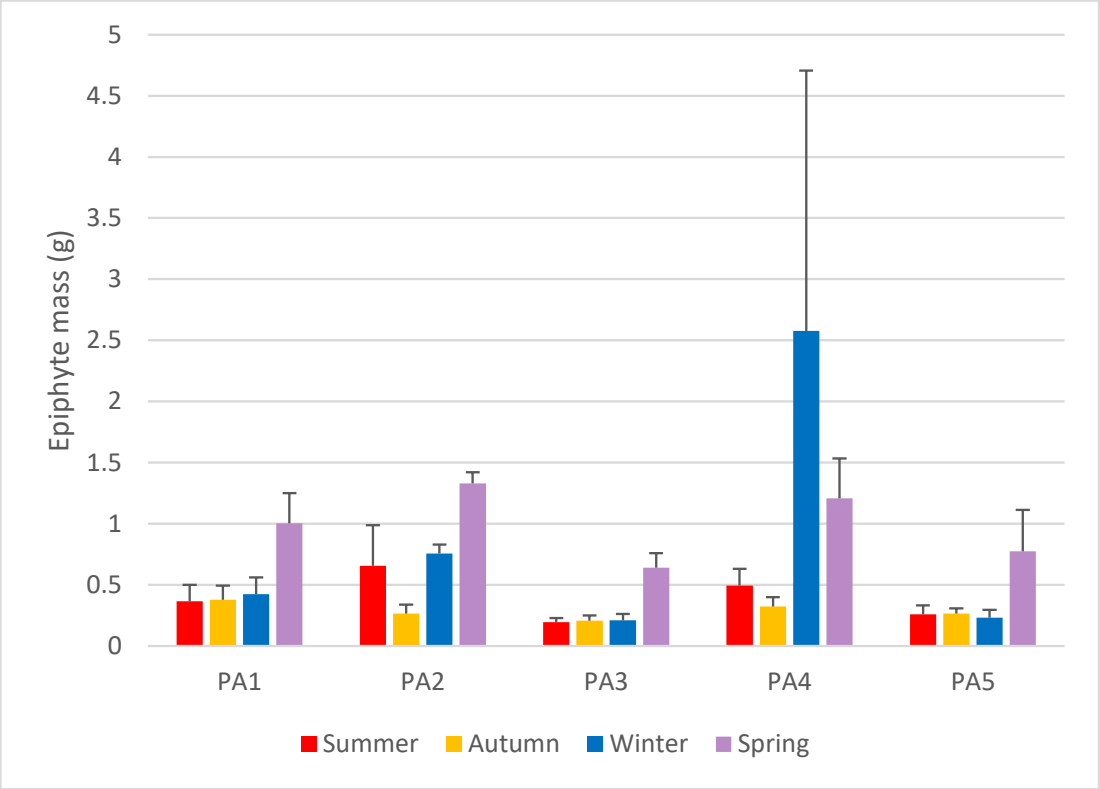


Figure 13. Mean mass of epiphytes per core sample on *Posidonia australis* during surveys across all seasons in 2025. Error bars show standard error of mean.

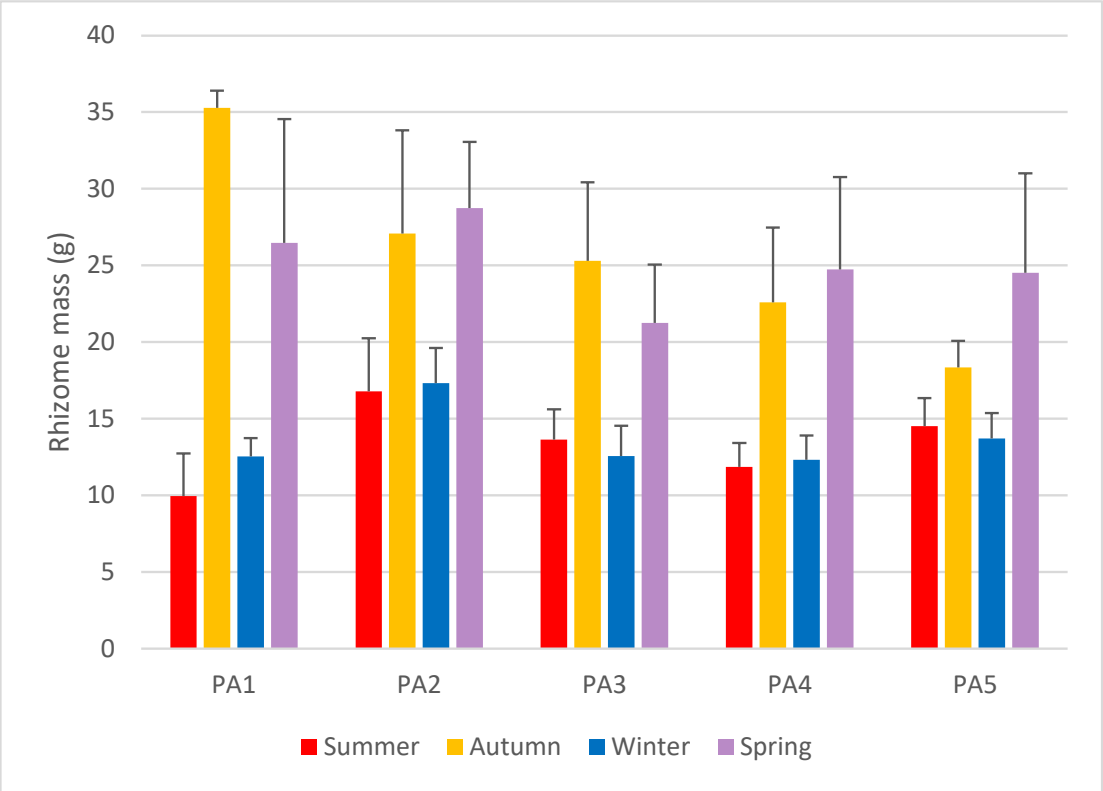


Figure 14. Mean mass of *Posidonia australis* rhizomes per core sample during surveys across all seasons in 2025. Error bars show standard error of mean.

4.2 *Posidonia sinuosa* habitat

Epiphyte cover ranged from about 27% at PS4 in autumn to 71% at PS5 in summer and was greatest at PS5 for all seasons (Figure 15). The amount of dead seagrass was lowest in summer at all sites except PS5 (Figure 15). When the seagrass beneath epiphytes was accounted for, the seagrass cover of *Posidonia* ranged from about 51% at PS4 in autumn to 93% at PS5 in spring (Figure 16). Seagrass cover was lowest during autumn at all sites except PS1 (Figure 16).

Mean canopy height was about 200 mm for all sites in summer and autumn except PS5 in summer with 175 mm but increased to 260–300 mm during winter then decreased to about 220–240 mm in spring except at PS5 with 300 mm (Figure 17). PERMANOVA detected a significant Season × Site interaction (P<0.001), indicating that seasonal patterns differed among sites. Pairwise comparisons for the interaction showed that canopy height differed significantly between all pairs of seasons at all sites except between summer and autumn at PS1–PS4, and between those seasons and spring at PS1 and PS4 (Appendix B). There was also significant overall seasonal variation (P<0.01).

The mean number of shoots and leaves had similar patterns and trends across sites and seasons, with greatest values at PS1 in spring, PS2 in autumn and spring and PS4 in summer and lowest at PS3 and PS4 in autumn (Figure 18, Figure 19). PERMANOVA detected a significant Season × Site interaction (P<0.01), indicating that seasonal patterns differed among sites. Pairwise comparisons for the interaction showed that the number of shoots was significantly greater in spring than in other seasons at PS1, and significantly lower in autumn than in other seasons at PS2 and PS4 (Figure 18, Appendix B). There was no significant overall seasonal variation, although significant spatial variation among sites was detected (P<0.01).

PERMANOVA detected a significant Season × Site interaction (P<0.01), indicating that seasonal patterns in the number of leaves differed among sites. Pairwise comparisons for the interaction showed that the number of leaves was significantly lower in autumn than in other seasons at PS3 and PS4 (Figure 19, Appendix B). There was no significant overall seasonal variation, although significant spatial variation among sites was detected (P<0.05).

Mean leaf length ranged from about 150 mm at PS3 and PS4 in autumn to 380 mm at PS5 in spring. Mean length generally increased each season between summer and spring, except for decreases between summer and autumn at PS2, PS3 and PS4. It was greatest at PS5 for all seasons (Figure 20). PERMANOVA detected significant seasonal variation (P<0.001) and significant spatial variation among sites (P<0.001), with no significant Season × Site interaction. Pairwise comparisons showed that leaf length was significantly greater in spring than in autumn and winter (Appendix B).

Mean leaf width ranged from about 6.2 mm at PS4 in autumn and PS5 in winter to about 7.7 mm at PS3 in summer (Figure 21). PERMANOVA detected significant seasonal variation (P<0.05) and significant spatial variation among sites (P<0.01), with no significant Season × Site interaction. Pairwise comparisons showed that leaf width was significantly greater in summer than in autumn and spring (Appendix B).

Mean leaf mass varied from about 0.5 g at PS3 in autumn to 5 g at PS1 in spring, with no clear seasonal or spatial patterns (Figure 22). PERMANOVA detected a significant Season × Site interaction (P<0.01), indicating that seasonal patterns differed among sites. Pairwise comparisons for the interaction showed that leaf biomass was significantly greater in spring than in other seasons at PS1 and significantly lower in autumn than in other seasons at PS3 and PS4 (Figure 22, Appendix B).

There was also significant overall seasonal variation (P<0.05), while no significant overall spatial variation among sites was detected (Appendix B).

Mean epiphyte mass was <0.5 g in all seasons at all sites except PS5, where it was 0.6–0.8 g in all seasons except autumn with 1.3 g (Figure 23). PERMANOVA detected a significant Season × Site interaction (P<0.05), indicating that seasonal patterns differed among sites. Pairwise comparisons for the interaction showed that epiphyte biomass was significantly greater in autumn and winter than in summer and spring at PS4, and greater in autumn than in spring at PS5 (Figure 23, Appendix B). There was no significant overall seasonal variation, but significant spatial variation among sites was detected (P<0.001).

Mean rhizome mass range was about 8–13 g for all sites and seasons except PS2 in autumn and spring and PS3 in autumn with values of about 21 g, 16 g and 18 g, respectively (Figure 24). PERMANOVA detected a significant Season × Site interaction (P<0.01), indicating that seasonal patterns differed among sites. Pairwise comparisons for the interaction showed that rhizome biomass in autumn was significantly greater than in summer or winter at PS2 and PS3, and biomass in spring was greater than in winter at PS2 (Figure 24, Appendix B). No significant overall seasonal or spatial variation was detected.

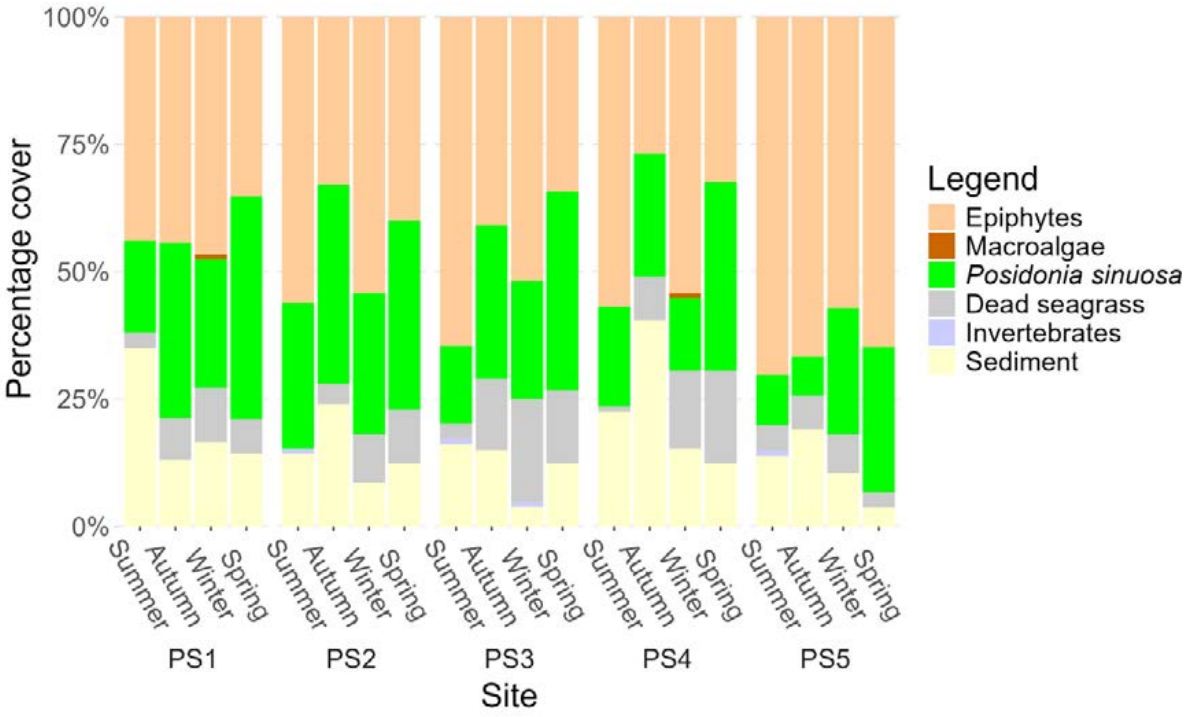


Figure 15. Community composition of *Posidonia sinuosa* habitat recorded during surveys across all seasons in 2025. Note that epiphytes include those masking seagrass.

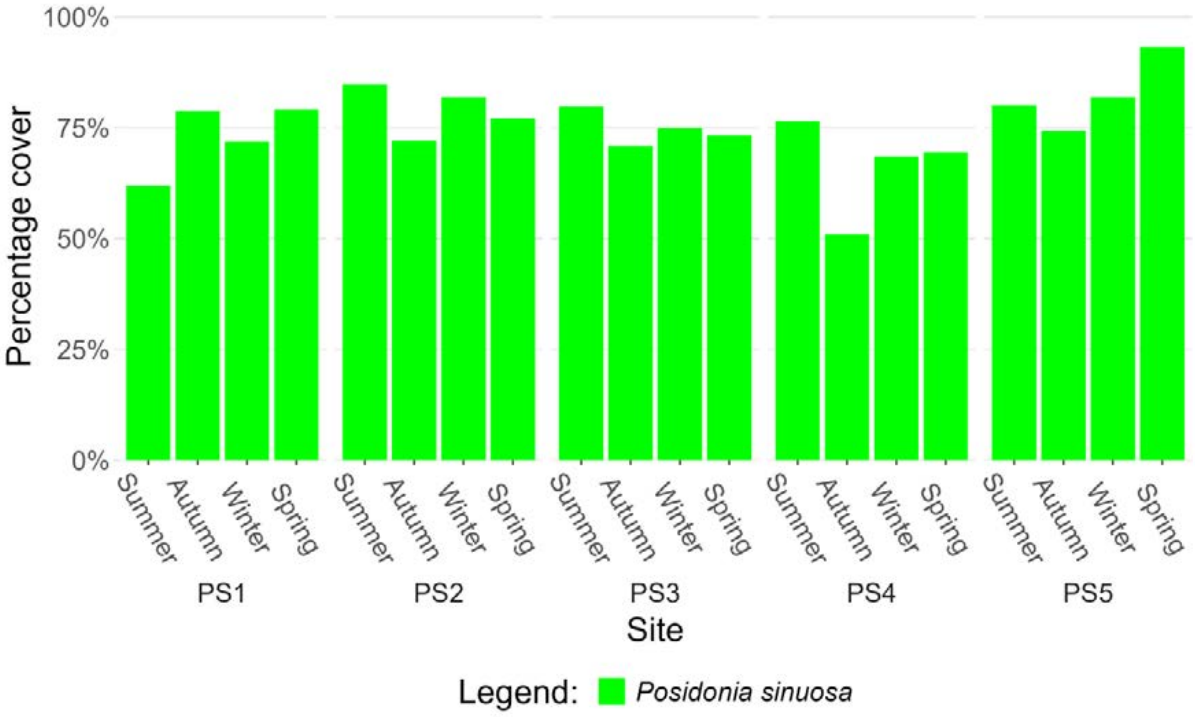


Figure 16. Percentage cover of *Posidonia sinuosa*, including that assumed to be covered by epiphytes, recorded during surveys across all seasons in 2025.

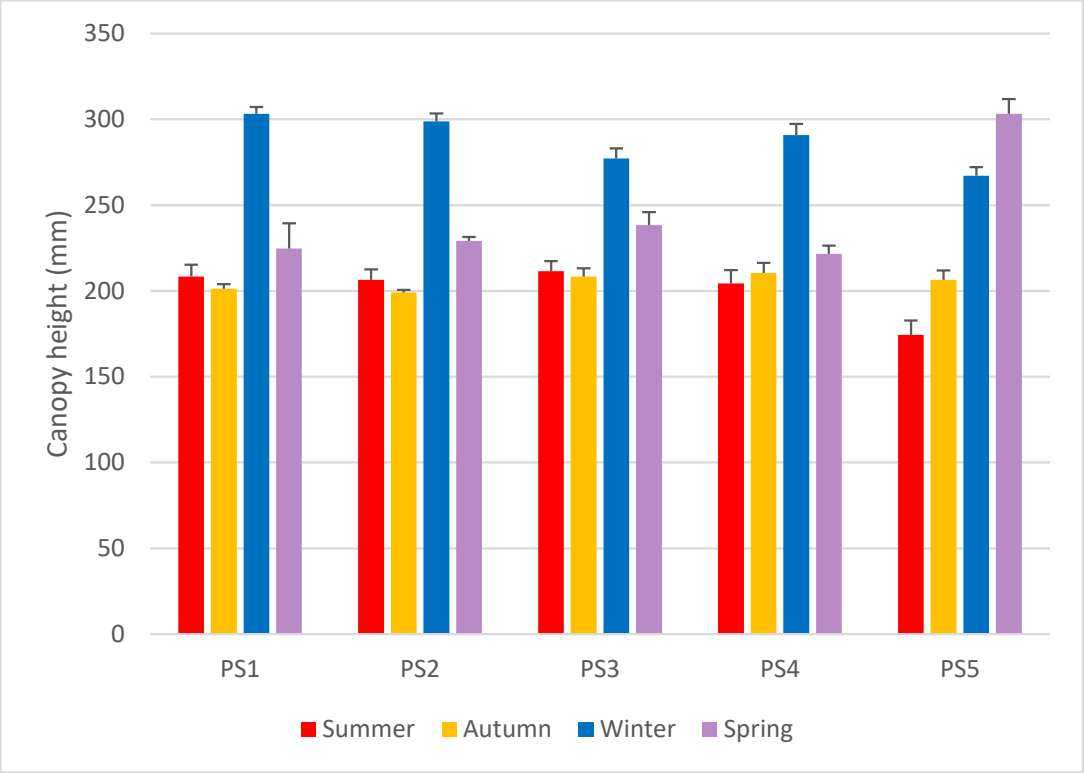


Figure 17. Mean *Posidonia sinuosa* canopy height recorded during surveys across all seasons in 2025. Error bars show standard error of mean.

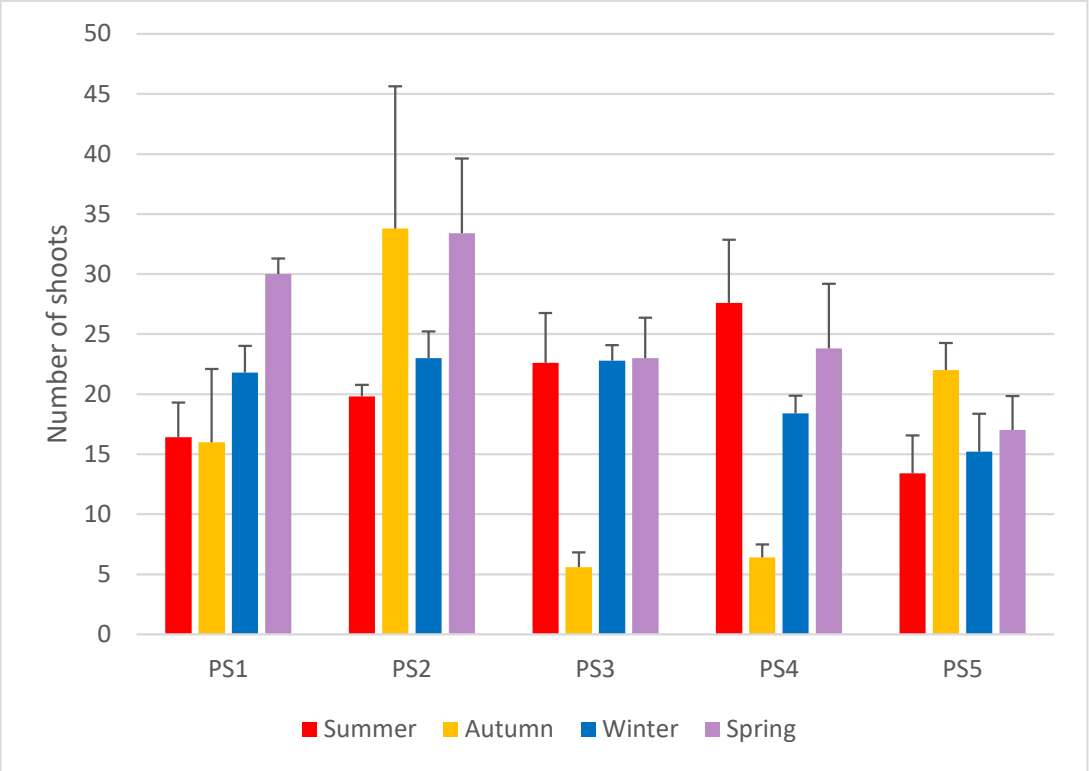


Figure 18. Mean number of *Posidonia sinuosa* shoots per core sample during surveys across all seasons in 2025. Error bars show standard error of mean.

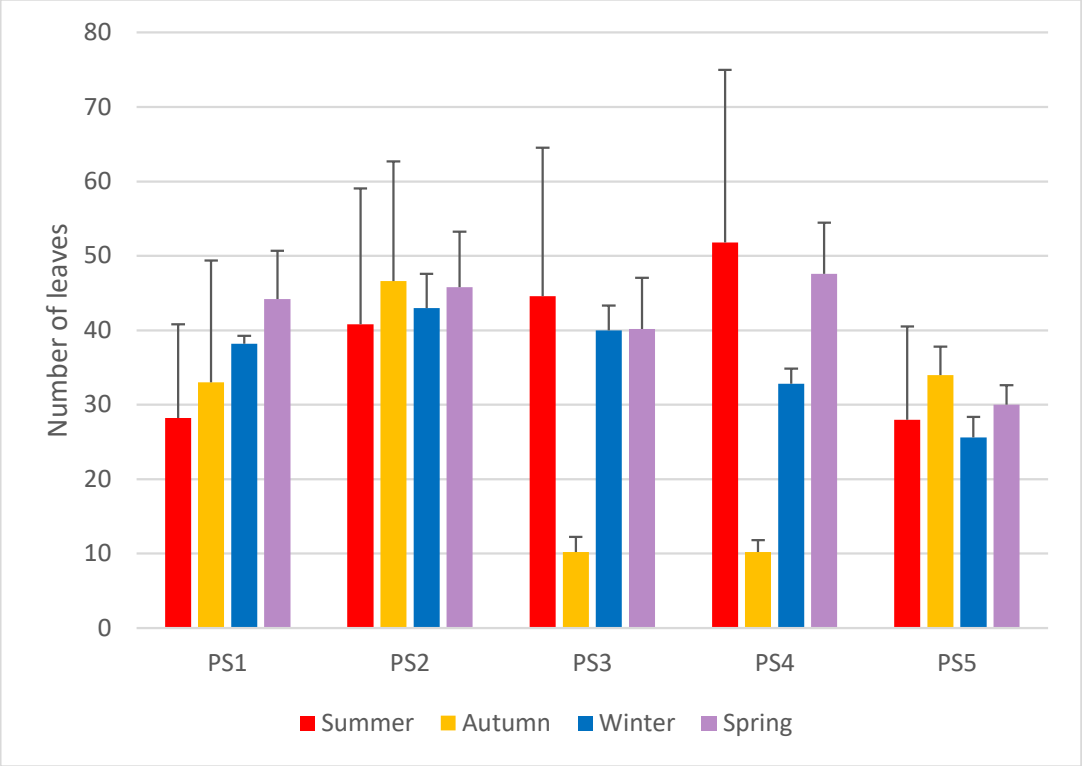


Figure 19. Mean number of *Posidonia sinuosa* leaves per core sample during surveys across all seasons in 2025. Error bars show standard error of mean.

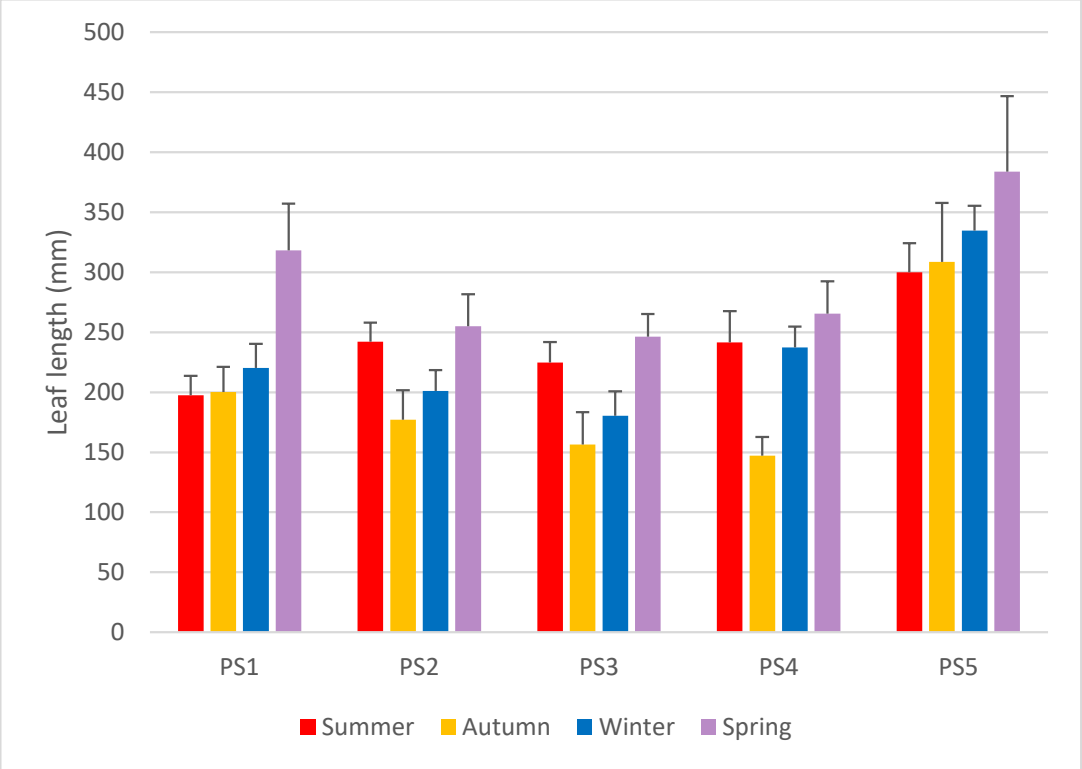


Figure 20. Mean length of *Posidonia sinuosa* leaves per core sample during surveys across all seasons in 2025. Error bars show standard error of mean.

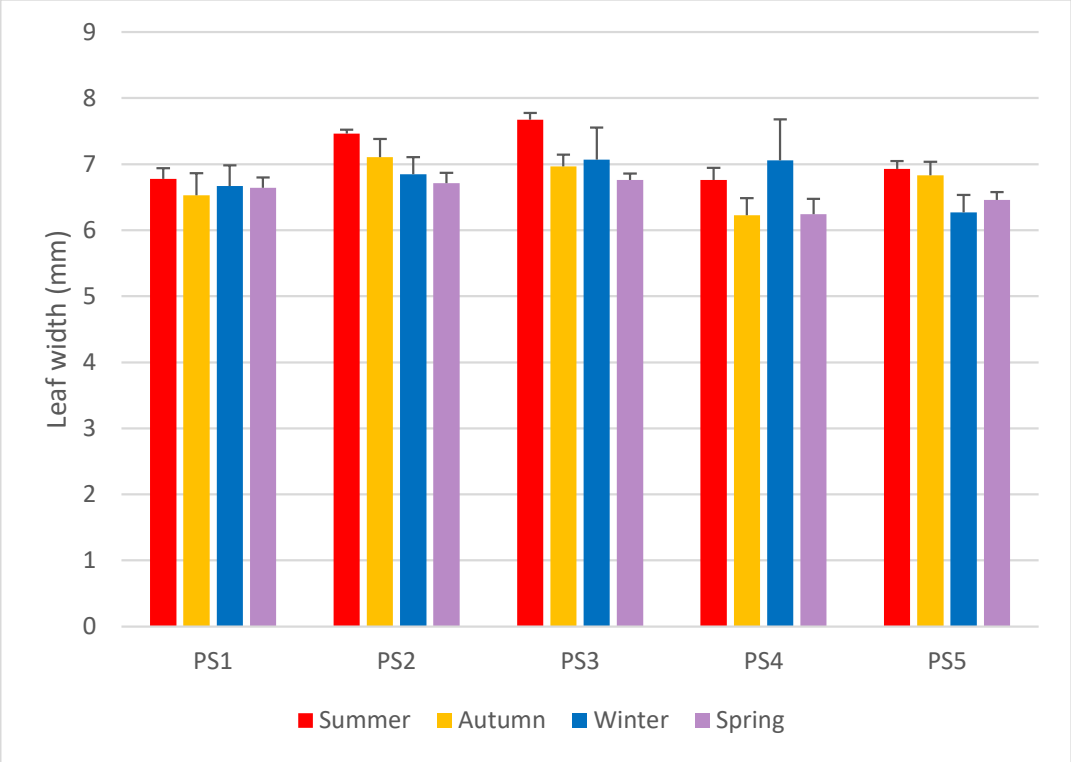


Figure 21. Mean width of *Posidonia sinuosa* leaves per core sample during surveys across all seasons in 2025. Error bars show standard error of mean.

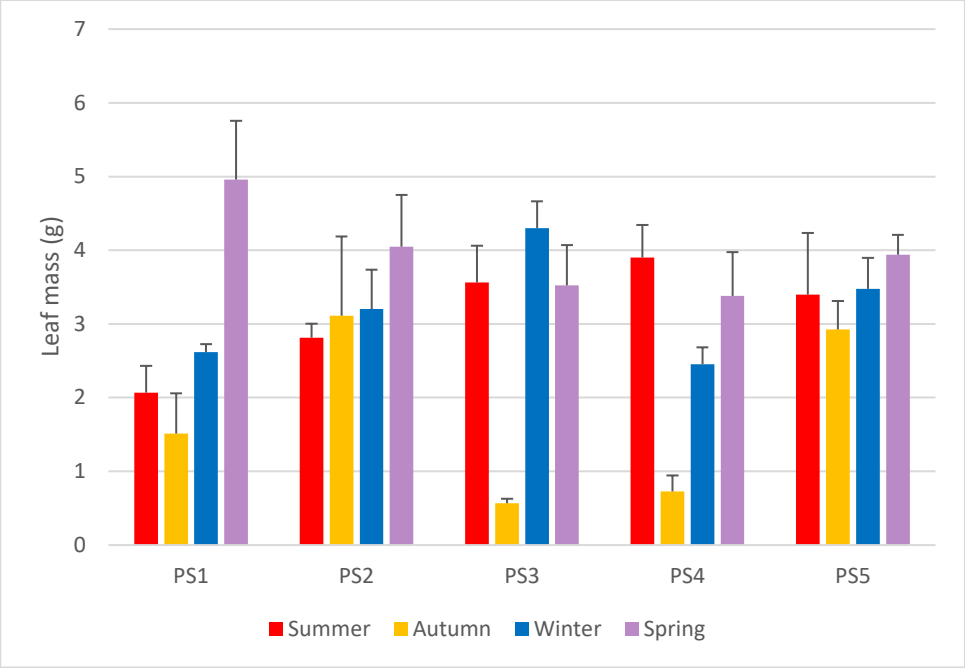


Figure 22. Mean mass of *Posidonia sinuosa* leaves per core sample during surveys across all seasons in 2025. Error bars show standard error of mean.

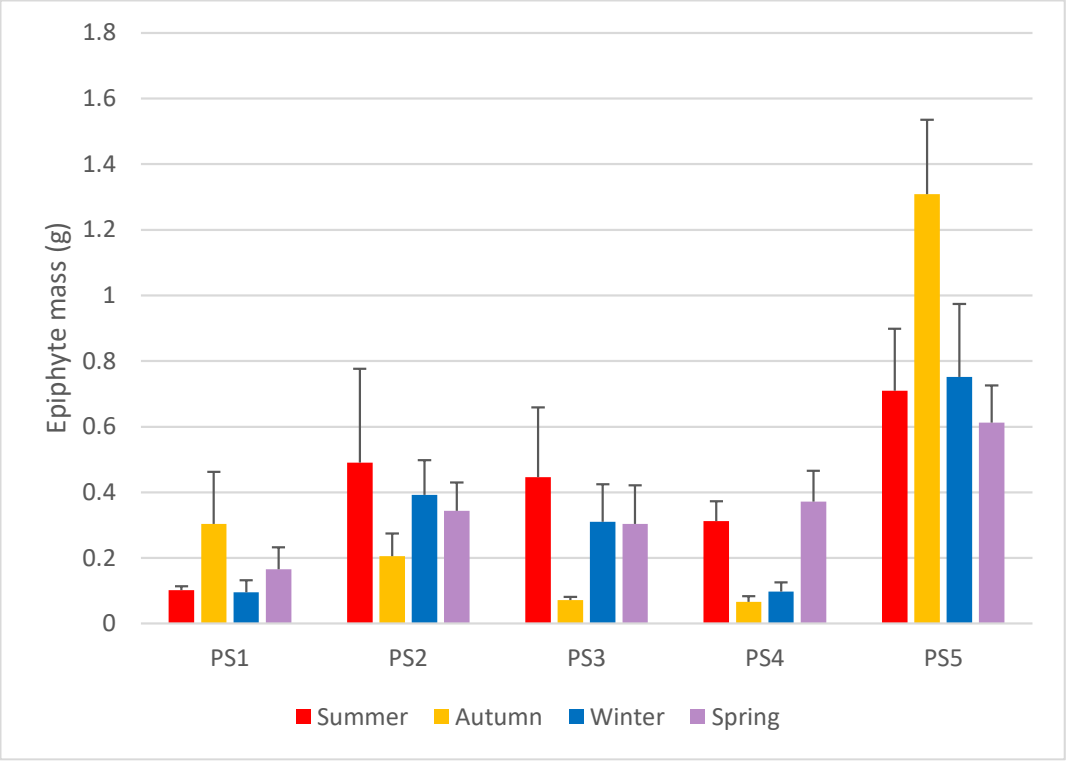


Figure 23. Mean mass of epiphytes per core sample on *Posidonia sinuosa* during surveys across all seasons in 2025. Error bars show standard error of mean.

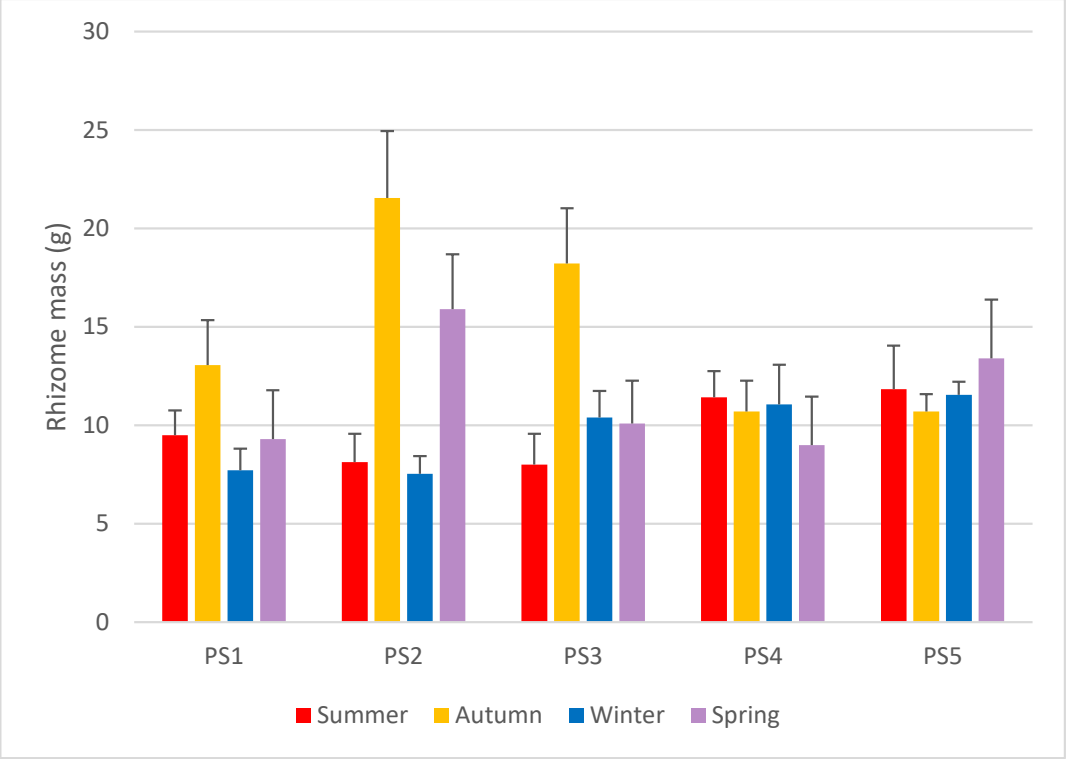


Figure 24. Mean mass of *Posidonia sinuosa* rhizomes per core sample during surveys across all seasons in 2025. Error bars show standard error of mean.

4.3 *Amphibolis* and mixed *Amphibolis*/*Posidonia* habitats

*S*ites AM1 and AO1 were a monoculture of *Amphibolis* across all seasons, as was AP4 with the exception of a trace of *Posidonia* in winter and spring (Figure 25). Epiphyte cover was 38–85% across all sites and seasons (Figure 25). When the seagrass beneath the epiphytes was accounted for, seagrass cover was close to 100% at the *Amphibolis* monoculture sites, and within a range of about 78–95% at the other sites. The cover of *Posidonia* at the mixed seagrass sites (AP1, AP2, AP3 and AP5) was typically 26–50% but was 61% at AP1 in spring, 63% at AP3 in summer and 67% at AP5 in summer (Figure 26).

Mean canopy height ranged from about 180 mm at AP3 in winter to about 375 mm at sites AP2 and AP4 in autumn[5] (Figure 27). Canopy height was greatest during autumn for the mixed *Amphibolis/Posidonia* sites except AP1. Canopy height was lowest for all seasons at AP3 (Figure 27). PERMANOVA detected a significant Season × Site interaction (P<0.001), indicating that seasonal patterns differed among sites. Pairwise comparisons for the interaction showed that canopy height was significantly greater in spring than in summer and autumn at AO1; greater in autumn than in summer and spring at AP2; greater in autumn than in winter at AP3; greater in autumn than in spring, and in spring than in summer and winter, at AP4; and greater in autumn than in summer and winter, and in spring than in summer, at AP5 (Figure 27, Appendix B). There was also significant overall seasonal variation (P<0.01).

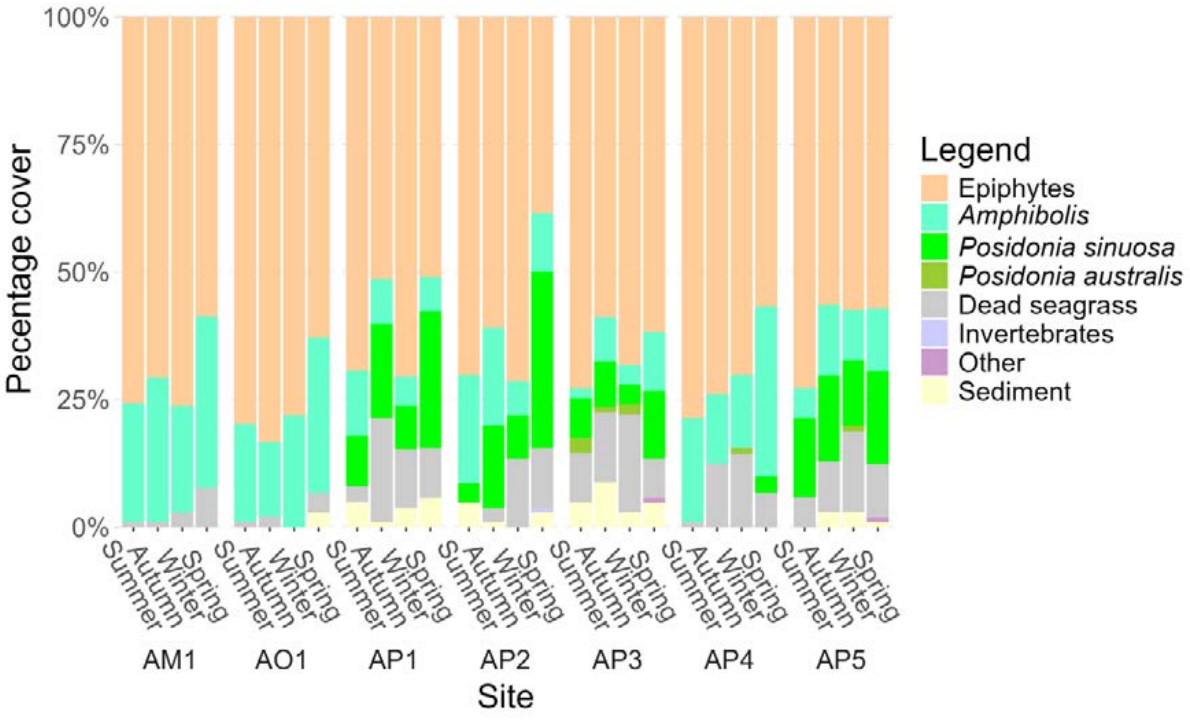


Figure 25. Community composition recorded in *Amphibolis* and mixed *Amphibolis*/*Posidonia* habitat during surveys across all seasons 2025. Note that epiphytes include those masking seagrass.

[5] Canopy height measurements are not available for site AM1 in summer and winter and AO1 in winter.

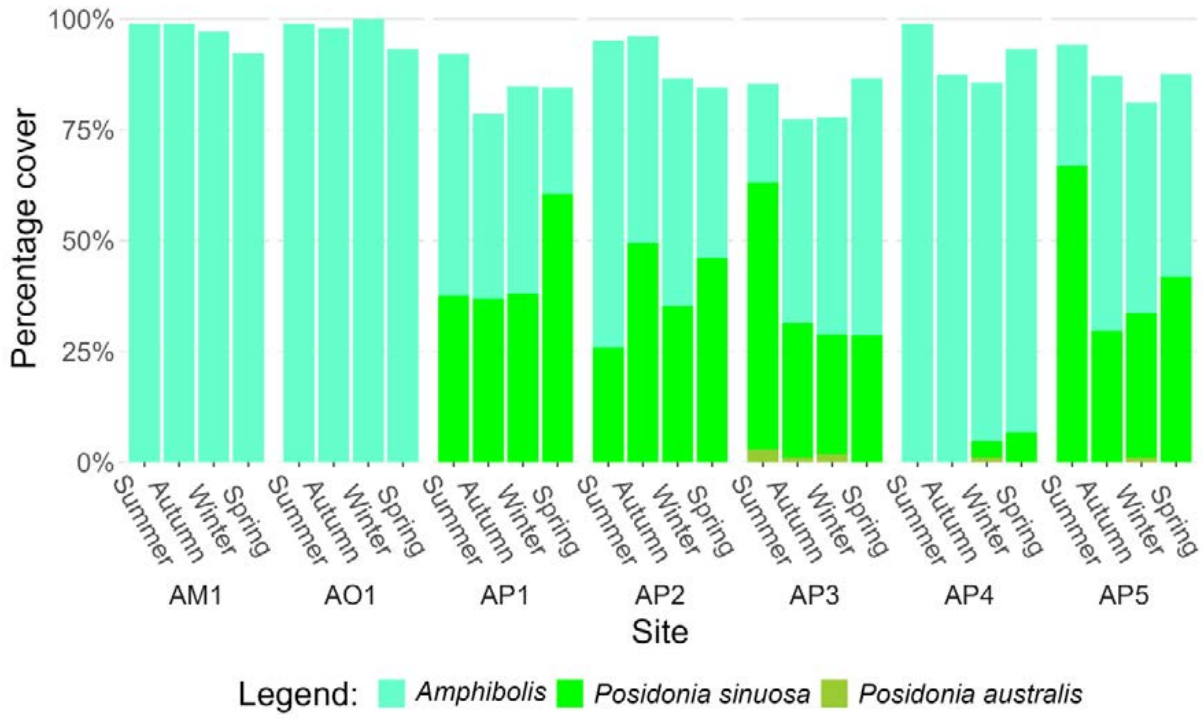


Figure 26. Percentage cover of seagrass (*Posidonia* and *Amphibolis*), including that assumed to be covered by epiphytes, recorded during surveys across all seasons in 2025 over *Amphibolis* and mixed *Amphibolis*/*Posidonia* habitat.

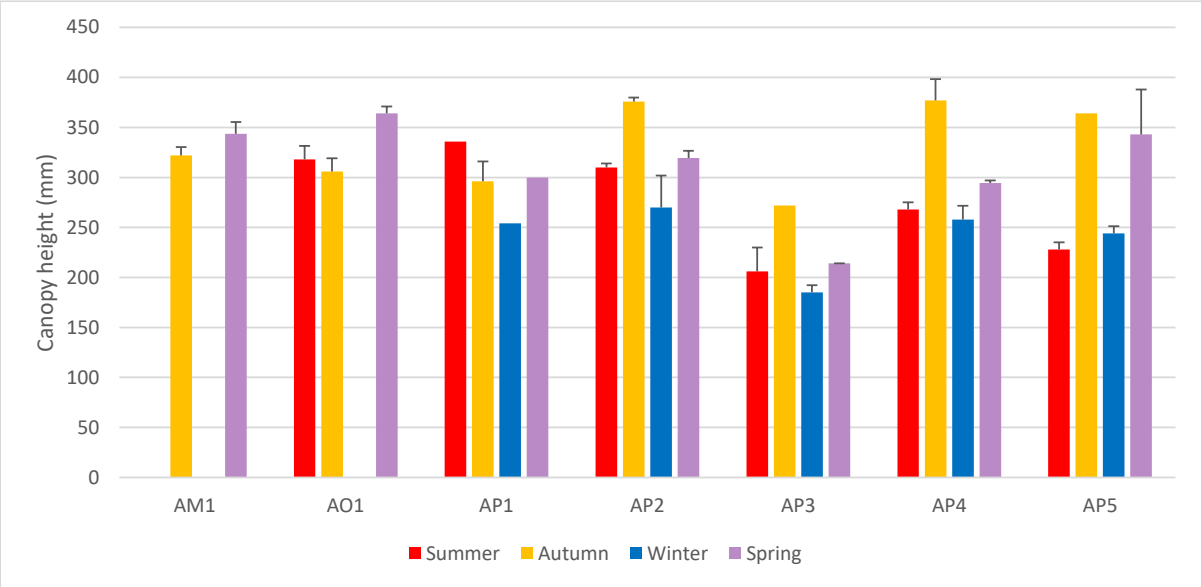


Figure 27. Mean *Amphibolis* and *Amphibolis*/*Posidonia* seagrass canopy height recorded during surveys across all seasons in 2025. Error bars show standard error of mean (where there was more than one measurement of *Amphibolis* canopy). Note that there are no data for the mixed site AM1 in autumn and winter and AO1 in winter.

4.4 *Zostera* habitat

Zostera was sparse at all sites in both summer and autumn and generally masked by epiphytes, which were greatest in summer at all sites except ZO2 (Figure 28). *Zostera* became more prominent in winter with a further increase in spring (Figure 28). When *Zostera* cover beneath epiphytes was accounted for, cover ranged from about 7–34% in summer, 2-18% in autumn, 29–55% in winter and 65–90% in spring (Figure 29). *Zostera* cover was generally greater at ZO2, ZO4 and ZO5 than ZO1 and ZO3 but in summer was lowest at ZO2 and greatest at ZO1 (Figure 29).

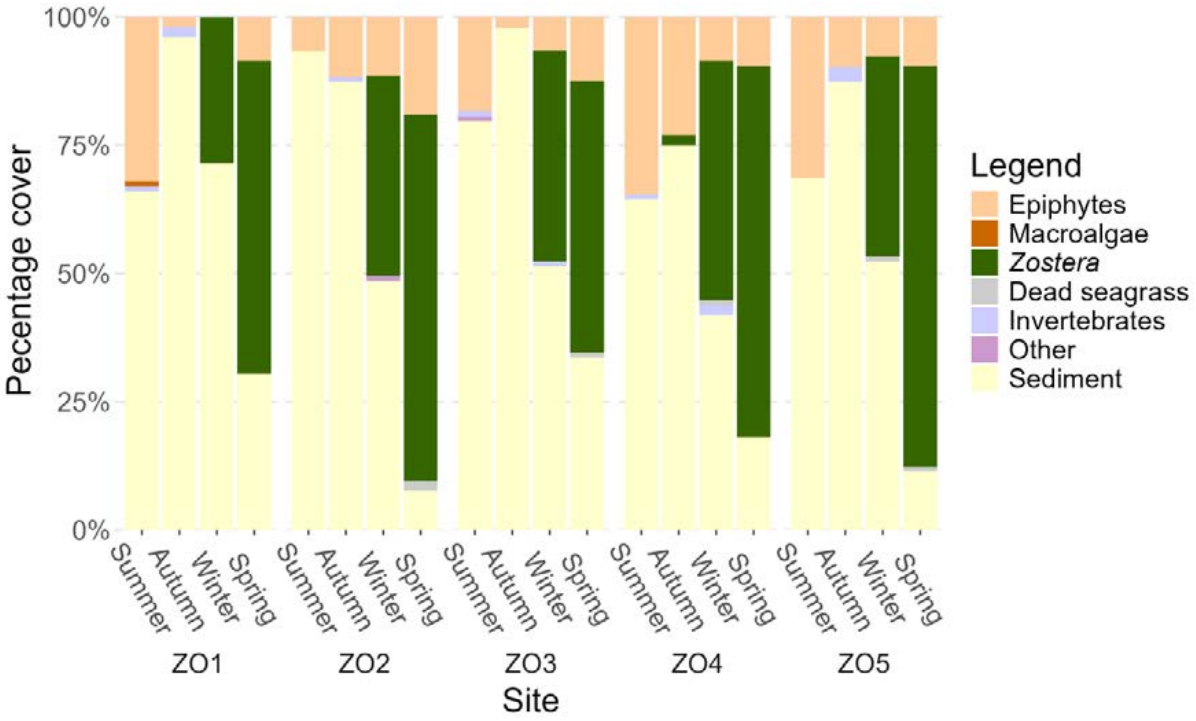


Figure 28. Community composition of *Zostera* habitat recorded during surveys across all seasons in 2025. Note that epiphytes include those masking seagrass.

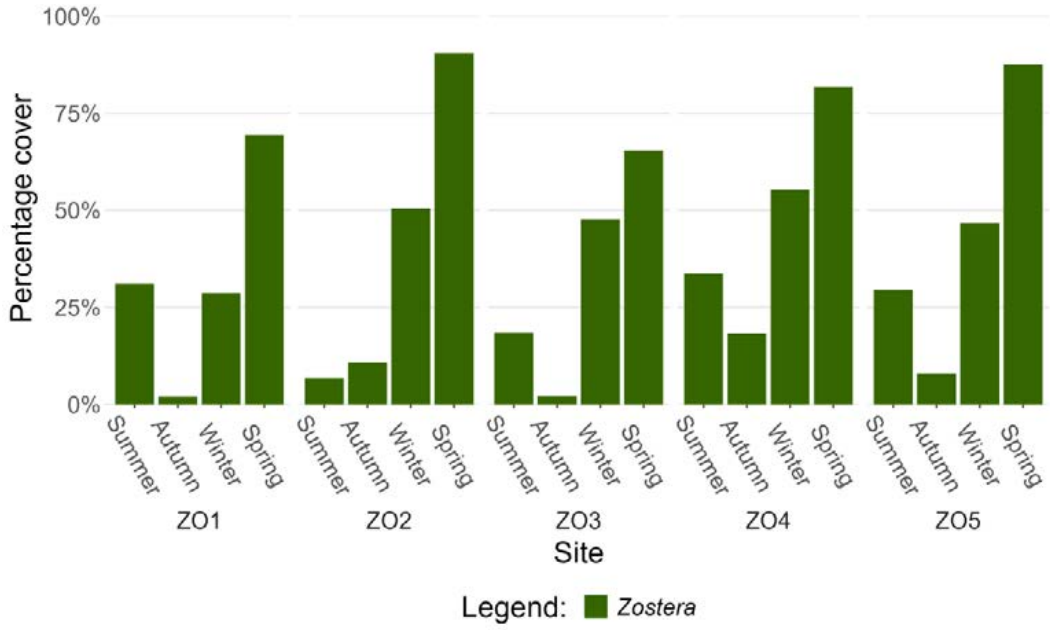


Figure 29. Percentage cover of *Zostera*, including that assumed to be covered by epiphytes, recorded during surveys across all seasons in 2025.

5. Epibenthic fauna

5.1 Scuba – seagrass invertebrate/fish surveys

A total of 7,819 individuals were recorded during seagrass invertebrate/cryptic fish surveys across all seasons in 2025, representing 100 taxa[6], comprising six crustaceans, seven echinoderms, 19 molluscs, 53 sessiles (including 32 sponge morphologies) and 15 fishes. The most abundant taxon was mauve-mouthed ascidian *Polycarpa viridis* (Plate 3) with 1,912 individuals (>24% of the total). Other solitary ascidians (e.g. Plate 4) were also relatively abundant, with 1,261 individuals. There was a single school of approximately 300 baitfish recorded in summer. The mean site abundance for each taxon, habitat and season is provided in Table 4 and Table 5. Abundances for each site and season are provided in Appendix A.

Mean site abundances were greatest in *Posidonia sinuosa* habitat across all seasons with 193 individuals in summer, 146 in autumn, 191 in winter, and 136 in spring. Mean site abundance was lowest in *Posidonia/Zostera* habitat in autumn, winter and spring with <5 individuals and in *Posidonia australis* habitat in all seasons with <20 individuals (Figure 30). Mean site richness was greatest in *Posidonia sinuosa* habitat in summer with about 17 taxa and in *Zostera* habitat in summer and autumn with about 15 taxa (Figure 31). Mean site richness was lowest with <4 taxa in the *Posidonia*/*Zostera* habitat across all seasons and in *Posidonia australis* habitat in summer and winter (Figure 31).

An MDS plot of community structure shows four main groups (Figure 32):

- *Zostera* habitat, correlated with hammer oyster *Malleus meridianus*, mussels *Mytilus* spp., obese ascidian *Phallusia obesa* and wavy grubfish *Parapercis haackei.*
- *Posidonia australis* with or without *Zostera*, the latter correlated more strongly with razor clams *Pinna bicolor*
- *Amphibolis/Posidonia*, strongly correlated with mauve-mouthed ascidian and other solitary ascidians. There were two minor groupings nearby representing pure *Amphibolis sites* (AO1 and AM1)
- *Posidonia sinuosa*.

There was less variability between seasons than between habitats, and no consistent pattern of seasonal variation within habitat groups (Figure 32).

[6] Includes morphological groups for sponges



Plate 3. Mauve-mouthed ascidian *Polycarpa viridis*

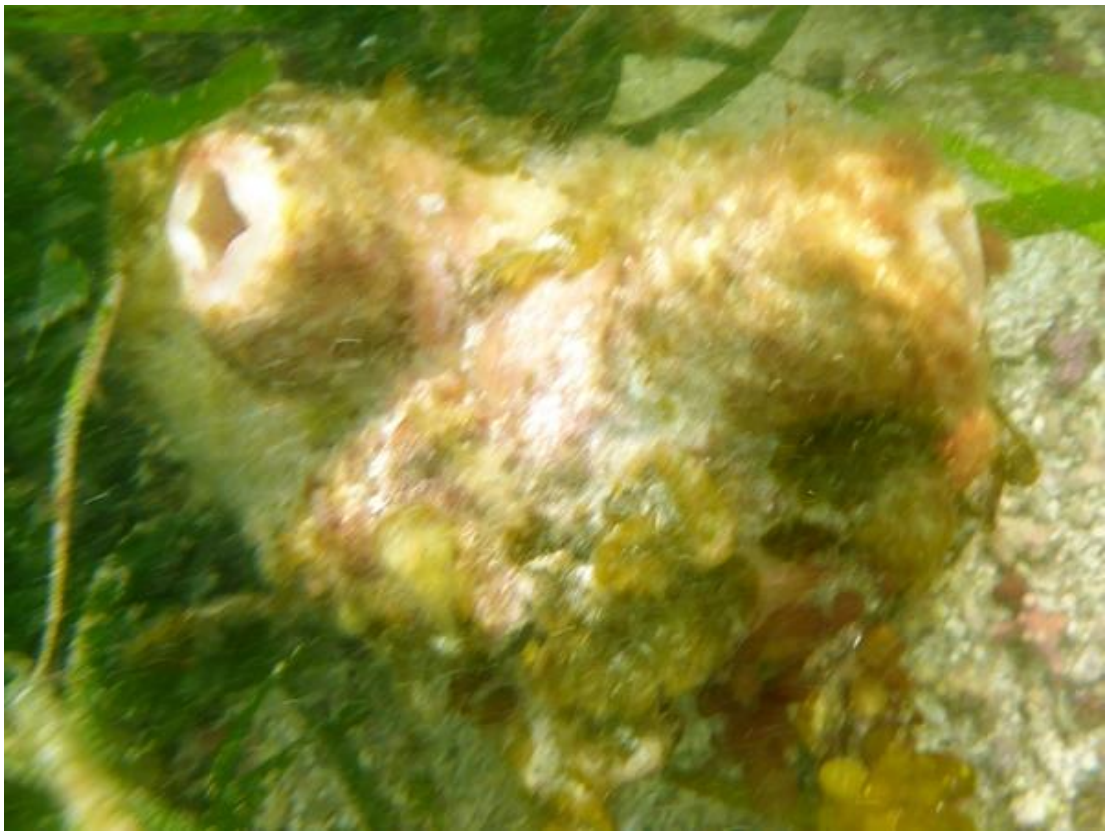


Plate 4. Solitary ascidian, possibly *Styela plicata*

Table 4. Mean site abundance of taxa recorded in *Posidonia australis, and Posidonia/Zostera* habitat during scuba surveys of invertebrates/cryptic fish over all seasons in 2025. Brackets contain standard error of mean.

Taxon	Common name	Habitats/seasons							
		Posidonia australis				*Posidonia/Zostera*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Crustaceans									
Austrodromidia octodentata	Bristled sponge crab	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Naxia aurita	Seagrass spider crab	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Nectocarcinus integrifrons	Red swimmer crab	0.20 (0.20)	1.0 (0.45)	0 (0)	0.60 (0.60)	0 (0)	0 (0)	0 (0)	0 (0)
Paguristes frontalis	Southern hermit crab	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Penaeus latisulcatus	Western king prawn	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Portunus armatus	Blue swimmer crab	0.60 (0.24)	0.80 (0.37)	0 (0)	0 (0)	3.0 (3.0)	1.5 (1.5)	0 (0)	1.0 (0)
Echinoderms									
Amblypneustes pallidus	Yellow-spined egg urchin	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Anthaster valvulatus	Mottled seastar	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Australostichopus mollis	Southern sea cucumber	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Coscinasterias muricata	Eleven arm seastar	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Goniocidaris tubaria	Pencil urchin	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Stichopus ludwigi	Ludwig's sea cucumber	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Tosia australis	Southern biscuit star	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Molluscs									
Astralium spp.	Turban shell	0 (0)	0 (0)	0 (0)	9.8 (1.7)	0 (0)	0 (0)	0 (0)	0 (0)
Ceratosoma brevicaudatum	Short tailed nudibranch	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Circe quoyi	Circular tapestry shell	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Conus anemone	Anemone cone	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Taxon	Common name	Habitats/seasons							
		Posidonia australis				*Posidonia/Zostera*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Equichlamys bifrons	Queen scallop	0 (0)	1.2 (0.58)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Fusinus australis	Southern spindle	0 (0)	1.0 (0.32)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Haliotis spp.	Abalone	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Lima nimbifer	File shell	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Malleus meridianus	Hammer oyster	0.80 (0.58)	0.20 (0.20)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0.50 (0.50)	0.50 (0.50)
Mytilidae spp.	Mussels	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Notocallista kingii	King's cockle	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ostrea angasi	Native mussel	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pecten fumatus	King scallop	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Phasianella australis	Painted lady	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Phasianella ventricosa	Swollen pheasant shell	0 (0)	0.40 (0.24)	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)
Pinna bicolor	Razor clam	3.0 (1.9)	6.4 (1.7)	3.8 (2.8)	0.80 (0.37)	3.5 (1.5)	1.5 (0.50)	3.5 (1.5)	1.5 (0.50)
Pleuroploca australasia	Tulip shell	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sepioteuthis australis (eggs)	Calamari eggs	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Turbo torquatus	Turban shell	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sessiles									
Adeona grisea	Black sieve bryozoan	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ascidiacea spp. (grey colonial)	Grey colonial ascidians	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ascidiacea spp. (other solitary)	Other solitary ascidians	0.20 (0.20)	0.60 (0.40)	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)
Ascidiacea spp. (stalked solitary)	Stalked solitary ascidians	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Botrylloides spp.	Colonial ascidians	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Bryozoa spp. (purple hard massive)	Purple hard massive bryozoan	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Taxon	Common name	Habitats/seasons							
		Posidonia australis				*Posidonia/Zostera*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Carijoa sp.	Soft coral	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Drifa sp.	Soft coral	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Echinogorgia sp.	Sea whip	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Euplexaura sp.	Gorgonian coral	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Halocynthia dumosa	Spiny sea squirt	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Herdmania fimbriae	Small red-mouthed ascidian	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Mycale sp.	Pumpkin sponge	9.2 (9.0)	0 (0)	2.4 (1.9)	7.4 (6.2)	0 (0)	0 (0)	0 (0)	0 (0)
Phallusia obesa	Obese ascidian	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Plesiastrea versipora	Green coral	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Polycarpa viridis	Mauve-mouthed ascidian	0.20 (0.20)	1.4 (0.60)	0 (0)	0.80 (0.37)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (black ball)	Black ball sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (black massive)	Black massive sponge	0.40 (0.24)	0 (0)	0 (0)	0 (0)	2.0 (2.0)	0.50 (0.50)	0 (0)	0 (0)
Porifera spp. (blue massive)	Blue massive sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (brown ball)	Brown ball sponge	0 (0)	4.2 (3.2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (brown branching)	Brown branching sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (brown massive)	Brown massive sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (brown tubular)	Brown tubular sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (cream ball)	Cream ball sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (cream digitate)	Cream digitate sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (cream encrusting)	Cream encrusting sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (cream honeycomb)	Cream honeycomb sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (cream massive)	Cream massive sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Taxon	Common name	Habitats/seasons							
		Posidonia australis				*Posidonia/Zostera*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Porifera spp. (cream tubular)	Cream tubular sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (green digitate)	Green digitate sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (green massive)	Green massive sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (grey encrusting)	Grey encrusting sponge	0 (0)	0.60 (0.60)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (grey other)	Grey sponge	0.20 (0.20)	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0.50 (0.50)	0 (0)
Porifera spp. (orange branching)	Orange branching sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (orange digitate)	Orange digitate sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (orange massive)	Orange massive sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (orange palmate)	Orange palmate sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (orange tubular)	Orange tubular sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (pink massive soft)	Pink massive soft sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (pink massive)	Pink massive sponge	0 (0)	0 (0)	0.40 (0.24)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (purple digitate)	Purple digitate sponge	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (purple massive)	Purple massive sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (white amorphous)	White amorphous sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (white tubular)	White tubular sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (yellow amorphous)	Yellow amorphous sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (yellow branching)	Yellow branching sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (yellow digitate)	Yellow digitate sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (yellow massive)	Yellow massive sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pyura abradata	Red bait	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sabella sp. (tubes)	Worm tubes	0.40 (0.24)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Taxon	Common name	Habitats/seasons							
		Posidonia australis				*Posidonia/Zostera*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Steginoporella truncata	Mazy bryozoan	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Tethya spp.	Golf ball sponge	0 (0)	0.80 (0.37)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Thorectid sp.	Orange amorphous sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Fishes									
Actinopterygii sp. (small green)	Unidentified small green fish	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)
Actinopterygii sp. (small)	Unidentified small fish	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Actinopterygii spp. (baitfish)	Unidentified baitfish	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Aetapcus maculatus	Warty prowfish	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Aracana aurita	Shaw's cowfish	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pagrus auratus	Snapper	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Eocallionymus papilio	Painted stinkfish	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Monacanthidae spp.	Leatherjacket undifferentiated	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Neoodax balteatus	Little weed whiting	0 (0)	0.20 (0.20)	0.20 (0.20)	0.60 (0.60)	0 (0)	1.0 (1.0)	0 (0)	0 (0)
Parapercis haackei	Wavy grubfish	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Parequula melbournensis	Silverbelly	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pelates octolineatus	Western striped trumpeter	0 (0)	0 (0)	0 (0)	0 (0)	80 (0)	0 (0)	0 (0)	0 (0)
Pleuronectiformes sp.	Flounder	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Siphamia cephalotes	Wood's siphonfish	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0.50 (0.50)	0 (0)	0 (0)	0 (0)

Table 5. Mean site abundance of taxa recorded in patchy *Amphibolis, Amphibolis/Posidonia* mixed, and *Amphibolis/Posidonia* patchy habitat during scuba surveys of invertebrates/cryptic fish across all seasons in 2025. Brackets contain standard error of mean.

Taxon	Common name	Habitats/seasons											
		Amphibolis				*Amphibolis/Posidonia* mixed				*Amphibolis/Posidonia* patchy			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Crustaceans													
Austrodromidia octodentata	Bristled sponge crab	0	0	0	0	0	0	0	0	0 (0)	0.20 (0.20)	0 (0)	0 (0)
Naxia aurita	Seagrass spider crab	0	0	0	1.0	0	0	1.0	0	0 (0)	0 (0)	0.20 (0.20)	0 (0)
Nectocarcinus integrifrons	Red swimmer crab	1.0	0	0	1.0	1.0	3.0	1.0	0	0.80 (0.37)	1.4 (0.40)	0.20 (0.20)	0.80 (0.37)
Paguristes frontalis	Southern hermit crab	0	0	0	0	0	0	0	0	0 (0)	0.40 (0.24)	0 (0)	0 (0)
Penaeus latisulcatus	Western king prawn	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Portunus armatus	Blue swimmer crab	1.0	0	0	1.0	0	0	0	0	0.40 (0.40)	0 (0)	0 (0)	0 (0)
Echinoderms													
Amblypneustes pallidus	Yellow-spined egg urchin	1.0	0	1.0	0	0	0	0	0	0.20 (0.20)	0.60 (0.24)	0.40 (0.40)	0 (0)
Anthaster valvulatus	Mottled seastar	0	0	0	0	1.0	0	0	0	0.40 (0.40)	0.20 (0.20)	0.40 (0.24)	0.20 (0.20)
Australostichopus mollis	Southern sea cucumber	0	1.0	0	1.0	0	0	0	0	0.20 (0.20)	0.20 (0.20)	0 (0)	0 (0)
Coscinasterias muricata	Eleven arm seastar	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Goniocidaris tubaria	Pencil urchin	1.0	0	0	0	1.0	1.0	1.0	1.0	0.40 (0.24)	0.20 (0.20)	0.80 (0.37)	0.40 (0.24)
Stichopus ludwigi	Ludwig's sea cucumber	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Tosia australis	Southern biscuit star	0	0	0	0	0	0	0	0	0.20 (0.20)	0.20 (0.20)	0.20 (0.20)	0.20 (0.20)
Molluscs													
Astralium spp.	Turban shell	0	0	0	0	0	0	0	0	1.0 (0.45)	0.20 (0.20)	3.6 (1.6)	1.8 (0.37)
Ceratosoma brevicaudatum	Short tailed nudibranch	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Circe quoyi	Circular tapestry shell	0	0	1.0	0	0	0	0	0	0.20 (0.20)	0 (0)	0 (0)	0.20 (0.20)
Conus anemone	Anemone cone	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)

Taxon	Common name	Habitats/seasons											
		Amphibolis				*Amphibolis/Posidonia* mixed				*Amphibolis/Posidonia* patchy			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Equichlamys bifrons	Queen scallop	0	1.0	0	0	0	0	0	0	0 (0)	0 (0)	0.20 (0.20)	0 (0)
Fusinus australis	Southern spindle	0	0	0	0	0	2.0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Haliotis spp.	Abalone	1.0	0	1.0	2.0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Lima nimbifer	File shell	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0.20 (0.20)	0 (0)
Malleus meridianus	Hammer oyster	0	0	0	0	0	0	0	0	0 (0)	0.40 (0.24)	0 (0)	0 (0)
Mytilidae spp.	Mussels	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Notocallista kingii	King's cockle	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Ostrea angasi	Native mussel	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Pecten fumatus	King scallop	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Phasianella australis	Painted lady	0	0	0	0	0	0	0	0	0.20 (0.20)	0 (0)	0 (0)	0 (0)
Phasianella ventricosa	Swollen pheasant shell	0	1.0	0	1.0	0	1.0	0	1.0	0 (0)	0 (0)	0.20 (0.20)	0.60 (0.40)
Pinna bicolor	Razor clam	26	20	10	9.0	0	1.0	0	1.0	0 (0)	0 (0)	0 (0)	0 (0)
Pleuroploca australasia	Tulip shell	0	0	0	0	0	0	0	0	0.20 (0.20)	0.20 (0.20)	0 (0)	0 (0)
Sepioteuthis australis (eggs)	Calamari eggs	0	0	0	0	0	0	0	0	0.40 (0.24)	0 (0)	0 (0)	0 (0)
Turbo torquatus	Turban shell	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Sessiles													
Adeona grisea	Black sieve bryozoan	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Ascidiacea spp. (grey colonial)	Grey colonial ascidians	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Ascidiacea spp. (other solitary)	Other solitary ascidians	5.0	7.0	5.0	5.0	1.0	2.0	1.0	2.0	20 (4.2)	17 (4.5)	18 (4.5)	15 (3.5)
Ascidiacea spp. (stalked solitary)	Stalked solitary ascidians	2.0	1.0	1.0	2.0	0	0	0	1.0	0.40 (0.24)	0 (0)	0 (0)	0 (0)
Botrylloides spp.	Colonial ascidians	1.0	0	0	0	0	0	0	0	0 (0)	0.20 (0.20)	0 (0)	0 (0)
Bryozoa spp. (purple hard massive)	Purple hard massive bryozoan	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)

Taxon	Common name	Habitats/seasons											
		Amphibolis				*Amphibolis/Posidonia* mixed				*Amphibolis/Posidonia* patchy			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Carijoa sp.	Soft coral	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Drifa sp.	Soft coral	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Echinogorgia sp.	Sea whip	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Euplexaura sp.	Gorgonian coral	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Halocynthia dumosa	Spiny sea squirt	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Herdmania fimbriae	Small red-mouthed ascidian	0	0	0	0	1.0	0	0	0	0.20 (0.20)	0 (0)	0.20 (0.20)	0.20 (0.20)
Mycale sp.	Pumpkin sponge	0	0	0	0	0	2.0	0	1.0	9.0 (8.5)	4.8 (4.6)	2.8 (2.6)	4.8 (4.1)
Phallusia obesa	Obese ascidian	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Plesiastrea versipora	Green coral	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0.20 (0.20)	0 (0)
Polycarpa viridis	Mauve-mouthed ascidian	7.0	8.0	11	11	9.0	15	7.0	13	54 (8.8)	42 (4.1)	58 (12)	43 (3.6)
Porifera spp. (black ball)	Black ball sponge	0	0	0	0	0	0	0	0	2.6 (0.93)	2.0 (0.63)	1.6 (0.51)	1.8 (0.37)
Porifera spp. (black massive)	Black massive sponge	0	0	0	0	0	0	0	0	1.0 (0.45)	0.40 (0.40)	0.20 (0.20)	0.20 (0.20)
Porifera spp. (blue massive)	Blue massive sponge	0	0	0	0	1.0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (brown ball)	Brown ball sponge	0	0	0	0	0	0	0	0	0.60 (0.60)	0 (0)	0 (0)	0 (0)
Porifera spp. (brown branching)	Brown branching sponge	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (brown massive)	Brown massive sponge	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (brown tubular)	Brown tubular sponge	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (cream ball)	Cream ball sponge	0	0	0	0	0	0	0	0	0 (0)	0.20 (0.20)	0 (0)	0 (0)
Porifera spp. (cream digitate)	Cream digitate sponge	0	0	0	0	19	28	0	2.0	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (cream encrusting)	Cream encrusting sponge	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (cream honeycomb)	Cream honeycomb sponge	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0.20 (0.20)	0 (0)
Porifera spp. (cream massive)	Cream massive sponge	0	0	0	0	0	0	0	0	0 (0)	1.0 (0.63)	0.80 (0.37)	0.20 (0.20)

Taxon	Common name	Habitats/seasons											
		Amphibolis				*Amphibolis/Posidonia* mixed				*Amphibolis/Posidonia* patchy			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Porifera spp. (cream tubular)	Cream tubular sponge	0	0	0	0	0	0	13	0	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (green digitate)	Green digitate sponge	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (green massive)	Green massive sponge	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (grey encrusting)	Grey encrusting sponge	0	0	0	0	0	0	0	0	0.20 (0.20)	0 (0)	0 (0)	0 (0)
Porifera spp. (grey other)	Grey sponge	1.0	0	0	1.0	0	0	1.0	0	2.6 (1.2)	1.0 (0.55)	1.0 (0.32)	1.0 (0.77)
Porifera spp. (orange branching)	Orange branching sponge	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (orange digitate)	Orange digitate sponge	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (orange massive)	Orange massive sponge	0	0	0	0	0	0	0	0	0.20 (0.20)	0 (0)	0 (0)	0 (0)
Porifera spp. (orange palmate)	Orange palmate sponge	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (orange tubular)	Orange tubular sponge	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (pink massive soft)	Pink massive soft sponge	0	0	0	0	0	0	0	0	0.60 (0.40)	0 (0)	0 (0)	0 (0)
Porifera spp. (pink massive)	Pink massive sponge	0	0	0	0	0	0	0	0	0.20 (0.20)	0 (0)	0 (0)	0 (0)
Porifera spp. (purple digitate)	Purple digitate sponge	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (purple massive)	Purple massive sponge	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (white amorphous)	White amorphous sponge	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (white tubular)	White tubular sponge	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (yellow amorphous)	Yellow amorphous sponge	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (yellow branching)	Yellow branching sponge	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (yellow digitate)	Yellow digitate sponge	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (yellow massive)	Yellow massive sponge	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Pyura abradata	Red bait	0	0	0	0	0	1.0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Sabella sp. (tubes)	Worm tubes	13	6.0	1.0	7.0	0	3.0	0	0	3.0 (1.9)	4.2 (2.0)	4.2 (1.6)	5.0 (0.77)

Taxon	Common name	Habitats/seasons											
		Amphibolis				*Amphibolis/Posidonia* mixed				*Amphibolis/Posidonia* patchy			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Steginoporella truncata	Mazy bryozoan	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Tethya spp.	Golf ball sponge	0	0	0	0	1.0	0	0	0	7.2 (4.2)	10 (4.0)	7.2 (3.2)	11 (5.1)
Thorectid sp.	Orange amorphous sponge	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Fishes													
Actinopterygii sp. (small green)	Unidentified small green fish	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Actinopterygii sp. (small)	Unidentified small fish	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Actinopterygii spp. (baitfish)	Unidentified baitfish	0	0	0	0	0	0	0	0	60 (40)	0 (0)	0 (0)	0 (0)
Aetapcus maculatus	Warty prowfish	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0.20 (0.20)
Aracana aurita	Shaw's cowfish	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Pagrus auratus	Snapper	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Eocallionymus papilio	Painted stinkfish	0	0	0	1.0	0	0	0	0	0.20 (0.20)	0 (0)	0 (0)	0 (0)
Monacanthidae spp.	Leatherjacket undifferentiated	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Neoodax balteatus	Little weed whiting	0	0	0	0	0	0	0	0	0 (0)	0.20 (0.20)	0 (0)	0 (0)
Parapercis haackei	Wavy grubfish	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Parequula melbournensis	Silverbelly	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Pelates octolineatus	Western striped trumpeter	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Pleuronectiformes sp.	Flounder	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)
Siphamia cephalotes	Wood's siphonfish	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0 (0)	0 (0)

Table 6. Mean site abundance of taxa recorded in patchy *Posidonia sinuosa,* and *Zostera* habitat during scuba surveys of invertebrates/cryptic fish across all seasons in 2025. Brackets contain standard error of mean.

Taxon	Common name	Habitats/seasons							
		Posidonia sinuosa				*Zostera*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Crustaceans									
Austrodromidia octodentata	Bristled sponge crab	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Naxia aurita	Seagrass spider crab	0 (0)	0 (0)	0 (0)	0.80 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)
Nectocarcinus integrifrons	Red swimmer crab	0 (0)	0.60 (0.40)	0.40 (0.24)	0.40 (0.40)	0 (0)	0 (0)	0.40 (0.24)	0.40 (0.24)
Paguristes frontalis	Southern hermit crab	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Penaeus latisulcatus	Western king prawn	0 (0)	0 (0)	0 (0)	0 (0)	1.8 (0.73)	0 (0)	0 (0)	0 (0)
Portunus armatus	Blue swimmer crab	0.40 (0.24)	0.80 (0.37)	0 (0)	0.80 (0.37)	0.60 (0.24)	0.60 (0.40)	0 (0)	0 (0)
Echinoderms									
Amblypneustes pallidus	Yellow-spined egg urchin	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Anthaster valvulatus	Mottled seastar	0.60 (0.40)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0.40 (0.24)	0 (0)	0 (0)
Australostichopus mollis	Southern sea cucumber	0.40 (0.24)	0.20 (0.20)	0.40 (0.40)	0.20 (0.20)	0.40 (0.24)	0.20 (0.20)	0.20 (0.20)	0.40 (0.40)
Coscinasterias muricata	Eleven arm seastar	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Goniocidaris tubaria	Pencil urchin	0.40 (0.40)	0 (0)	0.40 (0.24)	0 (0)	0 (0)	0.40 (0.24)	0.20 (0.20)	0 (0)
Stichopus ludwigi	Ludwig's sea cucumber	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)
Tosia australis	Southern biscuit star	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Molluscs									
Astralium spp.	Turban shell	9.6 (2.5)	2.8 (0.86)	11 (4.1)	6.0 (2.9)	0 (0)	0 (0)	0 (0)	0 (0)
Ceratosoma brevicaudatum	Short tailed nudibranch	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Circe quoyi	Circular tapestry shell	0.60 (0.24)	0 (0)	0.20 (0.20)	1.0 (0.55)	0 (0)	0.60 (0.40)	0.20 (0.20)	0 (0)
Conus anemone	Anemone cone	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)

Taxon	Common name	Habitats/seasons							
		Posidonia sinuosa				*Zostera*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Equichlamys bifrons	Queen scallop	6.2 (4.3)	1.6 (0.40)	3.4 (1.7)	2.8 (2.3)	0 (0)	0 (0)	0 (0)	0 (0)
Fusinus australis	Southern spindle	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)
Haliotis spp.	Abalone	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Lima nimbifer	File shell	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Malleus meridianus	Hammer oyster	17 (6.3)	0 (0)	20 (11)	15 (5.3)	7.8 (2.2)	10 (3.7)	5.6 (2.2)	15 (4.2)
Mytilus spp.	Blue mussel	0 (0)	0 (0)	2.4 (2.4)	0.20 (0.20)	21 (8.0)	21 (5.0)	13 (4.1)	35 (12)
Ostrea angasi	Native mussel	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)
Pecten fumatus	King scallop	0 (0)	0 (0)	0 (0)	0 (0)	2.6 (0.68)	1.4 (0.51)	0.20 (0.20)	0.80 (0.80)
Phasianella australis	Painted lady	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0.60 (0.40)	0 (0)	0 (0)
Phasianella ventricosa	Swollen pheasant shell	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pinna bicolor	Razor clam	0 (0)	0.40 (0.24)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pleuroploca australasia	Tulip shell	1.2 (0.97)	0.60 (0.40)	0 (0)	0.20 (0.20)	2.8 (1.5)	3.2 (2.5)	1.8 (0.73)	3.8 (2.2)
Sepioteuthis australis (eggs)	Calamari eggs	0.40 (0.24)	0 (0)	0.20 (0.20)	0.40 (0.24)	0 (0)	0 (0)	0 (0)	0 (0)
Turbo torquatus	Turban shell	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sessiles									
Adeona grisea	Black sieve bryozoan	0 (0)	0 (0)	0 (0)	0 (0)	3.6 (1.1)	0.80 (0.58)	0.60 (0.24)	0.40 (0.40)
Ascidiacea spp. (grey colonial)	Grey colonial ascidians	0 (0)	0 (0)	0.40 (0.40)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ascidiacea spp. (other solitary)	Other solitary ascidians	53 (12)	41 (8.6)	42 (9.0)	39 (12)	0.20 (0.20)	0.80 (0.49)	0.40 (0.24)	1.0 (0.32)
Ascidiacea spp. (stalked solitary)	Stalked solitary ascidians	0.20 (0.20)	0.60 (0.40)	0.20 (0.20)	0.40 (0.24)	0 (0)	0 (0)	0 (0)	0.20 (0.20)
Botrylloides spp.	Colonial ascidians	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Bryozoa spp. (orange hard massive)	Orange hard massive bryozoan	2.6 (1.9)	0.40 (0.40)	3.0 (2.3)	1.2 (0.97)	0 (0)	0 (0)	0 (0)	0 (0)
Bryozoa spp. (purple hard massive)	Purple hard massive bryozoan	0 (0)	0 (0)	0 (0)	0 (0)	1.8 (0.86)	2.2 (0.80)	1.0 (0.77)	1.2 (1.2)

Taxon	Common name	Habitats/seasons							
		Posidonia sinuosa				*Zostera*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Carijoa sp.	Soft coral	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)
Drifa sp.	Soft coral	0 (0)	0 (0)	0 (0)	0 (0)	6.6 (1.9)	4.2 (1.2)	0.80 (0.58)	0 (0)
Echinogorgia sp.	Sea whip	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)
Euplexaura sp.	Gorgonian coral	0 (0)	0 (0)	0.40 (0.24)	0 (0)	0 (0)	0.20 (0.20)	0.20 (0.20)	0 (0)
Halocynthia dumosa	Spiny sea squirt	0.20 (0.20)	0.20 (0.20)	1.6 (1.2)	0 (0)	0.60 (0.40)	0 (0)	0 (0)	0 (0)
Herdmania fimbriae	Small red-mouthed ascidian	0.60 (0.40)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Phallusia obesa	Obese ascidian	0.80 (0.58)	12 (4.3)	0.80 (0.80)	0 (0)	6.6 (1.6)	6.6 (0.68)	6.0 (1.9)	5.6 (0.98)
Plesiastrea versipora	Green coral	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Polycarpa viridis	Mauve-mouthed ascidian	45 (13)	26 (6.1)	51 (13)	35 (14)	1.6 (0.40)	3.4 (1.8)	3.2 (1.7)	1.8 (1.1)
Porifera spp. ("pumpkin")	Pumpkin sponge	0.20 (0.20)	1.2 (0.58)	0.40 (0.24)	0.80 (0.49)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (black ball)	Black ball sponge	1.0 (0.45)	0.80 (0.37)	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)
Porifera spp. (black massive)	Black massive sponge	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (blue massive)	Blue massive sponge	0 (0)	2.8 (1.4)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (brown ball)	Brown ball sponge	0 (0)	0 (0)	0 (0)	0 (0)	1.0 (0.45)	0 (0)	0 (0)	0 (0)
Porifera spp. (brown branching)	Brown branching sponge	0 (0)	0 (0)	0 (0)	0.40 (0.24)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (cream ball)	Cream ball sponge	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (cream digitate)	Cream digitate sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (cream encrusting)	Cream encrusting sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1.2 (0.97)	0 (0)	0 (0)
Porifera spp. (cream honeycomb)	Cream honeycomb sponge	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (cream massive)	Cream massive sponge	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0.40 (0.24)	0.40 (0.24)	0.20 (0.20)
Porifera spp. (cream tubular)	Cream tubular sponge	0 (0)	0 (0)	0.80 (0.49)	0.20 (0.20)	0.80 (0.49)	1.6 (0.51)	0 (0)	0.40 (0.24)
Porifera spp. (green massive)	Green massive sponge	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)	1.0 (1.0)	0 (0)	0 (0)

Taxon	Common name	Habitats/seasons							
		Posidonia sinuosa				*Zostera*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Porifera spp. (grey encrusting)	Grey encrusting sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)
Porifera spp. (grey massive)	Grey massive sponge	0.60 (0.40)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (orange branching)	Orange branching sponge	0.80 (0.58)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (orange digitate)	Orange digitate sponge	2.0 (0.55)	0.20 (0.20)	7.2 (2.0)	6.6 (1.5)	0.40 (0.40)	0.20 (0.20)	0.20 (0.20)	0.60 (0.24)
Porifera spp. (orange massive)	Orange massive sponge	0 (0)	0 (0)	0 (0)	0 (0)	0.40 (0.40)	0 (0)	0 (0)	0 (0)
Porifera spp. (pink massive soft)	Pink massive soft sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.40 (0.24)	0.20 (0.20)	0.80 (0.58)
Porifera spp. (pink massive)	Pink massive sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0.20 (0.20)	0 (0)
Porifera spp. (purple digitate)	Purple digitate sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)
Porifera spp. (purple massive)	Purple massive sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.40 (0.40)	0 (0)
Porifera spp. (soft pink massive)	Soft pink massive sponge	0.60 (0.24)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (white tubular)	White tubular sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (yellow amorphous)	Yellow amorphous sponge	0 (0)	3.2 (0.97)	0 (0)	0 (0)	0.20 (0.20)	0.20 (0.20)	1.6 (0.68)	0.60 (0.24)
Porifera spp. (yellow branching)	Yellow branching sponge	5.4 (1.5)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.60 (0.40)
Porifera spp. (yellow digitate)	Yellow digitate sponge	0 (0)	0 (0)	0 (0)	0.40 (0.40)	0 (0)	0 (0)	0 (0)	0 (0)
Porifera spp. (yellow massive)	Yellow massive sponge	0.60 (0.60)	0.40 (0.40)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pyura abradata	Red bait	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0.40 (0.40)	0 (0)
Sabella sp. (tubes)	Worm tubes	0 (0)	0 (0)	0 (0)	0 (0)	1.0 (0.63)	0 (0)	0 (0)	0 (0)
Tethya spp.	Golf ball sponge	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)

Taxon	Common name	Habitats/seasons							
		Posidonia sinuosa				*Zostera*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Fishes									
Actinopterygii sp. (small green)	Unidentified small green fish	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Actinopterygii spp. (baitfish)	Unidentified baitfish	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.60 (0.40)
Aracana aurita	Shaw's cowfish	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pagrus auratus	Snapper	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Eocallionymus papilio	Painted stinkfish	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)
Monacanthidae spp.	Leatherjacket undifferentiated	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.40 (0.24)	0 (0)	0 (0)
Neoodax balteatus	Little weed whiting	0 (0)	0 (0)	0.20 (0.20)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0.40 (0.24)
Parapercis haackei	Wavy grubfish	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)
Parequula melbournensis	Silverbelly	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0.20 (0.20)	1.0 (0.45)
Pelates octolineatus	Western striped trumpeter	2.2 (1.0)	0.20 (0.20)	0.20 (0.20)	0 (0)	5.4 (1.4)	7.0 (1.6)	0.80 (0.58)	1.0 (0.45)
Pleuronectiformes sp.	Flounder	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.60 (0.60)	0.20 (0.20)	0 (0)
Siphamia cephalotes	Wood's siphonfish	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Vincentia conspersa	Southern cardinalfish	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)

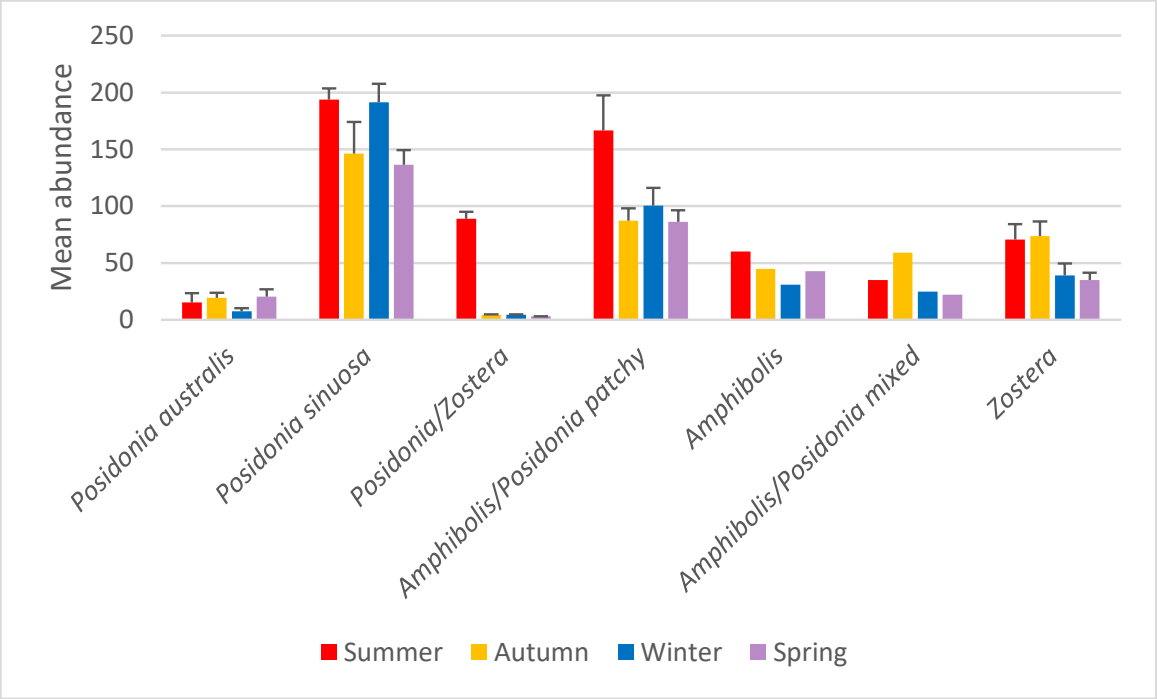


Figure 30. Mean total site abundance of taxa recorded in seagrass habitat during invertebrate/cryptic fish surveys across all seasons in 2025. Error bars show standard error of mean.

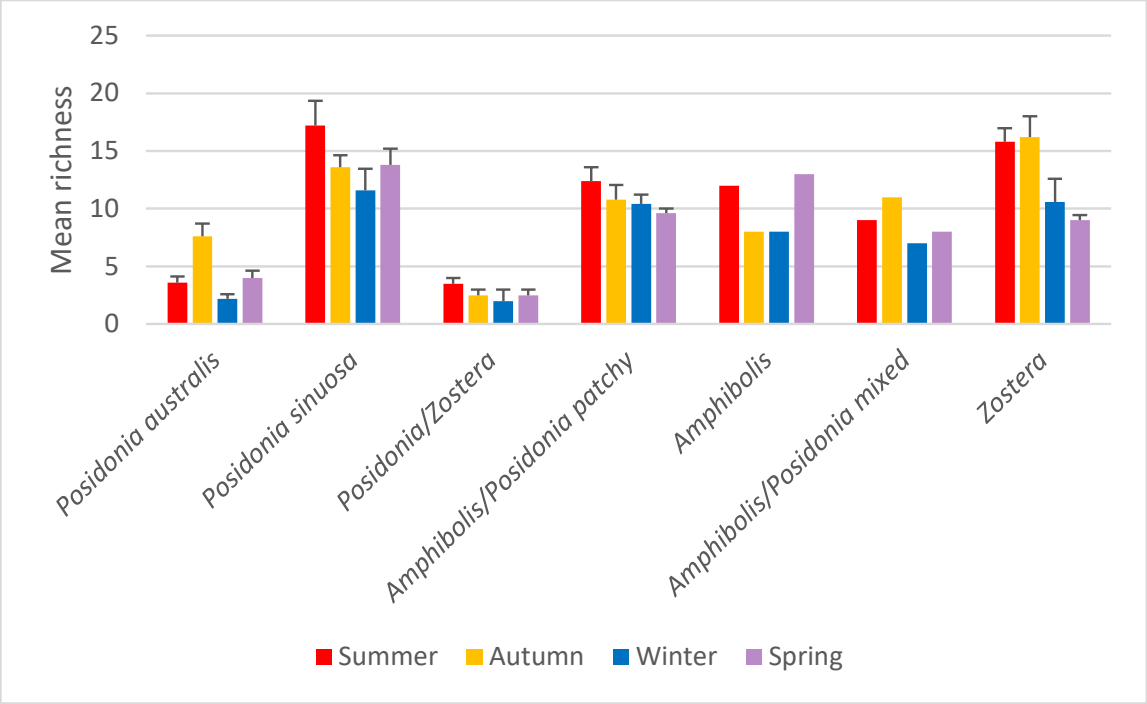


Figure 31. Mean site richness of taxa recorded in seagrass habitat during invertebrate/cryptic fish surveys across all seasons in 2025. Error bars show standard error of mean.

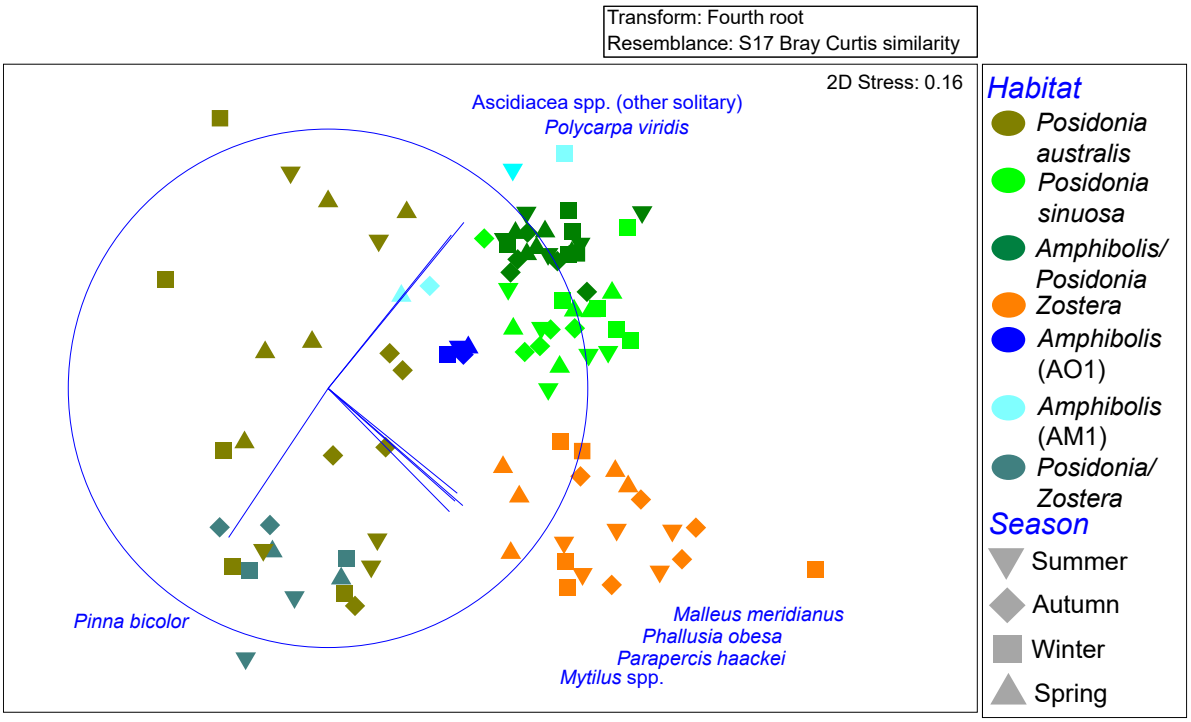


Figure 32. MDS plot representing structure of communities recorded in seagrass habitat during invertebrate/cryptic fish surveys across all seasons in 2025.

5.2 Towed camera– deep water fauna surveys

A total of 3,151 individuals were recorded during towed camera surveys across all seasons in 2025, including 1,043 colonies of the soft coral *Echinogorgia* sp. (Plate 5), 722 colonies of the bryozoan *Steginoporella truncata* (Plate 6), 612 undifferentiated filter feeders, and 441 European fan worms *Sabella spallanzanii* (Plate 7), which is a pest species of concern (PIRSA 2024a). These four taxa comprised more than 89% of the total abundance. Mean site abundance for each taxon, habitat and season is provided in Table 7. Abundances for each site and season are provided in Appendix E.

The Bryozoan habitat had the greatest mean abundance over all seasons, with 61 individuals in summer, 143 in autumn, 226 in winter, and 97 in spring (Figure 33), and the lowest mean richness, with less than two taxa for all seasons (Figure 34). Mean abundance was greater in the Sand/invertebrates habitat than the Sand/bioturbation habitat for all seasons except spring, but the differences were similar to the standard errors (Figure 33). Mean abundance increased from summer to winter but decreased in spring in all three habitats (Figure 33). Mean richness reflected the pattern of mean abundance with greater richness in the Sand/invertebrates habitat than the Sand/bioturbation habitat for all seasons except spring. Mean richness was lowest in autumn across all three habitats, but the differences were less than or similar to the standard errors (Figure 34).

An MDS plot of community structure shows (Figure 35):

- Bryozoan habitat sites towards the left of the plot, correlated with the bryozoan *Steginoporella truncata* and wavy grubfish *Parapercis haackei*
- no distinction between the Sand/invertebrates and Sand/bioturbation habitats
- seasonal variation similar to or greater than spatial variation within Bryozoan habitat



Plate 5. Soft coral *Echinogorgia* sp.



Plate 6. Mazy bryozoan *Steginoporella truncata*



Plate 7. European fan worm *Sabella spallanzanii*

Table 7. Mean site abundance of epibenthic fauna taxa recorded in deep water invertebrate habitats during towed camera surveys across all seasons in 2025. Brackets contain standard error of mean.

Taxon	Common name	Habitats/seasons											
		Sand/bioturbation				Sand/invertebrates				Bryozoans			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Crustaceans													
Leptomithrax gaimardii	Giant spider crab	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.40 (0.40)	0 (0)	0 (0)	0 (0)	0 (0)
Penaeus latisulcatus	Western king prawn	2.6 (0.98)	1.6 (0.68)	0 (0)	0.80 (0.80)	0.80 (0.37)	0.20 (0.20)	0 (0)	0.60 (0.24)	2.0 (1.0)	0.50 (0.50)	0 (0)	0 (0)
Echinoderms													
Anthaster valvulatus	Mottled seastar	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.50 (0.50)	0 (0)	0 (0)
Australostichopus mollis	Southern sea cucumber	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Coscinasterias muricata	Eleven arm seastar	0 (0)	0 (0)	0.40 (0.24)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Molluscs													
Pinna bicolor	Razor clam	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sessiles													
Alcyonacea spp.	Gorgonians	12 (4.0)	16 (4.4)	39 (8.5)	11 (2.4)	15 (5.3)	23 (6.5)	49 (12)	13 (3.4)	22 (0.50)	18 (4.0)	22 (11)	15 (0)
Ascidiacea spp. (large solitary)	Large solitary ascidian	0 (0)	0.20 (0.20)	0.60 (0.40)	0 (0)	0 (0)	0 (0)	0.80 (0.58)	0 (0)	0 (0)	0.50 (0.50)	0 (0)	0 (0)
Phallusia obesa	Obese ascidian	1.2 (0.58)	0.80 (0.37)	6.8 (2.2)	3.8 (1.4)	1.8 (0.80)	4.0 (0.45)	7.2 (1.9)	2.2 (0.58)	5.0 (1.0)	5.0 (5.0)	20 (6.5)	4.0 (1.0)
Porifera spp.	Undifferentiated sponge	0.80 (0.37)	0.60 (0.40)	1.4 (0.51)	1.4 (0.51)	0.20 (0.20)	1.0 (0.63)	1.2 (0.37)	1.0 (0.55)	1.0 (1.0)	0 (0)	0 (0)	0.50 (0.50)
Sabella spallanzanii	European fan worm	6.0 (1.9)	7.0 (2.2)	5.6 (3.0)	16 (5.5)	13 (4.0)	9.2 (4.2)	7.0 (2.3)	13 (4.2)	7.0 (7.0)	14 (4.5)	2.5 (2.5)	5.5 (1.5)
Steginoporella truncata	Mazy bryozoan	0.80 (0.80)	0.40 (0.40)	0 (0)	0.40 (0.40)	0 (0)	0.40 (0.40)	0.40 (0.40)	0.20 (0.20)	16 (3.5)	100 (6.5)	170 (31)	63 (34)
Unidentified filter feeder	Unidentified filter feeder	6.4 (2.0)	13 (3.4)	27 (4.9)	11 (2.4)	7.0 (1.0)	16 (1.8)	22 (2.3)	12 (2.4)	4.0 (3.0)	0.50 (0.50)	8.5 (1.5)	7.5 (2.5)
Fishes													
Aracana spp.	Cowfish	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Parapercis haackei	Wavy grubfish	0 (0)	0.80 (0.58)	0 (0)	0.20 (0.20)	0 (0)	0.40 (0.40)	0 (0)	0.60 (0.40)	3.5 (1.5)	2.0 (1.0)	0.50 (0.50)	0 (0)
Thamnaconus degeni	Degen's leatherjacket	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1.0 (1.0)	0 (0)	2.0 (2.0)

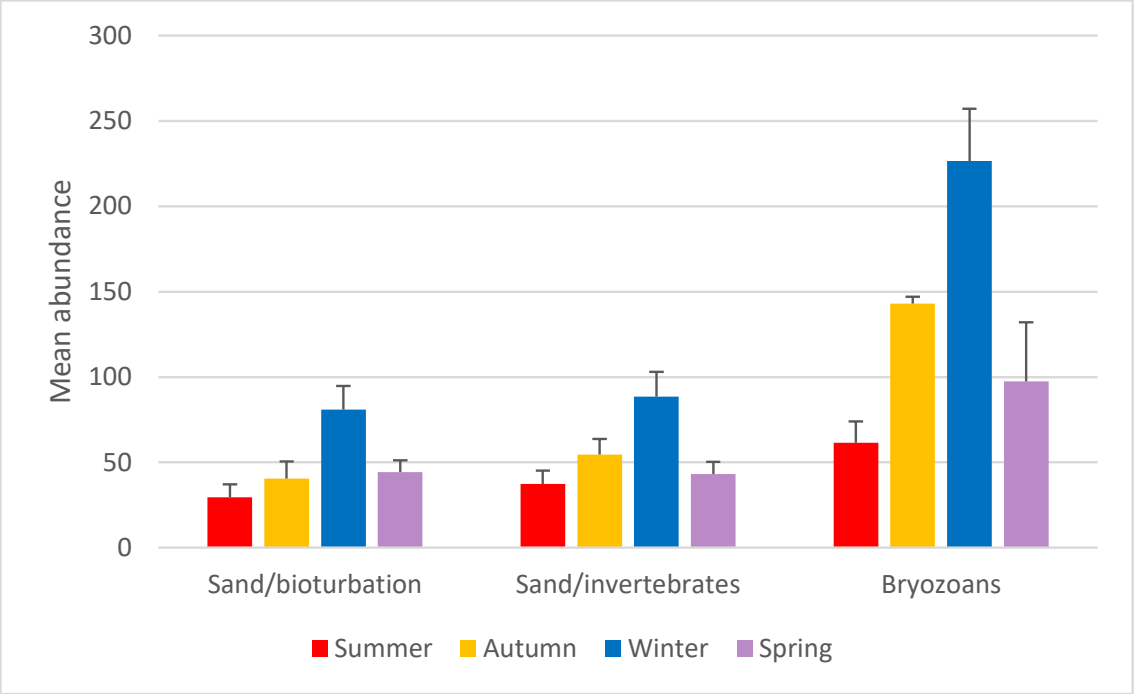


Figure 33. Mean total site abundance of epibenthic fauna recorded in deep water habitats during towed camera surveys across all seasons in 2025. Error bars show standard error of mean.

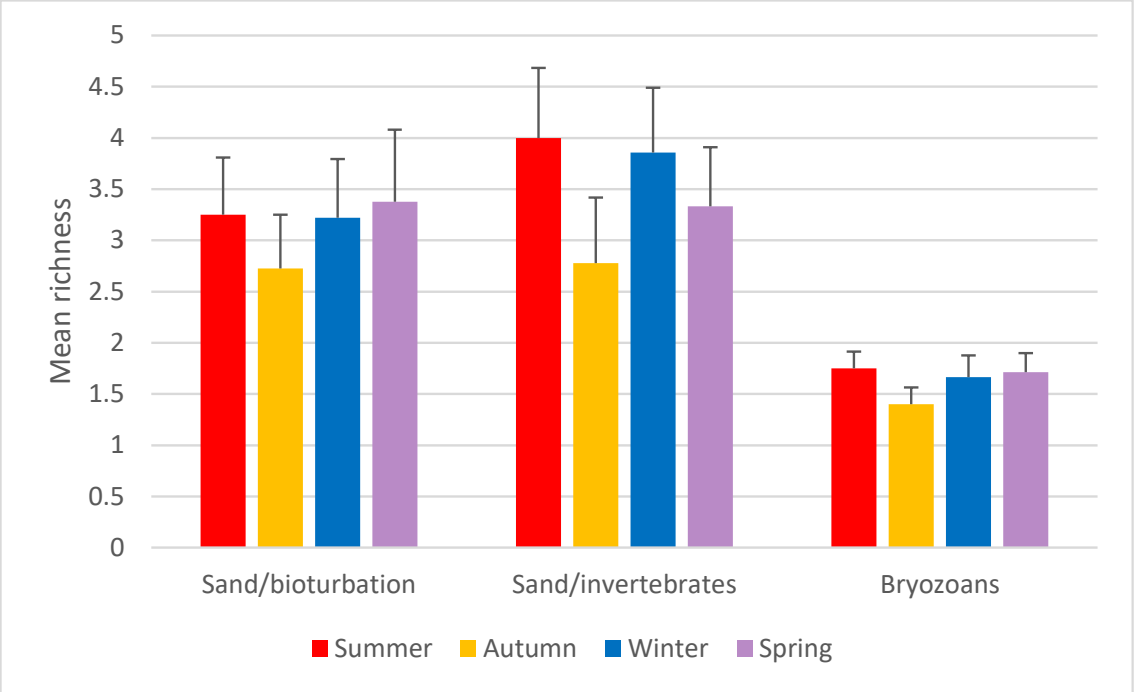


Figure 34. Mean site richness of epibenthic fauna recorded in deep water habitats during towed camera surveys across all seasons in 2025. Error bars show standard error of mean.

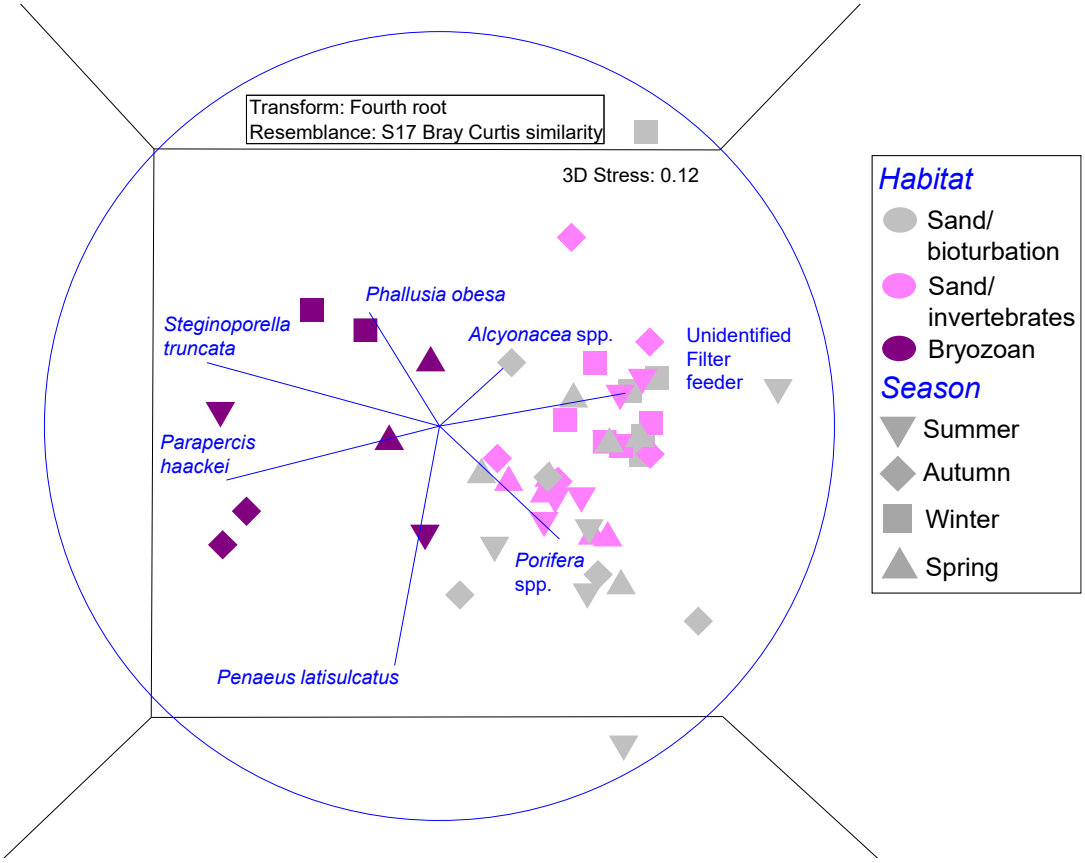


Figure 35. MDS plot representing the structure of epibenthic fauna communities recorded in deep water habitats during towed camera surveys across all seasons in 2025.

5.3 Baited remote underwater video (BRUV) surveys

A total of 9,347 individuals were recorded during BRUV surveys across all seasons of 2025, representing 32 taxa from three crustacean families, two mollusc families, 21 ray-finned fish families and six elasmobranch (shark and ray) families. Approximately 40% of these (4,027) were western striped trumpeter *Pelates octolineatus* (Plate 8), of which 3,010 were recorded during summer and 907 during spring. Other relatively abundant species were baitfish, Degen's leatherjacket *Thamnaconus degeni* (Plate 9), Toothbrush leatherjacket *Acanthaluteres vittiger* (Plate 10), and silver trevally *Pseudocaranx georgianus* (Plate 11) with 1,307, 798, 755 and 564 individuals, respectively. Mean site abundance for each taxon, habitat and season is provided in Table 8 and Table 9. Abundances for each site are provided in Appendix F.

Visibility in the deeper habitats (*Zostera*, Sand/bioturbation and Sand/invertebrates) was poor, particularly during summer, and was exacerbated by disturbance of silty sediment by fish approaching the bait basket.

Mean site abundances (as MaxN) were greatest in *Posidonia australis*, *Amphibolis*/*Posidonia* and *Posidonia sinuosa* habitats in summer, with MaxN values of about 340, 2,700 and 150, respectively (Figure 36). These high summer abundances were driven mainly by the abundance of western striped trumpeter (Table 8). Otherwise, mean sites abundance was generally less than 100 and was lowest in winter in Sand/bioturbation habitat, with a MaxN of less than 10. Mean site richness ranged from less than 4 in Sand/invertebrates habitat in winter to about 10 taxa in *Posidonia australis* and *P. sinuosa* habitat in autumn (Figure 37). There was no clear pattern of mean site richness across seagrass habitats or seasons (Figure 37).

An MDS plot of community structure shows (Figure 38):

- separation between the deeper habitats (*Zostera*, Sand/bioturbation and Sand/invertebrates) and the shallow seagrass habitats (*Posidonia australis, Posidonia sinuosa* and *Amphibolis/Posidonia*), except for four *Zostera* sites in winter which were more similar to the shallow seagrass sites
- partial separation (i.e. with some overlap) of the *Zostera* sites from the sand habitats, with the former correlated with the abundance of western striped trumpeter and the latter with Port Jackson shark *Heterodontus portusjacksoni*
- intermixing of samples among the Sand/invertebrates and Sand/bioturbation habitat samples, and among the shallow seagrass habitat samples
- separation of winter samples for all habitats, generally towards the top of the plot, from spring and summer samples, generally towards the bottom of the plot and correlated with western striped trumpeter and Australian herring *Arripis georgianus*
- separation of autumn samples from other seasons in shallow seagrass habitats.



Plate 8. Western striped trumpeter *Pelates octolineatus*



Plate 9. Degen's leatherjacket *Thamnaconus degeni*



Plate 10. Toothbrush leatherjacket *Acanthaluteres vittiger*



Plate 11. Silver trevally *Pseudocaranx georgianus*

Table 8. Mean site abundance (MaxN) of mobile epibenthic fauna taxa recorded in *Posidonia australis* and *Amphibolis/Posidonia* habitats during BRUV surveys across all seasons in 2025.

Species	Common name	Habitats/seasons							
		Posidonia australis				*Amphibolis/Posidonia*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Crustaceans									
Naxia aurita	Seagrass spider crab	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)
Nectocarcinus integrifrons	Red swimmer crab	0 (0)	0.40 (0.24)	0.40 (0.24)	0.20 (0.20)	0 (0)	0.40 (0.24)	1.0 (0)	0.40 (0.24)
Penaeus latisulcatus	Western king prawn	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Portunus armatus	Blue swimmer crab	1.4 (0.24)	0.80 (0.37)	0.60 (0.60)	0.40 (0.24)	2.4 (0.51)	1.8 (0.37)	0.40 (0.40)	2.2 (0.37)
Molluscs									
Octopus sp.	Octopus	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sepioteuthis australis	Southern calamari	0 (0)	2.0 (1.4)	0.40 (0.24)	0 (0)	0 (0)	0 (0)	2.2 (0.80)	0 (0)
Fishes									
Acanthaluteres brownii	Spiny tailed leatherjacket	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2.0 (2.0)	0 (0)
Acanthaluteres vittiger	Toothbrush leatherjacket	1.0 (0.45)	19 (15)	4.2 (3.0)	0 (0)	5.2 (1.6)	3.2 (1.9)	15 (11)	0.60 (0.40)
Aracana ornata	Ornate cowfish	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)
Arripis georgianus	Australian herring	2.8 (1.5)	1.2 (0.58)	0.40 (0.24)	3.8 (1.7)	8.2 (3.3)	0.20 (0.20)	0 (0)	5.0 (1.8)
Arripis truttacea	Western Australian salmon	0 (0)	0.80 (0.58)	8.2 (5.1)	0.80 (0.49)	0 (0)	0 (0)	0 (0)	0.20 (0.20)
Brachaluteres jacksonianus	Pygmy leatherjacket	0 (0)	0.20 (0.20)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)
Pagrus auratus	Snapper	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Eubalichthys mosaicus	Mosaic leatherjacket	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Haletta semifasciata	Blue weed whiting	1.2 (0.37)	1.4 (0.24)	2.6 (0.68)	1.6 (0.68)	1.0 (0.32)	1.2 (0.20)	11 (8.8)	1.0 (0.32)
Hyporhamphus melanochir	Southern sea garfish	1.0 (1.0)	0 (0)	0 (0)	0 (0)	1.2 (1.2)	0 (0)	0 (0)	0 (0)
Meuschenia freycineti	Six-spine leatherjacket	1.4 (0.51)	3.8 (0.49)	2.8 (0.58)	0 (0)	0.20 (0.20)	0.20 (0.20)	0.20 (0.20)	0 (0)
Paralichthyidae sp.	Flounder	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Parapercis haackei	Wavy grubfish	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Species	Common name	Habitats/seasons							
		Posidonia australis				*Amphibolis/Posidonia*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Parequula melbournensis	Silverbelly	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pelates octolineatus	Western striped trumpeter	320 (100)	17 (8.9)	0 (0)	48 (24)	120 (17)	0.20 (0.20)	0 (0)	50 (26)
Platycephalus speculator	Southern bluespotted flathead	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pseudocaranx georgianus	Silver trevally	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pseudophycis palmata	Red cod	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pseudorhombus jenynsii	Small-toothed flounder	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Scobinichthys granulatus	Rough leatherjacket	0.20 (0.20)	1.0 (0.45)	0.40 (0.40)	0 (0)	0.60 (0.40)	1.4 (0.24)	1.2 (0.37)	0.60 (0.60)
Sillaginodes punctatus	King George whiting	0.40 (0.40)	1.4 (0.51)	0 (0)	1.0 (0.45)	0.40 (0.40)	0.20 (0.20)	0.20 (0.20)	3.6 (2.2)
Siphamia cephalotes	Wood's siphonfish	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)	2.4 (2.4)	0.40 (0.24)
Siphonognathus attenuatus	Slender weed whiting	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Siphonognathus sp.	Weed whiting	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sphyraena novaehollandiae	Snook	0 (0)	0.60 (0.24)	0.60 (0.40)	0 (0)	1.6 (0.24)	1.2 (0.49)	8.8 (6.0)	1.8 (0.73)
Stigmatopora spp.	Pipefish	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)
Thamnaconus degeni	Degen's leatherjacket	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Tilodon sexfasciatus	Moonlighter	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)
Torquigener pleurogramma	Banded toadfish	3.8 (0.58)	1.2 (0.20)	0.60 (0.24)	2.2 (0.58)	3.6 (1.7)	2.8 (0.92)	1.2 (0.37)	1.6 (0.60)
Trachurus novaezelandiae	Yellow-tail scad	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Upeneichthys vlamingii	Southern goatfish	0 (0)	0.20 (0.20)	0 (0)	0 (0)	1.0 (0)	0.40 (0.24)	0 (0)	0.40 (0.24)
Unidentified baitfish	Unidentified baitfish	0 (0)	59 (59)	0 (0)	0 (0)	130 (59)	40 (40)	14 (14)	0 (0)
Unidentified fishes	Unidentified fishes	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)
Unidentified fish sp. 1	Silver fish with big eye	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Species	Common name	Habitats/seasons							
		Posidonia australis				*Amphibolis/Posidonia*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Elasmobranchs									
Bathytoshia brevicaudata	Smooth stingray	0.40 (0.24)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Heterodontus portusjacksoni	Port Jackson shark	0 (0)	0.40 (0.24)	0 (0)	0 (0)	0 (0)	0.60 (0.24)	0.80 (0.20)	0 (0)
Mustelus antarcticus	Gummy shark	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Myliobatis tenuicaudatus	Southern eagle ray	0 (0)	0 (0)	0.20 (0.20)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)
Trygonorrhina dumerilii	Southern fiddler ray	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)
Unidentified shark	Unidentified shark	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Table 9: Mean site abundance (MaxN) of mobile epibenthic fauna taxa recorded in *Posidonia sinuosa* and *Zostera* habitats during BRUV surveys across all seasons in 2025.

Species	Common name	Habitats/seasons							
		Posidonia sinuosa				*Zostera*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Crustaceans									
Naxia aurita	Seagrass spider crab	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Nectocarcinus integrifrons	Red swimmer crab	0 (0)	0.80 (0.37)	0.60 (0.24)	0.60 (0.24)	0 (0)	0 (0)	1.0 (0.32)	0.60 (0.24)
Penaeus latisulcatus	Western king prawn	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)
Portunus armatus	Blue swimmer crab	2.0 (0.45)	1.6 (0.24)	0.20 (0.20)	1.8 (0.20)	2.6 (0.24)	2.6 (0.24)	1.2 (0.20)	0.80 (0.20)
Molluscs									
Octopus sp.	Octopus	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sepioteuthis australis	Southern calamari	0.40 (0.24)	1.0 (0.63)	0.80 (0.49)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Fishes									
Acanthaluteres brownii	Spiny tailed leatherjacket	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)
Acanthaluteres vittiger	Toothbrush leatherjacket	8.4 (5.1)	43 (33)	42 (29)	0.40 (0.24)	0 (0)	0 (0)	9.0 (6.5)	0 (0)
Aracana ornata	Ornate cowfish	0 (0)	0 (0)	0 (0)	0.40 (0.24)	0.40 (0.24)	0.60 (0.24)	0.20 (0.20)	0 (0)
Arripis georgianus	Australian herring	8.2 (1.5)	5.6 (3.5)	0 (0)	4.0 (2.5)	0 (0)	0 (0)	0 (0)	0.40 (0.24)
Arripis truttacea	Western Australian salmon	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)
Brachaluteres jacksonianus	Pygmy leatherjacket	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)
Pagrus auratus	Snapper	0.20 (0.20)	0 (0)	0 (0)	0 (0)	1.6 (0.81)	4.8 (3.7)	0 (0)	3.8 (1.2)
Eubalichthys mosaicus	Mosaic leatherjacket	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Haletta semifasciata	Blue weed whiting	0.20 (0.20)	15 (9.7)	14 (4.6)	0.20 (0.20)	0 (0)	0 (0)	9.0 (4.9)	0.60 (0.24)
Hyporhamphus melanochir	Southern sea garfish	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Meuschenia freycineti	Six-spine leatherjacket	0 (0)	0.40 (0.24)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Paralichthyidae sp.	Flounder	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)
Parapercis haackei	Wavy grubfish	0 (0)	0 (0)	0 (0)	0 (0)	1.6 (0.81)	5.0 (1.1)	1.0 (0.63)	0.20 (0.20)

Species	Common name	Habitats/seasons							
		Posidonia sinuosa				*Zostera*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Parequula melbournensis	Silverbelly	0 (0)	0 (0)	0 (0)	0 (0)	0.80 (0.58)	2.6 (1.2)	12 (11)	2.0 (1.1)
Pelates octolineatus	Western striped trumpeter	120 (33)	1.6 (0.87)	0.20 (0.20)	45 (16)	33 (3.0)	1.4 (1.2)	0 (0)	37 (18)
Platycephalus speculator	Southern bluespotted flathead	0.20 (0.20)	0.20 (0.20)	0 (0)	0 (0)	0.20 (0.20)	0.60 (0.24)	0 (0)	0.80 (0.20)
Pseudocaranx georgianus	Silver trevally	0 (0)	0 (0)	0 (0)	0 (0)	32 (12)	46 (17)	7.8 (7.8)	0 (0)
Pseudophycis palmata	Red cod	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	1.0 (0.32)
Pseudorhombus jenynsii	Small-toothed flounder	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)
Scobinichthys granulatus	Rough leatherjacket	0.20 (0.20)	3.0 (0.71)	1.4 (0.51)	0.20 (0.20)	0 (0)	0.20 (0.20)	0.20 (0.20)	0 (0)
Sillaginodes punctatus	King George whiting	0 (0)	0.20 (0.20)	1.4 (1.4)	0.60 (0.24)	0 (0)	0 (0)	0 (0)	0.20 (0.20)
Siphamia cephalotes	Wood's siphonfish	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)
Siphonognathus attenuatus	Slender weed whiting	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.40 (0.24)	0 (0)
Siphonognathus sp.	Weed whiting	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sphyraena novaehollandiae	Snook	0 (0)	2.2 (0.80)	1.4 (0.51)	4.0 (1.5)	0 (0)	0 (0)	0 (0)	0 (0)
Stigmatopora spp.	Pipefish	0 (0)	0.20 (0.20)	0.40 (0.24)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Thamnaconus degeni	Degen's leatherjacket	0 (0)	0 (0)	0 (0)	0.40 (0.40)	0.20 (0.20)	4.6 (2.0)	0.20 (0.20)	0.40 (0.24)
Tilodon sexfasciatus	Moonlighter	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Torquigener pleurogramma	Banded toadfish	3.4 (1.5)	1.6 (0.24)	2.0 (0.71)	1.6 (0.60)	1.6 (0.68)	6.2 (2.9)	0.60 (0.40)	1.0 (0.55)
Trachurus novaezelandiae	Yellow-tail scad	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)
Upeneichthys vlamingii	Southern goatfish	0.20 (0.20)	0.80 (0.37)	1.2 (0.73)	0 (0)	0.20 (0.20)	0.20 (0.20)	0 (0)	1.0 (0.32)
Unidentified baitfish	Unidentified baitfish	0 (0)	13 (13)	9.4 (9.4)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Unidentified fishes	Unidentified fishes	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Unidentified fish sp. 1	Silver fish with big eye	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Species	Common name	Habitats/seasons							
		Posidonia sinuosa				*Zostera*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Elasmobranchs									
Bathytoshia brevicaudata	Smooth stingray	0 (0)	0 (0)	0 (0)	0 (0)	0.60 (0.24)	0.40 (0.24)	0.20 (0.20)	0 (0)
Heterodontus portusjacksoni	Port Jackson shark	0 (0)	1.4 (0.40)	0.60 (0.24)	0.20 (0.20)	1.4 (0.40)	1.0 (0.32)	0.80 (0.37)	0 (0)
Mustelus antarcticus	Gummy shark	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Myliobatis tenuicaudatus	Southern eagle ray	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Trygonorrhina dumerilii	Southern fiddler ray	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)
Unidentified shark	Unidentified shark	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Table 10: Mean site abundance (MaxN) of mobile epibenthic fauna taxa recorded in Sand/bioturbation and Sand/ invertebrate habitats during BRUV surveys across all seasons in 2025.

Species	Common name	Habitats/seasons							
		Posidonia australis				*Amphibolis/Posidonia*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Crustaceans									
Naxia aurita	Seagrass spider crab	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Nectocarcinus integrifrons	Red swimmer crab	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Penaeus latisulcatus	Western king prawn	0.80 (0.20)	0.60 (0.24)	0 (0)	1.0 (0.45)	1.2 (0.49)	1.4 (0.40)	0 (0)	0.40 (0.24)
Portunus armatus	Blue swimmer crab	2.4 (0.40)	1.8 (0.37)	0.20 (0.20)	1.6 (0.24)	2.4 (0.40)	2.0 (0.32)	0 (0)	2.0 (0.32)
Molluscs									
Octopus sp.	Octopus	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sepioteuthis australis	Southern calamari	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Fishes									
Acanthaluteres brownii	Spiny tailed leatherjacket	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Acanthaluteres vittiger	Toothbrush leatherjacket	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Aracana ornata	Ornate cowfish	0 (0)	0.20 (0.20)	0.40 (0.24)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)
Arripis georgianus	Australian herring	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1.2 (1.2)	0 (0)	0 (0)
Arripis truttacea	Western Australian salmon	0.60 (0.60)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Brachaluteres jacksonianus	Pygmy leatherjacket	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pagrus auratus	Snapper	2.4 (0.51)	2.8 (0.97)	0 (0)	0.60 (0.60)	2.4 (0.75)	2.0 (0.84)	0 (0)	0.20 (0.20)
Eubalichthys mosaicus	Mosaic leatherjacket	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)
Haletta semifasciata	Blue weed whiting	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Hyporhamphus melanochir	Southern sea garfish	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Meuschenia freycineti	Six-spine leatherjacket	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Paralichthyidae sp.	Flounder	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Parapercis haackei	Wavy grubfish	2.8 (0.37)	3.4 (0.75)	0.40 (0.24)	2.2 (0.66)	2.4 (0.24)	3.6 (0.75)	1.2 (0.37)	2.0 (0.32)

Species	Common name	Habitats/seasons							
		Posidonia australis				*Amphibolis/Posidonia*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Parequula melbournensis	Silverbelly	0 (0)	0.40 (0.24)	0 (0)	0.20 (0.20)	0.20 (0.20)	0.20 (0.20)	0 (0)	0 (0)
Pelates octolineatus	Western striped trumpeter	3.2 (1.2)	0.60 (0.60)	0.20 (0.20)	0.20 (0.20)	1.4 (1.4)	1.0 (0.63)	0 (0)	1.0 (0.63)
Platycephalus speculator	Southern bluespotted flathead	0.40 (0.40)	0.80 (0.20)	1.2 (0.37)	1.4 (0.24)	0.20 (0.20)	1.4 (0.40)	0.40 (0.24)	0.80 (0.37)
Pseudocaranx georgianus	Silver trevally	7.0 (0.84)	0.60 (0.40)	0 (0)	5.2 (2.8)	6.0 (3.3)	2.4 (1.5)	5.4 (3.3)	0.60 (0.40)
Pseudophycis palmata	Red cod	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pseudorhombus jenynsii	Small-toothed flounder	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Scobinichthys granulatus	Rough leatherjacket	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sillaginodes punctatus	King George whiting	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Siphamia cephalotes	Wood's siphonfish	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Siphonognathus attenuatus	Slender weed whiting	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Siphonognathus sp.	Weed whiting	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0 (0)
Sphyraena novaehollandiae	Snook	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Stigmatopora spp.	Pipefish	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Thamnaconus degeni	Degen's leatherjacket	15 (6.4)	48 (18)	0.60 (0.60)	8.4 (3.6)	17 (4.2)	52 (12)	1.4 (0.60)	11 (0.68)
Tilodon sexfasciatus	Moonlighter	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Torquigener pleurogramma	Banded toadfish	0 (0)	0.40 (0.24)	0.80 (0.37)	0.60 (0.40)	0 (0)	0.20 (0.20)	0.20 (0.20)	0.80 (0.37)
Trachurus novaezelandiae	Yellow-tail scad	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)
Upeneichthys vlamingii	Southern goatfish	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Unidentified baitfish	Unidentified baitfish	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Unidentified fishes	Unidentified fishes	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Unidentified fish sp. 1	Silver fish with big eye	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)

Species	Common name	Habitats/seasons							
		Posidonia australis				*Amphibolis/Posidonia*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Elasmobranchs									
Bathytoshia brevicaudata	Smooth stingray	0.60 (0.24)	0 (0)	0 (0)	0.20 (0.20)	0.40 (0.24)	0.20 (0.20)	0.20 (0.20)	0.20 (0.20)
Heterodontus portusjacksoni	Port Jackson shark	1.8 (0.20)	2.0 (0.45)	1.6 (0.24)	0.40 (0.24)	2.4 (0.24)	2.6 (0.68)	2.0 (0)	1.0 (0.77)
Mustelus antarcticus	Gummy shark	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)
Myliobatis tenuicaudatus	Southern eagle ray	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Trygonorrhina dumerilii	Southern fiddler ray	0.20 (0.20)	1.0 (0.32)	0.20 (0.20)	0 (0)	0.60 (0.24)	0.40 (0.24)	0 (0)	0 (0)
Unidentified shark	Unidentified shark	0.20 (0.20)	0 (0)	0 (0)	0 (0)	0.20 (0.20)	0 (0)	0 (0)	0 (0)

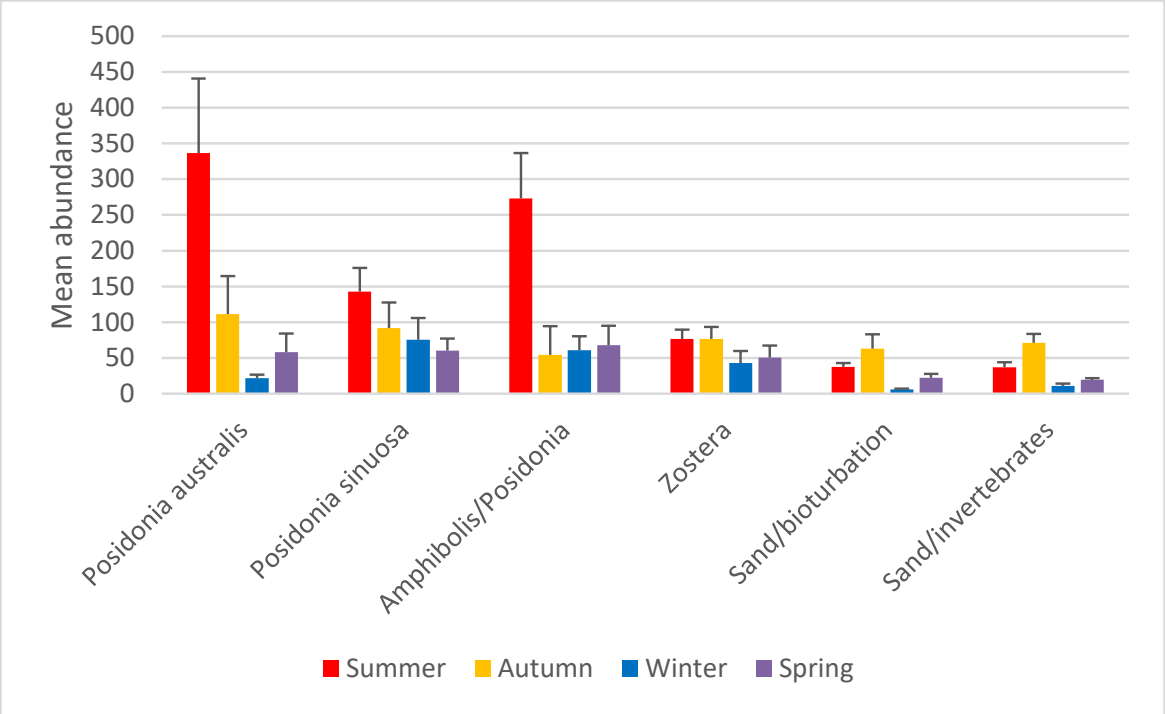


Figure 36. Mean total site abundance (MaxN) of mobile epibenthic fauna taxa recorded in all habitats during BRUV surveys across all seasons in 2025. Error bars show standard error of mean.

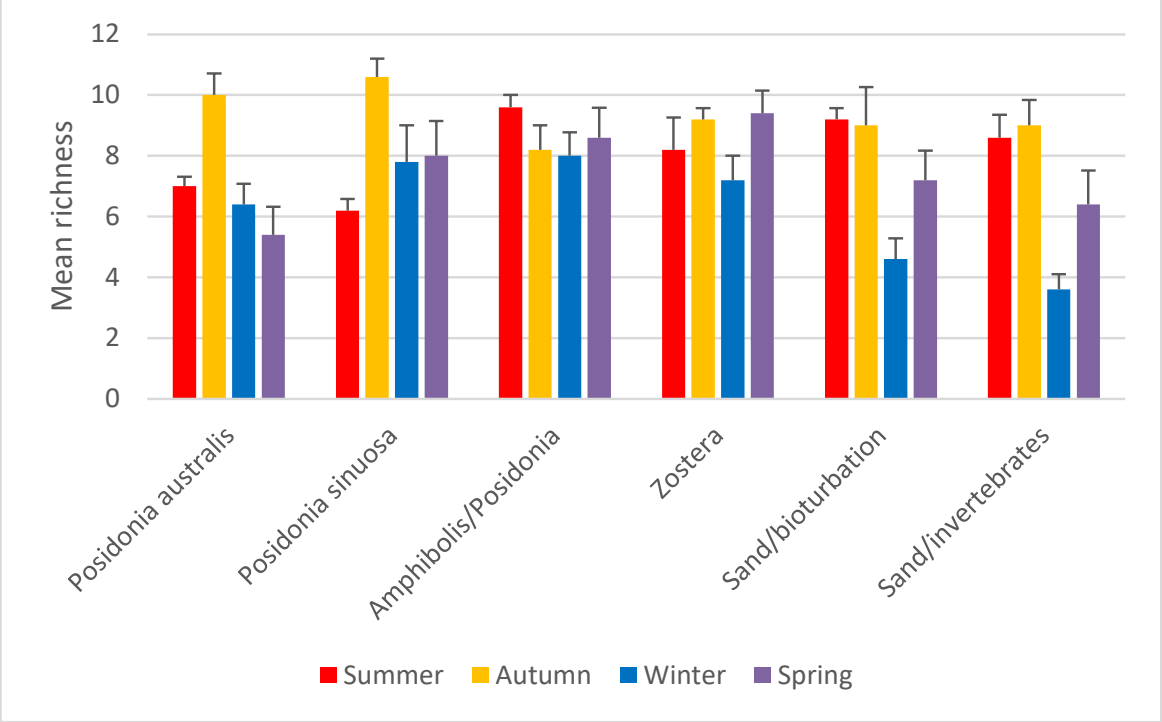


Figure 37. Mean site richness of mobile epibenthic fauna taxa recorded in all habitats during BRUV surveys across all seasons in 2025. Error bars show standard error of mean.

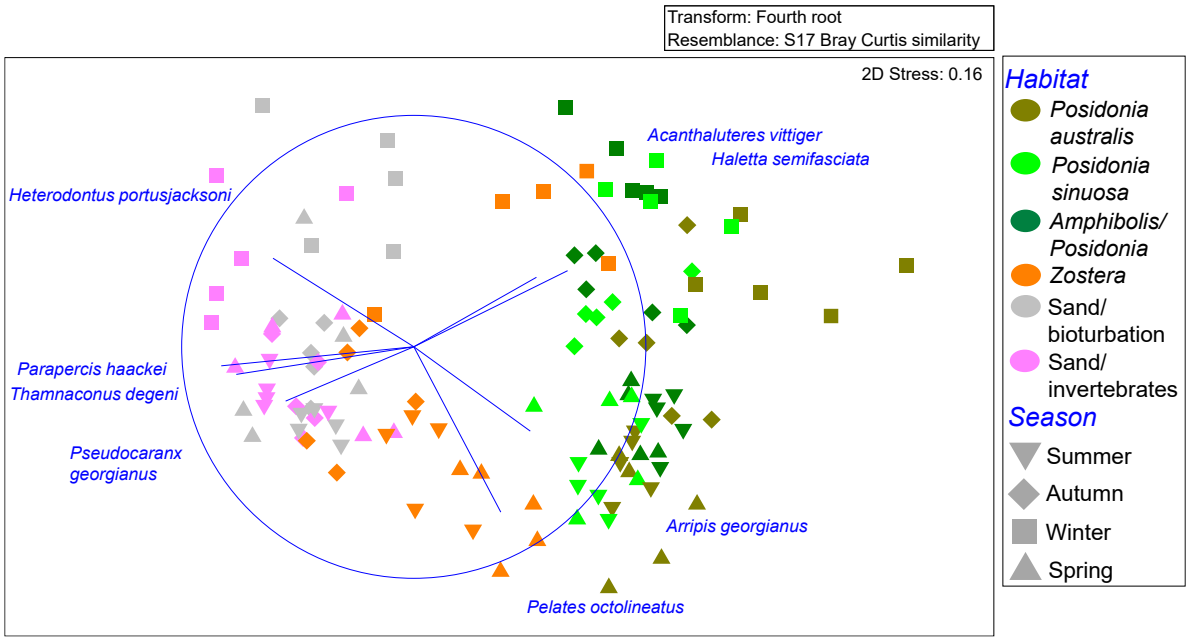


Figure 38. MDS plot representing structure of communities recorded in all habitats during BRUV surveys across all seasons in 2025.

6. Infauna

6.1 Macrofauna

A total of 6,232 individuals from 168 taxa (ranging from phylum to species) were recorded across all habitats during the summer, autumn, winter and spring macrofauna surveys, with 25% of this total recorded in spring. Crustaceans and Annelids (segmented worms) each comprised more than a third of this total, with 2,820 and 1,997 individuals, respectively, and Molluscs were also relatively abundant, with 1,039 individuals.

At the lowest taxonomic level, the most abundant taxa were the crustaceans Apseudidae sp. 1 (Plate 12), Melitidae sp. 1 (Plate 13) and Phoxocephalidae-sp. 1 (Plate 14), and the segmented worms Nereididae sp. 1 (Plate 15) and *Capitella* sp. 1 (Plate 16). Mean site abundance for each taxon, habitat and season is provided in Table 11, Table 12 and Table 13. Abundances for each sample are provided in Appendix D.

Mean site abundance was greatest in the *Amphibolis*/*Posidonia* habitat in summer, winter and spring, *Zostera* habitat in summer and *Posidonia australis* in autumn, with about 17–20 individuals (Figure 39). Mean site abundance was below 10 for all seasons at the *Posidonia sinuosa,* Sand/bioturbation and Sand/invertebrates habitats (Figure 39). Taxonomic richness was greatest in *Amphibolis*/*Posidonia* habitat in summer, winter and spring and *Zostera* habitat in summer with 10–12 taxa and was lowest at the Sand/bioturbation and Sand/invertebrates habitats with <5 taxa for all seasons (Figure 40). Mean richness was lowest in autumn for all habitats except for *Posidonia australis*, which was lowest in summer (Figure 40).

An MDS plot based on individual replicates is not presented here because both the 2- and 3-dimensional MDS plots had high stress values (>0.3), indicating that they did not reliably represent the underlying data (Clarke & Warwick 2001).

An MDS plot of community structure based on replicate averages showed separation between deep and shallow habitats, positioned on the left and right sides of the plot, respectively (Figure 41). Within the deep habitats, there was partial separation (i.e. with some overlap) between *Zostera* habitat and the deeper sand habitats (Sand/bioturbation and Sand/invertebrates), which were correlated more strongly with Nereididae sp. 1 and *Goniada* sp. 1. Among the shallow seagrass habitats, there was partial separation between *Posidonia australis*, *Amphibolis*/*Posidonia* and *Posidonia sinuosa* habitats, of which the former was most strongly correlated with the most common taxa Apseudidae sp. 1, Melitidae sp. 1 and Phoxocephalidae sp. 1 (Figure 41).

In the deep sand habitats, summer and spring samples showed some separation from the other seasons but no consistent seasonal pattern was evident within the remaining habitats (Figure 41).



Plate 12. Apseudidae-sp. 1. Source: Benthic Australia.



Plate 13. Melitidae-sp. 1. Source: Benthic Australia.



Plate 14. Phoxocephalidae sp. 1. Source: Benthic Australia.



Plate 15. Nereididae sp. 1. Source: Benthic Australia.



Plate 16. *Capitella* sp. 1. Source: Benthic Australia.

Table 11. Mean site abundance of taxa recorded in *Posidonia* seagrass habitats during macrofauna surveys across all seasons in 2025. Brackets contain standard error of mean.

Family/higher taxon	Taxon	Habitats/seasons							
		Posidonia australis				*Posidonia sinuosa*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Porifera	Porifera	0 (0)	0.080 (0.049)	0.080 (0.049)	0.16 (0.075)	0 (0)	0 (0)	0 (0)	0 (0)
Cnidaria									
Actiniaria	Actiniaria sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Actiniaria	Actiniaria sp. 2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Hexacorallia	*Hexacorallia* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Nemertea	Nemertea	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0.040 (0.040)	0 (0)	0.080 (0.080)	0.040 (0.040)
Nematoda	Nematoda	0 (0)	0 (0)	0.080 (0.049)	0.040 (0.040)	0.12 (0.080)	0.040 (0.040)	0.16 (0.12)	0.040 (0.040)
Annelida									
Amphinomidae	Amphinomidae	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Aphroditidae	*Pontogenia* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0.080 (0.049)	0 (0)
Capitellidae	*Capitella* sp. 1	0.040 (0.040)	0.44 (0.21)	0.24 (0.19)	0.16 (0.075)	0.40 (0.11)	0.20 (0.063)	0.080 (0.080)	0.040 (0.040)
Capitellidae	*Notomastus* sp. 1	0 (0)	0.040 (0.040)	0.24 (0.16)	0 (0)	0 (0)	0.32 (0.10)	0.16 (0.040)	0.040 (0.040)
Chrysopetalidae	Chrysopetalidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Cirratulidae	Cirratulidae sp. 1	0 (0)	0.040 (0.040)	0.080 (0.080)	0.080 (0.049)	0 (0)	0.040 (0.040)	0.040 (0.040)	0 (0)
Cirratulidae	Cirratulidae sp. 2	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)
Dorvilleidae	Dorvilleidae sp. 1	0.20 (0.20)	0.24 (0.12)	0.16 (0.12)	0.16 (0.075)	0.20 (0.089)	0.080 (0.080)	0.16 (0.16)	0.16 (0.075)
Eunicidae	*Eunice* sp. 1	0.080 (0.080)	0 (0)	0.040 (0.040)	0 (0)	0.16 (0.075)	0.080 (0.080)	0.32 (0.10)	0.16 (0.075)
Eunicidae	*Lysidice unicornis*	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0.16 (0.075)	0.040 (0.040)	0.20 (0.089)	0.080 (0.080)
Eunicidae	*Marphysa* sp. 1	0 (0)	0.040 (0.040)	0 (0)	0.040 (0.040)	0.040 (0.040)	0.12 (0.049)	0 (0)	0 (0)
Flabelligeridae	*Pherusa* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0.040 (0.040)
Glyceridae	*Glycera* sp. 1	0 (0)	0.040 (0.040)	0 (0)	0.040 (0.040)	0 (0)	0.12 (0.049)	0 (0)	0 (0)
Goniadidae	*Goniada* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Hesionidae	Hesionidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Family/higher taxon	Taxon	Habitats/seasons							
		Posidonia australis				*Posidonia sinuosa*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Lumbrineridae	*Lumbrineris* sp. 1	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0.16 (0.040)	0.040 (0.040)	0.12 (0.049)	0.28 (0.15)
Magelonidae	*Magelona* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)
Maldanidae	*Axiothella* sp. 1	0.040 (0.040)	0 (0)	0.080 (0.049)	0.080 (0.049)	0 (0)	0 (0)	0.040 (0.040)	0 (0)
Nephtyidae	*Aglaophamus* sp. 1	0.080 (0.049)	0.080 (0.080)	0.24 (0.075)	0.040 (0.040)	0.12 (0.080)	0.56 (0.38)	0.12 (0.080)	0.28 (0.20)
Nereididae	Nereididae sp. 1	0.080 (0.080)	0.040 (0.040)	0.16 (0.075)	0.36 (0.15)	0.080 (0.080)	0.040 (0.040)	0.040 (0.040)	0.16 (0.075)
Nereididae	Nereididae sp. 2	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)
Oenonidae	*Arabella longipedata*	0 (0)	0 (0)	0 (0)	0 (0)	0.080 (0.049)	0 (0)	0.040 (0.040)	0 (0)
Onuphidae	*Diopatra* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)
Onuphidae	*Rhamphobrachium* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)
Opheliidae	*Armandia* sp. 1	0.36 (0.15)	0.44 (0.12)	0.40 (0.30)	0.60 (0.23)	0.040 (0.040)	0 (0)	0.080 (0.049)	0.040 (0.040)
Orbiniidae	Orbiniidae sp. 1	0.12 (0.080)	0 (0)	0.080 (0.080)	0.080 (0.080)	0 (0)	0 (0)	0.040 (0.040)	0 (0)
Paraonidae	*Aricidea* sp. 1	0.16 (0.075)	0.32 (0.14)	0.080 (0.080)	0.28 (0.17)	0.24 (0.16)	0.28 (0.12)	0.44 (0.12)	0.36 (0.22)
Phyllodocidae	Phyllodocidae sp. 1	0 (0)	0.040 (0.040)	0.080 (0.080)	0.040 (0.040)	0.12 (0.080)	0.040 (0.040)	0 (0)	0 (0)
Poecilochaetidae	*Poecilochaetus serpens*	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Polynoidae	Polynoidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.15)	0 (0)	0 (0)
Sabellidae	Sabellidae sp. 1	0 (0)	0 (0)	0.080 (0.080)	0 (0)	0.040 (0.040)	0.040 (0.040)	0 (0)	0 (0)
Sigalionidae	*Pholoides mendeleevi*	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)
Sigalionidae	Sigalionidae sp. 1	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0.12 (0.049)	0 (0)	0.040 (0.040)	0.080 (0.080)
Sphaerodoridae	*Sphaerodoropsis heteropapillata*	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Spionidae	Spionidae sp. 1	0 (0)	0.20 (0.15)	0.16 (0.12)	0.040 (0.040)	0.080 (0.049)	0.080 (0.049)	0.080 (0.049)	0 (0)
Spionidae	Spionidae sp. 2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Syllidae	Syllidae sp. 1	0.080 (0.049)	0.24 (0.12)	0.28 (0.14)	0.12 (0.080)	0.20 (0.063)	0.080 (0.049)	0.16 (0.075)	0.040 (0.040)
Syllidae	Syllidae sp. 2	0.040 (0.040)	0.040 (0.040)	0.080 (0.080)	0.12 (0.080)	0.040 (0.040)	0.040 (0.040)	0.28 (0.12)	0.040 (0.040)
Syllidae	Syllidae sp. 3	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)
Syllidae	Syllidae sp. 4	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)
Terebellidae	Terebellidae sp. 1	0.040 (0.040)	0.080 (0.049)	0.040 (0.040)	0.080 (0.049)	0.040 (0.040)	0 (0)	0 (0)	0 (0)

Family/higher taxon	Taxon	Habitats/seasons							
		Posidonia australis				*Posidonia sinuosa*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Trichobranchidae	Trichobranchidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Echuira	Echuira	0 (0)	0 (0)	0 (0)	0 (0)	0.080 (0.049)	0 (0)	0.080 (0.080)	0 (0)
Sipuncula	Sipuncula	0.080 (0.049)	0.040 (0.040)	0 (0)	0 (0)	0.20 (0.089)	0.080 (0.049)	0.12 (0.049)	0.20 (0.063)
Crustacea									
Alpheidae	*Alpheus* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ampeliscidae	Ampeliscidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0.12 (0.080)	0 (0)	0.040 (0.040)
Anthuridea	Anthuridea sp. 1	0.32 (0.19)	0.40 (0.25)	0.24 (0.12)	0.16 (0.075)	0.32 (0.21)	0.080 (0.049)	0.12 (0.080)	0.040 (0.040)
Aoridae	Aoridae sp. 1	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0.040 (0.040)	0.080 (0.049)	0 (0)
Apseudidae	Apseudidae sp. 1	1.2 (0.53)	2.8 (2.1)	2.6 (1.8)	3.6 (2.5)	1.2 (0.47)	0.68 (0.29)	0.64 (0.19)	0.32 (0.12)
Arcturidae	Arcturidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Atyidae	Atyidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Bodotriidae	Bodotriidae sp. 1	0 (0)	0.20 (0.089)	0 (0)	0.080 (0.049)	0 (0)	0.040 (0.040)	0.040 (0.040)	0.040 (0.040)
Callianassidae	Callianassidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0.040 (0.040)
Caprellidae	Caprellidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Caridea	Caridea damaged	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ceinidae	c.f.Ceinidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ceratocumatidae	Ceratocumatidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)
Cirolanidae	Cirolanidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Copepoda	Copepoda	0 (0)	0 (0)	0 (0)	0 (0)	0.080 (0.049)	0.040 (0.040)	0.12 (0.12)	0 (0)
Corophiidae	Corophiidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)
Crustacea	Crustacea sp. 1	0 (0)	0.12 (0.12)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Cyproideidae	Cyproideidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Dexaminidae	Dexaminidae sp. 1	0 (0)	0.12 (0.080)	0.36 (0.22)	0.24 (0.075)	0.080 (0.049)	0.040 (0.040)	0.20 (0.063)	0.040 (0.040)
Diogenidae	Diogenidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Gnathiidae	Gnathiidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0.080 (0.049)
Grapsidae	Grapsidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)

Family/higher taxon	Taxon	Habitats/seasons							
		Posidonia australis				*Posidonia sinuosa*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Gynodiastylidae	Gynodiastylidae sp. 1	0 (0)	0.20 (0.15)	0.040 (0.040)	0 (0)	0.040 (0.040)	0.080 (0.049)	0.040 (0.040)	0.16 (0.12)
Hymenosomatidae	Hymenosomatidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ischyroceridae	Ischyroceridae sp. 1	0.040 (0.040)	0.16 (0.12)	0.12 (0.080)	0.32 (0.15)	0.32 (0.14)	0.040 (0.040)	0.24 (0.12)	0.60 (0.20)
Isopoda	Isopoda sp. 1	0.040 (0.040)	0.080 (0.080)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Joeropsididae	Joeropsididae sp. 1	0.040 (0.040)	1.1 (0.79)	0.52 (0.38)	0.28 (0.10)	0.24 (0.075)	0.16 (0.075)	0 (0)	0.040 (0.040)
Leptostraca	Leptostraca sp. 1	0.040 (0.040)	0 (0)	0.040 (0.040)	0 (0)	0.040 (0.040)	0.040 (0.040)	0.16 (0.12)	0.040 (0.040)
Leucosiidae	Cryptocnemus sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Leucothoidae	Leucothoidae sp. 1	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0.080 (0.049)
Liljeborgiidae	Liljeborgiidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Limnoriidae	Limnoriidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Lysianassidae	Lysianassidae sp. 1	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)
Maeridae	Maeridae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Melitidae	Melitidae sp. 1	0.20 (0.15)	2.3 (1.2)	1.0 (0.43)	1.2 (0.54)	0.68 (0.29)	0.080 (0.049)	0.16 (0.098)	0.64 (0.54)
Munnidae	Munnidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Mysidae	Mysidae sp. 1	0.040 (0.040)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ochlesidae	Ochlesidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ocypodidae	Ocypodidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)
Ostracoda	Ostracoda sp. 1	0.48 (0.38)	1.6 (0.65)	2.0 (0.62)	0.84 (0.26)	0.16 (0.075)	0.12 (0.049)	0.080 (0.080)	0 (0)
Ostracoda	Ostracoda sp. 2	1.3 (0.40)	1.3 (0.30)	0.60 (0.19)	0.76 (0.47)	0.40 (0.23)	0.040 (0.040)	0 (0)	0.12 (0.049)
Ostracoda	Ostracoda sp. 3	0 (0)	0.080 (0.049)	0 (0)	0 (0)	0.32 (0.19)	0.12 (0.080)	0 (0)	0.040 (0.040)
Ostracoda	Ostracoda sp. 4	0 (0)	0.080 (0.080)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Oxycephalidae	Oxycephalidae sp. 1	0 (0)	0.080 (0.049)	0 (0)	0 (0)	0.12 (0.080)	0.080 (0.080)	0 (0)	0.040 (0.040)
Penaeidae	Penaeidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Phoxocephalidae	Phoxocephalidae sp. 1	1.1 (0.26)	1.7 (0.32)	0.88 (0.17)	2.1 (0.24)	0.32 (0.19)	0.60 (0.17)	0.28 (0.10)	0.24 (0.075)
Pilumnidae	Pilumnidae sp. 1	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Platyischnopidae	Platyischnopidae sp. 1	0 (0)	0.040 (0.040)	0.040 (0.040)	0.12 (0.12)	0 (0)	0 (0)	0 (0)	0.040 (0.040)

Family/higher taxon	Taxon	Habitats/seasons							
		Posidonia australis				*Posidonia sinuosa*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Podoceridae	Podoceridae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Portunidae	Portunidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pseudozeuxidae	Pseudozeuxidae sp. 1	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0.20 (0.089)	0.040 (0.040)	0.080 (0.049)	0.12 (0.080)
Pseudozeuxidae	Pseudozeuxidae sp. 2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pycnogonida	Pycnogonida sp. 1	0.040 (0.040)	0.040 (0.040)	0.080 (0.049)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0.040 (0.040)
Sphaeromatidae	*Chitonopsis* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)
Sphaeromatidae	Sphaeromatidae sp. 1	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sphaeromatidae	Sphaeromatidae sp. 2	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0.080 (0.049)	0 (0)	0 (0)	0 (0)
Sphaeromatidae	Sphaeromatidae sp. 3	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Squillidae	*Belosquilla* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Tanaididae	Tanaididae sp. 1	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0.080 (0.080)	0 (0)	0 (0)	0 (0)
Zobrachoidae	Zobrachoidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
c.f.Hologna thidae	c.f.Hologna thidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Mollusca									
Anatomidae	Anatomidae sp. 1	0 (0)	0 (0)	0 (0)	0.080 (0.080)	0 (0)	0 (0)	0 (0)	0.080 (0.080)
Aplysiidae	Aplysiidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)
Architectonicidae	Architectonicidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)
Cerithiidae	Cerithiidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Corbulidae	*Corbula* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Cuspidariidae	Cuspidariidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Cylichnidae	Cylichnidae sp. 1	0.040 (0.040)	0.080 (0.080)	0.080 (0.049)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)
Eulimidae	Eulimidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)
Gastropoda	Gastropoda juv	0 (0)	0.080 (0.080)	0.12 (0.12)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)
Glycymerididae	*Glycymeris* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)
Hiatellidae	*Hiatella* sp. 1	0 (0)	0.040 (0.040)	0 (0)	0.040 (0.040)	0.080 (0.049)	0.040 (0.040)	0.080 (0.049)	0 (0)
Lasaeidae	*Curvemysella paula*	0 (0)	0 (0)	0 (0)	0.080 (0.080)	0 (0)	0 (0)	0 (0)	0 (0)

Family/higher taxon	Taxon	Habitats/seasons							
		Posidonia australis				*Posidonia sinuosa*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Limidae	Limidae sp. 1	0 (0)	0.080 (0.049)	0 (0)	0.040 (0.040)	0.040 (0.040)	0.20 (0.11)	0.080 (0.080)	0.080 (0.080)
Lucinidae	Lucinidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Mactridae	*Mactra* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)
Mactridae	*Mactra* sp. 2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.080 (0.080)	0 (0)	0 (0)
Myochamidae	*Myochama* sp. 1	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Mytillidae	*Modiolus* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.12 (0.049)	0.040 (0.040)	0.080 (0.049)
Mytillidae	*Modiolus* sp. 2	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0.36 (0.13)	0 (0)	0 (0)	0.080 (0.080)
Mytillidae	*Musculus coenobitus*	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0.080 (0.049)	0 (0)
Mytillidae	*Musculus* sp. 1	0 (0)	0 (0)	0.040 (0.040)	0.040 (0.040)	0.12 (0.080)	0 (0)	0.12 (0.12)	0.040 (0.040)
Nassaridae	*Nassarius* sp. 1	0.040 (0.040)	0.040 (0.040)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)
Naticidae	*Natica* sp. 1	0 (0)	0.040 (0.040)	0.12 (0.080)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)
Naticidae	*Natica* sp. 2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Nuculanidae	*Saccella darwini*	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Nuculidae	*Ennucula* sp. 1	0 (0)	0.040 (0.040)	0.12 (0.049)	0.12 (0.080)	0 (0)	0 (0)	0.040 (0.040)	0.040 (0.040)
Olividae	*Phenacovolva* sp. 1	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)
Ostreidae	Ostreidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Patellidae	Patellidae sp. 1	0.040 (0.040)	0.040 (0.040)	0.040 (0.040)	0 (0)	0.080 (0.049)	0 (0)	0.080 (0.080)	0.20 (0.089)
Pleurotomariidae	Pleurotomariidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)
Polyplacophora	Polyplacophora sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0.16 (0.075)	0.40 (0.14)	0.12 (0.049)
Polyplacophora	Polyplacophora sp. 2	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)
Pteriidae	*Pteria* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Rissoidae	Rissoidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Solemyidae	*Solemya australis*	0.20 (0.11)	0.12 (0.12)	0.28 (0.20)	0.20 (0.089)	0.20 (0.11)	0.16 (0.098)	0.080 (0.049)	0.080 (0.049)
Tellinidae	*Tellina* sp. 1	0 (0)	0 (0)	0.040 (0.040)	0.080 (0.049)	0 (0)	0 (0)	0.040 (0.040)	0.12 (0.080)
Tellinidae	*Tellina* sp. 2	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0.040 (0.040)	0 (0)	0.040 (0.040)	0 (0)
Tellinidae	*Tellina* sp. 3	0.040 (0.040)	0 (0)	0 (0)	0.080 (0.080)	0.040 (0.040)	0.040 (0.040)	0 (0)	0 (0)

Family/higher taxon	Taxon	Habitats/seasons							
		Posidonia australis				*Posidonia sinuosa*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Tellinidae	*Tellina* sp. 4	0.080 (0.049)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Trochidae	Trochidae sp. 1	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Veneridae	*Antigona* sp. 1	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0.040 (0.040)
Veneridae	*Circe* sp. 1	0.20 (0.15)	0.080 (0.080)	0.080 (0.049)	0.12 (0.049)	0.28 (0.12)	0.040 (0.040)	0.040 (0.040)	0 (0)
Veneridae	*Dosinia* sp. 1	0.080 (0.049)	0 (0)	0 (0)	0.080 (0.080)	0.32 (0.049)	0.12 (0.049)	0.20 (0.11)	0.080 (0.049)
Veneridae	*Dosinia* sp. 2	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0.080 (0.049)
Veneridae	*Dosinia* sp. 3	0 (0)	0 (0)	0 (0)	0 (0)	0.080 (0.080)	0 (0)	0 (0)	0 (0)
Veneridae	*Paphia* sp. 1	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Veneridae	Veneridae juv	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Vulsellidae	*Electroma* sp. 1	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Bryozoa									
Bryozoa	Bryozoa fan	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Echinodermata									
Asteroidea	Asteroidea sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)
Echinoidea	Echinoidea juvenile	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)
Holothuroidea	Holothuroidea sp. 1	0 (0)	0 (0)	0 (0)	0.12 (0.080)	0 (0)	0 (0)	0 (0)	0 (0)
Holothuroidea	Holothuroidea sp. 2	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)
Holothuroidea	Holothuroidea sp. 3	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ophiuroidea	Ophiuroidea sp. 1	0.40 (0.28)	0.76 (0.42)	0.92 (0.53)	0.52 (0.17)	0.44 (0.12)	0.40 (0.17)	0.36 (0.18)	0.32 (0.14)
Toxopneustidae	Toxopneustidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)
Chordata									
Ascidiacea	Ascidiacea sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Table 12. Mean site abundance of taxa recorded *Amphibolis/Posidonia* and *Zostera habitats* during macrofauna surveys across all seasons in 2025. Brackets contain standard error of mean.

Family/higher taxon	Taxon	Habitats/seasons							
		Amphibolis/Posidonia				*Zostera*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Porifera	Porifera	0 (0)	0 (0)	0.12 (0.049)	0.32 (0.32)	0 (0)	0.040 (0.040)	0.080 (0.049)	0 (0)
Cnidaria									
Actiniaria	Actiniaria sp. 1	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Actiniaria	Actiniaria sp. 2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Hexacorallia	*Hexacorallia* sp. 1	0 (0)	0 (0)	0 (0)	0.12 (0.12)	0 (0)	0 (0)	0 (0)	0 (0)
Nemertea	Nemertea	0 (0)	0.040 (0.040)	0 (0)	0.040 (0.040)	0 (0)	0.080 (0.080)	0 (0)	0 (0)
Nematoda	Nematoda	0.76 (0.55)	0.16 (0.098)	0.24 (0.16)	0.76 (0.32)	0.040 (0.040)	0 (0)	0 (0)	0.12 (0.12)
Annelida									
Amphinomidae	Amphinomidae	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Aphroditidae	*Pontogenia* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Capitellidae	*Capitella* sp. 1	0.56 (0.23)	0.44 (0.12)	0.20 (0.063)	0.24 (0.19)	0.32 (0.12)	0.28 (0.14)	0.32 (0.19)	0.28 (0.12)
Capitellidae	*Notomastus* sp. 1	0 (0)	0 (0)	0.040 (0.040)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)
Chrysopetalidae	Chrysopetalidae sp. 1	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Cirratulidae	Cirratulidae sp. 1	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0.080 (0.080)	0.28 (0.12)	0.20 (0.089)	0.080 (0.049)
Cirratulidae	Cirratulidae sp. 2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Dorvilleidae	Dorvilleidae sp. 1	0.32 (0.17)	0.12 (0.080)	0.24 (0.12)	0.36 (0.075)	0.64 (0.22)	0.48 (0.10)	0.28 (0.10)	0.16 (0.075)
Eunicidae	*Eunice* sp. 1	0.52 (0.19)	0.080 (0.049)	0.24 (0.12)	0.16 (0.075)	1.4 (0.68)	0.040 (0.040)	0.40 (0.19)	0.44 (0.19)
Eunicidae	*Lysidice unicornis*	0.48 (0.14)	0.32 (0.14)	0.080 (0.080)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)
Eunicidae	*Marphysa* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.28 (0.080)	0 (0)	0 (0)
Flabelligeridae	*Pherusa* sp. 1	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0.12 (0.080)	0.040 (0.040)	0 (0)	0 (0)
Glyceridae	*Glycera* sp. 1	0.040 (0.040)	0.040 (0.040)	0 (0)	0 (0)	0.040 (0.040)	0.080 (0.080)	0 (0)	0 (0)
Goniadidae	*Goniada* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0.52 (0.14)	0.72 (0.26)	1.0 (0.19)	0.60 (0.23)
Hesionidae	Hesionidae sp. 1	0.12 (0.080)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Family/higher taxon	Taxon	Habitats/seasons							
		Amphibolis/Posidonia				*Zostera*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Lumbrineridae	*Lumbrineris* sp. 1	0.16 (0.075)	0.16 (0.075)	0.080 (0.049)	0.20 (0.11)	0.88 (0.31)	0.16 (0.098)	0.24 (0.075)	0.48 (0.12)
Magelonidae	*Magelona* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0.24 (0.19)	0.32 (0.10)	0.040 (0.040)	0 (0)
Maldanidae	*Axiothella* sp. 1	0.040 (0.040)	0.040 (0.040)	0 (0)	0 (0)	0.080 (0.049)	0.040 (0.040)	0 (0)	0 (0)
Nephtyidae	*Aglaophamus* sp. 1	0.28 (0.10)	0.24 (0.075)	0 (0)	0.040 (0.040)	1.2 (0.17)	0.44 (0.22)	0.40 (0.21)	0.40 (0.14)
Nereididae	Nereididae sp. 1	0.36 (0.17)	0.12 (0.080)	0.48 (0.15)	0 (0)	0.80 (0.33)	0.52 (0.17)	0.36 (0.18)	0.36 (0.12)
Nereididae	Nereididae sp. 2	0.40 (0.30)	0 (0)	0.080 (0.080)	0 (0)	0.48 (0.35)	0 (0)	0.080 (0.080)	0 (0)
Oenonidae	*Arabella longipedata*	0 (0)	0 (0)	0 (0)	0 (0)	0.20 (0.089)	0.080 (0.080)	0.080 (0.080)	0.040 (0.040)
Onuphidae	*Diopatra* sp. 1	0.20 (0.15)	0 (0)	0.20 (0.15)	0.28 (0.14)	0 (0)	0 (0)	0 (0)	0 (0)
Onuphidae	*Rhamphobrachium* sp. 1	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Opheliidae	*Armandia* sp. 1	0.040 (0.040)	0.040 (0.040)	0.20 (0.089)	0.48 (0.22)	0 (0)	0.040 (0.040)	0.12 (0.049)	0.040 (0.040)
Orbiniidae	Orbiniidae sp. 1	0.040 (0.040)	0 (0)	0 (0)	0.080 (0.080)	0 (0)	0 (0)	0 (0)	0 (0)
Paraonidae	*Aricidea* sp. 1	0.36 (0.15)	0.80 (0.30)	0.080 (0.049)	0.32 (0.15)	0 (0)	0.080 (0.080)	0 (0)	0 (0)
Phyllodocidae	Phyllodocidae sp. 1	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0.040 (0.040)	0 (0)
Poecilochaetidae	*Poecilochaetus serpens*	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Polynoidae	Polynoidae sp. 1	0.080 (0.080)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sabellidae	Sabellidae sp. 1	0.12 (0.080)	0 (0)	0.040 (0.040)	0.080 (0.049)	0 (0)	0 (0)	0 (0)	0 (0)
Sigalionidae	*Pholoides mendeleevi*	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sigalionidae	Sigalionidae sp. 1	0.040 (0.040)	0.040 (0.040)	0 (0)	0.040 (0.040)	0.16 (0.040)	0.040 (0.040)	0.20 (0.11)	0.16 (0.12)
Sphaerodoridae	*Sphaerodoropsis heteropapillata*	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Spionidae	Spionidae sp. 1	0.080 (0.049)	0.20 (0.13)	0.080 (0.049)	0.12 (0.080)	0.16 (0.12)	0.080 (0.080)	0.040 (0.040)	0 (0)
Spionidae	Spionidae sp. 2	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)
Syllidae	Syllidae sp. 1	0.96 (0.40)	0.16 (0.12)	0.36 (0.22)	0.56 (0.17)	0.040 (0.040)	0 (0)	0.080 (0.080)	0 (0)
Syllidae	Syllidae sp. 2	0.28 (0.10)	0.040 (0.040)	0.12 (0.080)	0.20 (0.089)	0.040 (0.040)	0.080 (0.049)	0.20 (0.13)	0.040 (0.040)
Syllidae	Syllidae sp. 3	0.16 (0.040)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Syllidae	Syllidae sp. 4	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Terebellidae	Terebellidae sp. 1	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)

Family/higher taxon	Taxon	Habitats/seasons							
		Amphibolis/Posidonia				*Zostera*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Trichobranchidae	Trichobranchidae sp. 1	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0.080 (0.049)	0 (0)	0 (0)	0 (0)
Echuira	Echuira	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sipuncula	Sipuncula	0.080 (0.049)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0.080 (0.049)	0.040 (0.040)
Crustacea									
Alpheidae	*Alpheus* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)
Ampeliscidae	Ampeliscidae sp. 1	0.080 (0.080)	0 (0)	0.040 (0.040)	0.040 (0.040)	0.12 (0.080)	0.080 (0.049)	0.20 (0.063)	0.080 (0.049)
Anthuridea	Anthuridea sp. 1	0.60 (0.36)	0.24 (0.075)	0.24 (0.075)	0.36 (0.22)	0 (0)	0.12 (0.080)	0.040 (0.040)	0 (0)
Aoridae	Aoridae sp. 1	0 (0)	0.24 (0.15)	0.040 (0.040)	0 (0)	0.040 (0.040)	0.040 (0.040)	0.040 (0.040)	0 (0)
Apseudidae	Apseudidae sp. 1	1.8 (0.37)	4.5 (2.4)	1.7 (0.56)	3.6 (0.99)	0.20 (0.15)	0.48 (0.26)	0.40 (0.21)	0.20 (0.063)
Arcturidae	Arcturidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)
Atyidae	Atyidae sp. 1	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Bodotriidae	Bodotriidae sp. 1	0.080 (0.049)	0 (0)	0.16 (0.12)	0.28 (0.10)	0.16 (0.098)	0.24 (0.098)	0.60 (0.089)	0.44 (0.20)
Callianassidae	Callianassidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.16 (0.098)	0 (0)	0 (0)
Caprellidae	Caprellidae sp. 1	0 (0)	0 (0)	0.080 (0.049)	0.080 (0.080)	0 (0)	0 (0)	0.040 (0.040)	0 (0)
Caridea	Caridea damaged	0.080 (0.049)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ceinidae	c.f.Ceinidae sp. 1	0.040 (0.040)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)
Ceratocumatidae	Ceratocumatidae sp. 1	0.16 (0.12)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)
Cirolanidae	Cirolanidae sp. 1	0.12 (0.049)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Copepoda	Copepoda	0.20 (0.11)	0 (0)	0 (0)	0 (0)	0.56 (0.15)	0.28 (0.10)	0.40 (0.21)	0 (0)
Corophiidae	Corophiidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Crustacea	Crustacea sp. 1	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Cyproideidae	Cyproideidae sp. 1	0 (0)	0 (0)	0.12 (0.080)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Dexaminidae	Dexaminidae sp. 1	0 (0)	0.040 (0.040)	1.1 (0.29)	0.56 (0.16)	0.12 (0.12)	0.040 (0.040)	0.20 (0.089)	0.080 (0.049)
Diogenidae	Diogenidae sp. 1	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)
Gnathiidae	Gnathiidae sp. 1	0.080 (0.049)	0 (0)	0.16 (0.16)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)
Grapsidae	Grapsidae sp. 1	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)

Family/higher taxon	Taxon	Habitats/seasons							
		Amphibolis/Posidonia				*Zostera*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Gynodiastylidae	Gynodiastylidae sp. 1	0.080 (0.080)	0.040 (0.040)	0.20 (0.063)	0 (0)	0.080 (0.049)	0 (0)	0.080 (0.049)	0.080 (0.080)
Hymenosomatidae	Hymenosomatidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0.040 (0.040)	0.040 (0.040)	0.040 (0.040)
Ischyroceridae	Ischyroceridae sp. 1	0.64 (0.35)	0.080 (0.049)	1.5 (0.29)	1.8 (0.65)	0.080 (0.080)	0 (0)	0.040 (0.040)	0.040 (0.040)
Isopoda	Isopoda sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Joeropsididae	Joeropsididae sp. 1	0.20 (0.15)	0.32 (0.19)	0.64 (0.21)	0.80 (0.38)	0 (0)	0.040 (0.040)	0 (0)	0 (0)
Leptostraca	Leptostraca sp. 1	0.040 (0.040)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0.040 (0.040)	0 (0)	0 (0)
Leucosiidae	Cryptocnemus sp. 1	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Leucothoidae	Leucothoidae sp. 1	0.12 (0.080)	0 (0)	0.20 (0.063)	0 (0)	0 (0)	0 (0)	0.20 (0.13)	0.040 (0.040)
Liljeborgiidae	Liljeborgiidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Limnoriidae	Limnoriidae sp. 1	0 (0)	0 (0)	0.080 (0.080)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Lysianassidae	Lysianassidae sp. 1	0.40 (0.089)	0 (0)	0.36 (0.16)	0.12 (0.080)	0.16 (0.12)	0 (0)	0.16 (0.075)	0 (0)
Maeridae	Maeridae sp. 1	0 (0)	0 (0)	0 (0)	0.16 (0.12)	0 (0)	0 (0)	0 (0)	0 (0)
Melitidae	Melitidae sp. 1	2.5 (1.2)	2.0 (0.81)	3.2 (1.5)	2.7 (1.3)	0.52 (0.21)	0.16 (0.040)	0.080 (0.080)	0.040 (0.040)
Munnidae	Munnidae sp. 1	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Mysidae	Mysidae sp. 1	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0.080 (0.049)	0 (0)	0 (0)	0.040 (0.040)
Ochlesidae	Ochlesidae sp. 1	0.080 (0.080)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ocypodidae	Ocypodidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ostracoda	Ostracoda sp. 1	0.40 (0.18)	0.16 (0.12)	0.52 (0.19)	0.080 (0.080)	0.84 (0.59)	0.040 (0.040)	0.12 (0.080)	0.040 (0.040)
Ostracoda	Ostracoda sp. 2	0.28 (0.15)	0.16 (0.075)	0.40 (0.17)	0.16 (0.098)	0.080 (0.049)	0 (0)	0 (0)	0 (0)
Ostracoda	Ostracoda sp. 3	0.12 (0.049)	0 (0)	0.040 (0.040)	0.16 (0.040)	0 (0)	0.080 (0.049)	0 (0)	0.040 (0.040)
Ostracoda	Ostracoda sp. 4	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Oxycephalidae	Oxycephalidae sp. 1	0.080 (0.049)	0.040 (0.040)	0.16 (0.075)	0.16 (0.040)	0.040 (0.040)	0.12 (0.080)	0.40 (0.21)	0.20 (0.11)
Penaeidae	Penaeidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)
Phoxocephalidae	Phoxocephalidae sp. 1	0.80 (0.11)	0.48 (0.16)	0.72 (0.26)	0.92 (0.37)	0.12 (0.080)	0.20 (0.11)	0.60 (0.18)	2.3 (0.78)
Pilumnidae	Pilumnidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Platyischnopidae	Platyischnopidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)

Family/higher taxon	Taxon	Habitats/seasons							
		Amphibolis/Posidonia				*Zostera*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Podoceridae	Podoceridae sp. 1	0 (0)	0 (0)	0.080 (0.049)	0.20 (0.15)	0.12 (0.080)	0 (0)	0.040 (0.040)	0.040 (0.040)
Portunidae	Portunidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)
Pseudozeuxidae	Pseudozeuxidae sp. 1	0.080 (0.080)	0.040 (0.040)	0.040 (0.040)	0.16 (0.098)	0.080 (0.049)	0 (0)	0 (0)	0.040 (0.040)
Pseudozeuxidae	Pseudozeuxidae sp. 2	0.32 (0.16)	0 (0)	0 (0)	0.080 (0.049)	0 (0)	0 (0)	0 (0)	0 (0)
Pycnogonida	Pycnogonida sp. 1	0.12 (0.080)	0.080 (0.049)	0 (0)	0.040 (0.040)	0.080 (0.080)	0 (0)	0 (0)	0 (0)
Sphaeromatidae	*Chitonopsis* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sphaeromatidae	Sphaeromatidae sp. 1	0 (0)	0 (0)	0.080 (0.080)	0.080 (0.049)	0 (0)	0 (0)	0 (0)	0 (0)
Sphaeromatidae	Sphaeromatidae sp. 2	0.12 (0.049)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sphaeromatidae	Sphaeromatidae sp. 3	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Squillidae	*Belosquilla* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)
Tanaididae	Tanaididae sp. 1	0 (0)	0.12 (0.080)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)
Zobrachoidae	Zobrachoidae sp. 1	0 (0)	0 (0)	0 (0)	0.12 (0.080)	0 (0)	0 (0)	0 (0)	0 (0)
c.f.Hologna thidae	c.f.Hologna thidae sp. 1	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Mollusca									
Anatomidae	Anatomidae sp. 1	0 (0)	0 (0)	0 (0)	0.20 (0.063)	0 (0)	0 (0)	0 (0)	0 (0)
Aplysiidae	Aplysiidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.12 (0.080)	0.16 (0.12)
Architectonicidae	Architectonicidae sp. 1	0 (0)	0 (0)	0.16 (0.098)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)
Cerithiidae	Cerithiidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)
Corbulidae	*Corbula* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)
Cuspidariidae	Cuspidariidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0.080 (0.080)	0 (0)	0 (0)	0 (0)
Cylichnidae	Cylichnidae sp. 1	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0.16 (0.098)	0.32 (0.22)	1.8 (0.44)	0.12 (0.080)
Eulimidae	Eulimidae sp. 1	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Gastropoda	Gastropoda juv	0 (0)	0.040 (0.040)	0.36 (0.31)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)
Glycymeridi dae	*Glycymeris* sp. 1	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Hiatellidae	*Hiatella* sp. 1	0 (0)	0 (0)	0.16 (0.075)	0.040 (0.040)	0.48 (0.30)	0 (0)	1.2 (1.1)	0 (0)
Lasaeidae	*Curvemysella paula*	0.36 (0.31)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)

Family/higher taxon	Taxon	Habitats/seasons							
		Amphibolis/Posidonia				*Zostera*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Limidae	Limidae sp. 1	0.080 (0.080)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Lucinidae	Lucinidae sp. 1	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)
Mactridae	*Mactra* sp. 1	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)
Mactridae	*Mactra* sp. 2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Myochamidae	*Myochama* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Mytillidae	*Modiolus* sp. 1	0.080 (0.080)	0.12 (0.12)	0.080 (0.080)	0.12 (0.12)	0.12 (0.080)	0.32 (0.14)	0 (0)	0.040 (0.040)
Mytillidae	*Modiolus* sp. 2	0.88 (0.40)	0 (0)	0 (0)	0.20 (0.11)	0.44 (0.19)	0 (0)	0 (0)	0.040 (0.040)
Mytillidae	*Musculus coenobitus*	0 (0)	0.24 (0.19)	0.88 (0.47)	0 (0)	0 (0)	0.24 (0.15)	0 (0)	0 (0)
Mytillidae	*Musculus* sp. 1	0.16 (0.16)	0 (0)	0.12 (0.049)	0.040 (0.040)	1.3 (0.40)	0 (0)	0.40 (0.14)	0.12 (0.12)
Nassaridae	*Nassarius* sp. 1	0.080 (0.049)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)
Naticidae	*Natica* sp. 1	0 (0)	0.040 (0.040)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)
Naticidae	*Natica* sp. 2	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Nuculanidae	*Saccella darwini*	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0.080 (0.080)	0.040 (0.040)	0 (0)	0 (0)
Nuculidae	*Ennucula* sp. 1	0.20 (0.089)	0.16 (0.12)	0.24 (0.15)	0.080 (0.080)	0 (0)	0 (0)	0 (0)	0.040 (0.040)
Olividae	*Phenacovolva* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ostreidae	Ostreidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0.16 (0.12)	0.040 (0.040)	0 (0)	0 (0)
Patellidae	Patellidae sp. 1	0.080 (0.049)	0.040 (0.040)	0.12 (0.049)	0.080 (0.049)	0 (0)	0 (0)	0 (0)	0 (0)
Pleurotomariidae	Pleurotomariidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Polyplacophora	Polyplacophora sp. 1	0 (0)	0.040 (0.040)	0.48 (0.23)	0.36 (0.16)	0 (0)	0 (0)	0 (0)	0 (0)
Polyplacophora	Polyplacophora sp. 2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pteriidae	*Pteria* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0.56 (0.31)	0 (0)	0 (0)	0 (0)
Rissoidae	Rissoidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Solemyidae	*Solemya australis*	0.68 (0.54)	0.52 (0.20)	0.44 (0.21)	0.12 (0.049)	0 (0)	0 (0)	0 (0)	0 (0)
Tellinidae	*Tellina* sp. 1	0 (0)	0 (0)	0.080 (0.049)	0.040 (0.040)	0.24 (0.19)	0.040 (0.040)	0.040 (0.040)	0.12 (0.12)
Tellinidae	*Tellina* sp. 2	0 (0)	0 (0)	0 (0)	0 (0)	1.0 (0.36)	0 (0)	0.12 (0.12)	0.040 (0.040)
Tellinidae	*Tellina* sp. 3	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0.080 (0.049)	0.080 (0.049)	0 (0)	0 (0)

Family/higher taxon	Taxon	Habitats/seasons							
		Amphibolis/Posidonia				*Zostera*			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Tellinidae	*Tellina* sp. 4	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0.080 (0.049)	0.040 (0.040)	0 (0)	0 (0)
Trochidae	Trochidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Veneridae	*Antigona* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.12 (0.049)
Veneridae	*Circe* sp. 1	0.28 (0.23)	0 (0)	0.28 (0.12)	0.040 (0.040)	0.16 (0.12)	0 (0)	0.080 (0.080)	0 (0)
Veneridae	*Dosinia* sp. 1	0.12 (0.049)	0.040 (0.040)	0.12 (0.049)	0.12 (0.049)	0.52 (0.29)	0.72 (0.57)	0.64 (0.35)	1.1 (0.84)
Veneridae	*Dosinia* sp. 2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.16 (0.16)
Veneridae	*Dosinia* sp. 3	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)
Veneridae	*Paphia* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Veneridae	Veneridae juv	0 (0)	0 (0)	0 (0)	0 (0)	0.080 (0.080)	0 (0)	0 (0)	0 (0)
Vulsellidae	*Electroma* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Bryozoa									
Bryozoa	Bryozoa fan	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)
Echinodermata									
Asteroidea	Asteroidea sp. 1	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Echinoidea	Echinoidea juvenile	0.040 (0.040)	0.040 (0.040)	0 (0)	0 (0)	0.36 (0.31)	0.040 (0.040)	0 (0)	0 (0)
Holothuroidea	Holothuroidea sp. 1	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0.080 (0.080)	0 (0)	0 (0)	0.080 (0.080)
Holothuroidea	Holothuroidea sp. 2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Holothuroidea	Holothuroidea sp. 3	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ophiuroidea	Ophiuroidea sp. 1	0.52 (0.14)	0.24 (0.098)	0.40 (0.17)	0.48 (0.14)	0.12 (0.080)	0 (0)	0.12 (0.080)	0.12 (0.080)
Toxopneustidae	Toxopneustidae sp. 1	0 (0)	0 (0)	0.040 (0.040)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0.040 (0.040)
Chordata									
Ascidiacea	Ascidiacea sp. 1	0.040 (0.040)	0 (0)	0.040 (0.040)	0 (0)	0.040 (0.040)	0 (0)	0.52 (0.52)	0 (0)

Table 13. Mean site abundance of taxa sampled in deep (>15 m) habitats during macrofauna surveys across all seasons in 2025. Brackets contain standard error of mean.

Family/ higher taxon	Taxon	Habitats/seasons							
		Sand bioturbation				Sand/algae/inverts			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Porifera	Porifera	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Cnidaria									
Actiniaria	Actiniaria sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)
Actiniaria	Actiniaria sp. 2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.24 (0.19)
Hexacorallia	*Hexacorallia* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Nemertea	Nemertea	0.040 (0.040)	0.040 (0.040)	0.040 (0.040)	0 (0)	0.080 (0.080)	0.080 (0.080)	0.040 (0.040)	0 (0)
Nematoda	Nematoda	0 (0)	0 (0)	0 (0)	0.16 (0.098)	0 (0)	0 (0)	0 (0)	0 (0)
Annelida									
Amphinomidae	Amphinomidae	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Aphroditidae	*Pontogenia* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Capitellidae	*Capitella* sp. 1	0.20 (0.15)	1.4 (0.52)	1.7 (0.15)	0.36 (0.17)	0.040 (0.040)	1.0 (0.35)	0.68 (0.28)	0.56 (0.16)
Capitellidae	*Notomastus* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Chrysopetalidae	Chrysopetalidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Cirratulidae	Cirratulidae sp. 1	0 (0)	0.88 (0.49)	1.5 (1.2)	0.72 (0.37)	0 (0)	0.32 (0.15)	0.44 (0.27)	0.040 (0.040)
Cirratulidae	Cirratulidae sp. 2	1.0 (0.76)	0 (0)	0 (0)	0 (0)	0.32 (0.23)	0 (0)	0 (0)	0 (0)
Dorvilleidae	Dorvilleidae sp. 1	0.080 (0.049)	0.080 (0.080)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0.080 (0.049)	0 (0)
Eunicidae	*Eunice* sp. 1	0 (0)	0 (0)	0 (0)	0.12 (0.080)	0.040 (0.040)	0 (0)	0 (0)	0.080 (0.049)
Eunicidae	*Lysidice unicornis*	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Eunicidae	*Marphysa* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Flabelligeridae	*Pherusa* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Glyceridae	*Glycera* sp. 1	0.080 (0.049)	0.12 (0.080)	0 (0)	0.040 (0.040)	0.040 (0.040)	0.12 (0.12)	0 (0)	0 (0)
Goniadidae	*Goniada* sp. 1	0.28 (0.049)	0.40 (0.14)	0.96 (0.25)	0.96 (0.19)	0.40 (0.089)	0.44 (0.17)	0.48 (0.15)	1.2 (0.14)
Hesionidae	Hesionidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Family/ higher taxon	Taxon	Habitats/seasons							
		Sand bioturbation				Sand/algae/inverts			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Lumbrineridae	*Lumbrineris* sp. 1	0.080 (0.080)	0.24 (0.12)	0.080 (0.080)	0.040 (0.040)	0.24 (0.098)	0 (0)	0 (0)	0.16 (0.040)
Magelonidae	*Magelona* sp. 1	0 (0)	0.080 (0.049)	0 (0)	0 (0)	0 (0)	0.12 (0.049)	0 (0)	0 (0)
Maldanidae	*Axiothella* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Nephtyidae	*Aglaophamus* sp. 1	0.40 (0.22)	0.20 (0.063)	0.040 (0.040)	0.20 (0.11)	0.28 (0.12)	0.080 (0.080)	0.040 (0.040)	0.20 (0.11)
Nereididae	Nereididae sp. 1	1.0 (0.33)	0.92 (0.22)	0.84 (0.26)	0.44 (0.24)	0.88 (0.22)	0.92 (0.14)	0.72 (0.21)	0.52 (0.080)
Nereididae	Nereididae sp. 2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)
Oenonidae	*Arabella longipedata*	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Onuphidae	*Diopatra* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Onuphidae	*Rhamphobrachium* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Opheliidae	*Armandia* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Orbiniidae	Orbiniidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Paraonidae	*Aricidea* sp. 1	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Phyllodocidae	Phyllodocidae sp. 1	0.12 (0.12)	0 (0)	0.080 (0.080)	0.040 (0.040)	0 (0)	0 (0)	0.16 (0.075)	0.080 (0.049)
Poecilochaetidae	*Poecilochaetus serpens*	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)
Polynoidae	Polynoidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sabellidae	Sabellidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sigalionidae	*Pholoides mendeleevi*	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sigalionidae	Sigalionidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sphaerodoridae	*Sphaerodoropsis heteropapillata*	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Spionidae	Spionidae sp. 1	0.16 (0.16)	0.040 (0.040)	0.040 (0.040)	0 (0)	0.12 (0.049)	0.040 (0.040)	0 (0)	0 (0)
Spionidae	Spionidae sp. 2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Syllidae	Syllidae sp. 1	0.12 (0.080)	0.040 (0.040)	0.080 (0.049)	0.080 (0.080)	0 (0)	0 (0)	0 (0)	0 (0)
Syllidae	Syllidae sp. 2	0 (0)	0 (0)	0.16 (0.12)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0.080 (0.049)
Syllidae	Syllidae sp. 3	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Syllidae	Syllidae sp. 4	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)
Terebellidae	Terebellidae sp. 1	0.040 (0.040)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Family/ higher taxon	Taxon	Habitats/seasons							
		Sand bioturbation				Sand/algae/inverts			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Trichobranchidae	Trichobranchidae sp. 1	0.16 (0.16)	0 (0)	0 (0)	0 (0)	0.32 (0.27)	0 (0)	0 (0)	0 (0)
Echuira	Echuira	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sipuncula	Sipuncula	0.16 (0.040)	0 (0)	0.080 (0.049)	0.12 (0.049)	0.12 (0.080)	0.040 (0.040)	0.16 (0.075)	0 (0)
Crustacea									
Alpheidae	*Alpheus* sp. 1	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ampeliscidae	Ampeliscidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Anthuridea	Anthuridea sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Aoridae	Aoridae sp. 1	0.12 (0.12)	0 (0)	0 (0)	0.040 (0.040)	0.040 (0.040)	0 (0)	0.040 (0.040)	0 (0)
Apseudidae	Apseudidae sp. 1	1.6 (0.72)	0.12 (0.080)	0.12 (0.080)	0 (0)	0.40 (0.17)	0 (0)	0.040 (0.040)	0.12 (0.12)
Arcturidae	Arcturidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Atyidae	Atyidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Bodotriidae	Bodotriidae sp. 1	0.040 (0.040)	0 (0)	0.16 (0.12)	0.12 (0.049)	0 (0)	0 (0)	0.040 (0.040)	0.16 (0.075)
Callianassidae	Callianassidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Caprellidae	Caprellidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)
Caridea	Caridea damaged	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ceinidae	c.f.Ceinidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ceratocumatidae	Ceratocumatidae sp. 1	0.040 (0.040)	0.20 (0.089)	0.040 (0.040)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)
Cirolanidae	Cirolanidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Copepoda	Copepoda	0.44 (0.17)	0.20 (0.063)	0.32 (0.10)	0.040 (0.040)	0.12 (0.080)	0.28 (0.12)	0.36 (0.15)	0 (0)
Corophiidae	Corophiidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Crustacea	Crustacea sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Cyproideidae	Cyproideidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Dexaminidae	Dexaminidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)
Diogenidae	Diogenidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Gnathiidae	Gnathiidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Family/ higher taxon	Taxon	Habitats/seasons							
		Sand bioturbation				Sand/algae/inverts			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Grapsidae	Grapsidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Gynodiastylidae	Gynodiastylidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Hymenosomatidae	Hymenosomatidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ischyroceridae	Ischyroceridae sp. 1	0.080 (0.080)	0 (0)	0 (0)	0.040 (0.040)	0.040 (0.040)	0 (0)	0.040 (0.040)	0 (0)
Isopoda	Isopoda sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Joeropsididae	Joeropsididae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Leptostraca	Leptostraca sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Leucosiidae	Cryptocnemus sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Leucothoidae	Leucothoidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Liljeborgiidae	Liljeborgiidae sp. 1	0 (0)	0 (0)	0.080 (0.080)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Limnoriidae	Limnoriidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Lysianassidae	Lysianassidae sp. 1	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)
Maeridae	Maeridae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Melitidae	Melitidae sp. 1	0 (0)	0.080 (0.080)	0.040 (0.040)	0.040 (0.040)	0.040 (0.040)	0.040 (0.040)	0 (0)	0 (0)
Munnidae	Munnidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Mysidae	Mysidae sp. 1	0.080 (0.049)	0.080 (0.080)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)
Ochlesidae	Ochlesidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ocypodidae	Ocypodidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ostracoda	Ostracoda sp. 1	0.040 (0.040)	0 (0)	0.080 (0.080)	0 (0)	0.040 (0.040)	0.040 (0.040)	0 (0)	0 (0)
Ostracoda	Ostracoda sp. 2	0.040 (0.040)	0 (0)	0 (0)	0.080 (0.080)	0 (0)	0.040 (0.040)	0.12 (0.12)	0 (0)
Ostracoda	Ostracoda sp. 3	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ostracoda	Ostracoda sp. 4	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Oxycephalidae	Oxycephalidae sp. 1	0 (0)	0 (0)	0.12 (0.12)	0.44 (0.17)	0 (0)	0 (0)	0 (0)	0.040 (0.040)
Penaeidae	Penaeidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Phoxocephalidae	Phoxocephalidae sp. 1	0 (0)	0 (0)	0.040 (0.040)	0.080 (0.049)	0.040 (0.040)	0 (0)	0.040 (0.040)	0.040 (0.040)
Pilumnidae	Pilumnidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Family/ higher taxon	Taxon	Habitats/seasons							
		Sand bioturbation				Sand/algae/inverts			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Platyischnopidae	Platyischnopidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Podoceridae	Podoceridae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Portunidae	Portunidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pseudozeuxidae	Pseudozeuxidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0.080 (0.080)	0 (0)	0.080 (0.049)	0 (0)
Pseudozeuxidae	Pseudozeuxidae sp. 2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pycnogonida	Pycnogonida sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)
Sphaeromatidae	*Chitonopsis* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sphaeromatidae	Sphaeromatidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sphaeromatidae	Sphaeromatidae sp. 2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sphaeromatidae	Sphaeromatidae sp. 3	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Squillidae	*Belosquilla* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Tanaididae	Tanaididae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Zobrachoidae	Zobrachoidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
c.f.Hologнathidae	c.f.Hologнathidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Mollusca									
Anatomidae	Anatomidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Aplysiidae	Aplysiidae sp. 1	0 (0)	0 (0)	0 (0)	0.24 (0.19)	0 (0)	0 (0)	0 (0)	0 (0)
Architectonicidae	Architectonicidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Cerithiidae	Cerithiidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Corbulidae	*Corbula* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Cuspidariidae	Cuspidariidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Cylichnidae	Cylichnidae sp. 1	0 (0)	0 (0)	0.40 (0.26)	0.64 (0.26)	0 (0)	0 (0)	0.12 (0.12)	0.60 (0.31)
Eulimidae	Eulimidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Gastropoda	Gastropoda juv	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Glycymerididae	*Glycymeris* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Hiatellidae	*Hiatella* sp. 1	0 (0)	0 (0)	0.080 (0.080)	0.080 (0.049)	0 (0)	0.040 (0.040)	0.080 (0.080)	0 (0)

Family/ higher taxon	Taxon	Habitats/seasons							
		Sand bioturbation				Sand/algae/inverts			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Lasaeidae	*Curvemysella paula*	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Limidae	Limidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Lucinidae	Lucinidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Mactridae	*Mactra* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Mactridae	*Mactra* sp. 2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Myochamidae	*Myochama* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Mytillidae	*Modiolus* sp. 1	0.040 (0.040)	0.040 (0.040)	0 (0)	0.080 (0.080)	0 (0)	0 (0)	0.040 (0.040)	0.040 (0.040)
Mytillidae	*Modiolus* sp. 2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Mytillidae	*Musculus coenobitus*	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Mytillidae	*Musculus* sp. 1	0 (0)	0 (0)	0.12 (0.080)	0.20 (0.11)	0.040 (0.040)	0 (0)	0.040 (0.040)	0.080 (0.080)
Nassaridae	*Nassarius* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Naticidae	*Natica* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Naticidae	*Natica* sp. 2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Nuculanidae	*Saccella darwini*	0.080 (0.049)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)
Nuculidae	*Ennucula* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)
Olividae	*Phenacovolva* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)
Ostreidae	Ostreidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Patellidae	Patellidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pleurotomariidae	Pleurotomariidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Polyplacophora	Polyplacophora sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)
Polyplacophora	Polyplacophora sp. 2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Pteriidae	*Pteria* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)
Rissoidae	Rissoidae sp. 1	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)
Solemyidae	*Solemya australis*	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)
Tellinidae	*Tellina* sp. 1	0.24 (0.15)	0 (0)	0 (0)	0.32 (0.14)	0.080 (0.080)	0 (0)	0 (0)	0.52 (0.27)
Tellinidae	*Tellina* sp. 2	0.24 (0.098)	0 (0)	1.2 (0.21)	0.040 (0.040)	0.12 (0.080)	0 (0)	0.92 (0.30)	0.16 (0.16)

Family/ higher taxon	Taxon	Habitats/seasons							
		Sand bioturbation				Sand/algae/inverts			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Tellinidae	*Tellina* sp. 3	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Tellinidae	*Tellina* sp. 4	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)
Trochidae	Trochidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Veneridae	*Antigona* sp. 1	0 (0)	0 (0)	0 (0)	0.48 (0.26)	0 (0)	0 (0)	0 (0)	0.080 (0.080)
Veneridae	*Circe* sp. 1	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Veneridae	*Dosinia* sp. 1	0 (0)	0.12 (0.049)	0.12 (0.049)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0.12 (0.080)
Veneridae	*Dosinia* sp. 2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Veneridae	*Dosinia* sp. 3	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Veneridae	*Paphia* sp. 1	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)
Veneridae	Veneridae juv	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)
Vulsellidae	*Electroma* sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Bryozoa									
Bryozoa	Bryozoa fan	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Echinodermata									
Asteroidea	Asteroidea sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Echinoidea	Echinoidea juvenile	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Holothuroidea	Holothuroidea sp. 1	0.32 (0.20)	0 (0)	0 (0)	0.040 (0.040)	0.080 (0.049)	0 (0)	0 (0)	0 (0)
Holothuroidea	Holothuroidea sp. 2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Holothuroidea	Holothuroidea sp. 3	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ophiuroidea	Ophiuroidea sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0.040 (0.040)	0 (0)
Toxopneustidae	Toxopneustidae sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Chordata									
Ascidiacea	Ascidiacea sp. 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

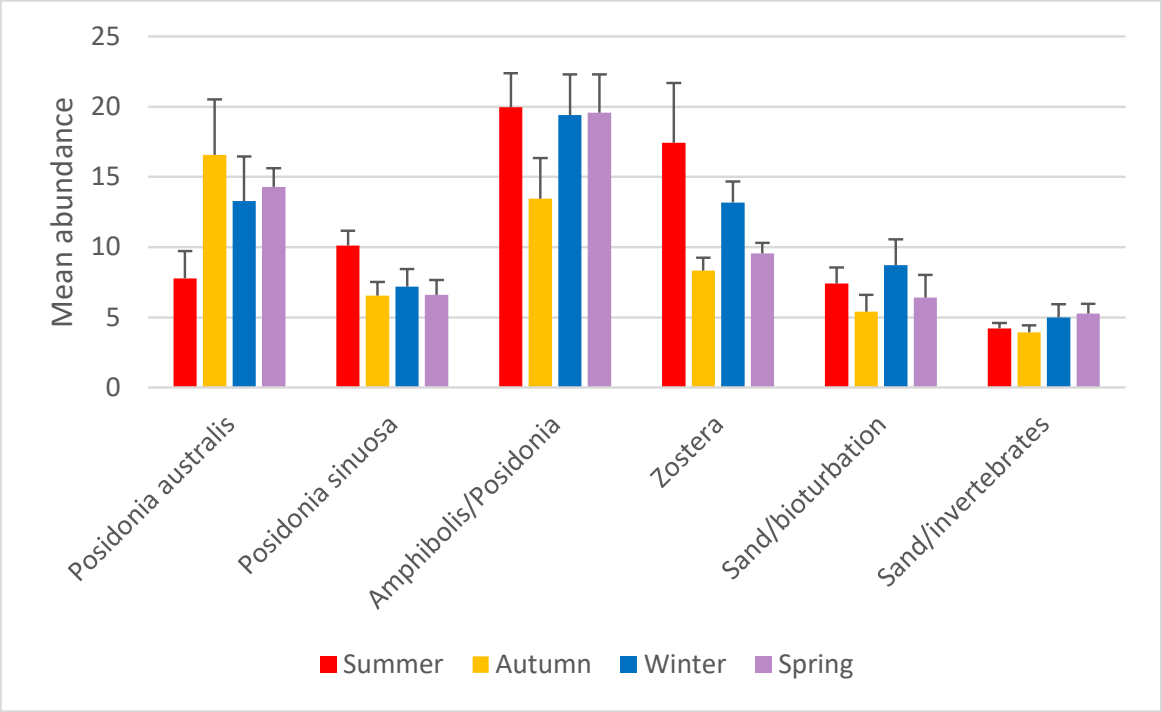


Figure 39. Mean total site abundance of taxa recorded in all habitats during macrofauna surveys across all seasons in 2025. Error bars show standard error of mean.

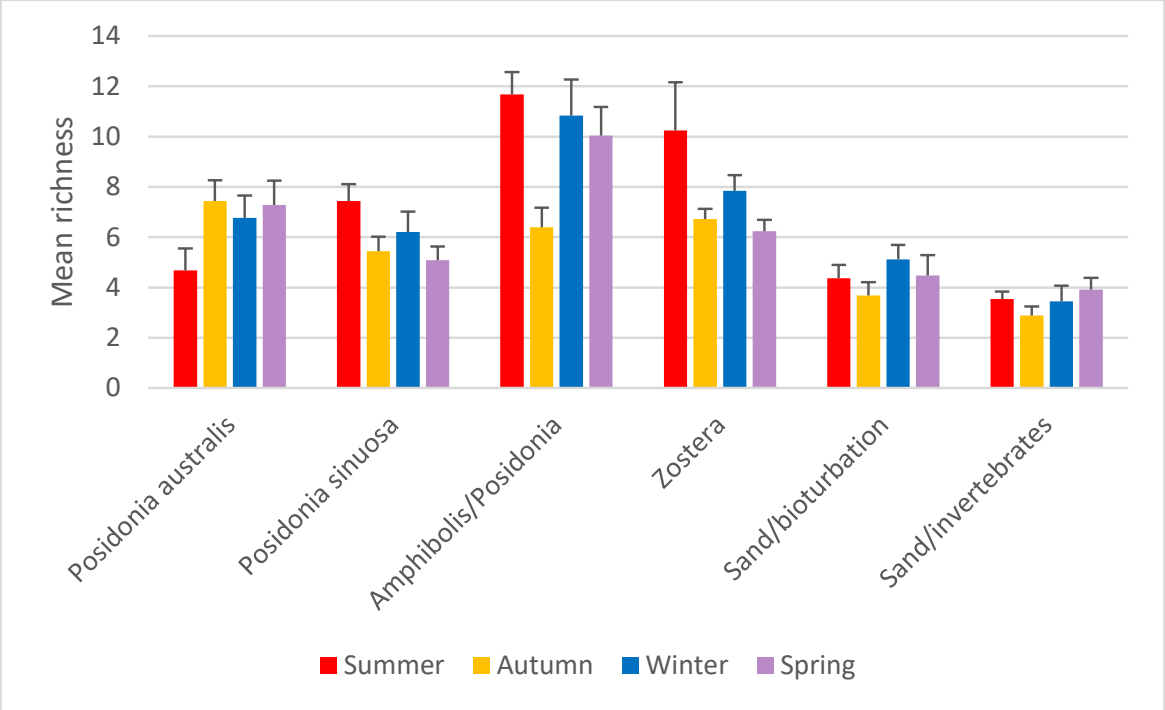


Figure 40. Mean site richness of taxa recorded in all habitats during macrofauna surveys across all seasons in 2025. Error bars show standard error of mean.

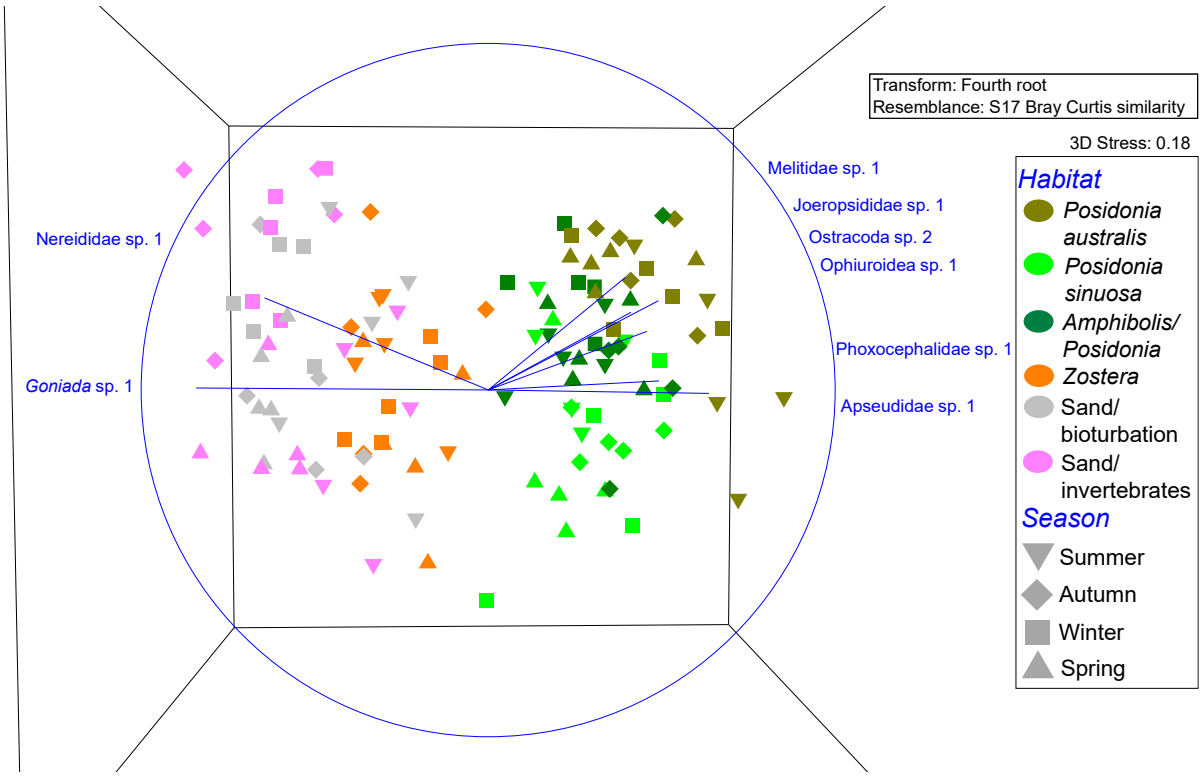


Figure 41. MDS plot representing structure of site-averaged macrofauna communities recorded in all habitats across all seasons in 2025.

6.2 Meiofauna

A total of 22,116 individuals from 38 taxa (ranging from phylum to family, with some species distinguished within higher taxa) were recorded across all habitats and seasons. More than 80% of these (18,364 individuals) were foraminiferans, with arthropods also relatively abundant (2,975 individuals). Other phyla comprised less than 10% of the total abundance. About 40% of the total abundance was recorded in autumn, 29% in winter, 20% in spring and 11% in summer.

At the lowest taxonomic level, the most abundant taxa were Foraminifera sp. 1 (Plate 17), with 10,411 individuals, Foraminifera sp. 7 (Plate 18) with 4,890 individuals and the crustacean Ostracoda sp. 1 (Plate 19) with 2,387 individuals. Mean site abundance for each taxon, habitat and season is provided in Table 14, Table 15 and Table 16. Abundances for each sample are provided in Appendix I.

Mean site abundance was greatest in *Amphibolis*/*Posidonia* habitat in all seasons, with a maximum in winter of about 120 individuals (Figure 42). Mean site abundance was lowest in *Posidonia sinuosa* habitat in summer with about 5 individuals and was lower in summer than in other seasons in all seagrass habitats. It was greatest in autumn in all habitats except *Posidonia sinuosa* and *Amphibolis*/*Posidonia,* in which it was greatest in winter (Figure 42). Mean taxonomic richness followed a similar pattern, being greatest in autumn and winter in those same habitats (Figure 43). Mean richness ranged from about 2 in the deep sand habitats in winter to 9 in Sand/invertebrates habitat in autumn (Figure 43).

An MDS plot of community structure based on replicate means at each site did not show any clear grouping of habitats (Figure 43). Summer samples were largely separated, and winter samples were partially separated from autumn and spring samples, and there was much less variability within the latter two seasons (Figure 44). The general separation of summer samples from other seasons and their greater variability were also evident in an MDS plot based on individual replicates (Figure 45).

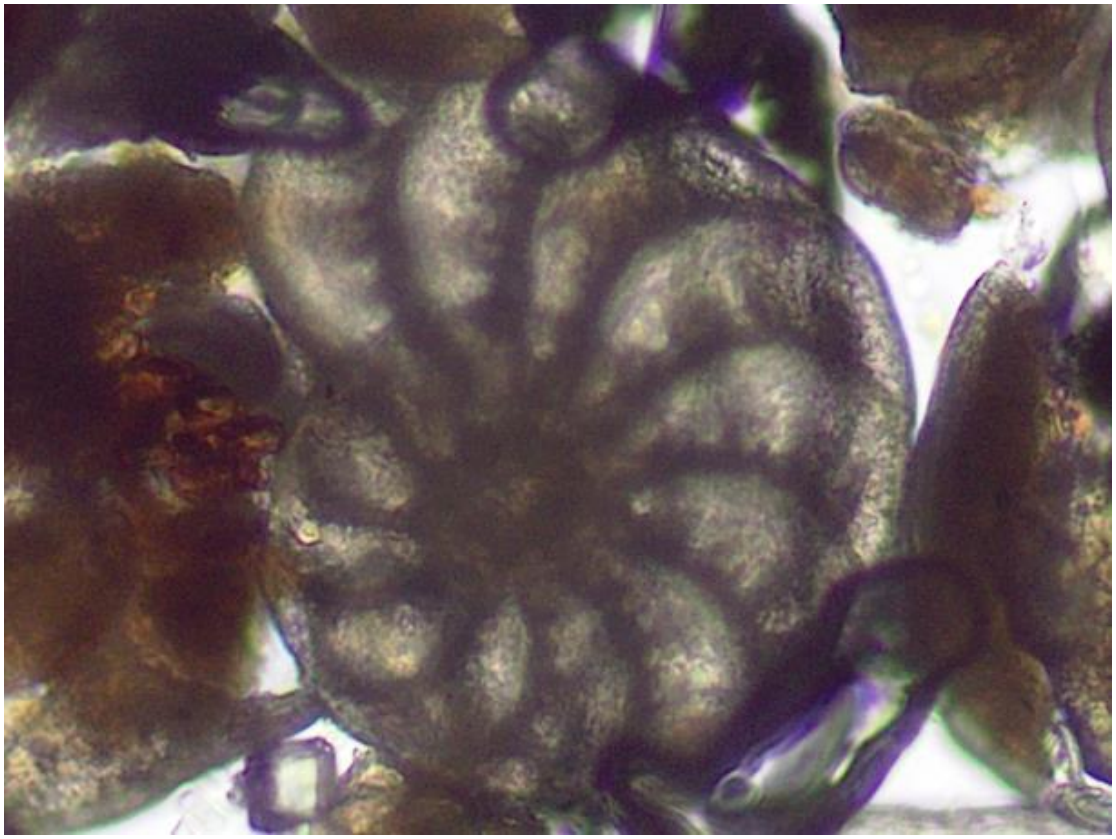


Plate 17. Foraminifera sp. 1. Source: Flinders University.

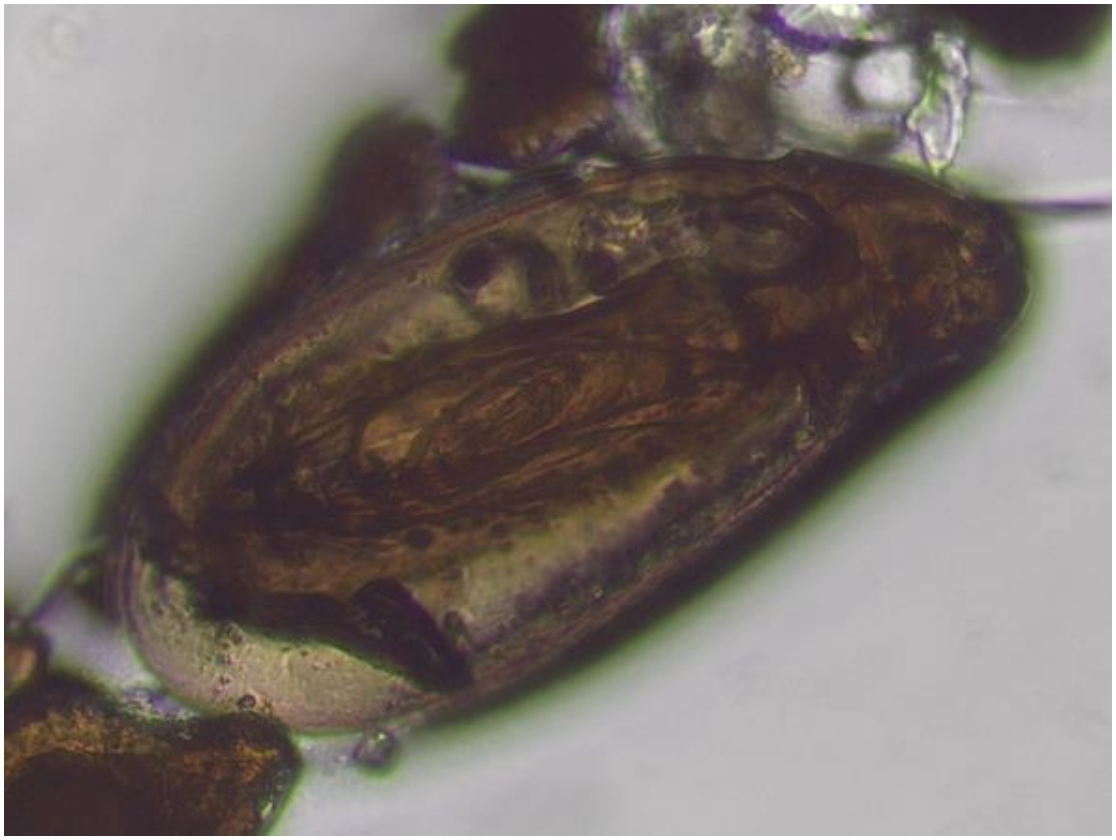


Plate 18. Foraminifera sp. 7. Source: Flinders University.

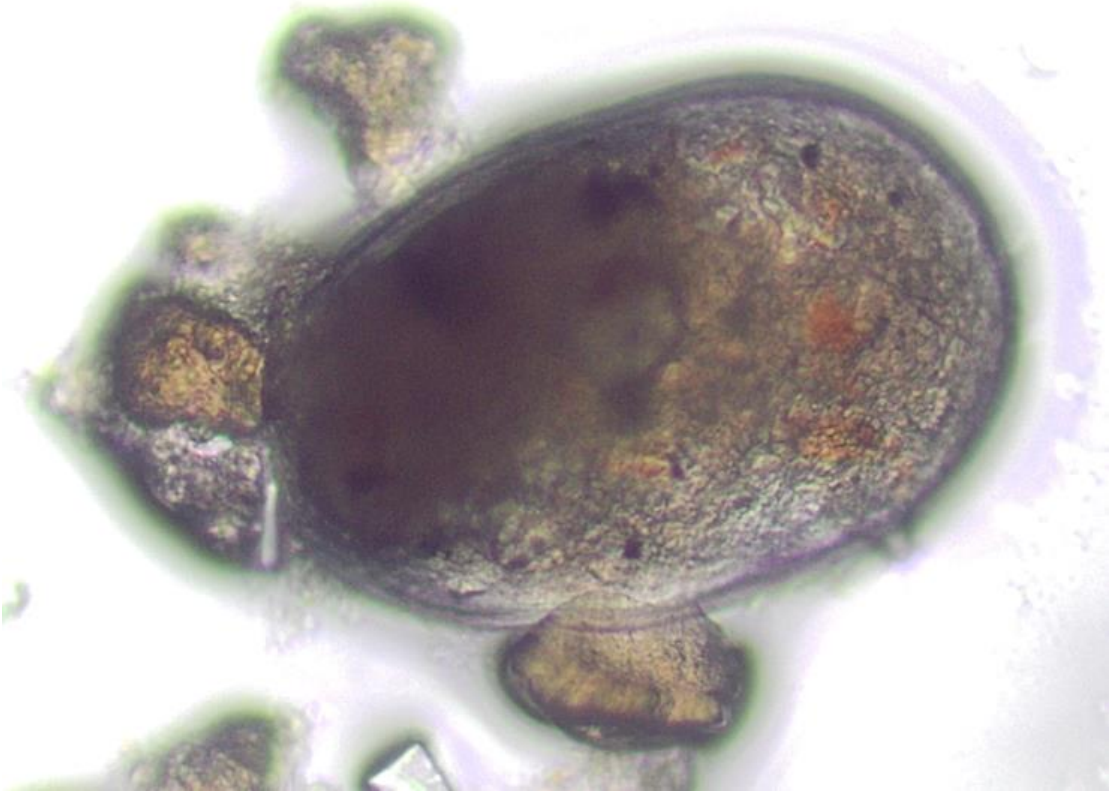


Plate 19. Ostracoda sp. 1. Source: Flinders University.

Table 14. Mean site abundance of taxa sampled in *Posidonia* seagrass habitats during meiofauna surveys across all seasons in 2025. Brackets contain standard error of mean.

Taxon	Common name	Habitat/seasons							
		Posidonia australis			*Posidonia sinuosa*				
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Ciliophora									
Karyorelictea	Primitive ciliates	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Foraminifera									
Foraminifera sp. 1	Forams	5.6 (1.8)	27 (6.2)	7.3 (1.2)	24 (4.3)	1.2 (0.47)	15 (2.9)	41 (19)	5.6 (1.8)
Foraminifera sp. 2	Forams	0.24 (0.075)	2.8 (0.79)	1.4 (0.48)	0.48 (0.12)	0.92 (0.57)	7.6 (3.9)	2.2 (0.50)	0.24 (0.075)
Foraminifera sp. 3	Forams	0.40 (0.30)	1.1 (0.46)	0.12 (0.080)	0.040 (0.040)	0.28 (0.15)	0.20 (0.089)	0.96 (0.29)	0.40 (0.30)
Foraminifera sp. 4	Forams	0.080 (0.049)	0.20 (0.089)	0 (0)	0 (0)	0.28 (0.28)	0 (0)	0.12 (0.080)	0.080 (0.049)
Foraminifera sp. 5	Forams	0.68 (0.22)	3.6 (1.3)	0.36 (0.13)	0.16 (0.075)	0 (0)	0.56 (0.24)	3.7 (0.99)	0.68 (0.22)
Foraminifera sp. 6	Forams	0.12 (0.080)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.12 (0.080)
Foraminifera sp. 7	Forams	0 (0)	33 (11)	6.2 (1.7)	12 (3.0)	0 (0)	3.7 (1.2)	11 (3.4)	0 (0)
Foraminifera sp. 8	Forams	0 (0)	3.2 (0.79)	0.12 (0.049)	0.040 (0.040)	0 (0)	0 (0)	1.6 (0.63)	0 (0)
Cnidaria	Corals	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.080 (0.049)	0 (0)	0 (0)
Plathyhelminthes	Flatworms	0.040 (0.040)	0.080 (0.080)	0 (0)	0 (0)	0.28 (0.15)	0 (0)	0 (0)	0 (0)
Gastrotricha	Hairybacks	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Gnathostomulida	Jaw worms	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)
Kinorhyncha									
Coreifera	Mud dragons	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Loricifera	Brush heads	0 (0)	0 (0)	0 (0)	0 (0)	0.080 (0.049)	0 (0)	0 (0)	0 (0)
Nematoda	Roundworms	0.64 (0.19)	0.080 (0.080)	4.2 (1.7)	0 (0)	0.12 (0.12)	0 (0)	0.12 (0.080)	0.12 (0.12)
Tardigrada	Water bears	0 (0)	0 (0)	0.080 (0.049)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)
Annelida									
Oligochaeta	Earthworms	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Polychaeta	Bristle worms	0.080 (0.080)	0.080 (0.080)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Bryozoa	Moss animals	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Taxon	Common name	Habitat/seasons							
		Posidonia australis			*Posidonia sinuosa*				
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Mollusca									
Bivalvia	Bivalves	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.080 (0.049)	0 (0)
Gastropoda	Gastropods	0 (0)	0.36 (0.24)	0.16 (0.075)	0.040 (0.040)	0 (0)	1.3 (0.33)	1.3 (0.21)	0.12 (0.12)
Gastropoda spp. (larvae)	Gastropods	0.080 (0.080)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Nudibranchia sp.	Nudibranchs	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Nudibranchia sp. (juvenile)	Nudibranchs	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)
Arthropoda									
Copepoda (other)	Other copepods	0 (0)	0.080 (0.049)	0.040 (0.040)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)
Copepods (Harpactioid)	Benthic copepods	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Cumacea	Comma shrimps	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)
Halacaridae	Marine mites	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)
Ostracoda sp. 1	Seed shrimp	4.4 (1.5)	12 (3.0)	8.4 (4.6)	4.0 (1.1)	1.5 (0.56)	0.64 (0.29)	6.2 (1.6)	1.4 (0.70)
Ostracoda sp. 2	Seed shrimp	0.12 (0.080)	0.20 (0.20)	0 (0)	0 (0)	0.20 (0.15)	0 (0)	0.040 (0.040)	0.040 (0.040)
Ostracoda sp. 3	Seed shrimp	0.24 (0.12)	3.4 (0.35)	0.36 (0.18)	2.2 (0.49)	0 (0)	0 (0)	0.92 (0.20)	0.24 (0.16)
Ostracoda sp. 4	Seed shrimp	0.20 (0.063)	0.040 (0.040)	0.12 (0.12)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ostracoda sp. 5	Seed shrimp	0 (0)	0.36 (0.22)	0.36 (0.36)	0 (0)	0 (0)	0 (0)	0.12 (0.12)	0 (0)
Ostracoda sp. 6	Seed shrimp	0 (0)	0.16 (0.12)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Echinodermata	Echinoderms	0.040 (0.040)	0.88 (0.68)	0.080 (0.049)	0 (0)	0 (0)	0 (0)	0.92 (0.21)	0.12 (0.049)
Chordata									
Ascidiacea	Sea squirt	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Tunicata	Tunicates	0.12 (0.080)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)

Table 15. Mean site abundance of taxa sampled in *Amphibolis* and *Zostera* seagrass habitats during meiofauna surveys across all seasons, 2025. Brackets contain standard error of mean.

Taxon	Common name	Habitat/seasons							
		Amphibolis/Posidonia			*Zostera*				
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Ciliophora									
Karyorelictea	Primitive ciliates	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Foraminifera									
Foraminifera sp. 1	Forams	24 (8.0)	48 (15)	70 (13)	46 (5.2)	3.6 (1.5)	15 (3.5)	6.7 (1.1)	9.6 (1.9)
Foraminifera sp. 2	Forams	0.44 (0.20)	11 (4.7)	3.3 (2.1)	2.2 (0.77)	1.2 (0.72)	4.1 (1.3)	0.44 (0.075)	0.56 (0.075)
Foraminifera sp. 3	Forams	0.40 (0.31)	0.44 (0.44)	1.4 (0.47)	0 (0)	1.3 (0.55)	0.72 (0.32)	0.040 (0.040)	0.040 (0.040)
Foraminifera sp. 4	Forams	0 (0)	0.40 (0.40)	0.040 (0.040)	0 (0)	0.20 (0.15)	0 (0)	0 (0)	0 (0)
Foraminifera sp. 5	Forams	0.96 (0.23)	5.3 (4.0)	5.1 (2.8)	1.0 (0.40)	1.6 (0.62)	7.7 (2.8)	0.36 (0.040)	1.5 (0.52)
Foraminifera sp. 6	Forams	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)
Foraminifera sp. 7	Forams	0.24 (0.24)	9.9 (5.1)	24 (3.4)	8.6 (1.1)	2.0 (0.72)	9.8 (2.7)	3.0 (1.1)	8.7 (1.2)
Foraminifera sp. 8	Forams	0.32 (0.19)	2.3 (1.9)	2.6 (0.81)	0.20 (0.11)	0.080 (0.080)	0.36 (0.19)	0 (0)	0.080 (0.049)
Cnidaria	Corals	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Plathyhelminthes	Flatworms	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)
Gastrotricha	Hairybacks	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Gnathostomulida	Jaw worms	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Kinorhyncha									
Coreifera	Mud dragons	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Loricifera	Brush heads	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Nematoda	Roundworms	0 (0)	0 (0)	0.040 (0.040)	0.040 (0.040)	0.16 (0.075)	0 (0)	0.88 (0.23)	0 (0)
Tardigrada	Water bears	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0.040 (0.040)	0 (0)	0 (0)
Annelida									
Oligochaeta	Earthworms	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Polychaeta	Bristle worms	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Bryozoa	Moss animals	0 (0)	0 (0)	0 (0)	0 (0)	0.080 (0.080)	0 (0)	0 (0)	0 (0)

Taxon	Common name	Habitat/seasons							
		Amphibolis/Posidonia			*Zostera*				
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Mollusca									
Bivalvia	Bivalves	0 (0)	0 (0)	0.12 (0.080)	0 (0)	0 (0)	0.20 (0.15)	0 (0)	0 (0)
Gastropoda	Gastropods	0 (0)	1.0 (0.50)	2.0 (0.69)	0.76 (0.098)	0 (0)	1.6 (0.95)	0.16 (0.075)	0.040 (0.040)
Gastropoda spp. (larvae)	Gastropods	0.24 (0.15)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Nudibranchia sp.	Nudibranchs	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Nudibranchia sp. (juvenile)	Nudibranchs	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Arthropoda									
Copepoda (other)	Other copepods	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Copepods (Harpactioid)	Benthic copepods	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Cumacea	Comma shrimps	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Halacaridae	Marine mites	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ostracoda sp. 1	Seed shrimp	5.3 (1.5)	7.9 (6.9)	10 (2.2)	2.4 (0.95)	2.6 (1.4)	6.4 (1.5)	3.1 (1.2)	1.6 (0.41)
Ostracoda sp. 2	Seed shrimp	0 (0)	0.12 (0.12)	0 (0)	0 (0)	0.080 (0.049)	0 (0)	0 (0)	0.12 (0.12)
Ostracoda sp. 3	Seed shrimp	0.48 (0.23)	0.40 (0.40)	0.64 (0.35)	0.40 (0.089)	0.48 (0.21)	1.6 (0.95)	0.12 (0.080)	0.88 (0.28)
Ostracoda sp. 4	Seed shrimp	0.20 (0.11)	0 (0)	0 (0)	0 (0)	0.24 (0.19)	0 (0)	0 (0)	0 (0)
Ostracoda sp. 5	Seed shrimp	0.52 (0.27)	0.16 (0.16)	0.12 (0.080)	0 (0)	0.12 (0.12)	0.040 (0.040)	0 (0)	0 (0)
Ostracoda sp. 6	Seed shrimp	0.24 (0.12)	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)
Echinodermata	Echinoderms	0 (0)	0.48 (0.35)	0.56 (0.28)	0 (0)	0.080 (0.080)	3.5 (1.2)	0 (0)	0 (0)
Chordata									
Ascidiacea	Sea squirt	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Tunicata	Tunicates	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Table 16. Mean site abundance of taxa sampled in deep (>15 m) habitats during meiofauna surveys across all seasons, 2025. Brackets contain standard error of mean.

Taxon	Common name	Habitat/seasons							
		Sand bioturbation			Sand/algae/inverts				
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Ciliophora									
Karyorelictea	Primitive ciliates	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Foraminifera									
Foraminifera sp. 1	Forams	8.3 (3.4)	12 (4.0)	3.9 (1.2)	5.0 (1.1)	2.5 (1.1)	20 (3.7)	4.3 (1.2)	3.6 (1.6)
Foraminifera sp. 2	Forams	0.60 (0.51)	0.72 (0.23)	0 (0)	0.16 (0.075)	0.72 (0.48)	1.8 (0.62)	0 (0)	2.0 (0.75)
Foraminifera sp. 3	Forams	0.20 (0.15)	0.24 (0.12)	0.12 (0.12)	0 (0)	0.72 (0.57)	1.1 (0.19)	0.040 (0.040)	0 (0)
Foraminifera sp. 4	Forams	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0.60 (0.37)	0.12 (0.080)	0 (0)	0.48 (0.32)
Foraminifera sp. 5	Forams	2.8 (1.3)	2.8 (0.95)	0.68 (0.22)	0.76 (0.13)	0.72 (0.15)	5.4 (1.4)	0.32 (0.14)	2.3 (1.0)
Foraminifera sp. 6	Forams	0 (0)	0 (0)	0.080 (0.049)	0 (0)	0.52 (0.17)	0.080 (0.049)	0 (0)	0 (0)
Foraminifera sp. 7	Forams	5.5 (2.7)	7.7 (1.5)	5.3 (1.1)	5.8 (0.86)	0.84 (0.34)	24 (0.72)	2.4 (0.79)	7.7 (3.7)
Foraminifera sp. 8	Forams	0.16 (0.075)	0.12 (0.049)	0.12 (0.080)	0.080 (0.049)	0.16 (0.12)	1.1 (0.24)	0.040 (0.040)	0.36 (0.26)
Cnidaria	Corals	0.24 (0.19)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Plathyhelminthes	Flatworms	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)
Gastrotricha	Hairybacks	0 (0)	0 (0)	0 (0)	0 (0)	0.080 (0.080)	0 (0)	0 (0)	0 (0)
Gnathostomulida	Jaw worms	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Kinorhyncha									
Coreifera	Mud dragons	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Loricifera	Brush heads	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Nematoda	Roundworms	0.12 (0.080)	0.040 (0.040)	0 (0)	0.20 (0.11)	0.24 (0.15)	0 (0)	0 (0)	0.44 (0.098)
Tardigrada	Water bears	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Annelida									
Oligochaeta	Earthworms	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Polychaeta	Bristle worms	0.12 (0.080)	0 (0)	0 (0)	0 (0)	0.24 (0.24)	0.080 (0.080)	0 (0)	0 (0)
Bryozoa	Moss animals	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)	0 (0)

Taxon	Common name	Habitat/seasons							
		Sand bioturbation			Sand/algae/inverts				
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Mollusca									
Bivalvia	Bivalves	0.080 (0.080)	0 (0)	0 (0)	0 (0)	0 (0)	0.080 (0.049)	0 (0)	0 (0)
Gastropoda	Gastropods	0 (0)	1.1 (0.37)	0.080 (0.049)	0.20 (0.063)	0 (0)	0.56 (0.12)	0.32 (0.12)	0.080 (0.049)
Gastropoda spp. (larvae)	Gastropods	0.040 (0.040)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Nudibranchia sp.	Nudibranchs	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Nudibranchia sp. (juvenile)	Nudibranchs	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Arthropoda									
Copepoda (other)	Other copepods	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Copepods (Harpactioid)	Benthic copepods	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Cumacea	Comma shrimps	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Halacaridae	Marine mites	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Ostracoda sp. 1	Seed shrimp	1.4 (0.42)	1.1 (0.40)	0.12 (0.12)	1.6 (0.41)	2.8 (0.74)	9.0 (0.92)	0.16 (0.075)	0.52 (0.24)
Ostracoda sp. 2	Seed shrimp	0.12 (0.080)	0 (0)	0.040 (0.040)	0 (0)	0.12 (0.080)	0 (0)	0 (0)	0 (0)
Ostracoda sp. 3	Seed shrimp	0.28 (0.17)	0 (0)	0 (0)	0.44 (0.20)	0.080 (0.049)	2.7 (0.34)	0 (0)	0.040 (0.040)
Ostracoda sp. 4	Seed shrimp	0.20 (0.15)	0.040 (0.040)	0 (0)	0 (0)	0.16 (0.16)	0 (0)	0 (0)	0 (0)
Ostracoda sp. 5	Seed shrimp	0.080 (0.080)	0.040 (0.040)	0 (0)	0 (0)	0.32 (0.14)	1.4 (0.75)	0 (0)	0.040 (0.040)
Ostracoda sp. 6	Seed shrimp	0.12 (0.080)	0.040 (0.040)	0.040 (0.040)	0 (0)	0.16 (0.12)	0.48 (0.23)	0 (0)	0 (0)
Echinodermata	Echinoderms	0.24 (0.075)	0.080 (0.080)	0 (0)	0 (0)	0 (0)	2.0 (0.38)	0 (0)	0 (0)
Chordata									
Ascidiacea	Sea squirt	0.12 (0.12)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Tunicata	Tunicates	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.040 (0.040)	0 (0)	0 (0)

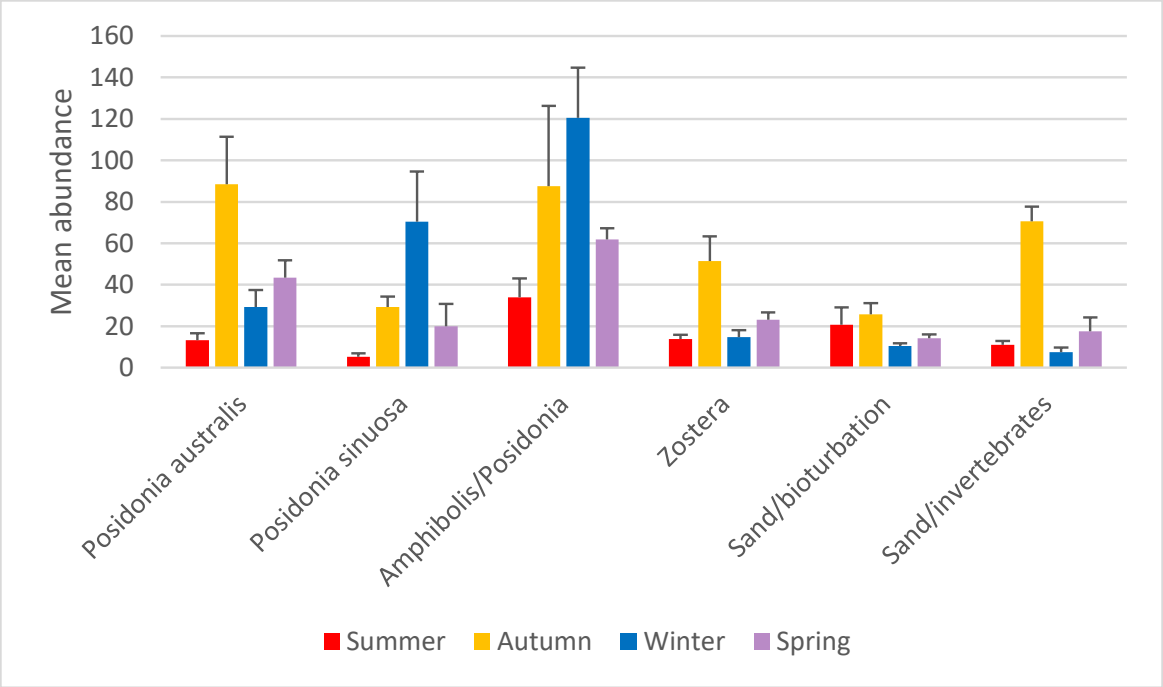


Figure 42. Mean total site abundance of taxa recorded in all habitats during meiofauna surveys across all seasons in 2025. Error bars show standard error of mean.

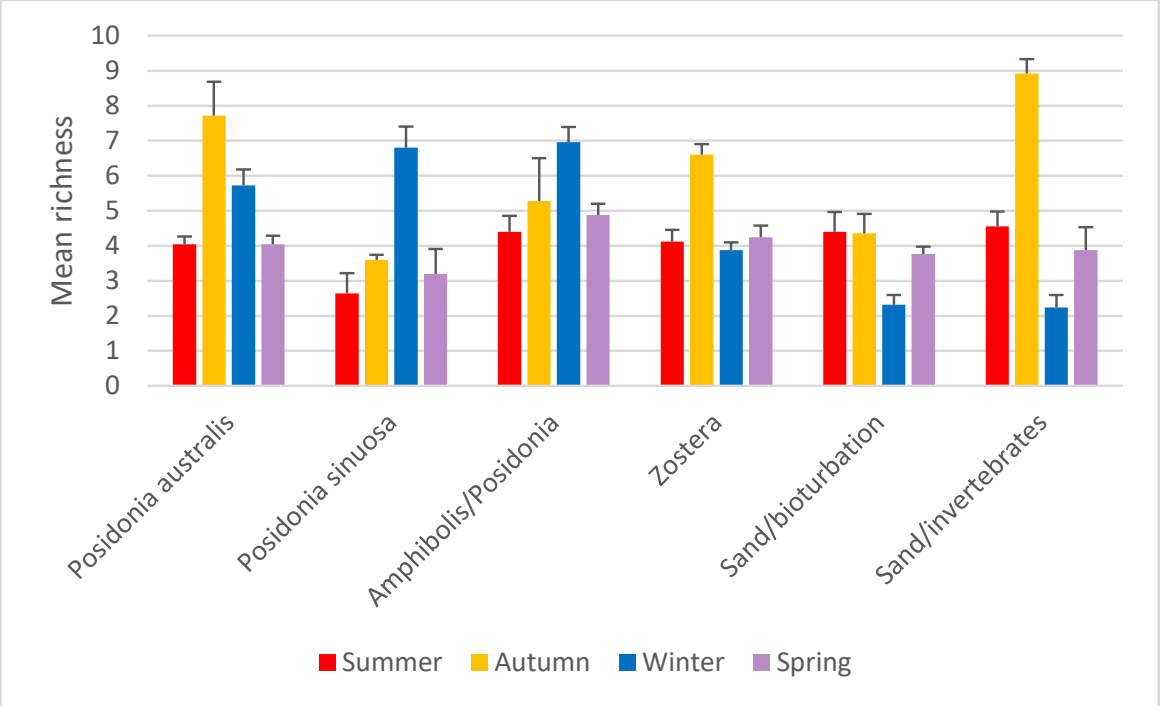


Figure 43. Mean site richness of taxa recorded in all habitats during meiofauna surveys across all seasons in 2025. Error bars show standard error of habitat mean.

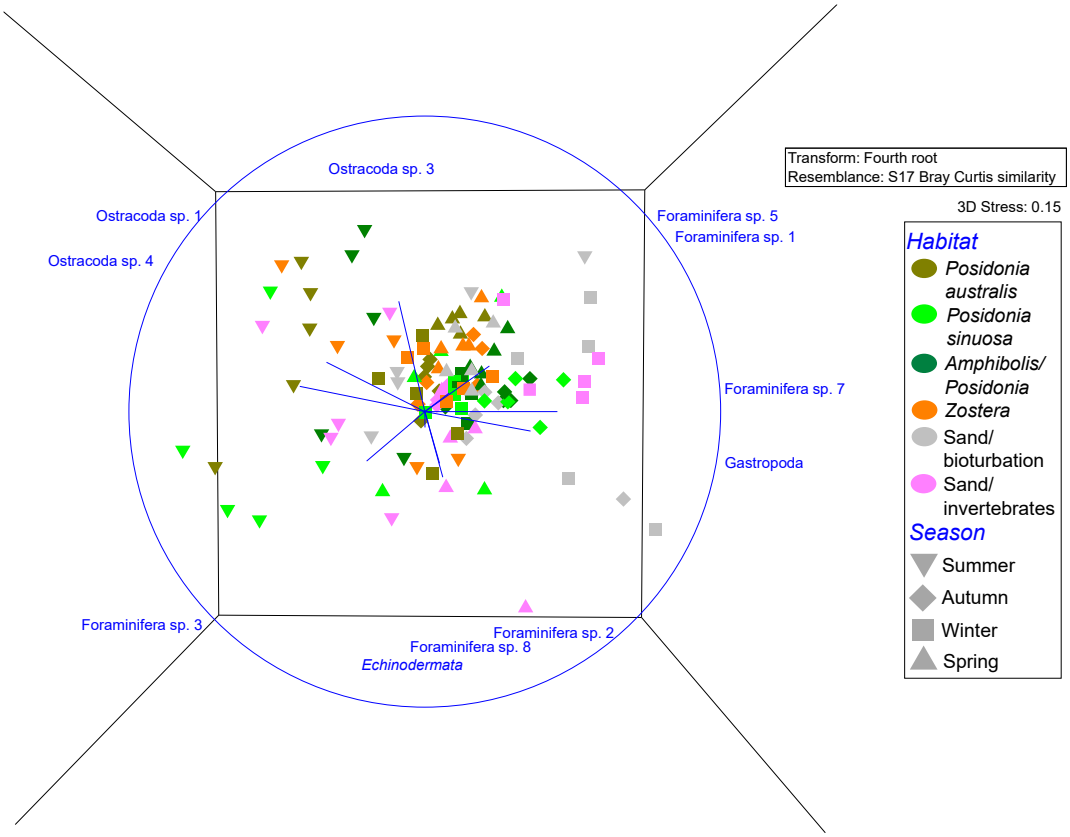


Figure 44. MDS plot representing structure of site-averaged meiofauna communities recorded in all habitats across all seasons in 2025.

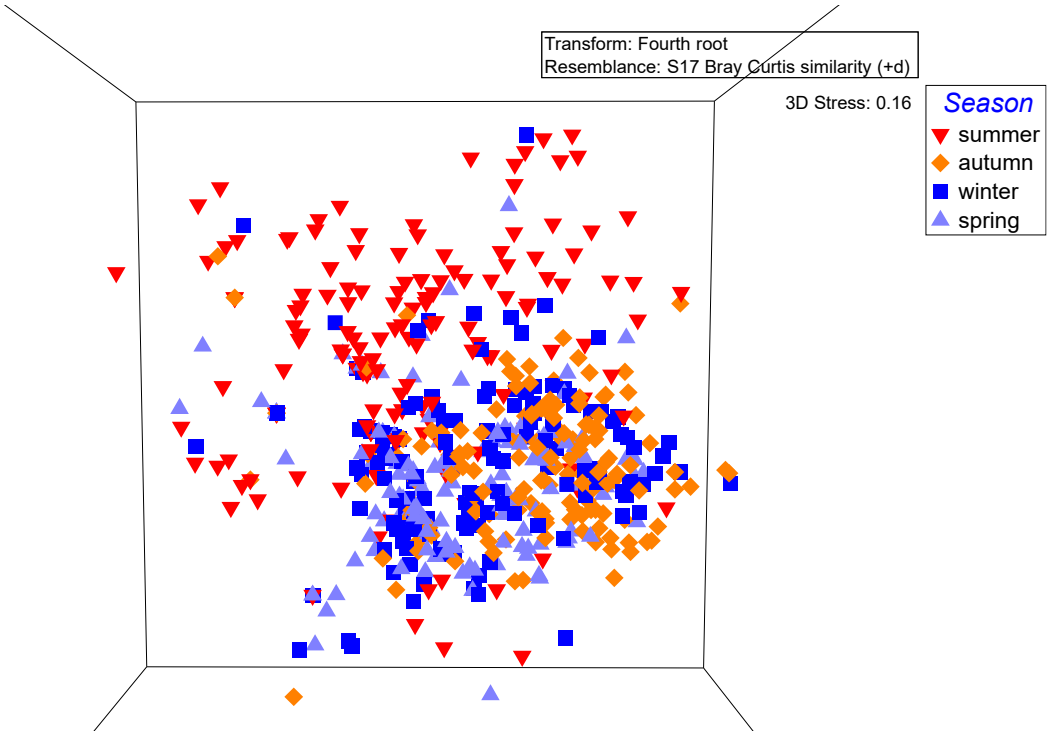


Figure 45. MDS plot representing structure of meiofauna communities (all replicates) recorded in all habitats across all seasons in 2025, highlighting seasonal patterns.

PART 3: DESKTOP STUDY RESULTS

7. Listed and other priority species

To further support the findings of the marine surveys, a desktop study was undertaken to determine species of conservation significance, including but not limited to those listed under the EPBC Act and/or South Australian *National Parks and Wildlife Act 1972* or *Fisheries Management Act 2007*, which may potentially interact with the Project.

The Protected Matters Search Tool and Atlas of Living Australia, which includes records from the Biological Databases of South Australia, identified marine mammal, marine turtle, shark and fish species listed under national (EPBC Act) and/or state (*National Parks and Wildlife Act 1972* or *Fisheries Act 2007*) legislation.

In addition, a number of species or species groups have been identified as important based on:

- publications discussing their conservation status (e.g. Cheshire et al. 2000)
- their socio-economic importance.

One such species is the giant Australian cuttlefish *Ascarosepion apama*, which is important for both natural heritage and recreation and tourism values in Spencer Gulf.

Species of importance for fisheries and aquaculture are discussed in Section 8.

7.1 Megafauna

A significant impact assessment for threatened and migratory species identified the following marine mammals, turtles and fishes as being known, possible or likely to occur within 5 km of the Project Area:

- Southern right whale *Eubalaena australis*
- Humpback whale *Megaptera novaeangliae*
- Australian sea lion *Neophoca cinerea*
- Loggerhead turtle *Caretta caretta*
- Leatherback turtle *Dermochelys coriacea*
- White shark *Carcharodon carcharias*

In addition, a number of other megafauna species have been identified as potentially interacting with the Project, based on records from Spencer Gulf, north of Wallaroo and Cowell, and their ability to move long-distances (Table 17).

Table 17. Megafauna species identified as potentially interacting with the Project, in addition to those identified by the significant impact assessment of threatened and migratory species (JBS&G 2026c), based on a search of records north of Cowell and Wallaroo.

Scientific name	Common name	EPBC Act Status	SA Status	Distribution and records
Arctocephalus forsteri	Long-nosed fur seal	Marine		Breeds in New Zealand and its subantarctic islands, and southern Australia, particularly South Australia (Shaughnessy et al. 2014). Nineteen ALA records in search area.
Balaenoptera bonaerensis	Antarctic minke whale	Migratory	Rare (as *Balaenoptera acutorostrata*)	Found near Antarctica throughout summer. Recorded from all Australian states but not Northern Territory. One ALA record in search area.
Balaenoptera edeni	Bryde's whale	Migratory	Rare	Wide ranging across temperate and tropical Australia, with no specific breeding or feeding habitats known in Australia. Five ALA records in search area.
Delphinus delphis	Short beaked common dolphin	Cetacean		Recorded in waters offshore from all Australian states and territories (although rarely in northern Australian waters). Ninety-six ALA records in search area.
Kogia breviceps	Pygmy sperm whale	Cetacean	Rare	Cosmopolitan, oceanic distribution, generally beyond the continental shelf. Few sightings in Australia, mainly of strandings. Seventeen ALA records in search area.
Mesoplodon layardii	Strap-toothed Whale	Cetacean		Circumpolar distribution in the Southern Hemisphere between latitudes of 25–55°S. One ALA record in search area.
Physeter macrocephalus	Sperm whale	Migratory	Rare	Occurs in deep waters in all oceans including all Australian states (possibly in fragmented populations), with concentrations near the continental shelf edge, including south-west of Kangaroo Island. One ALA record in search area.
Pseudorca crassidens	False killer whale	Cetacean	Rare	Wide distribution within tropical and warm temperate waters. Prefer areas of deep water in the open ocean away from land. Two ALA records in search area.
Tursiops spp.	Bottlenose dolphin	Cetacean		Two hundred and five ALA records in search area. Bottlenose dolphins are distributed continuously around the Australian mainland, but the taxonomic status of many populations is unknown. In Australia, Indo-Pacific bottlenose dolphin *T. aduncus* generally favours shallow embayments and nearshore habitats, while common bottlenose dolphin *T. truncatus* most commonly occurs in water deeper than 30 m. Three ALA records in search area.
Chelonia mydas	Green turtle	Vulnerable, Migratory	Vulnerable	Key breeding and foraging habitat is in tropical Australia. Two ALA records in search area.
Galeorhinus galeus	School shark	Conservation Dependent		Widespread in temperate waters. Inhabits continental shelves and upper to mid slopes from shallow inshore waters to well offshore at depths to 826 m, though most frequently above 200 m. Four ALA records in search area.

7.2 Syngnathids

Fishes of the family Syngnathidae (Syngnathids) include seadragons, seahorses and pipefish. They are listed as “Marine” under the EPBC Act, and as “Protected” under the South Australian *Fisheries Management Act 2007*.

The Protected Matters Search Tool (PMST) identified 25 Syngnathid species for which “species or species habitat may occur within area” within a search area comprising Spencer Gulf, north of Cowell and Wallaroo. In addition, there are 63 records of big-belly seahorse *Hippocampus abdominalis* within the search area. Pipefish of the genus *Stigmatopora* were recorded from BRUV footage (Section 5.3). This was likely spotted pipefish *S. argus*, for which there are 38 records in the search area, but may also have been widebody pipefish *S. nigra* or gulf pipefish *S. narinosa*, both of which have records elsewhere in Spencer Gulf, including just south of the search area.

Due to the cryptic nature of Syngnathids, the absence of ALA records is generally not a good indicator of their absence except in areas where harvesting methods such as beam trawls have occurred.

Details of the habitat, distribution and likely interaction with the Project of the 27 species identified from the PMST and ALA searches and field observations are provided in Table 18.

Table 18. Syngnathids with Atlas of Living Australia (ALA) records or identified by the PMST as potentially occurring or having habitat within a search area comprising Spencer Gulf north of Cowell and Wallaroo. Note: unless otherwise specified, knowledge of distribution and habitat is based on information provided by Reef Watch (2014) and ALA records (ALA 2026).

Species	Common name	Distribution and habitat	Likelihood of interaction with the Project
Campichthys tryoni	Tryon's pipefish	Described as endemic to Queensland (Thompson & Bray 2017), and all ten ALA records are from near Brisbane. However, there is a museum specimen from Gulf St Vincent (Baker 2007). Inhabits shallow rubble areas in estuaries, inner reef flats and reef margins bordering sand channels (Thompson & Bray 2017).	Unlikely (no suitable habitat within the MSA and no records from Spencer Gulf)
Filicampus tigris	Tiger pipefish	Subtropical distribution with a separate population in the South Australian gulfs. Usually found in sheltered bays, tidal channels and estuaries, on rubble, sandy or muddy bottom, or near the edges of seagrass beds. Most ALA records in South Australia are from Upper Spencer Gulf or the mouth of Gulf St Vincent. There are 12 ALA records from the search area, the nearest being from a prawn bycatch survey 10 km south-east of the MSA (Currie et al. 2009).	Likely (suitable habitat and recorded within 10 km of the MSA).
Heraldia nocturna	Upside-down pipefish	Found across southern Australia in caves and crevices on rocky reefs, in depths of 2-30 m. South Australian records are from Kangaroo Island and the southern part of the gulfs.	Unlikely (no suitable habitat within the MSA and no records from the search area)
Hippocampus abdominalis	Big-belly seahorse	Found in south-eastern Australia near reefs covered with macroalgae, or near seagrass, sponges and sand and rubble bottom in deeper water, generally to depths less than 50 m. There are 63 ALA records from the search area, the nearest being from a prawn bycatch survey 5 km east of the MSA (Currie et al. 2009).	Likely (suitable habitat and recorded within 5 km of the MSA)
Hippocampus breviceps	Short-head seahorse	Found in Tasmania, Victoria and South Australia, in sheltered seagrass or macroalgae, or near jetties, to depths of 15 m. Six ALA records from the search area and recorded during beam trawl surveys at Cowleds Landing (McDonald 2008).	Likely (suitable habitat and recorded within 10 km of the MS)
Histiogamphelus cristatus	Rhino pipefish	Ranges from southern Western Australia to the South Australian gulfs, generally in sandy areas, near rocks or rubble, and sparse seagrass. One record from the search area, about 50 km south of the MSA.	Possible (suitable habitat and recorded within 60 km of the MSA)

Species	Common name	Distribution and habitat	Likelihood of interaction with the Project
Hypselognathus rostratus	Knifesnout pipefish	Found in Victoria, Bass Strait and South Australia, mostly in shallow seagrass beds of *Posidonia* and *Zostera*, and on sandy substrates with clumps of seagrass and detritus in sheltered and more exposed waters to depths of 10 m. One ALA record from the search area, near Whyalla, and records from a wide range in Spencer Gulf, but not recorded during beam trawl surveys at Cowleds Landing (McDonald 2008).	Possible (suitable habitat and records from a wide range in Spencer Gulf, including 25 km from the MSA)
Idiotropiscis australis	Southern pygmy pipehorse	Found in Western Australia and South Australia, typically in and near seagrass and red macroalgae. The few records to date in South Australia have mainly come from red algae in southern Gulf St Vincent and Investigator Strait.	Unlikely (suitable habitat but no records within the search area)
Kaupus costatus	Deepbody pipefish	Known mainly from South Australia, in sheltered, silty, clear-water environments supporting *Zostera* seagrass or short, filamentous macroalgae. Seven ALA records from the search area, with the closest at Whyalla.	Possible (suitable habitat and recorded within 25 km of the MSA)
Leptoichthys fistularius	Brushtail pipefish	Found across southern Australia mainly in dense seagrass beds in depths of 3-20 m. Thirteen ALA records from a wide range of locations in the search area, with the closest at Whyalla and recorded during beam trawl surveys at Cowleds Landing (McDonald 2008)	Likely (suitable habitat and recorded within 10 km of the MSA)
Lissocampus caudalis	Smooth pipefish	Ranges from Bass Strait and northern Tasmania to southern Western Australia, in tide pools, seagrass beds, reefs with mixed macroalgae, sand and rubble habitats, and under jetties, in depths to 10 m. One record from the search area at Port Davis and recorded during beam trawl surveys at Cowleds Landing (McDonald 2008).	Likely (suitable habitat and recorded within 10 km of the MSA)
Lissocampus runa	Javelin pipefish	Ranges from northern New South Wales to southern Western Australia, including Tasmania. Habitats include estuaries, tide pools, shallow seagrass beds, shallow rubble reefs with short macroalgae and subtidal sand habitat, to depths of 18 m. One record from near Wallaroo.	Possible (suitable habitat and recorded in the search area)
Maroubra perserrata	Sawtooth pipefish	Ranges from northern New South Wales to southern Western Australia, including Tasmania, in rocky caves and crevices in depths to 15 m. Records from lower Gulf St Vincent but not Spencer Gulf.	Unlikely (no suitable habitat within the MSA and no records from Spencer Gulf)

Species	Common name	Distribution and habitat	Likelihood of interaction with the Project
Notiocampus ruber	Red pipefish	Ranges from New South Wales to Western Australia, including Tasmania, in filamentous and other red macroalgae, amongst sponges in reef crevices, in seagrass beds, and shipwrecks. The few records from South Australia have been from lower Gulf St Vincent, Kangaroo Island and south-east South Australia.	Unlikely (suitable habitat but no records from Spencer Gulf)
Phycodurus eques	Leafy seadragon	Found mainly in Western Australia and South Australia, with isolated records from Victoria and northern Tasmania, in and near seagrass and macroalgae at the edges of reefs, and near jetties. One ALA record from Douglas Bank.	Unlikely (no suitable habitat within the MSA and no records within 50 km)
Phyllopteryx taeniolatus	Weedy seadragon	Found across southern Australia in reef areas with kelp and other macroalgae, and in mixed seagrass, macroalgae, sponge, bare sand and rubble habitats. One ALA record from Douglas Bank.	Unlikely (no suitable habitat within the MSA and no records within 50 km)
Pugnaso curtirostris	Pugnose pipefish	Ranges from Bass Strait and northern Tasmania to south-western Western Australia in shallow seagrass, short macroalgae and areas of rubble and sand, to depths of 15 m. Juveniles are found in estuaries and shallow bays, often amongst decaying seagrass. One ALA record from False Bay and recorded during beam trawl surveys at Cowleds Landing (McDonald 2008).	Likely (suitable habitat and recorded within 10 km of the MSA)
Solegnathus robustus	Robust pipehorse	Known mainly from prawn trawls in the Great Australian Bight area and the mouth of Spencer Gulf, in depths of 40-70 m.	Unlikely (no suitable habitat within the MSA and no records from the search area)
Stigmatopora argus	Spotted pipefish	Ranges from the central New South Wales coast to Shark Bay in Western Australia, including Tasmania. Inhabits seagrass beds of various types. Thirty-eight ALA records from a wide range of locations in the study area, with the nearest at Eight Mile Creek. Also recorded during beam trawl surveys at Cowleds Landing (McDonald 2008). *Stigmatopora* spp. were recorded in multiple seagrass habitats and seasons during BRUV surveys within the MSA.	Likely (suitable habitat and recorded within 10 km of the MSA and at genus level within it)
Stigmatorpora narinosa	Gulf pipefish	Distribution limited to the South Australian gulfs, preferring areas with low turbidity and a patchy substrate of brown algae and sparse seagrass in 1–5 m (Bray 2025). No ALA records from the search area. *Stigmatopora* spp. were recorded in multiple seagrass habitats and seasons during BRUV surveys within the MSA.	Possible (suitable habitat and recorded at genus level within the MSA)

Species	Common name	Distribution and habitat	Likelihood of interaction with the Project
Stigmatopora nigra	Widebody pipefish	Distributed across New Zealand and southern Australia, including Tasmania, in seagrass. No ALA records from the search area but recorded during beam trawl surveys at Cowleds Landing (McDonald 2008). *Stigmatopora* spp. were recorded in multiple seagrass habitats and seasons during BRUV surveys within the MSA.	Likely (suitable habitat and recorded within 10 km of the MSA and at genus level within it)
Stipecampus cristatus	Ringback pipefish	Found mainly in Victoria, northern Tasmania and South Australia in sparse seagrass in sandy bays and estuaries, but may also occur in other habitats, such as rubble reef and shell beds with low macroalgae, typically in depths to 15 m but have been found in deeper waters in Bass Strait. No ALA records in the search area.	Unlikely (limited suitable habitat and not recorded within the study area)
Urocampus carinirostris	Hairy pipefish	Ranges from tropical Australia and Papua New Guinea to Tasmania, in estuaries and protected inshore marine habitats, often in *Zostera* seagrass to depths of a few metres. Very rarely recorded in South Australia, with no records from Spencer Gulf.	Unlikely (limited suitable habitat and no records in Spencer Gulf)
Vanacampus margaritifer	Mother-of-pearl pipefish	Ranges from southern Queensland to South Australia excluding Tasmania, with a separate population in Western Australia. Inhabits estuarine areas, coastal lagoons and shallow bays amongst seagrass and macroalgae over sand, rubble and mud, to depths of about 10 m. The only ALA record from Spencer Gulf is near Port Lincoln.	Unlikely (suitable habitat but no records within the search area)
Vanacampus phillipi	Port Phillip pipefish	Ranges from southern New South Wales through to southern Western Australia, in estuaries and in shallow sandy and muddy bays with seagrass, but also in shallow reefs with macroalgae, to depths of 25 m. Eleven records from around Port Pirie and records from a wide range in Spencer Gulf and recorded during beam trawl surveys at Cowleds Landing (McDonald 2008).	Likely (suitable habitat and recorded within 10 km of the MSA).
Vanacampus poecilolaemus	Longsnout pipefish	Several populations across southern Australia, in *Posidonia* and *Zostera* seagrass beds, and on shallow reefs with macroalgae in bays, to 25 m depth. Seven ALA records from around Port Pirie and south-east of Port Broughton and recorded during beam trawl surveys at Cowleds Landing (McDonald 2008).	Likely (suitable habitat and recorded within 10 km of the MSA)
Vanacampus vercoi	Verco's pipefish	Endemic to South Australia, in tide pools, tidal channels, shallow subtidal macroalgae and seagrass, and rubble bottom habitat, to about 3 m deep.	Unlikely (limited suitable habitat and no records within the search area)

7.3 Giant Australian cuttlefish

The giant Australian cuttlefish *Ascarosepion apama* has a broad distribution around Australia's southern coastline (Hall & Fowler 2003, Edgar 2008). Throughout its range, the nearshore reef on Point Lowly peninsula[7] is the only location where it is known to form a dense spawning aggregation, and this is the only known such occurrence in the world (Hall & Fowler 2003).

Within that broad distribution, genetic studies found that there were distinct populations in New South Wales, South Australia/Victoria and Western Australia (Hall & Fowler 2003). Further genetic studies found that cuttlefish from northern Spencer Gulf (north of Wallaroo) were a separate population from those in southern Spencer Gulf, a separate species under the biological species concept[8], and appeared to be the only population represented in the spawning aggregation at Point Lowly (Gillanders et al. 2016). However, the northern Spencer Gulf population has not been formally described as a distinct species and was not considered to be a distinct species for the purposes of the EPBC Act (TSSC 2011).

Hall and Fowler (2003) found cuttlefish to be widely distributed through Spencer Gulf (north of Arno Bay), at densities that were higher in autumn than summer but much lower densities than at the aggregation area (Figure 46). An observation of a cuttlefish at Point Lowly, that had been tagged 65 km further south, suggests that the breeding aggregation is drawn widely from northern Spencer Gulf (Hall & Fowler 2003).

Further surveys of cuttlefish were undertaken over a greater portion of Spencer Gulf by prawn trawlers during 2013/2014 (Steer 2015), including both fishery-dependent surveys at a fixed set of sites (Figure 48), and fishery independent surveys at variable locations (Figure 47). These surveys also found giant Australian cuttlefish to be widely distributed, with densities in northern Spencer Gulf again highest in autumn.

Four locations in the northern half of Spencer Gulf were searched, using towed camera surveys, for evidence of cuttlefish breeding aggregations, including Point Douglas, Point Riley, Port Hughes and north of Arno Bay (Steer 2015). No cuttlefish were found at these locations, despite the presence of rocky reef habitat considered adequate to accommodate spawning cuttlefish.

It is likely that giant Australian cuttlefish outside of the population north of Wallaroo are sustained by dispersed spawning activity at isolated reefs (Rowling 1994, Steer 2015).

No giant Australian cuttlefish were recorded near Mullaquana Station during seasonal epifauna surveys in 2025 using scuba, BRUV or towed camera (Section 5).

Further information on giant Australian cuttlefish is provided by JBS&G (2026b).

[7] Note that there are also smaller discrete aggregations at Whyalla, ~20 km west and Backy Point, ~10 km north of Point Lowly (Hall and Fowler 2003).

[8] Defines a species as a group of interbreeding natural populations that are reproductively isolated from other such groups

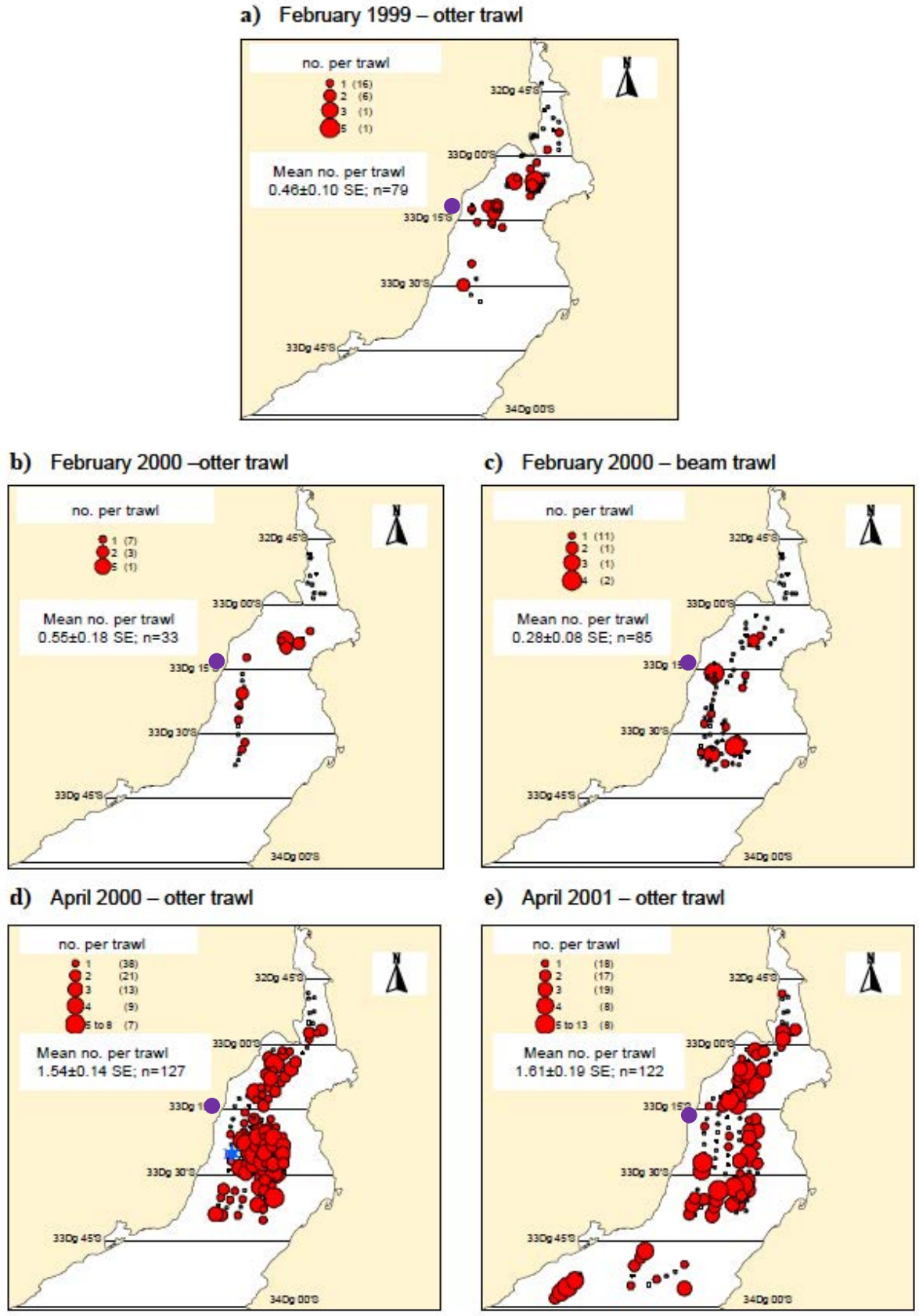


Figure 46. Abundance (number per trawl) and distribution of giant Australian cuttlefish in northern Spencer Gulf. Open circles indicate zero abundance. Blue point indicates tagging location of cuttlefish. Purple dots added to show approximate location of Mullaquana Station. Source: Hall & Fowler 2003.

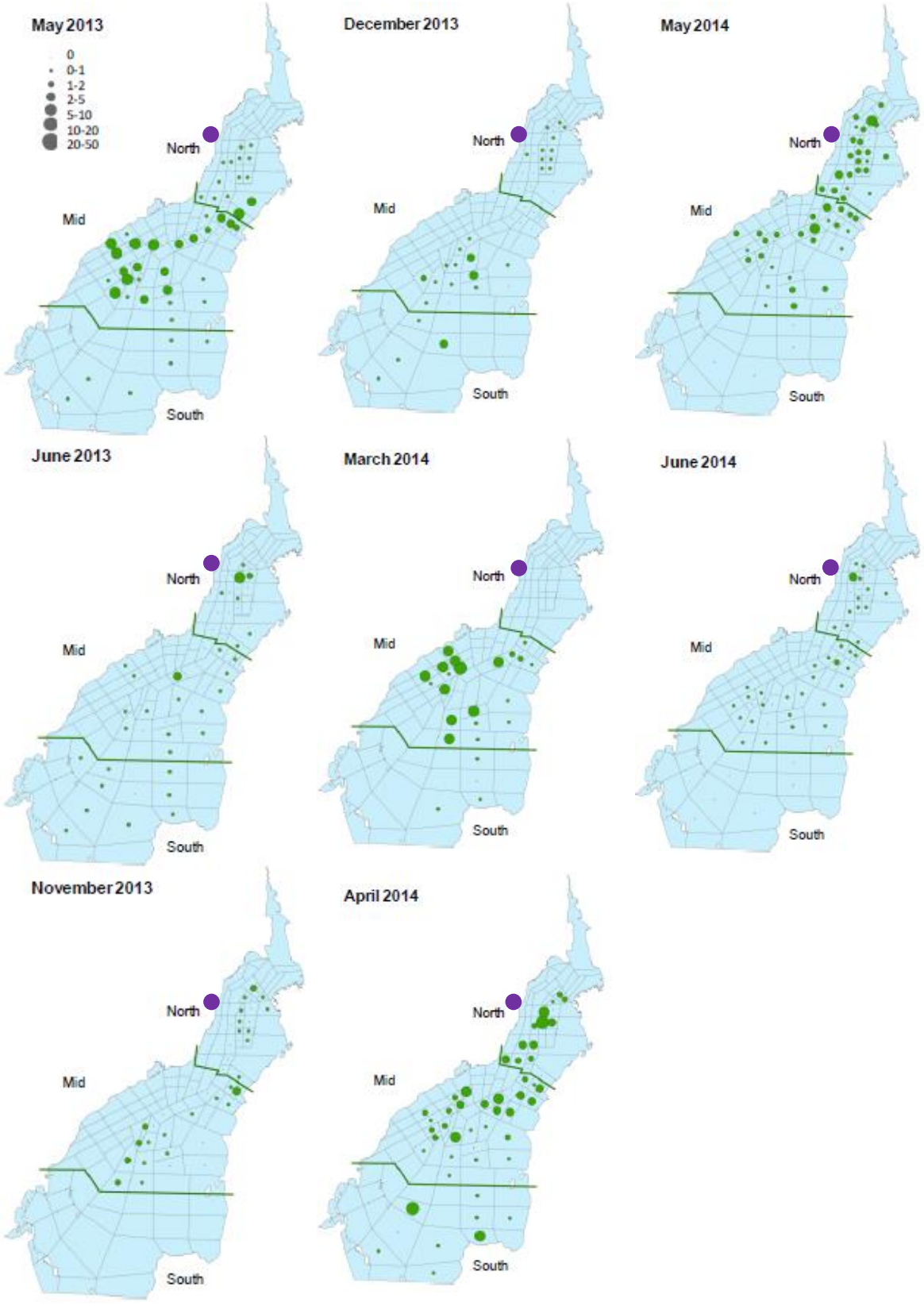


Figure 47. Abundance (number per trawl hour) and distribution of giant Australian cuttlefish in Spencer Gulf from fishery-dependent surveys. Source: Steer 2015 (layout adapted, and purple dots added to show approximate location of Mullaquana Station).

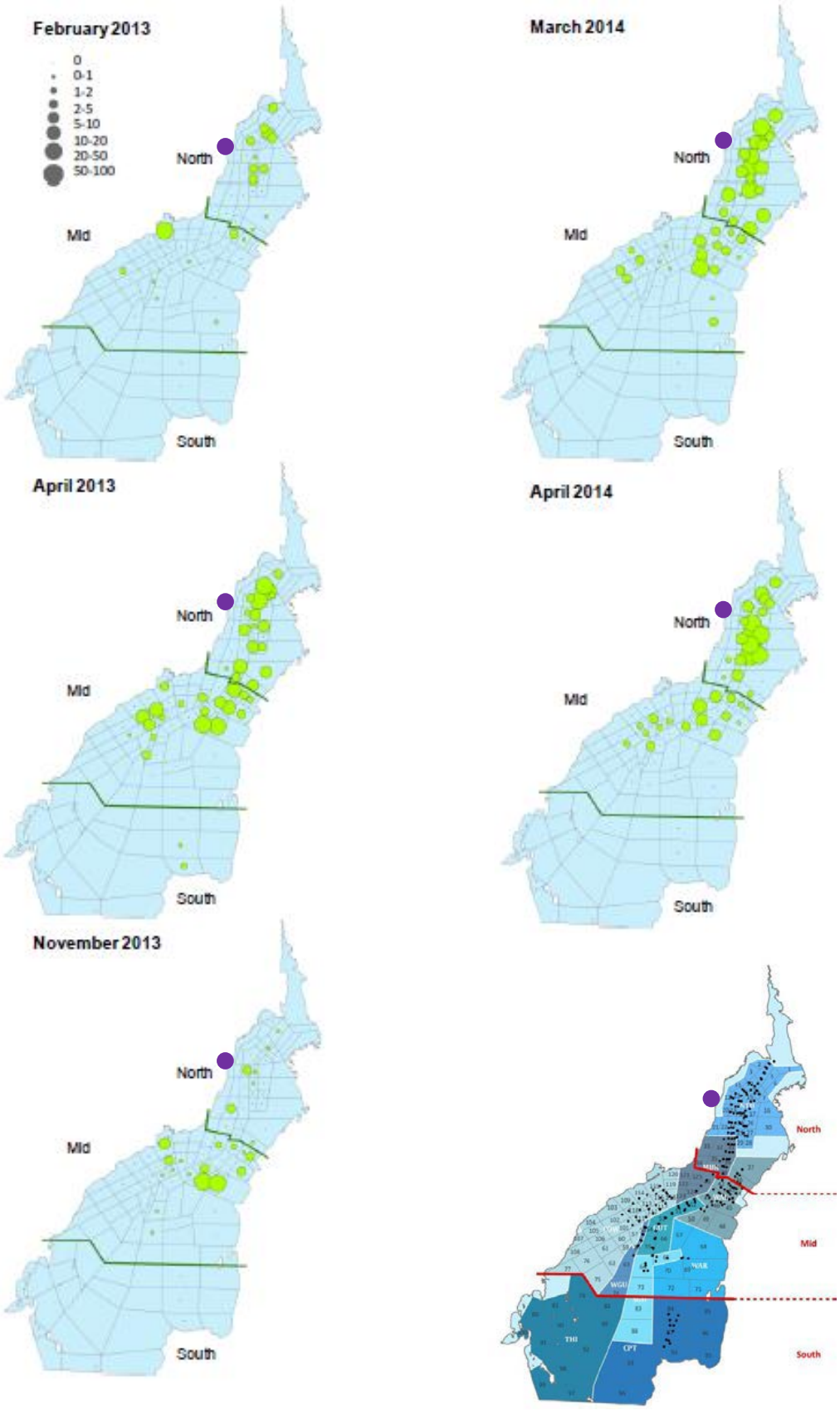


Figure 48. Abundance (number per trawl hour) and distribution of giant Australian cuttlefish in Spencer Gulf from fishery-independent surveys. Bottom-right map shows locations of surveys (black dots). Source: Steer 2015 (layout adapted). Purple dots added to show approximate location of Mullaquana Station.

7.4 Sponges

Sponges have important ecological functions including substrate stabilization, nutrient cycling, habitat formation and filtering, and have increasing economic importance for bioprospecting (Sorokin & Currie 2009).

Much of the current understanding of the sponge fauna in Spencer Gulf comes from a fishery-independent survey of bycatch in the Spencer Gulf Prawn Fishery in 2007. The survey comprised 120 sites distributed widely in the Gulf to represent a variety of historical fishing intensities, depths (>10m), sediment types and seascapes (e.g. banks, gutters, bays) (Currie et al. 2009). The 105 sponge taxa identified across 98 of the 120 sites represented more than a quarter of the taxa identified for the overall survey, and sponges had the third highest biomass of all phyla (Sorokin & Currie 2009). A species accumulation curve for the survey suggests that further sampling would have identified additional taxa in Spencer Gulf (Sorokin & Currie 2009). The distribution of sponge biomass and richness found during the survey is presented in Figure 49. The MSA is adjacent to one of two broad areas of relatively high sponge biomass and richness in Spencer Gulf.

The Spencer Gulf community was found to have few species in common with collections from nearby regions. A further collection made by BHP Billiton (2011a) from several sites in Upper Spencer Gulf found that a dense sponge community at Point Lowly had a greater proportion of unique sponges within Spencer Gulf than the other sites investigated.

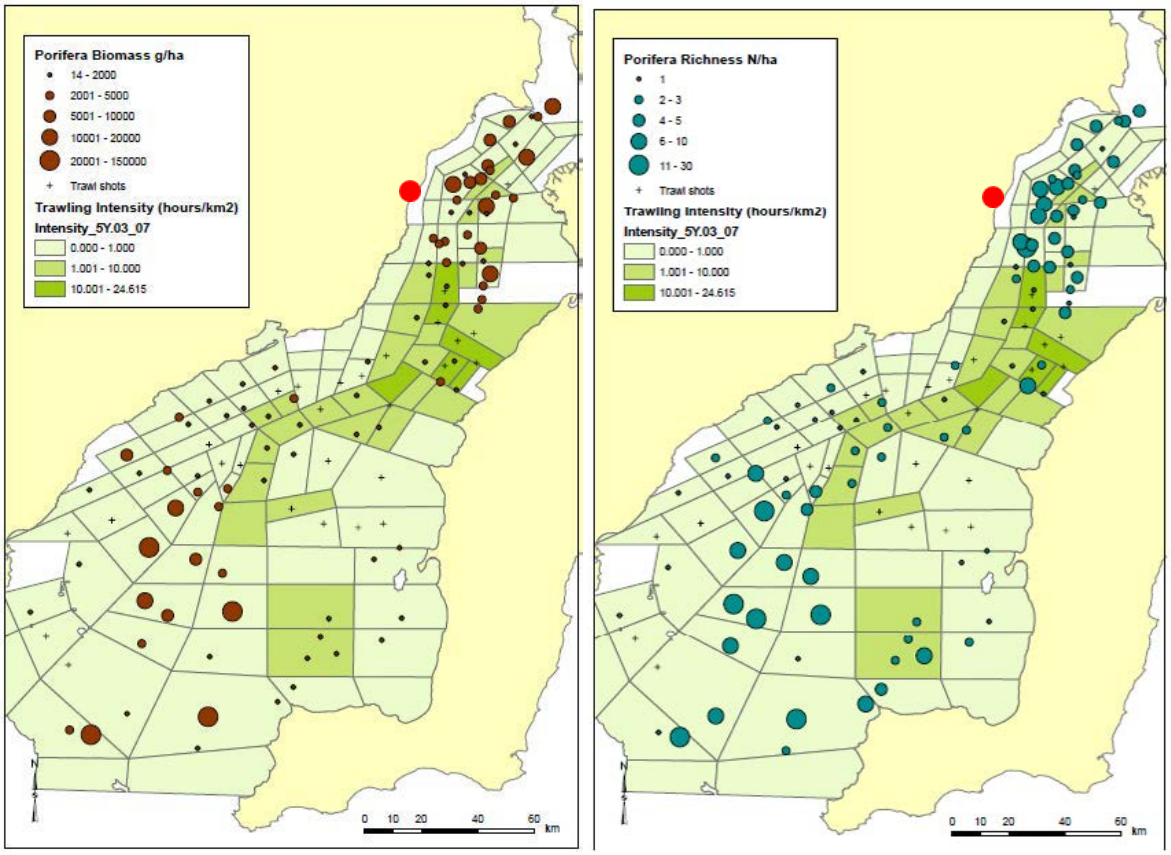


Figure 49. Distribution of sponge biomass (left) and richness (right) found during a Spencer Gulf Prawn Fishery bycatch survey in 2007. Source: Sorokin & Currie 2009 (layout adapted, and red dots added to show approximate location of Mullaquana Station).

Towed camera surveys to quantify epibenthic fauna in silty sand habitats during 2025 found seasonal mean site abundances of 0.5–1.3 across the Sand/Bioturbation and Sand/Invertebrate habitats and 0–1.0 in Bryozoan habitat (Section 5.2). Scuba surveys of 50 m x 1 m belt transects recorded seasonal mean site abundances of 0–5.0 per transect in *Posidonia australis* habitat, 3.2–8.0 in mixed *Amphibolis*/*Posidonia sinuosa* habitat, 8.4–12.0 in *Posidonia sinuosa* habitat and 3.8–5.6 in *Zostera* habitat (Section 5.1).

7.5 Macroalgae

With the lack of reef habitat within the MSA, large canopy-forming macroalgal communities are not present. Macroalgae are generally attached to shells, including living razor clams *Pinna bicolor* and dead shells or fragments of other bivalves, or are epiphytic on seagrass. Eight species generally of a foliose or filamentous nature were recorded from prawn trawl bycatch studies offshore from the MSA (Currie et al. 2009, Burnell et al. 2015), including:

- *Caulerpa cactoides*
- *Ectocarpus flagelliformis*
- *Gracilaria* sp. 3
- *Gracilaria* sp. 5
- *Hormophysa cuneiformis*
- *Melanthalia obtusata*
- *Phacelocarpus peperocarpos*
- *Spongoclonium conspicuum*

Cheshire et al. (2000) identified a number of species of macroalgae considered to be vulnerable due to their paucity of records or restricted range. The nearest record to Mullaquana Station of such species is of the red macroalga *Bonnemaisonia australis*, 25 km north-east at Whyalla. This species was assigned a Vulnerable classification based on having five or less records but on a second tier of this classification based on a range > 500m (Cheshire et al. 2000). It is noted that the ALA (2026) currently shows 23 records across a range extending from Bremer Bay in Western Australia to Tasmania and would therefore no longer meet the criteria for Vulnerable.

Other records of vulnerable species are more than 40 km from Mullaquana Station, near Point Lowly and Port Broughton (Cheshire et al. 2000).

8. Fisheries and aquaculture

8.1 Overview

Fisheries operating in Spencer Gulf include:

- Western Zone Abalone Fishery
- Northern Zone Rock Lobster Fishery
- Spencer Gulf Prawn Fishery
- Blue Crab Fishery (Spencer Gulf Sector)
- Sardine Fishery
- Marine Scalefish Fishery
- Charter Boat Fishery
- Recreational Fishery

Some of these fisheries depend on seagrass, unvegetated soft bottom, sheltered beach, tidal flat, tidal creek and saltmarsh habitats near Mullaquana Station for at least part of the life cycle of their related species (Bryars 2003).

There are also zones providing for aquaculture within Spencer Gulf, some of which have current leases, and zones that specifically exclude aquaculture.

8.2 Western Zone Abalone Fishery

The Western Zone Abalone Fishery is a quota managed fishery targeting blacklip abalone *Haliotis rubra*, greenlip abalone *H. laevigata* and Roe's abalone *H. roei*, using hand collection by scuba divers (Stobart & Daly 2025). There are 22 licence holders (Stobart & Daly 2025). The fishery was historically open to fishing all year, but in recent years there have been temporal closures, the latest being 1 August to 31 October 2024 (Stobart & Daly 2025). Commercial catches are reported to PIRSA for variable sized areas with unique "Map codes", which are grouped into spatial assessment units (SAUs).

No abalone catch has ever been recorded from within the MSA, which is outside all SAUs (Figure 50).

Abalone tend to have limited dispersal between populations covering scales of up to 135 km for greenlip abalone and less than 15 km for blacklip abalone (Stobart & Daly 2025). It is therefore considered unlikely that there is habitat near Mullaquana Station for life stages of abalone that disperse elsewhere.

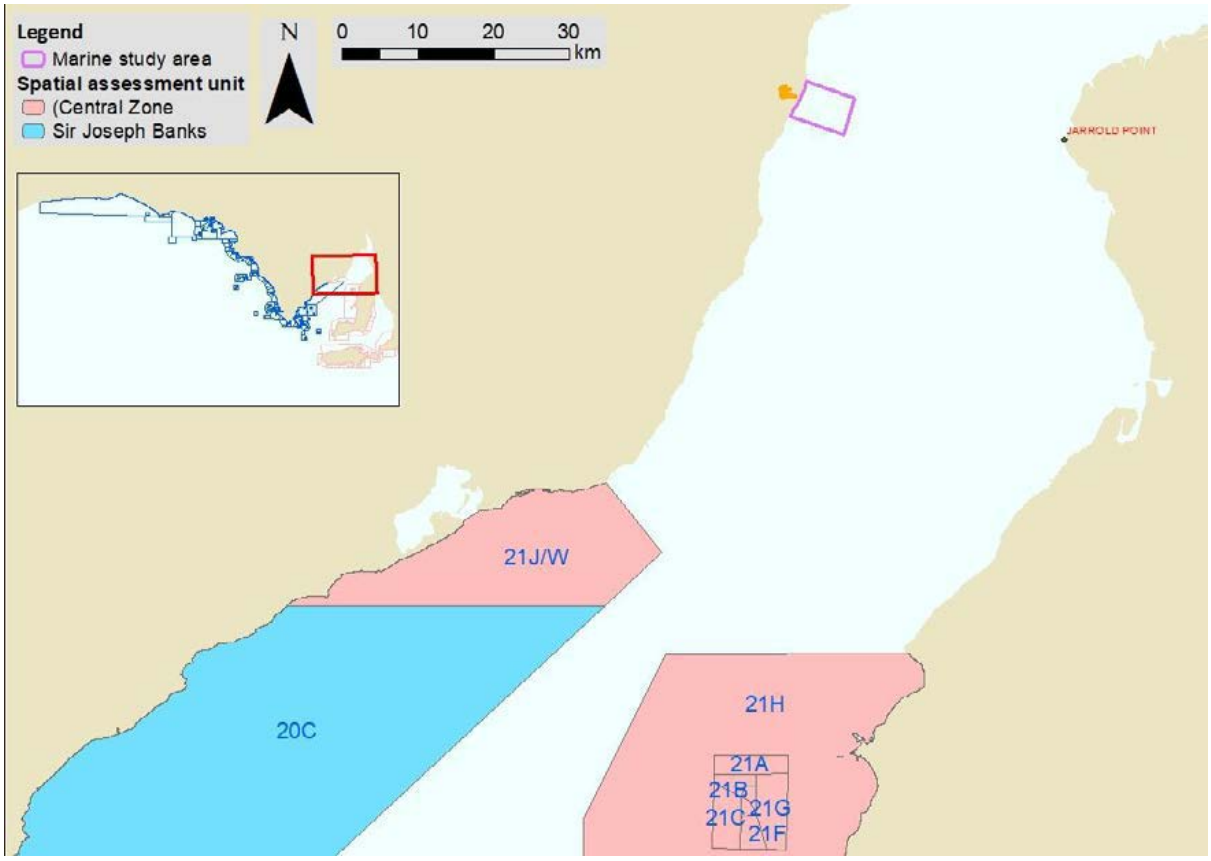


Figure 50. Spatial assessment units (SAUs) and map codes for the Western Zone Abalone Fishery near the MSA. Inset map shows Western Zone SAUs in blue, and Central Zone SAUs in red.

8.3 Northern Zone Rock Lobster Fishery

The Northern Zone Rock Lobster Fishery is a quota managed fishery targeting southern rock lobster *Jasus edwardsii* using pots. There are 63 licence holders (Linnane et al. 2024). The fishery has an annual closed season from 1 June to 31 October. Commercial catches are reported to PIRSA for Marine Fishing Areas (MFAs) with area up to 10,000 km^2 (one degree square), but less when truncated by coastlines. In 2021, 92% of the catch came from 10 MFAs (Linnane et al. 2024).

The MSA covers approximately 1.9% of MFA 21, which spans 1,852 km^2 (Figure 51), but contains no reef habitat (J Diversity 2025). There was no catch from this MFA between 1993–2011 (Ward et al. 2012). Catches from it have not been reported in recent annual stock assessments (Linnane et al. 2026), but due to the lack of suitable habitat it is expected that they have remained at zero.

Southern rock lobster larvae spend 12–24 months in offshore waters between hatching and settlement on inshore reefs (Linnane et al. 2013). Given the lack of any suitable habitat or catch history, it is unlikely that the MSA is a significant source of larvae for the broader fishery.

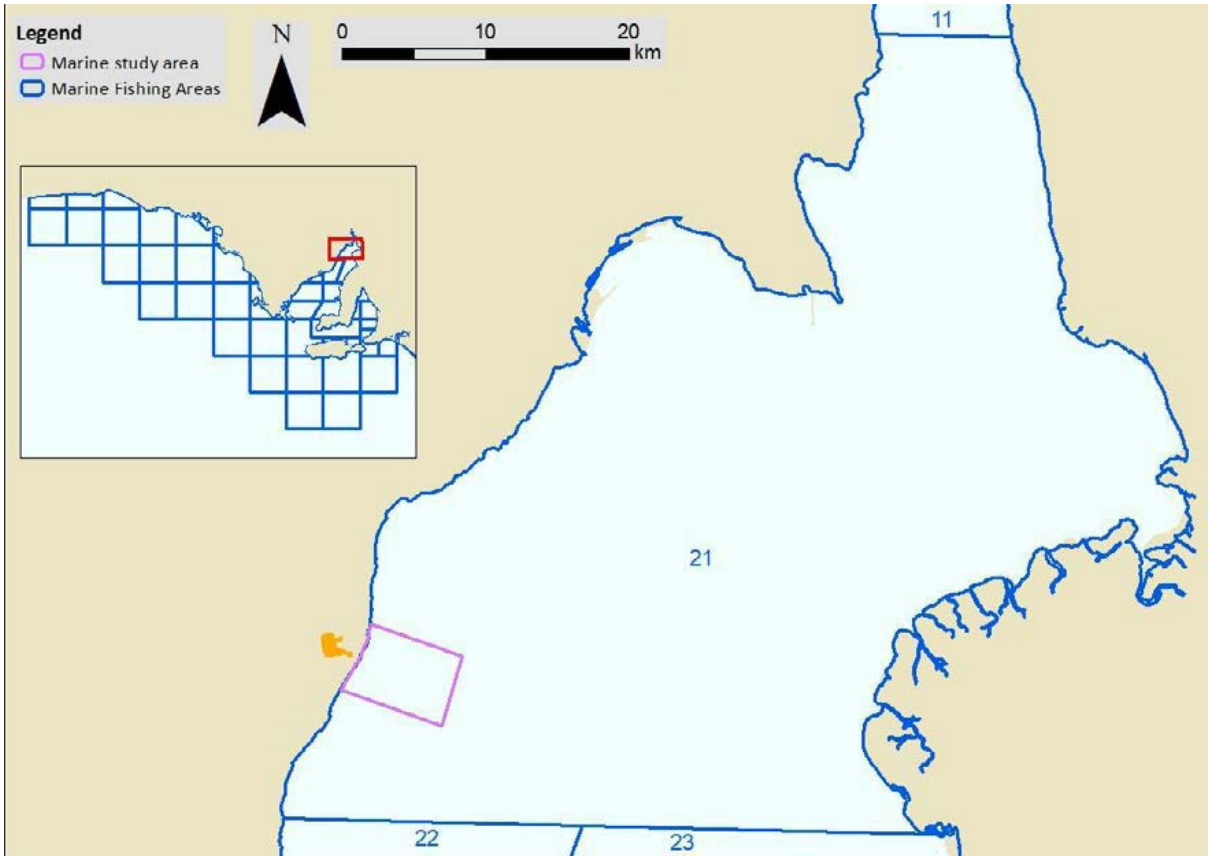


Figure 51.Reporting blocks in the Northern Zone Rock Lobster Fishery near the MSA.

8.4 Spencer Gulf Prawn Fishery

The Spencer Gulf Prawn Fishery has 39 licence holders (Heldt et al. 2025). The target species is the western king prawn *Penaeus latisulcatus*, harvested using an otter trawl in waters deeper than 10 m, but other retained species include eastern Balmain bug *Ibacus peronii* and southern calamari *Sepioteuthis australis* (Heldt et al. 2025). Fishing generally occurs during November–December and March–June, at nighttime up to a week either side of the new moon. Commercial catches are reported for spatial blocks of variable size but typically 5–10 thousand hectares in Upper Spencer Gulf (Heldt et al. 2025).

The MSA overlaps with about 48% of prawn reporting Block 12, which is about 41 km^2 and about 5% of Block 13 which is about 101 km^2 (Figure 52). The level of catch was zero in Block 12 throughout the 2016/17–2023/24 seasons, except pre-Christmas 2021 when it was confidential (and therefore probably low[9]); and was zero or confidential in Block 13 for all the aforementioned seasons, except for pre-Christmas catches of 10–20 t in 2016 and 2–10 t in 2021 and 2023, and 2–10 t and a confidential catch in April and June 2024, respectively (Noell & Hooper 2019, 2021, Heldt & Hooper 2023, Heldt et al. 2025). Based on the footprint of the Fishery during 2001–2018, which shows negligible intensity in the vicinity of the MSA (Figure 53), it is likely that the catches within Block 13 were beyond the offshore boundary of the MSA.

Juvenile western king prawns predominantly occur on intertidal sand and mudflats, generally located between shallow or intertidal seagrass beds and mangroves located higher on the shoreline (SARDI 2026b). Unvegetated soft bottom and tidal creeks between Murninnie Beach (8 km south of the MSA) and Whyalla also provide nursery habitat (Bryars 2003). The results of surveys of prawn larvae and juvenile prawns suggest that the MSA is within a region of significant spawning and/or nursery habitat (Figure 54).

One of the transects used to survey prawn stocks twice annually (to measure prawn biomass and inform fishing strategies) is within the MSA (Noell & Hooper 2019, Figure 53). One of 120 sites surveyed for bycatch in 2007 and 2013 is approximately 2 km offshore from the MSA (Currie et al. 2009, Burnell et al. 2015).

[9] Catches are confidential when less than five operators report catch for the block during the period in question

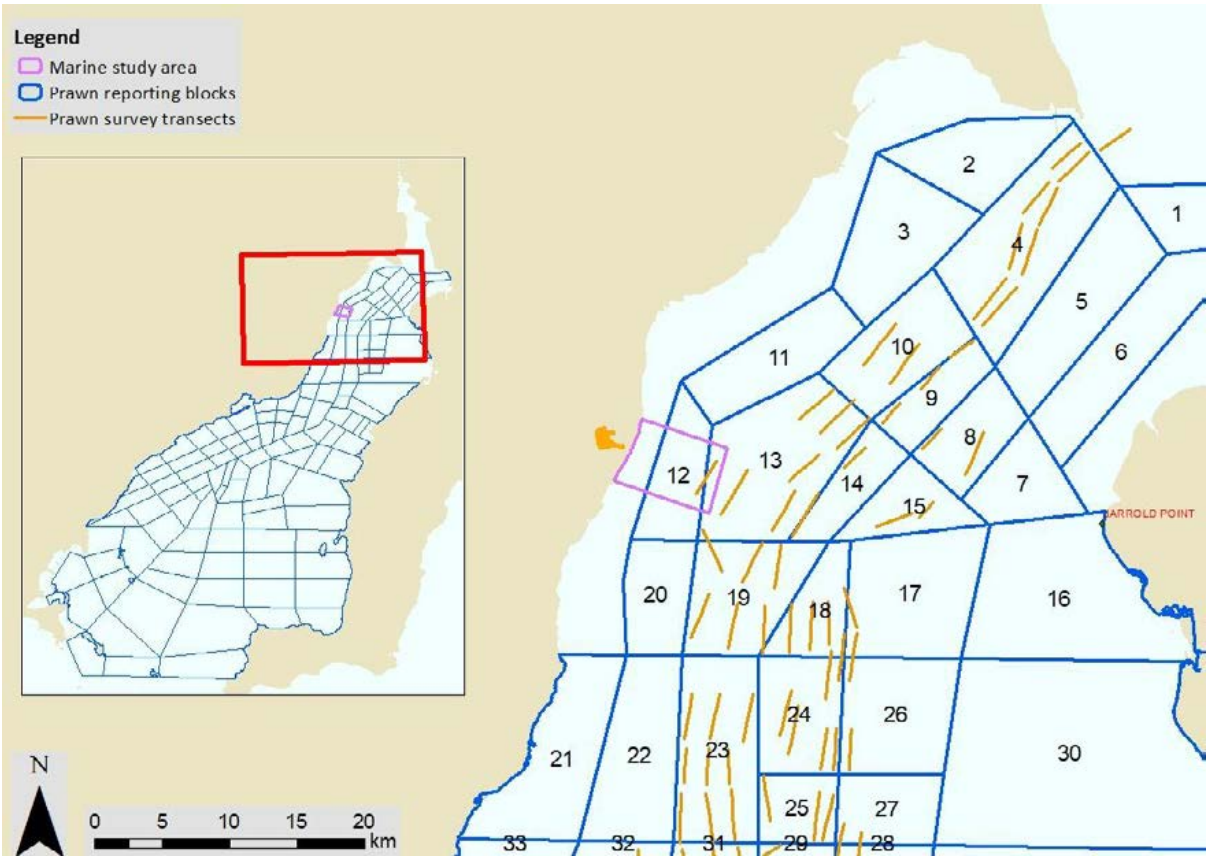


Figure 52. Reporting blocks for the Spencer Gulf Prawn Fishery near the MSA.

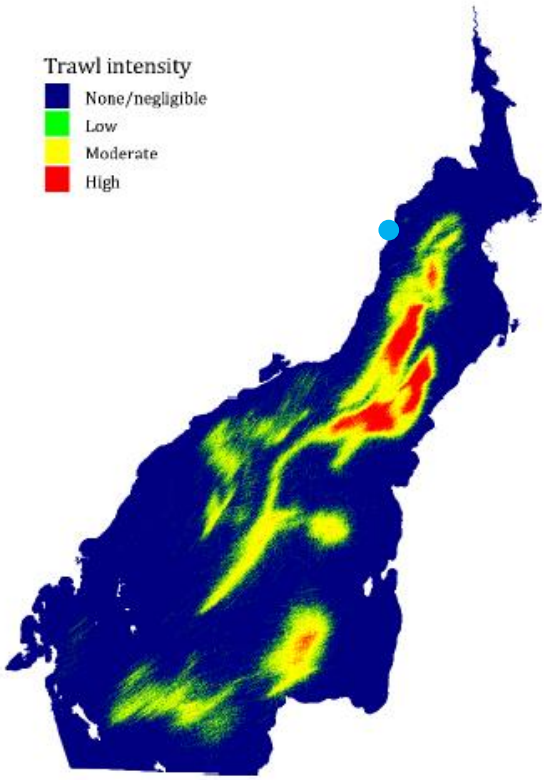


Figure 53. Spencer Gulf Prawn Fishery footprint, based on 40% of the total effort during 2001/02–2017/18. Source: Noell & Hooper 2019. Light blue dot was added to indicate approximate location of the MSA.

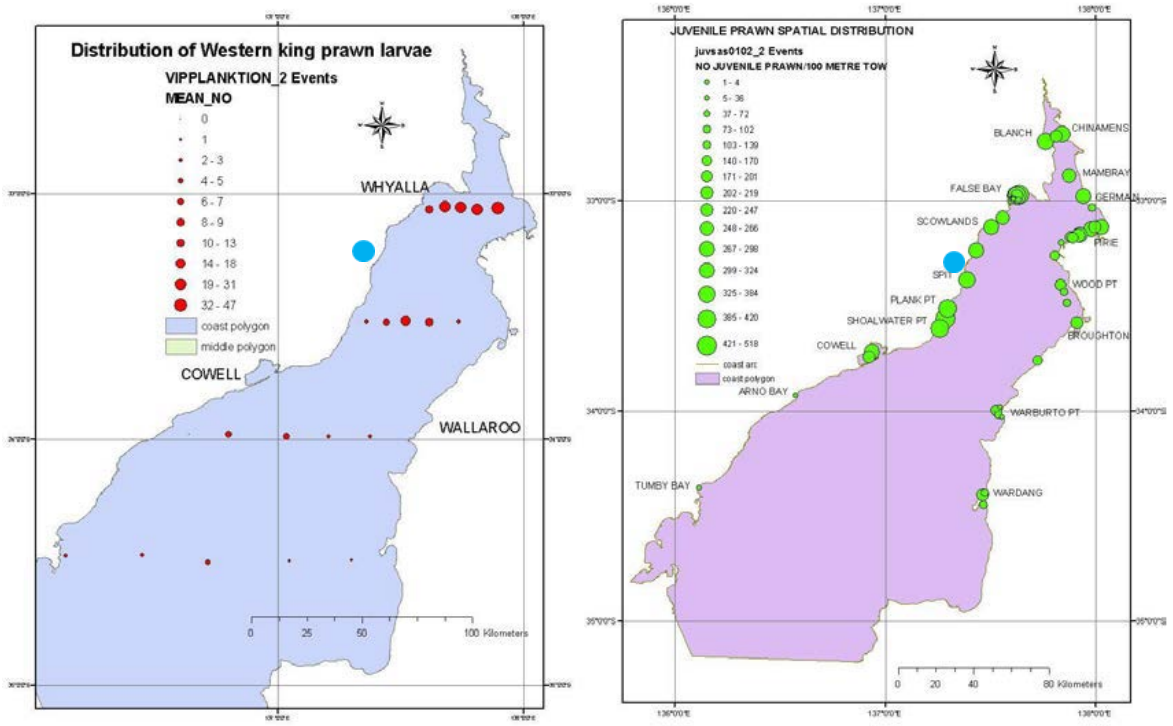


Figure 54. Distribution of prawn larvae and juveniles in Spencer Gulf. Source: Carrick 2003. Blue dots added to show approximate location of the MSA.

8.5 Blue Crab Fishery (Spencer Gulf Sector)

The Blue Crab Fishery is a quota managed fishery targeting the blue swimmer crab *Portunus armatus*, using pots. There are five licence holders in the Spencer Gulf Sector (PIRSA 2026a). Fishing occurs all year except for some areas with seasonal closures, the nearest of which is in Franklin Harbor (Beckmann 2025a). Commercial catches are reported to PIRSA for spatial blocks typically spanning about 160 km^2 unless truncated by the coastline but have only been published as ranges at that scale (Beckmann & Hooper 2019) or graphed with a continuous colour scale that is difficult to interrogate (Beckmann & Hooper 2023, Beckmann 2025a).

The MSA overlaps four of the Fishery's catch reporting blocks in Spencer Gulf: about 34% of Block 9, which is about 72 km^2; about 6% of Block 13 which is about 143 km^2; about 1% of Block 10 which is about 162 km^2 and about 0.1% of Block 14 which is about 162 km^2 (Figure 55).

No catch was reported from those blocks during the 2014/15–2023/24 fishing seasons (Beckmann 2025a). There were catches of <10 t in one or more of the four blocks, most commonly Block 13, during most of the 2000/01–2013/14 fishing seasons and catches of up to 40 t in Block 10, 20 t in Blocks 9 and 13 and 10 t in Block 14 during 1998/99–1999/2000 (Beckmann & Hooper 2019).

Blue crab larvae spend up to 45 days between hatching and settlement in Upper Spencer Gulf, with dispersal and survival influenced mainly by wind and temperature (Bryars 1997). Juveniles inhabit mangrove creeks and mud flats (Beckmann 2025a), which are represented within the MSA. Bryars (2003) identified seagrass meadows, unvegetated soft bottom and tidal flats between Murninnie Beach (8 km south of the MSA) and Whyalla as spawning and nursery habitat for blue crabs, and tidal creeks in the area as nursery habitat.

There are nine crab survey sites (fishery independent) within Blocks 9, 10 or 14 (Beckmann 2025a).

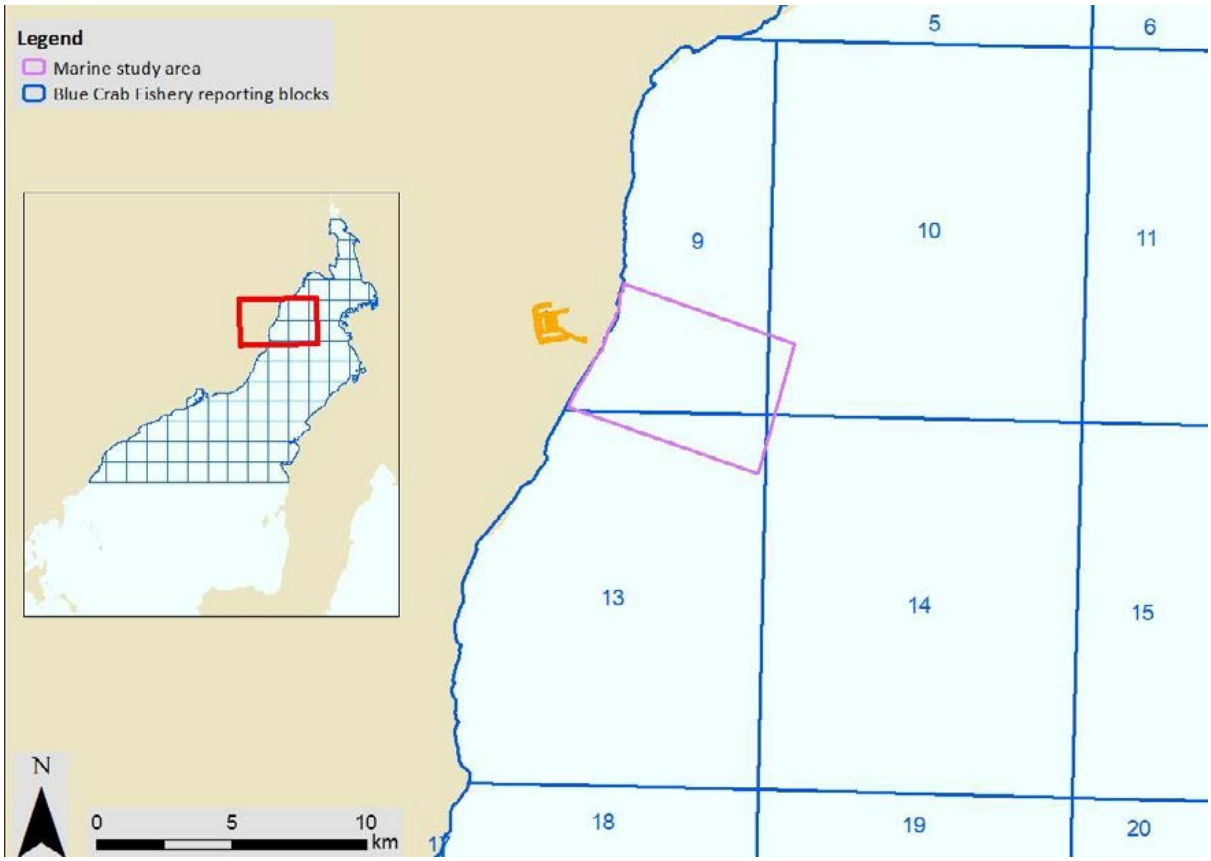


Figure 55. Reporting blocks for the Blue Crab Fishery near the MSA.

8.6 Sardine Fishery

The South Australian Sardine Fishery targets Australian sardine *Sardinops sagax* using purse seine nets in South Australian and Commonwealth marine waters (Grammer et al. 2024). Australian anchovy *Engraulis australis*, maray *Etrumeus teres*, blue sprat *Spratelloides robustus* and Sandy Sprat *Hyperlophus vittatus* are also permitted to be taken in the Fishery (PIRSA 2023), but more than 99% of the catch is Australian Sardine (MRAG Americas 2018). There are 14 licence holders, noting that several companies hold multiple licences (Grammer et al. 2024).

Catches are reported with GPS locations for each successful net deployment. South-western Spencer Gulf is the most important area for the Fishery, but there have been no catches north of Arno Bay/Point Riley (Grammer et al. 2024, Figure 56).

Surveys of sardine eggs over the past 30 years suggest that the MSA is not within a significant spawning ground for the South Australian stock (Grammer et al. 2024, Figure 57).

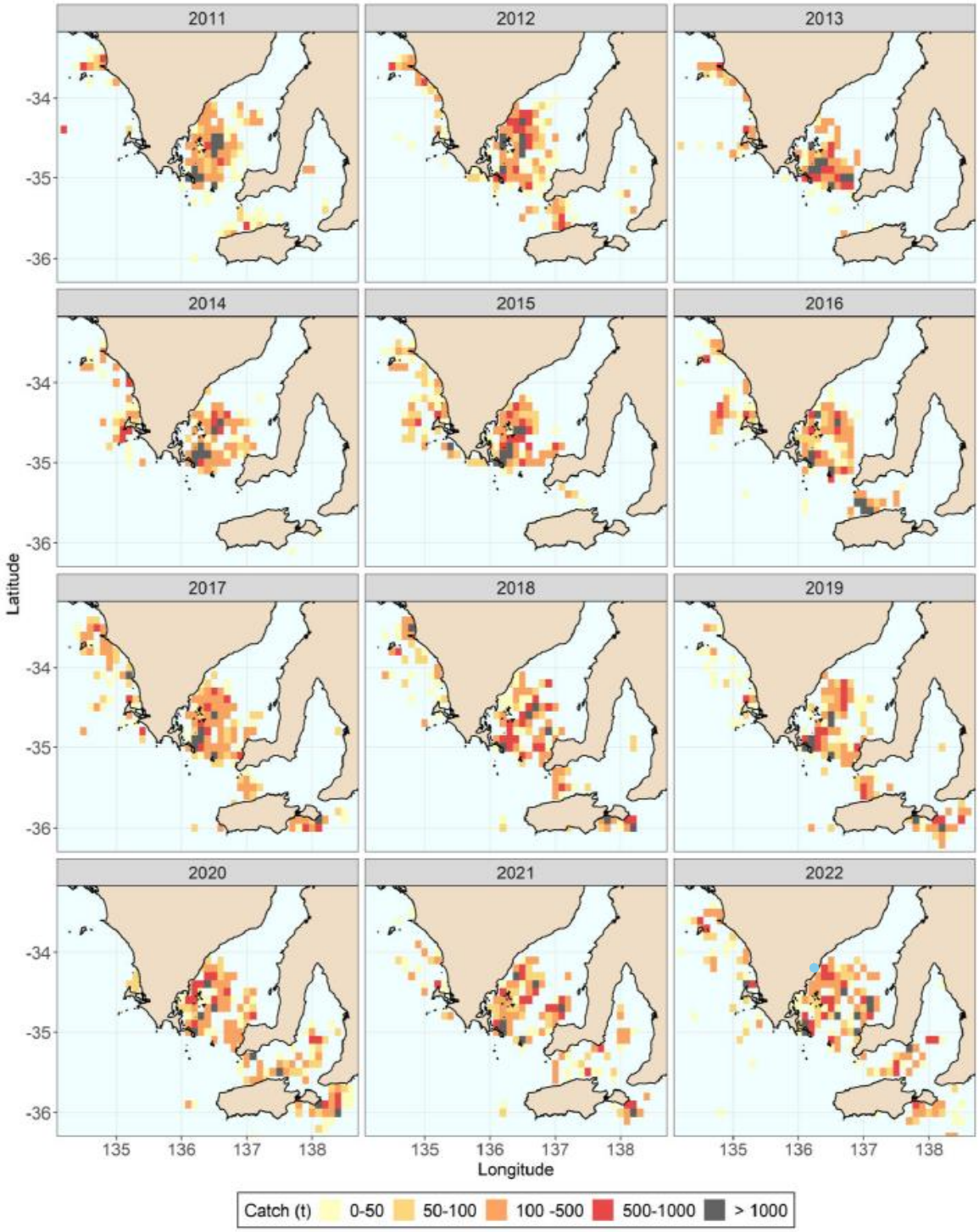


Figure 56. Sardine catches between 2011 and 2022. Source: Grammer et al. 2024.

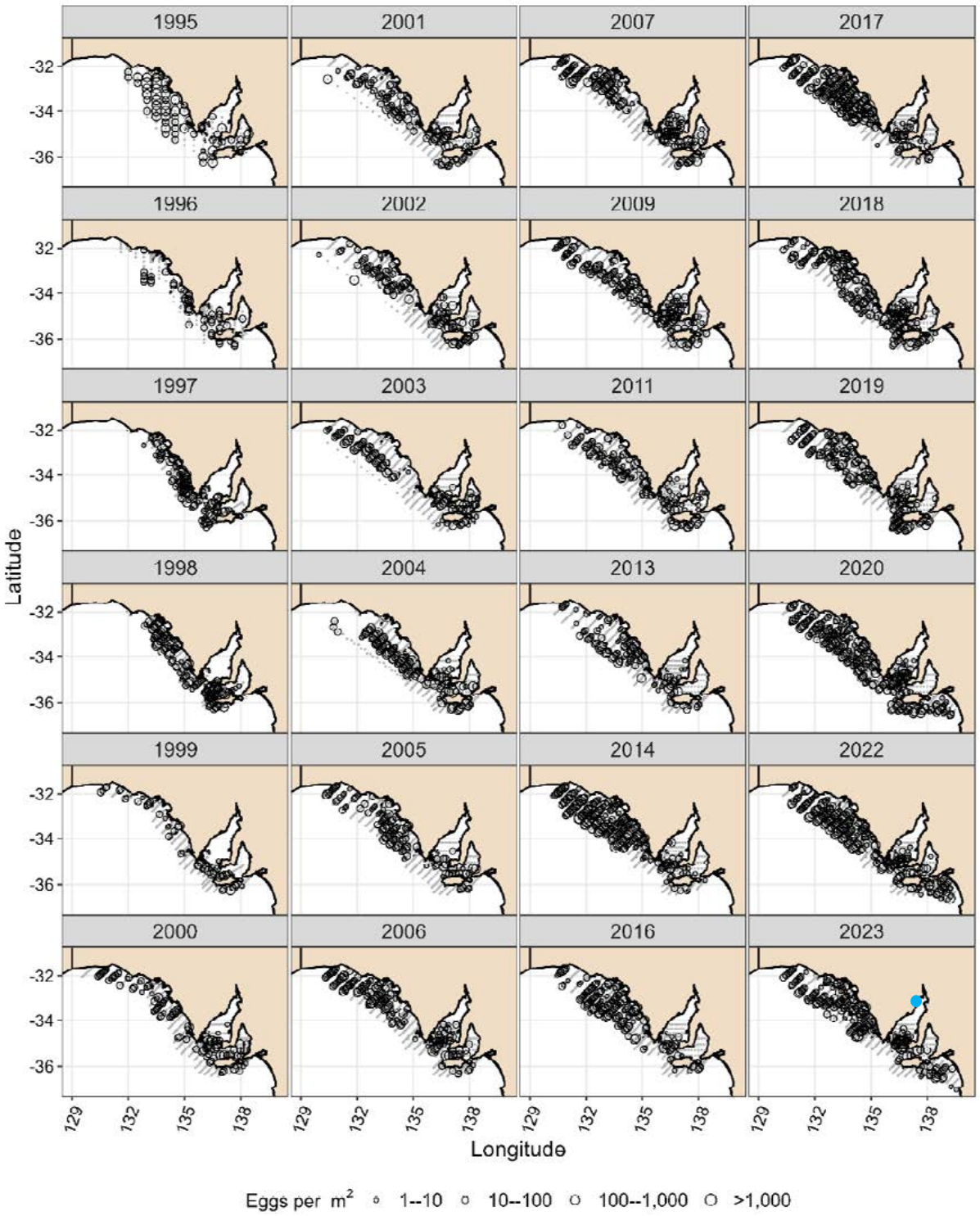


Figure 57. Distribution of Australian sardine eggs collected from surveys during 1995–2023. Source: Grammer et al. 2024. Blue dot added to 2023 map to show approximate location of the MSA.

8.7 Marine Scalefish Fishery

The Marine Scalefish Fishery (MSF) allows harvest of more than 60 species including fish, sharks, molluscs, crabs and worms by 204 licence holders throughout South Australian marine waters using a variety of methods including hauling nets, handlines, longline and squid jigs (Dennis et al. 2025). The MSF has undergone a structural reform that included the formation of four new management zones and implementation of total allowable commercial catches for eleven stocks.

Prior to 2020, the catch was dominated by four primary species, namely King George whiting *Sillaginodes punctatus*, southern sea garfish *Hyporhamphus melanochir*, southern calamari *Sepioteuthis australis* and snapper *Pagrus auratus*[10], collectively accounting for 43% of the catch by weight (Smart et al. 2022). Management restrictions on these primary species, including a closure on Snapper across most of the State since November 2019, have resulted in changes to catch composition and Australian salmon *Arripis truttacea* and yellowfin whiting *Sillago schomburgkii* are now amongst the highest catches (Smart et al. 2023, Dennis et al. 2025).

The spatial distribution of catches is reported by weight using Marine Fishery Areas (MFAs) which are up to 10,000 km^2 (one degree square), but less when truncated by coastlines. The MSA covers approximately 1.9% of MFA 21, which spans 1,852 km^2 (Figure 58). Up until the 2022/23 fishing season, these catches were published as annual weight ranges but have since been shown as a four-year mean of recent annual catches displayed using a continuous colour scale (Dennis et al. 2024, 2025), that is difficult to interrogate.

Some of the more significant contributions to the statewide annual catch from MFA 21 during 2012–2022 included up to[11] approximately (Table 19):

- 5% of King George whiting in 2015–2016 and 2021/22
- 20–50% of southern sea garfish in all years
- 10–20% of southern calamari in 2016–2020
- 10–15% of snapper in 2017–2018
- 30–75% of yellowfin whiting *Sillago schomburgkii* in all years
- 25–35% of Western Australian salmon in 2012 and 2020 and 10–20% in 2013, 2016, 2019 and 2021/22
- 10–30% of Australian herring *Arripis georgianus* in all years from 2013
- 50–80% of snook *Sphyraena novaehollandiae* in 2018–2020 and 20–30% in other years from 2015.
- 25–50% of yelloweye mullet *Aldrichetta forsteri* in all years
- 5% of gummy shark *Mustelus antarcticus* in 2013
- 20% of whaler sharks *Carcharhinus* spp. in 2013 and 2015
- 30–65% of leatherjackets in 2019–2021/22
- 10–50% of rays and skates in 2016–2018. This typically includes eagle rays, stingrays and skates

[10] Referred to as *Chrysophrys auratus* in stock assessment reports (e.g. Dennis et al 2025) but the accepted name in the World Register of Marine Species is *Pagrus auratus*

[11] Catches are expressed as ranges, and the values here are the upper limit or range of upper limits of each annual catch range. See Table 19 for further detail.

- 100% of cuttlefish (including *Ascarosepion apama* and *A. novaehollandiae*) in 2020. Most of this catch is likely to have been taken from near the spawning aggregation at Point Lowly (Smart et al. 2023).

In addition, there were smaller or unquantified (confidential[12]) catches in some years for some of the above species, and for silver trevally *Pseudocaranx georgianus*.

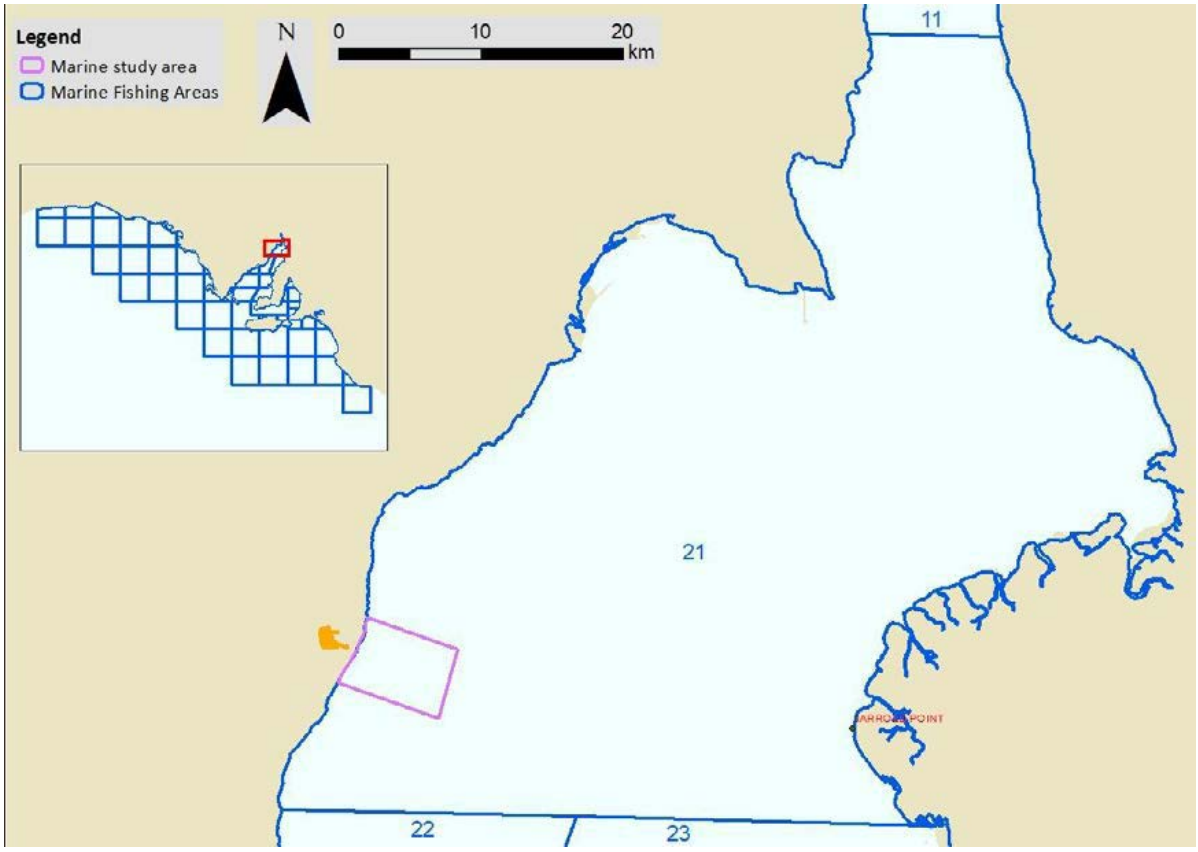


Figure 58. Marine Fishery Areas (MFAs), near the MSA, used to report catches in the Marine Scale Fishery.

[12] Catches are not published if caught by less than five licence holders

Table 19. Annual catches from MFA 21 of species (and percentage of statewide catch for that species) retained in the Marine Scalefish Fishery during 2012–2021/22.

Notes:

Reporting was based on calendar years except for 2021/22 when it was based on the financial year.

Conf. = confidential (catches are not published if caught by less than five licence holders).

Source: Fowler et al. 2013, 2014, 2015, 2016, Steer et al. 2018a, 2018b, 2020, Drew et al. 2021, Smart et al. 2022, 2023

	Year									
Species	**2021/22**	**2020**	**2019**	**2018**	**2017**	**2016**	**2015**	**2014**	**2013**	**2012**
King George whiting	0.1–10 t (0.1–5.7%)	0.1–5 t (0.0–2.5%)	0.1–5 t (0.0–2.2%)	0–5 t (0.0–2.0%)	0–5 t (0.0–2.0%)	6–15 t (2.1–5.2%)	6–15 t (2.1–5.2%)	1–5 t (0.4–1.8%)	1–5 t (0.3–1.7%)	1–10 t (0.3–3.2%)
Southern sea garfish	20–30 t (13–19%)	51–75 t (30–44%)	51–75 t (27–39%)	26–50 t (15–28%)	21–50 t (11–27%)	35–50 t (23–32%)	61–80 t (37–49%)	61–80 t (23–30%)	81–100 t (32–40%)	81–100 t (34–42%)
Southern calamari	10–20 t (3.6–7.2%)	51–75 t (14–20%)	26–50 t (8–15%)	26–50 t (7–13%)	26–50 t (6.3–12%)	25–50 t (6.3–13%)	6–25 t (1.6–6.8%)	6–25 t (1.5–6.2%)	6–25 t (1.5–6.3%)	6–25 t (1.4–5.8%)
Snapper	Zero	Zero	5.1–10 t (2–4%)	10–35 t (3.6–12%)	10–35 t (2.9–10%)	7–13 t (1.8–3.4%)	11–25 t (2.1–4.9%)	1–10 t (0.19–1.9%)	11–25 t (2.1–4.8%)	26–50 t (4–7.8%)
Silver trevally	Zero	Zero	Zero	Zero	Zero	Conf.	Zero	Zero	Conf.	Conf.
Whaler sharks	5–10 t (7.2–14%)	Conf.	Conf.	Conf.	0–2.5 t (0–4.0%)	Conf.	1–12 t (1.8–22%)	Conf.	1–12 t (1.7–21%)	Conf.
Cuttlefish	Conf.	6–25 (26–100%)	Zero	Zero	Zero	Conf.	Zero	Zero	Zero	Conf.
Gummy shark	Zero	Zero	Zero	Zero	Zero	Conf.	Conf.	Conf.	1–5 t (1–4.8%)	Conf.
Australian salmon	0–50 t (0–15%)	6–25 t (8–33%)	6–25 t (2.6–11%)	0–5 t (0–3.2%)	11–20 t (2.9–5.3%)	21–40 t (5.7–11%)	6–10 t (1.7–2.9%)	1–5 t (0.45–2.3%)	6–10 t (10–17%)	6–25 t (6.1–26%)
Australian herring	10–20 t (9.2–18%)	6–25 t (7.2–30%)	6–25 t (6–25%)	6–25 t (5.7–24%)	10–15 t (16–25%)	5–10 t (5.3–11%)	11–20 t (11–19%)	21–30 t (18–26%)	21–30 t (12–17%)	6–10 t (5.5–9.1%)

Species	Year									
	2021/22	**2020**	**2019**	**2018**	**2017**	**2016**	**2015**	**2014**	**2013**	**2012**
Snook	5–6 t (21–25%)	6–25 t (18–76%)	6–25 t (15–62%)	6–25 t (14–58%)	4–8 t (10–21%)	5–15 t (9.3–28%)	9–12 t (19–26%)	1–4 t (2.5–9.9%)	5–6 t (12–14%)	7–8 t (14–16%)
Leatherjackets	2–4 t (16–32%)	0.1–5 t (1.3–66%)	0.1–5 t (0.59–30%)	0–5 t (0–17%)	1–3 t (3.7–11%)	1–4 t (2.9–12%)	1–2 t (6.7–13%)	1–2 t (9.5–19%)	1–2 t (7–14%)	1–2 t (7.6–15%)
Yellowfin whiting	40–50 t (23–29%)	26–50 t (27–52%)	26–50 t (19–36%)	51–75 t (36–53%)	26–55 t (18–39%)	31–40 t (27–35%)	6–10 t (21–30%)	1–5 t (43–73%)	6–10 t (27–46%)	6–25 t (26–34%)
Rays and skates	Zero	Zero	Zero	0–5 t (0–49%)	1–2.5 t (7.6–19%)	0–1 t (0–10%)	Zero	Zero	Zero	Zero
Yelloweye mullet	1–2t (14–29%)	0.1–5t (1–51%)	0.1–5t (0.72–36%)	0–5t (0–25%)	5–10t (23–45%)	2.1–5t (17–40%)	3–7t (19–43%)	3–7t (19–44%)	3–7t (16–37%)	3–7t (7.2–25%)

Bryars (2003) identified a number of habitats between Murninnie Beach (8 km south of the MSA) and Whyalla as being used by spawners, eggs or larvae (spawning grounds) and post larvae and juveniles (nursery grounds) for a number of species retained by the Marine Scalefish Fishery (Table 20).

Plankton surveys in the MSA detected low numbers of anchovy, jack mackerel, flathead and flounder but no larvae of snapper, King George whiting or other species relevant to the Marine Scalefish Fishery (SARDI 2026a).

Table 20. Spawning and nursery habitats within the MSA identified by Bryars (2003). Note: S = spawning habitat, N = nursery habitat.

Species	Seagrass	Unvegetated soft bottom	Tidal flats	Tidal creeks
Snapper	N	N		
King George whiting	N	N	N	N
Southern sea garfish	S, N	S	N	N
Southern calamary	S	S, N		
Yellowfin whiting		S, N	N	N
Yelloweye mullet		N	N	N
Western Australian salmon	N	N	N	N
Australian herring	N	N	N	N
Leatherjacket	N			
Trevally	N	N		
Snook	S	S		
Red mullet	N	N		
Flathead	N	N	N	N
Flounder		N	N	N
Whaler shark	N	N		
Razor clam	S, N	S, N	S, N	
King scallop	S, N	S, N		
Queen scallop	S, N	S, N		
Mud cockle			S, N	
Bait worm			S, N	

Further information about important habitat near the MSA for some of the primary species includes:

- The primary spawning and nursery area the Spencer Gulf/West Coast snapper stock, which includes Spencer Gulf and all waters westward to the border with Western Australia, is in northern Spencer Gulf (Fowler 2023, Rogers 2025, Figure 59). Snapper typically spawn in dense aggregations around structures with relief such as large banks, ledges or shipwrecks. While there are no such structures within the MSA, egg surveys in Spencer Gulf found the greatest density at Western Shoal, just offshore from the MSA, and the Illusion wreck, 22 km south-southeast of the MSA, is a recognised aggregation site (Fowler & McGarvey 2014). Snapper nursery grounds in northern Spencer Gulf are relatively small areas characterised by soft, muddy benthic substrate, of which the one near Western Shoal has consistently provided the highest abundances of juvenile snapper in northern Spencer Gulf (Fowler & Jennings 2003, Rogers 2025). Further information is provided by Rogers (2025).
- The only recognised spawning area for the Spencer Gulf King George whiting stock is in southern Spencer Gulf and Investigator Strait. Larvae disperse generally northwards from this spawning area to nursery areas throughout Spencer Gulf, typically in protected bays with shallow beds of *Zostera* seagrass (Drew et al. 2020, Rogers 2025, Figure 60). One recognised such area is Cowleds Landing (Rogers 2025), about 6 km north of the MSA, and there are areas of shallow Zostera within the MSA (J Diversity 2025). Further information is provided by Rogers (2025).
- Southern garfish is thought to reproduce throughout its broad range in the coastal waters of South Australia, but a study of Gulf St Vincent found higher abundances of adult fish in the northern region of the Gulf (Fowler 2019). Likely reasons included the net northerly transport of larvae and the availability of intertidal *Zostera* habitat (Fowler 2019), which are also relevant to Spencer Gulf. It is therefore likely that the MSA lies within a region of important spawning and nursery area, but there is no information to suggest that the MSA is in an area of greater importance than elsewhere in the northern Gulf.
- Southern calamari typically have offshore nursery and inshore spawning grounds (Steer et al. 2007). Movement studies indicate that individuals use multiple spawning areas spanning hundreds of kilometres (Steer et al. 2007). One clutch of eggs was recorded at each of two mixed *Amphibolis/Posidonia* sites during the summer 2025 seagrass fauna survey (Section 3.3.1), but there is no evidence to suggest that the MSA has any special significance as a spawning habitat.

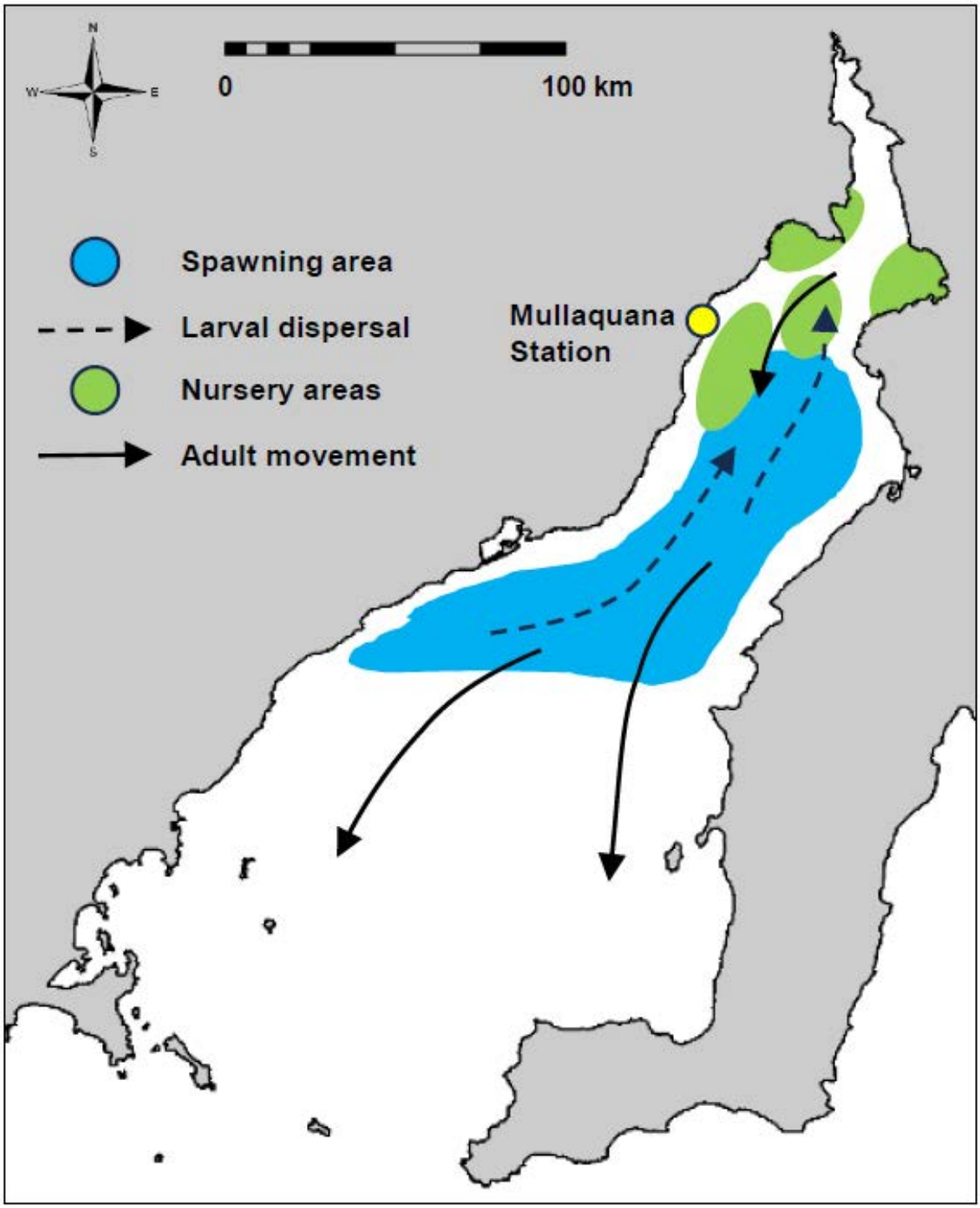


Figure 59. Conceptual model of the life history for snapper in Spencer Gulf. Source: Rogers (2025).

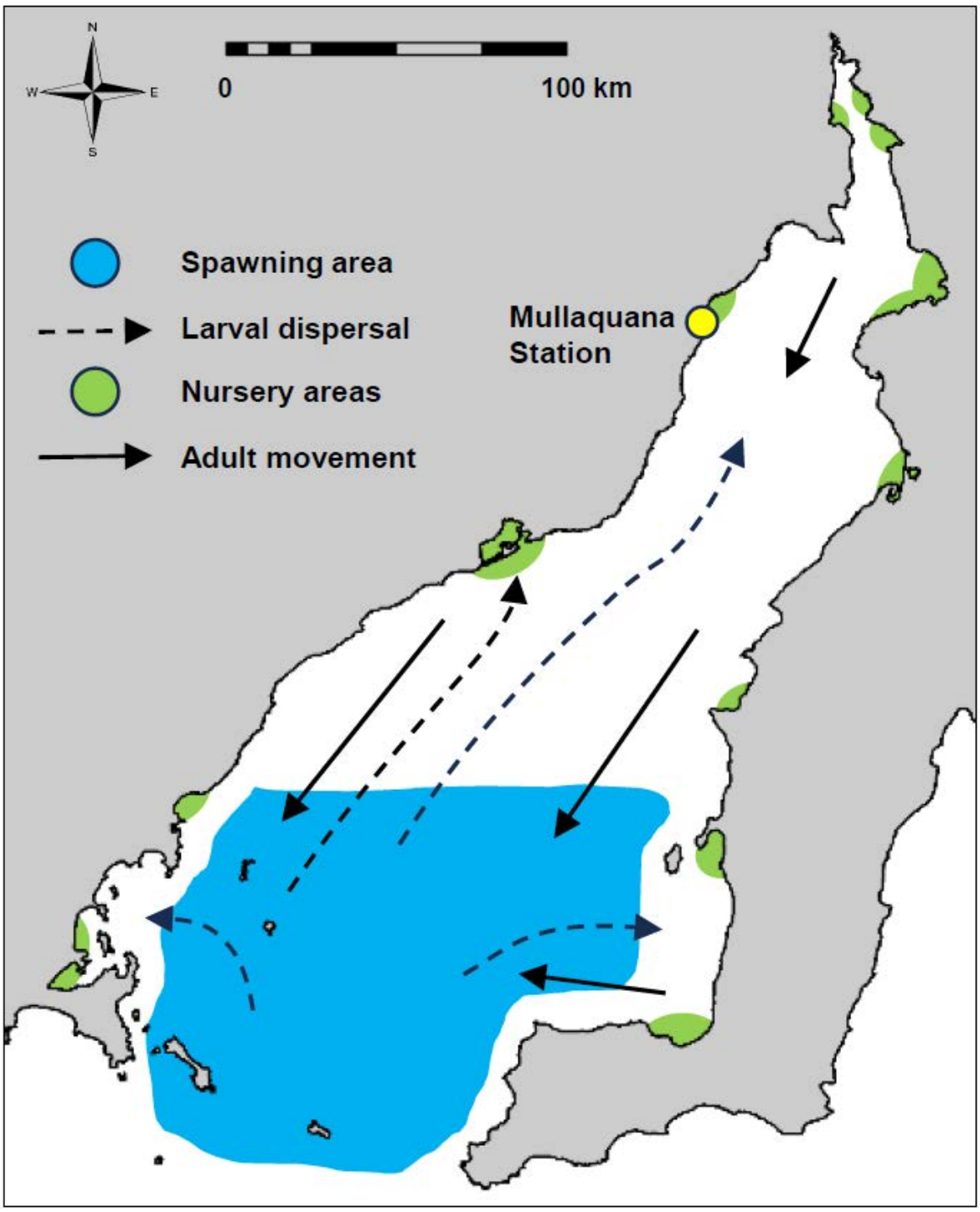


Figure 60. Conceptual model of the life history for King George whiting in Spencer Gulf. Source: Rogers (2025).

8.8 Charter Boat Fishery

The Charter Boat Fishery is a statewide fishery with 37 active licences in 2023/24 (Beckmann 2025b). Charter Boat Fishery licence holders complete a compulsory logbook for each trip in which they report the MFA fished and details of the catch. However, stock assessment reports have amalgamated the MFAs into five fishing regions, with MFA 21 situated in a region spanning all of Spencer Gulf (Beckmann 2025b). Whyalla was used as a port of landing by 1–5 Charter Boat Fishery licence holders in 2020/21 (Durante et al. 2022).

Between 2007/08 and 2020/21, the western portion of MFA 21 yielded up to 5,000 King George whiting and southern calamari and 25,000 snapper (prior to its closure in 2019/20) (Durante et al. 2022). Confidential numbers of Western Australian salmon *Arripis truttacea*, southern calamari, southern sea garfish and snook *Sphyraena novaehollandiae* were also caught during that period (Durante et al. 2022). In 2023/24, more than 95% of the catches in the Spencer Gulf region were comprised of King George whiting, southern calamari, red mullet, and silver trevally (Beckmann 2025b), noting that the latter two species had not been caught in MFA 21 during 2007/08–2020/21 (Durante et al. 2022).

8.9 Recreational Fishery

Information on recreational fishery participation and harvest has been collected through recreational fishing surveys in 2000/01 (Jones and Doonan 2005), 2007/08 (Jones 2009), 2013/14 (Giri and Hall 2015) and 2021/22 (Beckmann et al. 2023). The data collected for the first two surveys were spatially resolved into 35 individual fishing regions across South Australia (Figure 61), but data for 2013/14 and 2021/22 were reported using amalgamated regions including Northern Spencer Gulf, which comprises waters north of Wallaroo. The number of fishers using fishing region 9 (northern Spencer Gulf between Plank Point and Port Davis) was approximately 21,000 ± 4,000 during 2000/01 and 14,000 ± 3,000 during 2007/08, and the number of days fished was approximately 84,000 ± 29,000 and 47,000 ± 10,000, respectively. The number of fishers in that area represented approximately 6.5% and 6.1% of fishers state-wide in 2000/01 and 2007/08, respectively, and approximately 4.7% and 4.5% of the number of fishing days, respectively. The overall number of fisher days in Spencer Gulf was similar in 2007/08 to 2021/22 (Beckmann et al. 2023).

The nearest sites to the MSA on the RecFish SA *Fishing Locations Map* (RecFish SA 2026) are “Shotgun”, approximately 10 km offshore, and Yarraville Shoal, about 16 km offshore.

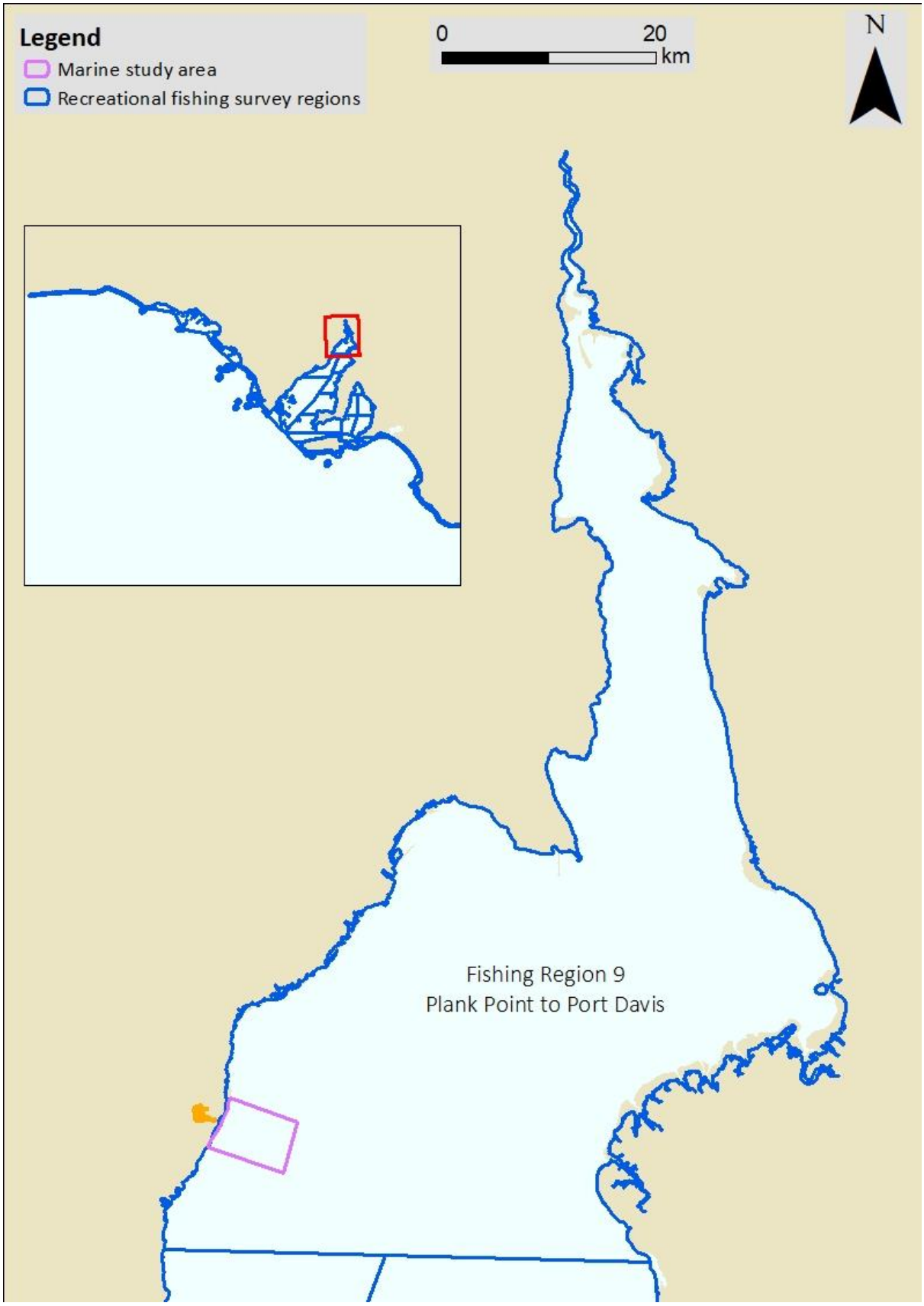


Figure 61. Recreational fishing survey regions near the MSA.

8.10 Aquaculture

The MSA is situated more than 40 km from aquaculture zones and/or leases in Port Broughton (south-east) and Fitzgerald Bay (north-east) and 30 km from a land-based aquaculture lease at the top of False Bay (Figure 62).

The Port Broughton intertidal, Tickera intertidal and Tickera subtidal aquaculture zones collectively span about 3,300 ha and provide for 165 ha of intertidal and subtidal mollusc aquaculture (PIRSA 2005) but currently have no active leases (PIRSA 2026b). There is a land-based aquaculture lease, adjacent to an aquaculture exclusion zone in the Port Broughton estuary, which permits pond farming of brine shrimp *Parartemia zietziana* and macroalgae including *Ulva* spp. and *Asparagopsis* spp. (PIRSA 2026b).

There are three active leases for finfish production spanning two areas within the Fitzgerald Bay aquaculture zone (Figure 62). It is understood that no fish have been stocked in those leases since 2022 (Whyalla News 2022). The associated zone spans about 4,500 ha and provides for up to 4,250 tonnes of regularly fed finfish (other than tuna), 1500 tonnes of bivalves and unlimited macroalgae (PIRSA 2008). The Fitzgerald Bay (north) aquaculture zone spans about 10 ha and provides for bivalves and macroalgae and was created to accommodate a particular application but there are currently no leases within it.

The aquaculture lease at the north of False Bay spans approximately 400 ha of hypersaline water and permits the culture of the microalga *Dunaliella salina*, from which human and animal food products are extracted (BHP Billiton 2009, PIRSA 2026b).

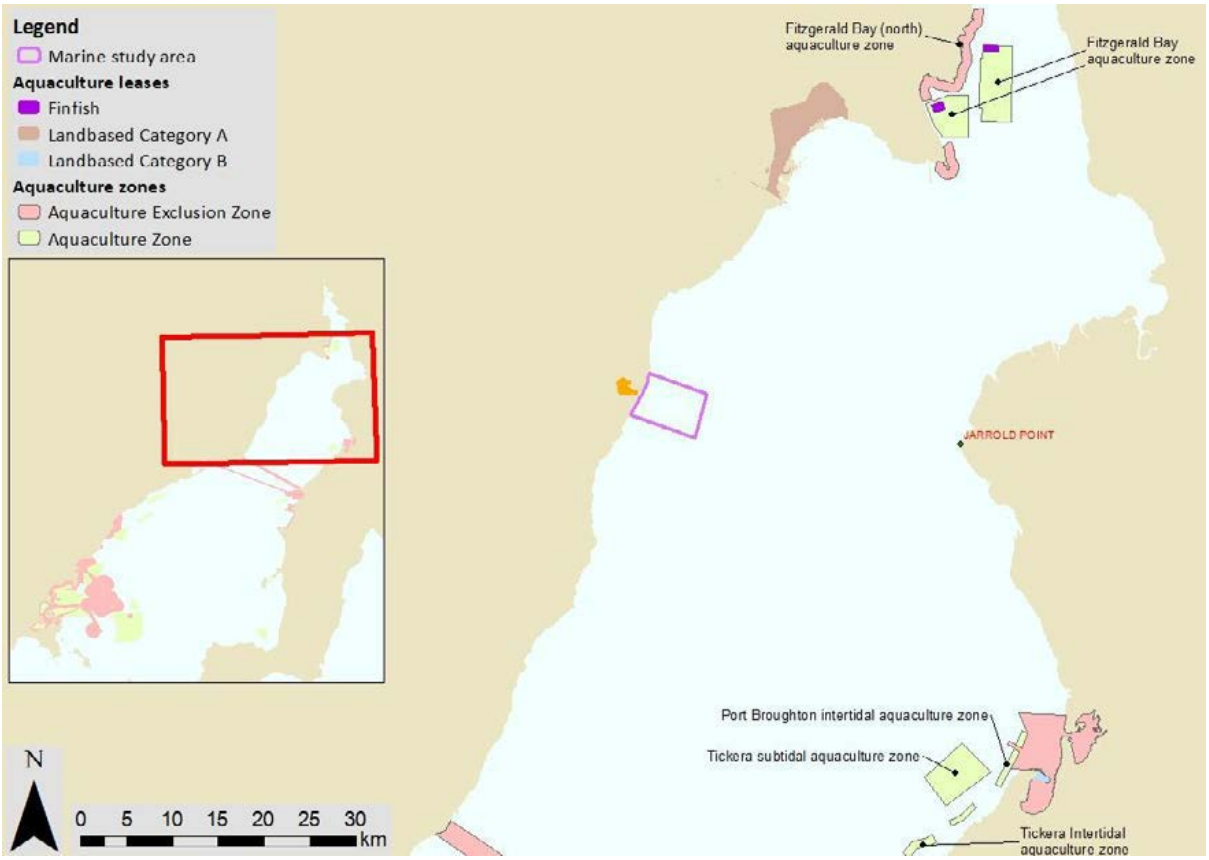


Figure 62. Aquaculture zones and leases within 50 km of Mullaquana Station. Source: PIRSA 2026c, d.

PART 4: IMPACT ASSESSMENT

9. Summary of field and desktop study findings

More than 250 epifauna, 169 macrofauna and 39 meiofauna taxa were identified from the field and desktop studies as having a potential interaction with the Project.

A consolidated epifauna taxa list is provided in Appendix D and infauna taxa lists are provided by Appendix H and Appendix I.

9.1 Marine ecology field studies

The field and laboratory studies were designed to support the description of spatial (habitat-related) and seasonal variation in seagrass structure and associated fauna. Six primary habitats and several less extensive habitats were surveyed using a variety of methods (Section 3).

9.1.1 Posidonia australis

This habitat comprised a monoculture of *Posidonia australis* with generally dense seagrass cover and moderate to dense epiphyte cover.

Seagrass cover, as determined from photoquadrats, showed no clear seasonal pattern despite seasonal variation in structural and biomass characteristics. Canopy height measured during scuba surveys and the number of shoots and leaves and leaf length were greatest in spring, and leaf mass was greatest in summer and autumn.

Rhizome mass was greater, but more variable, in autumn and spring than summer and winter.

There was a general consistency of seagrass characteristics across sites, with the exception of seagrass leaves being 1–2 mm narrower at PA1.

Epiphyte cover, as determined from photoquadrats, was generally greatest in winter, but the epiphyte mass determined from seagrass cores in spring was approximately double that of other seasons.

The epibenthic fauna community recorded using scuba in *Posidonia australis* habitat was distinct from other habitats and had very low abundance relative to other seagrass habitats. There was no consistent seasonal pattern within that community. The community recorded using BRUV had a similar abundance and community structure to other seagrass habitats. There were seasonal differences in community structure. Richness was greatest in autumn, and abundances greatest in summer, driven by large schools of western striped trumpeter.

The macrofauna community was distinct from other habitats and had a moderate abundance and richness relative to other seagrass habitats. The meiofauna community was similar to other shallow seagrass communities. Summer meiofauna samples generally differed in community structure from the other seasons.

9.1.2 *Posidonia australis/Zostera*

Seagrass cover was generally dense overall but comprised of moderate to dense *Zostera* and sparse *Posidonia australis*. Epiphyte cover was moderate to dense. Fauna abundance recorded using scuba was very low relative to other habitats. The fauna community, dominated by razor clams, was similar to some *Posidonia australis* sites.

9.1.3 *Amphibolis*/*Posidonia* and *Amphibolis*

This habitat comprised a patchy mix of *Amphibolis antarctica* and *Posidonia sinuosa* with generally dense seagrass cover and moderate to dense epiphyte cover. The proportion of *Amphibolis* varied from 100% at AO1 in winter to 22% at AP3 in summer, but was greater than 80% at sites AP4, AO1 and AM1 for all seasons. Seasonal differences in the mix of seagrass species may be partly explained by fine-scale spatial variability associated with transect placement in patchy habitat, despite fixed starting points.

The epibenthic fauna community recorded using scuba in *Amphibolis*/*Posidonia* habitat was distinct from other habitats and had a moderate to high abundance relative to other seagrass habitats. There was no consistent seasonal pattern within that community. The community recorded using BRUV had a similar abundance and community structure to other seagrass habitats. There were seasonal differences in community structure.

The macrofauna community was distinct from other habitats and had a high abundance and richness relative to other seagrass habitats. The meiofauna community was similar to other shallow seagrass communities but had a relatively high abundance. Summer meiofauna samples generally differed in community structure from the other seasons.

9.1.4 *Posidonia sinuosa*

This habitat comprised a moderate to dense (but generally dense) monoculture of *Posidonia sinuosa* with sparse to moderate epiphyte cover. PS5 differed from the other sites, with a greater cover of epiphytes, greater epiphyte mass, longer leaves, generally less shoots and leaves, and some seasonal differences in canopy height.

The epibenthic fauna community recorded using scuba in *Posidonia sinuosa* habitat was distinct from other habitats and had a high abundance and richness relative to other seagrass habitats. There was no consistent seasonal pattern within that community. The community recorded using BRUV had a similar abundance and community structure to other seagrass habitats. There were seasonal differences in community structure. Richness was greatest in autumn, and abundances greatest in summer, driven by large schools of western striped trumpeter.

The macrofauna community was distinct from other habitats and had a low abundance and moderate richness relative to other seagrass habitats. The meiofauna community was similar to other shallow seagrass communities but had a generally lower abundance and richness than other seagrass habitats. Summer meiofauna samples generally differed in community structure from the other seasons.

9.1.5 *Zostera*

This habitat comprised a monoculture of *Zostera nigricaulis* with percentage cover at ZO1 and ZO3 generally lower than the other three sites. There were distinct seasonal differences in cover, which was generally lowest in autumn, increased in winter and spring, then decreased in summer. *Zostera* species are relatively short-lived opportunistic species or colonisers. They have a low resistance to disturbance, including natural disturbance such as storms, but have the ability to build up a seed bank from which they can recover rapidly (Edgar 2001, Kilminster et al. 2015).

This seasonal pattern is about one season out of phase with the results of studies in Victoria where *Zostera* density[13] was found to be lowest during winter and greatest during summer (Bulthuis and Woelkerling 1983). It is, however, consistent with recent unpublished observations by the author in the Port Adelaide River, noting that interannual variation in *Zostera nigricaulis* cover has also been observed in parts of the River (Wiltshire 2010).

The epibenthic fauna community recorded using scuba in *Zostera* habitat was distinct from other habitats and had a moderate abundance and high richness relative to other seagrass habitats. There was no consistent seasonal pattern in community structure, but both abundance and richness declined in winter and spring as the cover in *Zostera* increased, for reasons unknown.

The community recorded using BRUV had a similar abundance and richness to other seagrass habitats but a largely distinct community structure, with seasonal differences.

The macrofauna community had a moderate to high (in summer) abundance and richness relative to other seagrass habitats and its community structure was largely distinct from other habitats. The meiofauna community was similar to other habitats but had a generally low abundance and moderate richness relative to other habitats.

9.1.6 Sand/invertebrates and Sand/bioturbation

Sand/invertebrates habitat was defined as silty sand with a sparse cover of sessile invertebrates and/or macroalgae, and Sand/bioturbation habitat as generally bare silty sand with evidence of bioturbation (mounds, holes).

Surveys using towed camera and BRUV, and infauna surveys, showed little distinction in fauna community structure, abundance or richness between these habitats, with the exception of a slightly greater abundance and richness of macrofauna in all seasons in the Sand/bioturbation habitat, and a spike in abundance and richness of meiofauna in the Sand/invertebrates habitat in autumn.

The similarity in epibenthic fauna between the two habitats is consistent with the findings from towed camera transects, undertaken since the mapping study (J Diversity 2025) and choice of representative sites, which showed a high level of small-scale spatial variability in the presence of sparse invertebrates in deep habitat.

There was a pattern of increasing seasonal abundance from summer to winter followed by a decrease in spring, but no obvious seasonal pattern in richness or community structure.

9.1.7 Bryozoan habitat

This habitat mainly comprises a monoculture of the bryozoan *Steginoporella truncata*, with a distinct community structure compared with other deep sand habitats. Diversity at this site was low (<2).

9.1.8 Other findings

The European fan worm, a pest species, was recorded during towed camera surveys at almost every deep sand site in every season with mean abundance of about nine per transect. Its consistent

[13] The density measure was number of leaf clusters per square metre, which is used here as a proxy for relative percentage cover. Note also that the Victorian studies refer to *Heterozostera tasmanica*, within which *Z. nigricaulis* was formerly included.

presence across seasons and sites suggests that it is well established within deep sand habitats of the study area, extending its previously documented distribution (Wiltshire et al. 2010).

9.1.9 Conclusions

Habitat type was the primary driver of variation in community composition, abundance and richness, with consistent distinctions between shallow seagrass and deep sand environments. Seasonal variation was evident within some habitats but was generally secondary to spatial (habitat-related) differences.

The community structure of fauna was generally consistent between the Sand/invertebrate and Sand/bioturbation habitats, suggesting that these habitats could be considered to comprise a single habitat class for the purpose of impact assessment.

9.2 Priority species

A total of 48 marine mammals, turtles, sharks and fish species that are protected by the EPBC Act or South Australian legislation were identified by the PMST or from ALA records. Of these, 31 species including 12 marine mammals, three marine turtles, two sharks and 14 Syngnathids were assessed as having a likely or possible interaction with the Project based on their distribution, habitat and records within Spencer Gulf (Sections 7.1 and 7.2). Several pipefish *Stigmatopora* spp. (representing three of the 14 Syngnathids at genus level) were recorded during BRUV surveys and bottlenose dolphins were regularly observed.

Giant Australian cuttlefish were not recorded during field studies but it is known that the cuttlefish that migrate to the breeding aggregation at Point Lowly during May to September have a widespread distribution in Spencer Gulf north of Wallaroo (Section 7.3).

No dense sponge communities were found within the MSA, but some sponges were recorded in all habitats. Sponges were a significant component of the fauna in several seagrass habitats and the MSA is adjacent to one of two broad areas of relatively high sponge biomass and richness in Spencer Gulf (Section 5.1).

No macroalgae considered to be vulnerable due to their paucity of records or restricted range were identified within 25 km of the MSA. No macroalgae species were recorded to species level during field studies but several species were identified from trawl studies (Appendix D).

9.3 Fisheries and aquaculture

Spencer Gulf fisheries that overlap spatially with the MSA include the Marine Scalefish, Charter Boat, Spencer Gulf Prawn and Blue Crab Fisheries (Section 8).

Species caught during 2012–2022 within the reporting area of the Marine Scalefish Fishery, which surrounds the MSA and has an area more than 50 times greater, include King George whiting, southern sea garfish, southern calamari, snapper, yellowfin whiting, Western Australian salmon, Australian herring, snook, yelloweye mullet, silver trevally, leatherjackets, gummy shark, whaler sharks, rays and skates and cuttlefish. Many of these species, and red mullet, are also taken by the Charter Boat Fishery in Spencer Gulf.

There have been relatively small catches from the Spencer Gulf Prawn Fishery during the 2016/17–2023/24 seasons, within reporting areas surrounding the MSA and with an area collectively 4 times

greater, and there has historically been negligible trawl effort within the MSA. Important byproduct species include Balmain bugs and southern calamari.

There was no catch for the Blue Crab Fishery within the MSA during the 2014/15–2023/24 fishing seasons, but there had been significant catches prior to that.

Assessments of the Northern Zone Rock Lobster Fishery indicate that there has been no catch, explicitly during 1993–2011 and implicitly since then up to 2022/23 from the reporting area which surrounds the MSA and has an area more than 50 times greater.

No catches have ever been recorded within the MSA for the Western Zone Abalone and Sardine Fisheries and the MSA is situated outside the reporting areas for these fisheries.

The area near Mullaquana Station provides important breeding and/or nursery habitat for blue crabs, western king prawn and a variety of species relevant to the Marine Scalefish Fishery. In particular, there is an important spawning and nursery area for snapper at Western Shoal and a recognised nursery area for King George whiting at Cowleds Landing.

There are aquaculture zones at least 40 km from the MSA but they currently have no leases or unstocked leases (which previously held yellowtail kingfish). There are land-based aquaculture leases 30 km north of the MSA in False Bay and 40 km south-east at Port Broughton.

9.4 Review of trawl studies and ALA records

A total of 149 species were identified from the review of trawl studies near Mullaquana Station and ALA records within the MSA, of which 109 were not identified during field studies (Appendix D).

10. Assessment of return water impacts

10.1 Generic concepts applied to the impact assessment

This section describes several concepts that are applied to the impact assessment of various ecosystem components in the remainder of Section 9.4.

The primary assessment approach, described in Section 10.1.1, is based on safe dilutions derived from whole effluent ecotoxicity (WET) studies which determine the chronic toxicity of the return water taking into account all pollutants, including concentrated seawater and additives, and on hydrodynamic modelling to determine when and where those safe dilutions are achieved following discharge.

Notwithstanding the importance of the above approach, it is generally understood that the primary adverse effects on marine ecosystems from desalination return water are typically due to elevated salinity (van Dam 2026, Gillanders & Stockbridge 2022). There are exceptions (van Dam 2026, Cambridge 2019), but the discharge of residual chemical additives within desalination plant return water typically makes a small or negligible contribution to the toxicity affecting some species (van Dam 2026). Impacts associated with elevated salinity are the focus of Sections 10.1.2 and 10.1.3 below.

10.1.1 Safe dilution contours

Whole effluent toxicity testing of the return water can be used to determine effects on species, including those unrelated to or synergistic with elevated salinity.

Ecotoxicity data comprising 72 endpoints for 23 species from 10 taxonomic groups were reviewed from studies for desalination plants across Australia (van Dam 2026). Following various filters for relevance and reliability, chronic toxicity values for 10 species from seven taxonomic groups were selected (van Dam 2026). Most of these values were from studies associated with BHP Billiton's proposed Olympic Dam Expansion and the Adelaide Desalination Plant. At least seven of these ten species, or their genera, are likely to occur within or near the MSA (van Dam 2026).

Using this dataset, a species sensitivity distribution (i.e. a curve) was fitted and used to estimate preliminary safe dilutions for the Project's desalination return water of (van Dam 2026):

- 1 in 26 (3.9% concentration) for protection of 95% of species
- 1 in 53 (1.9% concentration) for protection of 99% of species

These preliminary safe dilutions are expected to be conservative (i.e. protective) for the proposed site at Mullaquana Station, largely due to the conservative relevance criteria that were adopted for the brine salinity (van Dam 2026). The term "safe" is in the context of ecosystem protection. The 95% safe dilution is generally applied to moderately disturbed ecosystems and is the requirement for assessment for the Project (Section 1.4). The 99% safe dilution is generally applied to high conservation/ecological value ecosystems (ANZECC/ARMCANZ 2000). The EIS Assessment Requirements for the Project specify that the EIS must 'outline the degree of dilution required to ensure that "95% protection level" of representative local species are protected from any chronic impacts from the discharge'.

Hydrodynamic modelling was undertaken to simulate the dispersion of the return water and predict the extents of the impact footprint as defined by the safe dilutions (Water Technology 2026). Return

water discharge scenarios for 51 and 73 GL/y plant capacities and a "minimum capacity/turn down", discharging 286, 229 and 92 ML/day, were modelled over a simulation period spanning 1 November 2022 to 1 December 2023. This provided for model spin-up and a full year simulation across four seasons (Water Technology 2026). The results relating to the 51 GL/y scenario are the primary focus of the impact assessment in this report, because it is the capacity scenario that forms the basis of approval for the EIS. Nevertheless, the results relating to the 73 GL/y scenario provide a useful conservative benchmark for the assessment. It should also be noted that the modelling assumed an ambient salinity of 41 g/L. This is approximately 0.5 g/L higher than measured ambient salinities near Mullaquana Station (Section 10.1.2), and as such adds another level of conservatism to the assessment.

Plots of dilution contours were generated to delineate areas where predicted dilutions fell below the 95% and 99% safe dilutions more than 10% of the time, for each of four seasons and for each plant capacity scenario (Water Technology 2026). These contours represent the maximum spatial extent within which the desired level of species protection may not be achieved consistently during the season, and where ecosystem impacts may therefore occur. At any particular time, however, the plume (defined by the relevant safe dilution) occupies only a portion of the area enclosed by the seasonal contour.

For each season the 51 GL/y and minimum capacity scenario contours were within the 73 GL/y scenario contour, which therefore represented the worst-case scenario. The contours for four seasonal 73 GL/y scenario covered different areas with no clear worst-case, so their union was generated to provide an overall annual footprint corresponding to each of the 95% and 99% safe dilutions (Figure 63). For the 73 GL/y (worst case) scenario:

- the 95% footprint extends up to about 150 m inshore from the diffusers[14], 310 m offshore, 370 m alongshore to the north-east and 430 m to the south-west, which is its furthest distance from the diffusers (Figure 63). Its total area is approximately 22 ha.
- the 99% safe dilution footprint extends up to about 350 m inshore from the diffusers, 620 m offshore, 830 m alongshore to the north-east and 870 m to the south-west, which is its furthest distance from the diffusers (Figure 63). Its total area is approximately 120 ha.

For the 51 GL/y capacity scenario:

- the 95% footprint extends up to about 12 m inshore from the diffusers, 190 m offshore, 330 m alongshore to the north-east and 380 m to the south-west, which is its furthest distance from the diffusers (Figure 63). Its total area is approximately 13 ha.
- the 99% safe dilution footprint extends up to about 340 m inshore from the diffusers, 500 m offshore, 660 m alongshore to the north-east and 750 m to the south-west, which is its furthest distance from the diffusers (Figure 63). Its total area is approximately 83 ha.

The safe dilution contours are situated over various silty sand habitats mapped at an early stage of the Project (Figure 63), which were ultimately found to have similar biological communities (Section 9.1.9). It is also near the western extent of one of nine regional benthic associations (Association 1) identified by Grammer et al. (2025) in depths >7 m relative to the Australian Height datum (Figure 64). Association 1 is characterised by silty sand (approximately 60% sand, 20% silt and 20% gravel)

[14] Represented by the diffuser port closest to the outfall alignment

with habitat typically composed of medium and sparse algae, bivalve shell, low amounts of sparse bryozoans and dense seagrass interspersed together. The most abundant sessile taxa were ascidians and sponges, with low numbers of holothurians and bivalves. At depths less then approximately 15 m, where seagrass is no longer present, this description is consistent with the silty sand habitats mapped with in the MSA (Figure 63). A conservative estimate of the area within Association 1 deeper than 15 m, and likely to have similar habitat to the area within the safe dilution contours, is 69,200 ha (Figure 65). For the 51 GL/y scenario, the 95% and total 99% safe dilution footprints represent 0.02% and 0.12% of this area, respectively, and for the 73 GL/y scenario, 0.03% and 0.17% of this area, respectively.

Dilutions outside of the safe dilution footprints for each plant capacity would be lower (worse) than the corresponding safe dilution less than 10% of the time, i.e. the return water would be sufficiently diluted often enough to protect 95% and 99%, respectively, of all species from chronic impacts.

In addition to the safe dilution contours, 10th percentile dilutions were calculated for each simulation period at sites representing the nearest point within the Bryozoan habitat, primary seagrass habitats including *Zostera, Posidonia sinuosa*, *Amphibolis*/*Posidonia* and *Posidonia australis*, and intertidal mangroves (Figure 63). Additional sites at which dilutions were calculated include the Upper Spencer Gulf Marine Park, just offshore from the Cowleds Landing Sanctuary Zone, and the Franklin Harbor Marine Park (Figure 63). The minimum of the seasonal 10th percentile dilutions for each receptor (i.e. dilutions that would be exceeded less than 10% of the time) is shown in Table 21. These dilutions all exceeded the 99% (and therefore also 95%) safe dilution.

The R ssdtools software package (Thorley et al. 2025) and the toxicity dataset used by van Dam (2026) were used to calculate the percentage of species protected (Table 21). Species protection percentages exceeding 99% should be considered indicative only because of increasing uncertainty in the statistical model at beyond this level of protection.

The ssdtools software package was also used to calculate the lower 95% confidence limit for the safe concentrations (and upper limit for dilutions). There is no universally agreed approach for interpreting confidence limits for guideline values in a regulatory context (Warne et al. 2025), and Project assessment guidelines do not explicitly require their application. Nevertheless, the upper 95% confidence limit for the 95% safe dilution (1 in 79) was exceeded at all receptors listed in Table 21, providing additional confidence that risks to the marine ecosystem are negligible outside the 95% safe dilution footprint.

Table 21. Dilutions achieved at receptors and corresponding percentages of species protected. Seasonal minimums calculated from data provided by Water Technology (2026).

Receptor	Identifier (Figure 63)	51 GL/y		73 GL/y	
		10th percentile dilution (minimum from four seasons)	Corresponding percentage of species protected	10th percentile dilution (minimum from four seasons)	Corresponding percentage of species protected
Zostera	5	105	99.7	85	99.6
Posidonia sinuosa	4	212	99.9	178	99.9
Amphibolis/*Posidonia*	6	249	99.9	208	99.9
Posidonia australis	10	305	99.9	257	99.9
Intertidal mangroves	3	319	99.95	271	99.9
Bryozoan beds	9	152	99.8	105	99.7
Upper Spencer Gulf Marine Park	1	286	99.9	234	99.9
Franklin Harbor Marine Park	2	597	99.98	489	99.9

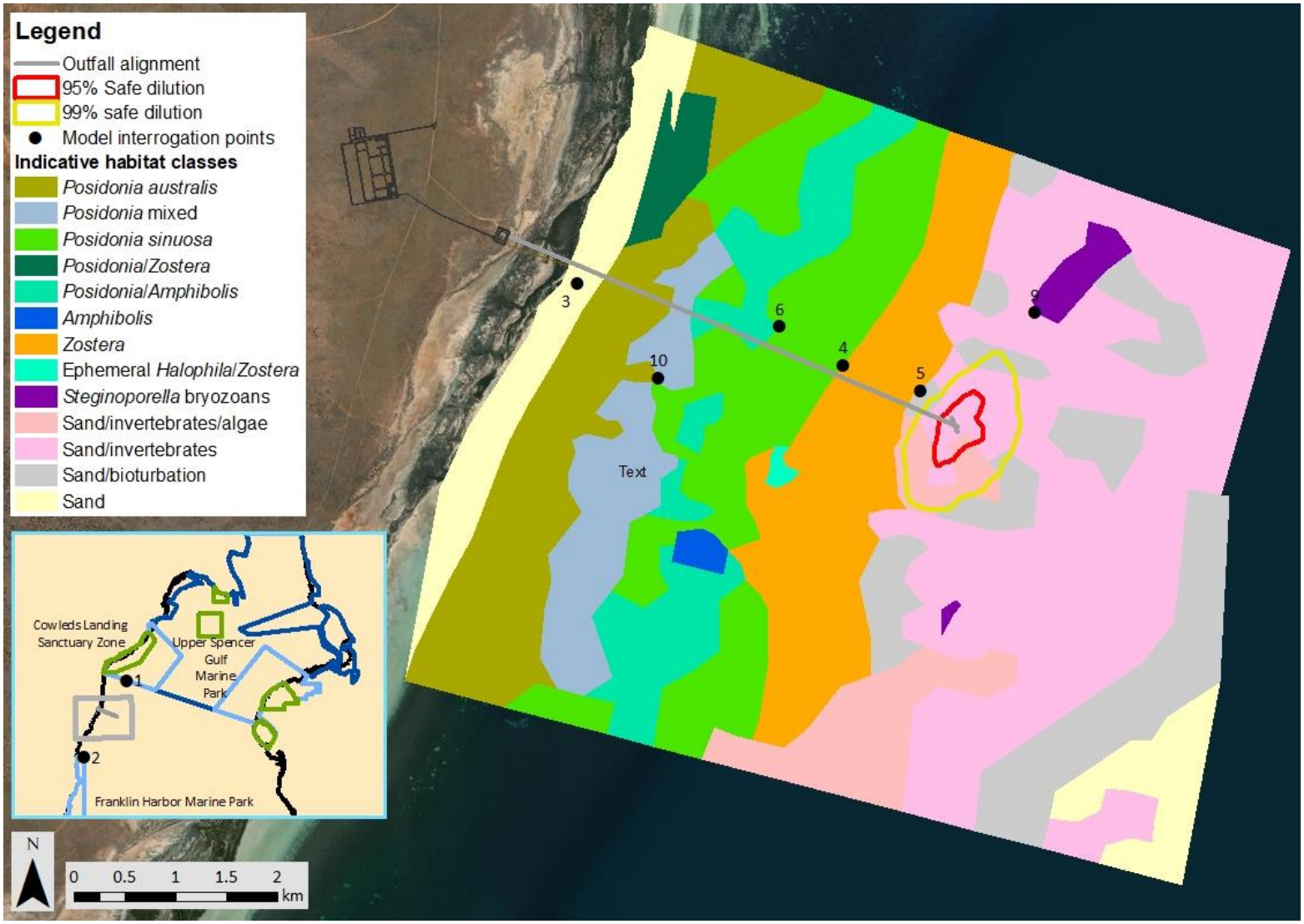


Figure 63. Union of 10th percentile contours for 95% and 99% protection levels across seasonal simulation periods for the 73 GL/y scenarios modelled by Water Technology (2026).

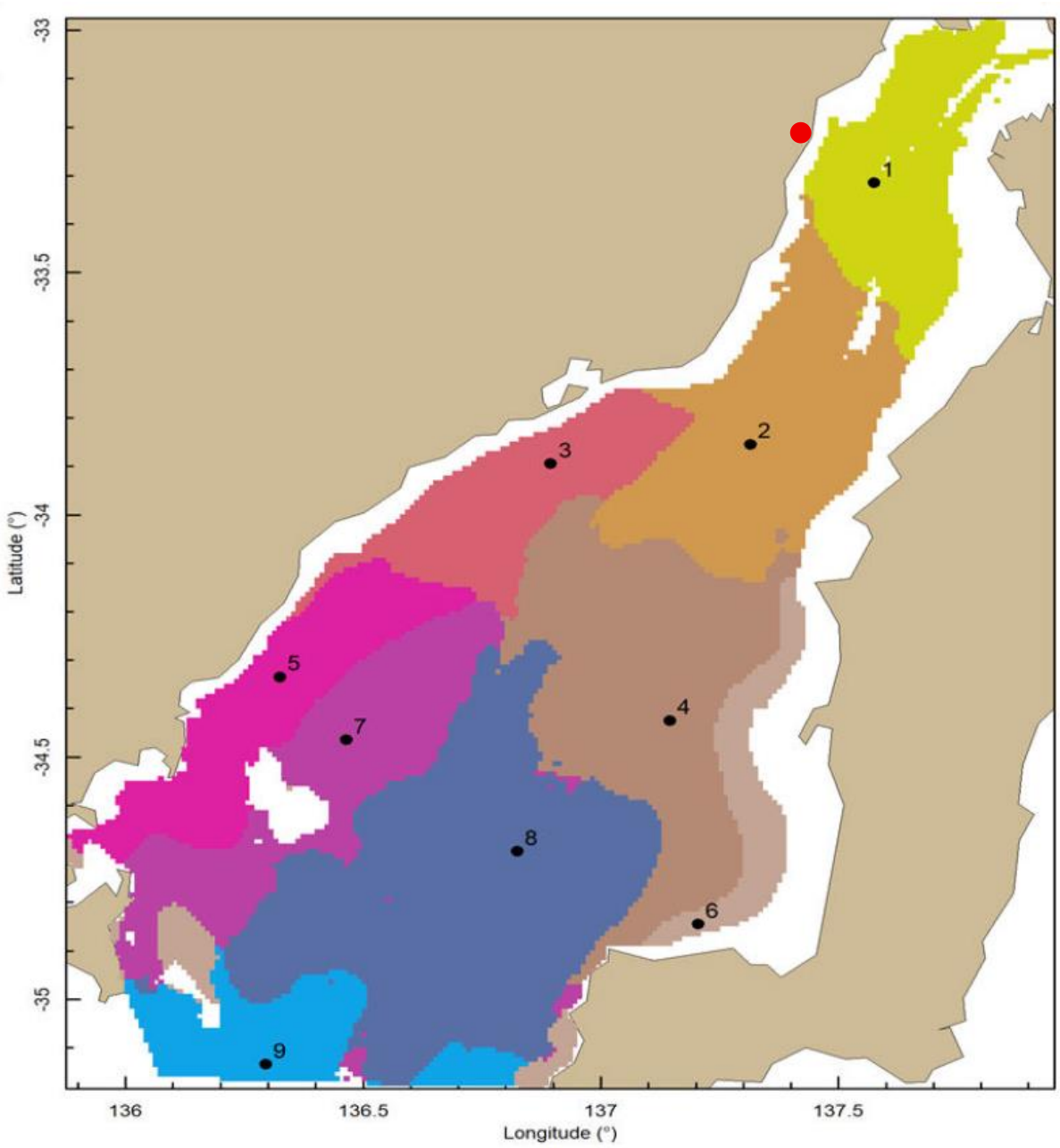


Figure 64. Nine benthic habitat associations identified by Grammer et al. (2025). Red dot added to show approximate position of Mullaquana Station.

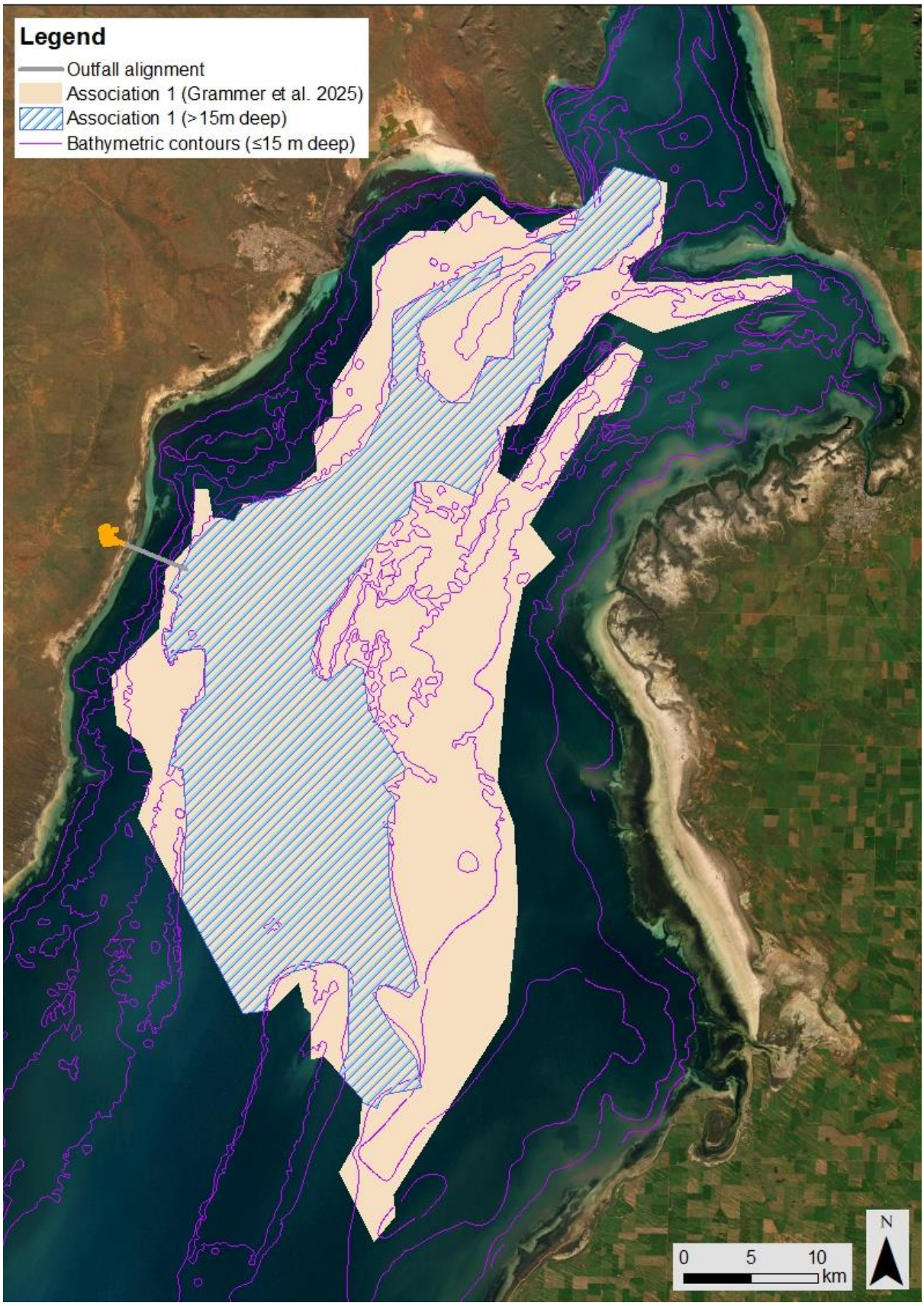


Figure 65. Conservative representation of area within Association 1 that is >15 m depth.

10.1.2 Natural variability of salinity near Mullaquana Station

Salinity was measured in vertical profiles at nine sites near Mullaquana Station between June 2025 and May 2026 (JBS&G 2026a). Site MQ08 was within the 99% safe dilution footprint and was the nearest site to the 95% safe dilution footprint. Salinity at that site varied across seasons with a range of average monthly salinities of 38.8–40.3 g/L (averaged across sites and depths) and 38.9–40.6 for maximum salinities, which were generally nearest to the seafloor (JBS&G 2026a). Monthly maximum ambient salinities, which were highest in winter, are shown in Figure 66, along with salinity increases associated with the 95% and 99% safe dilutions[15]. These salinity increases were 0.56–0.59 g/L for the 99% safe dilution and 1.12–1.19 g/L for the 95% safe dilution. Fixed salinity increases of 1.5 and 1.8 g/L above ambient are also shown in Figure 66.

Figure 66 shows that salinity corresponding to the 99% safe dilution would exceed the annual maximum ambient salinity at site MQ08 only during June and July, and salinity corresponding to the 95% safe dilution would exceed it only during March to August (Figure 66).

A salinity increase of 1.5 g/L would result in the salinity exceeding the annual maximum ambient salinity during all months except December and January and a salinity increase of 1.8 g/L, about 1.5 times higher than the salinity corresponding to the 95% safe dilution, would result in salinity that was always greater than the maximum annual ambient salinity near Mullaquana Station (Figure 66).

The main inference is that even where safe dilution values are not achieved, the corresponding salinity will not always exceed the maximum value naturally experienced by biota within those areas. Periods of potential cumulative exposure to elevated ambient salinity and desalination discharge are centred around early winter.

[15] Calculated from monthly ambient salinities and the return water salinity of 71 g/L used in mid-field model simulations (Water Technology 2026).

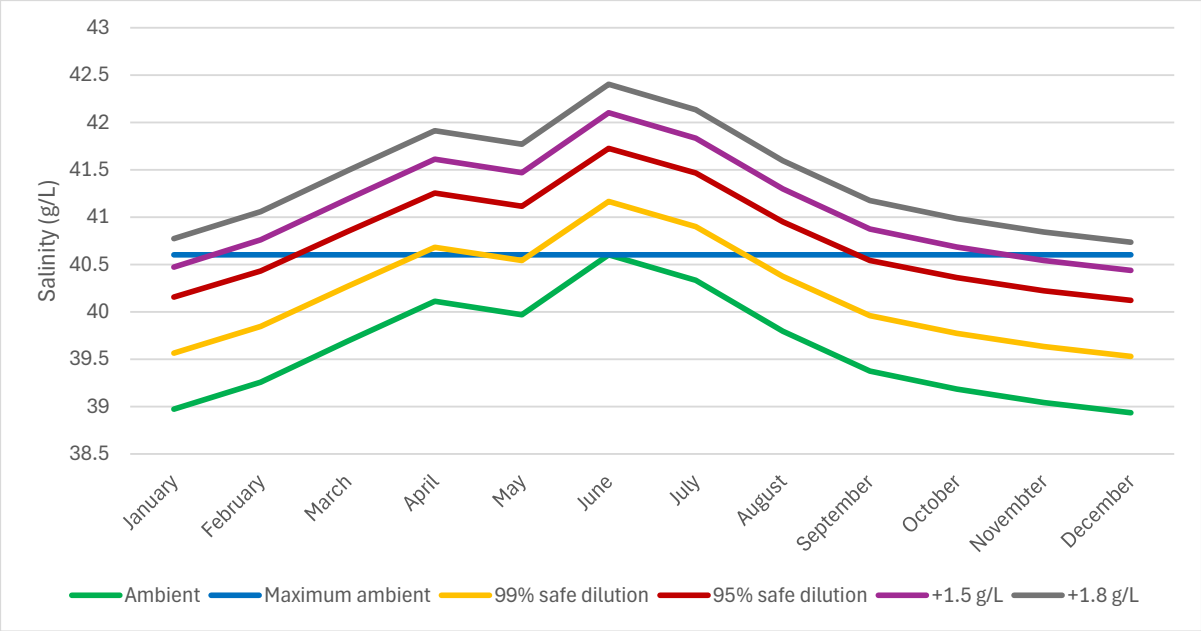


Figure 66. Monthly means of maximum ambient salinities near Mullaquana Station, and salinity increases associated with various levels of return water dilution. Source: JBS&G 2026a (ambient salinities).

10.1.3 Distribution of taxa along the Spencer Gulf salinity gradient

Spencer Gulf is an inverse estuary whereby evaporation exceeds rainfall in the north, driving a salinity gradient that decreases from north to south in the Gulf (Figure 67). The salinity fronts run north to south through the middle of the Gulf, meaning that salinities on the eastern side are also generally higher than the western side at the same latitude, i.e. salinity near Port Pirie is higher than near Mullaquana Station (Figure 67). Salinities in Upper Spencer Gulf, i.e. between Whyalla, Port Pirie and Port Augusta, exceed 40 g/L at all times and 46 g/L at Port Augusta in summer and autumn (Johnson 1981, Nunes & Lennon 1986, Figure 67, Figure 68).

Salinity data from 2022–2023 at measurement stations shown in Figure 69 also illustrate these salinity gradients (Figure 70). For salinity profiles periodically collected from all stations except NWP3, the maximum value from each profile was selected, which was generally near the sea floor. For the CTDs deployed on the seafloor at sites NPW3 and NPW4, monthly means were used. The range of differences between monthly salinities at NWP3 and the minimum of the remaining measuring stations was 1.1–2.9 g/L, with mean 1.8 g/L (Figure 70).

The main inference for assessing the impact of return water is that organisms which naturally inhabit areas in Spencer Gulf with higher salinity than near Mullaquana Station would be able to sustain equivalent increases in salinity near Mullaquana Station. It should be noted that Cambridge et al. (2017) caution that salinity tolerances displayed at one location may not transfer to other locations because the tolerance may be the result of evolution of a distinct ecotype[16]. This is considered to be unlikely, however, in Spencer Gulf given its continuous salinity gradient (Figure 68).

[16] A genetically distinct population that has adapted to specific environmental conditions.

Species with records from near Port Pirie or between Point Lowly and Blanche Harbour are considered likely to have a high tolerance for salinity increases near Mullaquana Station and would be unlikely to be impacted beyond an area similar to the 95% safe dilution footprint. Species with records from north of Blanche Harbour in Upper Spencer Gulf are considered to have a very high tolerance for salinity increase near Mullaquana Station and would be unlikely to be impacted by salinity increases even within the majority of the 95% safe dilution footprint.

The absence of records from Upper Spencer Gulf for a species does not necessarily mean that it would not tolerate the higher salinities found there. Other factors may influence the distribution of such species, including habitat type, temperature gradients and differences in wave exposure.

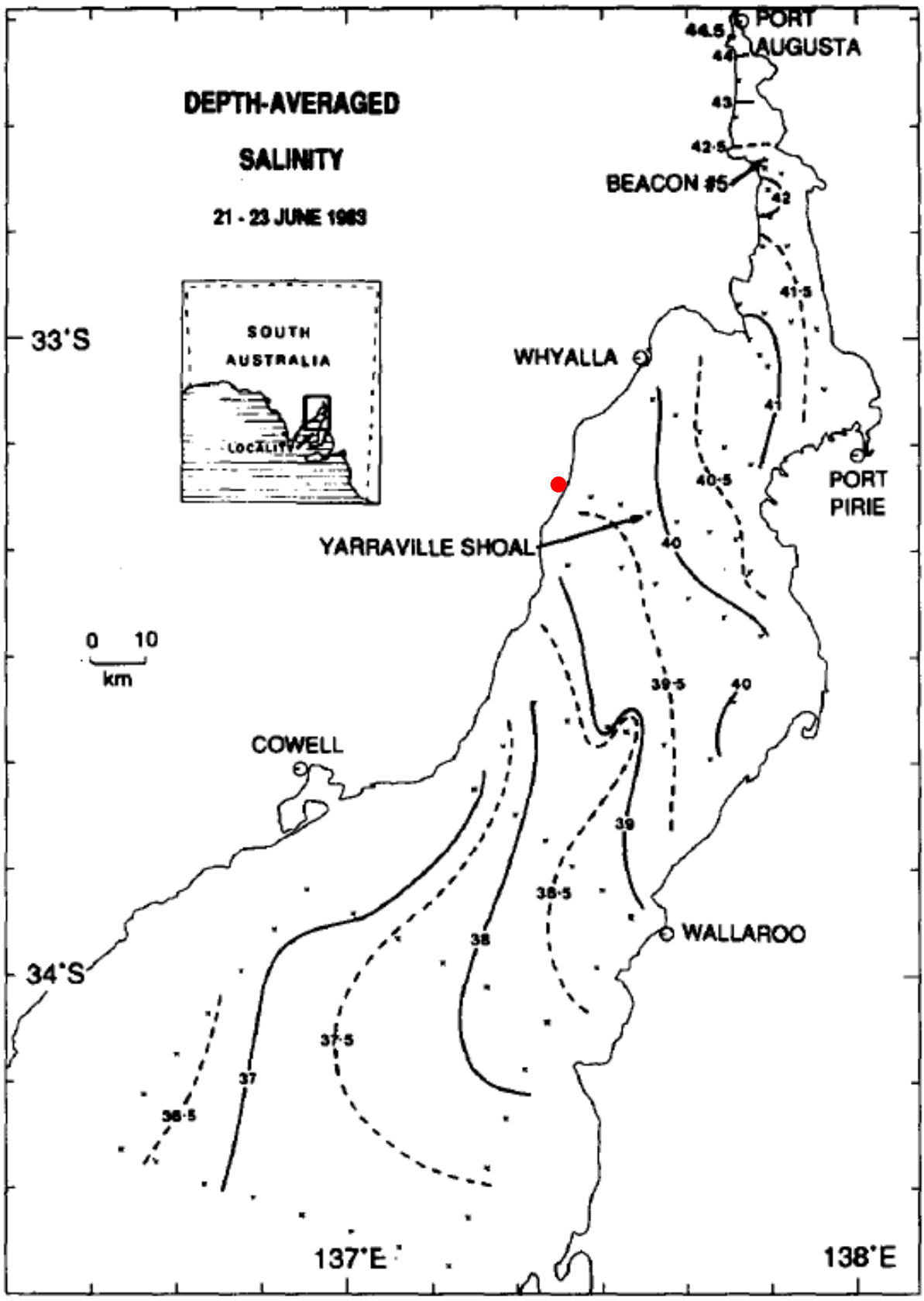


Figure 67. Depth-averaged salinities in Upper Spencer Gulf during winter. Source: Nunes & Lennon 1986. Red dot added to show approximate location of the proposed desalination plant at Mullaquana Station.

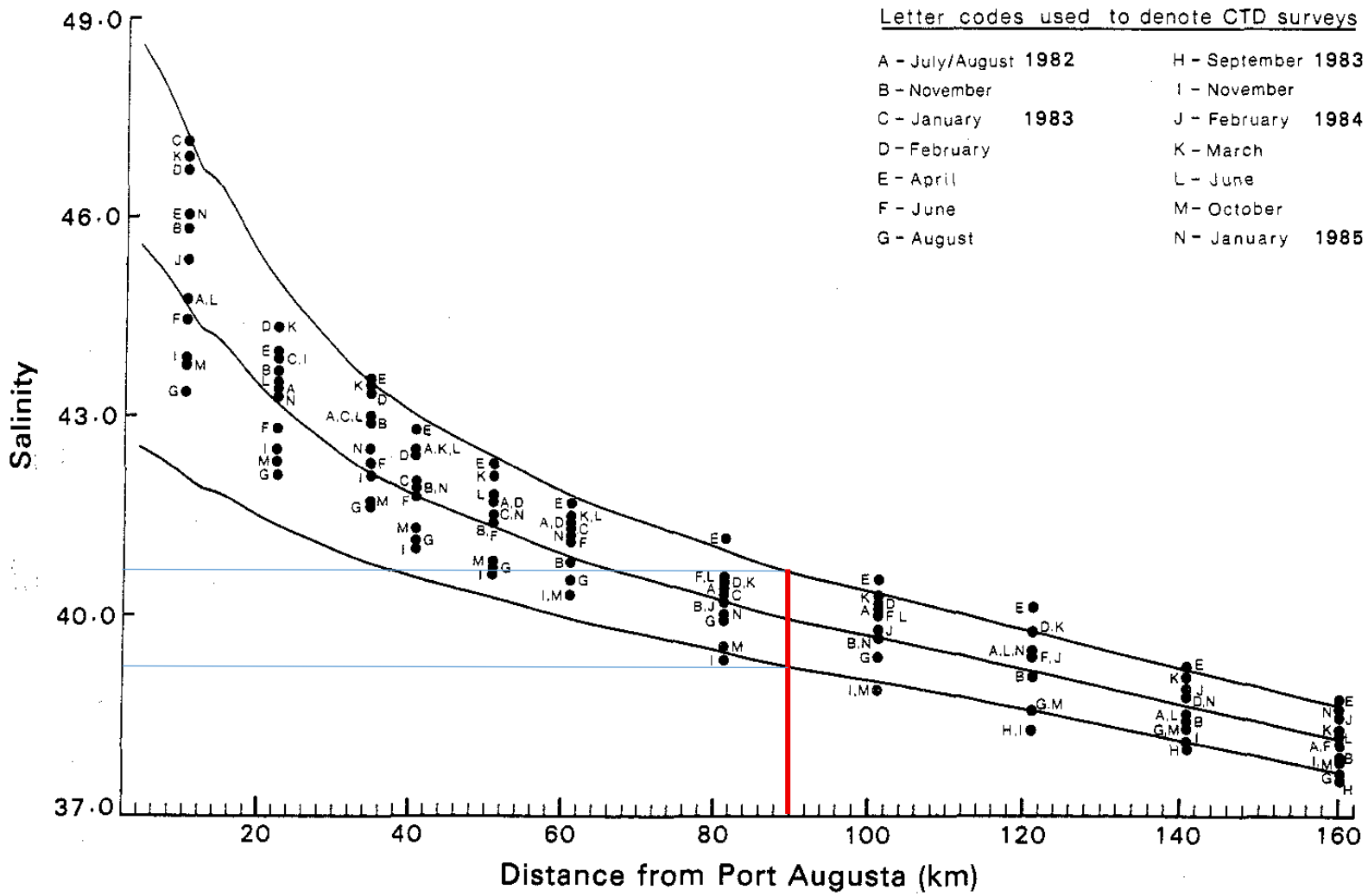


Figure 68. Observations of salinity along Upper Spencer Gulf during surveys in 1982–85. Lines show modelled envelope of seasonal extremes. The proposed desalination plant at Mullaquana Station is approximately 90 km from Port Augusta, as indicated by red line. Source: Nunes & Lennon 1986.



Figure 69. Locations of salinity measurement stations in Upper Spencer Gulf

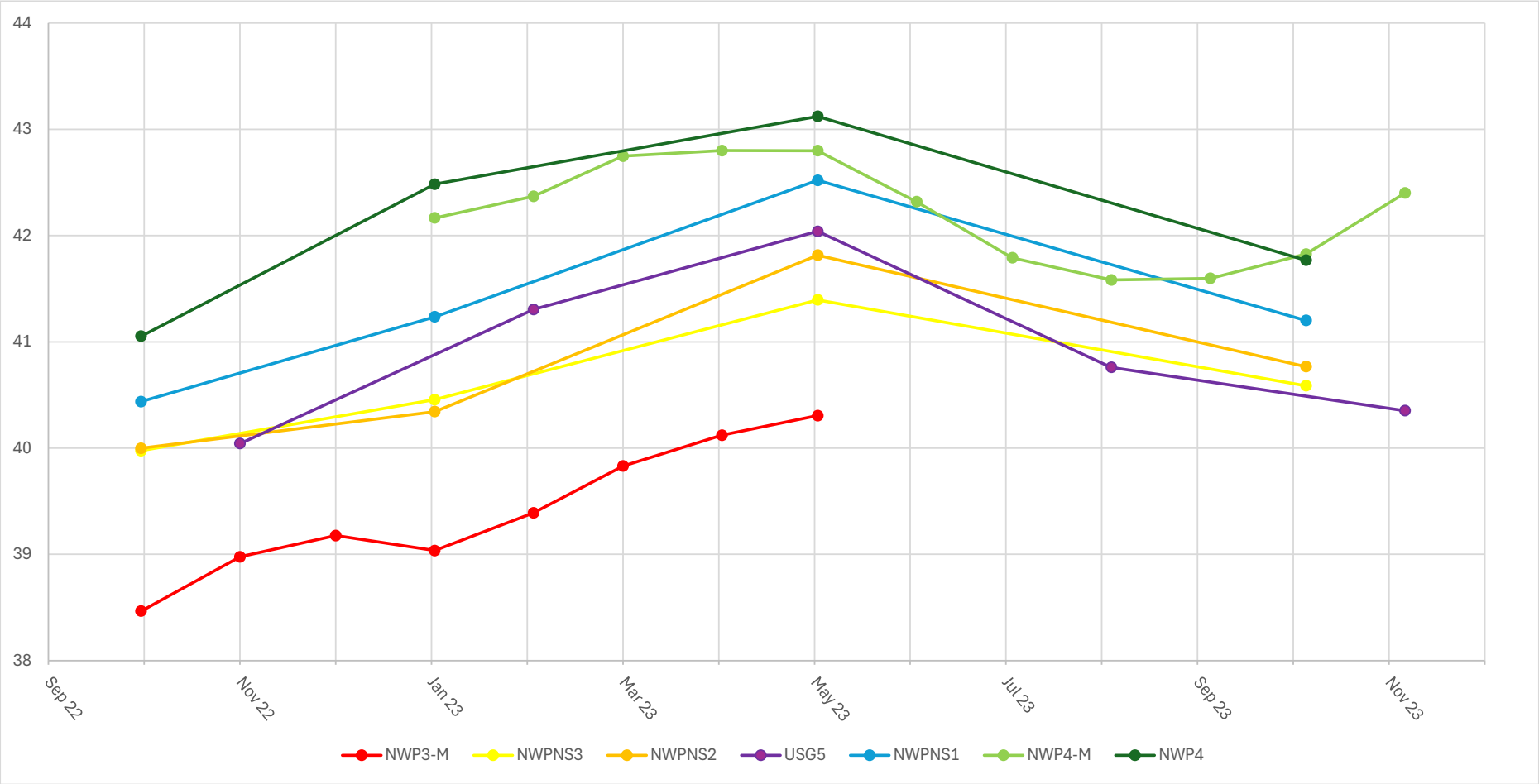


Figure 70. Salinity measurements from Upper Spencer Gulf during October 2022 to December 2023. Locations of measurement stations are provided in Figure 69

10.2 Subtidal habitats

This section assesses the impacts of the desalination plant discharge on habitats holistically but also focuses on impacts on foundation (habitat-forming) species near Mullaquana Station including *Posidonia*, *Amphibolis* and *Zostera* seagrasses, macroalgae (in deep water silty sand habitats) and invertebrates including razor clam *Pinna bicolor*, sponges and the bryozoan *Steginoporella truncata*.

Epibenthic fauna and infauna of all habitats are considered in Sections 10.3 and 10.4.

Experience from other desalination plants

Numerous studies showing impacts of elevated salinity on seagrasses, including *Posidonia* species, were identified by recent literature reviews (Tanner & Drabsch 2021, Gillanders & Stockbridge 2022). Laboratory studies of *P. australis* using return water from the Perth desalination plant found impacts on growth and mortality, but at salinity levels much higher than would likely occur following dilution and diffusion (Cambridge et al. 2017, 2019). Studies of *P. oceanica* in the laboratory (Fernandez-Torquemada & Sanchez-Lizaso 2013, Marín-Guirao et al. 2013), near a sea-based pilot desalination plant (Ruiz et al. 2009) and monitoring an operational desalination plant (Capo et al. 2020) found negative impacts with increases as little as 0.5-1 g/L.

No examples of negative impacts from desalination plants or elevated salinity on *Zostera nigricaulis* were found by recent literature reviews (Tanner & Drabsch 2021, Gillanders & Stockbridge 2022) or further investigation, but germination of the intertidal species *Zostera muelleri* was found to decline with increasing salinity (Stafford-Bell 2016).

Transplant studies in Chile of small brown macroalgae *Ectocarpus* and *Dictyota kunthii,* of which the former occurs in South Australia, showed decreased photosynthesis and increased physiological stress at sites 10 m and 30 m from a desalination plant discharge, corresponding to an increase in salinity of 2.38 and 1.5 g/L (Rodriguez-Rojas et al. 2020. Muñoz et al. 2023). Transplant studies in Spain of *Dictyota dichotoma*, which occurs in South Australia, showed a lesser response of a different nature, but the relevant salinities were not reported (Muñoz et al. 2023). A study of reef cover near the Sydney Desalination Plant found that a decrease in cover of common kelp *Ecklonia radiata*, a large canopy-forming species not found in Upper Spencer Gulf, occurred up to 55 m from the outlet during construction, but recovered during operation except within 25 m of the outlet, where the salinity increase was >1 g/L (Kelaher & Coleman 2022).

The Sydney Desalination Plant study found that return water discharge caused a significant decrease in cover of sponges out to 85 m from the diffuser (Kelaher & Coleman 2022). No examples of negative impacts of desalination plants on other habitat-forming invertebrates, including razor clams, were found by recent literature reviews (Tanner & Drabsch 2021, Gillanders & Stockbridge 2022) or further investigation.

Salinity tolerances inferred from gulf-wide distributions

The habitat-forming seagrass species *Posidonia australis*, *Posidonia sinuosa*, *Amphibolis antarctica* and *Zostera nigricaulis* have been recorded near Red Cliff Point in Upper Spencer Gulf (Shepherd 1973, 1983, Shepherd & Branden 1974). Their presence there suggests that they can tolerate salinities up to at least 45 g/L (Johnson 1981).

Furthermore, *Amphibolis antarctica* has also been recorded in salinities of up to 62 g/L in Shark Bay, Western Australia (Walker et al. 1988), although this may represent a distinct ecotype (genetic variant) of the species (Cambridge et al. 2017).

Razor clams have been recorded near Red Cliff Point in Upper Spencer Gulf (Shepherd & Branden 1974), suggesting that they can tolerate salinities up to at least 45 g/L (Johnson 1981). The sponges recorded during surveys for the Project were generally differentiated by morphology or were undifferentiated and therefore could not be compared with sponges recorded in more saline areas of Spencer Gulf. No records have been identified of *Steginoporella* in areas of naturally elevated salinity north or east of Mullaquana Station.

Interaction with return water plume

Predicted dilution factors for more than 90% of the time are at least (Section 10.1.1):

- 178 within *Posidonia sinuosa*, *Amphibolis/Posidonia* and *Posidonia australis* habitats, corresponding to protection of 99.9% of species from chronic impacts.
- 85 within *Zostera* habitat, corresponding to protection of 99.6% of species from chronic impacts.
- 105 within the Bryozoan habitat, corresponding to protection of 99.7% of species from chronic impacts.

Assessment

The discharge of return water is expected to have negligible impact on seagrass habitats and the *Steginoporella* Bryozoan habitat because:

- no examples were identified in the literature of desalination plants negatively impacting seagrass or bryozoan communities, or razor clams, although there is some evidence of potential impacts on sponges
- salinity outside the 95% protection footprint is predicted to remain within the range of natural seasonal variability near Mullaquana Station for most of the year
- the key habitat-forming seagrasses, including *Posidonia*, *Amphibolis* and *Zostera*, have a demonstrated tolerance for higher levels of salinity than would be experienced as a result of return water discharge, as inferred from their established distribution within Upper Spencer Gulf
- plume dispersion modelling predicts that return water dilutions would achieve safe protection levels, determined from ecotoxicology studies, often enough to protect all seagrass habitats and the Bryozoan habitat from chronic impacts.

The discharge of return water is expected to have localised, minor, temporary but recurring impacts on deep water silty sand habitats because:

- examples were identified in the literature of desalination plants negatively impacting sponges and macroalgae
- return water dilutions (for 51 GL/y capacity) are predicted to achieve safe protection levels often enough to protect more than 95% or 99% of species except within about 13 ha or 83 ha near the diffuser, representing 0.02% or 0.12% of that general habitat type, respectively
- salinity outside the 95% protection footprint is predicted to remain within the range of natural seasonal variability near Mullaquana Station for most of the year.

10.3 Epibenthic fauna

10.3.1 Fishes

A total of 106 fish and elasmobranch taxa were recorded during the various epibenthic fauna field studies undertaken for this report or were identified through the desktop study.

Experience from other desalination plants

Baited remote underwater video surveys in 2015, 2018 and 2021 of the rock armour surrounding the Adelaide desalination plant outfall diffuser in 16–18 m depth found that species abundance and diversity remained similar to reefs in reference areas subject to ambient salinity conditions (Whitmarsh et al. 2021, Brook 2022, 2025).

Video surveys (by scuba) of reef habitat near the outfall (<55 m) of the Sydney desalination plant found significantly higher fish abundance (279% increase), composition and diversity compared with reefs in reference areas subject to ambient salinity conditions, with no effect after the plant stopped discharging (Kelaher et al. 2020, 2022). Increased turbulence created by expulsion of the return water under pressure was considered to be a possible reason for the effects (Kelaher et al. 2022).

Salinity tolerances inferred from gulf-wide distributions

Of the 105 fish and elasmobranch taxa identified during field and desktop studies, 84 were identified to species level. Of this latter group, 52 species have been recorded in the northern/eastern region of elevated natural salinity and a further 23 species in the far north region (Table 22). These species are considered likely to have, respectively, a high or very high tolerance of elevated salinity associated with return water discharge (Section 10.1.3).

The remaining nine species are:

- Spiny-tailed leatherjacket *Acanthaluteres brownii*
- Southern tonguefish *Cynoglossus broadhursti*
- Large-eye weedfish *Heteroclinus macropthalmus*
- Sandy sprat *Hyperlophus vittatus*
- Eel blenny *Peronedys anguillaris*
- Red cod *Pseudophycis palmata*
- Widebody pipefish *Stigmatopora nigra*
- Degen's leatherjacket *Thamnaconus degeni*
- Orange cardinalfish *Vincentia punctata*

The absence of records of these species from further up the Gulf may not be related to salinity. For example, orange cardinalfish prefers exposed waters, and Degen's leatherjacket prefers moderately exposed waters (Edgar 2008).

Interaction with return water plume

Predicted dilution factors for more than 90% of the time are at least (Section 10.1.1):

- 178 within *Posidonia sinuosa*, *Amphibolis/Posidonia* and *Posidonia australis* habitats, corresponding to protection of 99.9% of species from chronic impacts.
- 85 within *Zostera* habitat, corresponding to protection of 99.6% of species from chronic impacts.

Fishes remaining in deep water silty sand habitat would also be protected from chronic impacts outside the 95% or 99% safe dilution footprints, which span 13 ha or 83 ha, representing 0.02% or 0.12% of that general habitat type (for 51GL/y capacity) (Section 10.1.1).

In response to localised unfavourable water quality conditions, such as elevated salinity, fish have the ability to move, which they are likely to do, avoiding chronic or enduring physiological or behavioural impacts. There is substantial alternative deep water silty sand habitat available adjacent to the safe dilution footprint areas.

Fish are also able to osmoregulate. Long-term reliance on this may be at the expense of energy for growth or reproduction (Gillanders & Stockbridge 2022), but for most of the year salinities near the diffusers would be within the range of ambient seasonal variation.

Assessment

The discharge of return water is expected to have negligible impact on fish because:

- no examples were identified in the literature of desalination plants negatively impacting fish communities
- salinity outside the 95% protection footprint is predicted to remain within the range of natural seasonal variability near Mullaquana Station for most of the year
- most fish species recorded near Mullaquana Station are likely to tolerate salinities higher than those predicted from return water discharge, as inferred from their distribution in Spencer Gulf
- plume dispersion modelling predicts that return water dilutions would achieve safe protection levels, determined from ecotoxicology studies, often enough to protect more than 99% of species within most habitats, including seagrass habitats
- in deep water silty sand habitats, return water dilutions are predicted to achieve safe protection levels often enough to protect more than 95% or 99% of species except within about 13 ha or 83 ha near the diffuser, representing 0.02% or 0.12% of that general habitat type (for 51GL/y capacity), respectively
- some of the species that are potentially less tolerant to increases in salinity are unlikely to inhabit the deep-water silty sand habitat
- fish have the ability to move or osmoregulate in response to elevated salinity, noting that long-term reliance on the latter option could potentially be at the expense of energy for growth or reproduction (Gillanders & Stockbridge 2022).

Table 22. Fishes recorded near Mullaquana Station and also recorded in areas of Upper Spencer Gulf with naturally elevated levels of salinity. Region: FN = Far north, NE = northern/eastern.

Species	Common name	Region	References
Acanthaluteres spilomelanurus	Bridled leatherjacket	NE	McDonald 2008, Saunders 2009, Currie et al. 2009
Acanthaluteres vittiger	Toothbrush leatherjacket	NE	Currie et al. 2009
Acanthosphex leurynnis	Fortescue	NE	ALA 2026, Saunders 2009
Aetapcus maculatus	Warty prowfish	NE	Shepherd 1973
Aptychotrema vincentiana	Southern shovelnose ray	NE	Shepherd 1973
Aracana aurita	Shaw's cowfish	NE	Shepherd 1973
Aracana ornata	Ornate cowfish	NE	Shepherd 1973, ALA 2026
Arripis georgiana	Australian herring	FN	Shepherd 1973, Branden et al. 1994
Arripis truttacea	Western Australian salmon	NE	Saunders 2009, Fowler et al. 2014
Bathytoshia brevicaudata	Smooth stingray	NE	Shepherd 1973, Currie et al. 2009
Brachaluteres jacksonianus	Pygmy leatherjacket	FN	Branden et al. 1994, Saunders 2009, Currie et al. 2009
Callogobius mucosus	Mucous goby	NE	Hutchings et al. 1993, Saunders 2009
Chelmonops curiosus	Western talma	FN	Branden et al. 1994
Cnidoglanis macrocephalus	Estuary catfish	FN	ALA 2026
Diodon nicthemerus	Globe fish	NE	ALA 2026, Currie et al. 2009, Saunders 2009
Engraulis australis	Australian anchovy	NE	Currie et al. 2009, Saunders 2009
Eocallionymus papillio	Butterfly dragonet	NE	Saunders 2009
Eubalichthys mosaicus	Mosaic leatherjacket	FN	Branden et al. 1994
Favonigobius lateralis	Longfin goby	FN	ALA 2026
Glyptauchen panduratus	Goblin fish	NE	Shepherd 1973, Saunders 2009
Gymnapistes marmoratus	Southern soldierfish	FN	ALA 2026
Haletta semifasciata	Blue weed whiting	FN	ALA 2026
Heteroclinus sp. 5	Weedfish (undescribed)	NE	McDonald 2008
Heterodontus portusjacksoni	Port Jackson shark	NE	Shepherd 1973, Currie et al. 2009, ALA 2026
Hippocampus abdominalis	Big-belly seahorse	FN	ALA 2026
Hippocampus breviceps	Short-headed seahorse	NE	Saunders 2009

Species	Common name	Region	References
Hypnos monopterygius	Coffin ray	NE	RLS 2026, ALA 2026
Hyporhamphus melanochir	Southern sea garfish	FN	ALA 2026
Lepidotrigla papilio	Butterfly gurnard perch	NE	Branden et al. 1994, Saunders 2009, Currie et al. 2009
Leptoichthys fistularius	Brushtail pipefish	NE	Saunders 2009, McDonald 2008
Lissocampus caudalis	Smooth pipefish	NE	McDonald 2008
Maxillicosta scabriceps	Roughhead triplefin	NE	Saunders 2009, ALA 2026
Meuschenia freycineti	Six-spine leatherjacket	NE	ALA 2026
Mustelus antarcticus	Gummy shark	NE	Shepherd 1973, Fowler et al. 2014
Myliobatis tenuicaudatus	Southern eagle ray	NE	Shepherd 1973, RLS 2026, Currie et al. 2009
Neoaploactis tridorsalis	Velvetfish	NE	Saunders 2009
Neoodax balteatus	Little weed whiting	NE	Saunders 2009, RLS 2026, ALA 2026
Ophiclinops pardalis	Leopard snakeblenny	NE	Saunders 2009
Pagrus auratus	Snapper	FN	Branden et al. 1994, Saunders 2009, Currie et al. 2009
Parapercis haackei	Wavy grubfish	FN	ALA 2026
Parapriacanthus elongatus	Slender bullseye	NE	Currie et al. 2009, Saunders 2009
Parequula melbournensis	Silverbelly	FN	Branden et al. 1994, Currie et al. 2009, Saunders 2009
Pelates octolineatus	Western striped trumpeter	FN	Branden et al. 1994, ALA 2026
Platycephalus aurimaculatus	Yellow-spotted flathead	NE	Currie et al. 2009
Platycephalus bassensis	Southern sand flathead	FN	Branden et al. 1994
Platycephalus richardsoni	Sand flathead	NE	Currie et al. 2009
Platycephalus speculator	Bluespotted flathead	NE	Shepherd 1973, Saunders 2009, ALA 2026
Pseudocaranx georgianus	Silver trevally	FN	Branden et al. 1994
Pseudocaranx wrighti	Skipjack trevally	NE	Currie et al. 2009, Saunders 2009
Pseudorhombus jenynsii	Small-toothed flounder	NE	Shepherd 1973, Shepherd 1983, Saunders 2009
Pugnaso curtirostris	Pugnose pipefish	NE	McDonald 2008
Repomucenus calcaratus	Spotted dragonet	NE	Saunders 2009
Rhycherus gloveri	Glover's handfish	NE	Saunders 2009
Scobinichthys granulatus	Rough leatherjacket	NE	Branden et al. 1994, Saunders 2009, McDonald 2008
Scomber australasicus	Blue mackerel	FN	ALA 2026

Species	Common name	Region	References
Sillaginodes punctatus	King George whiting	FN	Branden et al. 1994, ALA 2026, Fowler et al. 2014
Siphamia cephalotes	Wood's siphonfish	NE	Saunders 2009, RLS 2026
Siphonognathus argyrophanes	Tubemouth	NE	ALA 2026
Siphonognathus argyraphanes	Slender weed whiting	NE	Saunders 2009
Siphonognathus radiatus	Long-rayed weed whiting	FN	ALA 2026
Sphyraena novaehollandiae	Snook	NE	Shepherd 1973, Saunders 2009
Sprateloides robustus	Blue sprat	NE	Saunders 2009
Stigmatopora argus	Spotted pipefish	NE	Saunders 2009, McDonald 2008
Sutorectus tentaculatus	Cobbler carpetshark	NE	RLS 2026, Currie et al. 2009
Tetractenos glaber	Smooth toadfish	NE	Shepherd 1973, Currie et al. 2009
Tilodon sexfasciatus	Moonlighter	NE	BHP Billiton 2009, ALA 2026
Torquigener pleurogramma	Banded toadfish	FN	ALA 2026
Trachurus declivis	Jack mackerel	NE	Shepherd 1973
Trachurus novaezelandiae	Yellow-tail scad	FN	Branden et al. 1994
Trygonorrhina dumerilii	Southern fiddler ray	NE	ALA 2026, Currie et al. 2009
Upeneichthys vlamingii	Southern goatfish	FN	Branden et al. 1994
Vanacampus phillipi	Port Phillip pipefish	NE	Saunders 2009, McDonald 2008
Vanacampus poecilolaemus	Wide-bodied pipefish	NE	McDonald 2008
Vincentia badia	Pugnose goby	NE	Currie et al. 2009, Saunders 2009
Vincentia conspersa	Southern cardinalfish	FN	ALA 2026

10.3.2 Invertebrates

A total of 150 mobile and sessile invertebrate taxa were recorded during the various epibenthic fauna field studies undertaken for this report or were identified through the desktop study.

Experience from other desalination plants

A study of reef cover near the Sydney Desalination Plant found that return water discharge caused a significant decrease in cover of sponges out to 85 m from the diffuser, but other invertebrates were not significantly impacted by desalination discharge.

Salinity tolerances of species inferred from gulf-wide distribution

Of the 150 invertebrate taxa identified during field and desktop studies, 78 were identified to species level, most of which were mobile invertebrates. Of these 78 species, 40 species have been recorded in the northern/eastern region of elevated natural salinity and a further 21 species in the far north region (Table 23). These species are considered likely to have, respectively, a high or very high tolerance of elevated salinity associated with return water discharge (Section 10.1.3).

The remaining 17 species are:

- Amphipod *Amaryllis keablei*
- Velvet prawn *Metapenaeopsis lindae*
- Glass shrimp *Pseudambasia lochi*
- Long-snouted crab *Trigonoplax longirostris*
- Eleven-armed sea star *Coscinasterias muricata*
- Sea cucumber *Holothuria macroperona*
- Ludwig's sea cucumber *Notostichopus ludwigi*
- Brittle star *Ophiothrix caespitosa*
- Feather star *Ptilometra macronema*
- Turbo shell *Lunella torquatus*
- King cockle *Notocallista kingii*
- Black lace bryozoan *Adeona grisea*
- Hydroid *Halopteris campanula*
- Small red-mouthed ascidian *Herdmania fimbriae*
- Soft coral *Melithaea zimmeri*
- Sea squirt *Pyura abradata*
- Bryozoan *Steginoporella truncata*

The absence of records of these species from further up the Gulf may not be related to salinity. For example, the turbo shell *Lunella torquatus* prefers exposed waters (Edgar 2008).

Interaction with return water plume

Predicted dilution factors for more than 90% of the time are at least (Section 10.1.1):

- 178 within *Posidonia sinuosa*, *Amphibolis/Posidonia* and *Posidonia australis* habitats, corresponding to protection of 99.9% of species from chronic impacts.
- 85 within *Zostera* habitat, corresponding to protection of 99.6% of species from chronic impacts.

Invertebrates in deep water silty sand habitat would also be protected from chronic impacts outside the 95% or 99% safe dilution footprints, which span 13 ha or 83 ha, representing 0.02% or 0.12% of that general habitat type (for 51GL/y capacity) (Section 10.1.1).

Impacts associated with elevated salinity are most likely between late autumn and early winter (Section 10.1.2).

Assessment

The discharge of return water is expected to have localised, minor, temporary but recurring impacts on invertebrate communities because:

- no examples were identified in the literature of desalination plants negatively impacting invertebrate communities, other than sponges (see Section 10.2)
- many invertebrate species recorded near Mullaquana Station are likely to tolerate salinities higher than those predicted from return water discharge, as inferred from their distribution in Spencer Gulf
- salinity outside the 95% protection footprint is predicted to remain within the range of natural seasonal variability near Mullaquana Station for most of the year
- plume dispersion modelling predicts that return water dilutions would achieve safe protection levels, determined from ecotoxicology studies, often enough to protect more than 99% of species within most habitats, including seagrass habitats
- in deep water silty sand habitats, return water dilutions are predicted to achieve safe protection levels often enough to protect more than 95% or 99% of species except within about 13 ha or 83 ha near the diffuser, representing 0.02% or 0.12% of that general habitat type (for 51GL/y capacity).

Table 23. Invertebrates recorded near Mullaquana Station and also recorded in areas of Upper Spencer Gulf with naturally elevated levels of salinity. Region: FN = Far north, NE = northern/eastern.

Taxon	Common name	Region	References
Crustaceans			
Amaryllis spencerensis	An amphipod	NE	Lowry and Stoddart 2002
Ampelisca toora	An amphipod	NE	Ward and Hutchings 1996, Hutchings et al. 1993
Austrodromidia octodentata	Bristled sponge crab	NE	Saunders 2009
Erugosquilla grahami	Graham's mantis shrimp	NE	Currie et al. 2009
Gomeza bicornis	Bicornis amphipod	NE	Hutchings et al. 1993
Ibacus peronii	Balmain bug	NE	Currie et al. 2009
Lamarckdromia globosa	Sponge crab	NE	Currie et al. 2009, Saunders 2009
Leptomithrax gaimardii	Giant spider crab	NE	Currie et al. 2009, ALA 2026
Litocheira bispinosa	Two-spined pebble crab	NE	Hutchings et al. 1993, Saunders 2009, McDonald 2008
Naxia aurita	Seagrass spider crab	NE	Saunders 2009, RLS 2026, ALA 2026
Nectocarcinus integrifrons	Red swimmer crab	NE	Saunders 2009, RLS 2026
Ozius truncatus	Ozius crab	NE	ALA 2026
Paguristes frontalis	Southern hermit crab	NE	RLS 2026, Currie et al. 2009
Penaeus latisulcatus	Western king prawn	NE	Currie et al. 2009, Saunders 2009
Portunus armatus	Blue swimmer crab	FN	ALA 2026
Trichia australis	A crab	NE	Saunders 2009
Echinoderms			
Amblypneustes pallidus	Yellow-spined egg urchin	NE	ALA 2026
Anthaster valvulatus	Mottled seastar	NE	BHP Billiton 2009, Shepherd 1973, 1983, RLS 2026, ALA 2026
Australostichopus mollis	Southern sea cucumber	NE	RLS 2026
Goniocidaris tubaria	Pencil urchin	FN	BHP Billiton 2009, Shepherd 1983
Tosia australis	Southern biscuit star	FN	BHP Billiton 2009

Taxon	Common name	Region	References
Molluscs			
Ascarosepion apama	Giant Australian cuttlefish	NE	Currie et al. 2009, Saunders 2009, Steer 2015
Ascarosepion novaehollandiae	New Holland cuttlefish	NE	Saunders 2009
Australaria australasia	Sydney triton	NE	Shepherd 1973, 1974, 1983
Ceratosoma brevicaudatum	Short tailed nudibranch	FN	ALA 2026
Circe quoyi	Circular tapestry shell	FN	ALA 2026
Cleidothaerus albidus	Mangrove oyster	NE	RLS 2026, Currie et al. 2009
Conus anemone	Anemone cone	NE	BHP Billiton 2009, Hutchings et al. 1993
Equichlamys bifrons	Queen scallop	FN	ALA 2026
Euprymna tasmanica	Southern dumpling squid	NE	Saunders 2009
Idiosepius notoides	Southern pygmy squid	NE	McDonald 2008
Lima nimbifer	File shell	NE	ALA 2026
Malleus meridianus	Hammer oyster	FN	BHP Billiton 2009, Shepherd and Branden 1974, ALA 2026
Octopus australis	Southern octopus	NE	SEA 1981
Octopus berrima	Speckled octopus	NE	ALA 2026
Ostrea angasi	Native mussel	FN	ALA 2026
Pecten fumatus	King scallop	NE	BHP Billiton 2009, Shepherd 1974, Shepherd 1983, ALA 2026
Phasianella australis	Painted lady	FN	ALA 2026
Phasianella ventricosa	Swollen pheasant shell	NE	RLS 2026
Pinna bicolor	Razor clam	FN	BHP Billiton 2009, Shepherd and Branden 1974, ALA 2026
Propefusus australis	Southern spindle	NE	Hutchings et al. 1993
Euprymna tasmanica	Southern dumpling squid	NE	Saunders 2009, ALA 2026
Sepioloidea lineolata	Striped pyjama squid	NE	Shepherd 1973, Saunders 2009
Sepioteuthis australis	Southern calamari	NE	Shepherd 1973, Currie et al. 2009, Saunders 2009, RLS 2026
Trichomya hirsuta	Hairy mussel	FN	Shepherd 1983, BHP Billiton 2009, ALA 2026

Taxon	Common name	Region	References
Sessiles			
Ascidia sydneiensis	Sea squirt	NE	Currie et al. 2009, ALA 2026
Celleporaria fusca	Lace bryozoan	NE	Shepherd 1983
Cnemidocarpa radicosa	Sea squirt	FN	Shepherd and Branden 1974
Echinogorgia sp.	Sea fan	FN	BHP Billiton 2009, Shepherd 1983
Euplexaura sp.	Sea whip	FN	Shepherd 1983
Halocynthia dumosa	Spiny sea squirt	FN	BHP Billiton 2009, Shepherd 1983
Herdmania grandis	Red-throat ascidian	FN	Shepherd 1983
Holopsamma laminaefavosa	Honeycomb sponge	NE	BHP Billiton 2009, ALA 2026
Phallusia obesa	Obese ascidian	FN	BHP Billiton 2009
Plesiastrea versipora	Green coral	NE	RLS 2026, ALA 2026
Polycarpa pedunculata	Sea squirt	FN	Shepherd 1983
Polycarpa viridis	Mauve-mouthed ascidian	FN	ALA 2026
Pyura stolonifera	Red bait	FN	Shepherd 1973
Sabella spallanzanii	European fan worm	NE	Dittmann et al. 2010
Telesto multiflora	Soft coral	FN	BHP Billiton 2009
Tethya ingalli	Golf ball sponge	NE	ALA 2026

10.4 Infauna

Experience from other desalination plants

Del-Pilar-Ruso et al. (2007, 2015) and Al-Osaimi et al. (2019) found that discharge from the Alicante, and San Pedro del Pinatar desalination plants in Spain and Al-Dur desalination plant in Bahrain, altered the infauna communities at sites in the immediate vicinity of the outfall, which did not use a diffuser to facilitate increased mixing. Salinities at those sites were 39, 49 and 55 g/L, respectively. At the Alicante desalination plant, similar impacts were found at a site 400 m from the outfall, a year after the impacts observed near the outfall. At the San Pedro del Pinatar desalination plant, there was no impact 250 m from the outfall. At the Al-Dur desalination plant, similar impacts were found at sites approximately 500 m away at the same depth, but not at those a similar distance away in deeper water. The installation of a diffuser at the San Pedro del Pinatar desalination plant resulted in a decrease in salinity from 49 g/L to 38.5 g/L and a recovery in richness and progressive reductions of impact on abundance (Del-Pilar-Ruso et al. 2015).

Infauna surveys near the Adelaide desalination plant diffuser and at two reference sites in 2012/13, 2017, 2020 and 2023 found that discharge from the desalination plant was not impacting the infaunal assemblages at Port Stanvac (Loo et al. 2021, Hiller et al. 2024).

Salinity tolerances inferred from gulf-wide distributions

A total of 168 macrofauna taxa and 38 meiofauna taxa were identified during infauna surveys for the Project (Section 6).

Comprehensive studies of the infauna were undertaken near Port Pirie by Ward and Hutchings (1996) and Hutchings et al. (1993). However, because of the relatively coarse taxonomic level to which infauna are generally identified, no comparisons of meiofauna and very few comparisons of macrofauna could be meaningfully made with records from more saline environments further north or east in the Gulf, and most matches were at family or genus level (higher levels were not considered). Of the 168 macrofauna taxa recorded near Mullaquana Station, one, 29 and 64 were represented at species, genus and family level in areas of naturally elevated salinity in the north and east of Upper Spencer Gulf (Table 24).

Interaction with return water plume

Predicted dilution factors for more than 90% of the time are at least (Section 10.1.1):

- 178 within *Posidonia sinuosa*, *Amphibolis/Posidonia* and *Posidonia australis* habitats, corresponding to protection of 99.9% of species from chronic impacts
- 85 within *Zostera* habitat, corresponding to protection of 99.6% of species from chronic impacts.

Infauna in deep water silty sand habitat would also be protected from chronic impacts outside the 95% or 99% safe dilution footprints, which span 13 ha or 83 ha, representing 0.02% or 0.12% of that general habitat type (for 51GL/y capacity) (Section 10.1.1).

Assessment

The discharge of return water is expected to have negligible impacts on infauna communities in seagrass habitat and short-term, minor, temporary but recurring impacts in deep silty sand habitats because:

- no examples were found in the literature of a desalination plant negatively impacting infauna communities provided a diffuser was used to facilitate return water dispersion
- salinity outside the 95% protection footprint is predicted to remain within the range of natural seasonal variability near Mullaquana Station for most of the year
- some of the infauna taxa recorded near Mullaquana Station are likely to tolerate salinities higher than those predicted from return water discharge, as inferred from their distribution in Spencer Gulf
- plume dispersion modelling predicts that return water dilutions would achieve safe protection levels, determined from ecotoxicology studies, often enough to protect more than 99% of species within most habitats, including seagrass habitats
- in deep silty sand habitats, return water dilutions are predicted to achieve safe protection levels often enough to protect more than 95% or 99% of species except within about 13 ha or 83 ha near the diffuser, representing 0.02% or 0.12% of that general habitat type (for 51GL/y capacity).

Table 24. Infauna taxa recorded near Mullaquana Station and also near Port Pirie

Taxon	Level
Annelida	
Aglaophamus sp. 1	family
Aricidea sp. 1	genus
Arabella longipedata	genus
Armandia sp. 1	genus
Axiothella sp. 1	family
Capitella sp. 1	genus
Chrysopetalidae sp. 1	family
Cirratulidae sp. 1	family
Cirratulidae sp. 2	family
Eunice sp. 1	genus
Glycera sp. 1	genus
Goniada sp. 1	genus
Hesionidae sp. 1	family
Lumbrineris sp. 1	genus
Magelona sp. 1	genus
Marphysa sp. 1	genus
Lysidice unicornis	genus
Nereididae sp. 1	family
Nereididae sp. 2	family
Notomastus sp. 1	genus
Onuphis holobranchiata	family
Orbiniidae sp. 1	family
Pherusa sp. 1	family
Phyllodocidae sp. 1	family
Poecilochaetus serpens	species

Taxon	Level
Pherusa sp. 1	family
Phyllodocidae sp. 1	family
Poecilochaetus serpens	species
Polynoidae sp. 1	family
Pontogenia sp. 1	family
Rhamphobrachium sp. 1	family
Sabellidae sp. 1	family
Sigalionidae sp. 1	family
Spionidae sp. 1	family
Spionidae sp. 2	family
Syllidae sp. 1	family
Syllidae sp. 2	family
Syllidae sp. 3	family
Syllidae sp. 4	family
Terebellidae sp. 1	family
Trichobranchidae sp. 1	family

Taxon	Level
Crustacea	
Alpheus sp. 1	genus
Ampeliscidae sp. 1	family
Aoridae sp. 1	family
Apseudidae sp. 1	family
Callianassidae sp. 1	family
Chitonopsis sp. 1	family
Cirolanidae sp. 1	family
Cryptocnemus sp. 1	family
Dexaminidae sp. 1	family
Grapsidae sp. 1	family
Hymenosomatidae sp. 1	family
Ischyroceridae sp. 1	family
Leucothoidae sp. 1	family
Limnoriidae sp. 1	family
Lysianassidae sp. 1	family
Maeridae sp. 1	family
Melitidae sp. 1	family
Penaeidae sp. 1	family
Phoxocephalidae sp. 1	family
Pilumnidae sp. 1	family
Portunidae sp. 1	family
Sphaeromatidae sp. 1	family
Sphaeromatidae sp. 2	family
Sphaeromatidae sp. 3	family
Tanaididae sp. 1	family

Taxon	Level
Mollusca	
Antigona sp. 1	family
Cerithiidae sp. 1	family
Circe sp. 1	genus
Dosinia sp. 1	family
Dosinia sp. 2	family
Dosinia sp. 3	family
Electroma sp. 1	genus
Ennucula sp. 1	family
Glycymeris sp. 1	genus
Limidae sp. 1	family
Lucinidae sp. 1	family
Mactra sp. 1	genus
Mactra sp. 2	genus
Modiolus sp. 1	genus
Modiolus sp. 2	genus
Musculus coenobitus	genus
Musculus sp. 1	genus
Myochama sp. 1	family
Nassarius sp. 1	genus
Natica sp. 1	family
Natica sp. 2	family
Ostreidae sp. 1	family
Paphia sp. 1	family
Patellidae sp. 1	family
Pteria sp. 1	family
Saccella darwini	genus
Tellina sp. 1	genus
Tellina sp. 2	genus
Tellina sp. 3	genus
Tellina sp. 4	genus
Trochidae sp. 1	genus

10.5 Listed and other priority species

Note that sponges and macroalgae are covered within Section 10.2.

10.5.1 Megafauna

Twelve mammals, three turtles and two sharks, all listed under the EPBC Act and/or South Australian legislation, were identified as having a possible or likely interaction with the Project (Section 7.1).

Other, non-listed sharks and rays, including thresher shark *Alopias vulpinus* and eagle ray *Myliobatis tenuicaudata* were discussed in Section 10.3.1.

Salinity tolerances inferred from gulf-wide distributions

Of the above listed species, most have been recorded in Upper Spencer Gulf (Table 25). These species are considered likely to have a high tolerance of elevated salinity associated with return water discharge (Section 10.1.3). The exception is the sperm whale *Physeter macrocephalus*, for which the northernmost record is from centre of the gulf south of Whyalla (ALA 2026).

Interaction with return water plume

Predicted dilution factors for more than 90% of the time are at least (Section 10.1.1):

- 178 within *Posidonia sinuosa*, *Amphibolis/Posidonia* and *Posidonia australis* habitats, corresponding to protection of 99.9% of species from chronic impacts
- 85 within *Zostera* habitat, corresponding to protection of 99.6% of species from chronic impacts.

Megafauna using deep water silty sand habitat would also be protected from chronic impacts outside the 95% or 99% safe dilution footprints, which span 13 ha or 83 ha, representing 0.02% or 0.12% of that general habitat type (for 51GL/y capacity) (Section 10.1.1).

In response to localised unfavourable water quality conditions, such as elevated salinity, marine mammals, turtles and sharks have the ability to move, which they are likely to do, avoiding chronic or enduring physiological or behavioural impacts. There is substantial alternative deep water silty sand habitat available adjacent to the safe dilution footprint areas. Many megafauna species predominantly inhabit the water column where they would be less exposed to elevated salinity.

Assessment

The discharge of return water is expected to have negligible impact on listed megafauna because:

- salinity outside the 95% protection footprint is predicted to remain within the range of natural seasonal variability near Mullaquana Station for most of the year
- most megafauna species recorded near Mullaquana Station are likely to tolerate salinities higher than those predicted from return water discharge, as inferred from their distribution in Spencer Gulf
- plume dispersion modelling predicts that return water dilutions would achieve safe protection levels, determined from ecotoxicology studies, often enough to protect more than 99% of species within most habitats, including seagrass habitats

- in deep silty sand habitats, return water dilutions are predicted to achieve safe protection levels often enough to protect more than 95% or 99% of species except within about 13 ha or 83 ha near the diffuser, representing 0.02% or 0.12% of that general habitat type (for 51GL/y capacity)
- megafauna have the ability to move in response to elevated salinity, and many would predominantly inhabit the water column where they would be less exposed to saline plumes.

Table 25. Megafauna identified as having a likely or possible interaction with the Project and also recorded in areas of Upper Spencer Gulf with naturally elevated levels of salinity.

Species	Common name	Evidence of presence in areas of naturally elevated salinity
Mammals		
Arctocephalus forsteri	Long-nosed fur seal	Increasing numbers around Point Lowly (Steer et al. 2013)
Balaenoptera bonaerensis	Antarctic minke whale	Beach-washed specimen recorded north of Ward Spit (ALA 2026)
Balaenoptera edeni	Bryde's whale	Museum records from near Port Augusta in October 1985 and April 1989 (ALA 2026)
Delphinus delphis	Common dolphin	Observed during observational study in January and May 2010 at Point Lowly (Gibbs 2010)
Eubalaena australis	Southern right whale	Multiple records from Port Pirie, Port Bonython and Port Augusta from 1886–1955 and 1983–2014, mainly between June and September (ALA 2026).
Kogia breviceps	Pygmy sperm whale	Museum records from Point Lowly in 1974 and 2018 and Port Davis in 1989 (ALA 2026).
Megaptera novaeangliae	Humpback whale	Multiple records from Point Lowly and Port Augusta in 1921 and 1992–2017, mainly between May and September (ALA 2026)
Mesoplodon layardii	Strap-toothed Whale	Museum record from 1983 near Port Davis (ALA 2026)
Neophoca cinerea	Australian sea-lion	Validated citizen science records from Fitzgerald Bay in August 2011 (ALA 2026)
Pseudorca crassidens	False killer whale	Records near Point Lowly based on media from 1900 and 1934 (ALA 2026)
Tursiops spp.	Bottlenose dolphins	Observed during observational study in January and May 2010 at Point Lowly (Gibbs 2010)
Turtles		
Caretta caretta	Loggerhead turtle	Museum records (albeit from dead turtles) from Point Lowly in 2000 and Port Augusta in 1992 (ALA 2026)
Chelonia mydas	Green turtle	One museum record from Port Pirie in 1987 (ALA 2026)
Dermochelys coriacea	Leatherback turtle	Records from near Port Augusta and Point Lowly in April and June 2025, respectively (ALA 2026)
Sharks		
Carcharodon carcharias	White shark	Numerous sightings around Whyalla and Port Augusta (PIRSA 2024b)
Galeorhinus galeus	School shark	Fisheries catch records in Upper Spencer Gulf (Shepherd 1973). Also reported from Point Lowly by SEA (1981).

10.5.2 Syngnathids

Fifteen Syngnathids, all listed as 'Marine' under the EPBC Act and protected under the South Australian *Fisheries Management Act 2007*, were identified as having possible or likely interaction with the Project (Section 7.2).

Salinity tolerances inferred from gulf-wide distributions

Of these 15 species, 12 have been recorded in areas of Upper Spencer Gulf with naturally high salinity compared to near Mullaquana Station (Section 10.1.3, Table 26).

The remaining species are:

- Javelin pipefish *Lissocampus runa*
- Gulf pipefish *Stigmatopora narinosa*
- Widebody pipefish *Stigmatopora nigra*

The absence of records of these species from further up the Gulf is not necessarily related to salinity.

Interaction with return water plume

Predicted dilution factors for more than 90% of the time are at least (Section 10.1.1):

- 178 within *Posidonia sinuosa*, *Amphibolis/Posidonia* and *Posidonia australis* habitats, corresponding to protection of 99.9% of species from chronic impacts
- 85 within *Zostera* habitat, corresponding to protection of 99.6% of species from chronic impacts.

Syngnathids such a tiger pipefish *Filicampus tigris* remaining in deep water silty sand habitat would also be protected from chronic impacts outside the 95% or 99% safe dilution footprints, which span 13 ha or 83 ha, representing 0.02% or 0.12% of that general habitat type (for 51GL/y capacity) (Section 10.1.1).

In response to localised unfavourable water quality conditions, such as elevated salinity, fish have the ability to move, which they are likely to do, avoiding chronic or enduring physiological or behavioural impacts. There is substantial alternative deep water silty sand habitat available adjacent to the safe dilution footprint areas.

Fish, including Syngnathids, are able to osmoregulate. Long-term reliance on this may be at the expense of energy for growth or reproduction (Gillanders & Stockbridge 2022), but for most of the year salinities near the diffusers would be within the range of ambient seasonal variation.

Assessment

The discharge of return water is expected to have negligible impact on Syngnathids because:

- salinity outside the 95% protection footprint is predicted to remain within the range of natural seasonal variability near Mullaquana Station for most of the year
- most Syngnathid species recorded near Mullaquana Station are likely to tolerate salinities higher than those predicted from return water discharge, as inferred from their distribution in Spencer Gulf
- plume dispersion modelling predicts that return water dilutions would achieve safe protection levels, determined from ecotoxicology studies, often enough to protect more than 99% of species within most habitats, including seagrass habitats

- the few species that are potentially less tolerant to salinity inhabit seagrass, although javelin pipefish ay also inhabit deep-water sand habitat (Reef Watch 2014)
- in deep water silty sand habitats, return water dilutions are predicted to achieve safe protection levels often enough to protect more than 95% or 99% of species except within about 13 ha or 83 ha near the diffuser, representing 0.02% or 0.12% of that general habitat type, respectively (for 51GL/y capacity).
- Syngnathids have the ability to move or osmoregulate in response to elevated salinity, noting that long-term reliance on the latter option could potentially be at the expense of energy for growth or reproduction (Gillanders & Stockbridge 2022).

Table 26. Syngnathids identified as having a likely or possible interaction with the Project and also recorded in areas of Upper Spencer Gulf with naturally elevated levels of salinity. Region: FN = Far north, NE = northern/eastern.

Species	Common name	Region	References
Filicampus tigris	Tiger pipefish	NE	Saunders 2009
Hippocampus abdominalis	Big-belly seahorse	FN	ALA 2026
Hippocampus breviceps	Short-head seahorse	NE	Saunders 2009
Histiogamphelus cristatus	Rhino pipefish	NE	Saunders 2009
Hypselognathus rostratus	Knifesnout pipefish	NE	McDonald 2008
Kaupus costatus	Deepbody pipefish	NE	ALA 2026
Leptoichthys fistularius	Brushtail pipefish	NE	Saunders 2009, McDonald 2008
Lissocampus caudalis	Smooth pipefish	NE	McDonald 2008
Pugnaso curtirostris	Pugnose pipefish	NE	McDonald 2008
Stigmatopora argus	Spotted pipefish	NE	Saunders 2009, McDonald 2008
Vanacampus phillipi	Port Phillip pipefish	NE	Saunders 2009, McDonald 2008
Vanacampus poecilolaemus	Longsnout pipefish	NE	McDonald 2008

10.5.3 Giant Australian Cuttlefish

Giant Australian cuttlefish using habitats near Mullaquana Station are likely to be from the northern Spencer Gulf population, which aggregates at Point Lowly to breed (JBS&G 2026b).

Salinity tolerance inferred from gulf-wide distribution

Giant Australian cuttlefish have been recorded within 2 km of Crag Point during July (iNaturalist 2026), when salinity exceeds 42 g/L (Figure 69, Figure 70).

Relevant ecotoxicity data

Ecotoxicity tests on the northern subpopulation of giant Australian cuttlefish on behalf of BHP Billiton (2011b) showed no effect at salinities below 43 g/L and independent tests showed no effect at salinities below 41 g/L (Dupavillon & Gillanders 2009, as cited by BHP Billiton 2011b[17]).

The most conservative return water dilution factor required to protect cuttlefish from chronic impacts, calculated from the results of ecotoxicity testing undertaken by BHP Billiton, was 53 (the same as the 99% safe dilution factor). This result is considered to be very conservative because both the return water concentration and ambient (diluent) water were at much higher salinities than would be the case for the Project (van Dam 2026).

Interaction with return water plume

Cuttlefish use reef habitat at Point Lowly for breeding, which is too far from the outfall for the return water to have any measurable impact.

However, giant Australian cuttlefish migrate from Spencer Gulf, north of Wallaroo, to Point Lowly over a broader range of habitats.

Predicted dilution factors for more than 90% of the time are at least (Section 10.1.1):

- 178 within *Posidonia sinuosa*, *Amphibolis/Posidonia* and *Posidonia australis* habitats, corresponding to protection of 99.9% of species from chronic impacts.
- 85 within *Zostera* habitat, corresponding to protection of 99.6% of species from chronic impacts.

Based on the conservative safe dilution of 53, cuttlefish traversing deep water silty sand habitat near would also be protected from chronic impacts outside the 95% safe dilution footprints, which spans 13 ha, representing 0.02% of that general habitat type (for 51GL/y capacity) (Section 10.1.1).

In response to localised unfavourable water quality conditions, such as elevated salinity, cuttlefish have the ability to move to avoid chronic or enduring physiological or behavioural impacts. There is substantial alternative deep water silty sand habitat available adjacent to the 95% safe dilution footprint area.

Assessment

The discharge of return water is expected to have negligible impact on giant Australian cuttlefish from the northern Spencer Gulf population because:

[17] Suggests a correction to the value of 40 g/L stated by Dupavillon & Gillanders because of likely salinity measurement errors.

- salinity outside the 95% protection footprint would remain within the range of natural seasonal variability near Mullaquana Station for most of the year (although not in April and May when cuttlefish may be using the area as a migration pathway)
- the northern Spencer Gulf population of giant Australian cuttlefish has a tolerance for higher salinity than predicted to occur as a result of return water discharge, as inferred from its distribution in Spencer Gulf
- ecotoxicity testing suggests that giant Australian cuttlefish would be resilient to salinities predicted to occur as a result of return water discharge near Mullaquana Station. Even based on the most conservative safe dilution for cuttlefish derived from ecotoxicity studies, chronic effects on giant Australian cuttlefish would be limited to the 95% safe dilution footprint, i.e. 13 ha near the diffuser (for 51GL/y capacity)
- cuttlefish have the ability to move away from elevated salinity.

10.6 Fisheries and Aquaculture

Commercial and recreational fisheries and aquaculture operating or with key habitats within the MSA were identified in Section 8, with reference to 21 species or species groups.

Salinity tolerances inferred from gulf-wide distributions

Of the identified taxa, 18 were identified to species level. In addition, species recorded near Mullaquana Station that represent broader fisheries reporting groups included:

- bronze whaler *Carcharhinus brachyurus,* representing whaler sharks. The other species in this group is dusky whaler *C. obscurus*, for which there are no records in Upper Spencer Gulf (ALA 2026).
- southern eagle ray *Myliobatis tenuicaudatus*, representing rays and skates, as the most prominent species of this group (Dennis et al. 2025), and smooth stingray *Bathytoshia brevicaudata*. Both of these species have been recorded near Mullaquana Station.
- six-spined leatherjacket *Meuschenia freycineti* representing leatherjackets, as one of the two species commonly caught in the Marine Scalefish Fishery (Dennis et al. 2025) and recorded near Mullaquana Station. The other species is horseshoe leatherjacket *M. hippocrepis*, for which there are no records in Spencer Gulf north of Wallaroo (ALA 2026).

Each of these 22 species has been recorded in areas of the Gulf (north of Point Lowly) where salinity is naturally elevated (Table 27). For whaler sharks, rays and skates and leatherjackets, catches of the broader groups were also reported from north of Point Lowly (Dennis et al. 2025). All 22 species are considered likely to have a high tolerance of elevated salinity associated with return water discharge (Section 10.1.3).

Relevant ecotoxicity data

The following tests of species relevant to fisheries or aquaculture in southern Spencer Gulf have been undertaken for Australian desalination plants (van Dam 2026):

- One 7-day larval development/survival test of yellowtail kingfish *Seriola lalandi*, with a toxicity value of 26%
- Two 7-day larval growth tests of snapper *Pagrus auratus*, with toxicity values of 5.8% and 13.8%

- Two 48-hour larval development tests of the blue mussel *Mytilus edulis*, which is closely related to the aquaculture species *M. galloprovincialis* (Colgan & Middelfart 2011), with toxicity values of 3.5% and 12%
- A 16-day larval metamorphosis, 72-hour larval development and one hour fertilisation tests of Purple Urchin *Heliocidaris erythrogramma*, with toxicity values of 12.5%, 5.9% and 19.6%.

The corresponding minimum dilutions to protect these species are 4, 18, 29 and 17, respectively.

Loo & Nayar (2022) undertook a review of salinity tolerances of species relevant to fisheries and aquaculture near Port Lincoln. Relevant findings include:

- decreased growth performance, feed intake, feed efficiency and survival of yellowtail kingfish juveniles and fingerlings above 38 g/L (Stone et al. 2014)
- hatching success, yolk sac utilisation and early larval growth of King George whiting *Sillaginodes punctatus* were not affected by salinities up to 55 g/L (Ham & Hutchinson 2003)
- based on geographical distribution and habitat information, yelloweye mullet *Aldrichetta forsteri* can adapt to salinities up to 95 g/L (Earl & Ferguson 2013).

Interaction with return water plume

Plume dispersion modelling predicts that return water dilution would be sufficiently high often enough to protect from chronic impacts (Section 10.1.1):

- at least 99% of species in all seagrass and mangrove habitats.
- at least 95% of species in silty sand habitats except within 13 ha close to the diffuser (for 51GL/y capacity).
- at least 99% of species in silty sand habitats except within 70 ha close to the diffuser (for 51GL/y capacity).

Aquaculture species relying on typical seawater salinities would be more than 40 km away and would not be impacted by the return water.

Assessment

The discharge of return water is expected to have negligible impact on fisheries or aquaculture species because:

- salinity outside the 95% protection footprint would remain within the range of natural seasonal variability near Mullaquana Station for most of the year
- all of the species most relevant to fisheries near Mullaquana Station have a tolerance for higher salinity than would be experienced as a result of return water discharge, as inferred from their distribution in Spencer Gulf
- dilution of the return water within all seagrass and mangrove habitats would be sufficiently high often enough to protect more than 99% of species from chronic impacts, resulting in negligible risk to these ecosystems
- chronic impacts to species within silty sand habitats near Mullaquana Station would be limited to 13 ha for 95% of species and 83 ha for 99% of species (for 51GL/y capacity), representing a small fractional percentage of similar habitat mapped in the area.

- fish have the ability to move or osmoregulate in response to elevated salinity, noting that long-term reliance on the latter option could potentially be at the expense of energy for growth or reproduction (Gillanders & Stockbridge 2022)
- aquaculture leases and zones currently are too far from the outfall for permitted species including yellowtail kingfish, molluscs and macroalgae to be impacted by return water. The microalgae aquaculture lease at the top of False Bay is also too far to be impacted by the return water and in any case relies on hypersaline water.

Habitats relevant to fisheries were assessed in Section 10.2.

Table 27. Fisheries and aquaculture species recorded near Mullaquana Station and also recorded in high salinity areas of Upper Spencer Gulf.

Species	Common name	Commercial fisheries*	References
Penaeus latisulcatus	Western king prawn	Spencer Gulf Prawn	Currie et al. 2009
Ibacus peronii	Balmain bug	Spencer Gulf Prawn	Currie et al. 2009
Portunus armatus	Blue crab	Blue Crab	ALA 2026
Pagrus auratus	Snapper	Marine Scalefish and/or Charter Boat (prior to closure)	Drew et al. 2021
Sillaginodes punctatus	King George whiting	Marine Scalefish and/or Charter Boat	Dennis et al. 2025
Sepioteuthis australis	Southern calamari	Marine Scalefish and/or Charter Boat, Spencer Gulf Prawn	Dennis et al. 2025
Hyporhamphus melanochir	Southern sea garfish	Marine Scalefish and/or Charter Boat	Dennis et al. 2025
Sillago schomburgkii	Yellowfin whiting	Marine Scalefish and/or Charter Boat	Dennis et al. 2025
Arripis truttacea	Western Australian salmon	Marine Scalefish and/or Charter Boat	Dennis et al. 2025
Arripis georgianus	Australian herring	Marine Scalefish and/or Charter Boat	Dennis et al. 2025
Sphyraena novaehollandiae	Snook	Marine Scalefish and/or Charter Boat	Dennis et al. 2025
Aldrichetta forsteri	Yelloweye mullet	Marine Scalefish and/or Charter Boat	Branden et al. 1994
Mustelus antarcticus	Gummy shark	Marine Scalefish and/or Charter Boat	Smart et al. 2023
Carcharhinus brachyurus	Bronze whaler	Marine Scalefish and/or Charter Boat	Branden et al. 1994
Meuschenia freycineti	Six-spined leatherjacket	Marine Scalefish and/or Charter Boat	Shepherd 1973, RLS 2026
Myliobatis tenuicaudatus	Southern eagle ray	Marine Scalefish and/or Charter Boat	RLS 2026
Bathytoshia brevicaudata	Smooth stingray	Marine Scalefish and/or Charter Boat	Currie et al. 2009
Ascarosepion apama	Giant Australian cuttlefish	Marine Scalefish and/or Charter Boat	Saunders 2009
Ascarosepion novaehollandiae	New Holland cuttlefish	Marine Scalefish and/or Charter Boat	Saunders 2009
Pseudocaranx georgianus	Silver trevally	Marine Scalefish and/or Charter Boat	Branden et al. 1994
Upeneichthys vlamingii	Red mullet	Marine Scalefish and/or Charter Boat	Branden et al. 1994
Seriola lalandi	Yellowtail kingfish	Aquaculture, Marine Scalefish and/or Charter Boat	Branden et al. 1994

*All commercial fishing species can also be taken, with various restrictions, by the Recreational Fishery

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11. Conclusion

This report describes the results of marine ecological surveys undertaken at Mullaquana Station during 2025, before the harmful algal bloom (HAB) within South Australian gulfs reached Mullaquana Station during summer 2025/26. It is therefore possible that the marine ecosystem near Mullaquana Station has been degraded since the surveys were undertaken.

In most cases, it is not anticipated that any impacts on marine receptors will occur as a result of the discharge of return water within the marine environment adjacent to the outfall. However, for some receptors (subtidal habitats, epibenthic fauna and infauna), minor and highly localised impacts may be expected. The requirement to protect 95% of species would be achieved except within 13 ha of deep-water sand habitat, representing 0.02% of similar habitat in Spencer Gulf (for 51GL/y capacity).

It is recommended that a monitoring program be established that is informed by the studies presented in this report, and:

- includes the six major habitat classes defined in this report, to confirm that impacts on these habitats are negligible outside the 95% footprint
- adopts a Before-After, Control-Impact (BACI) framework with baseline surveys prior to construction and operation, and reference sites situated outside the area of expected impact.
- has sufficient replication within the potentially impacted and reference areas for each habitat to ensure sufficient power to measure unacceptable change.

PART 5: REFERENCES AND APPENDICES

12. References

Note that references from Appendices are included here.

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Appendix A. Subtidal survey GPS mark

Seagrass habitats

Site	Latitude	Longitude
PA1	-33.21660	137.45151
PA2	-33.22758	137.44545
PA3	-33.23079	137.43980
PA4	-33.23764	137.43994
PA5	-33.24290	137.43492
PZ1	-33.22075	137.44572
PZ2	-33.22500	137.44121
AM1	-33.25006	137.44551
AO1	-33.25296	137.44902
AP1	-33.21942	137.46156
AP2	-33.22733	137.45732
AP3	-33.23328	137.44826
AP4	-33.24183	137.44743
AP5	-33.25508	137.44542
PS1	-33.22491	137.46849
PS2	-33.23066	137.46205
PS3	-33.23532	137.45728
PS4	-33.24105	137.45512
PS5	-33.24708	137.44995
ZO1	-33.23022	137.47289
ZO2	-33.23413	137.46713
ZO3	-33.23796	137.46695
ZO4	-33.24206	137.46054
ZO5	-33.25510	137.45958

Deep water silty sand habitats

Site	Latitude	Longitude
SI1	-33.22442	137.48195
SI2	-33.24012	137.49847
SI3	-33.23859	137.47942
SI4	-33.24499	137.48271
SI5	-33.26041	137.47871
SB1	-33.23087	137.49722
SB2	-33.23799	137.48804
SB3	-33.23925	137.47173
SB4	-33.24685	137.47360
SB5	-33.25752	137.46965
BZ1	-33.23212	137.48383
BZ2	-33.22900	137.48636

Appendix B. Protocol for laboratory processing of seagrass cores

Preprocessing

Samples remain at -20°C until processing.

Processing

1. Allow sample to defrost in fresh water.
2. Rinse off sediment.
3. Lay out sample on a sorting tray and photograph full sample showing sample label. Photo should be taken from directly above the sample.
4. Identify and record species.
5. Record the number of whole, attached seagrass leaves.
6. Record the number of live seagrass shoots (Do not count the dark brown ones).
7. Use scissors to separate the leaves from the belowground biomass (BB).
8. Collect the BB in a pre-weighed foil pan.
9. Record length of intact seagrass blades (n = 5) to the nearest millimetre.
10. Record the width of intact seagrass blades (n=5) to nearest 0.1 mm.
11. Remove epiphytes from both sides of all seagrass blades in a sample using a plastic scraper, to the extent possible (noting that calcareous epibionts are very difficult to scrape off entirely).
12. Collect the epiphyte scrapings into a small, pre-weighed foil pan.
13. Collect the leaves into a pre-weighed foil pan.
14. Place in oven at 60°C and dry to constant weight.
15. Record dry weight of each component of the sample.

Appendix C. PERMANOVA results for seagrass characteristics

Posidonia australis canopy height

PERMANOVA

Permutational MANOVA

Resemblance worksheet
Name: PA_CanopySpr
Data type: Distance
Selection: All
Resemblance: D1 Euclidean distance

Sums of squares type: Type III (partial)
Fixed effects sum to zero for mixed terms
Permutation method: Permutation of residuals under a reduced model
Number of permutations: 9999

Factors

Name	Abbrev.	Type	Levels
Season	Se	Fixed	4
Site	Si	Random	5
Position	Po	Random	40

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Se	3	1.6607E5	55357	13.339	0.0009	9944	0.0003
Si	4	10917	2729.3	4.6124	0.0018	9947	0.0032
SexSi	12	49800	4150	7.0132	0.0001	9939	0.0001
Po(SexSi)	80	47339	591.74	No test			
Total	99	2.7413E5					

Details of the expected mean squares (EMS) for the model

Source	EMS
Se	1*V(Po(SexSi)) + 5*V(SexSi) + 25*S(Se)
Si	1*V(Po(SexSi)) + 20*V(Si)
SexSi	1*V(Po(SexSi)) + 5*V(SexSi)
Po(SexSi)	1*V(Po(SexSi))

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Se	1*Se	1*SexSi	3	12
Si	1*Si	1*Po(SexSi)	4	80
SexSi	1*SexSi	1*Po(SexSi)	12	80
Po(SexSi)			0	0

Estimates of components of variation

Source	Estimate	Sq.root
S(Se)	2048.3	45.258
V(Si)	106.88	10.338
V(SexSi)	711.65	26.677
V(Po(SexSi))	No test	

PAIR-WISE TESTS

Term 'SeasonxSite' for pairs of levels of factor 'Season'

Within level 'PA1' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	2.1859	0.0884	40	0.0574
Summer, Winter	4.9443	0.0068	45	0.0009
Summer, Spring	8.3689	0.0075	59	0.0001

Autumn, Winter	1.1832	0.303	28	0.2716
Autumn, Spring	8.8182	0.0085	73	0.0001
Winter, Spring	18.309	0.0082	57	0.0001

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	20.8			
Autumn	35.04	28		
Winter	43.6	18.96	11.6	
Spring	78.4	108	122	14.4

Within level 'PA2' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	3.5877	0.0402	37	0.0069
Summer, Winter	1.2815	0.2607	14	0.2397
Summer, Spring	4.5875	0.0082	50	0.0016
Autumn, Winter	4.3697	0.0073	31	0.0025
Autumn, Spring	2.2878	0.0487	44	0.0496
Winter, Spring	4.9752	0.0078	50	0.0009

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	10			
Autumn	44.08	27.2		
Winter	10.64	48.8	3.6	
Spring	96	55.44	102	54.4

Within level 'PA3' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	2.1091	0.1221	23	0.0665
Summer, Winter	0.1766	0.9381	25	0.8628
Summer, Spring	10.832	0.0076	57	0.0001
Autumn, Winter	1.8703	0.103	48	0.1028
Autumn, Spring	3.9071	0.0152	46	0.0037
Winter, Spring	8.8633	0.0086	59	0.0001

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring

Summer	12.4			
Autumn	36.24	41.2		
Winter	15.36	37.36	20.8	
Spring	96.4	64	94.8	20.8

Within level 'PA4' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	2.1721	0.0794	29	0.0561
Summer, Winter	3.2121	0.016	54	0.0127
Summer, Spring	5.8251	0.0077	69	0.0007
Autumn, Winter	2.3159	0.0308	52	0.0541
Autumn, Spring	5.1584	0.0084	55	0.0009
Winter, Spring	2.5845	0.0395	71	0.033

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	20			
Autumn	20.64	12		
Winter	58.4	41.76	45.2	
Spring	126.8	108.4	76.72	47.6

Within level 'PA5' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	8.1499E-2	0.9604	28	0.941
Summer, Winter	6.4305	0.0074	68	0.0003
Summer, Spring	6.4168	0.0085	74	0.0006
Autumn, Winter	9.5391	0.0086	64	0.0001
Autumn, Spring	7.8698	0.0078	74	0.0001
Winter, Spring	1.7401	0.1475	41	0.1194

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	32			
Autumn	22.48	19.2		
Winter	94	95.2	18.8	
Spring	120.8	122	33.52	38.4

Posidonia australis number of shoots

PERMANOVA

Permutational MANOVA

Resemblance worksheet
Name: PA_ShootsSpr
Data type: Distance
Selection: All
Resemblance: D1 Euclidean distance

Sums of squares type: Type III (partial)
Fixed effects sum to zero for mixed terms
Permutation method: Permutation of residuals under a reduced model
Number of permutations: 9999

Factors

Name	Abbrev.	Type	Levels
Season	Se	Fixed	4
Site	Si	Random	5
Position	Po	Random	40

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Se	3	509.16	169.72	3.4107	0.0568	9948	0.0529
Si	4	38.14	9.535	0.54424	0.7209	9951	0.7026
SexSi	12	597.14	49.762	2.8403	0.0024	9931	0.0027
Po(SexSi)	80	1401.6	17.52	No test			
Total	99	2546					

Details of the expected mean squares (EMS) for the model

Source	EMS
Se	1*V(Po(SexSi)) + 5*V(SexSi) + 25*S(Se)
Si	1*V(Po(SexSi)) + 20*V(Si)
SexSi	1*V(Po(SexSi)) + 5*V(SexSi)
Po(SexSi)	1*V(Po(SexSi))

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Se	1*Se	1*SexSi	3	12
Si	1*Si	1*Po(SexSi)	4	80
SexSi	1*SexSi	1*Po(SexSi)	12	80
Po(SexSi)			0	0

Estimates of components of variation

Source	Estimate	Sq.root
S(Se)	4.7983	2.1905
V(Si)	-0.39925	-0.63186
V(SexSi)	6.4483	2.5394
V(Po(SexSi))	No test	

PAIR-WISE TESTS

Term 'SeasonxSite' for pairs of levels of factor 'Season'

Within level 'PA1' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	0.79559	0.4645	19	0.4483
Summer, Winter	1.4863	0.2005	21	0.1757
Summer, Spring	1.6873	0.174	17	0.1331
Autumn, Winter	0.85263	0.5075	19	0.4186
Autumn, Spring	0.7303	0.5353	14	0.4855

Winter, Spring	0.46928	0.9043	13	0.6484	

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	5.4			
Autumn	5.2	5.6		
Winter	7.32	5.96	6.8	
Spring	5.84	4.08	4.2	2.2

Within level 'PA2' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	0.55829	0.6756	12	0.5905
Summer, Winter	3.3746	0.0307	14	0.0083
Summer, Spring	5.2095	0.0076	19	0.0008
Autumn, Winter	1.6865	0.1586	14	0.1281
Autumn, Spring	3.3941	0.0329	19	0.0091
Winter, Spring	3.1822	0.0077	11	0.0119

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	2.6			
Autumn	3.28	4.8		
Winter	4.64	4.48	1.6	
Spring	8.4	7.36	4	2.8

Within level 'PA3' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	0.13672	0.9569	16	0.8927
Summer, Winter	0.12549	1	10	0.9001
Summer, Spring	4.7122	0.0065	19	0.0018
Autumn, Winter	0.21082	0.9287	14	0.8354
Autumn, Spring	2.8463	0.0431	23	0.0236
Winter, Spring	5.0332	0.0083	18	0.0005

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	3.4			
Autumn	4.64	6.2		

```
Winter    2.6   4.68    2.8
Spring    7.8   9.24    7.6    2.8
```

Within level 'PA4' of factor 'Site'

```
                                  Unique
Groups               t  P(perm)   perms   P(MC)
Summer, Autumn  1.8876   0.026      23  0.1004
Summer, Winter 0.68302   0.7023     24   0.511
Summer, Spring 0.15529   0.9599     24   0.885
Autumn, Winter  2.9369   0.0258     16  0.0205
Autumn, Spring   5.273   0.0095     20  0.0006
Winter, Spring   1.179   0.3265     16   0.276
```

Denominators

```
Groups          Denominator              Den.df
Summer, Autumn  1*Position(SeasonxSite)       8
Summer, Winter  1*Position(SeasonxSite)       8
Summer, Spring  1*Position(SeasonxSite)       8
Autumn, Winter  1*Position(SeasonxSite)       8
Autumn, Spring  1*Position(SeasonxSite)       8
Winter, Spring  1*Position(SeasonxSite)       8
```

Average Distance between/within groups

```
        Summer  Autumn  Winter  Spring
Summer    11.8
Autumn    9.56     1.8
Winter    7.52    5.96     5.2
Spring    7.76     8.6    4.48       4
```

Within level 'PA5' of factor 'Site'

```
                                  Unique
Groups               t  P(perm)   perms   P(MC)
Summer, Autumn  4.8076   0.0074     17  0.0017
Summer, Winter 0.12403        1     10  0.9077
Summer, Spring  4.4272   0.0146     20  0.0025
Autumn, Winter     7.2   0.0078     16  0.0003
Autumn, Spring 0.98995   0.4266      9  0.3502
Winter, Spring   5.461   0.0088     19  0.0007
```

Denominators

```
Groups          Denominator              Den.df
Summer, Autumn  1*Position(SeasonxSite)       8
Summer, Winter  1*Position(SeasonxSite)       8
Summer, Spring  1*Position(SeasonxSite)       8
Autumn, Winter  1*Position(SeasonxSite)       8
Autumn, Spring  1*Position(SeasonxSite)       8
Winter, Spring  1*Position(SeasonxSite)       8
```

Average Distance between/within groups

```
        Summer  Autumn  Winter  Spring
Summer     3.8
Autumn       7     1.4
Winter    2.76     7.2     2.2
Spring          8.4         2.76          8.6          3.4
```

Posidonia australis number of leaves

PERMANOVA

Permutational MANOVA

Resemblance worksheet
Name: PA_LeavesSpr
Data type: Distance
Selection: All
Resemblance: D1 Euclidean distance

Sums of squares type: Type III (partial)
Fixed effects sum to zero for mixed terms
Permutation method: Permutation of residuals under a reduced model
Number of permutations: 9999

Factors

Name	Abbrev.	Type	Levels
Season	Se	Fixed	4
Site	Si	Random	5
Position	Po	Random	40

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Se	3	4191.4	1397.1	5.794	0.0101	9960	0.0089
Si	4	176.1	44.025	0.67877	0.6082	9953	0.6088
SexSi	12	2893.7	241.14	3.7178	0.0004	9937	0.0004
Po(SexSi)	80	5188.8	64.86	No test			
Total	99	12450					

Details of the expected mean squares (EMS) for the model

Source	EMS
Se	1*V(Po(SexSi)) + 5*V(SexSi) + 25*S(Se)
Si	1*V(Po(SexSi)) + 20*V(Si)
SexSi	1*V(Po(SexSi)) + 5*V(SexSi)
Po(SexSi)	1*V(Po(SexSi))

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Se	1*Se	1*SexSi	3	12
Si	1*Si	1*Po(SexSi)	4	80
SexSi	1*SexSi	1*Po(SexSi)	12	80
Po(SexSi)			0	0

Estimates of components of variation

Source	Estimate	Sq.root
S(Se)	46.24	6.8
V(Si)	-1.0417	-1.0207
V(SexSi)	35.256	5.9376
V(Po(SexSi))	No test	

PAIR-WISE TESTS

Term 'SeasonxSite' for pairs of levels of factor 'Season'

Within level 'PA1' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	0.3488	0.7799	33	0.739
Summer, Winter	1.0562	0.3446	39	0.3287
Summer, Spring	1.1562	0.301	30	0.2914
Autumn, Winter	0.97129	0.3963	29	0.3621
Autumn, Spring	1.1445	0.2988	26	0.2851
Winter, Spring	0.11378	0.9383	17	0.9093

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	15.6			
Autumn	13.28	12		
Winter	15.4	9.4	7.8	
Spring	15.64	8.92	5.52	5

Within level 'PA2' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	8.269E-2	0.9513	23	0.935
Summer, Winter	1.6335	0.1367	30	0.1449
Summer, Spring	4.7692	0.0091	46	0.0014
Autumn, Winter	1.2345	0.2587	36	0.2533
Autumn, Spring	3.7758	0.0147	49	0.0034
Winter, Spring	2.5152	0.053	42	0.0356

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	5.2			
Autumn	7.36	11.2		
Winter	10.36	12.28	12.6	
Spring	24.8	24.96	17.88	13.2

Within level 'PA3' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	1.3475	0.2291	24	0.2132
Summer, Winter	0.17039	0.928	20	0.8704
Summer, Spring	4.6394	0.0074	45	0.0016
Autumn, Winter	1.3344	0.2404	24	0.2188
Autumn, Spring	5.767	0.0084	52	0.0004
Winter, Spring	5.1933	0.0069	40	0.0012

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	7.2			
Autumn	8.36	7.2		
Winter	5.72	7.36	6	

Spring	20.8	26.2	21.4	9.6

Within level 'PA4' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	2.519	0.0219	39	0.0349
Summer, Winter	0.77259	0.474	31	0.468
Summer, Spring	1.1867	0.2477	35	0.2734
Autumn, Winter	5.3543	0.0078	39	0.0006
Autumn, Spring	5.3269	0.0078	44	0.0009
Winter, Spring	0.63844	0.5993	27	0.5458

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	14.8			
Autumn	15.52	6		
Winter	10.96	19.6	7.8	
Spring	12.52	22.6	7.64	9.6

Within level 'PA5' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	3.8927	0.0148	33	0.0037
Summer, Winter	0.11795	0.9462	21	0.9062
Summer, Spring	4.3091	0.014	31	0.0021
Autumn, Winter	4.6167	0.0075	33	0.0018
Autumn, Spring	0.3147	0.7473	22	0.7524
Winter, Spring	5.1913	0.0087	35	0.001

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	8			
Autumn	15.6	7.2		
Winter	5.76	15.2	4.8	
Spring	16.8	6.24	16.4	7.2

Posidonia australis leaf length

PERMANOVA

Permutational MANOVA

Resemblance worksheet
Name: PA_LengthSpr
Data type: Distance
Selection: All
Resemblance: D1 Euclidean distance

Sums of squares type: Type III (partial)
Fixed effects sum to zero for mixed terms
Permutation method: Permutation of residuals under a reduced model
Number of permutations: 9999

Factors

Name	Abbrev.	Type	Levels
Season	Se	Fixed	4
Site	Si	Random	5
Position	Po	Random	40

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Se	3	2.5277E5	84256	27.912	0.0001	9962	0.0001
Si	4	11941	2985.3	1.863	0.1271	9953	0.1247
SexSi	12	36223	3018.6	1.8838	0.05	9940	0.0505
Po(SexSi)	80	1.2819E5	1602.4	No test			
Total	99	4.2913E5					

Details of the expected mean squares (EMS) for the model

Source	EMS
Se	1*V(Po(SexSi)) + 5*V(SexSi) + 25*S(Se)
Si	1*V(Po(SexSi)) + 20*V(Si)
SexSi	1*V(Po(SexSi)) + 5*V(SexSi)
Po(SexSi)	1*V(Po(SexSi))

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Se	1*Se	1*SexSi	3	12
Si	1*Si	1*Po(SexSi)	4	80
SexSi	1*SexSi	1*Po(SexSi)	12	80
Po(SexSi)			0	0

Estimates of components of variation

Source	Estimate	Sq.root
S(Se)	3249.5	57.004
V(Si)	69.143	8.3152
V(SexSi)	283.23	16.83
V(Po(SexSi))	No test	

PAIR-WISE TESTS

Term 'SeasonxSite' for pairs of levels of factor 'Season'

Within level 'PA1' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	2.4906	0.0445	99	0.0399
Summer, Winter	8.6768E-2	0.9046	117	0.9345
Summer, Spring	6.2564	0.0099	110	0.0001
Autumn, Winter	2.1079	0.0903	122	0.0705
Autumn, Spring	8.0988	0.0065	126	0.0002
Winter, Spring	5.1143	0.0065	122	0.0011

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	33.92			
Autumn	49.872	38.96		
Winter	38.168	56.056	50.72	
Spring	128.68	176.76	126.72	44.6

Within level 'PA2' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	0.29873	0.7167	109	0.7716
Summer, Winter	2.5778	0.0505	116	0.0331
Summer, Spring	3.4153	0.0151	122	0.0091
Autumn, Winter	2.095	0.08	119	0.0645
Autumn, Spring	3.0035	0.0217	113	0.016
Winter, Spring	1.6668	0.1332	116	0.134

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	53.92			
Autumn	46.536	57.84		
Winter	68.888	63.92	29.88	
Spring	101.59	94.048	48.192	53.08

Within level 'PA3' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	2.4082	0.0402	122	0.046
Summer, Winter	2.8799	0.0399	113	0.0214
Summer, Spring	1.7151	0.1394	90	0.1229
Autumn, Winter	0.19774	0.8787	84	0.8418
Autumn, Spring	3.5047	0.0077	84	0.0088
Winter, Spring	3.9368	0.0085	87	0.0044

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	42.32			
Autumn	68.672	58.12		
Winter	62.328	40.696	35.36	

```
Spring 57.888 112.48 107.48  63.48
```

Within level 'PA4' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	5.3171	0.0097	123	0.0005
Summer, Winter	0.51129	0.6422	109	0.6185
Summer, Spring	3.0665	0.0081	124	0.016
Autumn, Winter	2.1785	0.0829	116	0.0641
Autumn, Spring	4.7558	0.008	122	0.0015
Winter, Spring	2.8834	0.024	125	0.019

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	12.48			
Autumn	64.96	31.76		
Winter	33.144	63.528	55.52	
Spring	104.64	169.6	117.83	92.4

Within level 'PA5' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	1.2275	0.283	122	0.255
Summer, Winter	1.6904	0.1387	112	0.1314
Summer, Spring	5.354	0.0077	125	0.0008
Autumn, Winter	6.6652E-2	0.9523	122	0.9485
Autumn, Spring	5.2786	0.0074	123	0.0007
Winter, Spring	6.7204	0.0076	116	0.0005

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	27.6			
Autumn	39.256	50.2		
Winter	31.16	34.464	26.8	
Spring	100.32	125.64	124.28	42.88

Posidonia australis leaf width

PERMANOVA

Permutational MANOVA

Resemblance worksheet
Name: PA_WidthSpr
Data type: Distance
Selection: All
Resemblance: D1 Euclidean distance

Sums of squares type: Type III (partial)
Fixed effects sum to zero for mixed terms
Permutation method: Permutation of residuals under a reduced model
Number of permutations: 9999

Factors

Name	Abbrev.	Type	Levels
Season	Se	Fixed	4
Site	Si	Random	5
Position	Po	Random	40

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Se	3	2.6087	0.86956	0.7654	0.5398	9950	0.5264
Si	4	49.921	12.48	7.5883	0.0001	9963	0.0001
SexSi	12	13.633	1.1361	0.69076	0.7551	9924	0.7523
Po(SexSi)	80	131.57	1.6447	No test			
Total	99	197.74					

Details of the expected mean squares (EMS) for the model

Source	EMS
Se	1*V(Po(SexSi)) + 5*V(SexSi) + 25*S(Se)
Si	1*V(Po(SexSi)) + 20*V(Si)
SexSi	1*V(Po(SexSi)) + 5*V(SexSi)
Po(SexSi)	1*V(Po(SexSi))

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Se	1*Se	1*SexSi	3	12
Si	1*Si	1*Po(SexSi)	4	80
SexSi	1*SexSi	1*Po(SexSi)	12	80
Po(SexSi)			0	0

Estimates of components of variation

Source	Estimate	Sq.root
S(Se)	-1.0661E-2	-0.10325
V(Si)	0.54178	0.73606
V(SexSi)	-0.10172	-0.31894
V(Po(SexSi))	No test	

Posidonia australis leaf mass

PERMANOVA

Permutational MANOVA

Resemblance worksheet
Name: PA_LeafMassSpr
Data type: Distance
Selection: All
Resemblance: D1 Euclidean distance

Sums of squares type: Type III (partial)
Fixed effects sum to zero for mixed terms
Permutation method: Permutation of residuals under a reduced model
Number of permutations: 9999

Factors

Name	Abbrev.	Type	Levels
Season	Se	Fixed	4
Site	Si	Random	5
Position	Po	Random	40

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Se	3	220.85	73.617	13.315	0.0009	9957	0.0005
Si	4	20.328	5.082	3.2161	0.0157	9950	0.0173
SexSi	12	66.346	5.5288	3.4989	0.0007	9923	0.0003
Po(SexSi)	80	126.41	1.5801	No test			
Total	99	433.94					

Details of the expected mean squares (EMS) for the model

Source	EMS
Se	1*V(Po(SexSi)) + 5*V(SexSi) + 25*S(Se)
Si	1*V(Po(SexSi)) + 20*V(Si)
SexSi	1*V(Po(SexSi)) + 5*V(SexSi)
Po(SexSi)	1*V(Po(SexSi))

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Se	1*Se	1*SexSi	3	12
Si	1*Si	1*Po(SexSi)	4	80
SexSi	1*SexSi	1*Po(SexSi)	12	80
Po(SexSi)			0	0

Estimates of components of variation

Source	Estimate	Sq.root
S(Se)	2.7235	1.6503
V(Si)	0.17509	0.41844
V(SexSi)	0.78973	0.88867
V(Po(SexSi))	No test	

PAIR-WISE TESTS

Term 'SeasonxSite' for pairs of levels of factor 'Season'

Within level 'PA1' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	0.59157	0.5405	107	0.5754
Summer, Winter	1.6828	0.1164	119	0.1238
Summer, Spring	3.2295	0.0242	116	0.0123
Autumn, Winter	1.1699	0.2671	115	0.2818
Autumn, Spring	2.8346	0.0453	111	0.0201
Winter, Spring	1.7685	0.0977	102	0.1135

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	1.314			
Autumn	1.2268	1.25		
Winter	1.622	1.2912	1.392	
Spring	2.8572	2.3632	1.8608	1.72

Within level 'PA2' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	0.39776	0.7513	113	0.7036
Summer, Winter	1.8596	0.1233	108	0.0986
Summer, Spring	3.8809	0.0164	125	0.0046
Autumn, Winter	3.7538	0.0083	114	0.0068
Autumn, Spring	4.838	0.0088	125	0.0012
Winter, Spring	3.2695	0.0074	120	0.0133

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	1.788			
Autumn	1.218	1.04		
Winter	1.8496	1.678	0.638	
Spring	4.4376	4.726	3.048	2.294

Within level 'PA3' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	1.7369	0.147	121	0.1241
Summer, Winter	0.20131	0.8667	108	0.8467
Summer, Spring	4.7062	0.0058	125	0.0023
Autumn, Winter	1.8592	0.1133	100	0.0977
Autumn, Spring	6.9499	0.008	126	0.0001
Winter, Spring	5.496	0.0085	107	0.0005

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	1.7			
Autumn	1.6996	1.148		
Winter	1.2832	1.4508	1.228	
Spring	4.424	5.762	4.58	1.754

Within level 'PA4' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	3.3808	0.0088	113	0.0091
Summer, Winter	2.0586	0.0893	103	0.0779
Summer, Spring	3.4235	0.0158	120	0.0086
Autumn, Winter	4.0485	0.0076	123	0.0045
Autumn, Spring	6.9223	0.0086	126	0.0002
Winter, Spring	0.36491	0.8055	113	0.7239

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	1.042			
Autumn	1.514	0.502		
Winter	2.2568	3.398	2.168	
Spring	2.3304	3.75	1.5192	1.3

Within level 'PA5' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	3.3133	0.0073	106	0.0104
Summer, Winter	1.5363	0.1904	110	0.1678
Summer, Spring	6.8822	0.0085	126	0.0003
Autumn, Winter	1.8344	0.1154	113	0.1033
Autumn, Spring	1.8626	0.1144	109	0.0946
Winter, Spring	4.3306	0.0134	120	0.0043

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	0.624			
Autumn	2.546	1.98		
Winter	1.0776	1.9772	1.386	
Spring	4.292	2.1892	3.4464	1.554

Posidonia australis epiphyte mass

PERMANOVA
Permutational MANOVA

Resemblance worksheet
Name: PA_EpiphytesSpr
Data type: Distance
Selection: All
Resemblance: D1 Euclidean distance

Sums of squares type: Type III (partial)
Fixed effects sum to zero for mixed terms
Permutation method: Permutation of residuals under a reduced model
Number of permutations: 9999

Factors

Name	Abbrev.	Type	Levels
Season	Se	Fixed	4
Site	Si	Random	5
Position	Po	Random	40

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Se	3	8.6693	2.8898	2.6393	0.0776	9960	0.0986
Si	4	9.1079	2.277	1.8036	0.0668	9926	0.1409
SexSi	12	13.139	1.0949	0.8673	0.7003	9876	0.5846
Po(SexSi)	80	101	1.2624	No test			
Total	99	131.91					

Details of the expected mean squares (EMS) for the model

Source	EMS
Se	1*V(Po(SexSi)) + 5*V(SexSi) + 25*S(Se)
Si	1*V(Po(SexSi)) + 20*V(Si)
SexSi	1*V(Po(SexSi)) + 5*V(SexSi)
Po(SexSi)	1*V(Po(SexSi))

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Se	1*Se	1*SexSi	3	12
Si	1*Si	1*Po(SexSi)	4	80
SexSi	1*SexSi	1*Po(SexSi)	12	80
Po(SexSi)			0	0

Estimates of components of variation

Source	Estimate	Sq.root
S(Se)	7.1794E-2	0.26794
V(Si)	5.0727E-2	0.22523
V(SexSi)	-3.3506E-2	-0.18305
V(Po(SexSi))	No test	

Posidonia australis rhizome mass

PERMANOVA
Permutational MANOVA

Resemblance worksheet
Name: PA_RhizomeSpr
Data type: Distance
Selection: All
Resemblance: D1 Euclidean distance

Sums of squares type: Type III (partial)
Fixed effects sum to zero for mixed terms
Permutation method: Permutation of residuals under a reduced model
Number of permutations: 9999

Factors

Name	Abbrev.	Type	Levels
Season	Se	Fixed	4
Site	Si	Random	5
Position	Po	Random	40

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Se	3	3551.9	1184	17.948	0.0004	9959	0.0003
Si	4	373.75	93.439	1.16	0.3415	9959	0.3276
SexSi	12	791.61	65.968	0.81896	0.622	9944	0.6312
Po(SexSi)	80	6444	80.55	No test			
Total	99	11161					

Details of the expected mean squares (EMS) for the model

Source	EMS
Se	1*V(Po(SexSi)) + 5*V(SexSi) + 25*S(Se)
Si	1*V(Po(SexSi)) + 20*V(Si)
SexSi	1*V(Po(SexSi)) + 5*V(SexSi)
Po(SexSi)	1*V(Po(SexSi))

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Se	1*Se	1*SexSi	3	12
Si	1*Si	1*Po(SexSi)	4	80
SexSi	1*SexSi	1*Po(SexSi)	12	80
Po(SexSi)			0	0

Estimates of components of variation

Source	Estimate	Sq.root
S(Se)	44.72	6.6873
V(Si)	0.64441	0.80275
V(SexSi)	-2.9165	-1.7078
V(Po(SexSi))	No test	

PAIR-WISE TESTS

Term 'Se'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	3.506	0.031	5303	0.027
Summer, Winter	0.5269	0.5904	5317	0.6342
Summer, Spring	7.9234	0.008	5274	0.0018
Autumn, Winter	4.0254	0.022	5233	0.0162
Autumn, Spring	0.2195	0.8412	5229	0.8396
Winter, Spring	13.168	0.0081	5317	0.0003

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*SexSi	4
Summer, Winter	1*SexSi	4
Summer, Spring	1*SexSi	4
Autumn, Winter	1*SexSi	4
Autumn, Spring	1*SexSi	4
Winter, Spring	1*SexSi	4

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	6.3478			
Autumn	14.423	12.484		
Winter	5.4658	13.951	4.5152	
Spring	13.744	13.092	12.97	14.062

Posidonia sinuosa canopy height

PERMANOVA

Permutational MANOVA

Resemblance worksheet
Name: PS_CanopySpr
Data type: Distance
Selection: All
Resemblance: D1 Euclidean distance

Sums of squares type: Type III (partial)
Fixed effects sum to zero for mixed terms
Permutation method: Permutation of residuals under a reduced model
Number of permutations: 9999

Factors

Name	Abbrev.	Type	Levels
Season	Se	Fixed	4
Site	Si	Random	5
Position	Po	Random	39

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Se	3	1.2163E5	40542	15.073	0.0012	9953	0.0003
Si	4	389.44	97.36	0.45326	0.7734	9963	0.7759
SexSi	12	32276	2689.7	12.522	0.0001	9926	0.0001
Po(SexSi)	80	17184	214.8	No test			
Total	99	1.7148E5					

Details of the expected mean squares (EMS) for the model

Source	EMS
Se	1*V(Po(SexSi)) + 5*V(SexSi) + 25*S(Se)
Si	1*V(Po(SexSi)) + 20*V(Si)
SexSi	1*V(Po(SexSi)) + 5*V(SexSi)
Po(SexSi)	1*V(Po(SexSi))

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Se	1*Se	1*SexSi	3	12
Si	1*Si	1*Po(SexSi)	4	80
SexSi	1*SexSi	1*Po(SexSi)	12	80
Po(SexSi)			0	0

Estimates of components of variation

Source	Estimate	Sq.root
S(Se)	1514.1	38.912
V(Si)	-5.872	-2.4232
V(SexSi)	494.98	22.248
V(Po(SexSi))	No test	

PAIR-WISE TESTS

Term 'SeasonxSite' for pairs of levels of factor 'Season'

Within level 'PS1' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	0.97262	0.3774	22	0.3588
Summer, Winter	11.887	0.0077	56	0.0001
Summer, Spring	1.0124	0.371	39	0.339
Autumn, Winter	20.616	0.0076	40	0.0001
Autumn, Spring	1.5794	0.1394	35	0.1507
Winter, Spring	5.1463	0.0083	49	0.0007

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	18.4			
Autumn	14.24	7.6		
Winter	94.8	102	10.8	
Spring	27.12	29.68	78.4	38.8

Within level 'PS2' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	1.1328	0.3105	19	0.2878
Summer, Winter	11.969	0.008	59	0.0001
Summer, Spring	3.4851	0.0064	26	0.0078
Autumn, Winter	20.468	0.0071	33	0.0001
Autumn, Spring	11.437	0.0066	25	0.0001
Winter, Spring	13.629	0.0081	44	0.0001

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	15.6			
Autumn	13.44	4		
Winter	92.4	99.6	12	
Spring	22.8	30	69.6	6

Within level 'PS3' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	0.43102	0.6967	18	0.6789
Summer, Winter	8.0263	0.0083	52	0.0001
Summer, Spring	2.8325	0.015	35	0.024
Autumn, Winter	9.1938	0.0071	54	0.0001
Autumn, Spring	3.3813	0.0076	35	0.0101
Winter, Spring	4.0808	0.0167	37	0.0034

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	15.6			
Autumn	12.16	12.8		
Winter	65.6	68.8	16	
Spring	26.96	30	38.8	20.4

Within level 'PS4' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	0.6152	0.5602	25	0.5547
Summer, Winter	8.4722	0.0085	61	0.0001
Summer, Spring	1.8911	0.1097	28	0.0929
Autumn, Winter	9.1035	0.006	30	0.0001
Autumn, Spring	1.4871	0.2058	19	0.1782
Winter, Spring	8.5439	0.0085	42	0.0001

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	19.2			
Autumn	17.36	14.4		
Winter	86.4	80.4	18	
Spring	22.48	15.04	69.2	12.4

Within level 'PS5' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	3.2013	0.0312	31	0.0133
Summer, Winter	9.5513	0.0087	60	0.0001
Summer, Spring	10.763	0.0077	73	0.0001
Autumn, Winter	8.0959	0.0088	46	0.0001
Autumn, Spring	9.4377	0.0086	61	0.0001
Winter, Spring	3.6058	0.0227	38	0.0075

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	23.2			
Autumn	32.16	13.2		
Winter	92.8	60.8	12.8	
Spring	128.8	96.8	36.32	24

Posidonia sinuosa number of shoots

PERMANOVA

Permutational MANOVA

Resemblance worksheet
Name: PS_ShootsSpr
Data type: Distance
Selection: All
Resemblance: D1 Euclidean distance

Sums of squares type: Type III (partial)
Fixed effects sum to zero for mixed terms
Permutation method: Permutation of residuals under a reduced model
Number of permutations: 9999

Factors

Name	Abbrev.	Type	Levels
Season	Se	Fixed	4
Site	Si	Random	5
Position	Po	Random	39

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Se	3	967.76	322.59	1.2744	0.3343	9949	0.3268
Si	4	1366.3	341.58	3.7751	0.0075	9949	0.0075
SexSi	12	3037.5	253.13	2.7976	0.0032	9929	0.003
Po(SexSi)	80	7238.4	90.48	No test			
Total	99	12610					

Details of the expected mean squares (EMS) for the model

Source	EMS
Se	1*V(Po(SexSi)) + 5*V(SexSi) + 25*S(Se)
Si	1*V(Po(SexSi)) + 20*V(Si)
SexSi	1*V(Po(SexSi)) + 5*V(SexSi)
Po(SexSi)	1*V(Po(SexSi))

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Se	1*Se	1*SexSi	3	12
Si	1*Si	1*Po(SexSi)	4	80
SexSi	1*SexSi	1*Po(SexSi)	12	80
Po(SexSi)			0	0

Estimates of components of variation

Source	Estimate	Sq.root
S(Se)	2.7783	1.6668
V(Si)	12.555	3.5433
V(SexSi)	32.53	5.7035
V(Po(SexSi))	No test	

PAIR-WISE TESTS

Term 'SeasonxSite' for pairs of levels of factor 'Season'

Within level 'PS1' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	5.9261E-2	0.9834	33	0.9551
Summer, Winter	1.4752	0.2005	21	0.1803
Summer, Spring	4.2667	0.0176	31	0.0031
Autumn, Winter	0.89453	0.463	31	0.3942
Autumn, Spring	2.2476	0.0494	39	0.0574
Winter, Spring	3.1822	0.0253	22	0.0147

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	8			
Autumn	10.4	13.8		
Winter	7.48	13.08	5.8	
Spring	13.6	18	8.44	3.6

Within level 'PS2' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	1.1787	0.3203	53	0.267
Summer, Winter	1.3242	0.2997	15	0.221
Summer, Spring	2.1612	0.0765	27	0.0657
Autumn, Winter	0.89677	0.4114	51	0.398
Autumn, Spring	2.9914E-2	0.9934	59	0.9755
Winter, Spring	1.5758	0.1665	37	0.1534

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	2.6			
Autumn	22.24	33.2		
Winter	4.64	21.6	6.2	
Spring	14	22.72	13.04	16.8

Within level 'PS3' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	3.9397	0.0073	35	0.0026
Summer, Winter	4.6127E-2	1	22	0.9626
Summer, Spring	7.4848E-2	0.9443	19	0.9381
Autumn, Winter	9.7689	0.0076	33	0.0001
Autumn, Spring	4.8521	0.0091	29	0.001
Winter, Spring	5.5385E-2	1	17	0.9573

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	11.2			
Autumn	17	3.2		
Winter	6.92	17.2	3.6	
Spring	8.56	17.4	5.64	8.4

Within level 'PS4' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	3.949	0.007	38	0.0049
Summer, Winter	1.6847	0.1511	30	0.1291
Summer, Spring	0.50376	0.6433	34	0.6223
Autumn, Winter	6.5859	0.0066	23	0.0004
Autumn, Spring	3.1558	0.0222	37	0.0141
Winter, Spring	0.96367	0.4171	30	0.3614

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	14.6			
Autumn	21.2	2.8		
Winter	11.04	12	4	
Spring	12.52	17.88	10.6	14.8

Within level 'PS5' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	2.2088	0.0728	23	0.0573
Summer, Winter	0.40249	0.7407	26	0.6972
Summer, Spring	0.84478	0.4767	17	0.425
Autumn, Winter	1.7534	0.1411	26	0.1163
Autumn, Spring	1.3762	0.2064	22	0.1972
Winter, Spring	0.42379	0.6975	23	0.6849

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	8.8			
Autumn	9.64	5.8		
Winter	7.56	8.56	8.6	
Spring	7.36	7.24	7.16	7.8

Posidonia sinuosa number of leaves

PERMANOVA

Permutational MANOVA

Resemblance worksheet
Name: PS_LeavesSpr
Data type: Distance
Selection: All
Resemblance: D1 Euclidean distance

Sums of squares type: Type III (partial)
Fixed effects sum to zero for mixed terms
Permutation method: Permutation of residuals under a reduced model
Number of permutations: 9999

Factors

Name	Abbrev.	Type	Levels
Season	Se	Fixed	4
Site	Si	Random	5
Position	Po	Random	39

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Se	3	3061.8	1020.6	1.7482	0.2004	9959	0.2077
Si	4	2265.1	566.29	2.4828	0.0476	9958	0.0538
SexSi	12	7005.5	583.79	2.5595	0.0064	9914	0.0068
Po(SexSi)	80	18247	228.09	No test			
Total	99	30579					

Details of the expected mean squares (EMS) for the model

Source	EMS
Se	1*V(Po(SexSi)) + 5*V(SexSi) + 25*S(Se)
Si	1*V(Po(SexSi)) + 20*V(Si)
SexSi	1*V(Po(SexSi)) + 5*V(SexSi)
Po(SexSi)	1*V(Po(SexSi))

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Se	1*Se	1*SexSi	3	12
Si	1*Si	1*Po(SexSi)	4	80
SexSi	1*SexSi	1*Po(SexSi)	12	80
Po(SexSi)			0	0

Estimates of components of variation

Source	Estimate	Sq.root
S(Se)	17.472	4.18
V(Si)	16.91	4.1122
V(SexSi)	71.141	8.4345
V(Po(SexSi))	No test	

PAIR-WISE TESTS

Term 'SeasonxSite' for pairs of levels of factor 'Season'

Within level 'PS1' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	0.28194	0.9783	59	0.7777
Summer, Winter	2.0861	0.0725	31	0.0673
Summer, Spring	1.9972	0.0971	39	0.0769
Autumn, Winter	0.31697	0.8847	54	0.7534
Autumn, Spring	0.63577	0.6266	50	0.5452
Winter, Spring	0.90993	0.445	33	0.3988

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	12.4			
Autumn	23.76	36.4		
Winter	12.72	29.12	2.8	
Spring	19.76	32.88	13.28	16.6

Within level 'PS2' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	0.35894	0.7457	65	0.7307
Summer, Winter	0.45734	0.6911	27	0.6629
Summer, Spring	0.6595	0.6622	33	0.5232
Autumn, Winter	0.21523	0.8404	74	0.8361
Autumn, Spring	4.5139E-2	0.975	70	0.9683
Winter, Spring	0.32089	0.8435	42	0.764

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	4			
Autumn	28.52	44.6		
Winter	8.92	29.84	12.6	
Spring	12.44	30.56	13.84	19.8

Within level 'PS3' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	5.3921	0.0085	56	0.001
Summer, Winter	0.66702	0.5537	38	0.5287
Summer, Spring	0.48238	0.6927	46	0.6342
Autumn, Winter	7.6086	0.0076	52	0.0001
Autumn, Spring	4.2017	0.0073	51	0.0042
Winter, Spring	2.6298E-2	1	38	0.9806

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	17			
Autumn	34.4	5.6		
Winter	12.12	29.8	8.8	
Spring	15.28	30	12.6	18.8

Within level 'PS4' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	7.2659	0.0079	54	0.0001
Summer, Winter	3.2451	0.0081	39	0.0128
Summer, Spring	0.4777	0.6742	42	0.6476
Autumn, Winter	8.6795	0.0079	39	0.0002
Autumn, Spring	5.2998	0.0087	48	0.0004
Winter, Spring	2.0663	0.0898	39	0.0739

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	13.4			
Autumn	41.6	4.4		
Winter	19	22.6	5	
Spring	15.08	37.4	16.64	18.6

Within level 'PS5' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	0.89944	0.4506	34	0.3957
Summer, Winter	0.39108	0.7754	30	0.7038
Summer, Spring	0.3288	0.8304	29	0.7533
Autumn, Winter	1.7844	0.1159	30	0.1055
Autumn, Spring	0.86266	0.4288	25	0.4189
Winter, Spring	1.1492	0.3034	25	0.2782

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	13.4			
Autumn	11.12	10.6		
Winter	10.08	10.32	7.4	
Spring	9.28	8.08	7.36	7.4

Posidonia sinuosa leaf length

PERMANOVA

Permutational MANOVA

Resemblance worksheet
Name: PS_LengthSpr
Data type: Distance
Selection: All
Resemblance: D1 Euclidean distance

Sums of squares type: Type III (partial)
Fixed effects sum to zero for mixed terms
Permutation method: Permutation of residuals under a reduced model
Number of permutations: 9999

Factors

Name	Abbrev.	Type	Levels
Season	Se	Fixed	4
Site	Si	Random	5
Position	Po	Random	39

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Se	3	1.1685E5	38950	12.2	0.0004	9965	0.0005
Si	4	2.1271E5	53178	13.65	0.0001	9955	0.0001
SexSi	12	38312	3192.7	0.81948	0.6279	9925	0.6316
Po(SexSi)	80	3.1168E5	3896	No test			
Total	99	6.7955E5					

Details of the expected mean squares (EMS) for the model

Source	EMS
Se	1*V(Po(SexSi)) + 5*V(SexSi) + 25*S(Se)
Si	1*V(Po(SexSi)) + 20*V(Si)
SexSi	1*V(Po(SexSi)) + 5*V(SexSi)
Po(SexSi)	1*V(Po(SexSi))

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Se	1*Se	1*SexSi	3	12
Si	1*Si	1*Po(SexSi)	4	80
SexSi	1*SexSi	1*Po(SexSi)	12	80
Po(SexSi)			0	0

Estimates of components of variation

Source	Estimate	Sq.root
S(Se)	1430.3	37.819
V(Si)	2464.1	49.64
V(SexSi)	-140.66	-11.86
V(Po(SexSi))	No test	

PAIR-WISE TESTS

Term 'Se'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	2.096	0.1053	5251	0.1026
Summer, Winter	0.39615	0.6948	5287	0.7186
Summer, Spring	2.4851	0.0698	5212	0.0717
Autumn, Winter	2.7535	0.0501	5205	0.0488
Autumn, Spring	10.124	0.0061	5291	0.0005
Winter, Spring	5.1489	0.013	5306	0.0086

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*SexSi	4
Summer, Winter	1*SexSi	4
Summer, Spring	1*SexSi	4
Autumn, Winter	1*SexSi	4
Autumn, Spring	1*SexSi	4
Winter, Spring	1*SexSi	4

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	61.717			
Autumn	86.491	88.453		
Winter	67.355	88.12	75.948	
Spring	89.933	125.34	97.97	105.14

Posidonia sinuosa leaf width

PERMANOVA

Permutational MANOVA

Resemblance worksheet
Name: PS_WidthSpr
Data type: Distance
Selection: All
Resemblance: D1 Euclidean distance

Sums of squares type: Type III (partial)
Fixed effects sum to zero for mixed terms
Permutation method: Permutation of residuals under a reduced model
Number of permutations: 9999

Factors

Name	Abbrev.	Type	Levels
Season	Se	Fixed	4
Site	Si	Random	5
Position	Po	Random	39

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Se	3	4.1067	1.3689	4.1661	0.0331	9958	0.0291
Si	4	5.1781	1.2945	3.7243	0.0061	9951	0.0087
SexSi	12	3.943	0.32858	0.94532	0.5103	9912	0.5113
Po(SexSi)	80	27.807	0.34759	No test			
Total	99	41.035					

Details of the expected mean squares (EMS) for the model

Source	EMS
Se	1*V(Po(SexSi)) + 5*V(SexSi) + 25*S(Se)
Si	1*V(Po(SexSi)) + 20*V(Si)
SexSi	1*V(Po(SexSi)) + 5*V(SexSi)
Po(SexSi)	1*V(Po(SexSi))

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Se	1*Se	1*SexSi	3	12
Si	1*Si	1*Po(SexSi)	4	80
SexSi	1*SexSi	1*Po(SexSi)	12	80
Po(SexSi)			0	0

Estimates of components of variation

Source	Estimate	Sq.root
S(Se)	4.1613E-2	0.20399
V(Si)	4.7347E-2	0.21759
V(SexSi)	-3.8009E-3	-6.1652E-2
V(Po(SexSi))	No test	

PAIR-WISE TESTS

Term 'Se'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	3.6146	0.0319	5272	0.0239
Summer, Winter	1.8059	0.1538	5268	0.1429
Summer, Spring	4.1816	0.0204	5264	0.0141
Autumn, Winter	0.21042	0.8339	5303	0.844
Autumn, Spring	1.6746	0.1731	5265	0.1672
Winter, Spring	1.2956	0.2857	5237	0.2707

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*SexSi	4
Summer, Winter	1*SexSi	4
Summer, Spring	1*SexSi	4
Autumn, Winter	1*SexSi	4
Autumn, Spring	1*SexSi	4
Winter, Spring	1*SexSi	4

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	0.54787			
Autumn	0.67581	0.68077		
Winter	0.84369	0.82258	0.9928	
Spring	0.67469	0.57043	0.74132	0.44044

Posidonia sinuosa leaf mass

PERMANOVA

Permutational MANOVA

Resemblance worksheet
Name: PS_LeafMassSpr
Data type: Distance
Selection: All
Resemblance: D1 Euclidean distance

Sums of squares type: Type III (partial)
Fixed effects sum to zero for mixed terms
Permutation method: Permutation of residuals under a reduced model
Number of permutations: 9999

Factors

Name	Abbrev.	Type	Levels
Season	Se	Fixed	4
Site	Si	Random	5
Position	Po	Random	39

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Se	3	63.096	21.032	5.2142	0.0133	9946	0.0166
Si	4	9.3179	2.3295	1.7009	0.1562	9957	0.1632
SexSi	12	48.403	4.0336	2.9451	0.0022	9923	0.0011
Po(SexSi)	80	109.57	1.3696	No test			
Total	99	230.38					

Details of the expected mean squares (EMS) for the model

Source	EMS
Se	1*V(Po(SexSi)) + 5*V(SexSi) + 25*S(Se)
Si	1*V(Po(SexSi)) + 20*V(Si)
SexSi	1*V(Po(SexSi)) + 5*V(SexSi)
Po(SexSi)	1*V(Po(SexSi))

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Se	1*Se	1*SexSi	3	12
Si	1*Si	1*Po(SexSi)	4	80
SexSi	1*SexSi	1*Po(SexSi)	12	80
Po(SexSi)			0	0

Estimates of components of variation

Source	Estimate	Sq.root
S(Se)	0.67994	0.82458
V(Si)	4.7994E-2	0.21908
V(SexSi)	0.5328	0.72993
V(Po(SexSi))	No test	

PAIR-WISE TESTS

Term 'SeasonxSite' for pairs of levels of factor 'Season'

Within level 'PS1' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	0.84264	0.4312	92	0.4223
Summer, Winter	1.4394	0.1907	95	0.1822
Summer, Spring	3.2964	0.0075	116	0.0098
Autumn, Winter	1.981	0.0466	103	0.0777
Autumn, Spring	3.5653	0.0148	119	0.0073
Winter, Spring	2.9095	0.0152	113	0.0206

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	1.008			
Autumn	1.2276	1.176		
Winter	0.7644	1.5336	0.272	
Spring	2.894	3.508	2.352	2.054

Within level 'PS2' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	0.2729	0.8066	116	0.8003
Summer, Winter	0.68651	0.4719	110	0.5138
Summer, Spring	1.6954	0.132	117	0.1278
Autumn, Winter	7.4969E-2	0.9688	112	0.945
Autumn, Spring	0.72834	0.5044	116	0.4866
Winter, Spring	0.95884	0.3713	110	0.3695

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	0.508			
Autumn	1.8996	2.918		
Winter	0.9968	2.0076	1.422	
Spring	1.5156	2.3384	1.6188	1.94

Within level 'PS3' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	5.9474	0.0077	112	0.0006
Summer, Winter	1.1953	0.2478	87	0.2681
Summer, Spring	5.3954E-2	0.9842	101	0.9606
Autumn, Winter	10.151	0.0074	84	0.0001
Autumn, Spring	5.3634	0.0072	126	0.001
Winter, Spring	1.1848	0.2591	77	0.271

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	1.388			
Autumn	2.996	0.172		
Winter	1.1828	3.734	0.872	
Spring	1.2216	2.956	1.282	1.48

Within level 'PS4' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	6.4397	0.0078	120	0.0004
Summer, Winter	2.9147	0.0392	86	0.0196
Summer, Spring	0.70329	0.4992	109	0.5037
Autumn, Winter	5.4391	0.0075	112	0.0009
Autumn, Spring	4.2	0.0071	117	0.0036
Winter, Spring	1.4629	0.2224	121	0.1775

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	1.23			
Autumn	3.176	0.592		
Winter	1.49	1.726	0.546	
Spring	1.3136	2.656	1.2052	1.63

Within level 'PS5' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	0.51743	0.6454	116	0.6203
Summer, Winter	8.1376E-2	0.9298	117	0.9384
Summer, Spring	0.61909	0.5715	107	0.5539
Autumn, Winter	0.96479	0.3615	110	0.3672
Autumn, Spring	2.1626	0.0852	104	0.0614
Winter, Spring	0.93658	0.3655	107	0.3731

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	2.296			
Autumn	1.5728	1.006		
Winter	1.596	1.0536	1.13	
Spring	1.6044	1.222	0.8796	0.714

Posidonia sinuosa epiphyte mass

PERMANOVA

Permutational MANOVA

Resemblance worksheet
Name: PS_EpiphyteSpr
Data type: Distance
Selection: All
Resemblance: D1 Euclidean distance

Sums of squares type: Type III (partial)
Fixed effects sum to zero for mixed terms
Permutation method: Permutation of residuals under a reduced model
Number of permutations: 9999

Factors

Name	Abbrev.	Type	Levels
Season	Se	Fixed	4
Site	Si	Random	5
Position	Po	Random	39

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Se	3	9.7883E-2	3.2628E-2	0.16045	0.9338	9956	0.9142
Si	4	5.9988	1.4997	16.155	0.0001	9945	0.0001
SexSi	12	2.4402	0.20335	2.1905	0.0209	9921	0.0201
Po(SexSi)	80	7.4267	9.2833E-2	No test			
Total	99	15.964					

Details of the expected mean squares (EMS) for the model

Source	EMS
Se	1*V(Po(SexSi)) + 5*V(SexSi) + 25*S(Se)
Si	1*V(Po(SexSi)) + 20*V(Si)
SexSi	1*V(Po(SexSi)) + 5*V(SexSi)
Po(SexSi)	1*V(Po(SexSi))

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Se	1*Se	1*SexSi	3	12
Si	1*Si	1*Po(SexSi)	4	80
SexSi	1*SexSi	1*Po(SexSi)	12	80
Po(SexSi)			0	0

Estimates of components of variation

Source	Estimate	Sq.root
S(Se)	-6.8289E-3	-8.2637E-2
V(Si)	7.0343E-2	0.26522
V(SexSi)	2.2104E-2	0.14867
V(Po(SexSi))	No test	

PAIR-WISE TESTS

Term 'SeasonxSite' for pairs of levels of factor 'Season'

Within level 'PS1' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	1.2735	0.3698	27	0.2386
Summer, Winter	0.15544	0.933	20	0.8805
Summer, Spring	0.94057	0.4471	29	0.3749
Autumn, Winter	1.2811	0.2623	44	0.2394
Autumn, Spring	0.80344	0.4749	42	0.4385
Winter, Spring	0.91662	0.409	37	0.3921

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	3.2E-2			
Autumn	0.2244	0.384		
Winter	6.84E-2	0.2528	0.102	
Spring	0.1144	0.2532	0.1324	0.178

Within level 'PS2' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	0.96359	0.5105	58	0.3616
Summer, Winter	0.32069	0.9134	75	0.7568
Summer, Spring	0.48801	0.8704	65	0.6346
Autumn, Winter	1.4746	0.1852	63	0.1804
Autumn, Spring	1.2581	0.2513	53	0.2444
Winter, Spring	0.35243	0.6864	59	0.7306

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	0.63			
Autumn	0.3872	0.188		
Winter	0.4228	0.254	0.282	
Spring	0.4052	0.214	0.224	0.236

Within level 'PS3' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	1.7533	0.0069	49	0.1161
Summer, Winter	0.56217	0.5903	43	0.5949
Summer, Spring	0.58366	0.7167	58	0.5763
Autumn, Winter	2.0704	0.0093	44	0.0745
Autumn, Spring	1.9692	0.1396	50	0.0866
Winter, Spring	3.6579E-2	0.9763	60	0.9718

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	0.478			
Autumn	0.374	2.6E-2		
Winter	0.3328	0.238	0.28	
Spring	0.3804	0.2648	0.278	0.324

Within level 'PS4' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	3.9191	0.015	48	0.0047
Summer, Winter	3.2196	0.0226	49	0.0121
Summer, Spring	0.53843	0.6482	38	0.6012
Autumn, Winter	0.97827	0.3681	21	0.3602
Autumn, Spring	3.2131	0.0229	62	0.0134
Winter, Spring	2.8041	0.0336	58	0.0199

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	0.166			
Autumn	0.246	4.8E-2		
Winter	0.2228	5.92E-2	7.4E-2	
Spring	0.1928	0.31	0.2876	0.262

Within level 'PS5' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	2.0259	0.1046	78	0.0738
Summer, Winter	0.1446	0.905	92	0.8896
Summer, Spring	0.44659	0.6712	80	0.6728
Autumn, Winter	1.7506	0.1111	88	0.1223
Autumn, Spring	2.7369	0.0241	98	0.0269
Winter, Spring	0.56272	0.7006	83	0.5853

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	0.508			
Autumn	0.6772	0.63		
Winter	0.4924	0.7096	0.534	
Spring	0.3812	0.7216	0.3816	0.318

Posidonia sinuosa rhizome mass

Permutational MANOVA

Resemblance worksheet
Name: PS_RhizomeSpr
Data type: Distance
Selection: All
Resemblance: D1 Euclidean distance

Sums of squares type: Type III (partial)
Fixed effects sum to zero for mixed terms
Permutation method: Permutation of residuals under a reduced model
Number of permutations: 9999

Factors

Name	Abbrev.	Type	Levels
Season	Se	Fixed	4
Site	Si	Random	5
Position	Po	Random	39

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Se	3	438.87	146.29	2.7052	0.0895	9954	0.0926
Si	4	136.05	34.012	1.6434	0.1704	9950	0.1713
SexSi	12	648.93	54.077	2.6129	0.0047	9945	0.006
Po(SexSi)	80	1655.7	20.696	No test			
Total	99	2879.6					

Details of the expected mean squares (EMS) for the model

Source	EMS
Se	1*V(Po(SexSi)) + 5*V(SexSi) + 25*S(Se)
Si	1*V(Po(SexSi)) + 20*V(Si)
SexSi	1*V(Po(SexSi)) + 5*V(SexSi)
Po(SexSi)	1*V(Po(SexSi))

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Se	1*Se	1*SexSi	3	12
Si	1*Si	1*Po(SexSi)	4	80
SexSi	1*SexSi	1*Po(SexSi)	12	80
Po(SexSi)			0	0

Estimates of components of variation

Source	Estimate	Sq.root
S(Se)	3.6885	1.9205
V(Si)	0.6658	0.81596
V(SexSi)	6.6762	2.5838
V(Po(SexSi))	No test	

PAIR-WISE TESTS

Term 'SeasonxSite' for pairs of levels of factor 'Season'

Within level 'PS1' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	1.3695	0.2245	126	0.2084
Summer, Winter	1.0615	0.3465	118	0.3256
Summer, Spring	7.1567E-2	0.9655	115	0.9463
Autumn, Winter	2.1077	0.0627	126	0.0693
Autumn, Spring	1.1146	0.3069	123	0.2996
Winter, Spring	0.57596	0.6745	125	0.5861

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	3.452			
Autumn	4.952	6.296		
Winter	3.1228	5.9236	2.988	
Spring	4.5824	6.4328	4.09	6.248

Within level 'PS2' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	3.6195	0.016	110	0.0069
Summer, Winter	0.35059	0.7751	125	0.738
Summer, Spring	2.4719	0.0619	116	0.0392
Autumn, Winter	3.9676	0.0072	125	0.0054
Autumn, Spring	1.2802	0.2446	116	0.2355
Winter, Spring	2.8506	0.0314	115	0.0209

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	3.706			
Autumn	13.42	9.438		
Winter	2.612	14.002	2.456	
Spring	8.466	8.792	8.5796	7.598

Within level 'PS3' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	3.1823	0.0145	125	0.0134
Summer, Winter	1.1648	0.2688	120	0.2759
Summer, Spring	0.77895	0.4495	116	0.4584
Autumn, Winter	2.5162	0.018	123	0.0351
Autumn, Spring	2.2925	0.0594	126	0.0512
Winter, Spring	0.12367	0.8954	116	0.9045

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	4.222			
Autumn	10.264	7.15		
Winter	3.9644	7.9292	3.79	
Spring	4.5652	8.6788	4.3312	5.87

Within level 'PS4' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	0.35754	0.7387	123	0.7313
Summer, Winter	0.15126	0.8642	124	0.8842
Summer, Spring	0.87066	0.404	123	0.4104
Autumn, Winter	0.14376	0.9194	115	0.8904
Autumn, Spring	0.58475	0.5724	116	0.5619
Winter, Spring	0.65087	0.5329	91	0.5351

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	3.654			
Autumn	3.3076	4.21		
Winter	4.0312	4.1988	5.458	
Spring	5.098	5.1696	5.5084	6.846

Within level 'PS5' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	0.47556	0.6697	124	0.6535
Summer, Winter	0.12475	0.9053	126	0.9043
Summer, Spring	0.41754	0.6833	123	0.6918
Autumn, Winter	0.76257	0.4733	108	0.4616
Autumn, Spring	0.85994	0.4261	126	0.4225
Winter, Spring	0.6	0.5489	123	0.5598

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Winter	1*Position(SeasonxSite)	8
Summer, Spring	1*Position(SeasonxSite)	8
Autumn, Winter	1*Position(SeasonxSite)	8
Autumn, Spring	1*Position(SeasonxSite)	8
Winter, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	6.224			
Autumn	4.2396	2.118		
Winter	4.0704	1.8956	1.68	
Spring	6.2316	5.2792	5.338	8.038

Amphibolis canopy height

PERMANOVA

Permutational MANOVA

Resemblance worksheet
Name: AmphCanSpr
Data type: Distance
Selection: All
Resemblance: D1 Euclidean distance

Sums of squares type: Type III (partial)
Fixed effects sum to zero for mixed terms
Permutation method: Permutation of residuals under a reduced model
Number of permutations: 9999

Factors

Name	Type	Levels
Season	Fixed	4
Site	Random	7
Position	Random	38

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Season	3	40166	13389	5.0482	0.0044	9941	0.0098
Site	6	49716	8286	13.187	0.0001	9953	0.0001
SeasonxSite**	15	48179	3212	5.1115	0.0001	9942	0.0001
Position(SeasonxSite)	48	30155	628.23	0.96949	0.672	9649	0.6825
Res	1	648	648				
Total	73	2.3748E5					

** Term has one or more empty cells

Details of the expected mean squares (EMS) for the model

Source	EMS
Season	1*V(Res) + 1.0023*V(Position(SeasonxSite)) + 2.0904*V(SeasonxSite) + 12.565*S(Season)
Site	1*V(Res) + 1.0065*V(Position(SeasonxSite)) + 9.1932*V(Site)
SeasonxSite	1*V(Res) + 1.005*V(Position(SeasonxSite)) + 2.6687*V(SeasonxSite)
Position(SeasonxSite)	1*V(Res) + 1.0125*V(Position(SeasonxSite))
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Num.df	Denominator	Den.df
Season	1*Season + 0.21242*Position(SeasonxSite) + 0.78331*SeasonxSite + 4.2745E-3*Res	3	1*Site + 0.99403*Position(SeasonxSite) + 5.9714E-3*Res	16.65
Site	1*Site + 0.99403*Position(SeasonxSite) + 5.9714E-3*Res	6	1*SeasonxSite + 0.9926*Position(SeasonxSite) + 7.4044E-3*Res	48.51
SeasonxSite	1*SeasonxSite + 0.9926*Position(SeasonxSite) + 7.4044E-3*Res	15	1*Position(SeasonxSite) + 1*Res	48.6
Position(SeasonxSite)	1*Position(SeasonxSite) + 1*Res	48	1*Res	1

Estimates of components of variation

Source	Estimate	Sq.root
S(Season)	854.49	29.232
V(Site)	832.98	28.861
V(SeasonxSite)	968.11	31.115
V(Position(SeasonxSite))	-19.529	-4.4192
V(Res)	648	25.456

PAIR-WISE TESTS

Term 'SeasonxSite' for pairs of levels of factor 'Season'

Within level 'AO1' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	0.63422	0.5697	48	0.5403
Summer, Spring	2.9157	0.0325	285	0.0211
Autumn, Spring	3.742	0.0213	399	0.0066

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	8
Summer, Spring	0.98979*Position(SeasonxSite) + 1.0212E-2*Res	7.16
Autumn, Spring	0.98979*Position(SeasonxSite) + 1.0212E-2*Res	7.16

Average Distance between/within groups

	Summer	Autumn	Spring
Summer	37.6		
Autumn	31.68	34.8	
Spring	47.6	58.64	19.2

Within level 'AP1' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	1.1547	0.6675	3	0.452
Summer, Winter	No test			
Summer, Spring	No test			
Autumn, Winter	1.2124	0.6659	3	0.4394
Autumn, Spring	0.11547	1	3	0.926
Winter, Spring	No test			

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	1
Summer, Winter	No test	
Summer, Spring	No test	
Autumn, Winter	1*Position(SeasonxSite)	1
Autumn, Spring	1*Position(SeasonxSite)	1
Winter, Spring	No test	

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	0			
Autumn	40	40		
Winter	82	42	0	
Spring	36	20	46	0

Within level 'AP2' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	11.667	0.3403	3	0.0065
Summer, Winter	1.2403	0.3343	3	0.3437
Summer, Spring	0.94032	0.5965	7	0.4197
Autumn, Winter	3.2869	0.3343	3	0.0819
Autumn, Spring	5.7091	0.0968	7	0.0118
Winter, Spring	1.9225	0.1019	7	0.1486

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	2
Summer, Winter	1*Position(SeasonxSite)	2
Summer, Spring	1*Position(SeasonxSite)	3
Autumn, Winter	1*Position(SeasonxSite)	2
Autumn, Spring	1*Position(SeasonxSite)	3
Winter, Spring	1*Position(SeasonxSite)	3

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	8			
Autumn	66	8		
Winter	40	106	64	
Spring	10.667	56.667	49.333	14.667

Within level 'AP3' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	1.5877	0.668	3	0.3639
Summer, Winter	1.1495	0.3349	11	0.3162
Summer, Spring	0.33333	1	2	0.7642
Autumn, Winter	5.3783	0.203	5	0.015
Autumn, Spring	Denominator is 0			
Winter, Spring	2.6725	0.1324	9	0.0567

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	1
Summer, Winter	1*Position(SeasonxSite)	4
Summer, Spring	1*Position(SeasonxSite)	2
Autumn, Winter	1*Position(SeasonxSite)	3
Autumn, Spring	1*Position(SeasonxSite)	0
Winter, Spring	1*Position(SeasonxSite)	4

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	48			
Autumn	66	0		
Winter	28	87	18.667	
Spring	24	58	29	0

Within level 'AP4' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	5.3587	0.0087	85	0.0015
Summer, Winter	0.69722	0.5067	52	0.5066
Summer, Spring	3.1997	0.0216	48	0.0134
Autumn, Winter	4.7125	0.0307	34	0.0033
Autumn, Spring	3.8469	0.0291	33	0.0091
Winter, Spring	2.6462	0.0294	25	0.0367

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	7
Summer, Winter	1*Position(SeasonxSite)	7
Summer, Spring	1*Position(SeasonxSite)	7
Autumn, Winter	1*Position(SeasonxSite)	6
Autumn, Spring	1*Position(SeasonxSite)	6
Winter, Spring	1*Position(SeasonxSite)	6

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	18.4			
Autumn	109	53.333		
Winter	24.4	119	34.667	
Spring	26.9	82.5	36.5	6.3333

Within level 'AP5' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Summer, Autumn	9.4299	0.2439	4	0.0121
Summer, Winter	1.5689	0.2984	8	0.1915
Summer, Spring	3.3037	0.1037	9	0.043
Autumn, Winter	8.3205	0.2531	4	0.0148
Autumn, Spring	0.26943	1	3	0.8347
Winter, Spring	2.8441	0.1014	10	0.0659

Denominators

Groups	Denominator	Den.df
Summer, Autumn	1*Position(SeasonxSite)	2
Summer, Winter	1*Position(SeasonxSite)	4
Summer, Spring	1*Position(SeasonxSite)	3
Autumn, Winter	1*Position(SeasonxSite)	2
Autumn, Spring	1*Position(SeasonxSite)	1
Winter, Spring	1*Position(SeasonxSite)	3

Average Distance between/within groups

	Summer	Autumn	Winter	Spring
Summer	16			
Autumn	136	0		
Winter	18.222	120	16	
Spring	115	45	99	90

Within level 'AM1' of factor 'Site'

Groups	t	P(perm)	Unique perms	P(MC)
Autumn, Spring	1.4829	0.1691	42	0.1821

Denominators

Groups	Denominator	Den.df
Autumn, Spring	1*Position(SeasonxSite)	8

Average Distance between/within groups

	Autumn	Spring
Autumn	23.6	
Spring	30.08	32.8

Appendix D. Scuba surveys - seagrass fauna detailed results

The following tables show the abundance per site (each one 50 m transect), season and habitat across four primary and three secondary seagrass habitats.

Species	Common name	*Posidonia australis*																				*Posidonia/Zostera*							
		PA1				PA2				PA3				PA4				PA5				PZ1				PZ2			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Crustaceans																													
Austrodromidia octodentata	Bristled sponge crab																												
Naxia aurita	Seagrass spider crab																												
Nectocarcinus integrifrons	Red swimmer crab		1			1	2				2										3								
Paguristes frontalis	Southern hermit crab																												
Penaeus latisulcatus	Western king prawn																												
Portunus armatus	Blue swimmer crab	1	2							1	1				1			1							1	6	3		1
Echinoderms																													
Amblypneustes pallidus	Yellow-spined egg urchin																												
Anthaster valvulatus	Mottled seastar																												
Australostichopus mollis	Southern sea cucumber																												
Coscinasterias muricata	Eleven arm seastar																												
Goniocidaris tubaria	Pencil urchin						1																						
Stichopus ludwigi	Ludwig's sea cucumber																												
Tosia australis	Southern biscuit star																												
Molluscs																													
Astralium spp.	Turban shell				14				12				4				9				10								
Ceratosoma brevicaudatum	Short tailed nudibranch														1														
Circe quoyi	Circular tapestry shell																												
Conus anemone	Anemone cone																												
Equichlamys bifrons	Queen scallop						1				2				3														
Fusinus australis	Southern spindle		1				2				1				1														
Haliotis spp.	Abalone																												
Lima nimbifer	File shell																												
Malleus meridianus	Hammer oyster	1								3		1							1					1	1				

Species	Common name	*Posidonia australis*																				*Posidonia/Zostera*							
		PA1				PA2				PA3				PA4				PA5				PZ1				PZ2			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Mytilidae spp.	Mussels																												
Notocallista kingii	King's cockle																												
Ostrea angasi	Native mussel																												
Pecten fumatus	King scallop																												
Phasianella australis	Painted lady																												
Phasianella ventricosa	Swollen pheasant shell		1				1										1												
Pinna bicolor	Razor clam	4	3				5	2	1	10	13	15	1		6			1	5	2	2	2	2	2	1	5	1	5	2
Pleuroploca australasia	Tulip shell																												
Sepioteuthis australis (eggs)	Calamari eggs																												
Turbo torquatus	Turban shell																												
Sessiles																													
Adeona grisea	Black sieve bryozoan																												
Ascidiacea spp. (grey colonial)	Grey colonial ascidians																												
Ascidiacea spp. (other solitary)	Other solitary ascidians		2		1		1							1															
Ascidiacea spp. (stalked solitary)	Stalked solitary ascidians															1													
Botrylloides spp.	Colonial ascidians																												
Bryozoa spp. (purple hard massive)	Purple hard massive bryozoan																												
Carijoa sp.	Soft coral																												
Drifa sp.	Soft coral																												
Echinogorgia sp.	Sea whip																												
Euplexaura sp.	Gorgonian coral																												
Halocynthia dumosa	Spiny sea squirt																												
Herdmania fimbriae	Small red-mouthed ascidian																												
Mycale sp.	Pumpkin sponge				1	1		2	2					45		10	32				2								
Phallusia obesa	Obese ascidian																												
Plesiastrea versipora	Green coral																												
Polycarpa viridis	Mauve-mouthed ascidian		2		2	1	2		1						3		1												
Porifera spp. (black ball)	Black ball sponge																												

Species	Common name	*Posidonia australis*																				*Posidonia/Zostera*							
		PA1				PA2				PA3				PA4				PA5				PZ1				PZ2			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Porifera spp. (black massive)	Black massive sponge									1				1												4	1		
Porifera spp. (blue massive)	Blue massive sponge																												
Porifera spp. (brown ball)	Brown ball sponge		1				3								17														
Porifera spp. (brown branching)	Brown branching sponge																												
Porifera spp. (brown massive)	Brown massive sponge																												
Porifera spp. (brown tubular)	Brown tubular sponge																												
Porifera spp. (cream ball)	Cream ball sponge																												
Porifera spp. (cream digitate)	Cream digitate sponge																												
Porifera spp. (cream encrusting)	Cream encrusting sponge																												
Porifera spp. (cream honeycomb)	Cream honeycomb sponge																												
Porifera spp. (cream massive)	Cream massive sponge																												
Porifera spp. (cream tubular)	Cream tubular sponge																												
Porifera spp. (green digitate)	Green digitate sponge																												
Porifera spp. (green massive)	Green massive sponge																												
Porifera spp. (grey encrusting)	Grey encrusting sponge		3																										
Porifera spp. (grey other)	Grey sponge			1		1																		1					
Porifera spp. (orange branching)	Orange branching sponge																												
Porifera spp. (orange digitate)	Orange digitate sponge																												
Porifera spp. (orange massive)	Orange massive sponge																												
Porifera spp. (orange palmate)	Orange palmate sponge																												
Porifera spp. (orange tubular)	Orange tubular sponge																												
Porifera spp. (pink massive soft)	Pink massive soft sponge																												
Porifera spp. (pink massive)	Pink massive sponge			1												1													
Porifera spp. (purple digitate)	Purple digitate sponge														1														
Porifera spp. (purple massive)	Purple massive sponge																												
Porifera spp. (white amorphous)	White amorphous sponge																												
Porifera spp. (white tubular)	White tubular sponge																												
Porifera spp. (yellow amorphous)	Yellow amorphous sponge																												

Species	Common name	*Posidonia australis*																				*Posidonia/Zostera*							
		PA1				PA2				PA3				PA4				PA5				PZ1				PZ2			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Porifera spp. (yellow branching)	Yellow branching sponge																												
Porifera spp. (yellow digitate)	Yellow digitate sponge																												
Porifera spp. (yellow massive)	Yellow massive sponge																												
Pyura abradata	Red bait																												
Sabella sp. (tubes)	Worm tubes	1				1																							
Steginoporella truncata	Mazy bryozoan																												
Tethya spp.	Golf ball sponge		1								2				1														
Thorectid sp.	Orange amorphous sponge																												
Fishes																													
Actinopterygii sp. (small green)	Unidentified small green fish																				1								
Actinopterygii sp. (small)	Unidentified small fish																												
Actinopterygii spp. (baitfish)	Unidentified baitfish																												
Aetapcus maculatus	Warty prowfish																												
Aracana aurita	Shaw's cowfish																												
Chrysophrys auratus	Snapper																												
Eocallionymus papilio	Painted stinkfish																												
Monacanthidae spp.	Leatherjacket undifferentiated																												
Neoodax balteatus	Little weed whiting			1															1		3		2						
Parapercis haackei	Wavy grubfish																												
Parequula melbournensis	Silverbelly																												
Pelates octolineatus	Western striped trumpeter																				80				80				
Pleuronectiformes sp.	Flounder																												
Siphamia cephalotes	Wood's siphonfish																		1			1							
Vincentia conspersa	Southern cardinalfish																												

Species	Common name	*Amphibolis*				*Amphibolis/ Posidonia mixed*				*Amphibolis/Posidonia patchy*																			
		AO1				AM1				AP1				AP2				AP3				AP4				AP5			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Crustaceans																													
Austrodromidia octodentata	Bristled sponge crab																		1										
Naxia aurita	Seagrass spider crab				1			1				1																	
Nectocarcinus integrifrons	Red swimmer crab	1			1	1	3	1			3		1		1		1	1	1			2	1		2	1	1	1	
Paguristes frontalis	Southern hermit crab										1								1										
Penaeus latisulcatus	Western king prawn																												
Portunus armatus	Blue swimmer crab	1			1					2																			
Echinoderms																													
Amblypneustes pallidus	Yellow-spined egg urchin	1		1						1	1				1	2							1						
Anthaster valvulatus	Mottled seastar					1									1					1	1	2		1					
Australostichopus mollis	Southern sea cucumber		1		1									1	1														
Coscinasterias muricata	Eleven arm seastar																												
Goniocidaris tubaria	Pencil urchin	1				1	1	1	1	1		2	1						1	1		1		1					1
Stichopus ludwigi	Ludwig's sea cucumber																												
Tosia australis	Southern biscuit star									1		1					1										1		
Molluscs																													
Astralium spp.	Turban shell									2		8	2	2		1	1			1	2			1	1	1	1	7	3
Ceratosoma brevicaudatum	Short tailed nudibranch																												
Circe quoyi	Circular tapestry shell			1						1															1				
Conus anemone	Anemone cone																												
Equichlamys bifrons	Queen scallop		1																	1									
Fusinus australis	Southern spindle						2																						
Haliotis spp.	Abalone	1		1	2																								
Lima nimbifer	File shell																											1	
Malleus meridianus	Hammer oyster														1				1										
Mytilidae spp.	Mussels																												
Notocallista kingii	King's cockle																												
Ostrea angasi	Native mussel																												

Species	Common name	*Amphibolis*				*Amphibolis/ Posidonia mixed*				*Amphibolis/Posidonia patchy*																			
		AO1				AM1				AP1				AP2				AP3				AP4				AP5			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Pecten fumatus	King scallop																												
Phasianella australis	Painted lady																					1							
Phasianella ventricosa	Swollen pheasant shell		1		1		1		1								1			1					2				
Pinna bicolor	Razor clam	26	20	10	9		1		1																				
Pleuroploca australasia	Tulip shell										1			1															
Sepioteuthis australis (eggs)	Calamari eggs									1				1															
Turbo torquatus	Turban shell																												
Sessiles																													
Adeona grisea	Black sieve bryozoan																												
Ascidiacea spp. (grey colonial)	Grey colonial ascidians																												
Ascidiacea spp. (other solitary)	Other solitary ascidians	5	7	5	5	1	2	1	2	31	18	23	18	8	33	14	12	14	10	16	12	27	7	4	5	22	16	31	26
Ascidiacea spp. (stalked solitary)	Stalked solitary ascidians	2	1	1	2				1	1																1			
Botrylloides spp.	Colonial ascidians	1													1														
Bryozoa spp. (purple hard massive)	Purple hard massive bryozoan																												
Carijoa sp.	Soft coral																												
Drifa sp.	Soft coral																												
Echinogorgia sp.	Sea whip																												
Euplexaura sp.	Gorgonian coral																												
Halocynthia dumosa	Spiny sea squirt																												
Herdmania fimbriae	Small red-mouthed ascidian					1				1		1													1				
Mycale sp.	Pumpkin sponge						2		1	2	1	1	3					43	23	13	21								
Phallusia obesa	Obese ascidian																												
Plesiastrea versipora	Green coral											1																	
Polycarpa viridis	Mauve-mouthed ascidian	7	8	11	11	9	15	7	13	78	50	100	53	26	39	29	31	56	54	42	40	64	32	52	46	44	37	67	43
Porifera spp. (black ball)	Black ball sponge									3	2	1	1	1	2	2	2	2	2		3	1		3	2	6	4	2	1
Porifera spp. (black massive)	Black massive sponge															1		1			1	2	2			2			
Porifera spp. (blue massive)	Blue massive sponge					1																							
Porifera spp. (brown ball)	Brown ball sponge																	3											

Species	Common name	*Amphibolis*				*Amphibolis/ Posidonia mixed*				*Amphibolis/Posidonia patchy*																			
		AO1				AM1				AP1				AP2				AP3				AP4				AP5			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Porifera spp. (brown branching)	Brown branching sponge																												
Porifera spp. (brown massive)	Brown massive sponge																												
Porifera spp. (brown tubular)	Brown tubular sponge																												
Porifera spp. (cream ball)	Cream ball sponge														1														
Porifera spp. (cream digitate)	Cream digitate sponge					19	28		2																				
Porifera spp. (cream encrusting)	Cream encrusting sponge																												
Porifera spp. (cream honeycomb)	Cream honeycomb sponge											1																	
Porifera spp. (cream massive)	Cream massive sponge											1			2	1											3	2	1
Porifera spp. (cream tubular)	Cream tubular sponge							13																					
Porifera spp. (green digitate)	Green digitate sponge																												
Porifera spp. (green massive)	Green massive sponge																												
Porifera spp. (grey encrusting)	Grey encrusting sponge									1																			
Porifera spp. (grey other)	Grey sponge	1			1			1		1			4	1	1	2		1	1	1		3		1		7	3	1	1
Porifera spp. (orange branching)	Orange branching sponge																												
Porifera spp. (orange digitate)	Orange digitate sponge																												
Porifera spp. (orange massive)	Orange massive sponge																									1			
Porifera spp. (orange palmate)	Orange palmate sponge																												
Porifera spp. (orange tubular)	Orange tubular sponge																												
Porifera spp. (pink massive soft)	Pink massive soft sponge													1				2											
Porifera spp. (pink massive)	Pink massive sponge																									1			
Porifera spp. (purple digitate)	Purple digitate sponge																												
Porifera spp. (purple massive)	Purple massive sponge																												
Porifera spp. (white amorphous)	White amorphous sponge																												
Porifera spp. (white tubular)	White tubular sponge																												
Porifera spp. (yellow amorphous)	Yellow amorphous sponge																												
Porifera spp. (yellow branching)	Yellow branching sponge																												
Porifera spp. (yellow digitate)	Yellow digitate sponge																												
Porifera spp. (yellow massive)	Yellow massive sponge																												

Species	Common name	*Amphibolis*				*Amphibolis/ Posidonia mixed*				*Amphibolis/Posidonia patchy*																			
		AO1				AM1				AP1				AP2				AP3				AP4				AP5			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Pyura abradata	Red bait						1																						
Sabella sp. (tubes)	Worm tubes	13	6	1	7		3				1		4		4	9	8	10	2	2	5	4	12	6	4	1	2	4	4
Steginoporella truncata	Mazy bryozoan																												
Tethya spp.	Golf ball sponge					1				7	8	4	12		5	3	3	23	25	18	29	1	2			5	10	11	13
Thorectid sp.	Orange amorphous sponge																												
Fishes																													
Actinopterygii sp. (small green)	Unidentified small green fish																												
Actinopterygii sp. (small)	Unidentified small fish																												
Actinopterygii spp. (baitfish)	Unidentified baitfish									100				200															
Aetapcus maculatus	Warty prowfish																								1				
Aracana aurita	Shaw's cowfish																												
Chrysophrys auratus	Snapper																												
Eocallionymus papilio	Painted stinkfish				1																	1							
Monacanthidae spp.	Leatherjacket undifferentiated																												
Neoodax balteatus	Little weed whiting																		1										
Parapercis haackei	Wavy grubfish																												
Parequula melbournensis	Silverbelly																												
Pelates octolineatus	Western striped trumpeter																												
Pleuronectiformes sp.	Flounder																												
Siphamia cephalotes	Wood's siphonfish																												
Vincentia conspersa	Southern cardinalfish																												

Species	Common name	*Posidonia sinuosa*																			
		PS1				PS2				PS3				PS4				PS5			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Crustaceans																					
Austrodromidia octodentata	Bristled sponge crab																				
Naxia aurita	Seagrass spider crab				1								1				1				1
Nectocarcinus integrifrons	Red swimmer crab		1					1							2	1	2				
Paguristes frontalis	Southern hermit crab																				
Penaeus latisulcatus	Western king prawn																				
Portunus armatus	Blue swimmer crab	1			1	1	1		1		1				2						2
Echinoderms																					
Amblypneustes pallidus	Yellow-spined egg urchin																				
Anthaster valvulatus	Mottled seastar	2			1					1											
Australostichopus mollis	Southern sea cucumber	1		2		1					1						1				
Coscinasterias muricata	Eleven arm seastar										1										
Goniocidaris tubaria	Pencil urchin			1						2		1									
Stichopus ludwigi	Ludwig's sea cucumber																				
Tosia australis	Southern biscuit star																				
Molluscs																					
Astralium spp.	Turban shell	11	5	16	4	10	2	21	16	12	3	15	9	15	4	2	1				
Ceratosoma brevicaudatum	Short tailed nudibranch																				
Circe quoyi	Circular tapestry shell	1			1				3					1			1	1		1	
Conus anemone	Anemone cone																				
Equichlamys bifrons	Queen scallop	23	3	10	12	1	1	3		2	1	1	1	5	2	3	1		1		
Fusinus australis	Southern spindle																				
Haliotis spp.	Abalone																				
Lima nimbifer	File shell																				
Malleus meridianus	Hammer oyster	36		63	31	18		13	8	4		15	13	23		8	23	2			1
Mytilidae spp.	Mussels			12	1																
Notocallista kingii	King's cockle								1												
Ostrea angasi	Native mussel																				
Pecten fumatus	King scallop				1																

Species	Common name	*Posidonia sinuosa*																			
		PS1				PS2				PS3				PS4				PS5			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Phasianella australis	Painted lady																				
Phasianella ventricosa	Swollen pheasant shell		1								1										
Pinna bicolor	Razor clam	5	2		1		1			1											
Pleuroploca australasia	Tulip shell				1				1	1				1		1					
Sepioteuthis australis (eggs)	Calamari eggs																				
Turbo torquatus	Turban shell																				
Sessiles																					
Adeona grisea	Black sieve bryozoan																				
Ascidiacea spp. (grey colonial)	Grey colonial ascidians															2					
Ascidiacea spp. (other solitary)	Other solitary ascidians	35	46	30	18	82	63	58	58	64	33	54	60	68	49	55	54	14	12	12	4
Ascidiacea spp. (stalked solitary)	Stalked solitary ascidians		2				1	1									1	1			1
Botrylloides spp.	Colonial ascidians																				
Bryozoa spp. (purple hard massive)	Purple hard massive bryozoan	10	2	12	5	2		1						1		2	1				
Carijoa sp.	Soft coral																				
Drifa sp.	Soft coral																				
Echinogorgia sp.	Sea whip																				
Euplexaura sp.	Gorgonian coral																				
Halocynthia dumosa	Spiny sea squirt			1																1	
Herdmania fimbriae	Small red-mouthed ascidian							2								6		1	1		
Mycale sp.	Pumpkin sponge	2																1	1		
Phallusia obesa	Obese ascidian	1	26				16				9			3	10	4					
Plesiastrea versipora	Green coral											1									
Polycarpa viridis	Mauve-mouthed ascidian	16	35	61	24	50	15	35	41	74	22	91	84	73	45	56	23	13	13	11	4
Porifera spp. (black ball)	Black ball sponge		1	1			3	1	2		2		2					1			
Porifera spp. (black massive)	Black massive sponge		2			2	1			1				2	1						
Porifera spp. (blue massive)	Blue massive sponge									1											
Porifera spp. (brown ball)	Brown ball sponge		3				2				8				1						
Porifera spp. (brown branching)	Brown branching sponge																				

Species	Common name	*Posidonia sinuosa*																			
		PS1				PS2				PS3				PS4				PS5			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Porifera spp. (brown massive)	Brown massive sponge				1								1								
Porifera spp. (brown tubular)	Brown tubular sponge												1								
Porifera spp. (cream ball)	Cream ball sponge																				
Porifera spp. (cream digitate)	Cream digitate sponge																				
Porifera spp. (cream encrusting)	Cream encrusting sponge									1											
Porifera spp. (cream honeycomb)	Cream honeycomb sponge																				
Porifera spp. (cream massive)	Cream massive sponge											2	1			2					
Porifera spp. (cream tubular)	Cream tubular sponge																				
Porifera spp. (green digitate)	Green digitate sponge																				
Porifera spp. (green massive)	Green massive sponge	2								1											
Porifera spp. (grey encrusting)	Grey encrusting sponge									3				1							
Porifera spp. (grey other)	Grey sponge	1		7	10	2		9	4	2		12	9	4		8	8	1	1		2
Porifera spp. (orange branching)	Orange branching sponge																				
Porifera spp. (orange digitate)	Orange digitate sponge																				
Porifera spp. (orange massive)	Orange massive sponge																				
Porifera spp. (orange palmate)	Orange palmate sponge																				
Porifera spp. (orange tubular)	Orange tubular sponge																				
Porifera spp. (pink massive soft)	Pink massive soft sponge	1								1				1							
Porifera spp. (pink massive)	Pink massive sponge																				
Porifera spp. (purple digitate)	Purple digitate sponge		3				4				3				6						
Porifera spp. (purple massive)	Purple massive sponge	8				6				8				5							
Porifera spp. (white amorphous)	White amorphous sponge																				2
Porifera spp. (white tubular)	White tubular sponge																	3	2		
Porifera spp. (yellow amorphous)	Yellow amorphous sponge																				
Porifera spp. (yellow branching)	Yellow branching sponge																				
Porifera spp. (yellow digitate)	Yellow digitate sponge																				
Porifera spp. (yellow massive)	Yellow massive sponge	1																	1		
Pyura abradata	Red bait																				

Species	Common name	*Posidonia sinuosa*																			
		PS1				PS2				PS3				PS4				PS5			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Sabella sp. (tubes)	Worm tubes	1	5	1	1		6	2	2	6	4	2		3	6	8	10	179	218	210	97
Steginoporella truncata	Mazy bryozoan																				
Tethya spp.	Golf ball sponge	3	2		2	1	2	3		2	3		3	1	1		1		1		1
Thorectid sp.	Orange amorphous sponge																				
Fishes																					
Actinopterygii sp. (small green)	Unidentified small green fish									1											
Actinopterygii sp. (small)	Unidentified small fish																				
Actinopterygii spp. (baitfish)	Unidentified baitfish																				
Aetapcus maculatus	Warty prowfish																				
Aracana aurita	Shaw's cowfish																				
Chrysophrys auratus	Snapper																				
Eocallionymus papilio	Painted stinkfish															1	1				
Monacanthidae spp.	Leatherjacket undifferentiated																				
Neoodax balteatus	Little weed whiting							1													
Parapercis haackei	Wavy grubfish	5	1	1		4								2							
Parequula melbournensis	Silverbelly																				
Pelates octolineatus	Western striped trumpeter																				
Pleuronectiformes sp.	Flounder																				
Siphamia cephalotes	Wood's siphonfish	1								1								6	2		
Vincentia conspersa	Southern cardinalfish	1																			

Species	Common name	*Zostera*																			
		ZO1				ZO2				ZO3				ZO4				ZO5			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Crustaceans																					
Austrodromidia octodentata	Bristled sponge crab																				
Naxia aurita	Seagrass spider crab				1								1				1				1
Nectocarcinus integrifrons	Red swimmer crab		1					1							2	1	2				
Paguristes frontalis	Southern hermit crab																				
Penaeus latisulcatus	Western king prawn																				
Portunus armatus	Blue swimmer crab	1			1	1	1		1		1				2						2
Echinoderms																					
Amblypneustes pallidus	Yellow-spined egg urchin																				
Anthaster valvulatus	Mottled seastar		1																1		
Australostichopus mollis	Southern sea cucumber					1						1		1					1		2
Coscinasterias muricata	Eleven arm seastar																				
Goniocidaris tubaria	Pencil urchin			1											1				1		
Stichopus ludwigi	Ludwig's sea cucumber																	1			
Tosia australis	Southern biscuit star																				
Molluscs																					
Astralium spp.	Turban shell																				
Ceratosoma brevicaudatum	Short tailed nudibranch																				
Circe quoyi	Circular tapestry shell										2					1			1		
Conus anemone	Anemone cone																	1			
Equichlamys bifrons	Queen scallop																				
Fusinus australis	Southern spindle												1								
Haliotis spp.	Abalone																				
Lima nimbifer	File shell																				
Malleus meridianus	Hammer oyster	6	8	13	26	10	7	6	7	2	6		23	6	6	3	5	15	25	6	13
Mytilidae spp.	Mussels	25	10	16	67	47	29	11	48	7	20	2	14	2	10	11	3	25	35	27	41
Notocallista kingii	King's cockle																				
Ostrea angasi	Native mussel	2				5	2			2	1		4	3	3			1	1	1	
Pecten fumatus	King scallop						1								2						

Species	Common name	*Zostera*																			
		ZO1				ZO2				ZO3				ZO4				ZO5			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Phasianella australis	Painted lady																				
Phasianella ventricosa	Swollen pheasant shell																				
Pinna bicolor	Razor clam	6	3	3	8	1		1	1							1		7	13	4	10
Pleuroploca australasia	Tulip shell																				
Sepioteuthis australis (eggs)	Calamari eggs																				
Turbo torquatus	Turban shell										1										
Sessiles																					
Adeona grisea	Black sieve bryozoan	1		1		6				6			2	4	1	1		1	3	1	
Ascidiacea spp. (grey colonial)	Grey colonial ascidians																				
Ascidiacea spp. (other solitary)	Other solitary ascidians			1				1	1				2		2		1	1	2		1
Ascidiacea spp. (stalked solitary)	Stalked solitary ascidians																1				
Botrylloides spp.	Colonial ascidians																				
Bryozoa spp. (purple hard massive)	Purple hard massive bryozoan																				
Carijoa sp.	Soft coral	5	4	1		2	2			1	1			1					4	4	6
Drifa sp.	Soft coral					1															
Echinogorgia sp.	Sea whip	6	6	3		10	3	1		11	7			6	5						
Euplexaura sp.	Gorgonian coral		1																		
Halocynthia dumosa	Spiny sea squirt														1	1					
Herdmania fimbriae	Small red-mouthed ascidian					2								1							
Mycale sp.	Pumpkin sponge																				
Phallusia obesa	Obese ascidian	8	8	10	6	11	8	10	6	8	5	2	2	3	5	1	8	3	7	7	6
Plesiastrea versipora	Green coral																				
Polycarpa viridis	Mauve-mouthed ascidian	2		9	6	2	2	2	2	2	9		1					2	6	5	
Porifera spp. (black ball)	Black ball sponge																				
Porifera spp. (black massive)	Black massive sponge										1										
Porifera spp. (blue massive)	Blue massive sponge																				
Porifera spp. (brown ball)	Brown ball sponge																				
Porifera spp. (brown branching)	Brown branching sponge	2								1								2			

Species	Common name	*Zostera*																			
		ZO1				ZO2				ZO3				ZO4				ZO5			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Porifera spp. (brown massive)	Brown massive sponge																				
Porifera spp. (brown tubular)	Brown tubular sponge																				
Porifera spp. (cream ball)	Cream ball sponge																				
Porifera spp. (cream digitate)	Cream digitate sponge										1								5		
Porifera spp. (cream encrusting)	Cream encrusting sponge																				
Porifera spp. (cream honeycomb)	Cream honeycomb sponge					1	1	1									1		1	1	
Porifera spp. (cream massive)	Cream massive sponge	2	1			2			1		2				2		1		3		
Porifera spp. (cream tubular)	Cream tubular sponge		5											1							
Porifera spp. (green digitate)	Green digitate sponge																			1	
Porifera spp. (green massive)	Green massive sponge																				
Porifera spp. (grey encrusting)	Grey encrusting sponge																				
Porifera spp. (grey other)	Grey sponge			1	1	2			1										1		1
Porifera spp. (orange branching)	Orange branching sponge					2															
Porifera spp. (orange digitate)	Orange digitate sponge				1						1					1			1		3
Porifera spp. (orange massive)	Orange massive sponge						1	1													
Porifera spp. (orange palmate)	Orange palmate sponge																			1	
Porifera spp. (orange tubular)	Orange tubular sponge			2																	
Porifera spp. (pink massive soft)	Pink massive soft sponge																				
Porifera spp. (pink massive)	Pink massive sponge																				
Porifera spp. (purple digitate)	Purple digitate sponge			2	1		1	1		1		4	1				1			1	
Porifera spp. (purple massive)	Purple massive sponge								2				1								
Porifera spp. (white amorphous)	White amorphous sponge																				
Porifera spp. (white tubular)	White tubular sponge																				
Porifera spp. (yellow amorphous)	Yellow amorphous sponge			2														1			
Porifera spp. (yellow branching)	Yellow branching sponge	3												2							
Porifera spp. (yellow digitate)	Yellow digitate sponge						1														
Porifera spp. (yellow massive)	Yellow massive sponge																				
Pyura abradata	Red bait																				

Species	Common name	*Zostera*																			
		ZO1				ZO2				ZO3				ZO4				ZO5			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Sabella sp. (tubes)	Worm tubes		3			2		2			1			4		2	1		1		
Steginoporella truncata	Mazy bryozoan	1	6	2	2								1					1	1		1
Tethya spp.	Golf ball sponge			1				1		2											
Thorectid sp.	Orange amorphous sponge							16	26			34				23	53				
Fishes																					
Actinopterygii sp. (small green)	Unidentified small green fish																				
Actinopterygii sp. (small)	Unidentified small fish								1												2
Actinopterygii spp. (baitfish)	Unidentified baitfish																				
Aetapcus maculatus	Warty prowfish																				
Aracana aurita	Shaw's cowfish																	1			
Chrysophrys auratus	Snapper						1												1		
Eocallionymus papilio	Painted stinkfish				1												1				
Monacanthidae spp.	Leatherjacket undifferentiated														1						
Neoodax balteatus	Little weed whiting			1					2				2				1				
Parapercis haackei	Wavy grubfish	2	13	3	2	10	7			7	3		2	5	6	1	1	3	6		
Parequula melbournensis	Silverbelly		3	1																	
Pelates octolineatus	Western striped trumpeter																				
Pleuronectiformes sp.	Flounder										1										
Siphamia cephalotes	Wood's siphonfish																				
Vincentia conspersa	Southern cardinalfish																				

Appendix E. Towed camera (deep habitat fauna) detailed results

The following tables show the abundance per site (each one 50 m transect), season and habitat across two primary and one secondary deep water sand habitats.

Species	Common name	Sand/bioturbation																			
		SB1				SB2				SB3				SB4				SB5			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Crustaceans																					
Leptomithrax gaimardii	Giant spider crab																	1			
Penaeus latisulcatus	Western king prawn	2	2			6				2	1			3	4				1		4
Echinoderms																					
Anthaster valvulatus	Mottled seastar																				
Australostichopus mollis	Southern sea cucumber														1						
Coscinasterias muricata	Eleven arm seastar											1				1					
Molluscs																					
Pinna bicolor	Razor clam												1								
Sessiles																					
Alcyonacea spp.	Gorgonians	4	25	45	9	24	15	68	17	15	4	37	16	13	26	26	7	2	8	19	5
Ascidiacea spp. (large solitary)	Large solitary ascidian			1				2											1		
Phallusia obesa	Obese ascidian	1		7	4		1	15	3	3	1	3	1	2	2	4	9			5	2
Porifera spp.	Undifferentiated sponge	2		2	1			1		1			1	1	2	3	2		1	1	3
Sabella spallanzanii	European fan worm	4	8	16	9	6	4	9	21	2	1		3	13	8	2	13	5	14	1	35
Steginoporella truncata	Mazy bryozoan													4	2		2				
Unidentified filter feeder	Unidentified filter feeder		11	37	10	10	10	25	7	6	3	12	8	11	23	22	8	5	18	38	20
Fishes																					
Aracana spp.	Cowfish											1									
Parapercis haackei	Wavy grubfish						1								3		1				
Thamnaconus degeni	Degen's leatherjacket														1						

Species	Common name	Sand/invertebrates																			
		SI1				SI2				SI3				SI4				SI5			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Crustaceans																					
Leptomithrax gaimardii	Giant spider crab								2												
Penaeus latisulcatus	Western king prawn				1					1	1		1	2			1	1			
Echinoderms																					
Anthaster valvulatus	Mottled seastar																				
Australostichopus mollis	Southern sea cucumber														1						
Coscinasterias muricata	Eleven arm seastar																				
Molluscs																					
Pinna bicolor	Razor clam																				
Sessiles																					
Alcyonacea spp.	Gorgonians	4	3	41	8	2	28	36	23	19	18	29	19	18	43	45	10	31	25	96	5
Ascidiacea spp. (large solitary)	Large solitary ascidian			3																1	
Phallusia obesa	Obese ascidian	1	3	7	1	1	5	5	1	1	3	9	4	1	4	2	2	5	5	13	3
Porifera spp.	Undifferentiated sponge			2	1		2		1			1			3	1		1		2	3
Sabella spallanzanii	European fan worm	9	2	2	13	7	11	5	7	26	24	15	29	18	9	9	10	4		4	6
Steginoporella truncata	Mazy bryozoan						2													2	1
Unidentified filter feeder	Unidentified filter feeder	5	19	21	13	9	13	26	14	9	19	20	14	4	18	16	3	8	10	29	17
Fishes																					
Aracana spp.	Cowfish																				
Parapercis haackei	Wavy grubfish						2		2												1
Thamnaconus degeni	Degen's leatherjacket																				

Species	Common name	Bryozoans							
		BZ1				BZ2			
		Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Crustaceans									
Leptomithrax gaimardii	Giant spider crab								
Penaeus latisulcatus	Western king prawn	3	1			1			
Echinoderms									
Anthaster valvulatus	Mottled seastar		1						
Australostichopus mollis	Southern sea cucumber								
Coscinasterias muricata	Eleven arm seastar								
Molluscs									
Pinna bicolor	Razor clam								
Sessiles									
Alcyonacea spp.	Gorgonians	22	14	11	15	23	22	33	15
Ascidiacea spp. (large solitary)	Large solitary ascidian						1		
Phallusia obesa	Obese ascidian	4	10	26	5	6		13	3
Porifera spp.	Undifferentiated sponge	2							1
Sabella spallanzanii	European fan worm	14	9	5	4		18		7
Steginoporella truncata	Mazy bryozoan	20	108	205	29	13	95	142	97
Unidentified filter feeder	Unidentified filter feeder	7	1	10	10	1		7	5
Fishes									
Aracana spp.	Cowfish								
Parapercis haackei	Wavy grubfish	2	1			5	3	1	
Thamnaconus degeni	Degen's leatherjacket		2						4

Appendix F. BRUV surveys detailed results

The following tables show the abundance (as MaxN) per site (each with one camera drop) and season for the six primary habitats.

Family	Species	Common name	*Posidonia australis*																			
			PA1				PA2				PA3				PA4				PA5			
			Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Crustaceans																						
Majidae	*Naxia aurita*	Seagrass spider crab																				
Penaeidae	*Penaeus latisulcatus*	Western king prawn																				
Portunidae	*Nectocarcinus integrifrons*	Red swimmer crab						1	1	1			1			1						
Portunidae	*Portunus armatus*	Blue swimmer crab	1	2	3		2				2	1		1	1	1			1			1
Molluscs																						
Loliginidae	*Sepioteuthis australis*	Southern calamari		3	1			7													1	
Octopodidae	Octopus sp.	Octopus																				
Fishes																						
Apogonidae	*Siphamia cephalotes*	Wood's siphonfish								1												
Arripidae	*Arripis georgianus*	Australian herring	8			10	1	1	1	1	1			4	4	2	1			3		4
Arripidae	*Arripis truttacea*	Western Australian salmon			26	2						3	13	2			2			1		
Carangidae	*Pseudocaranx georgianus*	Silver trevally																				
Carangidae	*Trachurus novaezelandiae*	Yellow-tail scad																				
Gerreidae	*Parequula melbournensis*	Silverbelly																				
Hemiramphidae	*Hyporhamphus melanochir*	Southern sea garfish																	5			
Labridae	*Haletta semifasciata*	Blue weed whiting	1	2	5	3	2	2	1		2	1	2	2	1	1	2			1	3	3
Labridae	*Siphonognathus beddomei*	Pencil weed whiting																				
Labridae	*Siphonognathus* sp.	Weed whiting																				
Monacanthidae	*Acanthaluteres brownii*	Spiny tailed leatherjacket																				
Monacanthidae	*Acanthaluteres vittiger*	Toothbrush leatherjacket			1		2		16		1	17				79	2		2	1	2	
Monacanthidae	*Brachaluteres jacksonianus*	Pygmy leatherjacket														1					1	
Monacanthidae	*Eubalichthys mosaicus*	Mosaic leatherjacket																				
Monacanthidae	*Meuschenia freycineti*	Six-spine leatherjacket	2	3	2		1	3	2		3	5	3		1	5	2			3	5	

Family	Species	Common name	*Posidonia australis*																			
			PA1				PA2				PA3				PA4				PA5			
			Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Monacanthidae	*Scobinichthys granulatus*	Rough leatherjacket		2				2								1			1		2	
Monacanthidae	*Thamnaconus degeni*	Degen's leatherjacket																				
Moridae	*Pseudophycis palmata*	Red cod																				
Mullidae	*Upeneichthys vlamingii*	Southern goatfish						1														
Ostraciidae	*Aracana ornata*	Ornate cowfish																				
Paralichthyidae	Paralichthyidae sp.	Flounder																				
Paralichthyidae	*Pseudorhombus jenynsii*	Small-toothed flounder																				
Pinguipedidae	*Parapercis haackei*	Wavy grubfish																				
Platycephalidae	*Platycephalus speculator*	Southern bluespotted flathead																				
Scorpididae	*Tilodon sexfasciatus*	Moonlighter																				
Sillaginidae	*Sillaginodes punctatus*	King George whiting	2	2		1						3		2		1				1		2
Sparidae	*Chrysophrys auratus*	Snapper																				
Sphyraenidae	*Sphyraena novaehollandiae*	Snook		1	2			1									1			1		
Syngnathidae	*Stigmatopora* spp.	Pipefish																				
Terapontidae	*Pelates octolineatus*	Western striped trumpeter	631	2		137	170			4	325	47		28	46	8		59	442	27		11
Tetraodontidae	*Torquigener pleurogramma*	Banded toadfish	5	2	1	2	3	1	1	1	4	1		4	2	1		1	5	1	1	3
Class Actinopterygii	Unidentified baitfish	Unidentified baitfish						297														
Class Actinopterygii	Unidentified fishes	Unidentified fishes																				
Class Actinopterygii	Unidentified fish sp. 1	Silver fish with big eye																				
Elasmobranchs																						
Dasyatidae	*Bathytoshia brevicaudata*	Smooth stingray		1							1								1			
Heterodontidae	*Heterodontus portusjacksoni*	Port Jackson shark						1								1						
Myliobatidae	*Myliobatis tenuicaudatus*	Southern eagle ray				1			1													
Rhinobatidae	*Trygonorrhina dumerilii*	Southern fiddler ray																				
Triakidae	*Mustelus antarcticus*	Gummy shark																				
Class Elasmobranchii	Unidentified shark	Unidentified shark																				

Family	Species	Common name	*Amphibolis/Posidonia*																			
			AP1				AP2				AP3				AP4				AP5			
			Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Crustaceans																						
Majidae	*Naxia aurita*	Seagrass spider crab			1																	
Penaeidae	*Penaeus latisulcatus*	Western king prawn																				
Portunidae	*Nectocarcinus integrifrons*	Red swimmer crab			1	1		1	1				1	1			1			1	1	
Portunidae	*Portunus armatus*	Blue swimmer crab	3	1		1	1	2		2	4	3	2	3	2	2		3	2	1		2
Molluscs																						
Loliginidae	*Sepioteuthis australis*	Southern calamari			1				1				5				3				1	
Octopodidae	Octopus sp.	Octopus																				
Fishes																						
Apogonidae	*Siphamia cephalotes*	Wood's siphonfish				1			12					1								
Arripidae	*Arripis georgianus*	Australian herring	8	1		7	5			2	2				5			6	21			10
Arripidae	*Arripis truttacea*	Western Australian salmon								1												
Carangidae	*Pseudocaranx georgianus*	Silver trevally																				
Carangidae	*Trachurus novaezelandiae*	Yellow-tail scad																				
Gerreidae	*Parequula melbournensis*	Silverbelly																				
Hemiramphidae	*Hyporhamphus melanochir*	Southern sea garfish													6							
Labridae	*Haletta semifasciata*	Blue weed whiting		1	5		1	1	46	1	2	2		2	1	1	1	1	1	1	3	1
Labridae	*Siphonognathus beddomei*	Pencil weed whiting																				
Labridae	*Siphonognathus* sp.	Weed whiting																				
Monacanthidae	*Acanthaluteres brownii*	Spiny tailed leatherjacket															10					
Monacanthidae	*Acanthaluteres vittiger*	Toothbrush leatherjacket	1	4	56	1	3	10			10	2			5		7	2	7		10	
Monacanthidae	*Brachaluteres jacksonianus*	Pygmy leatherjacket							1													
Monacanthidae	*Eubalichthys mosaicus*	Mosaic leatherjacket																				
Monacanthidae	*Meuschenia freycineti*	Six-spine leatherjacket									1	1	1									
Monacanthidae	*Scobinichthys granulatus*	Rough leatherjacket		1	2		2	2	2			1	1			1		3	1	2	1	
Monacanthidae	*Thamnaconus degeni*	Degen's leatherjacket																				
Moridae	*Pseudophycis palmata*	Red cod																				
Mullidae	*Upeneichthys vlamingii*	Southern goatfish	1				1			1	1	1		1	1	1			1			

Family	Species	Common name	*Amphibolis/Posidonia*																			
			AP1				AP2				AP3				AP4				AP5			
			Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Ostraciidae	*Aracana ornata*	Ornate cowfish																1				
Paralichthyidae	Paralichthyidae sp.	Flounder																				
Paralichthyidae	*Pseudorhombus jenynsii*	Small-toothed flounder																				
Pinguipedidae	*Parapercis haackei*	Wavy grubfish																				
Platycephalidae	*Platycephalus speculator*	Southern bluespotted flathead																				
Scorpididae	*Tilodon sexfasciatus*	Moonlighter					1															
Sillaginidae	*Sillaginodes punctatus*	King George whiting				12			1	3	2			1		1		2				
Sparidae	*Chrysophrys auratus*	Snapper																				
Sphyraenidae	*Sphyraena novaehollandiae*	Snook	2		12	1	1	1		1	2	3		4	2	1	1	3	1	1	31	
Syngnathidae	*Stigmatopora* spp.	Pipefish										1										
Terapontidae	*Pelates octolineatus*	Western striped trumpeter	182			140	83			75	128	1		18	125			14	92			3
Tetraodontidae	*Torquigener pleurogramma*	Banded toadfish	1	2	1	1	1	1	2	1	2	1		1	10	5	2	4	4	5	1	1
Class Actinopterygii	Unidentified baitfish	Unidentified baitfish	100									200			269				257		72	
Class Actinopterygii	Unidentified fishes	Unidentified fishes						1														
Class Actinopterygii	Unidentified fish sp. 1	Silver fish with big eye																				
Elasmobranchs																						
Dasyatidae	*Bathytoshia brevicaudata*	Smooth stingray																				
Heterodontidae	*Heterodontus portusjacksoni*	Port Jackson shark		1	1			1	1								1			1	1	
Myliobatidae	*Myliobatis tenuicaudatus*	Southern eagle ray																				
Rhinobatidae	*Trygonorrhina dumerilii*	Southern fiddler ray																1				
Triakidae	*Mustelus antarcticus*	Gummy shark																				
Class Elasmobranchii	Unidentified shark	Unidentified shark																				

Family	Species	Common name	*Posidonia sinuosa*																			
			PS1				PS2				PS3				PS4				PS5			
			Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Crustaceans																						
Majidae	*Naxia aurita*	Seagrass spider crab																				
Penaeidae	*Penaeus latisulcatus*	Western king prawn																				
Portunidae	*Nectocarcinus integrifrons*	Red swimmer crab			1	1						2		1		1	1			1	1	1
Portunidae	*Portunus armatus*	Blue swimmer crab	1	2		2	2	1		2	1	2		2	3	1		1	3	2	1	2
Molluscs																						
Loliginidae	*Sepioteuthis australis*	Southern calamari			2		1	3			1	2					2					
Octopodidae	Octopus sp.	Octopus																				
Fishes																						
Apogonidae	*Siphamia cephalotes*	Wood's siphonfish																				1
Arripidae	*Arripis georgianus*	Australian herring	3	1		2	10			2	7	18		2	9	9			12			14
Arripidae	*Arripis truttacea*	Western Australian salmon																				
Carangidae	*Pseudocaranx georgianus*	Silver trevally																				
Carangidae	*Trachurus novaezelandiae*	Yellow-tail scad																				
Gerreidae	*Parequula melbournensis*	Silverbelly																				
Hemiramphidae	*Hyporhamphus melanochir*	Southern sea garfish																				
Labridae	*Haletta semifasciata*	Blue weed whiting		49	25		1	24	24				9				1			1	13	1
Labridae	*Siphonognathus beddomei*	Pencil weed whiting																	1			
Labridae	*Siphonognathus* sp.	Weed whiting																				
Monacanthidae	*Acanthaluteres brownii*	Spiny tailed leatherjacket								1												
Monacanthidae	*Acanthaluteres vittiger*	Toothbrush leatherjacket	1	30	151		25	174	1	1		9	49		16		5			2	3	1
Monacanthidae	*Brachaluteres jacksonianus*	Pygmy leatherjacket																				
Monacanthidae	*Eubalichthys mosaicus*	Mosaic leatherjacket																				
Monacanthidae	*Meuschenia freycineti*	Six-spine leatherjacket		1								1										
Monacanthidae	*Scobinichthys granulatus*	Rough leatherjacket		5	2			3	3			4	1	1		2			1	1	1	
Monacanthidae	*Thamnaconus degeni*	Degen's leatherjacket				2																
Moridae	*Pseudophycis palmata*	Red cod								1												
Mullidae	*Upeneichthys vlamingii*	Southern goatfish	1	2	1								1			1				1	4	

Family	Species	Common name	*Posidonia sinuosa*																			
			PS1				PS2				PS3				PS4				PS5			
			Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Ostraciidae	*Aracana ornata*	Ornate cowfish								1												1
Paralichthyidae	Paralichthyidae sp.	Flounder																				
Paralichthyidae	*Pseudorhombus jenynsii*	Small-toothed flounder																				
Pinguipedidae	*Parapercis haackei*	Wavy grubfish																				
Platycephalidae	*Platycephalus speculator*	Southern bluespotted flathead		1											1							
Scorpididae	*Tilodon sexfasciatus*	Moonlighter																				
Sillaginidae	*Sillaginodes punctatus*	King George whiting				1		1		1								1			7	
Sparidae	*Chrysophrys auratus*	Snapper	1																			
Sphyraenidae	*Sphyraena novaehollandiae*	Snook		1	1	5		1	1	7		1	2	7		3				5	3	1
Syngnathidae	*Stigmatopora* spp.	Pipefish							1			1									1	
Terapontidae	*Pelates octolineatus*	Western striped trumpeter	73	1		54	161	5		104	228			10	79	1		29	56	1	1	30
Tetraodontidae	*Torquigener pleurogramma*	Banded toadfish	1	1	1	1	3	2	4	1	1	1		1	9	2	2	4	3	2	3	1
Class Actinopterygii	Unidentified baitfish	Unidentified baitfish										65									47	
Class Actinopterygii	Unidentified fishes	Unidentified fishes																				
Class Actinopterygii	Unidentified fish sp. 1	Silver fish with big eye																				
Elasmobranchs																						
Dasyatidae	*Bathytoshia brevicaudata*	Smooth stingray																				
Heterodontidae	*Heterodontus portusjacksoni*	Port Jackson shark		1	1	1		2					1			2	1			2		
Myliobatidae	*Myliobatis tenuicaudatus*	Southern eagle ray																				
Rhinobatidae	*Trygonorrhina dumerilii*	Southern fiddler ray										1										
Triakidae	*Mustelus antarcticus*	Gummy shark																				
Class Elasmobranchii	Unidentified shark	Unidentified shark																				

Family	Species	Common name	*Zostera*																			
			ZO1				ZO2				ZO3				ZO4				ZO5			
			Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Crustaceans																						
Majidae	*Naxia aurita*	Seagrass spider crab																				
Penaeidae	*Penaeus latisulcatus*	Western king prawn	1																			
Portunidae	*Nectocarcinus integrifrons*	Red swimmer crab							1	1			2	1			1				1	1
Portunidae	*Portunus armatus*	Blue swimmer crab	2	2	1	1	3	3	1	1	2	3	1	1	3	2	2	1	3	3	1	
Molluscs																						
Loliginidae	*Sepioteuthis australis*	Southern calamari																				
Octopodidae	Octopus sp.	Octopus																				
Fishes																						
Apogonidae	*Siphamia cephalotes*	Wood's siphonfish																				
Arripidae	*Arripis georgianus*	Australian herring								1								1				
Arripidae	*Arripis truttacea*	Western Australian salmon																1				
Carangidae	*Pseudocaranx georgianus*	Silver trevally	39	61	39		23	97			21				74	20			1	53		
Carangidae	*Trachurus novaezelandiae*	Yellow-tail scad								1												
Gerreidae	*Parequula melbournensis*	Silverbelly		2	54	3	1	3	1	1					3	7	1	6		1	2	
Hemiramphidae	*Hyporhamphus melanochir*	Southern sea garfish																				
Labridae	*Haletta semifasciata*	Blue weed whiting				1			4				6	1			7				28	1
Labridae	*Siphonognathus beddomei*	Pencil weed whiting			1								1									
Labridae	*Siphonognathus* sp.	Weed whiting																				
Monacanthidae	*Acanthaluteres brownii*	Spiny tailed leatherjacket																				
Monacanthidae	*Acanthaluteres vittiger*	Toothbrush leatherjacket			1				2				35				2				5	
Monacanthidae	*Brachaluteres jacksonianus*	Pygmy leatherjacket		1																		
Monacanthidae	*Eubalichthys mosaicus*	Mosaic leatherjacket																				
Monacanthidae	*Meuschenia freycineti*	Six-spine leatherjacket																				
Monacanthidae	*Scobinichthys granulatus*	Rough leatherjacket						1													1	
Monacanthidae	*Thamnaconus degeni*	Degen's leatherjacket		12	1			4						1		2			1	5		1
Moridae	*Pseudophycis palmata*	Red cod				1				1								1				2
Mullidae	*Upeneichthys vlamingii*	Southern goatfish								1	1			1				2		1		1

Family	Species	Common name	*Zostera*																			
			ZO1				ZO2				ZO3				ZO4				ZO5			
			Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Ostraciidae	*Aracana ornata*	Ornate cowfish	1					1				1				1			1		1	
Paralichthyidae	Paralichthyidae sp.	Flounder				1																
Paralichthyidae	*Pseudorhombus jenynsii*	Small-toothed flounder																		1		
Pinguipedidae	*Parapercis haackei*	Wavy grubfish	3	8	3	1	1	7				2	2			4			4	4		
Platycephalidae	*Platycephalus speculator*	Southern bluespotted flathead	1			1		1		1		1		1						1		1
Scorpididae	*Tilodon sexfasciatus*	Moonlighter																				
Sillaginidae	*Sillaginodes punctatus*	King George whiting								1												
Sparidae	*Chrysophrys auratus*	Snapper	3	5		4				4	4	19		8				1	1			2
Sphyraenidae	*Sphyraena novaehollandiae*	Snook																				
Syngnathidae	*Stigmatopora* spp.	Pipefish																				
Terapontidae	*Pelates octolineatus*	Western striped trumpeter	28	1		6	32			47	38	6		26	42			3	26			103
Tetraodontidae	*Torquigener pleurogramma*	Banded toadfish	1		1	1	2	8		1		1			1	6	2	3	4	16		
Class Actinopterygii	Unidentified baitfish	Unidentified baitfish																				
Class Actinopterygii	Unidentified fishes	Unidentified fishes																				
Class Actinopterygii	Unidentified fish sp. 1	Silver fish with big eye																				
Elasmobranchs																						
Dasyatidae	*Bathytoshia brevicaudata*	Smooth stingray	1								1				1	1				1	1	
Heterodontidae	*Heterodontus portusjacksoni*	Port Jackson shark	2	2	1		1	1			2	1	1			1			2		2	
Myliobatidae	*Myliobatis tenuicaudatus*	Southern eagle ray																				
Rhinobatidae	*Trygonorrhina dumerilii*	Southern fiddler ray	1																			
Triakidae	*Mustelus antarcticus*	Gummy shark																				
Class Elasmobranchii	Unidentified shark	Unidentified shark																				

Family	Species	Common name	Sand/bioturbation																			
			SB1				SB2				SB3				SB4				SB5			
			Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Crustaceans																						
Majidae	*Naxia aurita*	Seagrass spider crab																				
Penaeidae	*Penaeus latisulcatus*	Western king prawn	1			1	1	1			1					1		2	1	1		2
Portunidae	*Nectocarcinus integrifrons*	Red swimmer crab							1													
Portunidae	*Portunus armatus*	Blue swimmer crab	3	3		1	1	1	1	2	3	2		2	2	1		1	3	2		2
Molluscs																						
Loliginidae	*Sepioteuthis australis*	Southern calamari										1										
Octopodidae	Octopus sp.	Octopus											1									
Fishes																						
Apogonidae	*Siphamia cephalotes*	Wood's siphonfish																				
Arripidae	*Arripis georgianus*	Australian herring																				
Arripidae	*Arripis truttacea*	Western Australian salmon																	3			
Carangidae	*Pseudocaranx georgianus*	Silver trevally	8			15	8	1		1	5				5			2	9	2		8
Carangidae	*Trachurus novaezelandiae*	Yellow-tail scad																				
Gerreidae	*Parequula melbournensis*	Silverbelly										1				1		1				
Hemiramphidae	*Hyporhamphus melanochir*	Southern sea garfish																				
Labridae	*Haletta semifasciata*	Blue weed whiting																				
Labridae	*Siphonognathus beddomei*	Pencil weed whiting															1					
Labridae	*Siphonognathus* sp.	Weed whiting																				1
Monacanthidae	*Acanthaluteres brownii*	Spiny tailed leatherjacket																				
Monacanthidae	*Acanthaluteres vittiger*	Toothbrush leatherjacket										1										
Monacanthidae	*Brachaluteres jacksonianus*	Pygmy leatherjacket																				
Monacanthidae	*Eubalichthys mosaicus*	Mosaic leatherjacket																				
Monacanthidae	*Meuschenia freycineti*	Six-spine leatherjacket																				
Monacanthidae	*Scobinichthys granulatus*	Rough leatherjacket																				
Monacanthidae	*Thamnaconus degeni*	Degen's leatherjacket	38	16		9	9	34		5	20	25		2	7	117	3	22	2	48		4
Moridae	*Pseudophycis palmata*	Red cod																				
Mullidae	*Upeneichthys vlamingii*	Southern goatfish																				

Family	Species	Common name	Sand/bioturbation																			
			SB1				SB2				SB3				SB4				SB5			
			Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Ostraciidae	*Aracana ornata*	Ornate cowfish											1	1		1					1	
Paralichthyidae	Paralichthyidae sp.	Flounder																				
Paralichthyidae	*Pseudorhombus jenynsii*	Small-toothed flounder																				
Pinguipedidae	*Parapercis haackei*	Wavy grubfish	2	4		2	2	2		3	3	2	1		4	6	1	4	3	3		2
Platycephalidae	*Platycephalus speculator*	Southern bluespotted flathead			1	1		1	2	1	2	1	1	1		1		2		1	2	2
Scorpididae	*Tilodon sexfasciatus*	Moonlighter																				
Sillaginidae	*Sillaginodes punctatus*	King George whiting																				
Sparidae	*Chrysophrys auratus*	Snapper	2				4	2			3	3			1	3			2	6		3
Sphyraenidae	*Sphyraena novaehollandiae*	Snook																				
Syngnathidae	*Stigmatopora* spp.	Pipefish																				
Terapontidae	*Pelates octolineatus*	Western striped trumpeter	1			1	1				2		1		5				7	3		
Tetraodontidae	*Torquigener pleurogramma*	Banded toadfish				2		1		1			2			1	1				1	
Class Actinopterygii	Unidentified baitfish	Unidentified baitfish																				
Class Actinopterygii	Unidentified fishes	Unidentified fishes																				
Class Actinopterygii	Unidentified fish sp. 1	Silver fish with big eye																				
Elasmobranchs																						
Dasyatidae	*Bathytoshia brevicaudata*	Smooth stingray				1	1								1				1			
Heterodontidae	*Heterodontus portusjacksoni*	Port Jackson shark	2	1	2	1	2	2	2	1	1	1	1		2	3	2		2	3	1	
Myliobatidae	*Myliobatis tenuicaudatus*	Southern eagle ray																				
Rhinobatidae	*Trygonorrhina dumerilii*	Southern fiddler ray	1		1			1				1				2				1		
Triakidae	*Mustelus antarcticus*	Gummy shark																				
Class Elasmobranchii	Unidentified shark	Unidentified shark					1															

Family	Species	Common name	Sand/invertebrates																			
			SI1				SI2				SI3				SI4				SI5			
			Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Crustaceans																						
Majidae	*Naxia aurita*	Seagrass spider crab																				
Penaeidae	*Penaeus latisulcatus*	Western king prawn	1	2		1	1	1				2			1			1	3	2		
Portunidae	*Nectocarcinus integrifrons*	Red swimmer crab																				
Portunidae	*Portunus armatus*	Blue swimmer crab	2	1		3	2	2		2	4	2		2	2	2		1	2	3		2
Molluscs																						
Loliginidae	*Sepioteuthis australis*	Southern calamari																				
Octopodidae	Octopus sp.	Octopus																				
Fishes																						
Apogonidae	*Siphamia cephalotes*	Wood's siphonfish																				
Arripidae	*Arripis georgianus*	Australian herring										6										
Arripidae	*Arripis truttacea*	Western Australian salmon																				
Carangidae	*Pseudocaranx georgianus*	Silver trevally	1			2					8	8			3	3	13		18	1	14	1
Carangidae	*Trachurus novaezelandiae*	Yellow-tail scad								1												
Gerreidae	*Parequula melbournensis*	Silverbelly													1					1		
Hemiramphidae	*Hyporhamphus melanochir*	Southern sea garfish																				
Labridae	*Haletta semifasciata*	Blue weed whiting																				
Labridae	*Siphonognathus beddomei*	Pencil weed whiting																				
Labridae	*Siphonognathus* sp.	Weed whiting																				
Monacanthidae	*Acanthaluteres brownii*	Spiny tailed leatherjacket																				
Monacanthidae	*Acanthaluteres vittiger*	Toothbrush leatherjacket																				
Monacanthidae	*Brachaluteres jacksonianus*	Pygmy leatherjacket																				
Monacanthidae	*Eubalichthys mosaicus*	Mosaic leatherjacket	1																			
Monacanthidae	*Meuschenia freycineti*	Six-spine leatherjacket																				
Monacanthidae	*Scobinichthys granulatus*	Rough leatherjacket																				
Monacanthidae	*Thamnaconus degeni*	Degen's leatherjacket	10	34	3	12	6	33		9	20	35	2	11	30	89		12	20	71	2	9
Moridae	*Pseudophycis palmata*	Red cod																				
Mullidae	*Upeneichthys vlamingii*	Southern goatfish																				

Family	Species	Common name	Sand/invertebrates																			
			SI1				SI2				SI3				SI4				SI5			
			Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn	Winter	Spring
Ostraciidae	*Aracana ornata*	Ornate cowfish																				
Paralichthyidae	Paralichthyidae sp.	Flounder																				
Paralichthyidae	*Pseudorhombus jenynsii*	Small-toothed flounder																				
Pinguipedidae	*Parapercis haackei*	Wavy grubfish	2	1		2	3	4	2	2	2	5	1	1	3	3	2	2	2	5	1	3
Platycephalidae	*Platycephalus speculator*	Southern bluespotted flathead		1		2		2		1	1	2	1			2	1	1				
Scorpididae	*Tilodon sexfasciatus*	Moonlighter																				
Sillaginidae	*Sillaginodes punctatus*	King George whiting																				
Sparidae	*Chrysophrys auratus*	Snapper	5	2		1	1				3	2			1	1			2	5		
Sphyraenidae	*Sphyraena novaehollandiae*	Snook																				
Syngnathidae	*Stigmatopora* spp.	Pipefish																				
Terapontidae	*Pelates octolineatus*	Western striped trumpeter		3		2					7									2		3
Tetraodontidae	*Torquigener pleurogramma*	Banded toadfish			1	2				1						1						1
Class Actinopterygii	Unidentified baitfish	Unidentified baitfish																				
Class Actinopterygii	Unidentified fishes	Unidentified fishes																				
Class Actinopterygii	Unidentified fish sp. 1	Silver fish with big eye		1																		
Elasmobranchs																						
Dasyatidae	*Bathytoshia brevicaudata*	Smooth stingray	1			1						1			1		1					
Heterodontidae	*Heterodontus portusjacksoni*	Port Jackson shark	2	1	2		2	3	2	4	3	1	2		3	4	2	1	2	4	2	
Myliobatidae	*Myliobatis tenuicaudatus*	Southern eagle ray																				
Rhinobatidae	*Trygonorrhina dumerilii*	Southern fiddler ray					1				1	1			1	1						
Triakidae	*Mustelus antarcticus*	Gummy shark																		1		
Class Elasmobranchii	Unidentified shark	Unidentified shark													1							

Appendix G. Consolidated epibenthic fauna species list

Note: ALA = Atlas of Living Australia; Currie = Currie et al. 2009, Burnell et al. 2015; Saunders = Saunders (2009), McDonald = McDonald (2008).

Group	Taxon	BRUVS	Scuba	Towed camera	ALA Search	Trawl surveys		
						Currie	Saunders	McDonald
Crustaceans	*Amaryllis keablei*				Yes			
	Amaryllis spencerensis				Yes			
	Ampelisca toora				Yes			
	Austrodromidia octodentata		Yes					
	Erugosquilla grahami					Yes		
	Gomeza bicornis						Yes	
	Ibacus peronii					Yes		
	Lamarckdromia globosa				Yes			
	Leptomithrax gaimardii			Yes		Yes		
	Litocheira bispinosa							Yes
	Metapenaeopsis spp.					Yes	Yes	
	Naxia aurita	Yes	Yes					Yes
	Nectocarcinus integrifrons	Yes	Yes					Yes
	Ozius truncatus				Yes			
	Paguristes frontalis		Yes					
	Penaeus latisulcatus	Yes	Yes	Yes		Yes	Yes	Yes
	Pilumnidae sp.					Yes		
	Portunus armatus	Yes	Yes			Yes	Yes	Yes
	Pseudambasia lochi				Yes			
	Stomatopoda spp.						Yes	
	Trichia australis						Yes	
	Trigonoplax longirostris						Yes	

Group	Taxon	BRUVS	Scuba	Towed camera	ALA Search	Trawl surveys		
						Currie	Saunders	McDonald
Echinoderms	*Amblypneustes pallidus*		Yes					
	Anthaster valvulatus		Yes	Yes	Yes			
	Australostichopus mollis		Yes	Yes		Yes		
	Coscinasterias muricata		Yes	Yes				
	Goniocidaris tubaria		Yes			Yes		
	Holothuria macroperona					Yes		
	Notostichopus ludwigi		Yes					
	Ophiothrix caespitosa					Yes		
	Ptilometra macronema					Yes		
	Tosia australis		Yes					
Molluscs	*Ascarosepion apama*					Yes	Yes	
	Ascarosepion novaehollandiae					Yes	Yes	
	Astralium spp.		Yes					
	Australaria australasia		Yes					
	Ceratosoma brevicaudatum		Yes					
	Circe quoyi		Yes					
	Cleidothaerus albidus					Yes		
	Conus anemone		Yes					
	Equichlamys bifrons		Yes					
	Euprymna tasmanica						Yes	
	Haliotis spp.		Yes					
	Idiosepius notoides							Yes
	Lima nimbifer		Yes					
	Lunella torquatus		Yes					
	Malleus meridianus		Yes			Yes		
	Mytilidae spp.		Yes					
	Notocallista kingii		Yes					

Group	Taxon	BRUVS	Scuba	Towed camera	ALA Search	Trawl surveys		
						Currie	Saunders	McDonald
Molluscs (cont.)	*Octopus australis*					Yes		
	Octopus berrima	Yes				Yes		
	Ostrea angasi		Yes			Yes		
	Pecten fumatus		Yes					
	Phasianella australis		Yes					
	Phasianella ventricosa		Yes					
	Pinna bicolor		Yes	Yes				
	Propefusus australis		Yes					
	Sepioloidea australis						Yes	
	Sepioloidea lineolata						Yes	
	Sepioteuthis australis	Yes			Yes	Yes		
	Trichomya hirsuta					Yes		
Sessiles	*Adeona grisea*		Yes					
	Alcyonacea spp.			Yes				
	Amathia sp. *3*					Yes		
	Ascidia sydneiensis					Yes		
	Ascidiacea spp. (grey colonial)		Yes					
	Ascidiacea spp. (large solitary)			Yes				
	Ascidiacea spp. (other solitary)		Yes					
	Ascidiacea spp. (stalked solitary)		Yes					
	Botrylloides spp.		Yes					
	Bryozoa spp. (purple hard massive)		Yes					
	Carijoa sp.		Yes					
	Celleporaria fusca					Yes		
	Chalinid sp.					Yes		
	Clathria sp. *2*					Yes		
	Cnemidocarpa radicosa					Yes		

Group	Taxon	BRUVS	Scuba	Towed camera	ALA Search	Trawl surveys		
						Currie	Saunders	McDonald
Sessiles (cont.)	Demosponge sp. 1					Yes		
	Demosponge sp. 12					Yes		
	Demosponge sp. 13					Yes		
	Demosponge sp. 31					Yes		
	Demosponge sp. 36					Yes		
	Demosponge sp. 54					Yes		
	Demosponge sp. 59					Yes		
	Demosponge sp. 6					Yes		
	Demosponge sp. 60					Yes		
	Demosponge sp. 62					Yes		
	Dictyoceratid sp. 1					Yes		
	Dictyoceratid sp. 11					Yes		
	Dictyoceratid sp. 2					Yes		
	Dictyoceratid sp. 4					Yes		
	Dictyoceratid sp. 6					Yes		
	Dictyoceratid sp. 7					Yes		
	Drifa sp.		Yes					
	Echinogorgia sp.		Yes					
	Ecionemia sp. *1*					Yes		
	Ecionemia sp. *2*					Yes		
	Euplexaura sp.		Yes					
	Halocynthia dumosa		Yes					
	Halopteris campanula					Yes		
	Haplosclerid sp. 2					Yes		
	Herdmania fimbriae		Yes					
	Herdmania grandis					Yes		
	Holopsamma laminaefavosa					Yes		

Group	Taxon	BRUVS	Scuba	Towed camera	ALA Search	Trawl surveys		
						Currie	Saunders	McDonald
Sessiles (cont.)	*Ircinia* sp.					Yes		
	Melithaea zimmeri					Yes		
	Mycale sp.		Yes					
	Phallusia obesa		Yes	Yes		Yes		
	Plesiastrea versipora		Yes					
	Plexauridae sp. 1					Yes		
	Poecilosclerid sp. 1					Yes		
	Poecilosclerid sp. 2					Yes		
	Poecilosclerid sp. 3					Yes		
	Polycarpa pedunculata					Yes		
	Polycarpa viridis		Yes					
	Porifera spp. (black ball)		Yes					
	Porifera spp. (black massive)		Yes					
	Porifera spp. (blue massive)		Yes					
	Porifera spp. (brown ball)		Yes					
	Porifera spp. (brown branching)		Yes					
	Porifera spp. (brown massive)		Yes					
	Porifera spp. (brown tubular)		Yes					
	Porifera spp. (cream ball)		Yes					
	Porifera spp. (cream digitate)		Yes					
	Porifera spp. (cream encrusting)		Yes					
	Porifera spp. (cream honeycomb)		Yes					
	Porifera spp. (cream massive)		Yes					
	Porifera spp. (cream tubular)		Yes					
	Porifera spp. (green digitate)		Yes					
	Porifera spp. (green massive)		Yes					
	Porifera spp. (grey encrusting)		Yes					

Group	Taxon	BRUVS	Scuba	Towed camera	ALA Search	Trawl surveys		
						Currie	Saunders	McDonald
Sessiles (cont.)	Porifera spp. (grey other)		Yes					
	Porifera spp. (orange branching)		Yes					
	Porifera spp. (orange digitate)		Yes					
	Porifera spp. (orange massive)		Yes					
	Porifera spp. (orange palmate)		Yes					
	Porifera spp. (orange tubular)		Yes					
	Porifera spp. (pink massive soft)		Yes					
	Porifera spp. (pink massive)		Yes					
	Porifera spp. (purple digitate)		Yes					
	Porifera spp. (purple massive)		Yes					
	Porifera spp. (white amorphous)		Yes					
	Porifera spp. (white tubular)		Yes					
	Porifera spp. (yellow amorphous)		Yes					
	Porifera spp. (yellow branching)		Yes					
	Porifera spp. (yellow digitate)		Yes					
	Porifera spp. (yellow massive)		Yes					
	Pyura abradata		Yes			Yes		
	Pyura stolonifera					Yes		
	Sabella spallanzanii			Yes				
	Spongiid sp. 2					Yes		
	Steginoporella truncata		Yes	Yes		Yes		
	Telesto multiflora					Yes		
	Tethya ingalli				Yes			
	Tethya spp.		Yes			Yes		
	Thorectid sp.		Yes			Yes		
	Verongid sp. 1					Yes		
	Verongid sp. 2					Yes		

Group	Taxon	BRUVS	Scuba	Towed camera	ALA Search	Trawl surveys		
						Currie	Saunders	McDonald
Elasmobranchs	*Bathytoshia brevicaudata*	Yes				Yes		
	Heterodontus portusjacksoni	Yes				Yes		
	Hypnos monopterygius					Yes	Yes	
	Mustelus antarcticus	Yes						
	Myliobatis tenuicaudatus	Yes				Yes		
	Sutorectus tentaculatus					Yes		
	Trygonorrhina dumerilii	Yes						
Fishes	*Acanthaluteres brownii*	Yes						
	Acanthaluteres spilomelanurus					Yes	Yes	Yes
	Acanthaluteres vittiger	Yes				Yes		
	Acanthosphex leurynnis				Yes		Yes	
	Aetapcus maculatus		Yes					
	Aptychotrema vincentiana					Yes		
	Aracana aurita		Yes					
	Aracana ornata	Yes				Yes		
	Aracana spp.			Yes				
	Arripis georgiana	Yes						
	Arripis truttacea	Yes						
	Brachaluteres jacksonianus	Yes				Yes	Yes	
	Callogobius mucosus						Yes	
	Chelmonops curiosus					Yes		
	Cnidoglanis macrocephalus				Yes			
	Cynoglossus broadhursti				Yes			
	Diodon nicthemerus					Yes		
	Engraulis australis					Yes		
	Eocallionymus papilio		Yes				Yes	
	Eubalichthys mosaicus	Yes				Yes		

Group	Taxon	BRUVS	Scuba	Towed camera	ALA Search	Trawl surveys		
						Currie	Saunders	McDonald
Fishes (cont.)	*Favonigobius lateralis*							Yes
	Glyptauchen panduratus						Yes	
	Gymnapistes marmoratus					Yes		Yes
	Haletta semifasciata	Yes						Yes
	Heteroclinus macropthalmus							Yes
	Heteroclinus sp. 5						Yes	Yes
	Hippocampus abdominalis					Yes		
	Hippocampus breviceps							Yes
	Hyperlophus vittatus					Yes		
	Hyporhamphus melanochir	Yes						
	Lepidotrigla papilio				Yes	Yes		
	Leptoichthys fistularius						Yes	Yes
	Lissocampus caudalis							Yes
	Maxillicosta scabriceps				Yes	Yes		
	Meuschenia freycineti	Yes						
	Neoaploactis tridorsalis						Yes	
	Neoodax balteatus		Yes					Yes
	Nesogobius spp.						Yes	
	Nesogobius sp. 2						Yes	
	Ophiclinops pardalis						Yes	
	Ophiclinops sp.						Yes	
	Ophiclinus sp.						Yes	
	Orectolobidae spp.						Yes	
	Pagrus auratus	Yes	Yes		Yes	Yes	Yes	
	Paralichthyidae sp.	Yes						
	Parapercis haackei	Yes	Yes	Yes		Yes	Yes	
	Parapriacanthus elongatus					Yes		

Group	Taxon	BRUVS	Scuba	Towed camera	ALA Search	Trawl surveys		
						Currie	Saunders	McDonald
Fishes (cont.)	*Parequula melbournensis*	Yes	Yes			Yes		
	Pelates octolineatus	Yes	Yes			Yes		Yes
	Peronedys anguillaris						Yes	
	Platycephalus aurimaculatus					Yes		
	Platycephalus bassensis							Yes
	Platycephalus richardsoni					Yes		
	Platycephalus speculator	Yes				Yes		
	Pleuronectiformes sp.		Yes					
	Pseudocaranx georgianus	Yes						
	Pseudocaranx wrighti					Yes		
	Pseudophycis palmata	Yes						
	Pseudorhombus jenynsii	Yes				Yes		
	Pugnaso curtirostris							Yes
	Repomucenus calcaratus					Yes		
	Rhycherus gloveri						Yes	
	Scobinichthys granulatus	Yes				Yes	Yes	Yes
	Scomber australasicus				Yes			
	Sillaginodes punctatus	Yes			Yes	Yes		
	Siphamia cephalotes	Yes	Yes				Yes	Yes
	Siphonognathus argyrophanes							Yes
	Siphonognathus attenuatus	Yes						
	Siphonognathus radiatus							Yes
	Siphonognathus spp.	Yes						
	Sphyraena novaehollandiae	Yes					Yes	
	Sprateloides robustus						Yes	
	Stigmatopora argus							Yes
	Stigmatopora nigra							Yes

Group	Taxon	BRUVS	Scuba	Towed camera	ALA Search	Trawl surveys		
						Currie	Saunders	McDonald
Fishes (cont.)	*Stigmatopora* spp.	Yes						
	Tetractenos glaber					Yes		
	Thamnaconus degeni	Yes		Yes		Yes		
	Tilodon sexfasciatus	Yes						
	Torquigener pleurogramma	Yes						
	Trachurus declivis					Yes		
	Trachurus novaezelandiae	Yes			Yes			
	Upeneichthys vlamingii	Yes				Yes	Yes	
	Vanacampus phillipi							Yes
	Vanacampus poecilolaemus							Yes
	Vincentia badia					Yes		
	Vincentia conspersa		Yes			Yes		Yes
	Vincentia punctata							Yes

Appendix H. Macrofauna – detailed results

The following tables show the abundance of each of five replicates per site and season for the six primary habitats.

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site PA1																					
Porifera	Porifera																		1	1	
Cnidaria																					
Actiniaria	Actiniaria sp. 1																				
Actiniaria	Actiniaria sp. 2																				
Hexacorallia	Hexacorallia sp. 1																				
Nemertea	Nemertea																				1
Nematoda	Nematoda																				
Annelida																					
Amphinomidae	Amphinomidae						1														
Aphroditidae	Pontogenia sp. 1																				
Capitellidae	*Capitella* sp. 1						1												1		
Capitellidae	*Notomastus* sp. 1																				
Chrysopetalidae	Chrysopetalidae sp. 1																				
Cirratulidae	Cirratulidae sp. 1																				
Cirratulidae	Cirratulidae sp. 2																				
Dorvilleidae	Dorvilleidae sp. 1																				
Eunicidae	*Eunice* sp. 1																				
Eunicidae	*Marphysa* sp. 1																				
Eunicidae	*Lysidice unicornis*																				
Flabelligeridae	*Pherusa* sp. 1																				
Glyceridae	*Glycera* sp. 1																				
Goniadidae	Goniada sp. 1																				
Hesionidae	Hesionidae sp. 1																				
Lumbrineridae	*Lumbrineris* sp. 1																				
Magelonidae	*Magelona* sp. 1																				
Maldanidae	*Axiothella* sp. 1														1						
Nephtyidae	*Aglaophamus* sp. 1												1	1							

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Nereididae	Nereididae sp. 1																	1			
Nereididae	Nereididae sp. 2																				
Oenonidae	*Arabella longipedata*																				
Onuphidae	*Onuphis holobranchiata*																				
Onuphidae	Rhamphobrachium sp. 1																				
Opheliidae	Armandia sp. 1								1		1								1		
Orbiniidae	Orbiniidae sp. 1														2						
Paraonidae	Aricidea sp. 1.				1			1													
Phyllodocidae	Phyllodocidae sp. 1																				
Poecilochaetidae	*Poecilochaetus serpens*																				
Polynoidae	Polynoidae sp. 1																				
Sabellidae	Sabellidae sp. 1																				
Sigalionidae	*Pholoides mendeleevi*																				
Sigalionidae	Sigalionidae sp. 1			1																	
Sphaerodoridae	*Sphaerodoropsis heteropapillata*																				
Spionidae	Spionidae sp. 1																				
Spionidae	Spionidae sp. 2																				
Syllidae	Syllidae sp. 1			1													1				
Syllidae	Syllidae sp. 2						1														
Syllidae	Syllidae sp. 3																				
Syllidae	Syllidae sp. 4																				
Terebellidae	Terebellidae sp. 1													1						1	
Trichobranchidae	Trichobranchidae sp. 1																				
Echuira	Echuira																				
Sipuncula	Sipuncula		1																		
Crustacea																					
Alpheidae	*Alpheus* sp. 1																				
Ampeliscidae	Ampeliscidae sp. 1																				
Anthuridea	Anthuridea sp. 1			1										1	1		1				
Aoridae	Aoridae sp. 1																				
Apseudidae	Apseudidae sp. 1			1							1		1	1			1	1	1		2
Arcturidae	Arcturidae sp. 1																				
Atyidae	Atyidae sp. 1																				

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Bodotriidae	Bodotriidae sp. 1						1			1											
Callianassidae	Callianassidae sp. 1																				
Caprellidae	Caprellidae sp. 1																				
Caridea	Caridea damaged																				
Ceinidae	c.f.Ceinidae sp. 1																				
Ceratocumatidae	Ceratocumatidae sp. 1																				
Cirolanidae	Cirolanidae sp. 1																				
Copepoda	Copepoda																				
Corophiidae	Corophiidae sp. 1																				
Crustacea	Crustacea sp. 1																				
Cyproideidae	Cyproideidae sp. 1																				
Dexaminidae	Dexaminidae sp. 1																		1		
Diogenidae	Diogenidae sp. 1																				
Gnathiidae	Gnathiidae sp. 1																				
Grapsidae	Grapsidae sp. 1																				
Gynodiastylidae	Gynodiastylidae sp. 1							1													
Hymenosomatidae	Hymenosomatidae sp. 1																				
Ischyroceridae	Ischyroceridae sp. 1						2		1						2				2		
Isopoda	Isopoda sp. 1																				
Joeropsididae	Joeropsididae sp. 1						1		1	1							1		1		
Leptostraca	Leptostraca sp. 1																				
Leucosiidae	Cryptocnemus sp. 1																				
Leucothoidae	Leucothoidae sp. 1																				
Liljeborgiidae	Liljeborgiidae sp. 1																				
Limnoriidae	Limnoriidae sp. 1																				
Lysianassidae	Lysianassidae sp. 1																				
Maeridae	Maeridae sp. 1																				
Melitidae	Melitidae sp. 1	1		2	1		15	14	1	5			1		4		1		6		
Munnidae	Munnidae sp. 1																				
Mysidae	Mysidae sp. 1																				
Ochlesidae	Ochlesidae sp. 1																				
Ocypodidae	Ocypodidae sp. 1																				
Ostracoda	Ostracoda sp. 1			1								1			2			2			

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ostracoda	Ostracoda sp. 2			1				5		2		2			1						1
Ostracoda	Ostracoda sp. 3																				
Ostracoda	Ostracoda sp. 4							2													
Oxycephalidae	Oxycephalidae sp. 1																				
Penaeidae	Penaeidae sp. 1																				
Phoxocephalidae	Phoxocephalidae sp. 1	1		1			1	1		2		3	1	2	1		3	3		2	4
Pilumnidae	Pilumnidae sp. 1																				
Platyischnopidae	Platyischnopidae sp. 1																				
Podoceridae	Podoceridae sp. 1																				
Portunidae	Portunidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 2																				
Pycnogonida	Pycnogonida sp. 1																				
Sphaeromatidae	Chitonopsis sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 1			1																	
Sphaeromatidae	Sphaeromatidae sp. 2																1				
Sphaeromatidae	Sphaeromatidae sp. 3																				
Squillidae	Belosquilla sp. 1																				
Tanaididae	Tanaididae sp. 1																				
Zobrachoidae	Zobrachoidae sp. 1																				
c.f.Hognathidae	c.f.Hognathidae sp. 1																				
Mollusca																					
Anatomidae	Anatomidae sp. 1																				
Aplysiidae	Aplysiidae sp. 1																				
Architectonicidae	Architectonicidae sp. 1																				
Cerithiidae	Cerithiidae sp. 1																				
Corbulidae	*Corbula* sp. 1																				
Cuspidariidae	Cuspidariidae sp. 1																				
Cylichnidae	Cylichnidae sp. 1			1																	
Eulimidae	Eulimidae sp. 1																				
Gastropoda	Gastropoda juv																			1	
Glycymerididae	*Glycymeris* sp. 1																				
Hiatellidae	Hiatella sp. 1																		1		

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Lasaeidae	*Curvemysella paula*																				
Limidae	Limidae sp. 1																				
Lucinidae	Lucinidae sp. 1																				
Mactridae	*Mactra* sp. 1																				
Mactridae	*Mactra* sp. 2																				
Myochamidae	*Myochama* sp. 1																				
Mytillidae	*Modiolus* sp. 1																				
Mytillidae	*Modiolus* sp. 2																				
Mytillidae	*Musculus coenobitus*																				
Mytillidae	*Musculus* sp. 1																		1		
Nassaridae	*Nassarius* sp. 1																				
Naticidae	*Natica* sp. 1									1											
Naticidae	*Natica* sp. 2																				
Nuculanidae	*Saccella darwini*																				
Nuculidae	*Ennucula* sp. 1																				
Olividae	*Phenacovolva* sp. 1																				
Ostreidae	Ostreidae sp. 1																				
Patellidae	Patellidae sp. 1																				
Pleurotomariidae	Pleurotomariidae sp. 1																				
Polyplacophora	Polyplacophora sp. 1																				
Polyplacophora	Polyplacophora sp. 2																				
Pteriidae	*Pteria* sp. 1																				
Rissoidae	Rissoidae sp. 1																				
Solemyidae	*Solemya australis*		1		1	1							4			1		1		1	
Tellinidae	*Tellina* sp. 1																				
Tellinidae	*Tellina* sp. 2																				1
Tellinidae	*Tellina* sp. 3																				
Tellinidae	*Tellina* sp. 4	1																			
Trochidae	Trochidae sp. 1			1																	
Veneridae	*Antigona* sp. 1																				
Veneridae	*Circe* sp. 1																	1			
Veneridae	*Dosinia* sp. 1			1														2			
Veneridae	*Dosinia* sp. 2																				

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Veneridae	*Dosinia* sp. 3																				
Veneridae	*Paphia* sp. 1																				
Veneridae	Veneridae juv																				
Vulsellidae	*Electroma* sp. 1																				
Bryozoa	Bryozoa fan																				
Echinodermata																					
Asteroidea	Asteroidea sp. 1																				
Echinoidea	Echinoidea juv																				
Holothuroidea	Holothuroidea sp. 1																			1	
Holothuroidea	Holothuroidea sp. 2																				
Holothuroidea	Holothuroidea sp. 3																				
Ophiuroidea	Ophiuroidea sp. 1											1	1	1						1	1
Toxopneustidae	Toxopneustidae sp. 1																				
Chordata																					
Ascidiacea	Ascidiacea sp. 1																				

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site PA2																					
Porifera	Porifera									1									1		
Cnidaria																					
Actiniaria	Actiniaria sp. 1																				
Actiniaria	Actiniaria sp. 2																				
Hexacorallia	Hexacorallia sp. 1																				
Nemertea	Nemertea																				
Nematoda	Nematoda																	1			
Annelida																					
Amphinomidae	Amphinomidae																				
Aphroditidae	Pontogenia sp. 1																				
Capitellidae	*Capitella* sp. 1																	2			
Capitellidae	*Notomastus* sp. 1																				
Chrysopetalidae	Chrysopetalidae sp. 1																				
Cirratulidae	Cirratulidae sp. 1																	1			
Cirratulidae	Cirratulidae sp. 2																				
Dorvilleidae	Dorvilleidae sp. 1													1				1			
Eunicidae	*Eunice* sp. 1			2												1					
Eunicidae	*Marphysa* sp. 1																	1			
Eunicidae	*Lysidice unicornis*																				
Flabelligeridae	*Pherusa* sp. 1																				
Glyceridae	*Glycera* sp. 1																	1			
Goniadidae	Goniada sp. 1																				
Hesionidae	Hesionidae sp. 1																				
Lumbrineridae	*Lumbrineris* sp. 1																				
Magelonidae	*Magelona* sp. 1																				
Maldanidae	*Axiothella* sp. 1																				
Nephtyidae	*Aglaophamus* sp. 1			1				1			1	1		1							
Nereididae	Nereididae sp. 1											2					1	1		1	
Nereididae	Nereididae sp. 2																				
Oenonidae	*Arabella longipedata*																				
Onuphidae	*Onuphis holobranchiata*																				

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Onuphidae	Rhamphobrachium sp. 1																				
Opheliidae	Armandia sp. 1	1							1								2	2	1		1
Orbiniidae	Orbiniidae sp. 1																				
Paraonidae	Aricidea sp. 1									1	1							3			
Phyllodocidae	Phyllodocidae sp. 1																				
Poecilochaetidae	*Poecilochaetus serpens*																				
Polynoidae	Polynoidae sp. 1																				
Sabellidae	Sabellidae sp. 1																				
Sigalionidae	*Pholoides mendeleevi*																				
Sigalionidae	Sigalionidae sp. 1																				
Sphaerodoridae	*Sphaerodoropsis heteropapillata*																				
Spionidae	Spionidae sp. 1												1					1			
Spionidae	Spionidae sp. 2																				
Syllidae	Syllidae sp. 1											1				2		2			
Syllidae	Syllidae sp. 2																				
Syllidae	Syllidae sp. 3																				
Syllidae	Syllidae sp. 4																				
Terebellidae	Terebellidae sp. 1																				
Trichobranchidae	Trichobranchidae sp. 1																				
Echuira	Echuira																				
Sipuncula	Sipuncula																				
Crustacea																					
Alpheidae	*Alpheus* sp. 1																				
Ampeliscidae	Ampeliscidae sp. 1																				
Anthuridea	Anthuridea sp. 1		2				4			2		2				1					
Aoridae	Aoridae sp. 1											1									
Apseudidae	Apseudidae sp. 1					1				2		4		1	1		2			2	
Arcturidae	Arcturidae sp. 1																				
Atyidae	Atyidae sp. 1																				
Bodotriidae	Bodotriidae sp. 1								1												1
Callianassidae	Callianassidae sp. 1																				
Caprellidae	Caprellidae sp. 1																				
Caridea	Caridea damaged			1																	

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ceinidae	c.f.Ceinidae sp. 1																				
Ceratocumatidae	Ceratocumatidae sp. 1																				
Cirolanidae	Cirolanidae sp. 1																				
Copepoda	Copepoda																				
Corophiidae	Corophiidae sp. 1																				
Crustacea	Crustacea sp. 1																				
Cyproideidae	Cyproideidae sp. 1																				
Dexaminidae	Dexaminidae sp. 1											2							2		
Diogenidae	Diogenidae sp. 1																				
Gnathiidae	Gnathiidae sp. 1																				
Grapsidae	Grapsidae sp. 1																				
Gynodiastylidae	Gynodiastylidae sp. 1																				
Hymenosomatidae	Hymenosomatidae sp. 1																				
Ischyroceridae	Ischyroceridae sp. 1								1										1	1	
Isopoda	Isopoda sp. 1																				
Joeropsididae	Joeropsididae sp. 1								2		1								2		1
Leptostraca	Leptostraca sp. 1				1																
Leucosiidae	Cryptocnemus sp. 1																				
Leucothoidae	Leucothoidae sp. 1																		1		
Liljeborgiidae	Liljeborgiidae sp. 1																				
Limnoriidae	Limnoriidae sp. 1																				
Lysianassidae	Lysianassidae sp. 1																				
Maeridae	Maeridae sp. 1																				
Melitidae	Melitidae sp. 1								2		3	1						1	2		
Munnidae	Munnidae sp. 1																				
Mysidae	Mysidae sp. 1					1	1														
Ochlesidae	Ochlesidae sp. 1																				
Ocypodidae	Ocypodidae sp. 1																				
Ostracoda	Ostracoda sp. 1								2		1	1			2		3	1	1	2	2
Ostracoda	Ostracoda sp. 2	1	3				1					1		1		2					
Ostracoda	Ostracoda sp. 3																				
Ostracoda	Ostracoda sp. 4																				
Oxycephalidae	Oxycephalidae sp. 1										1										

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Penaeidae	Penaeidae sp. 1																				
Phoxocephalidae	Phoxocephalidae sp. 1	2	2			1		2	7	1	1	1				1	2		4	1	6
Pilumnidae	Pilumnidae sp. 1																				
Platyischnopidae	Platyischnopidae sp. 1						1													1	2
Podoceridae	Podoceridae sp. 1																				
Portunidae	Portunidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 2																				
Pycnogonida	Pycnogonida sp. 1																				
Sphaeromatidae	Chitonopsis sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 2																				
Sphaeromatidae	Sphaeromatidae sp. 3										1										
Squillidae	Belosquilla sp. 1																				
Tanaididae	Tanaididae sp. 1																		1		
Zobrachoidae	Zobrachoidae sp. 1																				
c.f.Hognathidae	c.f.Hognathidae sp. 1																				
Mollusca																					
Anatomidae	Anatomidae sp. 1																				
Aplysiidae	Aplysiidae sp. 1																				
Architectonicidae	Architectonicidae sp. 1																				
Cerithiidae	Cerithiidae sp. 1																				
Corbulidae	*Corbula* sp. 1																				
Cuspidariidae	Cuspidariidae sp. 1																				
Cylichnidae	Cylichnidae sp. 1																				
Eulimidae	Eulimidae sp. 1																				
Gastropoda	Gastropoda juv																				
Glycymerididae	*Glycymeris* sp. 1																				
Hiatellidae	Hiatella sp. 1								1												
Lasaeidae	*Curvemysella paula*																				
Limidae	Limidae sp. 1																				1
Lucinidae	Lucinidae sp. 1																				
Mactridae	*Mactra* sp. 1																				

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Mactridae	*Mactra* sp. 2																				
Myochamidae	*Myochama* sp. 1																				
Mytillidae	*Modiolus* sp. 1																				
Mytillidae	*Modiolus* sp. 2																		1		
Mytillidae	*Musculus coenobitus*																				
Mytillidae	*Musculus* sp. 1																				
Nassaridae	*Nassarius* sp. 1						1														
Naticidae	*Natica* sp. 1											1									
Naticidae	*Natica* sp. 2																				
Nuculanidae	*Saccella darwini*																				
Nuculidae	*Ennucula* sp. 1						1						1				1				
Olividae	*Phenacovolva* sp. 1																1				
Ostreidae	Ostreidae sp. 1																				
Patellidae	Patellidae sp. 1						1														
Pleurotomariidae	Pleurotomariidae sp. 1																				
Polyplacophora	Polyplacophora sp. 1																				
Polyplacophora	Polyplacophora sp. 2																				
Pteriidae	*Pteria* sp. 1																				
Rissoidae	Rissoidae sp. 1																				
Solemyidae	*Solemya australis*				1		1	1	1			2						1			1
Tellinidae	*Tellina* sp. 1																				
Tellinidae	*Tellina* sp. 2																				
Tellinidae	*Tellina* sp. 3																2				
Tellinidae	*Tellina* sp. 4																				
Trochidae	Trochidae sp. 1																				
Veneridae	*Antigona* sp. 1																				
Veneridae	*Circe* sp. 1																				
Veneridae	*Dosinia* sp. 1																				
Veneridae	*Dosinia* sp. 2																				
Veneridae	*Dosinia* sp. 3																				
Veneridae	*Paphia* sp. 1																				
Veneridae	Veneridae juv																				
Vulsellidae	*Electroma* sp. 1																				

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Bryozoa	Bryozoa fan																				
Echinodermata																					
Asteroidea	Asteroidea sp. 1																				
Echinoidea	Echinoidea juv																				
Holothuroidea	Holothuroidea sp. 1																				
Holothuroidea	Holothuroidea sp. 2																				
Holothuroidea	Holothuroidea sp. 3																				
Ophiuroidea	Ophiuroidea sp. 1													3			1		1		
Toxopneustidae	Toxopneustidae sp. 1																				
Chordata																					
Ascidiacea	Ascidiacea sp. 1																				

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site PA3																					
Porifera	Porifera												1								
Cnidaria																					
Actiniaria	Actiniaria sp. 1																				
Actiniaria	Actiniaria sp. 2																				
Hexacorallia	Hexacorallia sp. 1																				
Nemertea	Nemertea																				
Nematoda	Nematoda															1					
Annelida																					
Amphinomidae	Amphinomidae																				
Aphroditidae	Pontogenia sp. 1																				
Capitellidae	*Capitella* sp. 1								1				1								
Capitellidae	*Notomastus* sp. 1										1		1			3					
Chrysopetalidae	Chrysopetalidae sp. 1																				
Cirratulidae	Cirratulidae sp. 1												1	1							
Cirratulidae	Cirratulidae sp. 2																				
Dorvilleidae	Dorvilleidae sp. 1										1			3				2			
Eunicidae	*Eunice* sp. 1																				
Eunicidae	*Marphysa* sp. 1																				
Eunicidae	*Lysidice unicornis*																				
Flabelligeridae	*Pherusa* sp. 1																				
Glyceridae	*Glycera* sp. 1																				
Goniadidae	Goniada sp. 1																				
Hesionidae	Hesionidae sp. 1																				
Lumbrineridae	*Lumbrineris* sp. 1																				
Magelonidae	*Magelona* sp. 1																				
Maldanidae	*Axiothella* sp. 1																				
Nephtyidae	*Aglaophamus* sp. 1																			1	
Nereididae	Nereididae sp. 1								1			1									
Nereididae	Nereididae sp. 2																				

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Oenonidae	*Arabella longipedata*																				
Onuphidae	*Onuphis holobranchiata*																				
Onuphidae	Rhamphobrachium sp. 1																				
Opheliidae	Armandia sp. 1			1			2		1			2		4	2						
Orbiniidae	Orbiniidae sp. 1																				
Paraonidae	Aricidea sp. 1					1		1	2	1				1		1					
Phyllodocidae	Phyllodocidae sp. 1						1														
Poecilochaetidae	*Poecilochaetus serpens*																				
Polynoidae	Polynoidae sp. 1																				
Sabellidae	Sabellidae sp. 1																				
Sigalionidae	*Pholoides mendeleevi*																				
Sigalionidae	Sigalionidae sp. 1																				
Sphaerodoridae	*Sphaerodoropsis heteropapillata*																				
Spionidae	Spionidae sp. 1							3		1		1	1	1							
Spionidae	Spionidae sp. 2																				
Syllidae	Syllidae sp. 1								1		1					1					
Syllidae	Syllidae sp. 2													2			2				
Syllidae	Syllidae sp. 3																				
Syllidae	Syllidae sp. 4																				
Terebellidae	Terebellidae sp. 1							1										1			
Trichobranchidae	Trichobranchidae sp. 1																				
Echuira	Echuira																				
Sipuncula	Sipuncula																				
Crustacea																					
Alpheidae	*Alpheus* sp. 1																				
Ampeliscidae	Ampeliscidae sp. 1																				
Anthuridea	Anthuridea sp. 1																				
Aoridae	Aoridae sp. 1																				
Apseudidae	Apseudidae sp. 1	4	2	1	2		8	12	17	4	15	9	2	5	20	12	3	39	5	8	12
Arcturidae	Arcturidae sp. 1																				
Atyidae	Atyidae sp. 1																				
Bodotriidae	Bodotriidae sp. 1																				
Callianassidae	Callianassidae sp. 1																				

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Caprellidae	Caprellidae sp. 1																				
Caridea	Caridea damaged																				
Ceinidae	c.f.Ceinidae sp. 1																				
Ceratocumatidae	Ceratocumatidae sp. 1																				
Cirolanidae	Cirolanidae sp. 1																				
Copepoda	Copepoda																				
Corophiidae	Corophiidae sp. 1																				
Crustacea	Crustacea sp. 1						3														
Cyproideidae	Cyproideidae sp. 1																				
Dexaminidae	Dexaminidae sp. 1						1					2		1	1	2			1		
Diogenidae	Diogenidae sp. 1																				
Gnathiidae	Gnathiidae sp. 1																				
Grapsidae	Grapsidae sp. 1																				
Gynodiastylidae	Gynodiastylidae sp. 1																				
Hymenosomatidae	Hymenosomatidae sp. 1																				
Ischyroceridae	Ischyroceridae sp. 1																				
Isopoda	Isopoda sp. 1								2												
Joeropsididae	Joeropsididae sp. 1							1	20			7		1	2		1				
Leptostraca	Leptostraca sp. 1														1						
Leucosiidae	Cryptocnemus sp. 1																				
Leucothoidae	Leucothoidae sp. 1																				
Liljeborgiidae	Liljeborgiidae sp. 1																				
Limnoriidae	Limnoriidae sp. 1																				
Lysianassidae	Lysianassidae sp. 1								1												
Maeridae	Maeridae sp. 1																				
Melitidae	Melitidae sp. 1						2	1	8	1		1		3	2	3	1				
Munnidae	Munnidae sp. 1																				
Mysidae	Mysidae sp. 1																				
Ochlesidae	Ochlesidae sp. 1																				
Ocypodidae	Ocypodidae sp. 1																				
Ostracoda	Ostracoda sp. 1						4	6	6		1	2		4	4	2		1	1		
Ostracoda	Ostracoda sp. 2	3	4					2	4	3	1		1								
Ostracoda	Ostracoda sp. 3																				

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ostracoda	Ostracoda sp. 4																				
Oxycephalidae	Oxycephalidae sp. 1								1												
Penaeidae	Penaeidae sp. 1																				
Phoxocephalidae	Phoxocephalidae sp. 1	4				1		2	2	1				1	2	2		3		2	1
Pilumnidae	Pilumnidae sp. 1																				
Platyischnopidae	Platyischnopidae sp. 1														1						
Podoceridae	Podoceridae sp. 1																				
Portunidae	Portunidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 2																				
Pycnogonida	Pycnogonida sp. 1				1		1														
Sphaeromatidae	Chitonopsis sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 2																				
Sphaeromatidae	Sphaeromatidae sp. 3																				
Squillidae	Belosquilla sp. 1																				
Tanaididae	Tanaididae sp. 1																				
Zobrachoidae	Zobrachoidae sp. 1																				
c.f.Hologna thidae	c.f.Hologna thidae sp. 1																				
Mollusca																					
Anatomidae	Anatomidae sp. 1																				
Aplysiidae	Aplysiidae sp. 1																				
Architectonicidae	Architectonicidae sp. 1																				
Cerithiidae	Cerithiidae sp. 1																				
Corbulidae	*Corbula* sp. 1																				
Cuspidariidae	Cuspidariidae sp. 1																				
Cylichnidae	Cylichnidae sp. 1								2			1									
Eulimidae	Eulimidae sp. 1																				
Gastropoda	Gastropoda juv						1		1												
Glycymerididae	*Glycymeris* sp. 1																				
Hiatellidae	Hiatella sp. 1																				
Lasaeidae	*Curvemysella paula*																				
Limidae	Limidae sp. 1										1										

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Lucinidae	Lucinidae sp. 1																				
Mactridae	*Mactra* sp. 1																				
Mactridae	*Mactra* sp. 2																				
Myochamidae	*Myochama* sp. 1																				
Mytillidae	*Modiolus* sp. 1																				
Mytillidae	*Modiolus* sp. 2																				
Mytillidae	*Musculus coenobitus*								1												
Mytillidae	*Musculus* sp. 1																				
Nassaridae	*Nassarius* sp. 1																				
Naticidae	*Natica* sp. 1																				
Naticidae	*Natica* sp. 2																				
Nuculanidae	*Saccella darwini*																				
Nuculidae	*Ennucula* sp. 1																				
Olividae	*Phenacovolva* sp. 1																				
Ostreidae	Ostreidae sp. 1																				
Patellidae	Patellidae sp. 1																				
Pleurotomariidae	Pleurotomariidae sp. 1																				
Polyplacophora	Polyplacophora sp. 1																				
Polyplacophora	Polyplacophora sp. 2																				
Pteriidae	*Pteria* sp. 1																				
Rissoidae	Rissoidae sp. 1																				
Solemyidae	*Solemya australis*					1															1
Tellinidae	*Tellina* sp. 1															1					
Tellinidae	*Tellina* sp. 2																				
Tellinidae	*Tellina* sp. 3																				
Tellinidae	*Tellina* sp. 4			1																	
Trochidae	Trochidae sp. 1																				
Veneridae	*Antigona* sp. 1																				
Veneridae	*Circe* sp. 1				1		2									1					1
Veneridae	*Dosinia* sp. 1	1																			
Veneridae	*Dosinia* sp. 2																				
Veneridae	*Dosinia* sp. 3																				
Veneridae	*Paphia* sp. 1								1												

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Veneridae	Veneridae juv	1																			
Vulsellidae	*Electroma* sp. 1															1					
Bryozoa	Bryozoa fan																				
Echinodermata																					
Asteroidea	Asteroidea sp. 1																				
Echinoidea	Echinoidea juv																				
Holothuroidea	Holothuroidea sp. 1																	2			
Holothuroidea	Holothuroidea sp. 2																				
Holothuroidea	Holothuroidea sp. 3																				
Ophiuroidea	Ophiuroidea sp. 1										2										
Toxopneustidae	Toxopneustidae sp. 1																				
Chordata																					
Ascidiacea	Ascidiacea sp. 1																				

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site PA4																					
Porifera	Porifera																				
Cnidaria																					
Actiniaria	Actiniaria sp. 1																				
Actiniaria	Actiniaria sp. 2																				
Hexacorallia	Hexacorallia sp. 1																				
Nemertea	Nemertea																				
Nematoda	Nematoda														1						
Annelida																					
Amphinomidae	Amphinomidae																				
Aphroditidae	Pontogenia sp. 1																				
Capitellidae	*Capitella* sp. 1						1			1	1							1			
Capitellidae	*Notomastus* sp. 1																				
Chrysopetalidae	Chrysopetalidae sp. 1																				
Cirratulidae	Cirratulidae sp. 1																				
Cirratulidae	Cirratulidae sp. 2																				
Dorvilleidae	Dorvilleidae sp. 1				5			1			1										1
Eunicidae	*Eunice* sp. 1																				
Eunicidae	*Marphysa* sp. 1																				
Eunicidae	*Lysidice unicornis*																				
Flabelligeridae	*Pherusa* sp. 1																				
Glyceridae	*Glycera* sp. 1																				
Goniadidae	Goniada sp. 1																				
Hesionidae	Hesionidae sp. 1																				
Lumbrineridae	*Lumbrineris* sp. 1																				
Magelonidae	*Magelona* sp. 1																				
Maldanidae	*Axiothella* sp. 1			1											1		1				
Nephtyidae	*Aglaophamus* sp. 1			1												1					
Nereididae	Nereididae sp. 1														1		1				
Nereididae	Nereididae sp. 2																				

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Oenonidae	*Arabella longipedata*																				
Onuphidae	*Onuphis holobranchiata*																				
Onuphidae	Rhamphobrachium sp. 1																				
Opheliidae	Armandia sp. 1				2	2		1		3					1				2	2	1
Orbiniidae	Orbiniidae sp. 1				1														1		1
Paraonidae	Aricidea sp. 1				2																4
Phyllodocidae	Phyllodocidae sp. 1														1	1					1
Poecilochaetidae	*Poecilochaetus serpens*																				
Polynoidae	Polynoidae sp. 1																				
Sabellidae	Sabellidae sp. 1														2						
Sigalionidae	*Pholoides mendeleevi*																				
Sigalionidae	Sigalionidae sp. 1																				
Sphaerodoridae	*Sphaerodoropsis heteropapillata*																				
Spionidae	Spionidae sp. 1								1												
Spionidae	Spionidae sp. 2																				
Syllidae	Syllidae sp. 1	1						1							2	1					
Syllidae	Syllidae sp. 2				1																1
Syllidae	Syllidae sp. 3												1								
Syllidae	Syllidae sp. 4																				
Terebellidae	Terebellidae sp. 1		1							1											
Trichobranchidae	Trichobranchidae sp. 1																				
Echuira	Echuira																				
Sipuncula	Sipuncula								1												
Crustacea																					
Alpheidae	*Alpheus* sp. 1																				
Ampeliscidae	Ampeliscidae sp. 1																				
Anthuridea	Anthuridea sp. 1						3	1					1						1		
Aoridae	Aoridae sp. 1																				
Apseudidae	Apseudidae sp. 1	2	1	1	1		1		1			2	1		3		1				4
Arcturidae	Arcturidae sp. 1																				
Atyidae	Atyidae sp. 1																				
Bodotriidae	Bodotriidae sp. 1									1	1									1	
Callianassidae	Callianassidae sp. 1																				

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Caprellidae	Caprellidae sp. 1																				
Caridea	Caridea damaged																				
Ceinidae	c.f.Ceinidae sp. 1																				
Ceratocumatidae	Ceratocumatidae sp. 1																				
Cirolanidae	Cirolanidae sp. 1																				
Copepoda	Copepoda																				
Corophiidae	Corophiidae sp. 1																				
Crustacea	Crustacea sp. 1																				
Cyproideidae	Cyproideidae sp. 1																				
Dexaminidae	Dexaminidae sp. 1										2					1					
Diogenidae	Diogenidae sp. 1																				
Gnathiidae	Gnathiidae sp. 1																				
Grapsidae	Grapsidae sp. 1																				
Gynodiastylidae	Gynodiastylidae sp. 1							3		1				1							
Hymenosomatidae	Hymenosomatidae sp. 1																				
Ischyroceridae	Ischyroceridae sp. 1				1																
Isopoda	Isopoda sp. 1																				
Joeropsididae	Joeropsididae sp. 1											1			1						
Leptostraca	Leptostraca sp. 1																				
Leucosiidae	Cryptocnemus sp. 1																				
Leucothoidae	Leucothoidae sp. 1																				
Liljeborgiidae	Liljeborgiidae sp. 1																				
Limnoriidae	Limnoriidae sp. 1																				
Lysianassidae	Lysianassidae sp. 1																				
Maeridae	Maeridae sp. 1																				
Melitidae	Melitidae sp. 1						1	1			1	2			9		3				
Munnidae	Munnidae sp. 1																				
Mysidae	Mysidae sp. 1																				
Ochlesidae	Ochlesidae sp. 1																				
Ocypodidae	Ocypodidae sp. 1																				
Ostracoda	Ostracoda sp. 1	10						4	1		1		4	1	1	7	2			2	1
Ostracoda	Ostracoda sp. 2			2	4	2	2	1	4						1		2		3		1
Ostracoda	Ostracoda sp. 3							1													

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ostracoda	Ostracoda sp. 4																				
Oxycephalidae	Oxycephalidae sp. 1																				
Penaeidae	Penaeidae sp. 1																				
Phoxocephalidae	Phoxocephalidae sp. 1	1	1		3	1	3	5			3		1	2	1	1	4	2	3	1	1
Pilumnidae	Pilumnidae sp. 1							1													
Platyischnopidae	Platyischnopidae sp. 1																				
Podoceridae	Podoceridae sp. 1																				
Portunidae	Portunidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 2																				
Pycnogonida	Pycnogonida sp. 1													1							
Sphaeromatidae	Chitonopsis sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 2																				
Sphaeromatidae	Sphaeromatidae sp. 3																				
Squillidae	Belosquilla sp. 1																				
Tanaididae	Tanaididae sp. 1																				
Zobrachoidae	Zobrachoidae sp. 1																				
c.f.Hologнathidae	c.f.Hologнathidae sp. 1																				
Mollusca																					
Anatomidae	Anatomidae sp. 1																				
Aplysiidae	Aplysiidae sp. 1																				
Architectonicidae	Architectonicidae sp. 1																				
Cerithiidae	Cerithiidae sp. 1																				
Corbulidae	*Corbula* sp. 1																				
Cuspidariidae	Cuspidariidae sp. 1																				
Cylichnidae	Cylichnidae sp. 1																				
Eulimidae	Eulimidae sp. 1																				
Gastropoda	Gastropoda juv													3							
Glycymerididae	*Glycymeris* sp. 1																				
Hiatellidae	Hiatella sp. 1																				
Lasaeidae	*Curvemysella paula*																				
Limidae	Limidae sp. 1								1												

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Lucinidae	Lucinidae sp. 1																				
Mactridae	*Mactra* sp. 1																				
Mactridae	*Mactra* sp. 2																				
Myochamidae	*Myochama* sp. 1												1								
Mytillidae	*Modiolus* sp. 1																				
Mytillidae	*Modiolus* sp. 2																				
Mytillidae	*Musculus coenobitus*																				
Mytillidae	*Musculus* sp. 1														1						
Nassaridae	*Nassarius* sp. 1			1																	
Naticidae	*Natica* sp. 1														2						
Naticidae	*Natica* sp. 2																				
Nuculanidae	*Saccella darwini*				1																
Nuculidae	*Ennucula* sp. 1														1						2
Olividae	*Phenacovolva* sp. 1																				
Ostreidae	Ostreidae sp. 1																				
Patellidae	Patellidae sp. 1			1										1							
Pleurotomariidae	Pleurotomariidae sp. 1																				
Polyplacophora	Polyplacophora sp. 1																				
Polyplacophora	Polyplacophora sp. 2																				
Pteriidae	*Pteria* sp. 1																				
Rissoidae	Rissoidae sp. 1																				
Solemyidae	*Solemya australis*																				
Tellinidae	*Tellina* sp. 1																				1
Tellinidae	*Tellina* sp. 2																				
Tellinidae	*Tellina* sp. 3																				
Tellinidae	*Tellina* sp. 4																				
Trochidae	Trochidae sp. 1																				
Veneridae	*Antigona* sp. 1																				
Veneridae	*Circe* sp. 1																1				
Veneridae	*Dosinia* sp. 1																				
Veneridae	*Dosinia* sp. 2																				
Veneridae	*Dosinia* sp. 3																				
Veneridae	*Paphia* sp. 1																				

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Veneridae	Veneridae juv																				
Vulsellidae	*Electroma* sp. 1																				
Bryozoa	Bryozoa fan																				
Echinodermata																					
Asteroidea	Asteroidea sp. 1																				
Echinoidea	Echinoidea juv																				
Holothuroidea	Holothuroidea sp. 1																				
Holothuroidea	Holothuroidea sp. 2																				
Holothuroidea	Holothuroidea sp. 3																				
Ophiuroidea	Ophiuroidea sp. 1		1			2	2	1	1	1	1		1	1				3	1	1	
Toxopneustidae	Toxopneustidae sp. 1																				
Chordata																					
Ascidiacea	Ascidiacea sp. 1																				

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site PA5																					
Porifera	Porifera						1						1							1	
Cnidaria																					
Actiniaria	Actiniaria sp. 1																				
Actiniaria	Actiniaria sp. 2																				
Hexacorallia	Hexacorallia sp. 1																				
Nemertea	Nemertea																				
Nematoda	Nematoda																				
Annelida																					
Amphinomidae	Amphinomidae																				
Aphroditidae	Pontogenia sp. 1																				
Capitellidae	*Capitella* sp. 1	1					3	1	1		1	1	1		3						
Capitellidae	*Notomastus* sp. 1											1				1					
Chrysopetalidae	Chrysopetalidae sp. 1																				
Cirratulidae	Cirratulidae sp. 1									1										1	
Cirratulidae	Cirratulidae sp. 2				1																
Dorvilleidae	Dorvilleidae sp. 1							1		2											
Eunicidae	*Eunice* sp. 1																				
Eunicidae	*Marphysa* sp. 1									1											
Eunicidae	*Lysidice unicornis*				1																
Flabelligeridae	*Pherusa* sp. 1																				
Glyceridae	*Glycera* sp. 1									1											
Goniadidae	Goniada sp. 1																				
Hesionidae	Hesionidae sp. 1																				
Lumbrineridae	*Lumbrineris* sp. 1																				1
Magelonidae	*Magelona* sp. 1																				
Maldanidae	*Axiothella* sp. 1																	1			
Nephtyidae	*Aglaophamus* sp. 1												1								
Nereididae	Nereididae sp. 1	1				1												1		1	2
Nereididae	Nereididae sp. 2																				
Oenonidae	*Arabella longipedata*																				
Onuphidae	*Onuphis holobranchiata*																				

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Onuphidae	Rhamphobrachium sp. 1																				
Opheliidae	Armandia sp. 1	1			1	1					1				1				2	1	
Orbiniidae	Orbiniidae sp. 1	1	1																		
Paraonidae	Aricidea sp. 1							1													
Phyllodocidae	Phyllodocidae sp. 1																				
Poecilochaetidae	*Poecilochaetus serpens*																				
Polynoidae	Polynoidae sp. 1																				
Sabellidae	Sabellidae sp. 1																				
Sigalionidae	*Pholoides mendeleevi*																				
Sigalionidae	Sigalionidae sp. 1																				
Sphaerodoridae	*Sphaerodoropsis heteropapillata*																				
Spionidae	Spionidae sp. 1																				
Spionidae	Spionidae sp. 2																				
Syllidae	Syllidae sp. 1							2	1												
Syllidae	Syllidae sp. 2																				
Syllidae	Syllidae sp. 3																				
Syllidae	Syllidae sp. 4																				
Terebellidae	Terebellidae sp. 1																				
Trichobranchidae	Trichobranchidae sp. 1																				
Echuira	Echuira																				
Sipuncula	Sipuncula		1																		
Crustacea																					
Alpheidae	*Alpheus* sp. 1																				
Ampeliscidae	Ampeliscidae sp. 1																				
Anthuridea	Anthuridea sp. 1	1			1	3												1			1
Aoridae	Aoridae sp. 1																				
Apseudidae	Apseudidae sp. 1	3	2	3	3	4	3	4	1		2			1		1		6	1	1	1
Arcturidae	Arcturidae sp. 1																				
Atyidae	Atyidae sp. 1																				
Bodotriidae	Bodotriidae sp. 1																				
Callianassidae	Callianassidae sp. 1																				
Caprellidae	Caprellidae sp. 1																				
Caridea	Caridea damaged																				

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ceinidae	c.f.Ceinidae sp. 1																				
Ceratocumatidae	Ceratocumatidae sp. 1																				
Cirolanidae	Cirolanidae sp. 1																				
Copepoda	Copepoda																				
Corophiidae	Corophiidae sp. 1																				
Crustacea	Crustacea sp. 1																				
Cyproideidae	Cyproideidae sp. 1																				
Dexaminidae	Dexaminidae sp. 1																	2			
Diogenidae	Diogenidae sp. 1																				
Gnathiidae	Gnathiidae sp. 1																				
Grapsidae	Grapsidae sp. 1																				
Gynodiastylidae	Gynodiastylidae sp. 1																				
Hymenosomatidae	Hymenosomatidae sp. 1																				
Ischyroceridae	Ischyroceridae sp. 1												1					3	1		
Isopoda	Isopoda sp. 1					1															
Joeropsididae	Joeropsididae sp. 1					1							1					1			
Leptostraca	Leptostraca sp. 1																				
Leucosiidae	Cryptocnemus sp. 1																				
Leucothoidae	Leucothoidae sp. 1																				
Liljeborgiidae	Liljeborgiidae sp. 1																				
Limnoriidae	Limnoriidae sp. 1																				
Lysianassidae	Lysianassidae sp. 1																				
Maeridae	Maeridae sp. 1																				
Melitidae	Melitidae sp. 1					1	1		1	1							2	6	7		1
Munnidae	Munnidae sp. 1																				
Mysidae	Mysidae sp. 1																				
Ochlesidae	Ochlesidae sp. 1																				
Ocypodidae	Ocypodidae sp. 1																				
Ostracoda	Ostracoda sp. 1		1				7	4			3		6	9		4	2			1	
Ostracoda	Ostracoda sp. 2	1	2		8	2			3	5					5	1	1	4	1	4	2
Ostracoda	Ostracoda sp. 3						1														
Ostracoda	Ostracoda sp. 4																				
Oxycephalidae	Oxycephalidae sp. 1																				

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Penaeidae	Penaeidae sp. 1																				
Phoxocephalidae	Phoxocephalidae sp. 1	1	2	4	2	1	4	2	2	2	1				1	2		6	2	2	1
Pilumnidae	Pilumnidae sp. 1																				
Platyischnopidae	Platyischnopidae sp. 1																				
Podoceridae	Podoceridae sp. 1																				
Portunidae	Portunidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 1																		1		
Pseudozeuxidae	Pseudozeuxidae sp. 2																				
Pycnogonida	Pycnogonida sp. 1											1									
Sphaeromatidae	Chitonopsis sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 2																				
Sphaeromatidae	Sphaeromatidae sp. 3																				
Squillidae	Belosquilla sp. 1																				
Tanaididae	Tanaididae sp. 1																				
Zobrachoidae	Zobrachoidae sp. 1																				
c.f.Hognathidae	c.f.Hognathidae sp. 1																				
Mollusca																					
Anatomidae	Anatomidae sp. 1																	1	1		
Aplysiidae	Aplysiidae sp. 1																				
Architectonicidae	Architectonicidae sp. 1																				
Cerithiidae	Cerithiidae sp. 1																				
Corbulidae	*Corbula* sp. 1																				
Cuspidariidae	Cuspidariidae sp. 1																				
Cylichnidae	Cylichnidae sp. 1														1						
Eulimidae	Eulimidae sp. 1																				
Gastropoda	Gastropoda juv																				
Glycymerididae	*Glycymeris* sp. 1																				
Hiatellidae	Hiatella sp. 1																				
Lasaeidae	*Curvemysella paula*																		2		
Limidae	Limidae sp. 1																				
Lucinidae	Lucinidae sp. 1																				
Mactridae	*Mactra* sp. 1																				

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Mactridae	*Mactra* sp. 2																				
Myochamidae	*Myochama* sp. 1																				
Mytillidae	*Modiolus* sp. 1																				
Mytillidae	*Modiolus* sp. 2																				
Mytillidae	*Musculus coenobitus*																				
Mytillidae	*Musculus* sp. 1																				
Nassaridae	*Nassarius* sp. 1																				
Naticidae	*Natica* sp. 1																				
Naticidae	*Natica* sp. 2																				
Nuculanidae	*Saccella darwini*																				
Nuculidae	*Ennucula* sp. 1												1								
Olividae	*Phenacovolva* sp. 1																				
Ostreidae	Ostreidae sp. 1																				
Patellidae	Patellidae sp. 1																				
Pleurotomariidae	Pleurotomariidae sp. 1																				
Polyplacophora	Polyplacophora sp. 1																				
Polyplacophora	Polyplacophora sp. 2																				
Pteriidae	*Pteria* sp. 1																				
Rissoidae	Rissoidae sp. 1																				
Solemyidae	*Solemya australis*																				
Tellinidae	*Tellina* sp. 1																		1		
Tellinidae	*Tellina* sp. 2																				
Tellinidae	*Tellina* sp. 3			1																	
Tellinidae	*Tellina* sp. 4																				
Trochidae	Trochidae sp. 1																				
Veneridae	*Antigona* sp. 1																		1		
Veneridae	*Circe* sp. 1		1	2		1									1						
Veneridae	*Dosinia* sp. 1																				
Veneridae	*Dosinia* sp. 2																				
Veneridae	*Dosinia* sp. 3																				
Veneridae	*Paphia* sp. 1																				
Veneridae	Veneridae juv																				
Vulsellidae	*Electroma* sp. 1																				

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Bryozoa	Bryozoa fan																				
Echinodermata																					
Asteroidea	Asteroidea sp. 1																				
Echinoidea	Echinoidea juv																				
Holothuroidea	Holothuroidea sp. 1																				
Holothuroidea	Holothuroidea sp. 2																				
Holothuroidea	Holothuroidea sp. 3																				
Ophiuroidea	Ophiuroidea sp. 1		4			3	1		2	3	5	10	3		1	1		1		3	
Toxopneustidae	Toxopneustidae sp. 1																				
Chordata																					
Ascidiacea	Ascidiacea sp. 1																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site PS1																					
Porifera	Porifera																				
Cnidaria																					
Actiniaria	Actiniaria sp. 1																				
Actiniaria	Actiniaria sp. 2																				
Hexacorallia	Hexacorallia sp. 1																				
Nemertea	Nemertea																				
Nematoda	Nematoda				1	1		1													
Annelida																					
Amphinomidae	Amphinomidae																				
Aphroditidae	Pontogenia sp. 1																				
Capitellidae	*Capitella* sp. 1				1	1				1											
Capitellidae	*Notomastus* sp. 1						2				1	1									
Chrysopetalidae	Chrysopetalidae sp. 1																				
Cirratulidae	Cirratulidae sp. 1													1							
Cirratulidae	Cirratulidae sp. 2			1																	
Dorvilleidae	Dorvilleidae sp. 1	1			1				1	1											
Eunicidae	*Eunice* sp. 1				1								1			1			1		
Eunicidae	*Marphysa* sp. 1									1											
Eunicidae	*Lysidice unicornis*		2													1					
Flabelligeridae	*Pherusa* sp. 1																			1	
Glyceridae	*Glycera* sp. 1							1													
Goniadidae	Goniada sp. 1																				
Hesionidae	Hesionidae sp. 1																				
Lumbrineridae	*Lumbrineris* sp. 1			1												1	1			1	
Magelonidae	*Magelona* sp. 1																				
Maldanidae	*Axiothella* sp. 1																				
Nephtyidae	*Aglaophamus* sp. 1						1	1		1											
Nereididae	Nereididae sp. 1						1													1	
Nereididae	Nereididae sp. 2																				
Oenonidae	*Arabella longipedata*											1									
Onuphidae	*Onuphis holobranchiata*			1																	

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Onuphidae	Rhamphobrachium sp. 1																				
Opheliidae	Armandia sp. 1					1										1		1			
Orbiniidae	Orbiniidae sp. 1																				
Paraonidae	Aricidea sp. 1								1	1			1	1		1	1				1
Phyllodocidae	Phyllodocidae sp. 1																				
Poecilochaetidae	*Poecilochaetus serpens*																				
Polynoidae	Polynoidae sp. 1																				
Sabellidae	Sabellidae sp. 1									1											
Sigalionidae	*Pholoides mendeleevi*																				
Sigalionidae	Sigalionidae sp. 1	1																			
Sphaerodoridae	*Sphaerodoropsis heteropapillata*																				
Spionidae	Spionidae sp. 1														1						
Spionidae	Spionidae sp. 2																				
Syllidae	Syllidae sp. 1					1										1			1		
Syllidae	Syllidae sp. 2																				
Syllidae	Syllidae sp. 3																				
Syllidae	Syllidae sp. 4																				
Terebellidae	Terebellidae sp. 1																				
Trichobranchidae	Trichobranchidae sp. 1																				
Echuira	Echuira																				
Sipuncula	Sipuncula	1		1				1				1								1	
Crustacea																					
Alpheidae	*Alpheus* sp. 1																				
Ampeliscidae	Ampeliscidae sp. 1							1	1										1		
Anthuridea	Anthuridea sp. 1																				
Aoridae	Aoridae sp. 1																				
Apseudidae	Apseudidae sp. 1		1						1							1		1			
Arcturidae	Arcturidae sp. 1																				
Atyidae	Atyidae sp. 1																				
Bodotriidae	Bodotriidae sp. 1																				
Callianassidae	Callianassidae sp. 1									1											
Caprellidae	Caprellidae sp. 1																				
Caridea	Caridea damaged																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ceinidae	c.f.Ceinidae sp. 1																				
Ceratocumatidae	Ceratocumatidae sp. 1																				
Cirolanidae	Cirolanidae sp. 1																				
Copepoda	Copepoda																				
Corophiidae	Corophiidae sp. 1																				
Crustacea	Crustacea sp. 1																				
Cyproideidae	Cyproideidae sp. 1																				
Dexaminidae	Dexaminidae sp. 1															1					
Diogenidae	Diogenidae sp. 1																				
Gnathiidae	Gnathiidae sp. 1																				
Grapsidae	Grapsidae sp. 1																				
Gynodiastylidae	Gynodiastylidae sp. 1																				
Hymenosomatidae	Hymenosomatidae sp. 1																				
Ischyroceridae	Ischyroceridae sp. 1		1		2																2
Isopoda	Isopoda sp. 1																				
Joeropsididae	Joeropsididae sp. 1					2															
Leptostraca	Leptostraca sp. 1															3					
Leucosiidae	Cryptocnemus sp. 1																				
Leucothoidae	Leucothoidae sp. 1																				
Liljeborgiidae	Liljeborgiidae sp. 1																				
Limnoriidae	Limnoriidae sp. 1																				
Lysianassidae	Lysianassidae sp. 1																				
Maeridae	Maeridae sp. 1																				
Melitidae	Melitidae sp. 1		2			1				1											
Munnidae	Munnidae sp. 1																				
Mysidae	Mysidae sp. 1																				
Ochlesidae	Ochlesidae sp. 1																				
Ocypodidae	Ocypodidae sp. 1																				
Ostracoda	Ostracoda sp. 1	1																			
Ostracoda	Ostracoda sp. 2				1																
Ostracoda	Ostracoda sp. 3																				
Ostracoda	Ostracoda sp. 4																				
Oxycephalidae	Oxycephalidae sp. 1																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Penaeidae	Penaeidae sp. 1																				
Phoxocephalidae	Phoxocephalidae sp. 1								1						1			1	1		
Pilumnidae	Pilumnidae sp. 1																				
Platyischnopidae	Platyischnopidae sp. 1																				
Podoceridae	Podoceridae sp. 1																				
Portunidae	Portunidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 1	1																			
Pseudozeuxidae	Pseudozeuxidae sp. 2																				
Pycnogonida	Pycnogonida sp. 1			1																	
Sphaeromatidae	Chitonopsis sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 2																				
Sphaeromatidae	Sphaeromatidae sp. 3																				
Squillidae	Belosquilla sp. 1																				
Tanaididae	Tanaididae sp. 1																				
Zobrachoidae	Zobrachoidae sp. 1																				
c.f.Hognathidae	c.f.Hognathidae sp. 1																				
Mollusca																					
Anatomidae	Anatomidae sp. 1																				
Aplysiidae	Aplysiidae sp. 1																				
Architectonicidae	Architectonicidae sp. 1																				
Cerithiidae	Cerithiidae sp. 1																				
Corbulidae	*Corbula* sp. 1																				
Cuspidariidae	Cuspidariidae sp. 1																				
Cylichnidae	Cylichnidae sp. 1																				
Eulimidae	Eulimidae sp. 1																				
Gastropoda	Gastropoda juv																				
Glycymerididae	*Glycymeris* sp. 1																				
Hiatellidae	Hiatella sp. 1																				
Lasaeidae	*Curvemysella paula*																				
Limidae	Limidae sp. 1																				
Lucinidae	Lucinidae sp. 1																				
Mactridae	*Mactra* sp. 1																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Mactridae	*Mactra* sp. 2																				
Myochamidae	*Myochama* sp. 1																				
Mytillidae	*Modiolus* sp. 1													1							
Mytillidae	*Modiolus* sp. 2																				
Mytillidae	*Musculus coenobitus*																				
Mytillidae	*Musculus* sp. 1		1		1																
Nassaridae	*Nassarius* sp. 1																				
Naticidae	*Natica* sp. 1																				
Naticidae	*Natica* sp. 2																				
Nuculanidae	*Saccella darwini*																				
Nuculidae	*Ennucula* sp. 1																				
Olividae	*Phenacovolva* sp. 1																				
Ostreidae	Ostreidae sp. 1																				
Patellidae	Patellidae sp. 1																				
Pleurotomariidae	Pleurotomariidae sp. 1																				
Polyplacophora	Polyplacophora sp. 1												2			2					
Polyplacophora	Polyplacophora sp. 2																				
Pteriidae	*Pteria* sp. 1																				
Rissoidae	Rissoidae sp. 1																				
Solemyidae	*Solemya australis*																				
Tellinidae	*Tellina* sp. 1																				
Tellinidae	*Tellina* sp. 2			1																	
Tellinidae	*Tellina* sp. 3	1																			
Tellinidae	*Tellina* sp. 4																				
Trochidae	Trochidae sp. 1																				
Veneridae	*Antigona* sp. 1																				
Veneridae	*Circe* sp. 1				3																
Veneridae	*Dosinia* sp. 1				1												1				
Veneridae	*Dosinia* sp. 2		1																		
Veneridae	*Dosinia* sp. 3																				
Veneridae	*Paphia* sp. 1																				
Veneridae	Veneridae juv																				
Vulsellidae	*Electroma* sp. 1																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Bryozoa	Bryozoa fan																				
Echinodermata																					
Asteroidea	Asteroidea sp. 1																				
Echinoidea	Echinoidea juv																				
Holothuroidea	Holothuroidea sp. 1																				
Holothuroidea	Holothuroidea sp. 2																				
Holothuroidea	Holothuroidea sp. 3																				
Ophiuroidea	Ophiuroidea sp. 1				2				1	1			1			1					
Toxopneustidae	Toxopneustidae sp. 1																				
Chordata																					
Ascidiacea	Ascidiacea sp. 1																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site PS2																					
Porifera	Porifera																				
Cnidaria																					
Actiniaria	Actiniaria sp. 1																				
Actiniaria	Actiniaria sp. 2																				
Hexacorallia	Hexacorallia sp. 1																				
Nemertea	Nemertea			1												2					
Nematoda	Nematoda				1								2			1					
Annelida																					
Amphinomidae	Amphinomidae																				
Aphroditidae	Pontogenia sp. 1						1							1							
Capitellidae	*Capitella* sp. 1	1	2	1						1											
Capitellidae	*Notomastus* sp. 1											1									
Chrysopetalidae	Chrysopetalidae sp. 1																				
Cirratulidae	Cirratulidae sp. 1																				
Cirratulidae	Cirratulidae sp. 2																				
Dorvilleidae	Dorvilleidae sp. 1											1		3			1				
Eunicidae	*Eunice* sp. 1		1						2							1			1		
Eunicidae	*Marphysa* sp. 1																				
Eunicidae	*Lysidice unicornis*															2					
Flabelligeridae	*Pherusa* sp. 1											1									
Glyceridae	*Glycera* sp. 1							1													
Goniadidae	Goniada sp. 1																				
Hesionidae	Hesionidae sp. 1																				
Lumbrineridae	*Lumbrineris* sp. 1	1							1												
Magelonidae	*Magelona* sp. 1																				
Maldanidae	*Axiothella* sp. 1																				
Nephtyidae	*Aglaophamus* sp. 1	1																			
Nereididae	Nereididae sp. 1																	1	1		
Nereididae	Nereididae sp. 2					1															
Oenonidae	*Arabella longipedata*					1															
Onuphidae	*Onuphis holobranchiata*																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Onuphidae	Rhamphobrachium sp. 1																				
Opheliidae	Armandia sp. 1															1					
Orbiniidae	Orbiniidae sp. 1																				
Paraonidae	Aricidea sp. 1	1			2	1	1	1				1	1	1							
Phyllodocidae	Phyllodocidae sp. 1																				
Poecilochaetidae	*Poecilochaetus serpens*																				
Polynoidae	Polynoidae sp. 1																				
Sabellidae	Sabellidae sp. 1				1																
Sigalionidae	*Pholoides mendeleevi*												1								
Sigalionidae	Sigalionidae sp. 1																				
Sphaerodoridae	*Sphaerodoropsis heteropapillata*																				
Spionidae	Spionidae sp. 1																				
Spionidae	Spionidae sp. 2																				
Syllidae	Syllidae sp. 1		1		1				1						1	1					
Syllidae	Syllidae sp. 2				1											2					
Syllidae	Syllidae sp. 3																				
Syllidae	Syllidae sp. 4																				
Terebellidae	Terebellidae sp. 1																				
Trichobranchidae	Trichobranchidae sp. 1																				
Echuira	Echuira	1																			
Sipuncula	Sipuncula	1											1								
Crustacea																					
Alpheidae	*Alpheus* sp. 1																				
Ampeliscidae	Ampeliscidae sp. 1																				
Anthuridea	Anthuridea sp. 1			2		1	1							2							1
Aoridae	Aoridae sp. 1																				
Apseudidae	Apseudidae sp. 1	1				1	1		1	1			1	3							
Arcturidae	Arcturidae sp. 1																				
Atyidae	Atyidae sp. 1																				
Bodotriidae	Bodotriidae sp. 1																1				
Callianassidae	Callianassidae sp. 1																				
Caprellidae	Caprellidae sp. 1																				
Caridea	Caridea damaged																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ceinidae	c.f.Ceinidae sp. 1																				
Ceratocumatidae	Ceratocumatidae sp. 1																				
Cirolanidae	Cirolanidae sp. 1																				
Copepoda	Copepoda																				
Corophiidae	Corophiidae sp. 1																				
Crustacea	Crustacea sp. 1																				
Cyproideidae	Cyproideidae sp. 1																				
Dexaminidae	Dexaminidae sp. 1												1			1					
Diogenidae	Diogenidae sp. 1																				
Gnathiidae	Gnathiidae sp. 1																	1			
Grapsidae	Grapsidae sp. 1						1														
Gynodiastylidae	Gynodiastylidae sp. 1										1					1					
Hymenosomatidae	Hymenosomatidae sp. 1																				
Ischyroceridae	Ischyroceridae sp. 1																		5	1	
Isopoda	Isopoda sp. 1																				
Joeropsididae	Joeropsididae sp. 1				2		1		1												
Leptostraca	Leptostraca sp. 1					1					1		1								
Leucosiidae	Cryptocnemus sp. 1																				
Leucothoidae	Leucothoidae sp. 1																				1
Liljeborgiidae	Liljeborgiidae sp. 1																				
Limnoriidae	Limnoriidae sp. 1																				
Lysianassidae	Lysianassidae sp. 1																				
Maeridae	Maeridae sp. 1																				
Melitidae	Melitidae sp. 1		2												2				1		
Munnidae	Munnidae sp. 1																				
Mysidae	Mysidae sp. 1																				
Ochlesidae	Ochlesidae sp. 1																				
Ocypodidae	Ocypodidae sp. 1																				
Ostracoda	Ostracoda sp. 1						1														
Ostracoda	Ostracoda sp. 2										1										1
Ostracoda	Ostracoda sp. 3		4		1														1		
Ostracoda	Ostracoda sp. 4																				
Oxycephalidae	Oxycephalidae sp. 1	1	1								2										

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Penaeidae	Penaeidae sp. 1																				
Phoxocephalidae	Phoxocephalidae sp. 1		2				1	2				2						1		1	
Pilumnidae	Pilumnidae sp. 1																				
Platyischnopidae	Platyischnopidae sp. 1																				
Podoceridae	Podoceridae sp. 1																				
Portunidae	Portunidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 1				1	1							1					1			
Pseudozeuxidae	Pseudozeuxidae sp. 2																				
Pycnogonida	Pycnogonida sp. 1																		1		
Sphaeromatidae	Chitonopsis sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 2																				
Sphaeromatidae	Sphaeromatidae sp. 3																				
Squillidae	Belosquilla sp. 1																				
Tanaididae	Tanaididae sp. 1																				
Zobrachoidae	Zobrachoidae sp. 1																				
c.f.Hognathidae	c.f.Hognathidae sp. 1																				
Mollusca																					
Anatomidae	Anatomidae sp. 1																		2		
Aplysiidae	Aplysiidae sp. 1																				
Architectonicidae	Architectonicidae sp. 1																		1		
Cerithiidae	Cerithiidae sp. 1																				
Corbulidae	*Corbula* sp. 1																				
Cuspidariidae	Cuspidariidae sp. 1																				
Cylichnidae	Cylichnidae sp. 1																				
Eulimidae	Eulimidae sp. 1																				
Gastropoda	Gastropoda juv																				
Glycymerididae	*Glycymeris* sp. 1																				
Hiatellidae	Hiatella sp. 1	1																			
Lasaeidae	*Curvemysella paula*																				
Limidae	Limidae sp. 1				1			1													
Lucinidae	Lucinidae sp. 1																				
Mactridae	*Mactra* sp. 1																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Mactridae	*Mactra* sp. 2						2														
Myochamidae	*Myochama* sp. 1																				
Mytillidae	*Modiolus* sp. 1								1												
Mytillidae	*Modiolus* sp. 2	2																			
Mytillidae	*Musculus coenobitus*																				
Mytillidae	*Musculus* sp. 1																				
Nassaridae	*Nassarius* sp. 1				1																
Naticidae	*Natica* sp. 1										1										
Naticidae	*Natica* sp. 2																				
Nuculanidae	*Saccella darwini*																				
Nuculidae	*Ennucula* sp. 1															1			1		
Olividae	*Phenacovolva* sp. 1																				
Ostreidae	Ostreidae sp. 1																				
Patellidae	Patellidae sp. 1																			2	
Pleurotomariidae	Pleurotomariidae sp. 1															1					
Polyplacophora	Polyplacophora sp. 1						1				1		1						1		
Polyplacophora	Polyplacophora sp. 2																				
Pteriidae	*Pteria* sp. 1																				
Rissoidae	Rissoidae sp. 1																				
Solemyidae	*Solemya australis*		1				2						1								1
Tellinidae	*Tellina* sp. 1																				
Tellinidae	*Tellina* sp. 2																				
Tellinidae	*Tellina* sp. 3																				
Tellinidae	*Tellina* sp. 4																				
Trochidae	Trochidae sp. 1																				
Veneridae	*Antigona* sp. 1																				
Veneridae	*Circe* sp. 1						1														
Veneridae	*Dosinia* sp. 1			1		1								1							
Veneridae	*Dosinia* sp. 2																			1	
Veneridae	*Dosinia* sp. 3																				
Veneridae	*Paphia* sp. 1																				
Veneridae	Veneridae juv																				
Vulsellidae	*Electroma* sp. 1																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Bryozoa	Bryozoa fan																				
Echinodermata																					
Asteroidea	Asteroidea sp. 1																				
Echinoidea	Echinoidea juv																				
Holothuroidea	Holothuroidea sp. 1																				
Holothuroidea	Holothuroidea sp. 2																				
Holothuroidea	Holothuroidea sp. 3																				
Ophiuroidea	Ophiuroidea sp. 1				1			1	4					1		1					1
Toxopneustidae	Toxopneustidae sp. 1																				
Chordata																					
Ascidiacea	Ascidiacea sp. 1																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site PS3																					
Porifera	Porifera																				
Cnidaria																					
Actiniaria	Actiniaria sp. 1																				
Actiniaria	Actiniaria sp. 2																				
Hexacorallia	Hexacorallia sp. 1																				
Nemertea	Nemertea																				
Nematoda	Nematoda													1							1
Annelida																					
Amphinomidae	Amphinomidae																				
Aphroditidae	Pontogenia sp. 1												1								
Capitellidae	*Capitella* sp. 1					1		2									1				
Capitellidae	*Notomastus* sp. 1							1			1			1							
Chrysopetalidae	Chrysopetalidae sp. 1																				
Cirratulidae	Cirratulidae sp. 1						1														
Cirratulidae	Cirratulidae sp. 2																				
Dorvillidae	Dorvillidae sp. 1				1												1			1	
Eunicidae	*Eunice* sp. 1											1	1	1							
Eunicidae	*Marphysa* sp. 1		1				1														
Eunicidae	*Lysidice unicornis*		1						1												
Flabelligeridae	*Pherusa* sp. 1																				
Glyceridae	*Glycera* sp. 1										1										
Goniadidae	Goniada sp. 1																				
Hesionidae	Hesionidae sp. 1																				
Lumbrineridae	*Lumbrineris* sp. 1		1									1					2			1	1
Magelonidae	*Magelona* sp. 1																				
Maldanidae	*Axiothella* sp. 1													1							
Nephtyidae	*Aglaophamus* sp. 1									1											
Nereididae	Nereididae sp. 1															1					
Nereididae	Nereididae sp. 2																				
Oenonidae	*Arabella longipedata*																				
Onuphidae	*Onuphis holobranchiata*																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Onuphidae	Rhamphobrachium sp. 1																				
Opheliidae	Armandia sp. 1																				
Orbiniidae	Orbiniidae sp. 1													1							
Paraonidae	Aricidea sp. 1							3				2			1		1				
Phyllodocidae	Phyllodocidae sp. 1									1											
Poecilochaetidae	*Poecilochaetus serpens*																				
Polynoidae	Polynoidae sp. 1							2	1		1										
Sabellidae	Sabellidae sp. 1																				
Sigalionidae	*Pholoides mendeleevi*																				
Sigalionidae	Sigalionidae sp. 1	1															1		1		
Sphaerodoridae	*Sphaerodoropsis heteropapillata*																				
Spionidae	Spionidae sp. 1				1			1						1							
Spionidae	Spionidae sp. 2																				
Syllidae	Syllidae sp. 1			1												1					
Syllidae	Syllidae sp. 2											2									
Syllidae	Syllidae sp. 3																				
Syllidae	Syllidae sp. 4																				
Terebellidae	Terebellidae sp. 1																				
Trichobranchidae	Trichobranchidae sp. 1																				
Echuira	Echuira		1																		
Sipuncula	Sipuncula																	1			
Crustacea																					
Alpheidae	*Alpheus* sp. 1																				
Ampeliscidae	Ampeliscidae sp. 1								1												
Anthuridea	Anthuridea sp. 1	3	1	1			1														
Aoridae	Aoridae sp. 1										1		1								
Apseudidae	Apseudidae sp. 1		2	3	3		3	2	1	2	1		1	2	1	2					1
Arcturidae	Arcturidae sp. 1																				
Atyidae	Atyidae sp. 1																				
Bodotriidae	Bodotriidae sp. 1															1					
Callianassidae	Callianassidae sp. 1																1				
Caprellidae	Caprellidae sp. 1																				
Caridea	Caridea damaged																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ceinidae	c.f.Ceinidae sp. 1																				
Ceratocumatidae	Ceratocumatidae sp. 1		1																		
Cirolanidae	Cirolanidae sp. 1																				
Copepoda	Copepoda																				
Corophiidae	Corophiidae sp. 1			1																	
Crustacea	Crustacea sp. 1																				
Cyproideidae	Cyproideidae sp. 1																				
Dexaminidae	Dexaminidae sp. 1				1			1					1								
Diogenidae	Diogenidae sp. 1																				
Gnathiidae	Gnathiidae sp. 1												1							1	
Grapsidae	Grapsidae sp. 1																				
Gynodiastylidae	Gynodiastylidae sp. 1					1															1
Hymenosomatidae	Hymenosomatidae sp. 1																				
Ischyroceridae	Ischyroceridae sp. 1	1		2									1			1				1	2
Isopoda	Isopoda sp. 1																				
Joeropsididae	Joeropsididae sp. 1				1						1										
Leptostraca	Leptostraca sp. 1																				
Leucosiidae	Cryptocnemus sp. 1																				
Leucothoidae	Leucothoidae sp. 1																				
Liljeborgiidae	Liljeborgiidae sp. 1																				
Limnoriidae	Limnoriidae sp. 1																				
Lysianassidae	Lysianassidae sp. 1																			1	
Maeridae	Maeridae sp. 1																				
Melitidae	Melitidae sp. 1			4	1	4						2									
Munnidae	Munnidae sp. 1																				
Mysidae	Mysidae sp. 1																				
Ochlesidae	Ochlesidae sp. 1																				
Ocypodidae	Ocypodidae sp. 1	1																			
Ostracoda	Ostracoda sp. 1				1		1														
Ostracoda	Ostracoda sp. 2	3	2			1											1				
Ostracoda	Ostracoda sp. 3				1					2											
Ostracoda	Ostracoda sp. 4																				
Oxycephalidae	Oxycephalidae sp. 1			1																	

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Penaeidae	Penaeidae sp. 1																				
Phoxocephalidae	Phoxocephalidae sp. 1		1					1		1	4		1			2		1			
Pilumnidae	Pilumnidae sp. 1																				
Platyischnopidae	Platyischnopidae sp. 1																				
Podoceridae	Podoceridae sp. 1																				
Portunidae	Portunidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 2																				
Pycnogonida	Pycnogonida sp. 1																				
Sphaeromatidae	Chitonopsis sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 2		1																		
Sphaeromatidae	Sphaeromatidae sp. 3																				
Squillidae	Belosquilla sp. 1																				
Tanaididae	Tanaididae sp. 1																				
Zobrachoidae	Zobrachoidae sp. 1																				
c.f.Hognathidae	c.f.Hognathidae sp. 1																				
Mollusca																					
Anatomidae	Anatomidae sp. 1																				
Aplysiidae	Aplysiidae sp. 1																	1			
Architectonicidae	Architectonicidae sp. 1																				
Cerithiidae	Cerithiidae sp. 1																				
Corbulidae	*Corbula* sp. 1																				
Cuspidariidae	Cuspidariidae sp. 1																				
Cylichnidae	Cylichnidae sp. 1																				
Eulimidae	Eulimidae sp. 1																				
Gastropoda	Gastropoda juv																				
Glycymerididae	*Glycymeris* sp. 1																				
Hiatellidae	Hiatella sp. 1								1			1									
Lasaeidae	*Curvemysella paula*																				
Limidae	Limidae sp. 1							1					1			1				2	
Lucinidae	Lucinidae sp. 1																				
Mactridae	*Mactra* sp. 1																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Mactridae	*Mactra* sp. 2																				
Myochamidae	*Myochama* sp. 1																				
Mytillidae	*Modiolus* sp. 1								1												
Mytillidae	*Modiolus* sp. 2					1															
Mytillidae	*Musculus coenobitus*															1					
Mytillidae	*Musculus* sp. 1																				
Nassaridae	*Nassarius* sp. 1																				
Naticidae	*Natica* sp. 1																				
Naticidae	*Natica* sp. 2																				
Nuculanidae	*Saccella darwini*																				
Nuculidae	*Ennucula* sp. 1																				
Olividae	*Phenacovolva* sp. 1																				
Ostreidae	Ostreidae sp. 1																				
Patellidae	Patellidae sp. 1		1													2					
Pleurotomariidae	Pleurotomariidae sp. 1																				
Polyplacophora	Polyplacophora sp. 1							1							2	1			1		
Polyplacophora	Polyplacophora sp. 2					1															
Pteriidae	*Pteria* sp. 1																				
Rissoidae	Rissoidae sp. 1																				
Solemyidae	*Solemya australis*		1		2								1								
Tellinidae	*Tellina* sp. 1																				1
Tellinidae	*Tellina* sp. 2																				
Tellinidae	*Tellina* sp. 3						1														
Tellinidae	*Tellina* sp. 4																				
Trochidae	Trochidae sp. 1																				
Veneridae	*Antigona* sp. 1																				
Veneridae	*Circe* sp. 1																				
Veneridae	*Dosinia* sp. 1			1		1					1		1							1	
Veneridae	*Dosinia* sp. 2																				
Veneridae	*Dosinia* sp. 3																				
Veneridae	*Paphia* sp. 1																				
Veneridae	Veneridae juv																				
Vulsellidae	*Electroma* sp. 1																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Bryozoa	Bryozoa fan																				
Echinodermata																					
Asteroidea	Asteroidea sp. 1															1					
Echinoidae	Echinoidea juv		1																		
Holothuroidea	Holothuroidea sp. 1																				
Holothuroidea	Holothuroidea sp. 2					1															
Holothuroidea	Holothuroidea sp. 3																				
Ophiuroidea	Ophiuroidea sp. 1	2		1					1			1	1		1	2			1		1
Toxopneustidae	Toxopneustidae sp. 1												1								
Chordata																					
Ascidiacea	Ascidiacea sp. 1																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site PS4																					
Porifera	Porifera																				
Cnidaria																					
Actiniaria	Actiniaria sp. 1																				
Actiniaria	Actiniaria sp. 2																				
Hexacorallia	Hexacorallia sp. 1																				
Nemertea	Nemertea																				1
Nematoda	Nematoda																				
Annelida																					
Amphinomidae	Amphinomidae																				
Aphroditidae	Pontogenia sp. 1																				
Capitellidae	*Capitella* sp. 1		1			1															
Capitellidae	*Notomastus* sp. 1								1		1							1			
Chrysopetalidae	Chrysopetalidae sp. 1																				
Cirratulidae	Cirratulidae sp. 1																				
Cirratulidae	Cirratulidae sp. 2																				
Dorvilleidae	Dorvilleidae sp. 1																			1	
Eunicidae	*Eunice* sp. 1	1				1						1			1						2
Eunicidae	*Marphysa* sp. 1									1											
Eunicidae	*Lysidice unicornis*					1						1	1								2
Flabelligeridae	*Pherusa* sp. 1																				
Glyceridae	*Glycera* sp. 1																				
Goniadidae	Goniada sp. 1																				
Hesionidae	Hesionidae sp. 1																				
Lumbrineridae	*Lumbrineris* sp. 1																			1	
Magelonidae	*Magelona* sp. 1									1											
Maldanidae	*Axiothella* sp. 1																				
Nephtyidae	*Aglaophamus* sp. 1												1						2		
Nereididae	Nereididae sp. 1					2															
Nereididae	Nereididae sp. 2																				
Oenonidae	*Arabella longipedata*					1															
Onuphidae	*Onuphis holobranchiata*																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Onuphidae	Rhamphobrachium sp. 1								1												
Opheliidae	Armandia sp. 1																				
Orbiniidae	Orbiniidae sp. 1																				
Paraonidae	Aricidea sp. 1			1		1									1	1		5		1	
Phyllodocidae	Phyllodocidae sp. 1			1	1																
Poecilochaetidae	*Poecilochaetus serpens*																				
Polynoidae	Polynoidae sp. 1										1										
Sabellidae	Sabellidae sp. 1																				
Sigalionidae	*Pholoides mendeleevi*																				
Sigalionidae	Sigalionidae sp. 1			1												1					
Sphaerodoridae	*Sphaerodoropsis heteropapillata*																				
Spionidae	Spionidae sp. 1																				
Spionidae	Spionidae sp. 2																				
Syllidae	Syllidae sp. 1				1					1											
Syllidae	Syllidae sp. 2										1	2		1							
Syllidae	Syllidae sp. 3																				
Syllidae	Syllidae sp. 4																		1		
Terebellidae	Terebellidae sp. 1																				
Trichobranchidae	Trichobranchidae sp. 1																				
Echuira	Echuira												1		1						
Sipuncula	Sipuncula					2								1			1	1			
Crustacea																					
Alpheidae	*Alpheus* sp. 1																				
Ampeliscidae	Ampeliscidae sp. 1																				
Anthuridea	Anthuridea sp. 1																				
Aoridae	Aoridae sp. 1													1							
Apseudidae	Apseudidae sp. 1	1	2		6	5	1				1	2				2		3			
Arcturidae	Arcturidae sp. 1																				
Atyidae	Atyidae sp. 1																				
Bodotriidae	Bodotriidae sp. 1							1													
Callianassidae	Callianassidae sp. 1																				
Caprellidae	Caprellidae sp. 1																				
Caridea	Caridea damaged																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ceinidae	c.f.Ceinidae sp. 1																				
Ceratocumatidae	Ceratocumatidae sp. 1																				
Cirolanidae	Cirolanidae sp. 1																				
Copepoda	Copepoda			1								1	1			1					
Corophiidae	Corophiidae sp. 1																				
Crustacea	Crustacea sp. 1																				
Cyproideidae	Cyproideidae sp. 1																				
Dexaminidae	Dexaminidae sp. 1					1								1				1			
Diogenidae	Diogenidae sp. 1																				
Gnathiidae	Gnathiidae sp. 1																				
Grapsidae	Grapsidae sp. 1																				
Gynodiastylidae	Gynodiastylidae sp. 1																		2	1	
Hymenosomatidae	Hymenosomatidae sp. 1																				
Ischyroceridae	Ischyroceridae sp. 1							1				1	1	1							
Isopoda	Isopoda sp. 1																				
Joeropsididae	Joeropsididae sp. 1			1					1											1	
Leptostraca	Leptostraca sp. 1																			1	
Leucosiidae	Cryptocnemus sp. 1																				
Leucothoidae	Leucothoidae sp. 1																				
Lilijeborgiidae	Lilijeborgiidae sp. 1																				
Limnoriidae	Limnoriidae sp. 1																				
Lysianassidae	Lysianassidae sp. 1																				
Maeridae	Maeridae sp. 1																				
Melitidae	Melitidae sp. 1					1					1									14	
Munnidae	Munnidae sp. 1																				
Mysidae	Mysidae sp. 1																				
Ochlesidae	Ochlesidae sp. 1																				
Ocypodidae	Ocypodidae sp. 1																				
Ostracoda	Ostracoda sp. 1											2									
Ostracoda	Ostracoda sp. 2		1	2																	
Ostracoda	Ostracoda sp. 3	2					1														
Ostracoda	Ostracoda sp. 4																				
Oxycephalidae	Oxycephalidae sp. 1																		1		

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Penaeidae	Penaeidae sp. 1																				
Phoxocephalidae	Phoxocephalidae sp. 1		1	3		1		1	1						1						
Pilumnidae	Pilumnidae sp. 1																				
Platyischnopidae	Platyischnopidae sp. 1																				
Podoceridae	Podoceridae sp. 1																				
Portunidae	Portunidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 1					2					1		1						2		
Pseudozeuxidae	Pseudozeuxidae sp. 2																				
Pycnogonida	Pycnogonida sp. 1																				
Sphaeromatidae	Chitonopsis sp. 1											1									
Sphaeromatidae	Sphaeromatidae sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 2	1																			
Sphaeromatidae	Sphaeromatidae sp. 3																				
Squillidae	Belosquilla sp. 1																				
Tanaididae	Tanaididae sp. 1					2															
Zobrachoidae	Zobrachoidae sp. 1																				
c.f.Hognathidae	c.f.Hognathidae sp. 1																				
Mollusca																					
Anatomidae	Anatomidae sp. 1																				
Aplysiidae	Aplysiidae sp. 1																				
Architectonicidae	Architectonicidae sp. 1																				
Cerithiidae	Cerithiidae sp. 1																				
Corbulidae	*Corbula* sp. 1																				
Cuspidariidae	Cuspidariidae sp. 1																				
Cylichnidae	Cylichnidae sp. 1																				
Eulimidae	Eulimidae sp. 1													1							
Gastropoda	Gastropoda juv																				
Glycymerididae	*Glycymeris* sp. 1																	1			
Hiatellidae	Hiatella sp. 1											1									
Lasaeidae	*Curvemysella paula*																				
Limidae	Limidae sp. 1								3												
Lucinidae	Lucinidae sp. 1																				
Mactridae	*Mactra* sp. 1																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Mactridae	*Mactra* sp. 2																				
Myochamidae	*Myochama* sp. 1																				
Mytillidae	*Modiolus* sp. 1																1				
Mytillidae	*Modiolus* sp. 2					2															
Mytillidae	*Musculus coenobitus*													1							
Mytillidae	*Musculus* sp. 1					1															
Nassaridae	*Nassarius* sp. 1																				
Naticidae	*Natica* sp. 1																				
Naticidae	*Natica* sp. 2																				
Nuculanidae	*Saccella darwini*																				
Nuculidae	*Ennucula* sp. 1																				
Olividae	*Phenacovolva* sp. 1																				
Ostreidae	Ostreidae sp. 1																				
Patellidae	Patellidae sp. 1					1															1
Pleurotomariidae	Pleurotomariidae sp. 1																				
Polyplacophora	Polyplacophora sp. 1								1										1		
Polyplacophora	Polyplacophora sp. 2																				
Pteriidae	*Pteria* sp. 1																				
Rissoidae	Rissoidae sp. 1																				
Solemyidae	*Solemya australis*																				
Tellinidae	*Tellina* sp. 1																				
Tellinidae	*Tellina* sp. 2												1								
Tellinidae	*Tellina* sp. 3																				
Tellinidae	*Tellina* sp. 4																				
Trochidae	Trochidae sp. 1																				
Veneridae	*Antigona* sp. 1																				
Veneridae	*Circe* sp. 1	1				1								1							
Veneridae	*Dosinia* sp. 1				1	1		1													
Veneridae	*Dosinia* sp. 2																				
Veneridae	*Dosinia* sp. 3					2															
Veneridae	*Paphia* sp. 1																				
Veneridae	Veneridae juv																				
Vulsellidae	*Electroma* sp. 1																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Bryozoa	Bryozoa fan																				
Echinodermata																					
Asteroidea	Asteroidea sp. 1																				
Echinoidea	Echinoidea juv																				
Holothuroidea	Holothuroidea sp. 1																				
Holothuroidea	Holothuroidea sp. 2																				
Holothuroidea	Holothuroidea sp. 3																				
Ophiuroidea	Ophiuroidea sp. 1				1				1	1										1	
Toxopneustidae	Toxopneustidae sp. 1																				
Chordata																					
Ascidiacea	Ascidiacea sp. 1																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site PS5																					
Porifera	Porifera																				
Cnidaria																					
Actiniaria	Actiniaria sp. 1																				
Actiniaria	Actiniaria sp. 2																				
Hexacorallia	Hexacorallia sp. 1																				
Nemertea	Nemertea																				
Nematoda	Nematoda																				
Annelida																					
Amphinomidae	Amphinomidae																				
Aphroditidae	Pontogenia sp. 1																				
Capitellidae	*Capitella* sp. 1				1				1				1			1					
Capitellidae	*Notomastus* sp. 1							1						1							
Chrysopetalidae	Chrysopetalidae sp. 1																				
Cirratulidae	Cirratulidae sp. 1																				
Cirratulidae	Cirratulidae sp. 2																				
Dorvilleidae	Dorvilleidae sp. 1					2															
Eunicidae	*Eunice* sp. 1																				
Eunicidae	*Marphysa* sp. 1																				
Eunicidae	*Lysidice unicornis*																				
Flabelligeridae	*Pherusa* sp. 1																				
Glyceridae	*Glycera* sp. 1																				
Goniadidae	Goniada sp. 1																				
Hesionidae	Hesionidae sp. 1																				
Lumbrineridae	*Lumbrineris* sp. 1		1											1							
Magelonidae	*Magelona* sp. 1																				
Maldanidae	*Axiothella* sp. 1																				
Nephtyidae	*Aglaophamus* sp. 1		1		1		2	4	1	2	1	1		1			1			2	2
Nereididae	Nereididae sp. 1																	1			
Nereididae	Nereididae sp. 2																				
Oenonidae	*Arabella longipedata*																				
Onuphidae	*Onuphis holobranchiata*																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Onuphidae	Rhamphobrachium sp. 1																				
Opheliidae	Armandia sp. 1																				
Orbiniidae	Orbiniidae sp. 1																				
Paraonidae	Aricidea sp. 1																				
Phyllodocidae	Phyllodocidae sp. 1					1															
Poecilochaetidae	*Poecilochaetus serpens*																				
Polynoidae	Polynoidae sp. 1																				
Sabellidae	Sabellidae sp. 1																				
Sigalionidae	*Pholoides mendeleevi*																				
Sigalionidae	Sigalionidae sp. 1																				
Sphaerodoridae	*Sphaerodoropsis heteropapillata*																				
Spionidae	Spionidae sp. 1			1				1													
Spionidae	Spionidae sp. 2																				
Syllidae	Syllidae sp. 1																				
Syllidae	Syllidae sp. 2																1				
Syllidae	Syllidae sp. 3																	1			
Syllidae	Syllidae sp. 4																				
Terebellidae	Terebellidae sp. 1				1																
Trichobranchidae	Trichobranchidae sp. 1																				
Echuira	Echuira																				
Sipuncula	Sipuncula							1											1		
Crustacea																					
Alpheidae	*Alpheus* sp. 1																				
Ampeliscidae	Ampeliscidae sp. 1				1																
Anthuridea	Anthuridea sp. 1													1							
Aoridae	Aoridae sp. 1																				
Apseudidae	Apseudidae sp. 1			2		3			1		1	1					1	1	1		
Arcturidae	Arcturidae sp. 1																				
Atyidae	Atyidae sp. 1																				
Bodotriidae	Bodotriidae sp. 1																				
Callianassidae	Callianassidae sp. 1																				
Caprellidae	Caprellidae sp. 1																				
Caridea	Caridea damaged																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ceinidae	c.f.Ceinidae sp. 1																				
Ceratocumatidae	Ceratocumatidae sp. 1																				
Cirolanidae	Cirolanidae sp. 1																				
Copepoda	Copepoda					1					1										
Corophiidae	Corophiidae sp. 1																				
Crustacea	Crustacea sp. 1																				
Cyproideidae	Cyproideidae sp. 1																				
Dexaminidae	Dexaminidae sp. 1																				
Diogenidae	Diogenidae sp. 1																				
Gnathiidae	Gnathiidae sp. 1																				
Grapsidae	Grapsidae sp. 1																				
Gynodiastylidae	Gynodiastylidae sp. 1									1											
Hymenosomatidae	Hymenosomatidae sp. 1																				
Ischyroceridae	Ischyroceridae sp. 1				2											1	1	2	1		
Isopoda	Isopoda sp. 1																				
Joeropsididae	Joeropsididae sp. 1																				
Leptostraca	Leptostraca sp. 1																				
Leucosiidae	Cryptocnemus sp. 1																				
Leucothoidae	Leucothoidae sp. 1																	1			
Lilijeborgiidae	Lilijeborgiidae sp. 1																				
Limnoriidae	Limnoriidae sp. 1																				
Lysianassidae	Lysianassidae sp. 1																				
Maeridae	Maeridae sp. 1																				
Melitidae	Melitidae sp. 1					2											1				
Munnidae	Munnidae sp. 1																				
Mysidae	Mysidae sp. 1																				
Ochlesidae	Ochlesidae sp. 1																				
Ocypodidae	Ocypodidae sp. 1																				
Ostracoda	Ostracoda sp. 1		1			1				1											
Ostracoda	Ostracoda sp. 2																	1			
Ostracoda	Ostracoda sp. 3																				
Ostracoda	Ostracoda sp. 4																				
Oxycephalidae	Oxycephalidae sp. 1																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Penaeidae	Penaeidae sp. 1																				
Phoxocephalidae	Phoxocephalidae sp. 1						1		1		1										1
Pilumnidae	Pilumnidae sp. 1																				
Platyischnopidae	Platyischnopidae sp. 1																	1			
Podoceridae	Podoceridae sp. 1																				
Portunidae	Portunidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 2																				
Pycnogonida	Pycnogonida sp. 1																				
Sphaeromatidae	Chitonopsis sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 2																				
Sphaeromatidae	Sphaeromatidae sp. 3																				
Squillidae	Belosquilla sp. 1																				
Tanaididae	Tanaididae sp. 1																				
Zobrachoidae	Zobrachoidae sp. 1																				
c.f.Hognathidae	c.f.Hognathidae sp. 1																				
Mollusca																					
Anatomidae	Anatomidae sp. 1																				
Aplysiidae	Aplysiidae sp. 1																				
Architectonicidae	Architectonicidae sp. 1																				
Cerithiidae	Cerithiidae sp. 1																				
Corbulidae	*Corbula* sp. 1																				
Cuspidariidae	Cuspidariidae sp. 1																				
Cylichnidae	Cylichnidae sp. 1																1				
Eulimidae	Eulimidae sp. 1																				
Gastropoda	Gastropoda juv																				
Glycymerididae	*Glycymeris* sp. 1																				
Hiatellidae	Hiatella sp. 1			1																	
Lasaeidae	*Curvemysella paula*																				
Limidae	Limidae sp. 1																				
Lucinidae	Lucinidae sp. 1																				
Mactridae	*Mactra* sp. 1	1																			

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Mactridae	*Mactra* sp. 2																				
Myochamidae	*Myochama* sp. 1																				
Mytillidae	*Modiolus* sp. 1							1									1				
Mytillidae	*Modiolus* sp. 2		1			3											1				1
Mytillidae	*Musculus coenobitus*																				
Mytillidae	*Musculus* sp. 1													2		1					1
Nassaridae	*Nassarius* sp. 1																				
Naticidae	*Natica* sp. 1																				
Naticidae	*Natica* sp. 2																				
Nuculanidae	*Saccella darwini*																				
Nuculidae	*Ennucula* sp. 1																				
Olividae	*Phenacovolva* sp. 1																				
Ostreidae	Ostreidae sp. 1																				
Patellidae	Patellidae sp. 1																	2			
Pleurotomariidae	Pleurotomariidae sp. 1																				
Polyplacophora	Polyplacophora sp. 1					1						1		1							
Polyplacophora	Polyplacophora sp. 2																				
Pteriidae	*Pteria* sp. 1																				
Rissoidae	Rissoidae sp. 1																				
Solemyidae	*Solemya australis*		1					1	1									1			
Tellinidae	*Tellina* sp. 1											1						1			1
Tellinidae	*Tellina* sp. 2																				
Tellinidae	*Tellina* sp. 3																				
Tellinidae	*Tellina* sp. 4																				
Trochidae	Trochidae sp. 1																				
Veneridae	*Antigona* sp. 1																				1
Veneridae	*Circe* sp. 1					2															
Veneridae	*Dosinia* sp. 1				1					1		1		1		1					
Veneridae	*Dosinia* sp. 2																		1		
Veneridae	*Dosinia* sp. 3																				
Veneridae	*Paphia* sp. 1																				
Veneridae	Veneridae juv																				
Vulsellidae	*Electroma* sp. 1																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Bryozoa	Bryozoa fan																				
Echinodermata																					
Asteroidea	Asteroidea sp. 1																				
Echinoidea	Echinoidea juv																				
Holothuroidea	Holothuroidea sp. 1																				
Holothuroidea	Holothuroidea sp. 2																				
Holothuroidea	Holothuroidea sp. 3																				
Ophiuroidea	Ophiuroidea sp. 1	1				3											1	1	1	1	
Toxopneustidae	Toxopneustidae sp. 1																				
Chordata																					
Ascidiacea	Ascidiacea sp. 1																				

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site AP1																					
Porifera	Porifera																				
Cnidaria																					
Actiniaria	Actiniaria sp. 1												1								
Actiniaria	Actiniaria sp. 2																				
Hexacorallia	Hexacorallia sp. 1																				
Nemertea	Nemertea																				
Nematoda	Nematoda	3			1	1										4		1			4
Annelida																					
Amphinomidae	Amphinomidae																				
Aphroditidae	Pontogenia sp. 1																				
Capitellidae	*Capitella* sp. 1	1					1			2						1	3	2			
Capitellidae	*Notomastus* sp. 1																				
Chrysopetalidae	Chrysopetalidae sp. 1																				
Cirratulidae	Cirratulidae sp. 1																				
Cirratulidae	Cirratulidae sp. 2																				
Dorvilleidae	Dorvilleidae sp. 1	1	1			3							1			2			1		1
Eunicidae	*Eunice* sp. 1						1										1				
Eunicidae	*Marphysa* sp. 1																				
Eunicidae	*Lysidice unicornis*			1				1	2	1											
Flabelligeridae	*Pherusa* sp. 1																				
Glyceridae	*Glycera* sp. 1																				
Goniadidae	Goniada sp. 1																				
Hesionidae	Hesionidae sp. 1					1															
Lumbrineridae	*Lumbrineris* sp. 1						1			1							1				
Magelonidae	*Magelona* sp. 1																				
Maldanidae	*Axiothella* sp. 1				1																
Nephtyidae	*Aglaophamus* sp. 1							2													
Nereididae	Nereididae sp. 1		2						1			2				1					
Nereididae	Nereididae sp. 2																				
Oenonidae	*Arabella longipedata*																				
Onuphidae	*Onuphis holobranchiata*				1												1				

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Onuphidae	Rhamphobrachium sp. 1																				
Opheliidae	Armandia sp. 1															2					
Orbiniidae	Orbiniidae sp. 1																				
Paraonidae	Aricidea sp. 1	1		1		2	2	2	2								3	1			
Phyllodocidae	Phyllodocidae sp. 1																				
Poecilochaetidae	*Poecilochaetus serpens*																				
Polynoidae	Polynoidae sp. 1																				
Sabellidae	Sabellidae sp. 1																		1		
Sigalionidae	*Pholoides mendeleevi*																				
Sigalionidae	Sigalionidae sp. 1																				
Sphaerodoridae	*Sphaerodoropsis heteropapillata*			1																	
Spionidae	Spionidae sp. 1	1														1	2				
Spionidae	Spionidae sp. 2																				
Syllidae	Syllidae sp. 1				1	1						2					1				3
Syllidae	Syllidae sp. 2			1		2			1										2		
Syllidae	Syllidae sp. 3			1																	
Syllidae	Syllidae sp. 4																				
Terebellidae	Terebellidae sp. 1																				
Trichobranchidae	Trichobranchidae sp. 1																				
Echuira	Echuira																				
Sipuncula	Sipuncula				1																
Crustacea																					
Alpheidae	*Alpheus* sp. 1																				
Ampeliscidae	Ampeliscidae sp. 1	1		1																	
Anthuridea	Anthuridea sp. 1				1					2			1			1			1		
Aoridae	Aoridae sp. 1								3												
Apseudidae	Apseudidae sp. 1	4	3		1	2	8	1	4	11	1	3	1	5		4	5		6	15	5
Arcturidae	Arcturidae sp. 1																				
Atyidae	Atyidae sp. 1																				
Bodotriidae	Bodotriidae sp. 1												2	1					1		
Callianassidae	Callianassidae sp. 1																				
Caprellidae	Caprellidae sp. 1																				
Caridea	Caridea damaged														1						

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ceinidae	c.f.Ceinidae sp. 1																		1		
Ceratocumatidae	Ceratocumatidae sp. 1																				
Cirolanidae	Cirolanidae sp. 1																				
Copepoda	Copepoda																				
Corophiidae	Corophiidae sp. 1																				
Crustacea	Crustacea sp. 1																				
Cyproideidae	Cyproideidae sp. 1																				
Dexaminidae	Dexaminidae sp. 1							1				1		1	2	3				1	
Diogenidae	Diogenidae sp. 1																				
Gnathiidae	Gnathiidae sp. 1																				
Grapsidae	Grapsidae sp. 1																			1	
Gynodiastylidae	Gynodiastylidae sp. 1																				
Hymenosomatidae	Hymenosomatidae sp. 1																				
Ischyroceridae	Ischyroceridae sp. 1											3		6	3			1	1	3	1
Isopoda	Isopoda sp. 1																				
Joeropsididae	Joeropsididae sp. 1								2	1	2	1	1		2	1			1		
Leptostraca	Leptostraca sp. 1																				
Leucosiidae	Cryptocnemus sp. 1																				
Leucothoidae	Leucothoidae sp. 1															1					
Liljeborgiidae	Liljeborgiidae sp. 1																				
Limnoriidae	Limnoriidae sp. 1																				
Lysianassidae	Lysianassidae sp. 1	1																			
Maeridae	Maeridae sp. 1																				
Melitidae	Melitidae sp. 1		2	3		3		1	3	2	3	1	3	2		2		1	3	1	
Munnidae	Munnidae sp. 1																				
Mysidae	Mysidae sp. 1																				
Ochlesidae	Ochlesidae sp. 1																				
Ocypodidae	Ocypodidae sp. 1																				
Ostracoda	Ostracoda sp. 1	1							1			3		1	1						
Ostracoda	Ostracoda sp. 2	1									1				1	1					
Ostracoda	Ostracoda sp. 3											1							1		
Ostracoda	Ostracoda sp. 4																				
Oxycephalidae	Oxycephalidae sp. 1																			1	

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Penaeidae	Penaeidae sp. 1																				
Phoxocephalidae	Phoxocephalidae sp. 1	1		1	2						1	1	2	2	1						1
Pilumnidae	Pilumnidae sp. 1																				
Platyischnopidae	Platyischnopidae sp. 1																				
Podoceridae	Podoceridae sp. 1																				
Portunidae	Portunidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 2					1												1			
Pycnogonida	Pycnogonida sp. 1																				
Sphaeromatidae	Chitonopsis sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 2																				
Sphaeromatidae	Sphaeromatidae sp. 3																				
Squillidae	Belosquilla sp. 1																				
Tanaididae	Tanaididae sp. 1							2													
Zobrachoidae	Zobrachoidae sp. 1																				
c.f.Hognathidae	c.f.Hognathidae sp. 1																				
Mollusca																					
Anatomidae	Anatomidae sp. 1																1				
Aplysiidae	Aplysiidae sp. 1																				
Architectonicidae	Architectonicidae sp. 1											2									
Cerithiidae	Cerithiidae sp. 1																				
Corbulidae	*Corbula* sp. 1																				
Cuspidariidae	Cuspidariidae sp. 1																				
Cylichnidae	Cylichnidae sp. 1																				
Eulimidae	Eulimidae sp. 1																				
Gastropoda	Gastropoda juv																				
Glycymerididae	*Glycymeris* sp. 1																				
Hiatellidae	Hiatella sp. 1																				
Lasaeidae	*Curvemysella paula*																				
Limidae	Limidae sp. 1																				
Lucinidae	Lucinidae sp. 1															1					
Mactridae	*Mactra* sp. 1																				

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Mactridae	*Mactra* sp. 2																				
Myochamidae	*Myochama* sp. 1																				
Mytillidae	*Modiolus* sp. 1																				
Mytillidae	*Modiolus* sp. 2				1												1				
Mytillidae	*Musculus coenobitus*							2	1	2		1									
Mytillidae	*Musculus* sp. 1														1						
Nassaridae	*Nassarius* sp. 1																				
Naticidae	*Natica* sp. 1								1												
Naticidae	*Natica* sp. 2																				
Nuculanidae	*Saccella darwini*																				
Nuculidae	*Ennucula* sp. 1		1		1				1					1							
Olividae	*Phenacovolva* sp. 1																				
Ostreidae	Ostreidae sp. 1																				
Patellidae	Patellidae sp. 1						1					1								1	
Pleurotomariidae	Pleurotomariidae sp. 1																				
Polyplacophora	Polyplacophora sp. 1											2	2	1		1	1	1		1	
Polyplacophora	Polyplacophora sp. 2																				
Pteriidae	*Pteria* sp. 1																				
Rissoidae	Rissoidae sp. 1																				
Solemyidae	*Solemya australis*	10	1	2		1			1	4	1		1			5					
Tellinidae	*Tellina* sp. 1													1							
Tellinidae	*Tellina* sp. 2																				
Tellinidae	*Tellina* sp. 3																				
Tellinidae	*Tellina* sp. 4																				
Trochidae	Trochidae sp. 1																				
Veneridae	*Antigona* sp. 1																				
Veneridae	*Circe* sp. 1		1										1		1						
Veneridae	*Dosinia* sp. 1	1																1			
Veneridae	*Dosinia* sp. 2																				
Veneridae	*Dosinia* sp. 3																				
Veneridae	*Paphia* sp. 1																				
Veneridae	Veneridae juv																				
Vulsellidae	*Electroma* sp. 1																				

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Bryozoa	Bryozoa fan																				
Echinodermata																					
Asteroidea	Asteroidea sp. 1																				
Echinoidea	Echinoidea juv	1																			
Holothuroidea	Holothuroidea sp. 1								1												
Holothuroidea	Holothuroidea sp. 2																				
Holothuroidea	Holothuroidea sp. 3																				
Ophiuroidea	Ophiuroidea sp. 1			1		2			2			1		1	1	1	1	1			
Toxopneustidae	Toxopneustidae sp. 1													1				1			
Chordata																					
Ascidiacea	Ascidiacea sp. 1																				

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site AP2																					
Porifera	Porifera														1						
Cnidaria																					
Actiniaria	Actiniaria sp. 1																				
Actiniaria	Actiniaria sp. 2																				
Hexacorallia	Hexacorallia sp. 1																				
Nemertea	Nemertea																				1
Nematoda	Nematoda			14											2						
Annelida																					
Amphinomidae	Amphinomidae																				
Aphroditidae	Pontogenia sp. 1																				
Capitellidae	*Capitella* sp. 1									1			1		1						
Capitellidae	*Notomastus* sp. 1												1								1
Chrysopetalidae	Chrysopetalidae sp. 1																				
Cirratulidae	Cirratulidae sp. 1																				
Cirratulidae	Cirratulidae sp. 2																				
Dorvilleidae	Dorvilleidae sp. 1	1												1	1		1		1		
Eunicidae	*Eunice* sp. 1					1								1						2	
Eunicidae	*Marphysa* sp. 1																				
Eunicidae	*Lysidice unicornis*	1									1										
Flabelligeridae	*Pherusa* sp. 1																				
Glyceridae	*Glycera* sp. 1							1													
Goniadidae	Goniada sp. 1																				
Hesionidae	Hesionidae sp. 1																				
Lumbrineridae	*Lumbrineris* sp. 1								1					1					2	1	
Magelonidae	*Magelona* sp. 1																				
Maldanidae	*Axiothella* sp. 1																				
Nephtyidae	*Aglaophamus* sp. 1	1		1																	
Nereididae	Nereididae sp. 1					1								1							
Nereididae	Nereididae sp. 2	1																			
Oenonidae	*Arabella longipedata*																				
Onuphidae	*Onuphis holobranchiata*																1		1		1

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Onuphidae	Rhamphobrachium sp. 1																				
Opheliidae	Armandia sp. 1										1						1		3		2
Orbiniidae	Orbiniidae sp. 1			1																	
Paraonidae	Aricidea sp. 1	1														1	1	1			
Phyllodocidae	Phyllodocidae sp. 1																			1	
Poecilochaetidae	*Poecilochaetus serpens*																				
Polynoidae	Polynoidae sp. 1			2																	
Sabellidae	Sabellidae sp. 1																				
Sigalionidae	*Pholoides mendeleevi*																				
Sigalionidae	Sigalionidae sp. 1																		1		
Sphaerodoridae	*Sphaerodoropsis heteropapillata*																				
Spionidae	Spionidae sp. 1						2			1							1				
Spionidae	Spionidae sp. 2																				
Syllidae	Syllidae sp. 1			3				1					2	1	3				1	1	
Syllidae	Syllidae sp. 2			2																	
Syllidae	Syllidae sp. 3					1															
Syllidae	Syllidae sp. 4																				
Terebellidae	Terebellidae sp. 1																				
Trichobranchidae	Trichobranchidae sp. 1																				
Echuira	Echuira																				
Sipuncula	Sipuncula																				
Crustacea																					
Alpheidae	*Alpheus* sp. 1																				
Ampeliscidae	Ampeliscidae sp. 1																		1		
Anthuridea	Anthuridea sp. 1		1		1				1				1		1						
Aoridae	Aoridae sp. 1																				
Apseudidae	Apseudidae sp. 1	1	2	2	5	3	2		3			1	1	7	5	2	13	1	4	1	3
Arcturidae	Arcturidae sp. 1																				
Atyidae	Atyidae sp. 1																				
Bodotriidae	Bodotriidae sp. 1																		2		
Callianassidae	Callianassidae sp. 1																				
Caprellidae	Caprellidae sp. 1													1			2				
Caridea	Caridea damaged																				

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ceinidae	c.f.Ceinidae sp. 1																				
Ceratocumatidae	Ceratocumatidae sp. 1				1																
Cirolanidae	Cirolanidae sp. 1				1																
Copepoda	Copepoda																				
Corophiidae	Corophiidae sp. 1																				
Crustacea	Crustacea sp. 1										1										
Cyproideidae	Cyproideidae sp. 1											1		1							
Dexaminidae	Dexaminidae sp. 1															2					1
Diogenidae	Diogenidae sp. 1																				1
Gnathiidae	Gnathiidae sp. 1					1														1	
Grapsidae	Grapsidae sp. 1																				
Gynodiastylidae	Gynodiastylidae sp. 1			1	1							1				1					
Hymenosomatidae	Hymenosomatidae sp. 1																				
Ischyroceridae	Ischyroceridae sp. 1													2	1	1		4	3	12	3
Isopoda	Isopoda sp. 1																				
Joeropsididae	Joeropsididae sp. 1					1					1	2	3			1	1		5	3	1
Leptostraca	Leptostraca sp. 1	1																			
Leucosiidae	Cryptocnemus sp. 1													1							
Leucothoidae	Leucothoidae sp. 1															2					
Liljeborgiidae	Liljeborgiidae sp. 1																				
Limnoriidae	Limnoriidae sp. 1												2								
Lysianassidae	Lysianassidae sp. 1					1													2		
Maeridae	Maeridae sp. 1																				
Melitidae	Melitidae sp. 1	1		1		8		2			21		2			15			6		6
Munnidae	Munnidae sp. 1																				
Mysidae	Mysidae sp. 1																				
Ochlesidae	Ochlesidae sp. 1				2																
Ocypodidae	Ocypodidae sp. 1																				
Ostracoda	Ostracoda sp. 1					1										1		1	1		
Ostracoda	Ostracoda sp. 2	2	1		1		1		1						1					2	
Ostracoda	Ostracoda sp. 3																		1		
Ostracoda	Ostracoda sp. 4																				
Oxycephalidae	Oxycephalidae sp. 1	1										1							1		

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Penaeidae	Penaeidae sp. 1																				
Phoxocephalidae	Phoxocephalidae sp. 1			1	1	1	1	1			2	1	1	2	1		2	3	4		
Pilumnidae	Pilumnidae sp. 1																				
Platyischnopidae	Platyischnopidae sp. 1																				
Podoceridae	Podoceridae sp. 1																	2		2	
Portunidae	Portunidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 1																	1		1	
Pseudozeuxidae	Pseudozeuxidae sp. 2				1	2															
Pycnogonida	Pycnogonida sp. 1																1				
Sphaeromatidae	Chitonopsis sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 1															2		1			
Sphaeromatidae	Sphaeromatidae sp. 2					1															
Sphaeromatidae	Sphaeromatidae sp. 3																				
Squillidae	Belosquilla sp. 1																				
Tanaididae	Tanaididae sp. 1																				
Zobrachoidae	Zobrachoidae sp. 1																	1			
c.f.Hognathidae	c.f.Hognathidae sp. 1																				
Mollusca																					
Anatomidae	Anatomidae sp. 1																		1		
Aplysiidae	Aplysiidae sp. 1																				
Architectonicidae	Architectonicidae sp. 1																				
Cerithiidae	Cerithiidae sp. 1																				
Corbulidae	*Corbula* sp. 1																				
Cuspidariidae	Cuspidariidae sp. 1																				
Cylichnidae	Cylichnidae sp. 1																				
Eulimidae	Eulimidae sp. 1															1					
Gastropoda	Gastropoda juv																				
Glycymerididae	*Glycymeris* sp. 1																				
Hiatellidae	Hiatella sp. 1														1						
Lasaeidae	*Curvemysella paula*																				
Limidae	Limidae sp. 1																				
Lucinidae	Lucinidae sp. 1																				
Mactridae	*Mactra* sp. 1																				

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Mactridae	*Mactra* sp. 2																				
Myochamidae	*Myochama* sp. 1																				
Mytillidae	*Modiolus* sp. 1							2			1						1	1			1
Mytillidae	*Modiolus* sp. 2	2		3	1	5															
Mytillidae	*Musculus coenobitus*							1						1							
Mytillidae	*Musculus* sp. 1	1			1	2								1							
Nassaridae	*Nassarius* sp. 1						1														
Naticidae	*Natica* sp. 1															1					
Naticidae	*Natica* sp. 2																				
Nuculanidae	*Saccella darwini*																				
Nuculidae	*Ennucula* sp. 1						1	1			1	1									
Olividae	*Phenacovolva* sp. 1																				
Ostreidae	Ostreidae sp. 1																				
Patellidae	Patellidae sp. 1		1												1			1			
Pleurotomariidae	Pleurotomariidae sp. 1																				
Polyplacophora	Polyplacophora sp. 1							1					1		2	1	1	1			
Polyplacophora	Polyplacophora sp. 2																				
Pteriidae	*Pteria* sp. 1																				
Rissoidae	Rissoidae sp. 1																				
Solemyidae	*Solemya australis*		1			1	1		2			1	1	1							
Tellinidae	*Tellina* sp. 1																	1			
Tellinidae	*Tellina* sp. 2																				
Tellinidae	*Tellina* sp. 3																				
Tellinidae	*Tellina* sp. 4																				
Trochidae	Trochidae sp. 1																				
Veneridae	*Antigona* sp. 1																				
Veneridae	*Circe* sp. 1											1		1						1	
Veneridae	*Dosinia* sp. 1		1				1					1								1	
Veneridae	*Dosinia* sp. 2																				
Veneridae	*Dosinia* sp. 3																				
Veneridae	*Paphia* sp. 1																				
Veneridae	Veneridae juv																				
Vulsellidae	*Electroma* sp. 1																				

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Bryozoa	Bryozoa fan																				
Echinodermata																					
Asteroidea	Asteroidea sp. 1																				
Echinoidea	Echinoidea juv																				
Holothuroidea	Holothuroidea sp. 1																				
Holothuroidea	Holothuroidea sp. 2																				
Holothuroidea	Holothuroidea sp. 3																				
Ophiuroidea	Ophiuroidea sp. 1	2															1			1	
Toxopneustidae	Toxopneustidae sp. 1																				
Chordata																					
Ascidiacea	Ascidiacea sp. 1																				

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site AP3																					
Porifera	Porifera												1						8		
Cnidaria																					
Actiniaria	Actiniaria sp. 1																				
Actiniaria	Actiniaria sp. 2																				
Hexacorallia	Hexacorallia sp. 1																				
Nemertea	Nemertea																				
Nematoda	Nematoda							2										1		3	2
Annelida																					
Amphinomidae	Amphinomidae																				
Aphroditidae	Pontogenia sp. 1																				
Capitellidae	*Capitella* sp. 1	1	1					1	1				1								
Capitellidae	*Notomastus* sp. 1																				
Chrysopetalidae	Chrysopetalidae sp. 1																				
Cirratulidae	Cirratulidae sp. 1																				
Cirratulidae	Cirratulidae sp. 2																				
Dorvilleidae	Dorvilleidae sp. 1						1											2			1
Eunicidae	*Eunice* sp. 1	3	1		1						1		1		1	1					
Eunicidae	*Marphysa* sp. 1																				
Eunicidae	*Lysidice unicornis*		2																		
Flabelligeridae	*Pherusa* sp. 1																				
Glyceridae	*Glycera* sp. 1																				
Goniadidae	Goniada sp. 1																				
Hesionidae	Hesionidae sp. 1																				
Lumbrineridae	*Lumbrineris* sp. 1					1		1					1								
Magelonidae	*Magelona* sp. 1																				
Maldanidae	*Axiothella* sp. 1																				
Nephtyidae	*Aglaophamus* sp. 1	1		1	1		1			1											
Nereididae	Nereididae sp. 1	1		2		2							2	1	2						
Nereididae	Nereididae sp. 2																				
Oenonidae	*Arabella longipedata*																				
Onuphidae	*Onuphis holobranchiata*	1	1			2								3		1		2			1

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Onuphidae	Rhamphobrachium sp. 1								1												
Opheliidae	Armandia sp. 1												1			1					
Orbiniidae	Orbiniidae sp. 1																				
Paraonidae	Aricidea sp. 1										1										
Phyllodocidae	Phyllodocidae sp. 1																				
Poecilochaetidae	*Poecilochaetus serpens*																				
Polynoidae	Polynoidae sp. 1																				
Sabellidae	Sabellidae sp. 1					2									1					1	
Sigalionidae	*Pholoides mendeleevi*																				
Sigalionidae	Sigalionidae sp. 1																				
Sphaerodoridae	*Sphaerodoropsis heteropapillata*																				
Spionidae	Spionidae sp. 1																				
Spionidae	Spionidae sp. 2																				
Syllidae	Syllidae sp. 1					1		2	1				1					2	1		
Syllidae	Syllidae sp. 2					1							1		1		1				
Syllidae	Syllidae sp. 3																				
Syllidae	Syllidae sp. 4																				
Terebellidae	Terebellidae sp. 1																				
Trichobranchidae	Trichobranchidae sp. 1			1																	
Echuira	Echuira																				
Sipuncula	Sipuncula																				
Crustacea																					
Alpheidae	*Alpheus* sp. 1																				
Ampeliscidae	Ampeliscidae sp. 1																				
Anthuridea	Anthuridea sp. 1							1	1							1				1	1
Aoridae	Aoridae sp. 1																				
Apseudidae	Apseudidae sp. 1		2		3	4				1			1		1	4	9		5	1	
Arcturidae	Arcturidae sp. 1																				
Atyidae	Atyidae sp. 1												1								
Bodotriidae	Bodotriidae sp. 1			1													1			2	
Callianassidae	Callianassidae sp. 1																				
Caprellidae	Caprellidae sp. 1														1						
Caridea	Caridea damaged																				

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ceinidae	c.f.Ceinidae sp. 1																				
Ceratocumatidae	Ceratocumatidae sp. 1		1	1	1																
Cirolanidae	Cirolanidae sp. 1		1																		
Copepoda	Copepoda			1		2															
Corophiidae	Corophiidae sp. 1																				
Crustacea	Crustacea sp. 1																				
Cyproideidae	Cyproideidae sp. 1												1								
Dexaminidae	Dexaminidae sp. 1											1	3		3	2	2				1
Diogenidae	Diogenidae sp. 1																				
Gnathiidae	Gnathiidae sp. 1												4								
Grapsidae	Grapsidae sp. 1																				
Gynodiastylidae	Gynodiastylidae sp. 1														1						
Hymenosomatidae	Hymenosomatidae sp. 1																				
Ischyroceridae	Ischyroceridae sp. 1					1						1	2	1		1	4			1	
Isopoda	Isopoda sp. 1																				
Joeropsididae	Joeropsididae sp. 1														2						
Leptostraca	Leptostraca sp. 1																				
Leucosiidae	Cryptocnemus sp. 1																				
Leucothoidae	Leucothoidae sp. 1														1						
Liljeborgiidae	Liljeborgiidae sp. 1																				
Limnoriidae	Limnoriidae sp. 1																				
Lysianassidae	Lysianassidae sp. 1			1		2						2									
Maeridae	Maeridae sp. 1																				
Melitidae	Melitidae sp. 1		2			1						4	38			1	1	3			2
Munnidae	Munnidae sp. 1																				
Mysidae	Mysidae sp. 1																				
Ochlesidae	Ochlesidae sp. 1																				
Ocypodidae	Ocypodidae sp. 1																				
Ostracoda	Ostracoda sp. 1											2				1					
Ostracoda	Ostracoda sp. 2								1				1		1			1		1	
Ostracoda	Ostracoda sp. 3		1																		
Ostracoda	Ostracoda sp. 4																				
Oxycephalidae	Oxycephalidae sp. 1												1						1		

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Penaeidae	Penaeidae sp. 1																				
Phoxocephalidae	Phoxocephalidae sp. 1	1	1	1		1	2	1					3	3					1		
Pilumnidae	Pilumnidae sp. 1																				
Platyischnopidae	Platyischnopidae sp. 1																				
Podoceridae	Podoceridae sp. 1											1								1	
Portunidae	Portunidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 2																				
Pycnogonida	Pycnogonida sp. 1									1											
Sphaeromatidae	Chitonopsis sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 2			1																	
Sphaeromatidae	Sphaeromatidae sp. 3																				
Squillidae	Belosquilla sp. 1																				
Tanaididae	Tanaididae sp. 1																				
Zobrachoidae	Zobrachoidae sp. 1																				
c.f.Hognathidae	c.f.Hognathidae sp. 1												1								
Mollusca																					
Anatomidae	Anatomidae sp. 1																				
Aplysiidae	Aplysiidae sp. 1																				
Architectonicidae	Architectonicidae sp. 1																	1			
Cerithiidae	Cerithiidae sp. 1																				
Corbulidae	*Corbula* sp. 1																				
Cuspidariidae	Cuspidariidae sp. 1																				
Cylichnidae	Cylichnidae sp. 1																				
Eulimidae	Eulimidae sp. 1																				
Gastropoda	Gastropoda juv										1		1								
Glycymerididae	*Glycymeris* sp. 1																				
Hiatellidae	Hiatella sp. 1												1								
Lasaeidae	*Curvemysella paula*																				
Limidae	Limidae sp. 1																				
Lucinidae	Lucinidae sp. 1																				
Mactridae	*Mactra* sp. 1																				

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Mactridae	*Mactra* sp. 2																				
Myochamidae	*Myochama* sp. 1																				
Mytillidae	*Modiolus* sp. 1					2							2								
Mytillidae	*Modiolus* sp. 2			1		1											1				
Mytillidae	*Musculus coenobitus*											4	1	1	7						
Mytillidae	*Musculus* sp. 1																				
Nassaridae	*Nassarius* sp. 1			1																	
Naticidae	*Natica* sp. 1																				
Naticidae	*Natica* sp. 2																				
Nuculanidae	*Saccella darwini*																				
Nuculidae	*Ennucula* sp. 1																				
Olividae	*Phenacovolva* sp. 1																				
Ostreidae	Ostreidae sp. 1																				
Patellidae	Patellidae sp. 1																				
Pleurotomariidae	Pleurotomariidae sp. 1																				
Polyplacophora	Polyplacophora sp. 1																				
Polyplacophora	Polyplacophora sp. 2																				
Pteriidae	*Pteria* sp. 1																				
Rissoidae	Rissoidae sp. 1																				
Solemyidae	*Solemya australis*				1							1					1				
Tellinidae	*Tellina* sp. 1																				
Tellinidae	*Tellina* sp. 2																				
Tellinidae	*Tellina* sp. 3																				
Tellinidae	*Tellina* sp. 4																				
Trochidae	Trochidae sp. 1																				
Veneridae	*Antigona* sp. 1																				
Veneridae	*Circe* sp. 1																				
Veneridae	*Dosinia* sp. 1																				
Veneridae	*Dosinia* sp. 2																				
Veneridae	*Dosinia* sp. 3																				
Veneridae	*Paphia* sp. 1																				
Veneridae	Veneridae juv																				
Vulsellidae	*Electroma* sp. 1																				

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Bryozoa	Bryozoa fan																				
Echinodermata																					
Asteroidea	Asteroidea sp. 1																				
Echinoidea	Echinoidea juv																				
Holothuroidea	Holothuroidea sp. 1																				
Holothuroidea	Holothuroidea sp. 2																				
Holothuroidea	Holothuroidea sp. 3																				
Ophiuroidea	Ophiuroidea sp. 1		2										2	1			1		1		
Toxopneustidae	Toxopneustidae sp. 1																				
Chordata																					
Ascidiacea	Ascidiacea sp. 1												1								

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site AP4																					
Porifera	Porifera												1								
Cnidaria																					
Actiniaria	Actiniaria sp. 1																				
Actiniaria	Actiniaria sp. 2																				
Hexacorallia	Hexacorallia sp. 1																				
Nemertea	Nemertea									1											
Nematoda	Nematoda								2												
Annelida																					
Amphinomidae	Amphinomidae																				
Aphroditidae	Pontogenia sp. 1																				
Capitellidae	*Capitella* sp. 1	5							1	1	2	1									
Capitellidae	*Notomastus* sp. 1																				
Chrysopetalidae	Chrysopetalidae sp. 1				1																
Cirratulidae	Cirratulidae sp. 1																				
Cirratulidae	Cirratulidae sp. 2																				
Dorvilleidae	Dorvilleidae sp. 1	1																1			
Eunicidae	*Eunice* sp. 1	1	1			1								2							
Eunicidae	*Marphysa* sp. 1																				
Eunicidae	*Lysidice unicornis*	1		1	2				2					1		1					
Flabelligeridae	*Pherusa* sp. 1																				
Glyceridae	*Glycera* sp. 1																				
Goniadidae	Goniada sp. 1																				
Hesionidae	Hesionidae sp. 1																				
Lumbrineridae	*Lumbrineris* sp. 1	1				1											1				
Magelonidae	*Magelona* sp. 1																				
Maldanidae	*Axiothella* sp. 1																				
Nephtyidae	*Aglaophamus* sp. 1		1								1								1		
Nereididae	Nereididae sp. 1						1	1				1		1							
Nereididae	Nereididae sp. 2	4			4																
Oenonidae	*Arabella longipedata*																				
Onuphidae	*Onuphis holobranchiata*														1						

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Onuphidae	Rhamphobrachium sp. 1																				
Opheliidae	Armandia sp. 1	1															1			2	
Orbiniidae	Orbiniidae sp. 1																				
Paraonidae	Aricidea sp. 1	1						3	1	3	1	1					1				1
Phyllodocidae	Phyllodocidae sp. 1																				
Poecilochaetidae	*Poecilochaetus serpens*																				
Polynoidae	Polynoidae sp. 1																				
Sabellidae	Sabellidae sp. 1	1																			
Sigalionidae	*Pholoides mendeleevi*	1																			
Sigalionidae	Sigalionidae sp. 1																				
Sphaerodoridae	*Sphaerodoropsis heteropapillata*																				
Spionidae	Spionidae sp. 1															1					
Spionidae	Spionidae sp. 2																				
Syllidae	Syllidae sp. 1	8	2		2																
Syllidae	Syllidae sp. 2	1																			
Syllidae	Syllidae sp. 3				1																
Syllidae	Syllidae sp. 4																				
Terebellidae	Terebellidae sp. 1																				
Trichobranchidae	Trichobranchidae sp. 1																				
Echuira	Echuira																				
Sipuncula	Sipuncula	1																			
Crustacea																					
Alpheidae	*Alpheus* sp. 1																				
Ampeliscidae	Ampeliscidae sp. 1														1						
Anthuridea	Anthuridea sp. 1	8	1		1			1				1							3	3	
Aoridae	Aoridae sp. 1												1								
Apseudidae	Apseudidae sp. 1			1	1		11	11	19	12	14						1				
Arcturidae	Arcturidae sp. 1																				
Atyidae	Atyidae sp. 1																				
Bodotriidae	Bodotriidae sp. 1		1									1								1	
Callianassidae	Callianassidae sp. 1																				
Caprellidae	Caprellidae sp. 1																				
Caridea	Caridea damaged		1																		

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ceinidae	c.f.Ceinidae sp. 1																				
Ceratocumatidae	Ceratocumatidae sp. 1																				
Cirolanidae	Cirolanidae sp. 1										1										
Copepoda	Copepoda			1																	
Corophiidae	Corophiidae sp. 1																				
Crustacea	Crustacea sp. 1																				
Cyproideidae	Cyproideidae sp. 1																				
Dexaminidae	Dexaminidae sp. 1											3	2	1	1			3	1		
Diogenidae	Diogenidae sp. 1																				
Gnathiidae	Gnathiidae sp. 1																				
Grapsidae	Grapsidae sp. 1																				
Gynodiastylidae	Gynodiastylidae sp. 1									1			1								
Hymenosomatidae	Hymenosomatidae sp. 1																				
Ischyroceridae	Ischyroceridae sp. 1	1	1	1	5						1	1		3	4			2	1	4	
Isopoda	Isopoda sp. 1																				
Joeropsididae	Joeropsididae sp. 1												1	2				2	1	4	
Leptostraca	Leptostraca sp. 1																		1		
Leucosiidae	Cryptocnemus sp. 1																				
Leucothoidae	Leucothoidae sp. 1	1		1										1							
Liljeborgiidae	Liljeborgiidae sp. 1																				
Limnoriidae	Limnoriidae sp. 1																				
Lysianassidae	Lysianassidae sp. 1			2								2		1							
Maeridae	Maeridae sp. 1																1				
Melitidae	Melitidae sp. 1	2		2	2		2			2					1		1			4	
Munnidae	Munnidae sp. 1											1									
Mysidae	Mysidae sp. 1															1					
Ochlesidae	Ochlesidae sp. 1																				
Ocypodidae	Ocypodidae sp. 1																				
Ostracoda	Ostracoda sp. 1				2	1	1			1	1	1	1	2							
Ostracoda	Ostracoda sp. 2				2							2	1		1	1					
Ostracoda	Ostracoda sp. 3					1													1		
Ostracoda	Ostracoda sp. 4																				
Oxycephalidae	Oxycephalidae sp. 1							1				1		1							

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Penaeidae	Penaeidae sp. 1																				
Phoxocephalidae	Phoxocephalidae sp. 1	2	1		2	1	2		2							1	2		2	4	1
Pilumnidae	Pilumnidae sp. 1																				
Platyischnopidae	Platyischnopidae sp. 1																				
Podoceridae	Podoceridae sp. 1													1							
Portunidae	Portunidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 1				2																
Pseudozeuxidae	Pseudozeuxidae sp. 2																		1		
Pycnogonida	Pycnogonida sp. 1	1			1						1										
Sphaeromatidae	Chitonopsis sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 2																				
Sphaeromatidae	Sphaeromatidae sp. 3																				
Squillidae	Belosquilla sp. 1																				
Tanaididae	Tanaididae sp. 1																				
Zobrachoidae	Zobrachoidae sp. 1																		1	1	
c.f.Hognathidae	c.f.Hognathidae sp. 1																				
Mollusca																					
Anatomidae	Anatomidae sp. 1																		1	1	
Aplysiidae	Aplysiidae sp. 1																				
Architectonicidae	Architectonicidae sp. 1											2									
Cerithiidae	Cerithiidae sp. 1																				
Corbulidae	*Corbula* sp. 1																				
Cuspidariidae	Cuspidariidae sp. 1																				
Cylichnidae	Cylichnidae sp. 1																				
Eulimidae	Eulimidae sp. 1																				
Gastropoda	Gastropoda juv											8									
Glycymerididae	*Glycymeris* sp. 1	1																			
Hiatellidae	Hiatella sp. 1															2		1			
Lasaeidae	*Curvemysella paula*	8																			
Limidae	Limidae sp. 1	1			1																
Lucinidae	Lucinidae sp. 1																				
Mactridae	*Mactra* sp. 1																			1	

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Mactridae	*Mactra* sp. 2																				
Myochamidae	*Myochama* sp. 1																				
Mytillidae	*Modiolus* sp. 1																				
Mytillidae	*Modiolus* sp. 2	2	1	2	1	1												3			
Mytillidae	*Musculus coenobitus*											5		1							
Mytillidae	*Musculus* sp. 1															1					
Nassaridae	*Nassarius* sp. 1					1															
Naticidae	*Natica* sp. 1																				
Naticidae	*Natica* sp. 2														1						
Nuculanidae	*Saccella darwini*											1									
Nuculidae	*Ennucula* sp. 1		1		1							3				1					
Olividae	*Phenacovolva* sp. 1																				
Ostreidae	Ostreidae sp. 1																				
Patellidae	Patellidae sp. 1		1										1								
Pleurotomariidae	Pleurotomariidae sp. 1																				
Polyplacophora	Polyplacophora sp. 1																2		1	1	
Polyplacophora	Polyplacophora sp. 2																				
Pteriidae	*Pteria* sp. 1																				
Rissoidae	Rissoidae sp. 1																				
Solemyidae	*Solemya australis*								2								1				
Tellinidae	*Tellina* sp. 1														1						
Tellinidae	*Tellina* sp. 2																				
Tellinidae	*Tellina* sp. 3																				
Tellinidae	*Tellina* sp. 4																				
Trochidae	Trochidae sp. 1																				
Veneridae	*Antigona* sp. 1																				
Veneridae	*Circe* sp. 1	3	3									1	1		1						
Veneridae	*Dosinia* sp. 1	1														1					
Veneridae	*Dosinia* sp. 2																				
Veneridae	*Dosinia* sp. 3																				
Veneridae	*Paphia* sp. 1																				
Veneridae	Veneridae juv																				
Vulsellidae	*Electroma* sp. 1																				

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Bryozoa	Bryozoa fan																				
Echinodermata																					
Asteroidea	Asteroidea sp. 1																				
Echinoidea	Echinoidea juv										1										
Holothuroidea	Holothuroidea sp. 1																				
Holothuroidea	Holothuroidea sp. 2																				
Holothuroidea	Holothuroidea sp. 3																				
Ophiuroidea	Ophiuroidea sp. 1			1					1	1							1			3	1
Toxopneustidae	Toxopneustidae sp. 1																				
Chordata																					
Ascidiacea	Ascidiacea sp. 1				1																

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site AP5																					
Porifera	Porifera																				
Cnidaria																					
Actiniaria	Actiniaria sp. 1																				
Actiniaria	Actiniaria sp. 2																				
Hexacorallia	Hexacorallia sp. 1																	3			
Nemertea	Nemertea																				
Nematoda	Nematoda																		1	2	5
Annelida																					
Amphinomidae	Amphinomidae																				
Aphroditidae	Pontogenia sp. 1																				
Capitellidae	*Capitella* sp. 1	5				1		1													1
Capitellidae	*Notomastus* sp. 1																				
Chrysopetalidae	Chrysopetalidae sp. 1																				
Cirratulidae	Cirratulidae sp. 1																	1			
Cirratulidae	Cirratulidae sp. 2																				
Dorvilleidae	Dorvilleidae sp. 1					1		1	1				1								1
Eunicidae	*Eunice* sp. 1		3			1															1
Eunicidae	*Marphysa* sp. 1																				
Eunicidae	*Lysidice unicornis*	1	1		2		1														
Flabelligeridae	*Pherusa* sp. 1																		1		
Glyceridae	*Glycera* sp. 1	1																			
Goniadidae	Goniada sp. 1																				
Hesionidae	Hesionidae sp. 1					2															
Lumbrineridae	*Lumbrineris* sp. 1		1																		
Magelonidae	*Magelona* sp. 1																				
Maldanidae	*Axiothella* sp. 1						1														
Nephtyidae	*Aglaophamus* sp. 1					1			1												
Nereididae	Nereididae sp. 1		1													1					
Nereididae	Nereididae sp. 2					1						2									
Oenonidae	*Arabella longipedata*																				
Onuphidae	*Onuphis holobranchiata*																				

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Onuphidae	Rhamphobrachium sp. 1																				
Opheliidae	Armandia sp. 1												1							1	2
Orbiniidae	Orbiniidae sp. 1																	1		1	
Paraonidae	Aricidea sp. 1	1		1	1		3				2										
Phyllodocidae	Phyllodocidae sp. 1																				
Poecilochaetidae	*Poecilochaetus serpens*																				
Polynoidae	Polynoidae sp. 1																				
Sabellidae	Sabellidae sp. 1																				
Sigalionidae	*Pholoides mendeleevi*																				
Sigalionidae	Sigalionidae sp. 1	1								1											
Sphaerodoridae	*Sphaerodoropsis heteropapillata*																				
Spionidae	Spionidae sp. 1		1				1	1													
Spionidae	Spionidae sp. 2	1																			
Syllidae	Syllidae sp. 1	4		2													1	2		1	1
Syllidae	Syllidae sp. 2												1						1	1	
Syllidae	Syllidae sp. 3		1						1												
Syllidae	Syllidae sp. 4																				
Terebellidae	Terebellidae sp. 1			1																	
Trichobranchidae	Trichobranchidae sp. 1																				
Echuira	Echuira																				
Sipuncula	Sipuncula																		1		
Crustacea																					
Alpheidae	*Alpheus* sp. 1																				
Ampeliscidae	Ampeliscidae sp. 1																				
Anthuridea	Anthuridea sp. 1			1		1															
Aoridae	Aoridae sp. 1									3											
Apseudidae	Apseudidae sp. 1	1	6		2	2			2	8	5		4		2	1	3	1	1	3	12
Arcturidae	Arcturidae sp. 1																				
Atyidae	Atyidae sp. 1																				
Bodotriidae	Bodotriidae sp. 1																				
Callianassidae	Callianassidae sp. 1																				
Caprellidae	Caprellidae sp. 1																				
Caridea	Caridea damaged					1															

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ceinidae	c.f.Ceinidae sp. 1	1																			
Ceratocumatidae	Ceratocumatidae sp. 1																				
Cirolanidae	Cirolanidae sp. 1			1																	
Copepoda	Copepoda				1																
Corophiidae	Corophiidae sp. 1																				
Crustacea	Crustacea sp. 1																				
Cyproideidae	Cyproideidae sp. 1																				
Dexaminidae	Dexaminidae sp. 1												2					1	2	2	
Diogenidae	Diogenidae sp. 1																				
Gnathiidae	Gnathiidae sp. 1		1																		
Grapsidae	Grapsidae sp. 1																				
Gynodiastylidae	Gynodiastylidae sp. 1														1						
Hymenosomatidae	Hymenosomatidae sp. 1																				
Ischyroceridae	Ischyroceridae sp. 1	1	3	3					1			2	5		2		3	1			1
Isopoda	Isopoda sp. 1																				
Joeropsididae	Joeropsididae sp. 1		1	2		1	1			1									2		
Leptostraca	Leptostraca sp. 1																				
Leucosiidae	Cryptocnemus sp. 1																				
Leucothoidae	Leucothoidae sp. 1				1																
Liljeborgiidae	Liljeborgiidae sp. 1																				
Limnoriidae	Limnoriidae sp. 1																				
Lysianassidae	Lysianassidae sp. 1		1	1		1						4									1
Maeridae	Maeridae sp. 1																			3	
Melitidae	Melitidae sp. 1	20	5	7	2	1	7	1		3	4	2	1	3		4	7	3	7	20	2
Munnidae	Munnidae sp. 1																				
Mysidae	Mysidae sp. 1																				
Ochlesidae	Ochlesidae sp. 1																				
Ocypodidae	Ocypodidae sp. 1																				
Ostracoda	Ostracoda sp. 1		4		1																
Ostracoda	Ostracoda sp. 2																				
Ostracoda	Ostracoda sp. 3					1													1		
Ostracoda	Ostracoda sp. 4																				
Oxycephalidae	Oxycephalidae sp. 1			1													1				

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Penaeidae	Penaeidae sp. 1																				
Phoxocephalidae	Phoxocephalidae sp. 1	2				1													2		1
Pilumnidae	Pilumnidae sp. 1																				
Platyischnopidae	Platyischnopidae sp. 1																				
Podoceridae	Podoceridae sp. 1																				
Portunidae	Portunidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 1									1			1						1	1	
Pseudozeuxidae	Pseudozeuxidae sp. 2				4																
Pycnogonida	Pycnogonida sp. 1		1																		
Sphaeromatidae	Chitonopsis sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 1																1				
Sphaeromatidae	Sphaeromatidae sp. 2		1																		
Sphaeromatidae	Sphaeromatidae sp. 3																				
Squillidae	Belosquilla sp. 1																				
Tanaididae	Tanaididae sp. 1						1														
Zobrachoidae	Zobrachoidae sp. 1																				
c.f.Hognathidae	c.f.Hognathidae sp. 1																				
Mollusca																					
Anatomidae	Anatomidae sp. 1																				1
Aplysiidae	Aplysiidae sp. 1																				
Architectonicidae	Architectonicidae sp. 1																				
Cerithiidae	Cerithiidae sp. 1																				
Corbulidae	*Corbula* sp. 1																				
Cuspidariidae	Cuspidariidae sp. 1																				
Cylichnidae	Cylichnidae sp. 1																			1	
Eulimidae	Eulimidae sp. 1																				
Gastropoda	Gastropoda juv																				
Glycymerididae	*Glycymeris* sp. 1																				
Hiatellidae	Hiatella sp. 1																				
Lasaeidae	*Curvemysella paula*	1																			
Limidae	Limidae sp. 1																				
Lucinidae	Lucinidae sp. 1																				
Mactridae	*Mactra* sp. 1																				

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Mactridae	*Mactra* sp. 2																				
Myochamidae	*Myochama* sp. 1																				
Mytillidae	*Modiolus* sp. 1																				
Mytillidae	*Modiolus* sp. 2		1																		
Mytillidae	*Musculus coenobitus*															1					
Mytillidae	*Musculus* sp. 1																	1			
Nassaridae	*Nassarius* sp. 1																				
Naticidae	*Natica* sp. 1																				
Naticidae	*Natica* sp. 2																				
Nuculanidae	*Saccella darwini*																				
Nuculidae	*Ennucula* sp. 1			1																1	1
Olividae	*Phenacovolva* sp. 1																				
Ostreidae	Ostreidae sp. 1																				
Patellidae	Patellidae sp. 1																				
Pleurotomariidae	Pleurotomariidae sp. 1																				
Polyplacophora	Polyplacophora sp. 1												2								
Polyplacophora	Polyplacophora sp. 2																				
Pteriidae	*Pteria* sp. 1																				
Rissoidae	Rissoidae sp. 1																				
Solemyidae	*Solemya australis*							1	1			1						1			
Tellinidae	*Tellina* sp. 1																				
Tellinidae	*Tellina* sp. 2																				
Tellinidae	*Tellina* sp. 3														1						
Tellinidae	*Tellina* sp. 4																			1	
Trochidae	Trochidae sp. 1																				
Veneridae	*Antigona* sp. 1																				
Veneridae	*Circe* sp. 1																				
Veneridae	*Dosinia* sp. 1											1								1	
Veneridae	*Dosinia* sp. 2																				
Veneridae	*Dosinia* sp. 3																				
Veneridae	*Paphia* sp. 1																				
Veneridae	Veneridae juv																				
Vulsellidae	*Electroma* sp. 1																				

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Bryozoa	Bryozoa fan																	1			
Echinodermata																					
Asteroidea	Asteroidea sp. 1											1									
Echinoidea	Echinoidea juv																				
Holothuroidea	Holothuroidea sp. 1																				
Holothuroidea	Holothuroidea sp. 2																				
Holothuroidea	Holothuroidea sp. 3									1											
Ophiuroidea	Ophiuroidea sp. 1	1	1		2	1			1		1				3		1				
Toxopneustidae	Toxopneustidae sp. 1																				
Chordata																					
Ascidiacea	Ascidiacea sp. 1																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site ZO1																					
Porifera	Porifera																				
Cnidaria																					
Actiniaria	Actiniaria sp. 1																				
Actiniaria	Actiniaria sp. 2																				
Hexacorallia	Hexacorallia sp. 1																				
Nemertea	Nemertea																				
Nematoda	Nematoda																				
Annelida																					
Amphinomidae	Amphinomidae																				
Aphroditidae	Pontogenia sp. 1																				
Capitellidae	*Capitella* sp. 1									1			1			1			2	1	
Capitellidae	*Notomastus* sp. 1																				
Chrysopetalidae	Chrysopetalidae sp. 1																				
Cirratulidae	Cirratulidae sp. 1					2	1				1			1							
Cirratulidae	Cirratulidae sp. 2																				
Dorvilleidae	Dorvilleidae sp. 1					1		1		1	2	1									
Eunicidae	*Eunice* sp. 1		1																		
Eunicidae	*Marphysa* sp. 1									1	1										
Eunicidae	*Lysidice unicornis*																				1
Flabelligeridae	*Pherusa* sp. 1																				
Glyceridae	*Glycera* sp. 1																				
Goniadidae	Goniada sp. 1			4					1	1	1		1	1	1	1	1	1	1		
Hesionidae	Hesionidae sp. 1																				
Lumbrineridae	*Lumbrineris* sp. 1					1									2		1	1	1	1	
Magelonidae	*Magelona* sp. 1																				
Maldanidae	*Axiothella* sp. 1																				
Nephtyidae	*Aglaophamus* sp. 1	1	3			1												1	1	1	
Nereididae	Nereididae sp. 1		2			1		2		1	1			1		3					1
Nereididae	Nereididae sp. 2																				
Oenonidae	*Arabella longipedata*																				
Onuphidae	*Onuphis holobranchiata*																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Onuphidae	Rhamphobrachium sp. 1																				
Opheliidae	Armandia sp. 1										1	1									1
Orbiniidae	Orbiniidae sp. 1																				
Paraonidae	Aricidea sp. 1																				
Phyllodocidae	Phyllodocidae sp. 1																				
Poecilochaetidae	*Poecilochaetus serpens*																				
Polynoidae	Polynoidae sp. 1																				
Sabellidae	Sabellidae sp. 1																				
Sigalionidae	*Pholoides mendeleevi*																				
Sigalionidae	Sigalionidae sp. 1														1						
Sphaerodoridae	*Sphaerodoropsis heteropapillata*																				
Spionidae	Spionidae sp. 1		1	1	1			1		1											
Spionidae	Spionidae sp. 2																1				
Syllidae	Syllidae sp. 1				1																
Syllidae	Syllidae sp. 2						1							2							
Syllidae	Syllidae sp. 3																				
Syllidae	Syllidae sp. 4																				
Terebellidae	Terebellidae sp. 1																				
Trichobranchidae	Trichobranchidae sp. 1		1																		
Echuira	Echuira																				
Sipuncula	Sipuncula												1								
Crustacea																					
Alpheidae	*Alpheus* sp. 1																				
Ampeliscidae	Ampeliscidae sp. 1							1									1				
Anthuridea	Anthuridea sp. 1																				
Aoridae	Aoridae sp. 1																				
Apseudidae	Apseudidae sp. 1															1		1			
Arcturidae	Arcturidae sp. 1																				
Atyidae	Atyidae sp. 1																				
Bodotriidae	Bodotriidae sp. 1								1						1	2	2	2	1		1
Callianassidae	Callianassidae sp. 1																				
Caprellidae	Caprellidae sp. 1																				
Caridea	Caridea damaged																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ceinidae	c.f.Ceinidae sp. 1																				
Ceratocumatidae	Ceratocumatidae sp. 1																				
Cirolanidae	Cirolanidae sp. 1																				
Copepoda	Copepoda						1					1									
Corophiidae	Corophiidae sp. 1																				
Crustacea	Crustacea sp. 1																				
Cyproideidae	Cyproideidae sp. 1																				
Dexaminidae	Dexaminidae sp. 1															2					
Diogenidae	Diogenidae sp. 1																				
Gnathiidae	Gnathiidae sp. 1																				
Grapsidae	Grapsidae sp. 1																				
Gynodiastylidae	Gynodiastylidae sp. 1												1								
Hymenosomatidae	Hymenosomatidae sp. 1																				
Ischyroceridae	Ischyroceridae sp. 1												1								
Isopoda	Isopoda sp. 1																				
Joeropsididae	Joeropsididae sp. 1																				
Leptostraca	Leptostraca sp. 1																				
Leucosiidae	Cryptocnemus sp. 1																				
Leucothoidae	Leucothoidae sp. 1																				
Liljeborgiidae	Liljeborgiidae sp. 1																				
Limnoriidae	Limnoriidae sp. 1																				
Lysianassidae	Lysianassidae sp. 1				1								2								
Maeridae	Maeridae sp. 1																				
Melitidae	Melitidae sp. 1		1			2					1										
Munnidae	Munnidae sp. 1																				
Mysidae	Mysidae sp. 1					1															1
Ochlesidae	Ochlesidae sp. 1																				
Ocypodidae	Ocypodidae sp. 1																				
Ostracoda	Ostracoda sp. 1		1		1								1			1			1		
Ostracoda	Ostracoda sp. 2		1																		
Ostracoda	Ostracoda sp. 3									1							1				
Ostracoda	Ostracoda sp. 4																				
Oxycephalidae	Oxycephalidae sp. 1											1	3			2		1			

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Penaeidae	Penaeidae sp. 1																				
Phoxocephalidae	Phoxocephalidae sp. 1						1		1	1		1		1			3	1		1	5
Pilumnidae	Pilumnidae sp. 1																				
Platyischnopidae	Platyischnopidae sp. 1																				
Podoceridae	Podoceridae sp. 1																				
Portunidae	Portunidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 1																	1			
Pseudozeuxidae	Pseudozeuxidae sp. 2																				
Pycnogonida	Pycnogonida sp. 1																				
Sphaeromatidae	Chitonopsis sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 2																				
Sphaeromatidae	Sphaeromatidae sp. 3																				
Squillidae	Belosquilla sp. 1																				
Tanaididae	Tanaididae sp. 1																				
Zobrachoidae	Zobrachoidae sp. 1																				
c.f.Hognathidae	c.f.Hognathidae sp. 1																				
Mollusca																					
Anatomidae	Anatomidae sp. 1																				
Aplysiidae	Aplysiidae sp. 1																		1		
Architectonicidae	Architectonicidae sp. 1																				
Cerithiidae	Cerithiidae sp. 1						1														
Corbulidae	*Corbula* sp. 1																				
Cuspidariidae	Cuspidariidae sp. 1																				
Cylichnidae	Cylichnidae sp. 1											2	10	1	3	1	1				
Eulimidae	Eulimidae sp. 1																				
Gastropoda	Gastropoda juv																				
Glycymerididae	*Glycymeris* sp. 1																				
Hiatellidae	Hiatella sp. 1	1																			
Lasaeidae	*Curvemysella paula*																				
Limidae	Limidae sp. 1																				
Lucinidae	Lucinidae sp. 1																				
Mactridae	*Mactra* sp. 1																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Mactridae	*Mactra* sp. 2																				
Myochamidae	*Myochama* sp. 1																				
Mytillidae	*Modiolus* sp. 1																				
Mytillidae	*Modiolus* sp. 2		1																		
Mytillidae	*Musculus coenobitus*																				
Mytillidae	*Musculus* sp. 1		1																		
Nassaridae	*Nassarius* sp. 1																				
Naticidae	*Natica* sp. 1													1							
Naticidae	*Natica* sp. 2																				
Nuculanidae	*Saccella darwini*									1											
Nuculidae	*Ennucula* sp. 1																				
Olividae	*Phenacovolva* sp. 1																				
Ostreidae	Ostreidae sp. 1										1										
Patellidae	Patellidae sp. 1																				
Pleurotomariidae	Pleurotomariidae sp. 1																				
Polyplacophora	Polyplacophora sp. 1																				
Polyplacophora	Polyplacophora sp. 2																				
Pteriidae	*Pteria* sp. 1																				
Rissoidae	Rissoidae sp. 1																				
Solemyidae	*Solemya australis*																				
Tellinidae	*Tellina* sp. 1																			1	2
Tellinidae	*Tellina* sp. 2	2	1	1								1	2								
Tellinidae	*Tellina* sp. 3							1													
Tellinidae	*Tellina* sp. 4																				
Trochidae	Trochidae sp. 1																				
Veneridae	*Antigona* sp. 1																		1		
Veneridae	*Circe* sp. 1																				
Veneridae	*Dosinia* sp. 1	1			2									1	1				2	1	2
Veneridae	*Dosinia* sp. 2																				
Veneridae	*Dosinia* sp. 3																				
Veneridae	*Paphia* sp. 1																				
Veneridae	Veneridae juv																				
Vulsellidae	*Electroma* sp. 1																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Bryozoa	Bryozoa fan																				
Echinodermata																					
Asteroidea	Asteroidea sp. 1																				
Echinoidea	Echinoidea juv																				
Holothuroidea	Holothuroidea sp. 1																				
Holothuroidea	Holothuroidea sp. 2																				
Holothuroidea	Holothuroidea sp. 3																				
Ophiuroidea	Ophiuroidea sp. 1														1						
Toxopneustidae	Toxopneustidae sp. 1																				
Chordata																					
Ascidiacea	Ascidiacea sp. 1																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site ZO2																					
Porifera	Porifera						1														
Cnidaria																					
Actiniaria	Actiniaria sp. 1																				
Actiniaria	Actiniaria sp. 2																				
Hexacorallia	Hexacorallia sp. 1																				
Nemertea	Nemertea							1			1										
Nematoda	Nematoda				1												3				
Annelida																					
Amphinomidae	Amphinomidae																				
Aphroditidae	Pontogenia sp. 1																				
Capitellidae	*Capitella* sp. 1		1		2				1						1					1	1
Capitellidae	*Notomastus* sp. 1																				
Chrysopetalidae	Chrysopetalidae sp. 1																				
Cirratulidae	Cirratulidae sp. 1													1		1				1	
Cirratulidae	Cirratulidae sp. 2																				
Dorvilleidae	Dorvilleidae sp. 1	1		3				1	1							1			1		1
Eunicidae	*Eunice* sp. 1			4								1				1		2			1
Eunicidae	*Marphysa* sp. 1						1				1										
Eunicidae	*Lysidice unicornis*																				
Flabelligeridae	*Pherusa* sp. 1					2															
Glyceridae	*Glycera* sp. 1																				
Goniadidae	Goniada sp. 1		2	2				2	1			2	2	1		2	1		1	1	
Hesionidae	Hesionidae sp. 1																				
Lumbrineridae	*Lumbrineris* sp. 1	1		3	2							1				1			1		2
Magelonidae	*Magelona* sp. 1				3	2			1	1		1									
Maldanidae	*Axiothella* sp. 1					1		1													
Nephtyidae	*Aglaophamus* sp. 1	2	1	2		1			1		2	1	2	2						1	1
Nereididae	Nereididae sp. 1	2	1					1	1	2										1	1
Nereididae	Nereididae sp. 2			3																	
Oenonidae	*Arabella longipedata*				2			1			1			1		1					
Onuphidae	*Onuphis holobranchiata*																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Onuphidae	Rhamphobrachium sp. 1																				
Opheliidae	Armandia sp. 1																				
Orbiniidae	Orbiniidae sp. 1																				
Paraonidae	Aricidea sp. 1																				
Phyllodocidae	Phyllodocidae sp. 1																				
Poecilochaetidae	*Poecilochaetus serpens*																				
Polynoidae	Polynoidae sp. 1																				
Sabellidae	Sabellidae sp. 1																				
Sigalionidae	*Pholoides mendeleevi*																				
Sigalionidae	Sigalionidae sp. 1					1						1									
Sphaerodoridae	*Sphaerodoropsis heteropapillata*																				
Spionidae	Spionidae sp. 1		1																		
Spionidae	Spionidae sp. 2																				
Syllidae	Syllidae sp. 1																				
Syllidae	Syllidae sp. 2										1										
Syllidae	Syllidae sp. 3																				
Syllidae	Syllidae sp. 4																				
Terebellidae	Terebellidae sp. 1																				
Trichobranchidae	Trichobranchidae sp. 1																				
Echuira	Echuira																				
Sipuncula	Sipuncula																			1	
Crustacea																					
Alpheidae	*Alpheus* sp. 1																				
Ampeliscidae	Ampeliscidae sp. 1												1								
Anthuridea	Anthuridea sp. 1							1			1		1								
Aoridae	Aoridae sp. 1									1											
Apseudidae	Apseudidae sp. 1					1		1			1			5		1			1		
Arcturidae	Arcturidae sp. 1																				
Atyidae	Atyidae sp. 1																				
Bodotriidae	Bodotriidae sp. 1	1				1							2								
Callianassidae	Callianassidae sp. 1																				
Caprellidae	Caprellidae sp. 1																				
Caridea	Caridea damaged																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ceinidae	c.f.Ceinidae sp. 1																				
Ceratocumatidae	Ceratocumatidae sp. 1																				
Cirolanidae	Cirolanidae sp. 1																				
Copepoda	Copepoda	1	1	2								1	2			1					
Corophiidae	Corophiidae sp. 1																				
Crustacea	Crustacea sp. 1																				
Cyproideidae	Cyproideidae sp. 1																				
Dexaminidae	Dexaminidae sp. 1																		1		
Diogenidae	Diogenidae sp. 1																				
Gnathiidae	Gnathiidae sp. 1																				
Grapsidae	Grapsidae sp. 1																				
Gynodiastylidae	Gynodiastylidae sp. 1			1														1			1
Hymenosomatidae	Hymenosomatidae sp. 1			1																	
Ischyroceridae	Ischyroceridae sp. 1																		1		
Isopoda	Isopoda sp. 1																				
Joeropsididae	Joeropsididae sp. 1								1												
Leptostraca	Leptostraca sp. 1																				
Leucosiidae	Cryptocnemus sp. 1																				
Leucothoidae	Leucothoidae sp. 1																				
Liljeborgiidae	Liljeborgiidae sp. 1																				
Limnoriidae	Limnoriidae sp. 1																				
Lysianassidae	Lysianassidae sp. 1																				
Maeridae	Maeridae sp. 1																				
Melitidae	Melitidae sp. 1	2		1			1										1				
Munnidae	Munnidae sp. 1																				
Mysidae	Mysidae sp. 1			1																	
Ochlesidae	Ochlesidae sp. 1																				
Ocypodidae	Ocypodidae sp. 1																				
Ostracoda	Ostracoda sp. 1			1				1													
Ostracoda	Ostracoda sp. 2																				
Ostracoda	Ostracoda sp. 3																				
Ostracoda	Ostracoda sp. 4																				
Oxycephalidae	Oxycephalidae sp. 1																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Penaeidae	Penaeidae sp. 1																				
Phoxocephalidae	Phoxocephalidae sp. 1										1	3		2		1	1		2	3	1
Pilumnidae	Pilumnidae sp. 1																				
Platyischnopidae	Platyischnopidae sp. 1																				
Podoceridae	Podoceridae sp. 1	2																			
Portunidae	Portunidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 2																				
Pycnogonida	Pycnogonida sp. 1	1		1																	
Sphaeromatidae	Chitonopsis sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 2																				
Sphaeromatidae	Sphaeromatidae sp. 3																				
Squillidae	Belosquilla sp. 1																				
Tanaididae	Tanaididae sp. 1																				
Zobrachoidae	Zobrachoidae sp. 1																				
c.f.Hognathidae	c.f.Hognathidae sp. 1																				
Mollusca																					
Anatomidae	Anatomidae sp. 1																				
Aplysiidae	Aplysiidae sp. 1												1								
Architectonicidae	Architectonicidae sp. 1																				
Cerithiidae	Cerithiidae sp. 1																				
Corbulidae	*Corbula* sp. 1																				
Cuspidariidae	Cuspidariidae sp. 1																				
Cylichnidae	Cylichnidae sp. 1												2		2	3					
Eulimidae	Eulimidae sp. 1																				
Gastropoda	Gastropoda juv																				
Glycymerididae	*Glycymeris* sp. 1																				
Hiatellidae	Hiatella sp. 1			3																	
Lasaeidae	*Curvemysella paula*																				
Limidae	Limidae sp. 1																				
Lucinidae	Lucinidae sp. 1																				
Mactridae	*Mactra* sp. 1																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Mactridae	*Mactra* sp. 2																				
Myochamidae	*Myochama* sp. 1																				
Mytillidae	*Modiolus* sp. 1						1				2										1
Mytillidae	*Modiolus* sp. 2			1																	
Mytillidae	*Musculus coenobitus*							1		2											
Mytillidae	*Musculus* sp. 1	4	1	7									3								
Nassaridae	*Nassarius* sp. 1																				
Naticidae	*Natica* sp. 1																				
Naticidae	*Natica* sp. 2																				
Nuculanidae	*Saccella darwini*																				
Nuculidae	*Ennucula* sp. 1																				
Olividae	*Phenacovolva* sp. 1																				
Ostreidae	Ostreidae sp. 1																				
Patellidae	Patellidae sp. 1																				
Pleurotomariidae	Pleurotomariidae sp. 1																				
Polyplacophora	Polyplacophora sp. 1																				
Polyplacophora	Polyplacophora sp. 2																				
Pteriidae	*Pteria* sp. 1																				
Rissoidae	Rissoidae sp. 1																				
Solemyidae	*Solemya australis*																				
Tellinidae	*Tellina* sp. 1			5				1								1					
Tellinidae	*Tellina* sp. 2		1	1																	
Tellinidae	*Tellina* sp. 3																				
Tellinidae	*Tellina* sp. 4																				
Trochidae	Trochidae sp. 1																				
Veneridae	*Antigona* sp. 1																1				
Veneridae	*Circe* sp. 1			1																	
Veneridae	*Dosinia* sp. 1			1					1												
Veneridae	*Dosinia* sp. 2																				
Veneridae	*Dosinia* sp. 3																				
Veneridae	*Paphia* sp. 1																				
Veneridae	Veneridae juv																				
Vulsellidae	*Electroma* sp. 1																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Bryozoa	Bryozoa fan																				
Echinodermata																					
Asteroidea	Asteroidea sp. 1																				
Echinoidea	Echinoidea juv	1																			
Holothuroidea	Holothuroidea sp. 1	1				1													1	1	
Holothuroidea	Holothuroidea sp. 2																				
Holothuroidea	Holothuroidea sp. 3																				
Ophiuroidea	Ophiuroidea sp. 1																				1
Toxopneustidae	Toxopneustidae sp. 1																				
Chordata																					
Ascidiacea	Ascidiacea sp. 1																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site ZO3																					
Porifera	Porifera															1					
Cnidaria																					
Actiniaria	Actiniaria sp. 1																				
Actiniaria	Actiniaria sp. 2																				
Hexacorallia	Hexacorallia sp. 1																				
Nemertea	Nemertea																				
Nematoda	Nematoda																				
Annelida																					
Amphinomidae	Amphinomidae																				
Aphroditidae	Pontogenia sp. 1																				
Capitellidae	*Capitella* sp. 1	1						2	2												
Capitellidae	*Notomastus* sp. 1																				
Chrysopetalidae	Chrysopetalidae sp. 1																				
Cirratulidae	Cirratulidae sp. 1									1	1					2					
Cirratulidae	Cirratulidae sp. 2																				
Dorvilleidae	Dorvilleidae sp. 1	1				2					1	1		2				1			
Eunicidae	*Eunice* sp. 1	6	1											1	2			2		2	1
Eunicidae	*Marphysa* sp. 1								1												
Eunicidae	*Lysidice unicornis*																				
Flabelligeridae	*Pherusa* sp. 1		1				1														
Glyceridae	*Glycera* sp. 1																				
Goniadidae	Goniada sp. 1			1			1	2	1	2	2	2		1	2	2	1	4	2		
Hesionidae	Hesionidae sp. 1																				
Lumbrineridae	*Lumbrineris* sp. 1		1											1			1				
Magelonidae	*Magelona* sp. 1									1											
Maldanidae	*Axiothella* sp. 1																				
Nephtyidae	*Aglaophamus* sp. 1	1	2	2	2	2			1	1					1						
Nereididae	Nereididae sp. 1	3	1	5		1			1					3	1		1				
Nereididae	Nereididae sp. 2																				
Oenonidae	*Arabella longipedata*			1															1		
Onuphidae	*Onuphis holobranchiata*																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Onuphidae	Rhamphobrachium sp. 1																				
Opheliidae	Armandia sp. 1														1						
Orbiniidae	Orbiniidae sp. 1																				
Paraonidae	Aricidea sp. 1																				
Phyllodocidae	Phyllodocidae sp. 1																				
Poecilochaetidae	*Poecilochaetus serpens*																				
Polynoidae	Polynoidae sp. 1																				
Sabellidae	Sabellidae sp. 1																				
Sigalionidae	*Pholoides mendeleevi*																				
Sigalionidae	Sigalionidae sp. 1					1		1									1				
Sphaerodoridae	*Sphaerodoropsis heteropapillata*																				
Spionidae	Spionidae sp. 1														1						
Spionidae	Spionidae sp. 2																				
Syllidae	Syllidae sp. 1																				
Syllidae	Syllidae sp. 2	1										1				2		1			
Syllidae	Syllidae sp. 3																				
Syllidae	Syllidae sp. 4																				
Terebellidae	Terebellidae sp. 1																				
Trichobranchidae	Trichobranchidae sp. 1																				
Echuira	Echuira																				
Sipuncula	Sipuncula																				
Crustacea																					
Alpheidae	*Alpheus* sp. 1																				
Ampeliscidae	Ampeliscidae sp. 1													1		1					
Anthuridea	Anthuridea sp. 1																				
Aoridae	Aoridae sp. 1					1															
Apseudidae	Apseudidae sp. 1						1	1		1					1						
Arcturidae	Arcturidae sp. 1																				
Atyidae	Atyidae sp. 1																				
Bodotriidae	Bodotriidae sp. 1						1							1		1	1				
Callianassidae	Callianassidae sp. 1								1		1										
Caprellidae	Caprellidae sp. 1															1					
Caridea	Caridea damaged																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ceinidae	c.f.Ceinidae sp. 1																				
Ceratocumatidae	Ceratocumatidae sp. 1			1																	
Cirolanidae	Cirolanidae sp. 1																				
Copepoda	Copepoda					4				1											
Corophiidae	Corophiidae sp. 1																				
Crustacea	Crustacea sp. 1																				
Cyproideidae	Cyproideidae sp. 1																				
Dexaminidae	Dexaminidae sp. 1														1			1			
Diogenidae	Diogenidae sp. 1																				
Gnathiidae	Gnathiidae sp. 1																				
Grapsidae	Grapsidae sp. 1																				
Gynodiastylidae	Gynodiastylidae sp. 1																				
Hymenosomatidae	Hymenosomatidae sp. 1						1														
Ischyroceridae	Ischyroceridae sp. 1																				
Isopoda	Isopoda sp. 1																				
Joeropsididae	Joeropsididae sp. 1																				
Leptostraca	Leptostraca sp. 1																				
Leucosiidae	Cryptocnemus sp. 1																				
Leucothoidae	Leucothoidae sp. 1												2								
Liljeborgiidae	Liljeborgiidae sp. 1																				
Limnoriidae	Limnoriidae sp. 1																				
Lysianassidae	Lysianassidae sp. 1																				
Maeridae	Maeridae sp. 1																				
Melitidae	Melitidae sp. 1					1			1				2								
Munnidae	Munnidae sp. 1																				
Mysidae	Mysidae sp. 1																				
Ochlesidae	Ochlesidae sp. 1																				
Ocypodidae	Ocypodidae sp. 1																				
Ostracoda	Ostracoda sp. 1		1													1					
Ostracoda	Ostracoda sp. 2																				
Ostracoda	Ostracoda sp. 3																				
Ostracoda	Ostracoda sp. 4																				
Oxycephalidae	Oxycephalidae sp. 1															1					

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Penaeidae	Penaeidae sp. 1						1														
Phoxocephalidae	Phoxocephalidae sp. 1					1					1		1		1	2	9	4	8	6	
Pilumnidae	Pilumnidae sp. 1																				
Platyischnopidae	Platyischnopidae sp. 1																				
Podoceridae	Podoceridae sp. 1														1			1			
Portunidae	Portunidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 2																				
Pycnogonida	Pycnogonida sp. 1																				
Sphaeromatidae	Chitonopsis sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 2																				
Sphaeromatidae	Sphaeromatidae sp. 3																				
Squillidae	Belosquilla sp. 1																				
Tanaididae	Tanaididae sp. 1																				
Zobrachoidae	Zobrachoidae sp. 1																				
c.f.Hognathidae	c.f.Hognathidae sp. 1																				
Mollusca																					
Anatomidae	Anatomidae sp. 1																				
Aplysiidae	Aplysiidae sp. 1											1			1			1	1	1	
Architectonicidae	Architectonicidae sp. 1																				
Cerithiidae	Cerithiidae sp. 1																				
Corbulidae	*Corbula* sp. 1																				
Cuspidariidae	Cuspidariidae sp. 1																				
Cylichnidae	Cylichnidae sp. 1				2				1			1		2	4	1		1		1	
Eulimidae	Eulimidae sp. 1																				
Gastropoda	Gastropoda juv																				
Glycymerididae	*Glycymeris* sp. 1																				
Hiatellidae	Hiatella sp. 1											2	1								
Lasaeidae	*Curvemysella paula*																				
Limidae	Limidae sp. 1																				
Lucinidae	Lucinidae sp. 1																				
Mactridae	*Mactra* sp. 1																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Mactridae	*Mactra* sp. 2																				
Myochamidae	*Myochama* sp. 1																				
Mytillidae	*Modiolus* sp. 1						1				1										
Mytillidae	*Modiolus* sp. 2																				
Mytillidae	*Musculus coenobitus*						1				2										
Mytillidae	*Musculus* sp. 1		1	1	1							1			3						
Nassaridae	*Nassarius* sp. 1															1					
Naticidae	*Natica* sp. 1																				
Naticidae	*Natica* sp. 2																				
Nuculanidae	*Saccella darwini*																				
Nuculidae	*Ennucula* sp. 1																			1	
Olividae	*Phenacovolva* sp. 1																				
Ostreidae	Ostreidae sp. 1																				
Patellidae	Patellidae sp. 1																				
Pleurotomariidae	Pleurotomariidae sp. 1																				
Polyplacophora	Polyplacophora sp. 1																				
Polyplacophora	Polyplacophora sp. 2																				
Pteriidae	*Pteria* sp. 1		3			4															
Rissoidae	Rissoidae sp. 1																				
Solemyidae	*Solemya australis*																				
Tellinidae	*Tellina* sp. 1																				
Tellinidae	*Tellina* sp. 2					1												1			
Tellinidae	*Tellina* sp. 3																				
Tellinidae	*Tellina* sp. 4			1																	
Trochidae	Trochidae sp. 1																				
Veneridae	*Antigona* sp. 1																				
Veneridae	*Circe* sp. 1																				
Veneridae	*Dosinia* sp. 1	1											1		1						
Veneridae	*Dosinia* sp. 2																				
Veneridae	*Dosinia* sp. 3																				
Veneridae	*Paphia* sp. 1																				
Veneridae	Veneridae juv				2																
Vulsellidae	*Electroma* sp. 1																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Bryozoa	Bryozoa fan																				
Echinodermata																					
Asteroidea	Asteroidea sp. 1																				
Echinoidea	Echinoidea juv																				
Holothuroidea	Holothuroidea sp. 1																				
Holothuroidea	Holothuroidea sp. 2																				
Holothuroidea	Holothuroidea sp. 3																				
Ophiuroidea	Ophiuroidea sp. 1												1			1				1	1
Toxopneustidae	Toxopneustidae sp. 1																				
Chordata																					
Ascidiacea	Ascidiacea sp. 1												13								

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site ZO4																					
Porifera	Porifera																				
Cnidaria																					
Actiniaria	Actiniaria sp. 1																				
Actiniaria	Actiniaria sp. 2																				
Hexacorallia	Hexacorallia sp. 1																				
Nemertea	Nemertea																				
Nematoda	Nematoda																				
Annelida																					
Amphinomidae	Amphinomidae																				
Aphroditidae	Pontogenia sp. 1																				
Capitellidae	*Capitella* sp. 1		1				1														
Capitellidae	*Notomastus* sp. 1																				
Chrysopetalidae	Chrysopetalidae sp. 1																				
Cirratulidae	Cirratulidae sp. 1						2		1												
Cirratulidae	Cirratulidae sp. 2																				
Dorvilleidae	Dorvilleidae sp. 1	1						2													
Eunicidae	*Eunice* sp. 1	1		1		1															
Eunicidae	*Marphysa* sp. 1																				
Eunicidae	*Lysidice unicornis*																				
Flabelligeridae	*Pherusa* sp. 1																				
Glyceridae	*Glycera* sp. 1									1	1										
Goniadidae	Goniada sp. 1			1												2					
Hesionidae	Hesionidae sp. 1																				
Lumbrineridae	*Lumbrineris* sp. 1	1	1	1	1	1	1	1									1			1	1
Magelonidae	*Magelona* sp. 1								3												
Maldanidae	*Axiothella* sp. 1					1															
Nephtyidae	*Aglaophamus* sp. 1	2		1		3	2	1	1	1	1	2		1	1				1		
Nereididae	Nereididae sp. 1														1					1	
Nereididae	Nereididae sp. 2																				
Oenonidae	*Arabella longipedata*																				
Onuphidae	*Onuphis holobranchiata*																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Onuphidae	Rhamphobrachium sp. 1																				
Opheliidae	Armandia sp. 1															1					
Orbiniidae	Orbiniidae sp. 1																				
Paraonidae	Aricidea sp. 1						2														
Phyllodocidae	Phyllodocidae sp. 1																				
Poecilochaetidae	*Poecilochaetus serpens*																				
Polynoidae	Polynoidae sp. 1																				
Sabellidae	Sabellidae sp. 1																				
Sigalionidae	*Pholoides mendeleevi*																				
Sigalionidae	Sigalionidae sp. 1		1									1	2				1	1			1
Sphaerodoridae	*Sphaerodoropsis heteropapillata*																				
Spionidae	Spionidae sp. 1																				
Spionidae	Spionidae sp. 2																				
Syllidae	Syllidae sp. 1																				
Syllidae	Syllidae sp. 2																				
Syllidae	Syllidae sp. 3																				
Syllidae	Syllidae sp. 4																				
Terebellidae	Terebellidae sp. 1																	1			
Trichobranchidae	Trichobranchidae sp. 1	1																			
Echuira	Echuira																				
Sipuncula	Sipuncula																				
Crustacea																					
Alpheidae	*Alpheus* sp. 1																				
Ampeliscidae	Ampeliscidae sp. 1		1	1									1								
Anthuridea	Anthuridea sp. 1																				
Aoridae	Aoridae sp. 1																				
Apseudidae	Apseudidae sp. 1	1		3																2	
Arcturidae	Arcturidae sp. 1																				
Atyidae	Atyidae sp. 1																				
Bodotriidae	Bodotriidae sp. 1						1		1		1		2		2				2		
Callianassidae	Callianassidae sp. 1						1		1												
Caprellidae	Caprellidae sp. 1																				
Caridea	Caridea damaged																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ceinidae	c.f.Ceinidae sp. 1																				
Ceratocumatidae	Ceratocumatidae sp. 1																				
Cirolanidae	Cirolanidae sp. 1																				
Copepoda	Copepoda		2	1			1	1	1												
Corophiidae	Corophiidae sp. 1																				
Crustacea	Crustacea sp. 1																				
Cyproideidae	Cyproideidae sp. 1																				
Dexaminidae	Dexaminidae sp. 1												1		1						
Diogenidae	Diogenidae sp. 1																				
Gnathiidae	Gnathiidae sp. 1																				
Grapsidae	Grapsidae sp. 1																				
Gynodiastylidae	Gynodiastylidae sp. 1																				
Hymenosomatidae	Hymenosomatidae sp. 1												1								
Ischyroceridae	Ischyroceridae sp. 1																				
Isopoda	Isopoda sp. 1																				
Joeropsididae	Joeropsididae sp. 1																				
Leptostraca	Leptostraca sp. 1																				
Leucosiidae	Cryptocnemus sp. 1																				
Leucothoidae	Leucothoidae sp. 1																				
Liljeborgiidae	Liljeborgiidae sp. 1																				
Limnoriidae	Limnoriidae sp. 1																				
Lysianassidae	Lysianassidae sp. 1														1						
Maeridae	Maeridae sp. 1																				
Melitidae	Melitidae sp. 1						1														
Munnidae	Munnidae sp. 1																				
Mysidae	Mysidae sp. 1																				
Ochlesidae	Ochlesidae sp. 1																				
Ocypodidae	Ocypodidae sp. 1																				
Ostracoda	Ostracoda sp. 1		1																		
Ostracoda	Ostracoda sp. 2			1																	
Ostracoda	Ostracoda sp. 3						1														
Ostracoda	Ostracoda sp. 4																				
Oxycephalidae	Oxycephalidae sp. 1				1				1	1						2			1		

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Penaeidae	Penaeidae sp. 1																				
Phoxocephalidae	Phoxocephalidae sp. 1	1	1										1			1	1	3	1	2	
Pilumnidae	Pilumnidae sp. 1																				
Platyischnopidae	Platyischnopidae sp. 1													1							
Podoceridae	Podoceridae sp. 1																				
Portunidae	Portunidae sp. 1																			1	
Pseudozeuxidae	Pseudozeuxidae sp. 1					1															
Pseudozeuxidae	Pseudozeuxidae sp. 2																				
Pycnogonida	Pycnogonida sp. 1																				
Sphaeromatidae	Chitonopsis sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 2																				
Sphaeromatidae	Sphaeromatidae sp. 3																				
Squillidae	Belosquilla sp. 1																				
Tanaididae	Tanaididae sp. 1															1					
Zobrachoidae	Zobrachoidae sp. 1																				
c.f.Hognathidae	c.f.Hognathidae sp. 1																				
Mollusca																					
Anatomidae	Anatomidae sp. 1																				
Aplysiidae	Aplysiidae sp. 1																				
Architectonicidae	Architectonicidae sp. 1																				
Cerithiidae	Cerithiidae sp. 1																				
Corbulidae	*Corbula* sp. 1				1																
Cuspidariidae	Cuspidariidae sp. 1		2																		
Cylichnidae	Cylichnidae sp. 1						3	1		2			2			2					
Eulimidae	Eulimidae sp. 1																				
Gastropoda	Gastropoda juv																				
Glycymerididae	*Glycymeris* sp. 1																				
Hiatellidae	Hiatella sp. 1																				
Lasaeidae	*Curvemysella paula*																				
Limidae	Limidae sp. 1																				
Lucinidae	Lucinidae sp. 1														1						
Mactridae	*Mactra* sp. 1																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Mactridae	*Mactra* sp. 2																				
Myochamidae	*Myochama* sp. 1																				
Mytillidae	*Modiolus* sp. 1	1		1			1	1		1											
Mytillidae	*Modiolus* sp. 2	1		1		2													1		
Mytillidae	*Musculus coenobitus*																				
Mytillidae	*Musculus* sp. 1			6	1	2									1		2		1		
Nassaridae	*Nassarius* sp. 1																				
Naticidae	*Natica* sp. 1																				
Naticidae	*Natica* sp. 2																				
Nuculanidae	*Saccella darwini*																				
Nuculidae	*Ennucula* sp. 1																				
Olividae	*Phenacovolva* sp. 1																				
Ostreidae	Ostreidae sp. 1		1																		
Patellidae	Patellidae sp. 1																				
Pleurotomariidae	Pleurotomariidae sp. 1																				
Polyplacophora	Polyplacophora sp. 1																				
Polyplacophora	Polyplacophora sp. 2																				
Pteriidae	*Pteria* sp. 1		1																		
Rissoidae	Rissoidae sp. 1																				
Solemyidae	*Solemya australis*																				
Tellinidae	*Tellina* sp. 1		1																		
Tellinidae	*Tellina* sp. 2	3	4																		
Tellinidae	*Tellina* sp. 3					1				1											
Tellinidae	*Tellina* sp. 4																				
Trochidae	Trochidae sp. 1																				
Veneridae	*Antigona* sp. 1																1				
Veneridae	*Circe* sp. 1				3									2							
Veneridae	*Dosinia* sp. 1	2	1	4		1	1	3	1	3	7	2	1	1	4	2	8	6		7	1
Veneridae	*Dosinia* sp. 2																		4		
Veneridae	*Dosinia* sp. 3																				
Veneridae	*Paphia* sp. 1																				
Veneridae	Veneridae juv																				
Vulsellidae	*Electroma* sp. 1																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Bryozoa	Bryozoa fan																				
Echinodermata																					
Asteroidea	Asteroidea sp. 1																				
Echinoidea	Echinoidea juv						1														
Holothuroidea	Holothuroidea sp. 1																				
Holothuroidea	Holothuroidea sp. 2																				
Holothuroidea	Holothuroidea sp. 3																				
Ophiuroidea	Ophiuroidea sp. 1	1				1															
Toxopneustidae	Toxopneustidae sp. 1																				
Chordata																					
Ascidiacea	Ascidiacea sp. 1				1																

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site ZO5																					
Porifera	Porifera															1					
Cnidaria																					
Actiniaria	Actiniaria sp. 1																				
Actiniaria	Actiniaria sp. 2																				
Hexacorallia	Hexacorallia sp. 1																				
Nemertea	Nemertea																				
Nematoda	Nematoda																				
Annelida																					
Amphinomidae	Amphinomidae																				
Aphroditidae	Pontogenia sp. 1																				
Capitellidae	*Capitella* sp. 1		1	1		1							1		1	3	2				
Capitellidae	*Notomastus* sp. 1																				
Chrysopetalidae	Chrysopetalidae sp. 1																				
Cirratulidae	Cirratulidae sp. 1																		1		
Cirratulidae	Cirratulidae sp. 2																				
Dorvilleidae	Dorvilleidae sp. 1	1		3	1	2				1	2			2				1			
Eunicidae	*Eunice* sp. 1	6	3	1	8	2		1				1		4					1	1	1
Eunicidae	*Marphysa* sp. 1						1	1													
Eunicidae	*Lysidice unicornis*																				
Flabelligeridae	*Pherusa* sp. 1																				
Glyceridae	*Glycera* sp. 1	1																			
Goniadidae	Goniada sp. 1		1	2				3	1					2	1	2	1	1			
Hesionidae	Hesionidae sp. 1																				
Lumbrineridae	*Lumbrineris* sp. 1	1	1		6	1	1			1			1					1			
Magelonidae	*Magelona* sp. 1		1					1	1												
Maldanidae	*Axiothella* sp. 1																				
Nephtyidae	*Aglaophamus* sp. 1		1	1	1	1											1	1		1	1
Nereididae	Nereididae sp. 1		1	1		2	1	1		2								1	1	1	1
Nereididae	Nereididae sp. 2		4	2	3								2								
Oenonidae	*Arabella longipedata*	2																			
Onuphidae	*Onuphis holobranchiata*																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Onuphidae	Rhamphobrachium sp. 1																				
Opheliidae	Armandia sp. 1																				
Orbiniidae	Orbiniidae sp. 1																				
Paraonidae	Aricidea sp. 1																				
Phyllodocidae	Phyllodocidae sp. 1														1						
Poecilochaetidae	*Poecilochaetus serpens*																				
Polynoidae	Polynoidae sp. 1																				
Sabellidae	Sabellidae sp. 1																				
Sigalionidae	*Pholoides mendeleevi*																				
Sigalionidae	Sigalionidae sp. 1					1															
Sphaerodoridae	*Sphaerodoropsis heteropapillata*																				
Spionidae	Spionidae sp. 1																				
Spionidae	Spionidae sp. 2																				
Syllidae	Syllidae sp. 1												1		1						
Syllidae	Syllidae sp. 2																				
Syllidae	Syllidae sp. 3																				
Syllidae	Syllidae sp. 4																				
Terebellidae	Terebellidae sp. 1																				
Trichobranchidae	Trichobranchidae sp. 1																				
Echuira	Echuira																				
Sipuncula	Sipuncula												1								
Crustacea																					
Alpheidae	*Alpheus* sp. 1			1																	
Ampeliscidae	Ampeliscidae sp. 1	1								1		1						1			
Anthuridea	Anthuridea sp. 1							1													
Aoridae	Aoridae sp. 1												1								
Apseudidae	Apseudidae sp. 1						1		1	1	4		2						1		
Arcturidae	Arcturidae sp. 1																1				
Atyidae	Atyidae sp. 1																				
Bodotriidae	Bodotriidae sp. 1				2			1					2	2					2		
Callianassidae	Callianassidae sp. 1																				
Caprellidae	Caprellidae sp. 1																				
Caridea	Caridea damaged																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ceinidae	c.f.Ceinidae sp. 1																				
Ceratocumatidae	Ceratocumatidae sp. 1																				
Cirolanidae	Cirolanidae sp. 1																				
Copepoda	Copepoda		2	1					1		1		5								
Corophiidae	Corophiidae sp. 1																				
Crustacea	Crustacea sp. 1																				
Cyproideidae	Cyproideidae sp. 1																				
Dexaminidae	Dexaminidae sp. 1	2			1						1										
Diogenidae	Diogenidae sp. 1																				
Gnathiidae	Gnathiidae sp. 1																				
Grapsidae	Grapsidae sp. 1																				
Gynodiastylidae	Gynodiastylidae sp. 1					1								1							
Hymenosomatidae	Hymenosomatidae sp. 1																				1
Ischyroceridae	Ischyroceridae sp. 1			2																	
Isopoda	Isopoda sp. 1																				
Joeropsididae	Joeropsididae sp. 1																				
Leptostraca	Leptostraca sp. 1							1													
Leucosiidae	Cryptocnemus sp. 1																				
Leucothoidae	Leucothoidae sp. 1											2				1		1			
Liljeborgiidae	Liljeborgiidae sp. 1																				
Limnoriidae	Limnoriidae sp. 1																				
Lysianassidae	Lysianassidae sp. 1		1		2							1									
Maeridae	Maeridae sp. 1																				
Melitidae	Melitidae sp. 1			4	2																
Munnidae	Munnidae sp. 1																				
Mysidae	Mysidae sp. 1																				
Ochlesidae	Ochlesidae sp. 1																				
Ocypodidae	Ocypodidae sp. 1																				
Ostracoda	Ostracoda sp. 1		10	5		1															
Ostracoda	Ostracoda sp. 2																				
Ostracoda	Ostracoda sp. 3																				
Ostracoda	Ostracoda sp. 4																				
Oxycephalidae	Oxycephalidae sp. 1								1			1							3		

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Penaeidae	Penaeidae sp. 1																				
Phoxocephalidae	Phoxocephalidae sp. 1															1	2	1	4		
Pilumnidae	Pilumnidae sp. 1																				
Platyischnopidae	Platyischnopidae sp. 1																				
Podoceridae	Podoceridae sp. 1	1																			
Portunidae	Portunidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 1				1																
Pseudozeuxidae	Pseudozeuxidae sp. 2																				
Pycnogonida	Pycnogonida sp. 1																				
Sphaeromatidae	Chitonopsis sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 2																				
Sphaeromatidae	Sphaeromatidae sp. 3																				
Squillidae	Belosquilla sp. 1																1				
Tanaididae	Tanaididae sp. 1																				
Zobrachoidae	Zobrachoidae sp. 1																				
c.f.Hognathidae	c.f.Hognathidae sp. 1																				
Mollusca																					
Anatomidae	Anatomidae sp. 1																				
Aplysiidae	Aplysiidae sp. 1																				
Architectonicidae	Architectonicidae sp. 1																				
Cerithiidae	Cerithiidae sp. 1																				
Corbulidae	*Corbula* sp. 1																				
Cuspidariidae	Cuspidariidae sp. 1																				
Cylichnidae	Cylichnidae sp. 1	1	1					1				1	1	1	3	2					
Eulimidae	Eulimidae sp. 1																				
Gastropoda	Gastropoda juv		1																		
Glycymerididae	*Glycymeris* sp. 1																				
Hiatellidae	Hiatella sp. 1	2	2	2	2							3	24		1						
Lasaeidae	*Curvemysella paula*	1																			
Limidae	Limidae sp. 1																				
Lucinidae	Lucinidae sp. 1																				
Mactridae	*Mactra* sp. 1																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Mactridae	*Mactra* sp. 2																				
Myochamidae	*Myochama* sp. 1																				
Mytillidae	*Modiolus* sp. 1	1																			
Mytillidae	*Modiolus* sp. 2	1	2	1	1																
Mytillidae	*Musculus coenobitus*																				
Mytillidae	*Musculus* sp. 1	1	5	2								1	1								
Nassaridae	*Nassarius* sp. 1																				
Naticidae	*Natica* sp. 1																				
Naticidae	*Natica* sp. 2																				
Nuculanidae	*Saccella darwini*	2																			
Nuculidae	*Ennucula* sp. 1																				
Olividae	*Phenacovolva* sp. 1																				
Ostreidae	Ostreidae sp. 1		2		1																
Patellidae	Patellidae sp. 1																				
Pleurotomariidae	Pleurotomariidae sp. 1																				
Polyplacophora	Polyplacophora sp. 1																				
Polyplacophora	Polyplacophora sp. 2																				
Pteriidae	*Pteria* sp. 1	2	1	1	2																
Rissoidae	Rissoidae sp. 1																				
Solemyidae	*Solemya australis*																				
Tellinidae	*Tellina* sp. 1																				
Tellinidae	*Tellina* sp. 2	1	6	2	2																
Tellinidae	*Tellina* sp. 3				1																
Tellinidae	*Tellina* sp. 4	1									1										
Trochidae	Trochidae sp. 1																				
Veneridae	*Antigona* sp. 1																				
Veneridae	*Circe* sp. 1																				
Veneridae	*Dosinia* sp. 1								2			1		1					1		
Veneridae	*Dosinia* sp. 2																				
Veneridae	*Dosinia* sp. 3				1																
Veneridae	*Paphia* sp. 1																				
Veneridae	Veneridae juv																				
Vulsellidae	*Electroma* sp. 1																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Bryozoa	Bryozoa fan																				
Echinodermata																					
Asteroidea	Asteroidea sp. 1											1									
Echinoidea	Echinoidea juv																				
Holothuroidea	Holothuroidea sp. 1	1	5		2																
Holothuroidea	Holothuroidea sp. 2																				
Holothuroidea	Holothuroidea sp. 3																				
Ophiuroidea	Ophiuroidea sp. 1																				
Toxopneustidae	Toxopneustidae sp. 1		1																		
Chordata																					
Ascidiacea	Ascidiacea sp. 1				1																

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site SB1																					
Porifera	Porifera																				
Cnidaria																					
Actiniaria	Actiniaria sp. 1																				
Actiniaria	Actiniaria sp. 2																				
Hexacorallia	Hexacorallia sp. 1																				
Nemertea	Nemertea						1														
Nematoda	Nematoda																				
Annelida																					
Amphinomidae	Amphinomidae																				
Aphroditidae	Pontogenia sp. 1																				
Capitellidae	*Capitella* sp. 1		1	1	1	1			1				3	3	2						
Capitellidae	*Notomastus* sp. 1																				
Chrysopetalidae	Chrysopetalidae sp. 1																				
Cirratulidae	Cirratulidae sp. 1														1	1	2				
Cirratulidae	Cirratulidae sp. 2	1																			
Dorvilleidae	Dorvilleidae sp. 1		1																		
Eunicidae	*Eunice* sp. 1																		1		
Eunicidae	*Marphysa* sp. 1																				
Eunicidae	*Lysidice unicornis*																				
Flabelligeridae	*Pherusa* sp. 1																				
Glyceridae	*Glycera* sp. 1			1				1													
Goniadidae	Goniada sp. 1	1				1				1		1	1	2						1	2
Hesionidae	Hesionidae sp. 1																				
Lumbrineridae	*Lumbrineris* sp. 1																				
Magelonidae	*Magelona* sp. 1																				
Maldanidae	*Axiothella* sp. 1																				
Nephtyidae	*Aglaophamus* sp. 1	1		1							1					1				1	
Nereididae	Nereididae sp. 1	1	1		3	3				1			2	1	1		1				
Nereididae	Nereididae sp. 2																				
Oenonidae	*Arabella longipedata*																				
Onuphidae	*Onuphis holobranchiata*																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Onuphidae	Rhamphobrachium sp. 1																				
Opheliidae	Armandia sp. 1																				
Orbiniidae	Orbiniidae sp. 1																				
Paraonidae	Aricidea sp. 1						1														
Phyllodocidae	Phyllodocidae sp. 1													1	1						
Poecilochaetidae	*Poecilochaetus serpens*																				
Polynoidae	Polynoidae sp. 1																				
Sabellidae	Sabellidae sp. 1																				
Sigalionidae	*Pholoides mendeleevi*																				
Sigalionidae	Sigalionidae sp. 1																				
Sphaerodoridae	*Sphaerodoropsis heteropapillata*																				
Spionidae	Spionidae sp. 1			1	3									1							
Spionidae	Spionidae sp. 2																				
Syllidae	Syllidae sp. 1														1						
Syllidae	Syllidae sp. 2												1								
Syllidae	Syllidae sp. 3																				
Syllidae	Syllidae sp. 4																				
Terebellidae	Terebellidae sp. 1		1																		
Trichobranchidae	Trichobranchidae sp. 1																				
Echuira	Echuira																				
Sipuncula	Sipuncula				1																
Crustacea																					
Alpheidae	*Alpheus* sp. 1																				
Ampeliscidae	Ampeliscidae sp. 1																				
Anthuridea	Anthuridea sp. 1																				
Aoridae	Aoridae sp. 1																				
Apseudidae	Apseudidae sp. 1		1	2	6																
Arcturidae	Arcturidae sp. 1																				
Atyidae	Atyidae sp. 1																				
Bodotriidae	Bodotriidae sp. 1																			1	
Callianassidae	Callianassidae sp. 1																				
Caprellidae	Caprellidae sp. 1																				
Caridea	Caridea damaged																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ceinidae	c.f.Ceinidae sp. 1																				
Ceratocumatidae	Ceratocumatidae sp. 1																				
Cirolanidae	Cirolanidae sp. 1																				
Copepoda	Copepoda	2			1	2															
Corophiidae	Corophiidae sp. 1																				
Crustacea	Crustacea sp. 1																				
Cyproideidae	Cyproideidae sp. 1																				
Dexaminidae	Dexaminidae sp. 1																				
Diogenidae	Diogenidae sp. 1																				
Gnathiidae	Gnathiidae sp. 1																				
Grapsidae	Grapsidae sp. 1																				
Gynodiastylidae	Gynodiastylidae sp. 1																				
Hymenosomatidae	Hymenosomatidae sp. 1																				
Ischyroceridae	Ischyroceridae sp. 1																				
Isopoda	Isopoda sp. 1																				
Joeropsididae	Joeropsididae sp. 1																				
Leptostraca	Leptostraca sp. 1																				
Leucosiidae	Cryptocnemus sp. 1																				
Leucothoidae	Leucothoidae sp. 1																				
Liljeborgiidae	Liljeborgiidae sp. 1																				
Limnoriidae	Limnoriidae sp. 1																				
Lysianassidae	Lysianassidae sp. 1																				
Maeridae	Maeridae sp. 1																				
Melitidae	Melitidae sp. 1																				
Munnidae	Munnidae sp. 1																				
Mysidae	Mysidae sp. 1					1															
Ochlesidae	Ochlesidae sp. 1																				
Ocypodidae	Ocypodidae sp. 1																				
Ostracoda	Ostracoda sp. 1																				
Ostracoda	Ostracoda sp. 2																				
Ostracoda	Ostracoda sp. 3																				
Ostracoda	Ostracoda sp. 4																				
Oxycephalidae	Oxycephalidae sp. 1																	1			

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Penaeidae	Penaeidae sp. 1																				
Phoxocephalidae	Phoxocephalidae sp. 1																	1			
Pilumnidae	Pilumnidae sp. 1																				
Platyischnopidae	Platyischnopidae sp. 1																				
Podoceridae	Podoceridae sp. 1																				
Portunidae	Portunidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 2																				
Pycnogonida	Pycnogonida sp. 1																				
Sphaeromatidae	Chitonopsis sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 2																				
Sphaeromatidae	Sphaeromatidae sp. 3																				
Squillidae	Belosquilla sp. 1																				
Tanaididae	Tanaididae sp. 1																				
Zobrachoidae	Zobrachoidae sp. 1																				
c.f.Hognathidae	c.f.Hognathidae sp. 1																				
Mollusca																					
Anatomidae	Anatomidae sp. 1																				
Aplysiidae	Aplysiidae sp. 1																				1
Architectonicidae	Architectonicidae sp. 1																				
Cerithiidae	Cerithiidae sp. 1																				
Corbulidae	*Corbula* sp. 1																				
Cuspidariidae	Cuspidariidae sp. 1																				
Cylichnidae	Cylichnidae sp. 1																				1
Eulimidae	Eulimidae sp. 1																				
Gastropoda	Gastropoda juv																				
Glycymerididae	*Glycymeris* sp. 1																				
Hiatellidae	Hiatella sp. 1																				
Lasaeidae	*Curvemysella paula*																				
Limidae	Limidae sp. 1																				
Lucinidae	Lucinidae sp. 1																				
Mactridae	*Mactra* sp. 1																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Mactridae	*Mactra* sp. 2																				
Myochamidae	*Myochama* sp. 1																				
Mytillidae	*Modiolus* sp. 1																				
Mytillidae	*Modiolus* sp. 2																				
Mytillidae	*Musculus coenobitus*																				
Mytillidae	*Musculus* sp. 1																				
Nassaridae	*Nassarius* sp. 1																				
Naticidae	*Natica* sp. 1																				
Naticidae	*Natica* sp. 2																				
Nuculanidae	*Saccella darwini*																			1	
Nuculidae	*Ennucula* sp. 1																				
Olividae	*Phenacovolva* sp. 1																				
Ostreidae	Ostreidae sp. 1																				
Patellidae	Patellidae sp. 1																				
Pleurotomariidae	Pleurotomariidae sp. 1																				
Polyplacophora	Polyplacophora sp. 1																				
Polyplacophora	Polyplacophora sp. 2																				
Pteriidae	*Pteria* sp. 1																				
Rissoidae	Rissoidae sp. 1																				
Solemyidae	*Solemya australis*																				
Tellinidae	*Tellina* sp. 1																				1
Tellinidae	*Tellina* sp. 2					2							1		1	1					
Tellinidae	*Tellina* sp. 3																				
Tellinidae	*Tellina* sp. 4																				
Trochidae	Trochidae sp. 1																				
Veneridae	*Antigona* sp. 1																				
Veneridae	*Circe* sp. 1												1								
Veneridae	*Dosinia* sp. 1										1										
Veneridae	*Dosinia* sp. 2																				
Veneridae	*Dosinia* sp. 3																				
Veneridae	*Paphia* sp. 1																				
Veneridae	Veneridae juv																				
Vulsellidae	*Electroma* sp. 1																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Bryozoa	Bryozoa fan														1						
Echinodermata																					
Asteroidea	Asteroidea sp. 1																				
Echinoidea	Echinoidea juv																				
Holothuroidea	Holothuroidea sp. 1		4																		
Holothuroidea	Holothuroidea sp. 2																				
Holothuroidea	Holothuroidea sp. 3																				
Ophiuroidea	Ophiuroidea sp. 1																				
Toxopneustidae	Toxopneustidae sp. 1																				
Chordata																					
Ascidiacea	Ascidiacea sp. 1																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site SB2																					
Porifera	Porifera																				
Cnidaria																					
Actiniaria	Actiniaria sp. 1																				
Actiniaria	Actiniaria sp. 2																				
Hexacorallia	Hexacorallia sp. 1																				
Nemertea	Nemertea				1																
Nematoda	Nematoda																				
Annelida																					
Amphinomidae	Amphinomidae																				
Aphroditidae	Pontogenia sp. 1																				
Capitellidae	*Capitella* sp. 1						1	1	2		2	1	2	3	2	1		2			
Capitellidae	*Notomastus* sp. 1																				
Chrysopetalidae	Chrysopetalidae sp. 1																				
Cirratulidae	Cirratulidae sp. 1									2											
Cirratulidae	Cirratulidae sp. 2																				
Dorvilleidae	Dorvilleidae sp. 1																				
Eunicidae	*Eunice* sp. 1																				
Eunicidae	*Marphysa* sp. 1																				
Eunicidae	*Lysidice unicornis*																				
Flabelligeridae	*Pherusa* sp. 1																				
Glyceridae	*Glycera* sp. 1		1				1				1									1	
Goniadidae	Goniada sp. 1					1									3	1	2		1		
Hesionidae	Hesionidae sp. 1																				
Lumbrineridae	*Lumbrineris* sp. 1						1		1		1										
Magelonidae	*Magelona* sp. 1																				
Maldanidae	*Axiothella* sp. 1																				
Nephtyidae	*Aglaophamus* sp. 1							1													
Nereididae	Nereididae sp. 1	1	3				1		1		1		1			1					1
Nereididae	Nereididae sp. 2																				
Oenonidae	*Arabella longipedata*																				
Onuphidae	*Onuphis holobranchiata*																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Onuphidae	Rhamphobrachium sp. 1																				
Opheliidae	Armandia sp. 1																				
Orbiniidae	Orbiniidae sp. 1																				
Paraonidae	Aricidea sp. 1																				
Phyllodocidae	Phyllodocidae sp. 1	1		1		1															
Poecilochaetidae	*Poecilochaetus serpens*																				
Polynoidae	Polynoidae sp. 1																				
Sabellidae	Sabellidae sp. 1																				
Sigalionidae	*Pholoides mendeleevi*																				
Sigalionidae	Sigalionidae sp. 1																				
Sphaerodoridae	*Sphaerodoropsis heteropapillata*																				
Spionidae	Spionidae sp. 1								1												
Spionidae	Spionidae sp. 2																				
Syllidae	Syllidae sp. 1				1							1					1				1
Syllidae	Syllidae sp. 2																				
Syllidae	Syllidae sp. 3																				
Syllidae	Syllidae sp. 4																				
Terebellidae	Terebellidae sp. 1																				
Trichobranchidae	Trichobranchidae sp. 1																				
Echuira	Echuira																				
Sipuncula	Sipuncula	1																	1		
Crustacea																					
Alpheidae	*Alpheus* sp. 1									1											
Ampeliscidae	Ampeliscidae sp. 1																				
Anthuridea	Anthuridea sp. 1																				
Aoridae	Aoridae sp. 1																				
Apseudidae	Apseudidae sp. 1						1														
Arcturidae	Arcturidae sp. 1																				
Atyidae	Atyidae sp. 1																				
Bodotriidae	Bodotriidae sp. 1															1					
Callianassidae	Callianassidae sp. 1																				
Caprellidae	Caprellidae sp. 1																				
Caridea	Caridea damaged																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ceinidae	c.f.Ceinidae sp. 1																				
Ceratocumatidae	Ceratocumatidae sp. 1	1																			
Cirolanidae	Cirolanidae sp. 1																				
Copepoda	Copepoda								1				1			1	1				
Corophiidae	Corophiidae sp. 1																				
Crustacea	Crustacea sp. 1																				
Cyproideidae	Cyproideidae sp. 1																				
Dexaminidae	Dexaminidae sp. 1																				
Diogenidae	Diogenidae sp. 1																				
Gnathiidae	Gnathiidae sp. 1																				
Grapsidae	Grapsidae sp. 1																				
Gynodiastylidae	Gynodiastylidae sp. 1																				
Hymenosomatidae	Hymenosomatidae sp. 1																				
Ischyroceridae	Ischyroceridae sp. 1																	1			
Isopoda	Isopoda sp. 1																				
Joeropsididae	Joeropsididae sp. 1																				
Leptostraca	Leptostraca sp. 1																				
Leucosiidae	Cryptocnemus sp. 1																				
Leucothoidae	Leucothoidae sp. 1																				
Liljeborgiidae	Liljeborgiidae sp. 1																				
Limnoriidae	Limnoriidae sp. 1																				
Lysianassidae	Lysianassidae sp. 1																				
Maeridae	Maeridae sp. 1																				
Melitidae	Melitidae sp. 1															1					
Munnidae	Munnidae sp. 1																				
Mysidae	Mysidae sp. 1	1					1			1											
Ochlesidae	Ochlesidae sp. 1																				
Ocypodidae	Ocypodidae sp. 1																				
Ostracoda	Ostracoda sp. 1																				
Ostracoda	Ostracoda sp. 2																				
Ostracoda	Ostracoda sp. 3																				
Ostracoda	Ostracoda sp. 4																				
Oxycephalidae	Oxycephalidae sp. 1																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Penaeidae	Penaeidae sp. 1																				
Phoxocephalidae	Phoxocephalidae sp. 1														1						
Pilumnidae	Pilumnidae sp. 1																				
Platyischnopidae	Platyischnopidae sp. 1																				
Podoceridae	Podoceridae sp. 1																				
Portunidae	Portunidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 2																				
Pycnogonida	Pycnogonida sp. 1																				
Sphaeromatidae	Chitonopsis sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 2																				
Sphaeromatidae	Sphaeromatidae sp. 3																				
Squillidae	Belosquilla sp. 1																				
Tanaididae	Tanaididae sp. 1																				
Zobrachoidae	Zobrachoidae sp. 1																				
c.f.Hologna thidae	c.f.Hologna thidae sp. 1																				
Mollusca																					
Anatomidae	Anatomidae sp. 1																				
Aplysiidae	Aplysiidae sp. 1																				
Architectonicidae	Architectonicidae sp. 1																				
Cerithiidae	Cerithiidae sp. 1																				
Corbulidae	*Corbula* sp. 1																				
Cuspidariidae	Cuspidariidae sp. 1																				
Cylichnidae	Cylichnidae sp. 1																2				
Eulimidae	Eulimidae sp. 1																				
Gastropoda	Gastropoda juv																				
Glycymerididae	*Glycymeris* sp. 1																				
Hiatellidae	Hiatella sp. 1																				
Lasaeidae	*Curvemysella paula*																				
Limidae	Limidae sp. 1																				
Lucinidae	Lucinidae sp. 1																				
Mactridae	*Mactra* sp. 1																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Mactridae	*Mactra* sp. 2																				
Myochamidae	*Myochama* sp. 1																				
Mytillidae	*Modiolus* sp. 1																				
Mytillidae	*Modiolus* sp. 2																				
Mytillidae	*Musculus coenobitus*																				
Mytillidae	*Musculus* sp. 1																				
Nassaridae	*Nassarius* sp. 1																				
Naticidae	*Natica* sp. 1																				
Naticidae	*Natica* sp. 2																				
Nuculanidae	*Saccella darwini*																				
Nuculidae	*Ennucula* sp. 1																				
Olividae	*Phenacovolva* sp. 1																				
Ostreidae	Ostreidae sp. 1																				
Patellidae	Patellidae sp. 1																				
Pleurotomariidae	Pleurotomariidae sp. 1																				
Polyplacophora	Polyplacophora sp. 1																				
Polyplacophora	Polyplacophora sp. 2																				
Pteriidae	*Pteria* sp. 1																				
Rissoidae	Rissoidae sp. 1																				
Solemyidae	*Solemya australis*																				
Tellinidae	*Tellina* sp. 1																1			1	
Tellinidae	*Tellina* sp. 2											1	1		1	3					
Tellinidae	*Tellina* sp. 3																				
Tellinidae	*Tellina* sp. 4																				
Trochidae	Trochidae sp. 1																				
Veneridae	*Antigona* sp. 1																				
Veneridae	*Circe* sp. 1																				
Veneridae	*Dosinia* sp. 1								1												
Veneridae	*Dosinia* sp. 2																				
Veneridae	*Dosinia* sp. 3																				
Veneridae	*Paphia* sp. 1															1					
Veneridae	Veneridae juv																				
Vulsellidae	*Electroma* sp. 1																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Bryozoa	Bryozoa fan																				
Echinodermata																					
Asteroidea	Asteroidea sp. 1																				
Echinoidea	Echinoidea juv																				
Holothuroidea	Holothuroidea sp. 1																				
Holothuroidea	Holothuroidea sp. 2																				
Holothuroidea	Holothuroidea sp. 3																				
Ophiuroidea	Ophiuroidea sp. 1																				
Toxopneustidae	Toxopneustidae sp. 1																				
Chordata																					
Ascidiacea	Ascidiacea sp. 1																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site SB3																					
Porifera	Porifera																				
Cnidaria																					
Actiniaria	Actiniaria sp. 1																				
Actiniaria	Actiniaria sp. 2																				
Hexacorallia	Hexacorallia sp. 1																				
Nemertea	Nemertea																				
Nematoda	Nematoda																			2	
Annelida																					
Amphinomidae	Amphinomidae																				
Aphroditidae	Pontogenia sp. 1																				
Capitellidae	*Capitella* sp. 1						3	3	3	2	4	1	1	6	2						1
Capitellidae	*Notomastus* sp. 1																				
Chrysopetalidae	Chrysopetalidae sp. 1																				
Cirratulidae	Cirratulidae sp. 1						4	5	2	2	1	6	9	6	3	7	2	2	1	1	1
Cirratulidae	Cirratulidae sp. 2		2	1	9	8															
Dorvilleidae	Dorvilleidae sp. 1			1			1		1												
Eunicidae	*Eunice* sp. 1																1				1
Eunicidae	*Marphysa* sp. 1																				
Eunicidae	*Lysidice unicornis*																				
Flabelligeridae	*Pherusa* sp. 1																				
Glyceridae	*Glycera* sp. 1																				
Goniadidae	Goniada sp. 1	2							3			6	1		1		2	4	1		1
Hesionidae	Hesionidae sp. 1																				
Lumbrineridae	*Lumbrineris* sp. 1		1		1																
Magelonidae	*Magelona* sp. 1																				
Maldanidae	*Axiothella* sp. 1																				
Nephtyidae	*Aglaophamus* sp. 1		1	1													2		1		
Nereididae	Nereididae sp. 1			2	1			3	1	1	2		5		3	1		1			
Nereididae	Nereididae sp. 2																				
Oenonidae	*Arabella longipedata*																				
Onuphidae	*Onuphis holobranchiata*																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Onuphidae	Rhamphobrachium sp. 1																				
Opheliidae	Armandia sp. 1																				
Orbiniidae	Orbiniidae sp. 1																				
Paraonidae	Aricidea sp. 1																				
Phyllodocidae	Phyllodocidae sp. 1																				
Poecilochaetidae	*Poecilochaetus serpens*																				
Polynoidae	Polynoidae sp. 1																				
Sabellidae	Sabellidae sp. 1																				
Sigalionidae	*Pholoides mendeleevi*																				
Sigalionidae	Sigalionidae sp. 1																				
Sphaerodoridae	*Sphaerodoropsis heteropapillata*																				
Spionidae	Spionidae sp. 1																				
Spionidae	Spionidae sp. 2																				
Syllidae	Syllidae sp. 1																				
Syllidae	Syllidae sp. 2												1		1	1					
Syllidae	Syllidae sp. 3																				
Syllidae	Syllidae sp. 4																				
Terebellidae	Terebellidae sp. 1																				
Trichobranchidae	Trichobranchidae sp. 1		2		2																
Echuira	Echuira																				
Sipuncula	Sipuncula																				
Crustacea																					
Alpheidae	*Alpheus* sp. 1			1											1						
Ampeliscidae	Ampeliscidae sp. 1																				
Anthuridea	Anthuridea sp. 1																				
Aoridae	Aoridae sp. 1																				
Apseudidae	Apseudidae sp. 1																				
Arcturidae	Arcturidae sp. 1																				
Atyidae	Atyidae sp. 1																				
Bodotriidae	Bodotriidae sp. 1																				
Callianassidae	Callianassidae sp. 1	1																			
Caprellidae	Caprellidae sp. 1																				
Caridea	Caridea damaged																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ceinidae	c.f.Ceinidae sp. 1																				
Ceratocumatidae	Ceratocumatidae sp. 1																				
Cirolanidae	Cirolanidae sp. 1								1											1	
Copepoda	Copepoda																				
Corophiidae	Corophiidae sp. 1	1		1	1					1				1	1	1					
Crustacea	Crustacea sp. 1																				
Cyproideidae	Cyproideidae sp. 1																				
Dexaminidae	Dexaminidae sp. 1																				
Diogenidae	Diogenidae sp. 1																				
Gnathiidae	Gnathiidae sp. 1																				
Grapsidae	Grapsidae sp. 1																				
Gynodiastylidae	Gynodiastylidae sp. 1																				
Hymenosomatidae	Hymenosomatidae sp. 1																				
Ischyroceridae	Ischyroceridae sp. 1																				
Isopoda	Isopoda sp. 1																				
Joeropsididae	Joeropsididae sp. 1																				
Leptostraca	Leptostraca sp. 1																				
Leucosiidae	Cryptocnemus sp. 1																				
Leucothoidae	Leucothoidae sp. 1																				
Liljeborgiidae	Liljeborgiidae sp. 1																				
Limnoriidae	Limnoriidae sp. 1																				
Lysianassidae	Lysianassidae sp. 1																				
Maeridae	Maeridae sp. 1																				
Melitidae	Melitidae sp. 1																				
Munnidae	Munnidae sp. 1						1		1										1		
Mysidae	Mysidae sp. 1																				
Ochlesidae	Ochlesidae sp. 1																				
Ocypodidae	Ocypodidae sp. 1																				
Ostracoda	Ostracoda sp. 1																				
Ostracoda	Ostracoda sp. 2																				
Ostracoda	Ostracoda sp. 3					1															
Ostracoda	Ostracoda sp. 4																				
Oxycephalidae	Oxycephalidae sp. 1																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Penaeidae	Penaeidae sp. 1																		3		
Phoxocephalidae	Phoxocephalidae sp. 1																				
Pilumnidae	Pilumnidae sp. 1																				
Platyischnopidae	Platyischnopidae sp. 1																				
Podoceridae	Podoceridae sp. 1																				
Portunidae	Portunidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 2																				
Pycnogonida	Pycnogonida sp. 1																				
Sphaeromatidae	Chitonopsis sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 2																				
Sphaeromatidae	Sphaeromatidae sp. 3																				
Squillidae	Belosquilla sp. 1																				
Tanaididae	Tanaididae sp. 1																				
Zobrachoidae	Zobrachoidae sp. 1																				
c.f.Hognathidae	c.f.Hognathidae sp. 1																				
Mollusca																					
Anatomidae	Anatomidae sp. 1																				
Aplysiidae	Aplysiidae sp. 1																	3	1	1	
Architectonicidae	Architectonicidae sp. 1																				
Cerithiidae	Cerithiidae sp. 1																				
Corbulidae	*Corbula* sp. 1																				
Cuspidariidae	Cuspidariidae sp. 1																				
Cylichnidae	Cylichnidae sp. 1											1		1						5	3
Eulimidae	Eulimidae sp. 1																				
Gastropoda	Gastropoda juv																				
Glycymerididae	*Glycymeris* sp. 1																				
Hiatellidae	Hiatella sp. 1													1	1				1		
Lasaeidae	*Curvemysella paula*																				
Limidae	Limidae sp. 1																				
Lucinidae	Lucinidae sp. 1																				
Mactridae	*Mactra* sp. 1																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Mactridae	*Mactra* sp. 2																				
Myochamidae	*Myochama* sp. 1																				
Mytillidae	*Modiolus* sp. 1																	2			
Mytillidae	*Modiolus* sp. 2																				
Mytillidae	*Musculus coenobitus*																				
Mytillidae	*Musculus* sp. 1												2								3
Nassaridae	*Nassarius* sp. 1																				
Naticidae	*Natica* sp. 1																				
Naticidae	*Natica* sp. 2																				
Nuculanidae	*Saccella darwini*																				
Nuculidae	*Ennucula* sp. 1																				
Olividae	*Phenacovolva* sp. 1																				
Ostreidae	Ostreidae sp. 1																				
Patellidae	Patellidae sp. 1																				
Pleurotomariidae	Pleurotomariidae sp. 1																				
Polyplacophora	Polyplacophora sp. 1																				
Polyplacophora	Polyplacophora sp. 2																				
Pteriidae	*Pteria* sp. 1																				
Rissoidae	Rissoidae sp. 1																				
Solemyidae	*Solemya australis*																				
Tellinidae	*Tellina* sp. 1																	2	1		1
Tellinidae	*Tellina* sp. 2				2									1	3	1					
Tellinidae	*Tellina* sp. 3																				
Tellinidae	*Tellina* sp. 4																				
Trochidae	Trochidae sp. 1																				
Veneridae	*Antigona* sp. 1																1	2			3
Veneridae	*Circe* sp. 1																				
Veneridae	*Dosinia* sp. 1														1						
Veneridae	*Dosinia* sp. 2																				
Veneridae	*Dosinia* sp. 3																				
Veneridae	*Paphia* sp. 1																				
Veneridae	Veneridae juv																				
Vulsellidae	*Electroma* sp. 1																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Bryozoa	Bryozoa fan																				
Echinodermata																					
Asteroidea	Asteroidea sp. 1																				
Echinoidea	Echinoidea juv																				
Holothuroidea	Holothuroidea sp. 1																				
Holothuroidea	Holothuroidea sp. 2																				
Holothuroidea	Holothuroidea sp. 3																				
Ophiuroidea	Ophiuroidea sp. 1																				
Toxopneustidae	Toxopneustidae sp. 1																				
Chordata																					
Ascidiacea	Ascidiacea sp. 1																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site SB4																					
Porifera	Porifera																				
Cnidaria																					
Actiniaria	Actiniaria sp. 1																				
Actiniaria	Actiniaria sp. 2																				
Hexacorallia	Hexacorallia sp. 1																				
Nemertea	Nemertea														1						
Nematoda	Nematoda																				
Annelida																					
Amphinomidae	Amphinomidae																				
Aphroditidae	Pontogenia sp. 1																				
Capitellidae	*Capitella* sp. 1								2				2	3		1				1	
Capitellidae	*Notomastus* sp. 1																				
Chrysopetalidae	Chrysopetalidae sp. 1																				
Cirratulidae	Cirratulidae sp. 1							1	1	1			1		1	1	1	3	2	1	2
Cirratulidae	Cirratulidae sp. 2	1	1	1	1	1															
Dorvilleidae	Dorvilleidae sp. 1																				
Eunicidae	*Eunice* sp. 1																				
Eunicidae	*Marphysa* sp. 1																				
Eunicidae	*Lysidice unicornis*																				
Flabelligeridae	*Pherusa* sp. 1																				
Glyceridae	*Glycera* sp. 1																				
Goniadidae	Goniada sp. 1	1							1	2	1			4	1	2	1		1	2	
Hesionidae	Hesionidae sp. 1																				
Lumbrineridae	*Lumbrineris* sp. 1						1							1		1					
Magelonidae	*Magelona* sp. 1										1										
Maldanidae	*Axiothella* sp. 1																				
Nephtyidae	*Aglaophamus* sp. 1		1		3	2	1														1
Nereididae	Nereididae sp. 1			1			2	1		2	1	1	1		2					1	
Nereididae	Nereididae sp. 2																				
Oenonidae	*Arabella longipedata*																				
Onuphidae	*Onuphis holobranchiata*																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Onuphidae	Rhamphobrachium sp. 1																				
Opheliidae	Armandia sp. 1																				
Orbiniidae	Orbiniidae sp. 1																				
Paraonidae	Aricidea sp. 1																				
Phyllodocidae	Phyllodocidae sp. 1																			1	
Poecilochaetidae	*Poecilochaetus serpens*																				
Polynoidae	Polynoidae sp. 1																				
Sabellidae	Sabellidae sp. 1																				
Sigalionidae	*Pholoides mendeleevi*																				
Sigalionidae	Sigalionidae sp. 1																				
Sphaerodoridae	*Sphaerodoropsis heteropapillata*																				
Spionidae	Spionidae sp. 1																				
Spionidae	Spionidae sp. 2																				
Syllidae	Syllidae sp. 1									1											
Syllidae	Syllidae sp. 2																				
Syllidae	Syllidae sp. 3																				
Syllidae	Syllidae sp. 4																				
Terebellidae	Terebellidae sp. 1						1														
Trichobranchidae	Trichobranchidae sp. 1																				
Echuira	Echuira																				
Sipuncula	Sipuncula												1							1	
Crustacea																					
Alpheidae	*Alpheus* sp. 1																				
Ampeliscidae	Ampeliscidae sp. 1																				
Anthuridea	Anthuridea sp. 1																				
Aoridae	Aoridae sp. 1	2	1																		1
Apseudidae	Apseudidae sp. 1	2	5	3	2	7		1			1			1	1						
Arcturidae	Arcturidae sp. 1																				
Atyidae	Atyidae sp. 1																				
Bodotriidae	Bodotriidae sp. 1														1	2			1		
Callianassidae	Callianassidae sp. 1																				
Caprellidae	Caprellidae sp. 1																				
Caridea	Caridea damaged																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ceinidae	c.f.Ceinidae sp. 1																				
Ceratocumatidae	Ceratocumatidae sp. 1						1	1				1									
Cirolanidae	Cirolanidae sp. 1																				
Copepoda	Copepoda			1				1	1							1					
Corophiidae	Corophiidae sp. 1																				
Crustacea	Crustacea sp. 1																				
Cyproideidae	Cyproideidae sp. 1																				
Dexaminidae	Dexaminidae sp. 1																				
Diogenidae	Diogenidae sp. 1																				
Gnathiidae	Gnathiidae sp. 1																				
Grapsidae	Grapsidae sp. 1																				
Gynodiastylidae	Gynodiastylidae sp. 1																				
Hymenosomatidae	Hymenosomatidae sp. 1																				
Ischyroceridae	Ischyroceridae sp. 1	1	1																		
Isopoda	Isopoda sp. 1																				
Joeropsididae	Joeropsididae sp. 1																				
Leptostraca	Leptostraca sp. 1																				
Leucosiidae	Cryptocnemus sp. 1																				
Leucothoidae	Leucothoidae sp. 1																				
Liljeborgiidae	Liljeborgiidae sp. 1														2						
Limnoriidae	Limnoriidae sp. 1																				
Lysianassidae	Lysianassidae sp. 1													1							
Maeridae	Maeridae sp. 1																				
Melitidae	Melitidae sp. 1																				
Munnidae	Munnidae sp. 1																				
Mysidae	Mysidae sp. 1																				
Ochlesidae	Ochlesidae sp. 1																				
Ocypodidae	Ocypodidae sp. 1																				
Ostracoda	Ostracoda sp. 1													2							
Ostracoda	Ostracoda sp. 2																				
Ostracoda	Ostracoda sp. 3																				
Ostracoda	Ostracoda sp. 4																				
Oxycephalidae	Oxycephalidae sp. 1														3			1	1		

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Penaeidae	Penaeidae sp. 1																				
Phoxocephalidae	Phoxocephalidae sp. 1																				1
Pilumnidae	Pilumnidae sp. 1																				
Platyischnopidae	Platyischnopidae sp. 1																				
Podoceridae	Podoceridae sp. 1																				
Portunidae	Portunidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 2																				
Pycnogonida	Pycnogonida sp. 1																				
Sphaeromatidae	Chitonopsis sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 2																				
Sphaeromatidae	Sphaeromatidae sp. 3																				
Squillidae	Belosquilla sp. 1																				
Tanaididae	Tanaididae sp. 1																				
Zobrachoidae	Zobrachoidae sp. 1																				
c.f.Hognathidae	c.f.Hognathidae sp. 1																				
Mollusca																					
Anatomidae	Anatomidae sp. 1																				
Aplysiidae	Aplysiidae sp. 1																				
Architectonicidae	Architectonicidae sp. 1																				
Cerithiidae	Cerithiidae sp. 1																				
Corbulidae	*Corbula* sp. 1																				
Cuspidariidae	Cuspidariidae sp. 1																				
Cylichnidae	Cylichnidae sp. 1												1								1
Eulimidae	Eulimidae sp. 1																				
Gastropoda	Gastropoda juv																				
Glycymerididae	*Glycymeris* sp. 1																				
Hiatellidae	Hiatella sp. 1																			1	
Lasaeidae	*Curvemysella paula*																				
Limidae	Limidae sp. 1																				
Lucinidae	Lucinidae sp. 1																				
Mactridae	*Mactra* sp. 1																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Mactridae	*Mactra* sp. 2																				
Myochamidae	*Myochama* sp. 1																				
Mytillidae	*Modiolus* sp. 1																				
Mytillidae	*Modiolus* sp. 2																				
Mytillidae	*Musculus coenobitus*																				
Mytillidae	*Musculus* sp. 1														1				1		
Nassaridae	*Nassarius* sp. 1																				
Naticidae	*Natica* sp. 1																				
Naticidae	*Natica* sp. 2																				
Nuculanidae	*Saccella darwini*	1																			
Nuculidae	*Ennucula* sp. 1																				
Olividae	*Phenacovolva* sp. 1																				
Ostreidae	Ostreidae sp. 1																				
Patellidae	Patellidae sp. 1																				
Pleurotomariidae	Pleurotomariidae sp. 1																				
Polyplacophora	Polyplacophora sp. 1																				
Polyplacophora	Polyplacophora sp. 2																				
Pteriidae	*Pteria* sp. 1																				
Rissoidae	Rissoidae sp. 1																			1	
Solemyidae	*Solemya australis*																				
Tellinidae	*Tellina* sp. 1			1		2															
Tellinidae	*Tellina* sp. 2											1	1	2	1	3		1			
Tellinidae	*Tellina* sp. 3																				
Tellinidae	*Tellina* sp. 4																				
Trochidae	Trochidae sp. 1																				
Veneridae	*Antigona* sp. 1																			1	
Veneridae	*Circe* sp. 1																				
Veneridae	*Dosinia* sp. 1															1					
Veneridae	*Dosinia* sp. 2																				
Veneridae	*Dosinia* sp. 3																				
Veneridae	*Paphia* sp. 1																				
Veneridae	Veneridae juv																				
Vulsellidae	*Electroma* sp. 1																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Bryozoa	Bryozoa fan																				
Echinodermata																					
Asteroidea	Asteroidea sp. 1																				
Echinoidea	Echinoidea juv																				
Holothuroidea	Holothuroidea sp. 1																			1	
Holothuroidea	Holothuroidea sp. 2																				
Holothuroidea	Holothuroidea sp. 3																				
Ophiuroidea	Ophiuroidea sp. 1																				
Toxopneustidae	Toxopneustidae sp. 1																				
Chordata																					
Ascidiacea	Ascidiacea sp. 1																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site SB5																					
Porifera	Porifera																				
Cnidaria																					
Actiniaria	Actiniaria sp. 1																				
Actiniaria	Actiniaria sp. 2																				
Hexacorallia	Hexacorallia sp. 1																				
Nemertea	Nemertea																				
Nematoda	Nematoda																2				
Annelida																					
Amphinomidae	Amphinomidae																				
Aphroditidae	Pontogenia sp. 1																				
Capitellidae	*Capitella* sp. 1	1					3	4			3	2	2	4	2			1	2		2
Capitellidae	*Notomastus* sp. 1																				
Chrysopetalidae	Chrysopetalidae sp. 1																				
Cirratulidae	Cirratulidae sp. 1						2		1					1							
Cirratulidae	Cirratulidae sp. 2																				
Dorvilleidae	Dorvilleidae sp. 1																				
Eunicidae	*Eunice* sp. 1																				
Eunicidae	*Marphysa* sp. 1																				
Eunicidae	*Lysidice unicornis*	1																			
Flabelligeridae	*Pherusa* sp. 1																				
Glyceridae	*Glycera* sp. 1																				
Goniadidae	Goniada sp. 1		1							1	1	1					1	1		1	3
Hesionidae	Hesionidae sp. 1																				
Lumbrineridae	*Lumbrineris* sp. 1								1	1										1	
Magelonidae	*Magelona* sp. 1						1														
Maldanidae	*Axiothella* sp. 1																				
Nephtyidae	*Aglaophamus* sp. 1								2												
Nereididae	Nereididae sp. 1	2	1	1	2	4		2	3	1		1				1	2		2	1	2
Nereididae	Nereididae sp. 2																				
Oenonidae	*Arabella longipedata*																				
Onuphidae	*Onuphis holobranchiata*																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Onuphidae	Rhamphobrachium sp. 1																				
Opheliidae	Armandia sp. 1																				
Orbiniidae	Orbiniidae sp. 1																				
Paraonidae	Aricidea sp. 1																				
Phyllodocidae	Phyllodocidae sp. 1																				
Poecilochaetidae	*Poecilochaetus serpens*																				
Polynoidae	Polynoidae sp. 1																				
Sabellidae	Sabellidae sp. 1																				
Sigalionidae	*Pholoides mendeleevi*																				
Sigalionidae	Sigalionidae sp. 1																				
Sphaerodoridae	*Sphaerodoropsis heteropapillata*																				
Spionidae	Spionidae sp. 1																				
Spionidae	Spionidae sp. 2																				
Syllidae	Syllidae sp. 1		1	1																	
Syllidae	Syllidae sp. 2																				
Syllidae	Syllidae sp. 3																				
Syllidae	Syllidae sp. 4																				
Terebellidae	Terebellidae sp. 1																				
Trichobranchidae	Trichobranchidae sp. 1																				
Echuira	Echuira																				
Sipuncula	Sipuncula		1																		1
Crustacea																					
Alpheidae	*Alpheus* sp. 1																				
Ampeliscidae	Ampeliscidae sp. 1																				
Anthuridea	Anthuridea sp. 1																				
Aoridae	Aoridae sp. 1																				
Apseudidae	Apseudidae sp. 1	2	2	2	5											1					
Arcturidae	Arcturidae sp. 1																				
Atyidae	Atyidae sp. 1																				
Bodotriidae	Bodotriidae sp. 1																1				
Callianassidae	Callianassidae sp. 1																				
Caprellidae	Caprellidae sp. 1																				
Caridea	Caridea damaged																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ceinidae	c.f.Ceinidae sp. 1																				
Ceratocumatidae	Ceratocumatidae sp. 1									1	1										
Cirolanidae	Cirolanidae sp. 1																				
Copepoda	Copepoda	1				1			1				1	1							
Corophiidae	Corophiidae sp. 1																				
Crustacea	Crustacea sp. 1																				
Cyproideidae	Cyproideidae sp. 1																				
Dexaminidae	Dexaminidae sp. 1																				
Diogenidae	Diogenidae sp. 1																				
Gnathiidae	Gnathiidae sp. 1																				
Grapsidae	Grapsidae sp. 1																				
Gynodiastylidae	Gynodiastylidae sp. 1																				
Hymenosomatidae	Hymenosomatidae sp. 1																				
Ischyroceridae	Ischyroceridae sp. 1																				
Isopoda	Isopoda sp. 1																				
Joeropsididae	Joeropsididae sp. 1																				
Leptostraca	Leptostraca sp. 1																				
Leucosiidae	Cryptocnemus sp. 1																				
Leucothoidae	Leucothoidae sp. 1																				
Liljeborgiidae	Liljeborgiidae sp. 1																				
Limnoriidae	Limnoriidae sp. 1																				
Lysianassidae	Lysianassidae sp. 1																				
Maeridae	Maeridae sp. 1																				
Melitidae	Melitidae sp. 1																				
Munnidae	Munnidae sp. 1																				
Mysidae	Mysidae sp. 1																				
Ochlesidae	Ochlesidae sp. 1																				
Ocypodidae	Ocypodidae sp. 1																				
Ostracoda	Ostracoda sp. 1			1																	
Ostracoda	Ostracoda sp. 2																	1			1
Ostracoda	Ostracoda sp. 3																				
Ostracoda	Ostracoda sp. 4																				
Oxycephalidae	Oxycephalidae sp. 1																1	2	2		

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Penaeidae	Penaeidae sp. 1																				
Phoxocephalidae	Phoxocephalidae sp. 1																				
Pilumnidae	Pilumnidae sp. 1																				
Platyischnopidae	Platyischnopidae sp. 1																				
Podoceridae	Podoceridae sp. 1																				
Portunidae	Portunidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 2																				
Pycnogonida	Pycnogonida sp. 1																				
Sphaeromatidae	Chitonopsis sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 2																				
Sphaeromatidae	Sphaeromatidae sp. 3																				
Squillidae	Belosquilla sp. 1																				
Tanaididae	Tanaididae sp. 1																				
Zobrachoidae	Zobrachoidae sp. 1																				
c.f.Hognathidae	c.f.Hognathidae sp. 1																				
Mollusca																					
Anatomidae	Anatomidae sp. 1																				
Aplysiidae	Aplysiidae sp. 1																				
Architectonicidae	Architectonicidae sp. 1																				
Cerithiidae	Cerithiidae sp. 1																				
Corbulidae	*Corbula* sp. 1																				
Cuspidariidae	Cuspidariidae sp. 1																				
Cylichnidae	Cylichnidae sp. 1											1	3	2		1		1	2	1	
Eulimidae	Eulimidae sp. 1																				
Gastropoda	Gastropoda juv																				
Glycymerididae	*Glycymeris* sp. 1																				
Hiatellidae	Hiatella sp. 1																				
Lasaeidae	*Curvemysella paula*																				
Limidae	Limidae sp. 1																				
Lucinidae	Lucinidae sp. 1																				
Mactridae	*Mactra* sp. 1																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Mactridae	*Mactra* sp. 2																				
Myochamidae	*Myochama* sp. 1																				
Mytillidae	*Modiolus* sp. 1		1						1												
Mytillidae	*Modiolus* sp. 2																				
Mytillidae	*Musculus coenobitus*																				
Mytillidae	*Musculus* sp. 1																				1
Nassaridae	*Nassarius* sp. 1																				
Naticidae	*Natica* sp. 1																				
Naticidae	*Natica* sp. 2																				
Nuculanidae	*Saccella darwini*					1															
Nuculidae	*Ennucula* sp. 1																				
Olividae	*Phenacovolva* sp. 1																				
Ostreidae	Ostreidae sp. 1																				
Patellidae	Patellidae sp. 1																				
Pleurotomariidae	Pleurotomariidae sp. 1																				
Polyplacophora	Polyplacophora sp. 1																				
Polyplacophora	Polyplacophora sp. 2																				
Pteriidae	*Pteria* sp. 1																				
Rissoidae	Rissoidae sp. 1																				
Solemyidae	*Solemya australis*																				
Tellinidae	*Tellina* sp. 1			2		1												1			
Tellinidae	*Tellina* sp. 2					2						3	3	1	1	1					
Tellinidae	*Tellina* sp. 3																				
Tellinidae	*Tellina* sp. 4										1										
Trochidae	Trochidae sp. 1																				
Veneridae	*Antigona* sp. 1																2	1		2	
Veneridae	*Circe* sp. 1																				
Veneridae	*Dosinia* sp. 1								1			1									
Veneridae	*Dosinia* sp. 2																				
Veneridae	*Dosinia* sp. 3																				
Veneridae	*Paphia* sp. 1																				
Veneridae	Veneridae juv																				
Vulsellidae	*Electroma* sp. 1																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Bryozoa	Bryozoa fan																				
Echinodermata																					
Asteroidea	Asteroidea sp. 1																				
Echinoidea	Echinoidea juv																				
Holothuroidea	Holothuroidea sp. 1			2	2																
Holothuroidea	Holothuroidea sp. 2																				
Holothuroidea	Holothuroidea sp. 3																				
Ophiuroidea	Ophiuroidea sp. 1																				
Toxopneustidae	Toxopneustidae sp. 1																				
Chordata																					
Ascidiacea	Ascidiacea sp. 1																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site SI1																					
Porifera	Porifera																				
Cnidaria																					
Actiniaria	Actiniaria sp. 1																				
Actiniaria	Actiniaria sp. 2																		1		
Hexacorallia	Hexacorallia sp. 1																				
Nemertea	Nemertea																				
Nematoda	Nematoda																				
Annelida																					
Amphinomidae	Amphinomidae																				
Aphroditidae	Pontogenia sp. 1																				
Capitellidae	*Capitella* sp. 1				1				1				3	1			1			1	
Capitellidae	*Notomastus* sp. 1																				
Chrysopetalidae	Chrysopetalidae sp. 1																				
Cirratulidae	Cirratulidae sp. 1						1				1	1	2		2						1
Cirratulidae	Cirratulidae sp. 2	1	1																		
Dorvilleidae	Dorvilleidae sp. 1															1					
Eunicidae	*Eunice* sp. 1																		1		
Eunicidae	*Marphysa* sp. 1																				
Eunicidae	*Lysidice unicornis*																				
Flabelligeridae	*Pherusa* sp. 1																				
Glyceridae	*Glycera* sp. 1																				
Goniadidae	Goniada sp. 1				1	2		1	1		1	3		1	1		2		1	2	3
Hesionidae	Hesionidae sp. 1																				
Lumbrineridae	*Lumbrineris* sp. 1				2	1															
Magelonidae	*Magelona* sp. 1									1											
Maldanidae	*Axiothella* sp. 1																				
Nephtyidae	*Aglaophamus* sp. 1		1			1							1								
Nereididae	Nereididae sp. 1			1	2	2	1			1	1			1	1		1	2		1	
Nereididae	Nereididae sp. 2																				
Oenonidae	*Arabella longipedata*																				
Onuphidae	*Onuphis holobranchiata*																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Onuphidae	Rhamphobrachium sp. 1																				
Opheliidae	Armandia sp. 1																				
Orbiniidae	Orbiniidae sp. 1																				
Paraonidae	Aricidea sp. 1																				
Phyllodocidae	Phyllodocidae sp. 1												2						1		
Poecilochaetidae	*Poecilochaetus serpens*																				
Polynoidae	Polynoidae sp. 1																				
Sabellidae	Sabellidae sp. 1																				
Sigalionidae	*Pholoides mendeleevi*																				
Sigalionidae	Sigalionidae sp. 1																				
Sphaerodoridae	*Sphaerodoropsis heteropapillata*																				
Spionidae	Spionidae sp. 1		1																		
Spionidae	Spionidae sp. 2																				
Syllidae	Syllidae sp. 1																				
Syllidae	Syllidae sp. 2																	1			
Syllidae	Syllidae sp. 3																				
Syllidae	Syllidae sp. 4																				
Terebellidae	Terebellidae sp. 1																				
Trichobranchidae	Trichobranchidae sp. 1																				
Echuira	Echuira																				
Sipuncula	Sipuncula																				
Crustacea																					
Alpheidae	*Alpheus* sp. 1																				
Ampeliscidae	Ampeliscidae sp. 1																				
Anthuridea	Anthuridea sp. 1																				
Aoridae	Aoridae sp. 1															1					
Apseudidae	Apseudidae sp. 1																				
Arcturidae	Arcturidae sp. 1																				
Atyidae	Atyidae sp. 1																				
Bodotriidae	Bodotriidae sp. 1																1				
Callianassidae	Callianassidae sp. 1																				
Caprellidae	Caprellidae sp. 1				1																
Caridea	Caridea damaged																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ceinidae	c.f.Ceinidae sp. 1																				
Ceratocumatidae	Ceratocumatidae sp. 1																				
Cirolanidae	Cirolanidae sp. 1																				
Copepoda	Copepoda		1	1			1	1			1		2			1					
Corophiidae	Corophiidae sp. 1																				
Crustacea	Crustacea sp. 1																				
Cyproideidae	Cyproideidae sp. 1																				
Dexaminidae	Dexaminidae sp. 1																		1		
Diogenidae	Diogenidae sp. 1																				
Gnathiidae	Gnathiidae sp. 1																				
Grapsidae	Grapsidae sp. 1																				
Gynodiastylidae	Gynodiastylidae sp. 1																				
Hymenosomatidae	Hymenosomatidae sp. 1																				
Ischyroceridae	Ischyroceridae sp. 1																				
Isopoda	Isopoda sp. 1																				
Joeropsididae	Joeropsididae sp. 1																				
Leptostraca	Leptostraca sp. 1																				
Leucosiidae	Cryptocnemus sp. 1																				
Leucothoidae	Leucothoidae sp. 1																				
Liljeborgiidae	Liljeborgiidae sp. 1																				
Limnoriidae	Limnoriidae sp. 1																				
Lysianassidae	Lysianassidae sp. 1																1				
Maeridae	Maeridae sp. 1																				
Melitidae	Melitidae sp. 1			1																	
Munnidae	Munnidae sp. 1																				
Mysidae	Mysidae sp. 1																				
Ochlesidae	Ochlesidae sp. 1																				
Ocypodidae	Ocypodidae sp. 1																				
Ostracoda	Ostracoda sp. 1						1														
Ostracoda	Ostracoda sp. 2										1										
Ostracoda	Ostracoda sp. 3																				
Ostracoda	Ostracoda sp. 4																				
Oxycephalidae	Oxycephalidae sp. 1																				1

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Penaeidae	Penaeidae sp. 1																				
Phoxocephalidae	Phoxocephalidae sp. 1					1										1					
Pilumnidae	Pilumnidae sp. 1																				
Platyischnopidae	Platyischnopidae sp. 1																				
Podoceridae	Podoceridae sp. 1																				
Portunidae	Portunidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 1			2								1									
Pseudozeuxidae	Pseudozeuxidae sp. 2																				
Pycnogonida	Pycnogonida sp. 1																				
Sphaeromatidae	Chitonopsis sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 2																				
Sphaeromatidae	Sphaeromatidae sp. 3																				
Squillidae	Belosquilla sp. 1																				
Tanaididae	Tanaididae sp. 1																				
Zobrachoidae	Zobrachoidae sp. 1																				
c.f.Hognathidae	c.f.Hognathidae sp. 1																				
Mollusca																					
Anatomidae	Anatomidae sp. 1																				
Aplysiidae	Aplysiidae sp. 1																				
Architectonicidae	Architectonicidae sp. 1																				
Cerithiidae	Cerithiidae sp. 1																				
Corbulidae	*Corbula* sp. 1																				
Cuspidariidae	Cuspidariidae sp. 1																				
Cylichnidae	Cylichnidae sp. 1											1	1		1		2				
Eulimidae	Eulimidae sp. 1																				
Gastropoda	Gastropoda juv																				
Glycymerididae	*Glycymeris* sp. 1																				
Hiatellidae	Hiatella sp. 1													2							
Lasaeidae	*Curvemysella paula*																				
Limidae	Limidae sp. 1																				
Lucinidae	Lucinidae sp. 1																				
Mactridae	*Mactra* sp. 1																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Mactridae	*Mactra* sp. 2																				
Myochamidae	*Myochama* sp. 1																				
Mytillidae	*Modiolus* sp. 1											1									
Mytillidae	*Modiolus* sp. 2																				
Mytillidae	*Musculus coenobitus*																				
Mytillidae	*Musculus* sp. 1													1							
Nassaridae	*Nassarius* sp. 1																				
Naticidae	*Natica* sp. 1																				
Naticidae	*Natica* sp. 2																				
Nuculanidae	*Saccella darwini*																				
Nuculidae	*Ennucula* sp. 1																				
Olividae	*Phenacovolva* sp. 1																				
Ostreidae	Ostreidae sp. 1																				
Patellidae	Patellidae sp. 1																				
Pleurotomariidae	Pleurotomariidae sp. 1																				
Polyplacophora	Polyplacophora sp. 1																				
Polyplacophora	Polyplacophora sp. 2																				
Pteriidae	*Pteria* sp. 1																				
Rissoidae	Rissoidae sp. 1																				
Solemyidae	*Solemya australis*																				
Tellinidae	*Tellina* sp. 1																		1		1
Tellinidae	*Tellina* sp. 2	1											4	1	1						
Tellinidae	*Tellina* sp. 3																				
Tellinidae	*Tellina* sp. 4										1										
Trochidae	Trochidae sp. 1																				
Veneridae	*Antigona* sp. 1																				
Veneridae	*Circe* sp. 1																				
Veneridae	*Dosinia* sp. 1																	1			
Veneridae	*Dosinia* sp. 2																				
Veneridae	*Dosinia* sp. 3																				
Veneridae	*Paphia* sp. 1									1											
Veneridae	Veneridae juv																				
Vulsellidae	*Electroma* sp. 1																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Bryozoa	Bryozoa fan																				
Echinodermata																					
Asteroidea	Asteroidea sp. 1																				
Echinoidea	Echinoidea juv																				
Holothuroidea	Holothuroidea sp. 1			1																	
Holothuroidea	Holothuroidea sp. 2																				
Holothuroidea	Holothuroidea sp. 3																				
Ophiuroidea	Ophiuroidea sp. 1							1													
Toxopneustidae	Toxopneustidae sp. 1																				
Chordata																					
Ascidiacea	Ascidiacea sp. 1																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site SI2																					
Porifera	Porifera																				
Cnidaria																					
Actiniaria	Actiniaria sp. 1														1						
Actiniaria	Actiniaria sp. 2																	1	1	1	2
Hexacorallia	Hexacorallia sp. 1																				
Nemertea	Nemertea																				
Nematoda	Nematoda																				
Annelida																					
Amphinomidae	Amphinomidae																				
Aphroditidae	Pontogenia sp. 1																				
Capitellidae	*Capitella* sp. 1							2		1	1							2		2	
Capitellidae	*Notomastus* sp. 1																				
Chrysopetalidae	Chrysopetalidae sp. 1																				
Cirratulidae	Cirratulidae sp. 1																				
Cirratulidae	Cirratulidae sp. 2																				
Dorvilleidae	Dorvilleidae sp. 1																				
Eunicidae	*Eunice* sp. 1																				
Eunicidae	*Marphysa* sp. 1																				
Eunicidae	*Lysidice unicornis*																				
Flabelligeridae	*Pherusa* sp. 1																				
Glyceridae	*Glycera* sp. 1																				
Goniadidae	Goniada sp. 1				2								1	1					1	2	1
Hesionidae	Hesionidae sp. 1																				
Lumbrineridae	*Lumbrineris* sp. 1																		1		
Magelonidae	*Magelona* sp. 1										1										
Maldanidae	*Axiothella* sp. 1																				
Nephtyidae	*Aglaophamus* sp. 1																		1		
Nereididae	Nereididae sp. 1	1	1	1	1		1		2		1	1				3	1		1		
Nereididae	Nereididae sp. 2																				
Oenonidae	*Arabella longipedata*																				
Onuphidae	*Onuphis holobranchiata*																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Onuphidae	Rhamphobrachium sp. 1																				
Opheliidae	Armandia sp. 1																				
Orbiniidae	Orbiniidae sp. 1																				
Paraonidae	Aricidea sp. 1																				
Phyllodocidae	Phyllodocidae sp. 1																			1	
Poecilochaetidae	*Poecilochaetus serpens*																				
Polynoidae	Polynoidae sp. 1																				
Sabellidae	Sabellidae sp. 1																				
Sigalionidae	*Pholoides mendeleevi*																				
Sigalionidae	Sigalionidae sp. 1																				
Sphaerodoridae	*Sphaerodoropsis heteropapillata*																				
Spionidae	Spionidae sp. 1			1																	
Spionidae	Spionidae sp. 2																				
Syllidae	Syllidae sp. 1																				
Syllidae	Syllidae sp. 2																				
Syllidae	Syllidae sp. 3																				
Syllidae	Syllidae sp. 4																				
Terebellidae	Terebellidae sp. 1																				
Trichobranchidae	Trichobranchidae sp. 1																				
Echuira	Echuira																				
Sipuncula	Sipuncula			1										1							
Crustacea																					
Alpheidae	*Alpheus* sp. 1																				
Ampeliscidae	Ampeliscidae sp. 1																				
Anthuridea	Anthuridea sp. 1																				
Aoridae	Aoridae sp. 1																				
Apseudidae	Apseudidae sp. 1	2	2		1																
Arcturidae	Arcturidae sp. 1																				
Atyidae	Atyidae sp. 1																				
Bodotriidae	Bodotriidae sp. 1																				1
Callianassidae	Callianassidae sp. 1																				
Caprellidae	Caprellidae sp. 1																				
Caridea	Caridea damaged																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ceinidae	c.f.Ceinidae sp. 1																				
Ceratocumatidae	Ceratocumatidae sp. 1																				
Cirolanidae	Cirolanidae sp. 1																				
Copepoda	Copepoda								1	1		3									
Corophiidae	Corophiidae sp. 1																				
Crustacea	Crustacea sp. 1																				
Cyproideidae	Cyproideidae sp. 1																				
Dexaminidae	Dexaminidae sp. 1																				
Diogenidae	Diogenidae sp. 1																				
Gnathiidae	Gnathiidae sp. 1																				
Grapsidae	Grapsidae sp. 1																				
Gynodiastylidae	Gynodiastylidae sp. 1																				
Hymenosomatidae	Hymenosomatidae sp. 1																				
Ischyroceridae	Ischyroceridae sp. 1											1									
Isopoda	Isopoda sp. 1																				
Joeropsididae	Joeropsididae sp. 1																				
Leptostraca	Leptostraca sp. 1																				
Leucosiidae	Cryptocnemus sp. 1																				
Leucothoidae	Leucothoidae sp. 1																				
Liljeborgiidae	Liljeborgiidae sp. 1																				
Limnoriidae	Limnoriidae sp. 1																				
Lysianassidae	Lysianassidae sp. 1																				
Maeridae	Maeridae sp. 1																				
Melitidae	Melitidae sp. 1																				
Munnidae	Munnidae sp. 1																				
Mysidae	Mysidae sp. 1																				
Ochlesidae	Ochlesidae sp. 1																				
Ocypodidae	Ocypodidae sp. 1																				
Ostracoda	Ostracoda sp. 1																				
Ostracoda	Ostracoda sp. 2																				
Ostracoda	Ostracoda sp. 3																				
Ostracoda	Ostracoda sp. 4																				
Oxycephalidae	Oxycephalidae sp. 1																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Penaeidae	Penaeidae sp. 1																				
Phoxocephalidae	Phoxocephalidae sp. 1																				
Pilumnidae	Pilumnidae sp. 1																				
Platyischnopidae	Platyischnopidae sp. 1																				
Podoceridae	Podoceridae sp. 1																				
Portunidae	Portunidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 1											1									
Pseudozeuxidae	Pseudozeuxidae sp. 2																				
Pycnogonida	Pycnogonida sp. 1																		1		
Sphaeromatidae	Chitonopsis sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 2																				
Sphaeromatidae	Sphaeromatidae sp. 3																				
Squillidae	Belosquilla sp. 1																				
Tanaididae	Tanaididae sp. 1																				
Zobrachoidae	Zobrachoidae sp. 1																				
c.f.Hognathidae	c.f.Hognathidae sp. 1																				
Mollusca																					
Anatomidae	Anatomidae sp. 1																				
Aplysiidae	Aplysiidae sp. 1																				
Architectonicidae	Architectonicidae sp. 1																				
Cerithiidae	Cerithiidae sp. 1																				
Corbulidae	*Corbula* sp. 1																				
Cuspidariidae	Cuspidariidae sp. 1																				
Cylichnidae	Cylichnidae sp. 1																				
Eulimidae	Eulimidae sp. 1																				
Gastropoda	Gastropoda juv																				
Glycymerididae	*Glycymeris* sp. 1																				
Hiatellidae	Hiatella sp. 1																				
Lasaeidae	*Curvemysella paula*																				
Limidae	Limidae sp. 1																				
Lucinidae	Lucinidae sp. 1																				
Mactridae	*Mactra* sp. 1																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Mactridae	*Mactra* sp. 2																				
Myochamidae	*Myochama* sp. 1																				
Mytillidae	*Modiolus* sp. 1																1				
Mytillidae	*Modiolus* sp. 2																				
Mytillidae	*Musculus coenobitus*																				
Mytillidae	*Musculus* sp. 1																				
Nassaridae	*Nassarius* sp. 1																				
Naticidae	*Natica* sp. 1																				
Naticidae	*Natica* sp. 2																				
Nuculanidae	*Saccella darwini*																				
Nuculidae	*Ennucula* sp. 1																				
Olividae	*Phenacovolva* sp. 1	1																			
Ostreidae	Ostreidae sp. 1																				
Patellidae	Patellidae sp. 1																				
Pleurotomariidae	Pleurotomariidae sp. 1																				
Polyplacophora	Polyplacophora sp. 1																				
Polyplacophora	Polyplacophora sp. 2																				
Pteriidae	*Pteria* sp. 1																				
Rissoidae	Rissoidae sp. 1																				
Solemyidae	*Solemya australis*																				
Tellinidae	*Tellina* sp. 1																				
Tellinidae	*Tellina* sp. 2												1								
Tellinidae	*Tellina* sp. 3																				
Tellinidae	*Tellina* sp. 4																				
Trochidae	Trochidae sp. 1																				
Veneridae	*Antigona* sp. 1																				
Veneridae	*Circe* sp. 1																				
Veneridae	*Dosinia* sp. 1																		2		
Veneridae	*Dosinia* sp. 2																				
Veneridae	*Dosinia* sp. 3																				
Veneridae	*Paphia* sp. 1																				
Veneridae	Veneridae juv																				
Vulsellidae	*Electroma* sp. 1																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Bryozoa	Bryozoa fan																				
Echinodermata																					
Asteroidea	Asteroidea sp. 1																				
Echinoidea	Echinoidea juv																				
Holothuroidea	Holothuroidea sp. 1		1																		
Holothuroidea	Holothuroidea sp. 2																				
Holothuroidea	Holothuroidea sp. 3																				
Ophiuroidea	Ophiuroidea sp. 1																				
Toxopneustidae	Toxopneustidae sp. 1																				
Chordata																					
Ascidiacea	Ascidiacea sp. 1																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site SI3																					
Porifera	Porifera																				
Cnidaria																					
Actiniaria	Actiniaria sp. 1																				
Actiniaria	Actiniaria sp. 2																				
Hexacorallia	Hexacorallia sp. 1																				
Nemertea	Nemertea		1		1				2						1						
Nematoda	Nematoda																				
Annelida																					
Amphinomidae	Amphinomidae																				
Aphroditidae	Pontogenia sp. 1																				
Capitellidae	*Capitella* sp. 1						1	2				4	1	1	2						
Capitellidae	*Notomastus* sp. 1																				
Chrysopetalidae	Chrysopetalidae sp. 1																				
Cirratulidae	Cirratulidae sp. 1						2			1	1	1	1	1	2	1					
Cirratulidae	Cirratulidae sp. 2			1	2	3															
Dorvilleidae	Dorvilleidae sp. 1														1						
Eunicidae	*Eunice* sp. 1			1																	
Eunicidae	*Marphysa* sp. 1																				
Eunicidae	*Lysidice unicornis*																				
Flabelligeridae	*Pherusa* sp. 1																				
Glyceridae	*Glycera* sp. 1						2			1											
Goniadidae	Goniada sp. 1			1							1	3							1	3	1
Hesionidae	Hesionidae sp. 1																				
Lumbrineridae	*Lumbrineris* sp. 1					1											1				
Magelonidae	*Magelona* sp. 1									1											
Maldanidae	*Axiothella* sp. 1																				
Nephtyidae	*Aglaophamus* sp. 1		1		1	1														1	
Nereididae	Nereididae sp. 1				1		1	3	2		1					1	1	1			
Nereididae	Nereididae sp. 2														1						
Oenonidae	*Arabella longipedata*																				
Onuphidae	*Onuphis holobranchiata*																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Onuphidae	Rhamphobrachium sp. 1																				
Opheliidae	Armandia sp. 1																				
Orbiniidae	Orbiniidae sp. 1																				
Paraonidae	Aricidea sp. 1																				
Phyllodocidae	Phyllodocidae sp. 1															1					
Poecilochaetidae	*Poecilochaetus serpens*	1																			
Polynoidae	Polynoidae sp. 1																				
Sabellidae	Sabellidae sp. 1																				
Sigalionidae	*Pholoides mendeleevi*																				
Sigalionidae	Sigalionidae sp. 1																				
Sphaerodoridae	*Sphaerodoropsis heteropapillata*																				
Spionidae	Spionidae sp. 1																				
Spionidae	Spionidae sp. 2																				
Syllidae	Syllidae sp. 1																				
Syllidae	Syllidae sp. 2																				
Syllidae	Syllidae sp. 3																				
Syllidae	Syllidae sp. 4					1															
Terebellidae	Terebellidae sp. 1																				
Trichobranchidae	Trichobranchidae sp. 1																				
Echuira	Echuira																				
Sipuncula	Sipuncula													2							
Crustacea																					
Alpheidae	*Alpheus* sp. 1																				
Ampeliscidae	Ampeliscidae sp. 1																				
Anthuridea	Anthuridea sp. 1																				
Aoridae	Aoridae sp. 1	1																			
Apseudidae	Apseudidae sp. 1			1	1																
Arcturidae	Arcturidae sp. 1																				
Atyidae	Atyidae sp. 1																				
Bodotriidae	Bodotriidae sp. 1																				
Callianassidae	Callianassidae sp. 1																				
Caprellidae	Caprellidae sp. 1																				
Caridea	Caridea damaged																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ceinidae	c.f.Ceinidae sp. 1																				
Ceratocumatidae	Ceratocumatidae sp. 1																				
Cirolanidae	Cirolanidae sp. 1																				
Copepoda	Copepoda					1				2											
Corophiidae	Corophiidae sp. 1																				
Crustacea	Crustacea sp. 1																				
Cyproideidae	Cyproideidae sp. 1																				
Dexaminidae	Dexaminidae sp. 1																				
Diogenidae	Diogenidae sp. 1																				
Gnathiidae	Gnathiidae sp. 1																				
Grapsidae	Grapsidae sp. 1																				
Gynodiastylidae	Gynodiastylidae sp. 1																				
Hymenosomatidae	Hymenosomatidae sp. 1																				
Ischyroceridae	Ischyroceridae sp. 1	1																			
Isopoda	Isopoda sp. 1																				
Joeropsididae	Joeropsididae sp. 1																				
Leptostraca	Leptostraca sp. 1																				
Leucosiidae	Cryptocnemus sp. 1																				
Leucothoidae	Leucothoidae sp. 1																				
Liljeborgiidae	Liljeborgiidae sp. 1																				
Limnoriidae	Limnoriidae sp. 1																				
Lysianassidae	Lysianassidae sp. 1																				
Maeridae	Maeridae sp. 1																				
Melitidae	Melitidae sp. 1																				
Munnidae	Munnidae sp. 1																				
Mysidae	Mysidae sp. 1									1											
Ochlesidae	Ochlesidae sp. 1																				
Ocypodidae	Ocypodidae sp. 1																				
Ostracoda	Ostracoda sp. 1																				
Ostracoda	Ostracoda sp. 2																				
Ostracoda	Ostracoda sp. 3																				
Ostracoda	Ostracoda sp. 4																				
Oxycephalidae	Oxycephalidae sp. 1																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Penaeidae	Penaeidae sp. 1																				
Phoxocephalidae	Phoxocephalidae sp. 1																				
Pilumnidae	Pilumnidae sp. 1																				
Platyischnopidae	Platyischnopidae sp. 1																				
Podoceridae	Podoceridae sp. 1																				
Portunidae	Portunidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 2																				
Pycnogonida	Pycnogonida sp. 1																				
Sphaeromatidae	Chitonopsis sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 2																				
Sphaeromatidae	Sphaeromatidae sp. 3																				
Squillidae	Belosquilla sp. 1																				
Tanaididae	Tanaididae sp. 1																				
Zobrachoidae	Zobrachoidae sp. 1																				
c.f.Hognathidae	c.f.Hognathidae sp. 1																				
Mollusca																					
Anatomidae	Anatomidae sp. 1																				
Aplysiidae	Aplysiidae sp. 1																				
Architectonicidae	Architectonicidae sp. 1																				
Cerithiidae	Cerithiidae sp. 1																				
Corbulidae	*Corbula* sp. 1																				
Cuspidariidae	Cuspidariidae sp. 1																				
Cylichnidae	Cylichnidae sp. 1																1				1
Eulimidae	Eulimidae sp. 1																				
Gastropoda	Gastropoda juv																				
Glycymerididae	*Glycymeris* sp. 1																				
Hiatellidae	Hiatella sp. 1							1													
Lasaeidae	*Curvemysella paula*																				
Limidae	Limidae sp. 1																				
Lucinidae	Lucinidae sp. 1																				
Mactridae	*Mactra* sp. 1																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Mactridae	*Mactra* sp. 2																				
Myochamidae	*Myochama* sp. 1																				
Mytillidae	*Modiolus* sp. 1																				
Mytillidae	*Modiolus* sp. 2																				
Mytillidae	*Musculus coenobitus*																				
Mytillidae	*Musculus* sp. 1	1															2				
Nassaridae	*Nassarius* sp. 1																				
Naticidae	*Natica* sp. 1																				
Naticidae	*Natica* sp. 2																				
Nuculanidae	*Saccella darwini*																				
Nuculidae	*Ennucula* sp. 1																				
Olividae	*Phenacovolva* sp. 1																				
Ostreidae	Ostreidae sp. 1																				
Patellidae	Patellidae sp. 1																				
Pleurotomariidae	Pleurotomariidae sp. 1																				
Polyplacophora	Polyplacophora sp. 1																				
Polyplacophora	Polyplacophora sp. 2																				
Pteriidae	*Pteria* sp. 1																				
Rissoidae	Rissoidae sp. 1																				
Solemyidae	*Solemya australis*																				
Tellinidae	*Tellina* sp. 1				2																
Tellinidae	*Tellina* sp. 2											1	1	2	2	2	3	1			
Tellinidae	*Tellina* sp. 3																				
Tellinidae	*Tellina* sp. 4																				
Trochidae	Trochidae sp. 1																				
Veneridae	*Antigona* sp. 1																				
Veneridae	*Circe* sp. 1																				
Veneridae	*Dosinia* sp. 1																				
Veneridae	*Dosinia* sp. 2																				
Veneridae	*Dosinia* sp. 3																				
Veneridae	*Paphia* sp. 1																				
Veneridae	Veneridae juv									1											
Vulsellidae	*Electroma* sp. 1																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Bryozoa	Bryozoa fan																				
Echinodermata																					
Asteroidea	Asteroidea sp. 1																				
Echinoidea	Echinoidea juv																				
Holothuroidea	Holothuroidea sp. 1																				
Holothuroidea	Holothuroidea sp. 2																				
Holothuroidea	Holothuroidea sp. 3																				
Ophiuroidea	Ophiuroidea sp. 1											1									
Toxopneustidae	Toxopneustidae sp. 1																				
Chordata																					
Ascidiacea	Ascidiacea sp. 1																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site SI4																					
Porifera	Porifera																				
Cnidaria																					
Actiniaria	Actiniaria sp. 1																				
Actiniaria	Actiniaria sp. 2																				
Hexacorallia	Hexacorallia sp. 1																				
Nemertea	Nemertea																				
Nematoda	Nematoda																				
Annelida																					
Amphinomidae	Amphinomidae																				
Aphroditidae	Pontogenia sp. 1																				
Capitellidae	*Capitella* sp. 1						1	1	2	2	5		1					3		1	
Capitellidae	*Notomastus* sp. 1																				
Chrysopetalidae	Chrysopetalidae sp. 1																				
Cirratulidae	Cirratulidae sp. 1																				
Cirratulidae	Cirratulidae sp. 2																				
Dorvilleidae	Dorvilleidae sp. 1																				
Eunicidae	*Eunice* sp. 1																				
Eunicidae	*Marphysa* sp. 1																				
Eunicidae	*Lysidice unicornis*																				
Flabelligeridae	*Pherusa* sp. 1																				
Glyceridae	*Glycera* sp. 1																				
Goniadidae	Goniada sp. 1	1			2					2						1	3	1	1	1	
Hesionidae	Hesionidae sp. 1																				
Lumbrineridae	*Lumbrineris* sp. 1				1															1	
Magelonidae	*Magelona* sp. 1																				
Maldanidae	*Axiothella* sp. 1																				
Nephtyidae	*Aglaophamus* sp. 1	1	1				1		1								1	1			1
Nereididae	Nereididae sp. 1		5	2	1		1	2		1		1	2			1				1	1
Nereididae	Nereididae sp. 2																				
Oenonidae	*Arabella longipedata*																				
Onuphidae	*Onuphis holobranchiata*																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Onuphidae	Rhamphobrachium sp. 1																				
Opheliidae	Armandia sp. 1																				
Orbiniidae	Orbiniidae sp. 1																				
Paraonidae	Aricidea sp. 1																				
Phyllodocidae	Phyllodocidae sp. 1																				
Poecilochaetidae	*Poecilochaetus serpens*																				
Polynoidae	Polynoidae sp. 1																				
Sabellidae	Sabellidae sp. 1																				
Sigalionidae	*Pholoides mendeleevi*																				
Sigalionidae	Sigalionidae sp. 1																				
Sphaerodoridae	*Sphaerodoropsis heteropapillata*																				
Spionidae	Spionidae sp. 1				1																
Spionidae	Spionidae sp. 2																				
Syllidae	Syllidae sp. 1																				
Syllidae	Syllidae sp. 2															1					
Syllidae	Syllidae sp. 3																				
Syllidae	Syllidae sp. 4																				
Terebellidae	Terebellidae sp. 1																				
Trichobranchidae	Trichobranchidae sp. 1				1																
Echuira	Echuira																				
Sipuncula	Sipuncula															1					
Crustacea																					
Alpheidae	*Alpheus* sp. 1																				
Ampeliscidae	Ampeliscidae sp. 1																				
Anthuridea	Anthuridea sp. 1																				
Aoridae	Aoridae sp. 1																				
Apseudidae	Apseudidae sp. 1		1																		
Arcturidae	Arcturidae sp. 1																				
Atyidae	Atyidae sp. 1																				
Bodotriidae	Bodotriidae sp. 1																	1		1	
Callianassidae	Callianassidae sp. 1																				
Caprellidae	Caprellidae sp. 1																				
Caridea	Caridea damaged																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ceinidae	c.f.Ceinidae sp. 1																				
Ceratocumatidae	Ceratocumatidae sp. 1																				
Cirolanidae	Cirolanidae sp. 1																				
Copepoda	Copepoda																				
Corophiidae	Corophiidae sp. 1																				
Crustacea	Crustacea sp. 1																				
Cyproideidae	Cyproideidae sp. 1																				
Dexaminidae	Dexaminidae sp. 1																				
Diogenidae	Diogenidae sp. 1																				
Gnathiidae	Gnathiidae sp. 1																				
Grapsidae	Grapsidae sp. 1																				
Gynodiastylidae	Gynodiastylidae sp. 1																				
Hymenosomatidae	Hymenosomatidae sp. 1																				
Ischyroceridae	Ischyroceridae sp. 1																				
Isopoda	Isopoda sp. 1																				
Joeropsididae	Joeropsididae sp. 1																				
Leptostraca	Leptostraca sp. 1																				
Leucosiidae	Cryptocnemus sp. 1																				
Leucothoidae	Leucothoidae sp. 1																				
Liljeborgiidae	Liljeborgiidae sp. 1																				
Limnoriidae	Limnoriidae sp. 1																				
Lysianassidae	Lysianassidae sp. 1																				
Maeridae	Maeridae sp. 1																				
Melitidae	Melitidae sp. 1																				
Munnidae	Munnidae sp. 1																				
Mysidae	Mysidae sp. 1																				
Ochlesidae	Ochlesidae sp. 1																				
Ocypodidae	Ocypodidae sp. 1																				
Ostracoda	Ostracoda sp. 1																				
Ostracoda	Ostracoda sp. 2												2		1						
Ostracoda	Ostracoda sp. 3																				
Ostracoda	Ostracoda sp. 4																				
Oxycephalidae	Oxycephalidae sp. 1																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Penaeidae	Penaeidae sp. 1																				
Phoxocephalidae	Phoxocephalidae sp. 1																				1
Pilumnidae	Pilumnidae sp. 1																				
Platyischnopidae	Platyischnopidae sp. 1																				
Podoceridae	Podoceridae sp. 1																				
Portunidae	Portunidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 2																				
Pycnogonida	Pycnogonida sp. 1																				
Sphaeromatidae	Chitonopsis sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 2																				
Sphaeromatidae	Sphaeromatidae sp. 3																				
Squillidae	Belosquilla sp. 1																				
Tanaididae	Tanaididae sp. 1																				
Zobrachoidae	Zobrachoidae sp. 1																				
c.f.Hognathidae	c.f.Hognathidae sp. 1																				
Mollusca																					
Anatomidae	Anatomidae sp. 1																				
Aplysiidae	Aplysiidae sp. 1																				
Architectonicidae	Architectonicidae sp. 1																				
Cerithiidae	Cerithiidae sp. 1																				
Corbulidae	*Corbula* sp. 1																				
Cuspidariidae	Cuspidariidae sp. 1																				
Cylichnidae	Cylichnidae sp. 1																		1	1	
Eulimidae	Eulimidae sp. 1																				
Gastropoda	Gastropoda juv																				
Glycymerididae	*Glycymeris* sp. 1																				
Hiatellidae	Hiatella sp. 1																				
Lasaeidae	*Curvemysella paula*																				
Limidae	Limidae sp. 1																				
Lucinidae	Lucinidae sp. 1																				
Mactridae	*Mactra* sp. 1																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Mactridae	*Mactra* sp. 2																				
Myochamidae	*Myochama* sp. 1																				
Mytillidae	*Modiolus* sp. 1																				
Mytillidae	*Modiolus* sp. 2																				
Mytillidae	*Musculus coenobitus*																				
Mytillidae	*Musculus* sp. 1																				
Nassaridae	*Nassarius* sp. 1																				
Naticidae	*Natica* sp. 1																				
Naticidae	*Natica* sp. 2																				
Nuculanidae	*Saccella darwini*																				
Nuculidae	*Ennucula* sp. 1											1									
Olividae	*Phenacovolva* sp. 1																				
Ostreidae	Ostreidae sp. 1																				
Patellidae	Patellidae sp. 1																				
Pleurotomariidae	Pleurotomariidae sp. 1																				
Polyplacophora	Polyplacophora sp. 1																1				
Polyplacophora	Polyplacophora sp. 2																				
Pteriidae	*Pteria* sp. 1																				
Rissoidae	Rissoidae sp. 1																				
Solemyidae	*Solemya australis*																				
Tellinidae	*Tellina* sp. 1																3		1		
Tellinidae	*Tellina* sp. 2	1		1								4		1	1	1					
Tellinidae	*Tellina* sp. 3																				
Tellinidae	*Tellina* sp. 4																				
Trochidae	Trochidae sp. 1																				
Veneridae	*Antigona* sp. 1																				
Veneridae	*Circe* sp. 1																				
Veneridae	*Dosinia* sp. 1			1																	
Veneridae	*Dosinia* sp. 2																				
Veneridae	*Dosinia* sp. 3																				
Veneridae	*Paphia* sp. 1																				
Veneridae	Veneridae juv																				
Vulsellidae	*Electroma* sp. 1																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Bryozoa	Bryozoa fan																				
Echinodermata																					
Asteroidea	Asteroidea sp. 1																				
Echinoidea	Echinoidea juv																				
Holothuroidea	Holothuroidea sp. 1																				
Holothuroidea	Holothuroidea sp. 2																				
Holothuroidea	Holothuroidea sp. 3																				
Ophiuroidea	Ophiuroidea sp. 1																				
Toxopneustidae	Toxopneustidae sp. 1																				
Chordata																					
Ascidiacea	Ascidiacea sp. 1																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site SI5																					
Porifera	Porifera																				
Cnidaria																					
Actiniaria	Actiniaria sp. 1																				
Actiniaria	Actiniaria sp. 2																				
Hexacorallia	Hexacorallia sp. 1																				
Nemertea	Nemertea																				
Nematoda	Nematoda																				
Annelida																					
Amphinomidae	Amphinomidae																				
Aphroditidae	Pontogenia sp. 1																				
Capitellidae	*Capitella* sp. 1							2	2	1	2		2	1		1		1	2		1
Capitellidae	*Notomastus* sp. 1																				
Chrysopetalidae	Chrysopetalidae sp. 1																				
Cirratulidae	Cirratulidae sp. 1								1	1											
Cirratulidae	Cirratulidae sp. 2																				
Dorvilleidae	Dorvilleidae sp. 1						1														
Eunicidae	*Eunice* sp. 1																1				
Eunicidae	*Marphysa* sp. 1																				
Eunicidae	*Lysidice unicornis*																				
Flabelligeridae	*Pherusa* sp. 1																				
Glyceridae	*Glycera* sp. 1			1																	
Goniadidae	Goniada sp. 1					1	2		1	2			1				1	1	2	3	
Hesionidae	Hesionidae sp. 1																				
Lumbrineridae	*Lumbrineris* sp. 1		1																1		
Magelonidae	*Magelona* sp. 1																				
Maldanidae	*Axiothella* sp. 1																				
Nephtyidae	*Aglaophamus* sp. 1																				
Nereididae	Nereididae sp. 1		1	2	1		3			2		2		3	2				1		2
Nereididae	Nereididae sp. 2																				
Oenonidae	*Arabella longipedata*																				
Onuphidae	*Onuphis holobranchiata*																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Onuphidae	Rhamphobrachium sp. 1																				
Opheliidae	Armandia sp. 1																				
Orbiniidae	Orbiniidae sp. 1																				
Paraonidae	Aricidea sp. 1																				
Phyllodocidae	Phyllodocidae sp. 1													1							
Poecilochaetidae	*Poecilochaetus serpens*																				
Polynoidae	Polynoidae sp. 1																				
Sabellidae	Sabellidae sp. 1																				
Sigalionidae	*Pholoides mendeleevi*																				
Sigalionidae	Sigalionidae sp. 1																				
Sphaerodoridae	*Sphaerodoropsis heteropapillata*																				
Spionidae	Spionidae sp. 1						1														
Spionidae	Spionidae sp. 2																				
Syllidae	Syllidae sp. 1																				
Syllidae	Syllidae sp. 2																	1			
Syllidae	Syllidae sp. 3																				
Syllidae	Syllidae sp. 4																				
Terebellidae	Terebellidae sp. 1																				
Trichobranchidae	Trichobranchidae sp. 1	2	1		3	1															
Echuira	Echuira																				
Sipuncula	Sipuncula		1	1				1													
Crustacea																					
Alpheidae	*Alpheus* sp. 1																				
Ampeliscidae	Ampeliscidae sp. 1																				
Anthuridea	Anthuridea sp. 1																				
Aoridae	Aoridae sp. 1																				
Apseudidae	Apseudidae sp. 1			2											1			1	1		1
Arcturidae	Arcturidae sp. 1																				
Atyidae	Atyidae sp. 1																				
Bodotriidae	Bodotriidae sp. 1											1									
Callianassidae	Callianassidae sp. 1																				
Caprellidae	Caprellidae sp. 1																				
Caridea	Caridea damaged																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Ceinidae	c.f.Ceinidae sp. 1																				
Ceratocumatidae	Ceratocumatidae sp. 1																				
Cirolanidae	Cirolanidae sp. 1																				
Copepoda	Copepoda													3							
Corophiidae	Corophiidae sp. 1																				
Crustacea	Crustacea sp. 1																				
Cyproideidae	Cyproideidae sp. 1																				
Dexaminidae	Dexaminidae sp. 1																				
Diogenidae	Diogenidae sp. 1																				
Gnathiidae	Gnathiidae sp. 1																				
Grapsidae	Grapsidae sp. 1																				
Gynodiastylidae	Gynodiastylidae sp. 1																				
Hymenosomatidae	Hymenosomatidae sp. 1																				
Ischyroceridae	Ischyroceridae sp. 1																				
Isopoda	Isopoda sp. 1																				
Joeropsididae	Joeropsididae sp. 1																				
Leptostraca	Leptostraca sp. 1																				
Leucosiidae	Cryptocnemus sp. 1																				
Leucothoidae	Leucothoidae sp. 1																				
Liljeborgiidae	Liljeborgiidae sp. 1																				
Limnoriidae	Limnoriidae sp. 1																				
Lysianassidae	Lysianassidae sp. 1																				
Maeridae	Maeridae sp. 1																				
Melitidae	Melitidae sp. 1						1														
Munnidae	Munnidae sp. 1																				
Mysidae	Mysidae sp. 1																				
Ochlesidae	Ochlesidae sp. 1																				
Ocypodidae	Ocypodidae sp. 1																				
Ostracoda	Ostracoda sp. 1					1															
Ostracoda	Ostracoda sp. 2																				
Ostracoda	Ostracoda sp. 3																				
Ostracoda	Ostracoda sp. 4																				
Oxycephalidae	Oxycephalidae sp. 1																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Penaeidae	Penaeidae sp. 1																				
Phoxocephalidae	Phoxocephalidae sp. 1																				
Pilumnidae	Pilumnidae sp. 1																				
Platyischnopidae	Platyischnopidae sp. 1																				
Podoceridae	Podoceridae sp. 1																				
Portunidae	Portunidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 1																				
Pseudozeuxidae	Pseudozeuxidae sp. 2																				
Pycnogonida	Pycnogonida sp. 1																				
Sphaeromatidae	Chitonopsis sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 1																				
Sphaeromatidae	Sphaeromatidae sp. 2																				
Sphaeromatidae	Sphaeromatidae sp. 3																				
Squillidae	Belosquilla sp. 1																				
Tanaididae	Tanaididae sp. 1																				
Zobrachoidae	Zobrachoidae sp. 1																				
c.f.Hognathidae	c.f.Hognathidae sp. 1																				
Mollusca																					
Anatomidae	Anatomidae sp. 1																				
Aplysiidae	Aplysiidae sp. 1																				
Architectonicidae	Architectonicidae sp. 1																				
Cerithiidae	Cerithiidae sp. 1																				
Corbulidae	*Corbula* sp. 1																				
Cuspidariidae	Cuspidariidae sp. 1																				
Cylichnidae	Cylichnidae sp. 1																3		3	1	2
Eulimidae	Eulimidae sp. 1																				
Gastropoda	Gastropoda juv																				
Glycymerididae	*Glycymeris* sp. 1																				
Hiatellidae	Hiatella sp. 1																				
Lasaeidae	*Curvemysella paula*																				
Limidae	Limidae sp. 1																				
Lucinidae	Lucinidae sp. 1																				
Mactridae	*Mactra* sp. 1																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Mactridae	*Mactra* sp. 2																				
Myochamidae	*Myochama* sp. 1																				
Mytillidae	*Modiolus* sp. 1																				
Mytillidae	*Modiolus* sp. 2																				
Mytillidae	*Musculus coenobitus*																				
Mytillidae	*Musculus* sp. 1																				
Nassaridae	*Nassarius* sp. 1																				
Naticidae	*Natica* sp. 1																				
Naticidae	*Natica* sp. 2																				
Nuculanidae	*Saccella darwini*																				
Nuculidae	*Ennucula* sp. 1																				
Olividae	*Phenacovolva* sp. 1																				
Ostreidae	Ostreidae sp. 1																				
Patellidae	Patellidae sp. 1																				
Pleurotomariidae	Pleurotomariidae sp. 1																				
Polyplacophora	Polyplacophora sp. 1																				
Polyplacophora	Polyplacophora sp. 2																				
Pteriidae	*Pteria* sp. 1											1									
Rissoidae	Rissoidae sp. 1																				
Solemyidae	*Solemya australis*						1														
Tellinidae	*Tellina* sp. 1																1	1	2	1	2
Tellinidae	*Tellina* sp. 2													1							
Tellinidae	*Tellina* sp. 3																				
Tellinidae	*Tellina* sp. 4																				
Trochidae	Trochidae sp. 1																				
Veneridae	*Antigona* sp. 1																		1		1
Veneridae	*Circe* sp. 1																				
Veneridae	*Dosinia* sp. 1																				
Veneridae	*Dosinia* sp. 2																				
Veneridae	*Dosinia* sp. 3																				
Veneridae	*Paphia* sp. 1																				
Veneridae	Veneridae juv																				
Vulsellidae	*Electroma* sp. 1																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
yozoa	Bryozoa fan																				
Echinodermata																					
Asteroidea	Asteroidea sp. 1																				
Echinoidea	Echinoidea juv																				
Holothuroidea	Holothuroidea sp. 1																				
Holothuroidea	Holothuroidea sp. 2																				
Holothuroidea	Holothuroidea sp. 3																				
Ophiuroidea	Ophiuroidea sp. 1																				
Toxopneustidae	Toxopneustidae sp. 1																				
Chordata																					
Ascidiacea	Ascidiacea sp. 1																				

Appendix I. Meiofauna – detailed results

The following tables show the abundance of each of five replicates per site and season for the six primary habitats.

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site PA1																					
Ciliophora																					
Karyorelictea	Primitive ciliates																				
Foraminifera																					
Foraminifera sp. 1	Forams	3	21	4	9	1	22	28	11	93	8		9	14	9	9	34	29	71	19	22
Foraminifera sp. 2	Forams		1				6	5	1	8	3	2	1	1	2	1	3			1	
Foraminifera sp. 3	Forams				1		1	4	4	3											
Foraminifera sp. 4	Forams																				
Foraminifera sp. 5	Forams		2	1		1		3	1	14			1	1	1	1					
Foraminifera sp. 6	Forams																				
Foraminifera sp. 7	Forams						33	32	13	14	18		14	3	4	3	23	14	25	14	11
Foraminifera sp. 8	Forams							6	2	11						1					
Cnidaria	Corals																				
Plathyhelminthes	Flatworms							2													
Gastrotricha	Hairybacks																				
Gnathostomulida	Jaw worms																				
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads																				
Nematoda	Roundworms			1		1					2	1	4	6	11	6					
Tardigrada	Water bears											1									
Annelida																					
Oligochaeta	Earthworms																				
Polychaeta	Bristle worms				2					1	1										
Bryozoa	Moss animals																				
Mollusca																					
Bivalvia	Bivalves																				
Gastropoda	Gastropods						1	1		4			1					1			

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Gastropoda spp.	Gastropods																				
Nudibranchia sp.	Nudibranchs																				
Nudibranchia sp.	Nudibranchs																				
Arthropoda																					
Copepoda (other)	Other copepods																				
Copepods	Benthic copepods									1											
Cumacea	Comma shrimps																				
Halacaridae	Marine mites																				
Ostracoda sp. 1	Seed shrimp	3	8	1	7	4	6	6	6	27	3	1	3	1	6	1	6	6	7	4	2
Ostracoda sp. 2	Seed shrimp						1	1	2	1											
Ostracoda sp. 3	Seed shrimp		1	1				3	4	4	4						1	1	3	1	4
Ostracoda sp. 4	Seed shrimp				1										3						
Ostracoda sp. 5	Seed shrimp						1	1	1	1			5	1	3						
Ostracoda sp. 6	Seed shrimp						2	1													
Echinodermata	Echinoderms									1		1									
Chordata																					
Ascidiacea	Sea squirt																				
Tunicata	Tunicates		1																		

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site PA2																					
Ciliophora																					
Karyorelictea	Primitive ciliates																				
Foraminifera																					
Foraminifera sp. 1	Forams	4	1	1	14	3	2			79	5	2	1	2	16	2	48	6	27	13	25
Foraminifera sp. 2	Forams				1		1			6		1	2				2				1
Foraminifera sp. 3	Forams						1							1							
Foraminifera sp. 4	Forams																				
Foraminifera sp. 5	Forams	1			4					4	2	1		1			1		1		
Foraminifera sp. 6	Forams																				
Foraminifera sp. 7	Forams						2	1		71		1	4	2	8	3	3	3	5	2	11
Foraminifera sp. 8	Forams						1			7											
Cnidaria	Corals																				
Plathyhelminthes	Flatworms																				
Gastrotricha	Hairybacks														1						
Gnathostomulida	Jaw worms																				
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads																				
Nematoda	Roundworms		3			1															
Tardigrada	Water bears																				
Annelida																					
Oligochaeta	Earthworms																				
Polychaeta	Bristle worms																				
Bryozoa	Moss animals																				
Mollusca																					
Bivalvia	Bivalves																				
Gastropoda	Gastropods																				
Gastropoda spp.	Gastropods				1	1															
Nudibranchia sp.	Nudibranchs																				
Nudibranchia sp.	Nudibranchs																				

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Arthropoda																					
Copepoda (other)	Other copepods																				
Copepods	Benthic copepods									1											
Cumacea	Comma shrimps																				
Halacaridae	Marine mites																				
Ostracoda sp. 1	Seed shrimp	9	2	3	16	4	4	1	1	43	5	4	2	2	3	4	4		1		3
Ostracoda sp. 2	Seed shrimp				2																
Ostracoda sp. 3	Seed shrimp	1	1			1				11	3	1			1		1				2
Ostracoda sp. 4	Seed shrimp				1																
Ostracoda sp. 5	Seed shrimp																				
Ostracoda sp. 6	Seed shrimp									1											
Echinodermata	Echinoderms										1										
Chordata																					
Ascidiacea	Sea squirt																				
Tunicata	Tunicates																				

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site PA3																					
Ciliophora																					
Karyorelictea	Primitive ciliates																				
Foraminifera																					
Foraminifera sp. 1	Forams	2	2		1	1	31	7	2	2	21	3	11	4	4		6	2	8	3	26
Foraminifera sp. 2	Forams						2	2	5	3	1	2			2				1		
Foraminifera sp. 3	Forams						1		1												
Foraminifera sp. 4	Forams								1		1										
Foraminifera sp. 5	Forams		1			1		3	2		2	1						1			
Foraminifera sp. 6	Forams		1		1																
Foraminifera sp. 7	Forams						28	1	11	1	8	2	1	4	1	1		1	1	5	2
Foraminifera sp. 8	Forams						1			1	3										
Cnidaria	Corals																				
Plathyhelminthes	Flatworms																				
Gastrotricha	Hairybacks																				
Gnathostomulida	Jaw worms																				
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads																				
Nematoda	Roundworms	1			2	2						2	3	4		1					
Tardigrada	Water bears															1					
Annelida																					
Oligochaeta	Earthworms																				
Polychaeta	Bristle worms																				
Bryozoa	Moss animals																				
Mollusca																					
Bivalvia	Bivalves																				
Gastropoda	Gastropods													1	1						
Gastropoda spp.	Gastropods																				
Nudibranchia sp.	Nudibranchs																				
Nudibranchia sp.	Nudibranchs																				

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Arthropoda																					
Copepoda (other)	Other copepods																				
Copepods	Benthic copepods														1						
Cumacea	Comma shrimps																				
Halacaridae	Marine mites																				
Ostracoda sp. 1	Seed shrimp	1	3		4		11	5	7	2	18	1	5	4	1	2				1	5
Ostracoda sp. 2	Seed shrimp		1																		
Ostracoda sp. 3	Seed shrimp				1		9	2	7		2						2	1			6
Ostracoda sp. 4	Seed shrimp																				
Ostracoda sp. 5	Seed shrimp																				
Ostracoda sp. 6	Seed shrimp																				
Echinodermata	Echinoderms							2	7	5	4										
Chordata																					
Ascidiacea	Sea squirt																				
Tunicata	Tunicates	1			1																

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site PA4																					
Ciliophora																					
Karyorelictea	Primitive ciliates																				
Foraminifera																					
Foraminifera sp. 1	Forams	1	3		3		4	53	17	16	14	9	2	5	8	4	28	4	16	5	42
Foraminifera sp. 2	Forams		1		1		1	2		1		1	2		1		2			1	
Foraminifera sp. 3	Forams			1				1			1										
Foraminifera sp. 4	Forams	1					1				1										
Foraminifera sp. 5	Forams						1	1	5	1	1										
Foraminifera sp. 6	Forams																				
Foraminifera sp. 7	Forams						2	8	3	12	1	4	15	4	4	3	22	2	14	26	22
Foraminifera sp. 8	Forams						4	16	1	1	3					1					1
Cnidaria	Corals																				
Plathyhelminthes	Flatworms	1																			
Gastrotricha	Hairybacks																				
Gnathostomulida	Jaw worms																				
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads																				
Nematoda	Roundworms		1	2	2							19	6	4	15	5					
Tardigrada	Water bears																				
Annelida																					
Oligochaeta	Earthworms		1																		
Polychaeta	Bristle worms																				
Bryozoa	Moss animals																				
Mollusca																					
Bivalvia	Bivalves																				
Gastropoda	Gastropods																				
Gastropoda spp.	Gastropods																				
Nudibranchia sp.	Nudibranchs																				
Nudibranchia sp.	Nudibranchs																				

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Arthropoda																					
Copepoda (other)	Other copepods																				
Copepods	Benthic copepods																				
Cumacea	Comma shrimps																				
Halacaridae	Marine mites																				
Ostracoda sp. 1	Seed shrimp		2			1	4	15	7	8	6	2	2	5	8	4	2		7	5	14
Ostracoda sp. 2	Seed shrimp																				
Ostracoda sp. 3	Seed shrimp						2	3	2	1	5		1			1	4		4	5	3
Ostracoda sp. 4	Seed shrimp		1		1																
Ostracoda sp. 5	Seed shrimp																				
Ostracoda sp. 6	Seed shrimp																				
Echinodermata	Echinoderms	1														1					
Chordata																					
Ascidiacea	Sea squirt																				
Tunicata	Tunicates																				

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site PA5																					
Ciliophora																					
Karyorelictea	Primitive ciliates																				
Foraminifera																					
Foraminifera sp. 1	Forams	3	5	4	2	26	37	18	2	3	2	22	5	1	1	12	3	2	17	24	34
Foraminifera sp. 2	Forams			1		1	1	18	1	1	2	5	3	5	1	2					1
Foraminifera sp. 3	Forams	1	1	3	3			1				2									1
Foraminifera sp. 4	Forams					1					1										
Foraminifera sp. 5	Forams				3	3	1	26	2	2	1	2								1	
Foraminifera sp. 6	Forams				1																
Foraminifera sp. 7	Forams						56	26	38	2	2	19	14	14	3	14	22	11	5	6	34
Foraminifera sp. 8	Forams						2	11	5	3	1			1							
Cnidaria	Corals																				
Plathyhelminthes	Flatworms																				
Gastrotricha	Hairybacks																				
Gnathostomulida	Jaw worms																				
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads																				
Nematoda	Roundworms											2	2	2	11						
Tardigrada	Water bears																				
Annelida																					
Oligochaeta	Earthworms																				
Polychaeta	Bristle worms																				
Bryozoa	Moss animals																				
Mollusca																					
Bivalvia	Bivalves																				
Gastropoda	Gastropods							3					1								
Gastropoda spp.	Gastropods																				
Nudibranchia sp.	Nudibranchs												1								
Nudibranchia sp.	Nudibranchs																				

Family	Species	*Posidonia australis*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Arthropoda																					
Copepoda (other)	Other copepods				1																
Copepods	Benthic copepods																				
Cumacea	Comma shrimps																				
Halacaridae	Marine mites																				
Ostracoda sp. 1	Seed shrimp	3	3	1	15	12	8	1	6	4	3	56	17	32	4	23	12	8	4		9
Ostracoda sp. 2	Seed shrimp																				
Ostracoda sp. 3	Seed shrimp						2	1	5	3	2	2		1	1	1	2	3	5	1	5
Ostracoda sp. 4	Seed shrimp					1				1											
Ostracoda sp. 5	Seed shrimp							4	1												
Ostracoda sp. 6	Seed shrimp																				
Echinodermata	Echinoderms							2													
Chordata																					
Ascidiacea	Sea squirt																				
Tunicata	Tunicates																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site PS1																					
Ciliophora																					
Karyorelictea	Primitive ciliates																				
Foraminifera																					
Foraminifera sp. 1	Forams	3	1			3	13			18	1	39	35	25	2	2	5	9	1		1
Foraminifera sp. 2	Forams						1			2	6	1	3	3		2					
Foraminifera sp. 3	Forams						1				1	1	3	3							
Foraminifera sp. 4	Forams																				
Foraminifera sp. 5	Forams						1			2	1	7	4	4		3					
Foraminifera sp. 6	Forams																				
Foraminifera sp. 7	Forams									7	9	27	25	15			1	1			
Foraminifera sp. 8	Forams											2	1			1		1			
Cnidaria	Corals																				
Plathyhelminthes	Flatworms			1																	
Gastrotricha	Hairybacks																				
Gnathostomulida	Jaw worms																				
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads				1																
Nematoda	Roundworms																				
Tardigrada	Water bears																				
Annelida																					
Oligochaeta	Earthworms																				
Polychaeta	Bristle worms																				
Bryozoa	Moss animals																				
Mollusca																					
Bivalvia	Bivalves																				
Gastropoda	Gastropods									4	1	1	3								
Gastropoda spp.	Gastropods																				
Nudibranchia sp.	Nudibranchs																				
Nudibranchia sp.	Nudibranchs				1																

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Arthropoda																					
Copepoda (other)	Other copepods																				
Copepods	Benthic copepods																				
Cumacea	Comma shrimps																				
Halacaridae	Marine mites																				
Ostracoda sp. 1	Seed shrimp			1	2	1				3	2	9	14	11		1		3			
Ostracoda sp. 2	Seed shrimp																				
Ostracoda sp. 3	Seed shrimp											2	1	2							
Ostracoda sp. 4	Seed shrimp																				
Ostracoda sp. 5	Seed shrimp																				
Ostracoda sp. 6	Seed shrimp																				
Echinodermata	Echinoderms											2	1					1			
Chordata																					
Ascidiacea	Sea squirt																				
Tunicata	Tunicates																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site PS2																					
Ciliophora																					
Karyorelictea	Primitive ciliates																				
Foraminifera																					
Foraminifera sp. 1	Forams	1	2	1			1	58	2	25	4	11	25	7	61	19		2	6	2	4
Foraminifera sp. 2	Forams						3	7			1			6	4						
Foraminifera sp. 3	Forams	1						2					4	3	2						
Foraminifera sp. 4	Forams																				
Foraminifera sp. 5	Forams							4	1		2	1	2	4	6	1		2	2		3
Foraminifera sp. 6	Forams																				
Foraminifera sp. 7	Forams							24	11	3		3	2	13	33	2					
Foraminifera sp. 8	Forams											2	1		2	1			1		
Cnidaria	Corals																				
Plathyhelminthes	Flatworms																				
Gastrotricha	Hairybacks																				
Gnathostomulida	Jaw worms																				
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads																				
Nematoda	Roundworms																				
Tardigrada	Water bears																				
Annelida																					
Oligochaeta	Earthworms																				
Polychaeta	Bristle worms																				
Bryozoa	Moss animals																				
Mollusca																					
Bivalvia	Bivalves														1						
Gastropoda	Gastropods						3	4	2	1				3	7						
Gastropoda spp.	Gastropods																				
Nudibranchia sp.	Nudibranchs																				
Nudibranchia sp.	Nudibranchs																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Arthropoda																					
Copepoda (other)	Other copepods																				
Copepods	Benthic copepods																				
Cumacea	Comma shrimps																				
Halacaridae	Marine mites																				
Ostracoda sp. 1	Seed shrimp		1		1					1		2	1	13	22	5			3	1	1
Ostracoda sp. 2	Seed shrimp																				
Ostracoda sp. 3	Seed shrimp												3	1	2	2					
Ostracoda sp. 4	Seed shrimp																				
Ostracoda sp. 5	Seed shrimp																				
Ostracoda sp. 6	Seed shrimp																				
Echinodermata	Echinoderms											1	2		2				1		
Chordata																					
Ascidiacea	Sea squirt																				
Tunicata	Tunicates																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site PS3																					
Ciliophora																					
Karyorelictea	Primitive ciliates																				
Foraminifera																					
Foraminifera sp. 1	Forams			1		1	5	11	1	16	6	1	35	5	14	66	5	6	6	16	2
Foraminifera sp. 2	Forams	5		3	1	1	4	1	1	7	2				2	7				1	
Foraminifera sp. 3	Forams					2				1						4	1			1	
Foraminifera sp. 4	Forams				2	5									1	1					
Foraminifera sp. 5	Forams								1				3		1	21					
Foraminifera sp. 6	Forams																				
Foraminifera sp. 7	Forams								3	1			13		2	19	1	1	3	2	1
Foraminifera sp. 8	Forams											1	3		1	2					
Cnidaria	Corals							1													
Plathyhelminthes	Flatworms																				
Gastrotricha	Hairybacks																				
Gnathostomulida	Jaw worms																				
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads																				
Nematoda	Roundworms												1		1		2	1			
Tardigrada	Water bears	1																			
Annelida																					
Oligochaeta	Earthworms																				
Polychaeta	Bristle worms																				
Bryozoa	Moss animals																				
Mollusca																					
Bivalvia	Bivalves																				
Gastropoda	Gastropods							1	5	3			3			4				3	
Gastropoda spp.	Gastropods																				
Nudibranchia sp.	Nudibranchs																				
Nudibranchia sp.	Nudibranchs																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Arthropoda																					
Copepoda (other)	Other copepods																				
Copepods	Benthic copepods																				
Cumacea	Comma shrimps																				
Halacaridae	Marine mites																				
Ostracoda sp. 1	Seed shrimp	2	1	1	2	2		1				1	1			14		2		1	
Ostracoda sp. 2	Seed shrimp	1	1	2												1					
Ostracoda sp. 3	Seed shrimp												2		1	1	1			1	
Ostracoda sp. 4	Seed shrimp																				
Ostracoda sp. 5	Seed shrimp												1			2					
Ostracoda sp. 6	Seed shrimp																				
Echinodermata	Echinoderms														1	7					
Chordata																					
Ascidiacea	Sea squirt																				
Tunicata	Tunicates			1																	

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site PS4																					
Ciliophora																					
Karyorelictea	Primitive ciliates																				
Foraminifera																					
Foraminifera sp. 1	Forams		1	1	1		11	4	64	5	28	16	6	2	2		5	3	4	24	35
Foraminifera sp. 2	Forams						4		22		6	2		5							
Foraminifera sp. 3	Forams															1					
Foraminifera sp. 4	Forams																				
Foraminifera sp. 5	Forams										1	1		2							
Foraminifera sp. 6	Forams																				
Foraminifera sp. 7	Forams						2		6	2	14	1	2	2		2	2			4	2
Foraminifera sp. 8	Forams													2							
Cnidaria	Corals																				
Plathyhelminthes	Flatworms	2				2															
Gastrotricha	Hairybacks																				
Gnathostomulida	Jaw worms																				
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads					1															
Nematoda	Roundworms			1		2															
Tardigrada	Water bears																				
Annelida																					
Oligochaeta	Earthworms																				
Polychaeta	Bristle worms																				
Bryozoa	Moss animals																				
Mollusca																					
Bivalvia	Bivalves																				
Gastropoda	Gastropods								5	1	2	4	1								
Gastropoda spp.	Gastropods																				
Nudibranchia sp.	Nudibranchs																				
Nudibranchia sp.	Nudibranchs																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Arthropoda																					
Copepoda (other)	Other copepods																				
Copepods	Benthic copepods																				
Cumacea	Comma shrimps																				
Halacaridae	Marine mites	1																			
Ostracoda sp. 1	Seed shrimp	1		5				2			6	2	1	1				2			1
Ostracoda sp. 2	Seed shrimp																				1
Ostracoda sp. 3	Seed shrimp											1		3							
Ostracoda sp. 4	Seed shrimp																				
Ostracoda sp. 5	Seed shrimp																				
Ostracoda sp. 6	Seed shrimp																				
Echinodermata	Echinoderms												3	2							
Chordata																					
Ascidiacea	Sea squirt																				
Tunicata	Tunicates																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site PS5																					
Ciliophora																					
Karyorelictea	Primitive ciliates																				
Foraminifera																					
Foraminifera sp. 1	Forams	4	2	8	1		6	25	15	21	5	15	16	11	84	43	15	67	11	33	29
Foraminifera sp. 2	Forams		2	1	5	5		57	14	27	15	2	4	7	5	3	4	16	7	4	18
Foraminifera sp. 3	Forams	1	3									2			1			1			1
Foraminifera sp. 4	Forams														1						
Foraminifera sp. 5	Forams								1			5	1	1	5	2		2	1		6
Foraminifera sp. 6	Forams																				
Foraminifera sp. 7	Forams							5		1	5	23	44	19	1	11	3	14	13	21	18
Foraminifera sp. 8	Forams											2	8	5	4	1					
Cnidaria	Corals									1											
Plathyhelminthes	Flatworms				1	1															
Gastrotricha	Hairybacks																				
Gnathostomulida	Jaw worms		1																		
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads																				
Nematoda	Roundworms															1					
Tardigrada	Water bears																				
Annelida																					
Oligochaeta	Earthworms																				
Polychaeta	Bristle worms																				
Bryozoa	Moss animals																				
Mollusca																					
Bivalvia	Bivalves											1									
Gastropoda	Gastropods							1				5	1								
Gastropoda spp.	Gastropods																				
Nudibranchia sp.	Nudibranchs																				
Nudibranchia sp.	Nudibranchs																				

Family	Species	*Posidonia sinuosa*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Arthropoda																					
Copepoda (other)	Other copepods																				
Copepods	Benthic copepods	1																			
Cumacea	Comma shrimps		1																		
Halacaridae	Marine mites																				
Ostracoda sp. 1	Seed shrimp	2	8	1	5	2		1				8	16	7	4	4		4	6	3	8
Ostracoda sp. 2	Seed shrimp	1																			
Ostracoda sp. 3	Seed shrimp															2		2		1	1
Ostracoda sp. 4	Seed shrimp																				
Ostracoda sp. 5	Seed shrimp																				
Ostracoda sp. 6	Seed shrimp																				
Echinodermata	Echinoderms											1		1				1			
Chordata																					
Ascidiacea	Sea squirt																				
Tunicata	Tunicates																				

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site AP1																					
Ciliophora																					
Karyorelictea	Primitive ciliates																				
Foraminifera																					
Foraminifera sp. 1	Forams	3	1	6	19	15	95	23	15	84	71	19	51	46	35	15	49	35	5	45	24
Foraminifera sp. 2	Forams	3	2				28	11		4	2		4	3	36	15	4	6	6	7	3
Foraminifera sp. 3	Forams	1	5	1		1	3	6	1	1			2	1	7	5					
Foraminifera sp. 4	Forams						4	6						1							
Foraminifera sp. 5	Forams		1	1	1	1	27	65	2	5	6	3	2	4	51	2	3	3	3		
Foraminifera sp. 6	Forams																				
Foraminifera sp. 7	Forams	2		1	1	2	3	76	6	2	14	2	22	9	95	3	9	7	5	9	1
Foraminifera sp. 8	Forams				1		13	27	1	1	7	3		2	14	6			1		
Cnidaria	Corals																				
Plathyhelminthes	Flatworms																				
Gastrotricha	Hairybacks																				
Gnathostomulida	Jaw worms																				
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads																				
Nematoda	Roundworms																		1		
Tardigrada	Water bears																1				
Annelida																					
Oligochaeta	Earthworms																				
Polychaeta	Bristle worms																				
Bryozoa	Moss animals																				
Mollusca																					
Bivalvia	Bivalves														1						
Gastropoda	Gastropods						4	8			2		4	2	4	8	2				1
Gastropoda spp.	Gastropods		1																		
Nudibranchia sp.	Nudibranchs																				
Nudibranchia sp.	Nudibranchs																				

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Arthropoda																					
Copepoda (other)	Other copepods																				
Copepods	Benthic copepods																				
Cumacea	Comma shrimps																				
Halacaridae	Marine mites																				
Ostracoda sp. 1	Seed shrimp	4		2	3	2	4	13	11	11	13	6	2	9	54	22	1	1	2		
Ostracoda sp. 2	Seed shrimp						2	1													
Ostracoda sp. 3	Seed shrimp						5	2		2	1		2					2			
Ostracoda sp. 4	Seed shrimp																				
Ostracoda sp. 5	Seed shrimp				1	1		4													
Ostracoda sp. 6	Seed shrimp					2		1													
Echinodermata	Echinoderms							5		1	3			1	5	2					
Chordata																					
Ascidiacea	Sea squirt																				
Tunicata	Tunicates																				

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site AP2																					
Ciliophora																					
Karyorelictea	Primitive ciliates																				
Foraminifera																					
Foraminifera sp. 1	Forams	15	1	5	4	18	69	3	7	42	35	9	91	13	67	8	23	11	38	67	44
Foraminifera sp. 2	Forams						7	2	9	1	4		9	1	2		1	5		2	1
Foraminifera sp. 3	Forams											2	1	1	3						
Foraminifera sp. 4	Forams																				
Foraminifera sp. 5	Forams					1					1	2	11	8		1	1	2	1	6	
Foraminifera sp. 6	Forams																				
Foraminifera sp. 7	Forams						3	2	1	1	1	21	32	6	35		5	2	18	17	3
Foraminifera sp. 8	Forams											3	5	4	1	1			2	1	
Cnidaria	Corals																				
Plathyhelminthes	Flatworms																				
Gastrotricha	Hairybacks																				
Gnathostomulida	Jaw worms																				
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads																				
Nematoda	Roundworms														1						
Tardigrada	Water bears																				
Annelida																					
Oligochaeta	Earthworms																				
Polychaeta	Bristle worms																				
Bryozoa	Moss animals																				
Mollusca																					
Bivalvia	Bivalves																				
Gastropoda	Gastropods						1		1	1		2		4	1			2	1	2	
Gastropoda spp.	Gastropods																				
Nudibranchia sp.	Nudibranchs																				
Nudibranchia sp.	Nudibranchs																				

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Arthropoda																					
Copepoda (other)	Other copepods																				
Copepods	Benthic copepods																				
Cumacea	Comma shrimps																				
Halacaridae	Marine mites																				
Ostracoda sp. 1	Seed shrimp	6	2	3	1	8	3				3	6	7	16	8	3	2	6	1	3	1
Ostracoda sp. 2	Seed shrimp																				1
Ostracoda sp. 3	Seed shrimp			3		1															
Ostracoda sp. 4	Seed shrimp			2		1															
Ostracoda sp. 5	Seed shrimp																				
Ostracoda sp. 6	Seed shrimp																				
Echinodermata	Echinoderms							1	1		1	1									
Chordata																					
Ascidiacea	Sea squirt																				
Tunicata	Tunicates																				

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site AP3																					
Ciliophora																					
Karyorelictea	Primitive ciliates																				
Foraminifera																					
Foraminifera sp. 1	Forams	1	11	13	39	75	7	76	8	17	44	41	12	46	59	18	18	27	76	43	73
Foraminifera sp. 2	Forams							7	36	1	2	1				2		1	2	1	
Foraminifera sp. 3	Forams				1	1									2	7					
Foraminifera sp. 4	Forams																				
Foraminifera sp. 5	Forams				2	3		3							1	4					
Foraminifera sp. 6	Forams																				
Foraminifera sp. 7	Forams						3	15	1	1	3	7	1	8	35	84		1	14	8	24
Foraminifera sp. 8	Forams								2			1			1						
Cnidaria	Corals																				
Plathyhelminthes	Flatworms																				
Gastrotricha	Hairybacks																				
Gnathostomulida	Jaw worms																				
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads																				
Nematoda	Roundworms																				
Tardigrada	Water bears																				
Annelida																					
Oligochaeta	Earthworms																				
Polychaeta	Bristle worms																				
Bryozoa	Moss animals																				
Mollusca																					
Bivalvia	Bivalves															2					
Gastropoda	Gastropods						1	5	1			1			4	13			4	1	
Gastropoda spp.	Gastropods		1		2	1															
Nudibranchia sp.	Nudibranchs																				
Nudibranchia sp.	Nudibranchs																				

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Arthropoda																					
Copepoda (other)	Other copepods																				
Copepods	Benthic copepods																				
Cumacea	Comma shrimps																				
Halacaridae	Marine mites																				
Ostracoda sp. 1	Seed shrimp	2	4	2	4	2	3		1	2		8		12	9	19	1	1	1	2	1
Ostracoda sp. 2	Seed shrimp																				
Ostracoda sp. 3	Seed shrimp		2												4	6				2	1
Ostracoda sp. 4	Seed shrimp		1																		
Ostracoda sp. 5	Seed shrimp											1				1					
Ostracoda sp. 6	Seed shrimp																				
Echinodermata	Echinoderms													1		1					
Chordata																					
Ascidiacea	Sea squirt																				
Tunicata	Tunicates																				

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site AP4																					
Ciliophora																					
Karyorelictea	Primitive ciliates																				
Foraminifera																					
Foraminifera sp. 1	Forams	7	12	69	29	33	5	9	8	7		3	78	4	36	2	63	57	29	35	98
Foraminifera sp. 2	Forams		1	1					11		11			1	1		2	1		1	3
Foraminifera sp. 3	Forams													3		1					
Foraminifera sp. 4	Forams																				
Foraminifera sp. 5	Forams	1	5		1	1					2		1	1	1						1
Foraminifera sp. 6	Forams																				
Foraminifera sp. 7	Forams						2	2	3	1		13	3	25	1	3		9	6	9	12
Foraminifera sp. 8	Forams		2										4	2	1						
Cnidaria	Corals																				
Plathyhelminthes	Flatworms			1																	
Gastrotricha	Hairybacks																				
Gnathostomulida	Jaw worms																				
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads																				
Nematoda	Roundworms																				
Tardigrada	Water bears																				
Annelida																					
Oligochaeta	Earthworms																				
Polychaeta	Bristle worms																				
Bryozoa	Moss animals																				
Mollusca																					
Bivalvia	Bivalves																				
Gastropoda	Gastropods													3	1		1				2
Gastropoda spp.	Gastropods																				
Nudibranchia sp.	Nudibranchs																				
Nudibranchia sp.	Nudibranchs																				

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Arthropoda																					
Copepoda (other)	Other copepods																				
Copepods	Benthic copepods																				
Cumacea	Comma shrimps																				
Halacaridae	Marine mites																				
Ostracoda sp. 1	Seed shrimp	3	16	13	4	7				1		3	15	6	3	1		1	2	2	2
Ostracoda sp. 2	Seed shrimp																				
Ostracoda sp. 3	Seed shrimp													1				1			
Ostracoda sp. 4	Seed shrimp		1																		
Ostracoda sp. 5	Seed shrimp		3		1										1						
Ostracoda sp. 6	Seed shrimp					1															
Echinodermata	Echinoderms																				
Chordata																					
Ascidiacea	Sea squirt																				
Tunicata	Tunicates				1																

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site AP5																					
Ciliophora																					
Karyorelictea	Primitive ciliates																				
Foraminifera																					
Foraminifera sp. 1	Forams	13	34	36	28	14	26	45	19	73	37	15	21	17	45	11	49	27	56	29	26
Foraminifera sp. 2	Forams	4						7	4	9	9	1	1	3	2			2	8		
Foraminifera sp. 3	Forams													1							
Foraminifera sp. 4	Forams																				
Foraminifera sp. 5	Forams		3		2	1	3	6		11	2	2	2	7	6	1		1	4		
Foraminifera sp. 6	Forams																				
Foraminifera sp. 7	Forams						13	11	3	14	13	5	8	62	5	7	1	2	16	8	3
Foraminifera sp. 8	Forams			1	3	1	3	1		3		1	1	9	6	1				1	
Cnidaria	Corals																				
Plathyhelminthes	Flatworms																				
Gastrotricha	Hairybacks			1																	
Gnathostomulida	Jaw worms																				
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads																				
Nematoda	Roundworms																				
Tardigrada	Water bears																				
Annelida																					
Oligochaeta	Earthworms																				
Polychaeta	Bristle worms																				
Bryozoa	Moss animals																				
Mollusca																					
Bivalvia	Bivalves																				
Gastropoda	Gastropods						1			1				2			1	1		1	
Gastropoda spp.	Gastropods			1																	
Nudibranchia sp.	Nudibranchs																				
Nudibranchia sp.	Nudibranchs																				

Family	Species	*Amphibolis/Posidonia*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Arthropoda																					
Copepoda (other)	Other copepods																				
Copepods	Benthic copepods																				
Cumacea	Comma shrimps																				
Halacaridae	Marine mites																				
Ostracoda sp. 1	Seed shrimp	4	13	14	9	5	1	5				9	3	2	18	3	3	2	15	5	5
Ostracoda sp. 2	Seed shrimp																				
Ostracoda sp. 3	Seed shrimp		3	3								1		1		1	3				
Ostracoda sp. 4	Seed shrimp																				
Ostracoda sp. 5	Seed shrimp		5		2																
Ostracoda sp. 6	Seed shrimp	1			2																
Echinodermata	Echinoderms											1			2						
Chordata																					
Ascidiacea	Sea squirt																				
Tunicata	Tunicates																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site ZO1																					
Ciliophora																					
Karyorelictea	Primitive ciliates																				
Foraminifera																					
Foraminifera sp. 1	Forams	13	14			5	19	39	18	15	27	4	13	6	16	4	3	16	4	1	9
Foraminifera sp. 2	Forams	15	3	1		1	11	9	1	5	5					2	1		1		
Foraminifera sp. 3	Forams																				
Foraminifera sp. 4	Forams	4																			
Foraminifera sp. 5	Forams	8	1	1			5	3	1		5	1				1	2	5	4		4
Foraminifera sp. 6	Forams																				
Foraminifera sp. 7	Forams	13	4			6	12	22	13	8	16	4	15	3	5	8	1	13	7	2	16
Foraminifera sp. 8	Forams	2																	1		
Cnidaria	Corals																				
Plathyhelminthes	Flatworms																				
Gastrotricha	Hairybacks																				
Gnathostomulida	Jaw worms																				
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads																				
Nematoda	Roundworms			1								1	1	1		2					
Tardigrada	Water bears																				
Annelida																					
Oligochaeta	Earthworms																				
Polychaeta	Bristle worms																				
Bryozoa	Moss animals																				
Mollusca																					
Bivalvia	Bivalves																				
Gastropoda	Gastropods							8	3	5	6										
Gastropoda spp.	Gastropods																				
Nudibranchia sp.	Nudibranchs																				
Nudibranchia sp.	Nudibranchs																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Arthropoda																					
Copepoda (other)	Other copepods																				
Copepods	Benthic copepods																				
Cumacea	Comma shrimps																				
Halacaridae	Marine mites																				
Ostracoda sp. 1	Seed shrimp					2	14	13	3	2	12	21	3	5	6	1		5	1	1	2
Ostracoda sp. 2	Seed shrimp																	1	2		
Ostracoda sp. 3	Seed shrimp							13	8	3	3		1								1
Ostracoda sp. 4	Seed shrimp																				
Ostracoda sp. 5	Seed shrimp																				
Ostracoda sp. 6	Seed shrimp																				
Echinodermata	Echinoderms								1		1										
Chordata																					
Ascidiacea	Sea squirt																				
Tunicata	Tunicates																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site ZO2																					
Ciliophora																					
Karyorelictea	Primitive ciliates																				
Foraminifera																					
Foraminifera sp. 1	Forams	4	2	1	8	16	3	31		2	4	2	5	11	4	3	11	3	6	6	16
Foraminifera sp. 2	Forams			2	2			11		3	3			2					1	1	1
Foraminifera sp. 3	Forams	1	1	1	7			1		3											
Foraminifera sp. 4	Forams																				
Foraminifera sp. 5	Forams	2		1	3		8	36		16	5					2					
Foraminifera sp. 6	Forams																				
Foraminifera sp. 7	Forams	3	1	2	3	2	3	7		21	5		2	3	1	2	1	1	7	6	22
Foraminifera sp. 8	Forams						1			4											
Cnidaria	Corals																				
Plathyhelminthes	Flatworms																				
Gastrotricha	Hairybacks																				
Gnathostomulida	Jaw worms																				
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads																				
Nematoda	Roundworms																				
Tardigrada	Water bears							1													
Annelida																					
Oligochaeta	Earthworms																				
Polychaeta	Bristle worms																				
Bryozoa	Moss animals	1			1																
Mollusca																					
Bivalvia	Bivalves																				
Gastropoda	Gastropods												1								
Gastropoda spp.	Gastropods																				
Nudibranchia sp.	Nudibranchs																				
Nudibranchia sp.	Nudibranchs																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Arthropoda																					
Copepoda (other)	Other copepods																				
Copepods	Benthic copepods																				
Cumacea	Comma shrimps																				
Halacaridae	Marine mites																				
Ostracoda sp. 1	Seed shrimp	1			1		2	16	1	9	2	1	1	2	1		3				
Ostracoda sp. 2	Seed shrimp																				
Ostracoda sp. 3	Seed shrimp						1	4		1								1	1	3	2
Ostracoda sp. 4	Seed shrimp																				
Ostracoda sp. 5	Seed shrimp	1			1	1				1											
Ostracoda sp. 6	Seed shrimp							1													
Echinodermata	Echinoderms						2	12	1	2	1										
Chordata																					
Ascidiacea	Sea squirt																				
Tunicata	Tunicates																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site ZO3																					
Ciliophora																					
Karyorelictea	Primitive ciliates																				
Foraminifera																					
Foraminifera sp. 1	Forams	2	3				5	15	2	3	5	7	1	3	1	3	4	12		12	4
Foraminifera sp. 2	Forams					1	1	1		1		1		1	1			2	1		
Foraminifera sp. 3	Forams			6	2	5															
Foraminifera sp. 4	Forams					1															
Foraminifera sp. 5	Forams	1	1	1		1	6	7		2	2	1						1	1		
Foraminifera sp. 6	Forams																				
Foraminifera sp. 7	Forams			1	2	1	9	4	1	2	5	1				1	1	13		1	2
Foraminifera sp. 8	Forams																				
Cnidaria	Corals																				
Plathyhelminthes	Flatworms																				
Gastrotricha	Hairybacks																				
Gnathostomulida	Jaw worms																				
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads																				
Nematoda	Roundworms											2		1		2					
Tardigrada	Water bears																				
Annelida																					
Oligochaeta	Earthworms																				
Polychaeta	Bristle worms																				
Bryozoa	Moss animals																				
Mollusca																					
Bivalvia	Bivalves							1													
Gastropoda	Gastropods							1							1						
Gastropoda spp.	Gastropods																				
Nudibranchia sp.	Nudibranchs																				
Nudibranchia sp.	Nudibranchs																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Arthropoda																					
Copepoda (other)	Other copepods																				
Copepods	Benthic copepods																				
Cumacea	Comma shrimps																				
Halacaridae	Marine mites																				
Ostracoda sp. 1	Seed shrimp	2	1	3	3	1	6	4		4	3	1		1	1	2		1	1	1	1
Ostracoda sp. 2	Seed shrimp			1																	
Ostracoda sp. 3	Seed shrimp					5		2										1			
Ostracoda sp. 4	Seed shrimp	1																			
Ostracoda sp. 5	Seed shrimp																				
Ostracoda sp. 6	Seed shrimp																				
Echinodermata	Echinoderms		2				2	5	1												
Chordata																					
Ascidiacea	Sea squirt																				
Tunicata	Tunicates																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site ZO4																					
Ciliophora																					
Karyorelictea	Primitive ciliates																				
Foraminifera																					
Foraminifera sp. 1	Forams	7	7				71	6	3	2	7	4	6	18	1	4	11	13	14	41	6
Foraminifera sp. 2	Forams	4		1			16	2	1		1			3						1	1
Foraminifera sp. 3	Forams						2			1	3										
Foraminifera sp. 4	Forams																				
Foraminifera sp. 5	Forams	8	1		1		55	6	17		1	1		1				1	4	2	1
Foraminifera sp. 6	Forams						1														
Foraminifera sp. 7	Forams	4	2	1		1	5		5	11	25			11	2	1	7	6	11	35	5
Foraminifera sp. 8	Forams						2		1												
Cnidaria	Corals																				
Plathyhelminthes	Flatworms		1																		
Gastrotricha	Hairybacks																				
Gnathostomulida	Jaw worms																				
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads																				
Nematoda	Roundworms	1										2	1			2					
Tardigrada	Water bears																				
Annelida																					
Oligochaeta	Earthworms																				
Polychaeta	Bristle worms																				
Bryozoa	Moss animals																				
Mollusca																					
Bivalvia	Bivalves						4														
Gastropoda	Gastropods						16				1			1	1					1	
Gastropoda spp.	Gastropods																				
Nudibranchia sp.	Nudibranchs																				
Nudibranchia sp.	Nudibranchs																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Arthropoda																					
Copepoda (other)	Other copepods																				
Copepods	Benthic copepods																				
Cumacea	Comma shrimps																				
Halacaridae	Marine mites																				
Ostracoda sp. 1	Seed shrimp	1	2		1		4		5	6	3			3	4	3	2	2	1	6	2
Ostracoda sp. 2	Seed shrimp	1																			
Ostracoda sp. 3	Seed shrimp		3		1				1		1							1	2	1	3
Ostracoda sp. 4	Seed shrimp																				
Ostracoda sp. 5	Seed shrimp																				
Ostracoda sp. 6	Seed shrimp																				
Echinodermata	Echinoderms						21	2	11												
Chordata																					
Ascidiacea	Sea squirt																				
Tunicata	Tunicates																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site ZO5																					
Ciliophora																					
Karyorelictea	Primitive ciliates																				
Foraminifera																					
Foraminifera sp. 1	Forams						37	9	3	7	2	12	5		16	9	7	6	28		7
Foraminifera sp. 2	Forams						5	2	4	1	1	1					1		3		
Foraminifera sp. 3	Forams		6	2	1	1	5		3						1				1		
Foraminifera sp. 4	Forams																				
Foraminifera sp. 5	Forams		1				9	3	2	2	2	1			1		1		2		1
Foraminifera sp. 6	Forams																				
Foraminifera sp. 7	Forams	1		1	1		8	4	2	8	3	5	3		6	1	4	16	11	1	11
Foraminifera sp. 8	Forams						1												1		
Cnidaria	Corals																				
Plathyhelminthes	Flatworms																				
Gastrotricha	Hairybacks																				
Gnathostomulida	Jaw worms																				
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads																				
Nematoda	Roundworms				2									6	1						
Tardigrada	Water bears																				
Annelida																					
Oligochaeta	Earthworms																				
Polychaeta	Bristle worms																				
Bryozoa	Moss animals																				
Mollusca																					
Bivalvia	Bivalves																				
Gastropoda	Gastropods																				
Gastropoda spp.	Gastropods																				
Nudibranchia sp.	Nudibranchs																				
Nudibranchia sp.	Nudibranchs																				

Family	Species	*Zostera*																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Arthropoda																					
Copepoda (other)	Other copepods																				
Copepods	Benthic copepods																				
Cumacea	Comma shrimps																				
Halacaridae	Marine mites																				
Ostracoda sp. 1	Seed shrimp	27	7	3	1	1	5	3		5	3	5	3	1	8	5	2		7		3
Ostracoda sp. 2	Seed shrimp																				
Ostracoda sp. 3	Seed shrimp		3				3				1					2			1		5
Ostracoda sp. 4	Seed shrimp	3	1		1																
Ostracoda sp. 5	Seed shrimp																				
Ostracoda sp. 6	Seed shrimp																				
Echinodermata	Echinoderms						4	9	8	3	2										
Chordata																					
Ascidiacea	Sea squirt																				
Tunicata	Tunicates																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site SB1																					
Ciliophora																					
Karyorelictea	Primitive ciliates																				
Foraminifera																					
Foraminifera sp. 1	Forams	1		1		2	2	8	1		2	8	1				4	1		2	2
Foraminifera sp. 2	Forams																			1	
Foraminifera sp. 3	Forams								1	1		3									
Foraminifera sp. 4	Forams																				
Foraminifera sp. 5	Forams			2	1							4					1		1		1
Foraminifera sp. 6	Forams																				
Foraminifera sp. 7	Forams	4	2	8		13	2	5	7	3	7	28	11	6			4		2	11	8
Foraminifera sp. 8	Forams					1						2									
Cnidaria	Corals																				
Plathyhelminthes	Flatworms																				
Gastrotricha	Hairybacks																				
Gnathostomulida	Jaw worms																				
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads																				
Nematoda	Roundworms																1				
Tardigrada	Water bears																				
Annelida																					
Oligochaeta	Earthworms																				
Polychaeta	Bristle worms																				
Bryozoa	Moss animals																				
Mollusca																					
Bivalvia	Bivalves																				
Gastropoda	Gastropods											1									1
Gastropoda spp.	Gastropods																				
Nudibranchia sp.	Nudibranchs																				
Nudibranchia sp.	Nudibranchs																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Arthropoda																					
Copepoda (other)	Other copepods																				
Copepods	Benthic copepods																				
Cumacea	Comma shrimps																				
Halacaridae	Marine mites																				
Ostracoda sp. 1	Seed shrimp	1	2	1	1												2	2	1	2	2
Ostracoda sp. 2	Seed shrimp																				
Ostracoda sp. 3	Seed shrimp			1	2	1															
Ostracoda sp. 4	Seed shrimp																				
Ostracoda sp. 5	Seed shrimp									1											
Ostracoda sp. 6	Seed shrimp		1									1									
Echinodermata	Echinoderms																				
Chordata																					
Ascidiacea	Sea squirt																				
Tunicata	Tunicates																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site SB2																					
Ciliophora																					
Karyorelictea	Primitive ciliates																				
Foraminifera																					
Foraminifera sp. 1	Forams	2	72	1	26	6	5	2	5	14	13	1	1	1	1		1	7	7	2	7
Foraminifera sp. 2	Forams		13				4			2							1				
Foraminifera sp. 3	Forams		4				2		1												
Foraminifera sp. 4	Forams																				
Foraminifera sp. 5	Forams	2	26	3	1		5			18	2						1		1		
Foraminifera sp. 6	Forams											1									
Foraminifera sp. 7	Forams	2	63	2	7	5	15	1	1	19	17	3	2	4	7	7	29	4	7		5
Foraminifera sp. 8	Forams		1			1					1				1		1				
Cnidaria	Corals				1																
Plathyhelminthes	Flatworms																				
Gastrotricha	Hairybacks																				
Gnathostomulida	Jaw worms																				
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads																				
Nematoda	Roundworms																			2	1
Tardigrada	Water bears																				
Annelida																					
Oligochaeta	Earthworms																				
Polychaeta	Bristle worms																				
Bryozoa	Moss animals																				
Mollusca																					
Bivalvia	Bivalves																				
Gastropoda	Gastropods						1			6	4								1		
Gastropoda spp.	Gastropods		1																		
Nudibranchia sp.	Nudibranchs																				
Nudibranchia sp.	Nudibranchs																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Arthropoda																					
Copepoda (other)	Other copepods																				
Copepods	Benthic copepods																				
Cumacea	Comma shrimps																				
Halacaridae	Marine mites																				
Ostracoda sp. 1	Seed shrimp		9	2					1	5	5						9	3			3
Ostracoda sp. 2	Seed shrimp					1															
Ostracoda sp. 3	Seed shrimp		3														2				
Ostracoda sp. 4	Seed shrimp		4																		
Ostracoda sp. 5	Seed shrimp		2																		
Ostracoda sp. 6	Seed shrimp		1	1																	
Echinodermata	Echinoderms					1															
Chordata																					
Ascidiacea	Sea squirt																				
Tunicata	Tunicates																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site SB3																					
Ciliophora																					
Karyorelictea	Primitive ciliates																				
Foraminifera																					
Foraminifera sp. 1	Forams	2	1	1	8	7	1	5	5	11	1	6	4	15	5	7	12	8	7	6	
Foraminifera sp. 2	Forams			1		1	1		1												
Foraminifera sp. 3	Forams	1																			
Foraminifera sp. 4	Forams																				
Foraminifera sp. 5	Forams		5	1	1	1	3	3	1	8	9	2	3					1		3	
Foraminifera sp. 6	Forams																				
Foraminifera sp. 7	Forams				3	5	6	6	4	6	21	1		8	4	5	11	9	7	2	
Foraminifera sp. 8	Forams	1									1										
Cnidaria	Corals																				
Plathyhelminthes	Flatworms			1																	
Gastrotricha	Hairybacks																				
Gnathostomulida	Jaw worms																				
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads																				
Nematoda	Roundworms			2					1												
Tardigrada	Water bears																				
Annelida																					
Oligochaeta	Earthworms																				
Polychaeta	Bristle worms		1																		
Bryozoa	Moss animals																				
Mollusca																					
Bivalvia	Bivalves																				
Gastropoda	Gastropods								2	3	2			1			1				
Gastropoda spp.	Gastropods																				
Nudibranchia sp.	Nudibranchs																				
Nudibranchia sp.	Nudibranchs																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Arthropoda																					
Copepoda (other)	Other copepods																				
Copepods	Benthic copepods																				
Cumacea	Comma shrimps																				
Halacaridae	Marine mites																				
Ostracoda sp. 1	Seed shrimp	5	5		2	1	2	1	1	3	2		3						2	2	
Ostracoda sp. 2	Seed shrimp																				
Ostracoda sp. 3	Seed shrimp																	2	2		2
Ostracoda sp. 4	Seed shrimp			1							1										
Ostracoda sp. 5	Seed shrimp																				
Ostracoda sp. 6	Seed shrimp							1													
Echinodermata	Echinoderms			1		1															
Chordata																					
Ascidiacea	Sea squirt																				
Tunicata	Tunicates																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site SB4																					
Ciliophora																					
Karyorelictea	Primitive ciliates																				
Foraminifera																					
Foraminifera sp. 1	Forams	8	5		8	2	5	1	15	7	37	14		5	9			6	13	7	1
Foraminifera sp. 2	Forams							2	1	1											
Foraminifera sp. 3	Forams							1													
Foraminifera sp. 4	Forams				1																
Foraminifera sp. 5	Forams				1			5	3		2				2		1		1	2	
Foraminifera sp. 6	Forams																				
Foraminifera sp. 7	Forams				3		4	7	3	4	3	7	1	1	5		1	5	8	7	4
Foraminifera sp. 8	Forams																				
Cnidaria	Corals																				
Plathyhelminthes	Flatworms																				
Gastrotricha	Hairybacks																				
Gnathostomulida	Jaw worms																				
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads																				
Nematoda	Roundworms			1													1				
Tardigrada	Water bears																				
Annelida																					
Oligochaeta	Earthworms																				
Polychaeta	Bristle worms																				
Bryozoa	Moss animals																				
Mollusca																					
Bivalvia	Bivalves																				
Gastropoda	Gastropods						1				2										
Gastropoda spp.	Gastropods																				
Nudibranchia sp.	Nudibranchs																				
Nudibranchia sp.	Nudibranchs																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Arthropoda																					
Copepoda (other)	Other copepods																				
Copepods	Benthic copepods																				
Cumacea	Comma shrimps																				
Halacaridae	Marine mites																				
Ostracoda sp. 1	Seed shrimp	1			1		1				4						1			1	2
Ostracoda sp. 2	Seed shrimp				2																
Ostracoda sp. 3	Seed shrimp																		1		
Ostracoda sp. 4	Seed shrimp																				
Ostracoda sp. 5	Seed shrimp																				
Ostracoda sp. 6	Seed shrimp																				
Echinodermata	Echinoderms	1				1															
Chordata																					
Ascidiacea	Sea squirt																				
Tunicata	Tunicates																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site SB5																					
Ciliophora																					
Karyorelictea	Primitive ciliates			1																	
Foraminifera																					
Foraminifera sp. 1	Forams	16	1	11	2	6	25	25	11	47	22	5	4	4	3	3	1	1		8	5
Foraminifera sp. 2	Forams						3			3										1	1
Foraminifera sp. 3	Forams																				
Foraminifera sp. 4	Forams																				
Foraminifera sp. 5	Forams	13		6	1	6	1	4	4	1		1	1	2	2				2	1	3
Foraminifera sp. 6	Forams														1						
Foraminifera sp. 7	Forams	15	1	2		2	4	8	4	23	3	7	8	3	6	8	4	1	5	4	6
Foraminifera sp. 8	Forams									1										1	
Cnidaria	Corals	2		1		2															
Plathyhelminthes	Flatworms																				
Gastrotricha	Hairybacks																				
Gnathostomulida	Jaw worms																				
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads																				
Nematoda	Roundworms																				
Tardigrada	Water bears																				
Annelida																					
Oligochaeta	Earthworms																				
Polychaeta	Bristle worms			1		1															
Bryozoa	Moss animals																				
Mollusca																					
Bivalvia	Bivalves	1				1															
Gastropoda	Gastropods						1	1		4							1		1		
Gastropoda spp.	Gastropods																				
Nudibranchia sp.	Nudibranchs																				
Nudibranchia sp.	Nudibranchs																				

Family	Species	Sand bioturbation																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Arthropoda																					
Copepoda (other)	Other copepods																				
Copepods	Benthic copepods																				
Cumacea	Comma shrimps																				
Halacaridae	Marine mites																				
Ostracoda sp. 1	Seed shrimp	2				2				2	1						2			1	4
Ostracoda sp. 2	Seed shrimp															1					
Ostracoda sp. 3	Seed shrimp																1	1			
Ostracoda sp. 4	Seed shrimp																				
Ostracoda sp. 5	Seed shrimp																				
Ostracoda sp. 6	Seed shrimp																				
Echinodermata	Echinoderms				1					2											
Chordata																					
Ascidiacea	Sea squirt	3																			
Tunicata	Tunicates																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site SI1																					
Ciliophora																					
Karyorelictea	Primitive ciliates																				
Foraminifera																					
Foraminifera sp. 1	Forams	6	1	6	8	2	1	13	43	15	37	18	9	5	4	3	21		5	2	14
Foraminifera sp. 2	Forams								5		2						9	5	1		6
Foraminifera sp. 3	Forams								4		2				1						
Foraminifera sp. 4	Forams																				
Foraminifera sp. 5	Forams	1		1	1	2	1		12	3	11		2				17	1	4		7
Foraminifera sp. 6	Forams		2	1	1			1													
Foraminifera sp. 7	Forams						12	3	4	13	36	11			2		27	4	4		9
Foraminifera sp. 8	Forams								1		1										
Cnidaria	Corals																				
Plathyhelminthes	Flatworms																				
Gastrotricha	Hairybacks																				
Gnathostomulida	Jaw worms																				
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads																				
Nematoda	Roundworms			3		1												2			1
Tardigrada	Water bears																				
Annelida																					
Oligochaeta	Earthworms																				
Polychaeta	Bristle worms																				
Bryozoa	Moss animals	1																			
Mollusca																					
Bivalvia	Bivalves										1										
Gastropoda	Gastropods										1	1									
Gastropoda spp.	Gastropods																				
Nudibranchia sp.	Nudibranchs																				
Nudibranchia sp.	Nudibranchs																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Arthropoda																					
Copepoda (other)	Other copepods																				
Copepods	Benthic copepods																				
Cumacea	Comma shrimps																				
Halacaridae	Marine mites																				
Ostracoda sp. 1	Seed shrimp		5	5	3		2	2	7	3	16						1	1	1		
Ostracoda sp. 2	Seed shrimp	2																			
Ostracoda sp. 3	Seed shrimp							7	4	5	2										
Ostracoda sp. 4	Seed shrimp																				
Ostracoda sp. 5	Seed shrimp	1	1	2							1										1
Ostracoda sp. 6	Seed shrimp							1													
Echinodermata	Echinoderms						1		3		6										
Chordata																					
Ascidiacea	Sea squirt																				
Tunicata	Tunicates																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site SI2																					
Ciliophora																					
Karyorelictea	Primitive ciliates																				
Foraminifera																					
Foraminifera sp. 1	Forams	2	3				13	7	7	12	1	2	2	3	2	4	7	5	4	1	13
Foraminifera sp. 2	Forams	4		2	4	2	1	1		2							6	2	4	2	2
Foraminifera sp. 3	Forams				1	1					2										
Foraminifera sp. 4	Forams	4		3																	
Foraminifera sp. 5	Forams	1					9	1	2	3	1			1			5	4	5		2
Foraminifera sp. 6	Forams	1	3																		
Foraminifera sp. 7	Forams			4			23	26	8	28	27			6	3	2	2	2	11	13	45
Foraminifera sp. 8	Forams			1	1	1	1	3	1	3	1						1	1		4	1
Cnidaria	Corals																				
Plathyhelminthes	Flatworms																				
Gastrotricha	Hairybacks																				
Gnathostomulida	Jaw worms																				
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads																				
Nematoda	Roundworms																3				
Tardigrada	Water bears																				
Annelida																					
Oligochaeta	Earthworms																				
Polychaeta	Bristle worms	2	2	1	1																
Bryozoa	Moss animals																				
Mollusca																					
Bivalvia	Bivalves										1										
Gastropoda	Gastropods						2	1		1										1	
Gastropoda spp.	Gastropods																				
Nudibranchia sp.	Nudibranchs																				
Nudibranchia sp.	Nudibranchs																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Arthropoda																					
Copepoda (other)	Other copepods																				
Copepods	Benthic copepods																				
Cumacea	Comma shrimps																				
Halacaridae	Marine mites																				
Ostracoda sp. 1	Seed shrimp	2	5	3	2	2	8	1	4	8	9								1	1	5
Ostracoda sp. 2	Seed shrimp																				
Ostracoda sp. 3	Seed shrimp						2	3		2	2										
Ostracoda sp. 4	Seed shrimp																				
Ostracoda sp. 5	Seed shrimp	1					1		1	1	3										
Ostracoda sp. 6	Seed shrimp	1	2								1										
Echinodermata	Echinoderms						5			1											
Chordata																					
Ascidiacea	Sea squirt																				
Tunicata	Tunicates										1										

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site SI3																					
Ciliophora																					
Karyorelictea	Primitive ciliates																				
Foraminifera																					
Foraminifera sp. 1	Forams	2	2	2	8	3	4	15	31	9	3	7	8	2	5	12	1	2		2	
Foraminifera sp. 2	Forams										5						1		2	3	
Foraminifera sp. 3	Forams							5	1	1											
Foraminifera sp. 4	Forams								1										1	2	1
Foraminifera sp. 5	Forams	1			3	1	3		5	2	13		2			2	5			6	
Foraminifera sp. 6	Forams																				
Foraminifera sp. 7	Forams	2	1		2		19	27	22	15	34	7	5	1	1	11	5		2	8	1
Foraminifera sp. 8	Forams						2	2	1	1	1		1				1				
Cnidaria	Corals																				
Plathyhelminthes	Flatworms		1																		
Gastrotricha	Hairybacks																				
Gnathostomulida	Jaw worms																				
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads																				
Nematoda	Roundworms			1													1		1	1	
Tardigrada	Water bears																				
Annelida																					
Oligochaeta	Earthworms																				
Polychaeta	Bristle worms																				
Bryozoa	Moss animals																				
Mollusca																					
Bivalvia	Bivalves																				
Gastropoda	Gastropods							1	1					1	1	1					
Gastropoda spp.	Gastropods																				
Nudibranchia sp.	Nudibranchs																				
Nudibranchia sp.	Nudibranchs																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Arthropoda																					
Copepoda (other)	Other copepods																				
Copepods	Benthic copepods																				
Cumacea	Comma shrimps																				
Halacaridae	Marine mites																				
Ostracoda sp. 1	Seed shrimp	1	3		4	2	5	12	16	3	13	1				1	1				
Ostracoda sp. 2	Seed shrimp		1																		
Ostracoda sp. 3	Seed shrimp		1				1	5	3	2											
Ostracoda sp. 4	Seed shrimp																				
Ostracoda sp. 5	Seed shrimp						1	3	1		1										
Ostracoda sp. 6	Seed shrimp							1			1										
Echinodermata	Echinoderms						4	3		1	2										
Chordata																					
Ascidiacea	Sea squirt																				
Tunicata	Tunicates																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site SI4																					
Ciliophora																					
Karyorelictea	Primitive ciliates																				
Foraminifera																					
Foraminifera sp. 1	Forams	2	4		2		3	9	2	21	9	3	4	2	1	1			1		
Foraminifera sp. 2	Forams								2	3	3						1				
Foraminifera sp. 3	Forams				1		3	1		1	1										
Foraminifera sp. 4	Forams						2														
Foraminifera sp. 5	Forams	2	1				4	1	2	1	7										
Foraminifera sp. 6	Forams	1			2	1															
Foraminifera sp. 7	Forams		1	1			31	28	19	31	12	1	8		2		2	1	1		2
Foraminifera sp. 8	Forams						1	1		3	1									1	
Cnidaria	Corals																				
Plathyhelminthes	Flatworms																				
Gastrotricha	Hairybacks		1		1																
Gnathostomulida	Jaw worms																				
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads																				
Nematoda	Roundworms	1																	1		
Tardigrada	Water bears																				
Annelida																					
Oligochaeta	Earthworms																				
Polychaeta	Bristle worms						1				1										
Bryozoa	Moss animals																				
Mollusca																					
Bivalvia	Bivalves																				
Gastropoda	Gastropods							1		2			1			2					
Gastropoda spp.	Gastropods																				
Nudibranchia sp.	Nudibranchs																				
Nudibranchia sp.	Nudibranchs																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Arthropoda																					
Copepoda (other)	Other copepods																				
Copepods	Benthic copepods																				
Cumacea	Comma shrimps																				
Halacaridae	Marine mites																				
Ostracoda sp. 1	Seed shrimp	4	1	1			15	9	6	11	9		1								
Ostracoda sp. 2	Seed shrimp																				
Ostracoda sp. 3	Seed shrimp						4	3	1	4	1										
Ostracoda sp. 4	Seed shrimp																				
Ostracoda sp. 5	Seed shrimp	2					7		3	6	5										
Ostracoda sp. 6	Seed shrimp						1														
Echinodermata	Echinoderms						1			5	1										
Chordata																					
Ascidiacea	Sea squirt																				
Tunicata	Tunicates																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Site SI5																					
Ciliophora																					
Karyorelictea	Primitive ciliates			1																	
Foraminifera																					
Foraminifera sp. 1	Forams						8	25	29	41	59	3	2	4	1	1	2	5	2		2
Foraminifera sp. 2	Forams	2	3			1	2	2	6	6	5						3	1			1
Foraminifera sp. 3	Forams		3	1		2		1	3	1	2										
Foraminifera sp. 4	Forams	1		3	4														4		4
Foraminifera sp. 5	Forams	1	1		1	1		5	14	8	26		1					1			1
Foraminifera sp. 6	Forams		1							1											
Foraminifera sp. 7	Forams			1			6	15	27	29	52						5	9	2		1
Foraminifera sp. 8	Forams		1					1	1	2											
Cnidaria	Corals																				
Plathyhelminthes	Flatworms																				
Gastrotricha	Hairybacks																				
Gnathostomulida	Jaw worms																				
Kinorhyncha																					
Coreifera	Mud dragons																				
Loricifera	Brush heads																				
Nematoda	Roundworms																				1
Tardigrada	Water bears																				
Annelida																					
Oligochaeta	Earthworms																				
Polychaeta	Bristle worms																				
Bryozoa	Moss animals																				
Mollusca																					
Bivalvia	Bivalves																				
Gastropoda	Gastropods						1			2	1		1								1
Gastropoda spp.	Gastropods																				
Nudibranchia sp.	Nudibranchs																				
Nudibranchia sp.	Nudibranchs																				

Family	Species	Sand invertebrates																			
		Summer					Autumn					Winter					Spring				
		A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Arthropoda																					
Copepoda (other)	Other copepods																				
Copepods	Benthic copepods																				
Cumacea	Comma shrimps																				
Halacaridae	Marine mites																				
Ostracoda sp. 1	Seed shrimp	5	5	14		4	7	4	14	2	11	1						2			
Ostracoda sp. 2	Seed shrimp																				
Ostracoda sp. 3	Seed shrimp				1		1	3	5	3	5						1				
Ostracoda sp. 4	Seed shrimp		1	1	2																
Ostracoda sp. 5	Seed shrimp			1																	
Ostracoda sp. 6	Seed shrimp	1							3	1	3										
Echinodermata	Echinoderms							4	2	3	8										
Chordata																					
Ascidiacea	Sea squirt																				
Tunicata	Tunicates																				

Appendix G-4:

Mullaquana Station Mangrove Baseline Report

Cooe
Care Of Our Environment

PREPARED FOR J DIVERSITY

MULLAQUANA STATION MANGROVE BASELINE 2025

Final Report

V3 - 01 July 2026

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Document Information	
Client	Prepared for J Diversity
Project	Mullaquana Station Mangrove Baseline 2025
Document Title	Final Report
Document Distribution Date	1/07/2026
Document Version	V3 - 01 July 2026
File Name	JBD.MUL.002_Final report_V3

Document Control					
Version	**Issue Date**	**Author/s**	**Reviewer/s**	**Date Reviewed**	**Amendment Type**
V1.0	16/12/2025	NJ	GB	28/01/2026	Draft for internal review
V1.1	02/02/2026	NJ	JM	03/02/2026	Draft for client review
V1.2	16/02/2026	NJ	GB	16/02/2026	Final
V1.3	19/02/2026	NJ	GB	19/02/2026	Final with JBD and JBS&G text
V1.4	19/02/2026	NJ	GB	19/02/2026	Final address JBS&G edits
V2	11/05/2026	NJ	GB	11/05/2026	Final address DIT edits
V3	01/07/2026	NJ	GB	01/07/2026	Final – address Prof Gillanders review comments

Distribution			
Version	**Issue Date**	**Copies, Format**	**Recipient/s**
V1.1	04/02/2026	Soft copy via email	J Diversity, James Brook
V1.2	17/02/2026	Soft copy via email	J Diversity, James Brook
V1.3	19/02/2026	Soft copy via email	J Diversity & JBS&G
V1.4	19/02/2026	Soft copy via email	J Diversity & JBS&G
V2	11/05/2026	Soft copy via email	J Diversity & JBS&G
V3	01/07/2026	Soft copy via email	J Diversity & JBS&G

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ABBREVIATIONS

α	Significance Level
% CC	Percentage Canopy Cover
ANOSIM	Analysis of Similarities
cm	Centimetres
C	Canopy cover used in THI/THI$^+$ calculations
C_n	Normalised canopy area/cover used in THI/THI$^+$ calculations
DBH	Diameter at Breast Height (tree stem diameter measured at 1.3 m above ground)
D	Stem diameter used in THI/THI$^+$ calculations
D_n	Normalised stem diameter used in THI/THI$^+$ calculations
DO	Dissolved Oxygen
GL/y	Giga litres per year
GPS	Global Positioning System
HAB	Harmful Algal Bloom
H	Tree height used in THI/THI$^+$ calculations
H_n	Normalised tree height used in THI/THI$^+$ calculations
JBS&G	Lead consultant for Northern Water marine impact assessment
km	Kilometres
L	leaf colour (chlorosis/greenness) score in THI$^+$
L_n	Normalised leaf colour (chlorosis/greenness) score in THI$^+$
m^2	Square metres
mm	Millimetres
NTU	Nephelometric Turbidity Unit
PERMANOVA	Permutational Analysis of Variance
PPE	Personal Protective Equipment
SA	South Australia
SE	Standard Error
S	Stress/dieback score in THI$^+$
S_n	Normalised stress/dieback score in THI$^+$
THI	Tree Health Index
THI$^+$	Enhanced Tree Health Index (THI including foliage colour and stress/dieback)
TO	Traditional Owners (Barngarla and Kokatha in this report context)
USG	Upper Spencer Gulf
w_h	weight applied to tree height (H_n)

w_d	weight applied to diameter/DBH (D_n)
w_c	weight applied to canopy cover (C_n)
w_l	weight applied to leaf condition (L_n)
w_s	weight applied to stress/dieback (S_n)

EXECUTIVE SUMMARY

The 2025 seasonal mangrove surveys at Mullaquana Station provide the first complete annual baseline of mangrove condition within the proposed Northern Water Project Area. The study documented mangrove structure, health, recruitment and associated fauna across 10 sites. Together, these data establish a robust reference condition against which future project-related change can be assessed.

The survey area is characterised by extensive tidal flats intersected by tidal creeks, supporting both South Australian subspecies of *Avicennia marina*. Mangrove condition across the study area ranged from moderate to excellent. Enhanced Tree Health Index (THI^{+}) scores spanned 0.59–0.67 for most sites, indicating moderate–good health, while T7 (0.74) and T2 (0.80) reflected very good to excellent condition. Seasonal variability in overall mangrove health metrics was minor, with no statistically significant differences detected among seasons for mangrove height, canopy cover or composite health scores.

Some individual health indicators—specifically leaf condition and infauna/epifauna presence—showed inconsistent but statistically detectable seasonal differences. These fluctuations most likely reflect short-term environmental factors including storm-driven branch loss, seasonal crab activity, and varying tidal influence.

Recruitment was limited across most of the study area. Seedling densities were very low and highly patchy, with only T2, T18 and parts of T1 supporting consistent seedling presence. Pneumatophore density and height varied predictably with hydrodynamic setting, reflecting sediment oxygen conditions and inundation frequency.

Collectively, these findings describe a mangrove community that is structurally diverse, largely healthy, and subject to natural seasonal variability. They provide a defensible baseline for comparison should the Northern Water project proceed to construction and operational monitoring stages.

1. INTRODUCTION

Northern Water (The Project) aims to provide a secure, climate resilient water source for industry in South Australia's (SA) Upper Spencer Gulf (USG) and Far North of South Australia. The Project would enable the growth of industries and key mining resources crucial for contributing to decarbonisation initiatives, sustainability and unlocking long-term economic prosperity for South Australia.

Delivery of The Project will involve the construction and operation of a 51 GL/y seawater reverse osmosis desalination plant and associated marine structures, a water transfer system and required power supply infrastructure. The proposed desalination plant location is on the western shore of the USG at Mullaquana Station, approximately 25 km south-west of central Whyalla, and the water transfer system runs generally north from the desalination plant to delivery points at the Olympic Dam and Carrapateena copper-gold mines.

J Diversity, subcontracting to lead consultants JBS&G, commissioned COOE Pty Ltd (COOE) to prepare a final baseline mangrove conditions report for the 2025 Mullaquana Station mangrove surveys. This report is not an impact assessment of the project but will be used by JBS&G to support the marine impact assessment being undertaken for The Project. Specifically, this report investigates and summarises the data collected in 2025 across four seasons (Summer, Autumn, Winter and Spring) for the mangrove monitoring program designed to track and assess the condition of mangrove communities within a stipulated study area at Mullaquana Station (Table 1).

Table 1 Summary of seasonal mangrove surveys completed at Mullaquana.

Season	Dates surveyed	Weather conditions
Summer	February 19 – 21, 2025	Warm, sunny with moderate – strong winds
Autumn	April 30 – May 1, 2025	Cool-mild, sunny with moderate – strong winds
Winter	August 11 – 12, 2025	Cool, sunny with moderate – strong winds
Spring	November 18 – 19, 2025	Warm, sunny with moderate – strong winds

Within SA there are two varieties of mangrove, both subspecies of *Avicennia marina*, the Grey Mangrove. The two subspecies are very similar in appearance with the dominant variant *Avicennia marina marina* having paler broader leaves compared to the more elongated, narrower glossy dark green pointed leaves with smaller flowers of the *Avicennia marina var. australasica; Australasica* is also the only mangrove taxon growing at the highest latitude for mangroves in the world (Duke, 1991; Duke, 2006). Both subspecies of *Avicennia* have been identified at Mullaquana Station during these 2025 seasonal surveys.

2. SURVEY METHODS

2.1 Site selection

Eighteen sites were initially identified within a 50-hectare study area specified by the client and aerial imagery captured by J Diversity drone survey during the February 2025 Summer survey. Site selection was stratified to capture representative areas across tidal zones (lower, middle, upper) and different habitat types (e.g. tidal flat, tidal creek, sandy beach, sand dune).

Following initial site reconnaissance, 18 sites* were identified to represent key habitats and tidal zones Figure 1 and Table 2. Of these, 10 sites were selected for ongoing monitoring across all four seasonal surveys based on accessibility and representativeness. Transects in yellow, green and blue were

retained as they represent upper, mid and lower tidal ranges respectively. For retained sites, transect origins coincide with permanent photo point locations (e.g. P1 = T1).*Maps of the 18 sites are depicted in Appendix A.

Table 2 Co-ordinates of the 18 sites surveyed at Mullaquana Station.

Site	Co-ordinates	
P1 / T1	S 33°13'30.30", E 137°25'56.39"	Upper (High tide limit)
P2 / T2	S 33°13'26.45", E 137°26'00.66"	Upper (High tide limit)
P3	S 33°13'33.67", E 137°25'55.79"	Only surveyed in Summer and Autumn
P4	S 33°13'21.03", E 137°26'10.26"	Only surveyed in Summer and Autumn
P5	S 33°13'20.86", E 137°26'11.36"	Only surveyed in Summer and Autumn
P6	S 33°13'22.76", E 137°26'11.52"	Only surveyed in Summer and Autumn
P7 / T7	S 33°14'03.04", E 137°25'42.61"	Mid zone tidal creeks
P8 / T8	S 33°14'03.28", E 137°25'44.07"	Mid zone tidal creeks
P9 / T9	S 33°13'59.74", E 137°25'48.61"	Mid zone tidal creeks
P10 / T10	S 33°13'57.46", E 137°25'48.75"	Mid zone tidal creeks
P11	S 33°13'55.95", E 137°25'49.93"	Only surveyed in Summer and Autumn
P12 / T12	S 33°13'54.63", E 137°25'53.74"	Lower (Foreshore/wave zone)
P13 / T13	S 33°13'53.11", E 137°25'57.96"	Lower (Foreshore/wave zone)
P14 / T14	S 33°13'50.30", E 137°26'00.61"	Lower (Foreshore/wave zone)
P15	S 33°13'47.96", E137°26'04.15"	Only surveyed in Summer and Autumn
P16	S 33°13'35.93", E 137°25'50.11"	Only surveyed in Summer and Autumn
P17	S 33°13'51.97", E 137°25'38.53"	Only surveyed in Summer and Autumn
P18 / T18	S 33°13'35.88", E 137°25'54.25"	Upper (High tide limit)

The colour coded site ID (matches Figure 1 coding):

- Yellow = Upper (High tide limit).
- Green = Mid zone tidal creeks.
- Blue = Lower (Foreshore/wave zone).
- Pale red = Only surveyed in Summer and Autumn.



Figure 1. Map depicting the location of transects along photo points inside the survey area at Mullaquana Station. Image taken in Spring 2025. Source: J Diversity Pty Ltd. Refer to Table 1 for coordinates of P or T

At each of the 10 sites, linear transects, quadrats, and permanent photo points were used to survey the mangrove community. Surveys were completed during daytime low tides (Table 2, see Appendix B for tide heights in each season). The orientation of the transects generally ran perpendicular to the shore.

The survey methods described below were adapted from the guidelines outlined in Schwarz et al. (2005). These methods were used in Mullaquana Station mangrove surveys because it offers a practical, scientifically informed method for consistent long-term monitoring of mangrove habitats. It is especially suitable in regions with limited resources that need meaningful ecological data collection over time. Its successful application in New Zealand estuaries with comparable intertidal dynamics underscores its methodological transferability to South Australian conditions.

1. Relevant Habitat Characteristics

The Upper Spencer Gulf features tidal estuarine systems with mangroves, mudflats, and seagrass beds like the estuarine systems described in Schwarz et al. (2005). Key ecological processes like sediment accretion, epifaunal diversity, and mangrove expansion are common to both contexts.

2. Fit-for-purpose for Baseline Monitoring

Schwarz's protocol provides a low-cost, repeatable, and scientifically grounded method for collecting baseline data in remote or community-led monitoring settings, especially useful in data-scarce areas like parts of Upper Spencer Gulf.

3. Methodological Rigor with Flexibility

It includes:

- Permanent transects to track boundary shifts.
- Tree/sapling/seedling counts to assess recruitment and dieback.
- Epifauna surveys using quadrats.

These methods are scientifically robust but simplified enough to be implemented without requiring laboratory facilities or advanced instrumentation.

2.2 Linear transects

At each of the 10 all seasons transect sites, a 25-metre linear transect was surveyed. Each transect was walked out and data recorded at five metre intervals (n = 6); the presence/absence of infauna and epifauna, percentage mangrove canopy cover, mangrove leaf colour/condition and average mangrove tree height were quantified.

In this study, infauna was considered present when fresh invertebrate burrows or diggings (crabs, worms) were observed, while epifauna was considered present when invertebrates (snails, barnacles, mussels) were observed attached to mangrove pneumatophores, trunks or branches. The identification of all mobile and sessile invertebrates ≥ 4 mm size was recorded to species level (Janetzki et al. 2021). The presence/absence of infauna and epifauna was assessed visually in a 2 m² area either side of the transect. The presence/absence of infauna and epifauna was ranked on a scale of 0 – 5, where 0 represented neither infauna or epifauna present and 5 represented both infauna and epifauna present. A score of 3 was used when either infauna or epifauna (but not both) were present.

Once the infauna and epifauna presence/absence was established in the 2 m² areas either side of the transect, mangrove canopy coverage, leaf health and tree height were also recorded. Percentage mangrove canopy cover was estimated in this study using visual observation of canopy cover. A densiometer was not used because the tree height and low canopy cover made it impractical to get under trees to be used in this survey. Percentage mangrove canopy cover was ranked on a scale of 0 – 5, where 0 represented no mangrove canopy cover (no mangroves present or dead bare branched trees only) and 5 represented mangrove canopy cover of 100%. Intermediate scores of 1 represented <25 % mangrove canopy cover, 2 represented 25–50% mangrove canopy cover, 3 represented 50–75% mangrove canopy cover, and 4 represented >75% mangrove canopy cover.

Leaf colour/condition was assessed visually in the same 2 m² area either side of the transect. Leaf colour/condition was ranked on a scale of 0 – 5, where 0 represented poor leaf condition (no mangroves present or dead trees only) and 5 represented healthy bright green leaves (). Intermediate scores of 1 and 2 represented poor leaf condition with leaves that were stressed and brown with obvious signs of tree dieback (Table 3). Scores of 3 and 4 represented intermediate to good leaf condition with leaves showing some signs of stress and yellowing or chlorosis (or yellowing of plant leaves due to insufficient chlorophyll production (Table 3). The approximate height of mangrove trees was estimated to the nearest 10 cm using a vertical measure to provide an average mangrove tree height measurement in centimetres.

2.3 Health indices

Two different approaches were used to investigate the overall health of the mangrove community at each site using the measurements collected from linear transects during each of the four seasonal surveys commencing at the end of Summer (February 2025) through to Spring (November 2025). An overall health score for mangroves at each interval along each transect was calculated by summing the weighted measurements of infauna and epifauna presence (weight = 0.1), canopy cover (weight = 0.4) and leaf condition (weight = 0.5). Using this weighting system, the mangroves at each interval along each contract were assigned an overall health score between 0 and 5.

During the final seasonal survey (Spring only), mangrove Diameter at Breast Height (DBH) was measured for five trees haphazardly selected adjacent to linear transects.

Established mangrove carbon inventory protocols were followed to acquire tree level structural data within fixed plots. For each live tree ≥2 cm DBH, total height (H), diameter at breast height (DBH),

diameter above ground just below first branching, visually delineated crown/canopy area (C), leaf colour (L) as a proxy for chlorophyll and disease/stress/dieback (S) as per the visual assessment methods described above were recorded.

The prioritisation of diameter metrics is grounded in mangrove allometry: site and species-specific studies consistently find DBH to be the strongest predictors of above-ground biomass, with height and crown area providing additional explanatory power depending on growth form and region (Komiyama et al., 2008; Owers et al. 2018; Jones et al. 2020).

The foliage condition and crown integrity rankings collected during the seasonal surveys function as categorical variables designed to be scored rapidly and reproducibly in mangrove plots. Leaf colour/greenness classes (L) were adapted from forestry crown health guidance (healthy green; slight chlorosis (i.e. yellowing due to lack of chlorophyll); severe chlorosis/necrosis; defoliated) and crown damage/stress classes (S) captured dieback, lesions, and pest/disease evidence. These categories align with operational visual indicators widely used in forest health monitoring (crown dieback, crown density/transparency, leaf discoloration, defoliation and vigour) and are appropriate for rapid condition assessment (USDA Forest Service 2020).

A structural Tree Health Index (THI) and an Enhanced Tree Health Index (THI^+) incorporating foliage and stress terms were computed:

$$THI = w_h H_n + w_d D_n + w_c C_n$$

$$THI^+ = w_h H_n + w_d D_n + w_c C_n + w_l L_n + w_s S_n$$

where H_n, D_n and C_n are normalised height, diameter (DBH) and canopy cover; L_n is the normalised leaf-colour score (or corresponding spectral proxy when available); S_n is the normalised disease/stress score. Weights ($\mathbf{W_h}$, $\mathbf{W_d}$, $\mathbf{W_c}$, $\mathbf{W_l}$, $\mathbf{W_s}$) are non-negative and sum to 1.

A priori weights were set to emphasise structural predictors known to relate most strongly to biomass and mechanical vigour in mangroves, while still capturing foliage and stress symptoms. $\mathbf{W_h}$, $\mathbf{W_d}$, $\mathbf{W_c}$, $\mathbf{W_l}$, $\mathbf{W_s}$ = weighting coefficients assigned to each variable in the index, representing their relative importance:

- $\mathbf{W_d} \geq \mathbf{W_h}, \mathbf{W_c}$ because diameter is the most reliable single predictor of above-ground biomass across sites and species (Komiyama et al. 2008; Jones et al. 2020).

- $\mathbf{W_h}$ reflects growth vigour and exposure effects; $\mathbf{W_c}$ reflects photosynthetic apparatus and competitive status; together, these structural terms have documented associations with carbon stocks and condition (Owers et al. 2018).

- w_l and w_s are moderate, acknowledging that crown symptoms and pigment changes are early indicators of stress and decline and can be operationalised in plot surveys (USDA Forest Service 2020).

While THI/THI^+ are new formulations, they are methodologically analogous to multicriteria health and suitability indices used in mangrove monitoring (e.g., Mangrove Health Index, which integrates structure and spectral indicators), and to remote sensing health/stress overlays that combine multiple indices via weights (Zakiyah et al. 2025; Hati et al. 2021).

Using an average of the mangrove diameters taken during the Spring Survey, DBH was calculated at each site using these five measurements. For each site in Spring, averaged DBH, averaged tree height, averaged canopy cover, averaged leaf colour score and averaged disease/stress score was used to determine a score for mangrove health at each site using the Enhanced Tree Health Index (THI^+):

$$THI^+ = w_h H_n + w_d D_n + w_c C_n + w_l L_n + w_s S_n$$

Where:

- H_n = Normalised height (averaged tree height ÷ max observed height)
- D_n = Normalised DBH (averaged DBH ÷ max observed DBH)
- C_n = Normalised canopy cover (averaged actual canopy area ÷ max observed canopy area)
- L_n = Normalised leaf colour score (Scale: Healthy green = 1.0; Slight yellowing = 0.7; Severe chlorosis = 0.3; Defoliated = 0.0)
- S_n = Normalised disease/stress score (Scale: No signs = 1.0; Minor spots = 0.8; Moderate lesions = 0.5; Severe dieback = 0.0).

Weights of 0.3 were used for averaged DBH,

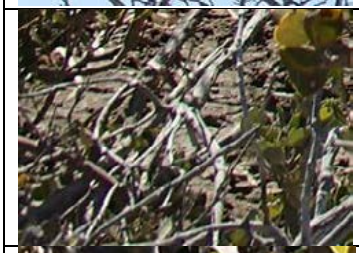
0.2 for averaged tree height (H_n),

0.2 for averaged canopy cover (C_n),

0.15 for averaged leaf colour score (L_n) and

0.15 for averaged disease/stress score (S_n).

Table 3 Mangrove leaf condition scale (0 – 5).

Representative image	Scale value & description
	**0** **Dead/bare**
	**1** **Very poor leaf condition, most leaves severely stressed and brown, large areas of dieback observed**
	**2** **Poor leaf condition, some leaves stressed and brown, some dieback observed**
	**3** **Intermediate leaf condition, most leaves with some stress and yellowing, small areas of dieback observed**
	**4** **Good leaf condition, some yellowing or stressed leaves, no areas of dieback observed**
	**5** **Excellent leaf condition, healthy bright green leaves, no dieback**

2.4 Quadrats

At three intervals (5, 15 and 25 metres) along each 25-metre linear transect, a 50 x 50 cm quadrat was surveyed to measure the density, height and diameter of mangrove seedlings and pneumatophores. For each quadrat, a count of seedlings and pneumatophores was made. For the ten tallest seedlings (if present) and pneumatophores in each quadrat, their height to the nearest cm was measured using a ruler and their diameter to the nearest mm was measured using digital callipers. In this study, a mangrove seedling was described as any small mangrove that consisted of only a single stem and had not developed any branches. It is to be noted that seedling or pneumatophores were absent along some transects, either due to substrate or hydrogeological effects including storm events either preventing them establishing or covering them between seasons.

Pneumatophore densities were measured in this survey as they are an indicator of hydrology*, soil conditions and mangrove health. For example, pneumatophore height and density are positively correlated to flooding levels and can be used as indicators of soil and hydrodynamics conditions in mangroves where taller and higher density pneumatophores indicate regular inundation and tidal flows. Areas with no or low pneumatophores can indicate thick anaerobic muds and or minimal tidal influence (as was observed at the supratidal site P17 that was only surveyed in summer and autumn and is only inundated during winter or extreme tidal events).

Seedling density and condition were measured in this survey as indicators of mangrove recruitment and community succession.

**Pneumatophore counts (density) act as an indicator for both hydrology and hydrodynamics, as these aerial roots are phenotypic responses designed to manage both the oxygen-deficient soil (hydrology) and the water flow/sedimentation (hydrodynamics) of the intertidal zone.*

Pneumatophore abundance is closely linked to soil oxygen levels and moisture. Higher pneumatophore densities and lengths are often found in areas with higher sediment mud content and poorer aeration (more anaerobic conditions). They are highly adaptable to changes in the soil's hydrological regime and therefore changes in pneumatophore density can be used as an indicator for changing hydrology and subsoil conditions.

Pneumatophore density has been positively correlated with both high sediment mud content (low aeration) and the level of turbulence in the mangrove fringe.

Pneumatophores adapt their density to localised topographical changes in the intertidal zone, which alters the water flow and saturation levels.

Increased pneumatophore length and density are observed in response to both environmental stress (like high salinity) and increased water levels.

2.5 Zones

The survey area consists of low-gradient intertidal flats intersected by tidal creeks. These flats are subject to seasonal patterns of sediment accretion and erosion, which can obscure stable elevation benchmarks. The delineation of lower, middle, and upper intertidal zones was undertaken using a combination of field observations, local tidal knowledge, and geomorphic cues.

2.6 Permanent photo points

Photos were taken seasonally at a permanent photo point established at each site that was surveyed in all four seasons (Table 1, Figure 2). Four photos were taken at each photo point, with one photo facing north, east, south and west, respectively. The co-ordinates for each photo point are shown in Table 1 and mapped in Figure 2.

2.7 Statistical analyses

All analyses were completed using PRIMER v6/PERMANOVA+. For measurements of mangrove health (mangrove height, canopy cover, leaf condition, infauna and epifauna presence and overall scaled mangrove health score), raw data was normalised and resemblance matrices created using Euclidean distances. Differences ($\alpha = 0.05$) among seasons (Summer, Autumn, Winter, Spring) and sites (10 sites surveyed in all four seasons) were investigated using PERMutational ANalysis Of VAriance (PERMANOVA) for mangrove height and ANalysis Of SIMilarity (ANOSIM) for all other measurements. For PERMANOVA, all tests were completed using unrestricted permutation of raw data with 9999 permutations as described in Anderson et al. (2008). Seasons were considered a fixed factor and sites a random factor. For ANOSIM, when a significant difference was detected among seasons, pair-wise tests were used to determine which seasons were significantly different from each other.

For counts of pneumatophores and seedlings in quadrats, differences ($\alpha = 0.05$) among seasons and sites were evaluated using PERMANOVA. All tests of PERMANOVA were completed using permutations of residuals with 9999 permutations as described in Anderson et al. (2008). A square root transformation was applied, and Bray-Curtis resemblances were used. A dummy variable of 1 was added to seedling counts because of the sparsity of non-zero values among samples (Anderson et al. 2008).

As most sites lacked seedlings, and a number of quadrats had few or no pneumatophores in them, it was not possible to run valid statistical analyses testing for seasonal differences in mangrove seedling and pneumatophore height and diameter. Instead, visual patterns in the data were explored using bar charts.

The analytical framework applied in this study reflects the structure and purpose of the baseline dataset. Several variables (including canopy cover, leaf condition and faunal presence) were recorded as ranked (ordinal) data based on field assessment. Accordingly, ANOSIM was selected as an appropriate non-parametric, rank-based method for detecting differences in similarity among groups without assuming continuous data or equal spacing between values.

PERMANOVA was applied where data structure supported variance-based testing using resemblance matrices (e.g. continuous or count-based variables). The combination of ANOSIM and PERMANOVA is consistent with established use within the PRIMER framework and enables analysis aligned to data type.

Multivariate analyses were not applied to the mangrove health indices. The indices are constructed metrics derived from ranked variables using predefined weightings, and therefore do not represent independent response variables. Any multivariate analysis would inherently reflect this weighting structure (i.e. circular inference) rather than providing independent insight into drivers. The potential application of multivariate approaches to raw, unweighted variables may be considered in future monitoring programs.

3. RESULTS

3.1 Site description

The survey area was predominantly tidal flats interspersed by several tidal creeks. Areas of sandy beach and some small sand dunes were observed on the seaward (eastern) side of the survey area (Table 4). Hydrogen sulphide mud ponds (at least knee-deep mud) were observed at several locations. Dense accumulations of woody mangrove debris (mainly branches broken down into smaller pieces) were observed in the vicinity of transect two.

Mangrove density and distribution was highly variable throughout the survey area. The greatest mangrove density was observed in the upper intertidal where transects 1 – 2 were surveyed (Figure 1). Here, the mangrove density was so great it was not physically possible to penetrate these groves of trees more than several metres without becoming too entangled to move or conduct measurements. In these upper intertidal areas to the north of the survey area, the mangrove community appeared relatively young, with high abundances of multi-trunked trees with canopy heights over 3m reaching down to their root base.

Transects surveyed in the lower intertidal zone generally had lower mangrove densities (transects 12 - 14). The mangroves in these lower intertidal areas were often very large, old trees, which had single thick trunk diameters and gnarled trunks and/or root bases. In some areas surveyed, an understorey of samphire and salt bush was observed (Table 4).

Table 4 Summary of tidal zone, habitat description, substrate types and overall mangrove health ranking for each site surveyed.

Transect	Tidal zone	Habitat description	Substrate type(s)	THI+
1	Upper	Tidal flat with dense mangroves	Mud/silt	0.677
2	Upper	Tidal flat with dense mangroves	Mud/silt	0.801
7	Midzone	Tidal creek with dense mangroves	Mud/silt	0.736
8	Midzone	Tidal flat interspersed with mangroves & sparse samphire	Mud/silt	0.671
9	Midzone	Tidal flat & small sand dune interspersed with mangroves & sparse samphire	Sand, gravel, shell grit, mud/silt	0.592
10	Midzone	Tidal creek & tidal flat interspersed with mangroves & samphire	Sand, shell grit, mud/silt	0.663
12	Lower	Tidal flat interspersed with sparse mangroves, samphire & salt bush	Mud/silt	0.667
13	Lower	Sandy beach & small sand dune. Beach interspersed with patchy mangroves, sand dune with mangroves & salt bush	Shell grit, sand	0.652
14	Lower	Tidal flat with patchy mangroves, dense pneumatophores & dense macroalgae mat	Macroalgae & wrack on sand	0.643
18	Upper	Tidal creek & tidal flat interspersed with dense samphire & mangroves	Mud/silt	0.606

3.2 Tree height

The tallest mangroves were large, old trees along T14, where a mean tree height exceeding 300 cm was observed (Figure 2). The shortest mangroves were sparse, stunted trees in an area dominated by a samphire and salt bush understorey along T12 and T18, where a tree height of approximately 100 cm was estimated (Figure 2).

Estimated mangrove height was not significantly different between seasons (PERMANOVA permuted *p*-value = 0.2072) but was significantly different among sites (PERMANOVA permuted *p*-value = 0.0001).

The low growth observed is likely due to the loss of some branches between seasons at some sites and low annual rainfall received by South Australian mangroves compared to subtropical and tropical mangrove communities that experience high growth rates due to large inputs of freshwater (Duke 2006).

Apparent decreases in mean tree height were observed at transects T10, T13 and T14 (Figure 2); however, these differences were within standard error and were not statistically significant. As such, no temporal change in tree height was detected. Field observations during the final survey noted broken or missing upper branches within the canopies at these transects, most likely reflecting localised physical disturbance (e.g. storm-related damage) rather than a measurable change in overall tree height. These observations are consistent with the lack of statistically significant seasonal differences in height.

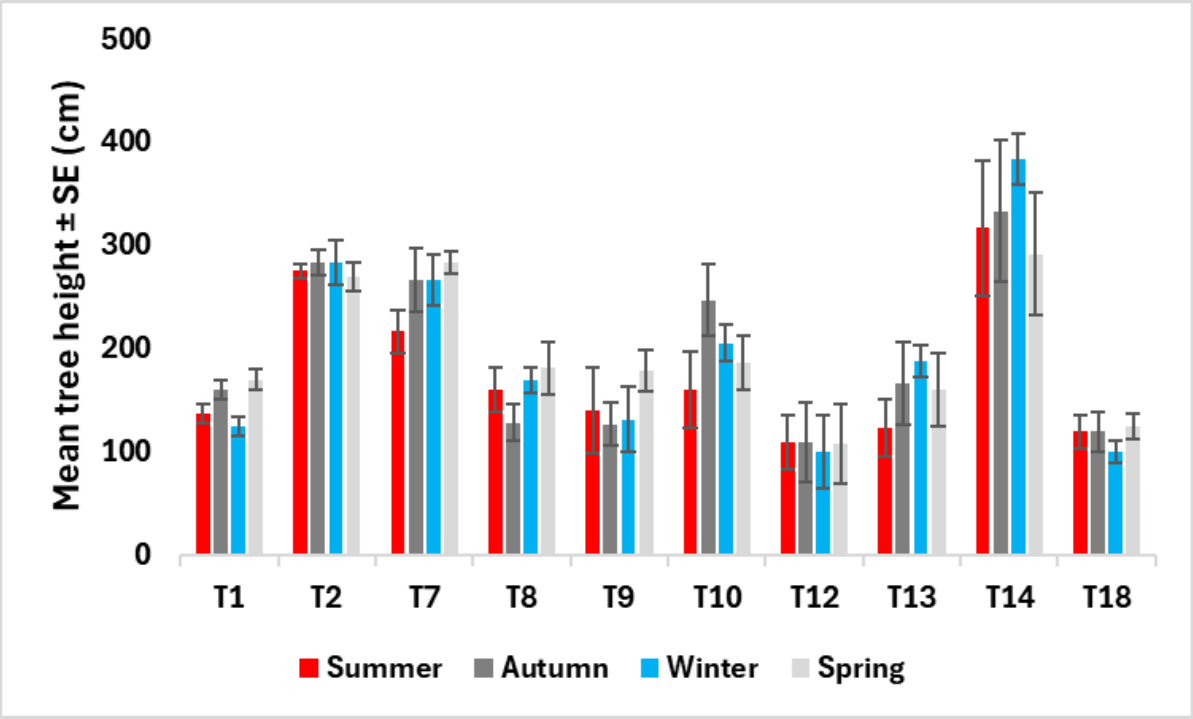


Figure 2. Mean ±SE mangrove height estimated at each site in each season.

3.3 Percentage canopy cover

The densest mangrove canopy was observed along T2 where a rank between three and four was consistently observed across all four of the seasonal surveys (Figure 3). A rank of 3 - 4 represents a canopy of 50 – 75 % coverage. The sparsest mangrove canopy was observed along T12 where a rank between one and two was consistently observed (Figure 3). A rank of 1 - 2 represents a canopy of 25 – 50 % coverage.

The rankings of percentage canopy cover were not significantly different among seasons (ANOSIM Global R = 0.008, p = 0.126). The extremely small Global R indicates significant variability among replicate seasonal measurements at each site.

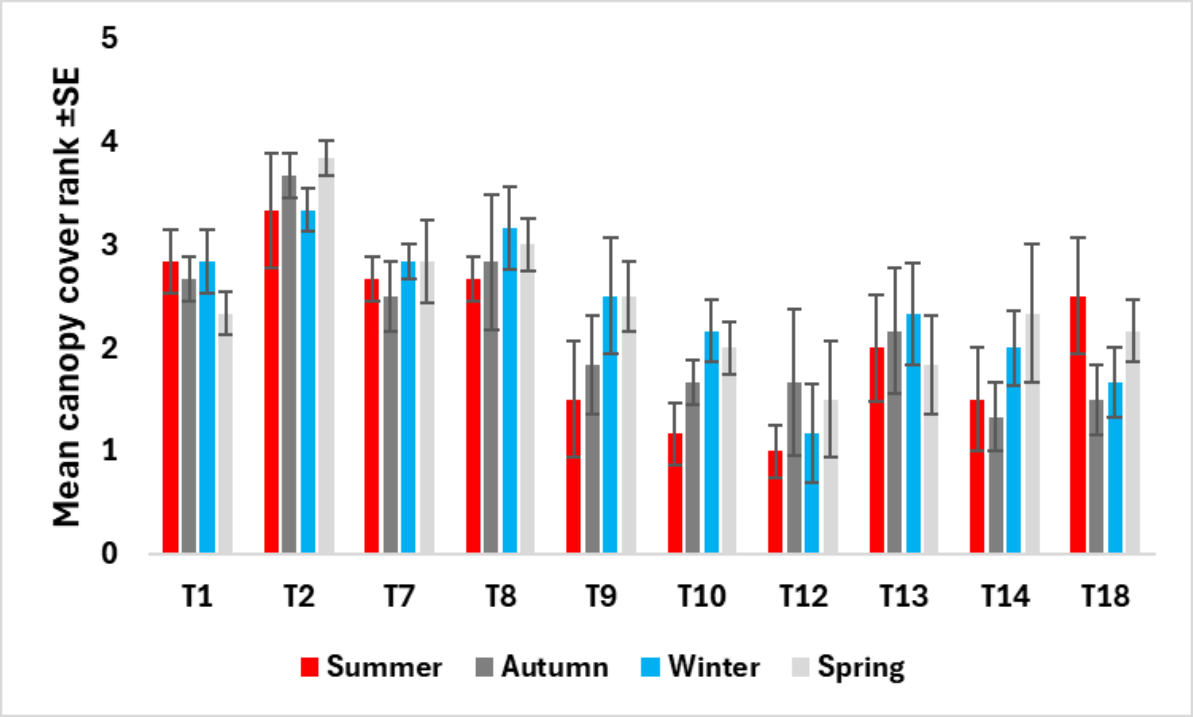


Figure 3. Mean ± SE canopy cover rank at each site in each season.

3.4 Leaf condition

The healthiest mangrove leaf condition was generally observed along T14, with a mean rank of 3 – 4 (Figure 4). A rank of 3 - 4 represents a leaf condition of generally healthy green leaves with only a few yellowing or stressed leaves (Table 3). The unhealthiest mangrove leaf condition was generally observed along T9, with a mean rank of 2 - 3 (Figure 4). A rank of 2 - 3 represents a leaf condition where most trees had some stressed or burnt leaves with limited signs of regrowth. These trees also had obvious areas of dieback where entire branches/limbs had died (Table 3, Figure 4).

The rankings of leaf condition were significantly different among seasons (ANOSIM Global R = 0.015, p = 0.016). The extremely small Global R indicates significant variability among replicate seasonal measurements at each site. Pair-wise tests showed that Autumn was significantly different from Summer (ANOSIM pair-wise p-value = 0.005). Generally, leaf condition was similar or had declined slightly from Summer to Autumn (Figure 4) with some sites showing signs of recovery during Winter.

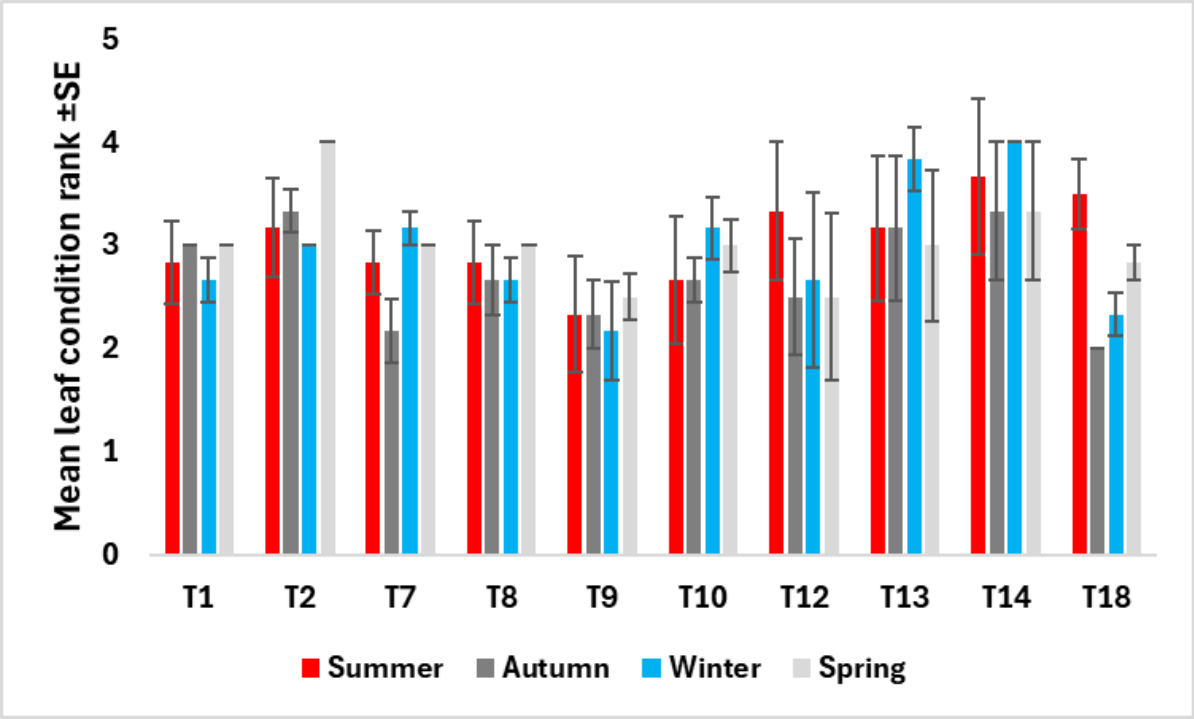


Figure 4. Mean ±SE leaf condition rank at each site in each season.

3.5 Infauna and epifauna

The dominant infauna observed in the survey area was the Red-fingered Marsh Crab *Parasesarma erythodactylum*. *P. erythodactylum* is a species of burrowing crab endemic to tropical Australian mangrove forests but is considered an introduced species to temperate mangrove forests in SA. This species was highly abundant and active across all seasons except winter. During winter, very few active *P. erythodactylum* were observed, although their burrows still dominated the benthic environment. Several observations of juvenile and adult blue swimmer crabs (*Portunus armatus*) were also made in the survey area.

The dominant epifauna observed in the survey area were mollusc species. The mud creeper *Zeacumantus diemenensis* and the snail *Phallomedusa solida* were regularly observed in large numbers moving on the sediment in between mangrove pneumatophores. The black nerite *Nerita atramentosa,* the gold-mouthed conniwink *Bembicium auratum*, the common periwinkle *Austrocochlea constricta* and the oyster drill *Lepsiella vinosa* were observed in smaller abundances attached to the pneumatophores, trunks and lower branches of mangroves. Also attached to the trunks and lower branches of mangroves, especially large, old trees in the lower intertidal zone, were the mussel *Brachidontes rostratus* and the barnacle *Chthamalus antennatus*.

The rankings of infauna and epifauna presence were significantly different among seasons (ANOSIM Global R = 0.014, p = 0.017). The extremely small Global R indicates significant variability among replicate seasonal measurements at each site. Pair-wise tests showed that Autumn was significantly different from all three seasons (ANOSIM pair-wise p-values = <0.05), and that Spring was significantly different from Winter (ANOSIM pair-wise p-value = 0.022) (Figure 5). Seasonal differences in infauna and epifauna differed among sites, with autumn having a lower rank at some locations (T1, T10, T13) and a higher rank at others (T2, T9, T14) (Figure 5).

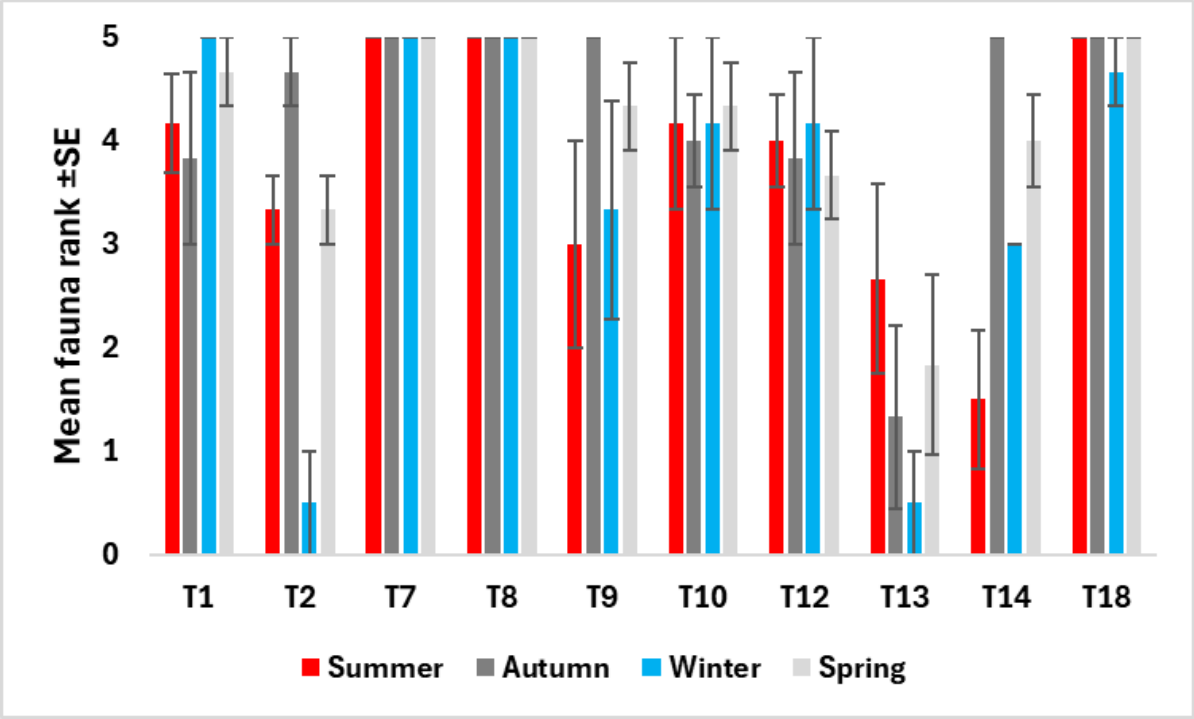


Figure 5. Mean ±SE fauna rank at each site in each season.

3.6 Health indices

In Spring, the healthiest mangrove community was observed along T2 which recorded a THI+ of 0.801, while the least-healthy mangrove community was recorded along T9 which recorded a THI+ of 0.592 (Table 4). THI+ scores in the range of 0.59 – 0.67 represent mangrove communities in moderate to good health, while the scores of 0.74 at T7 and 0.80 at T2 represent mangrove communities in very good to excellent health (Table 4). While mangrove health did fluctuate across seasons at several sites there was no statistical pattern for changes in health (ANOSIM Global R = 0.008, p = 0.089). Variation in total health scores among seasons was generally small, with substantial overlap in standard errors indicating high within-site variability. The extremely small Global R indicates significant variability among replicate seasonal measurements at each site. As such, there was no consistent directional change in mangrove health across seasons, and observed differences likely reflect short-term, site-specific variability rather than a generalised seasonal trend.

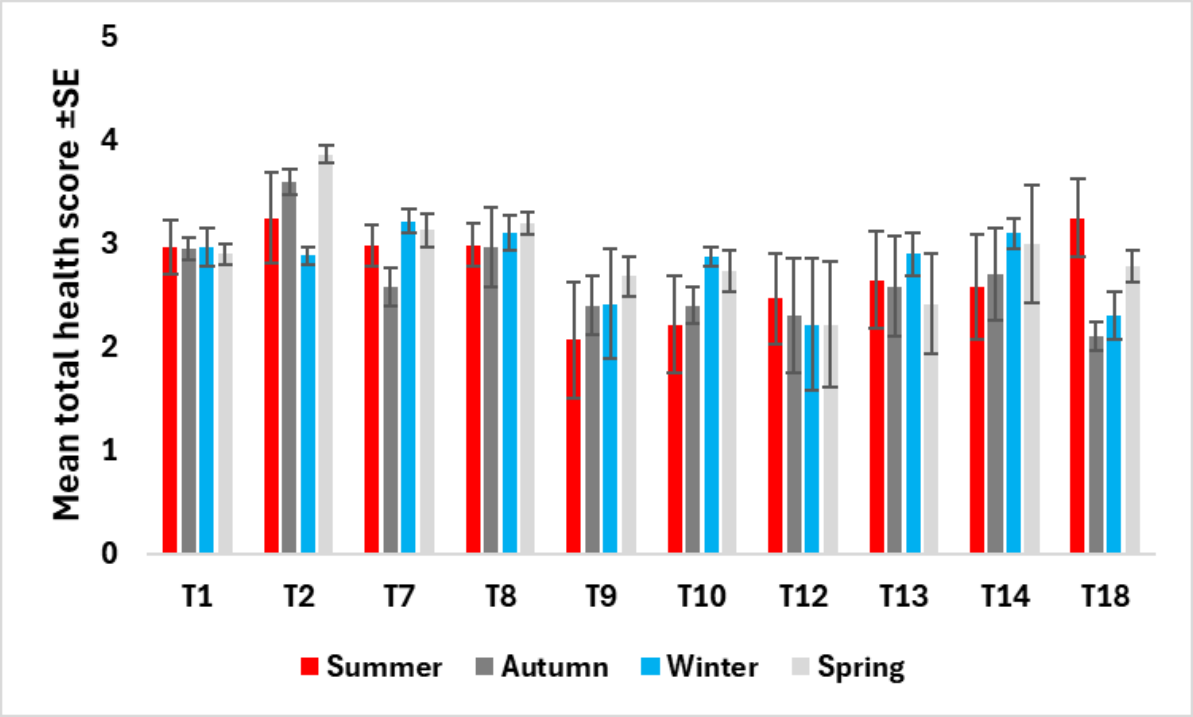


Figure 6. Mean ±SE total health score at each site in each season.

3.7 Mangrove seedlings

3.7.1 Seedling counts

Counts of mangrove seedlings were generally low across the survey area, with four sites (T7, T9, T10 and T13) not having any seedlings recorded in quadrats during any season (Figure 7). Transect 2 had the highest seedling count across all seasons except Spring, with seedlings recorded year-round at T18 and T1 (Figure 7). With only intermittently observed seedlings at sites T6, T8, T12 and T14 (Figure 7), indicating limited recruitment success at these locations.

Counts of mangrove seedlings in quadrats did not differ significantly between seasons (PERMANOVA permuted *p*-value = 0.2594) but were significantly different among sites (PERMANOVA permuted *p*-value = 0.0001).

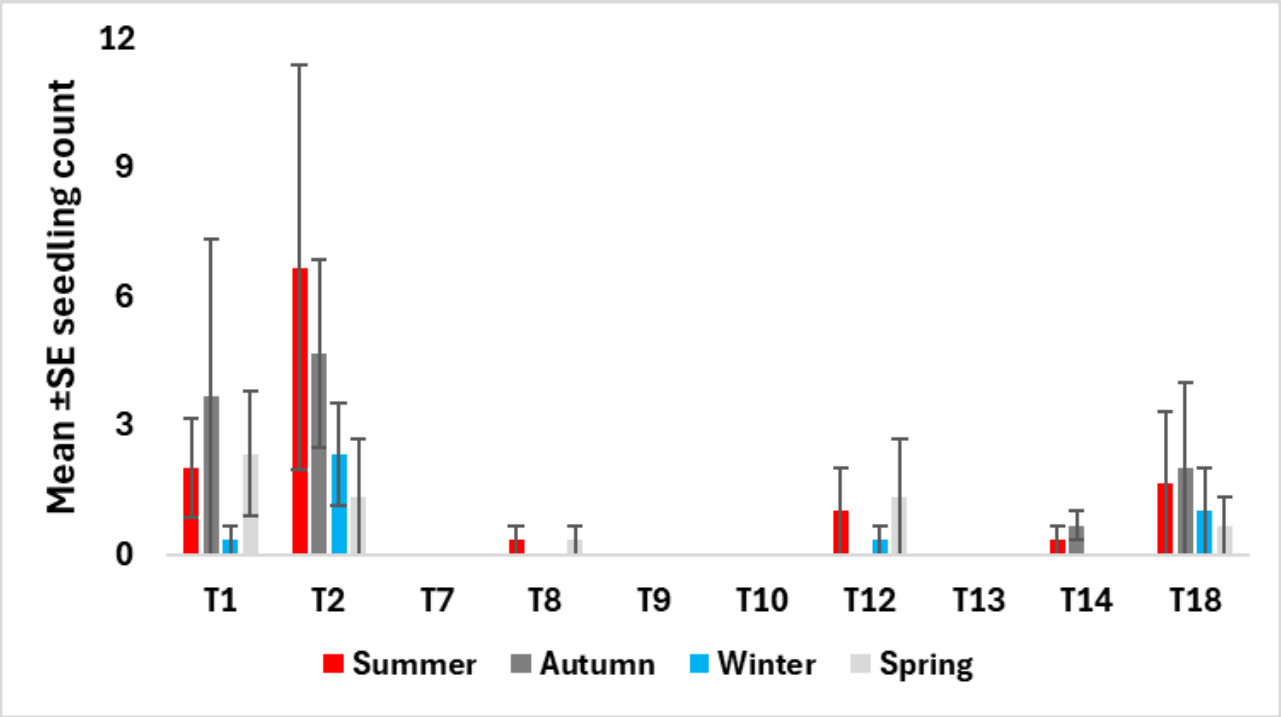


Figure 7. Mean ±SE seedling count in quadrats for each site in each season.

3.7.2 Seedling height

The mean height of mangrove seedlings at each location for each season was generally <25 cm (Figure 8). Transect 14 had the tallest seedlings, while T12 generally had the shortest seedlings (Figure 8).

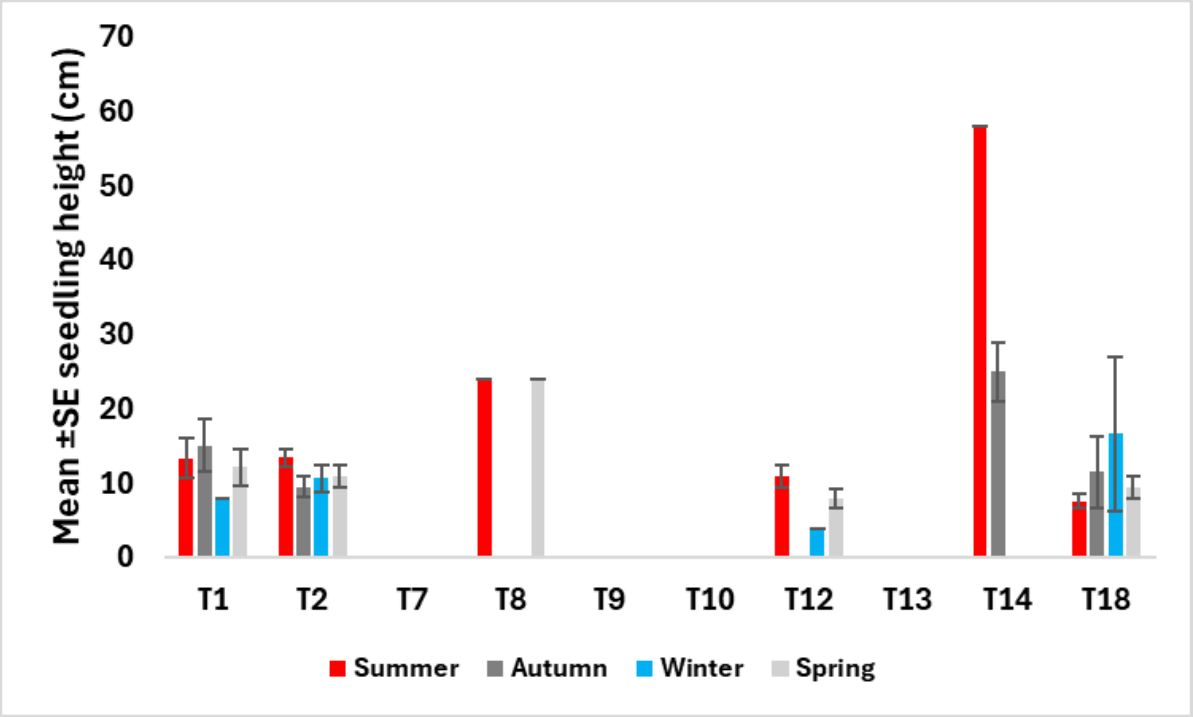


Figure 8. Mean ±SE seedling height (cm) in quadrats for each site in each season.

3.7.3 Seedling diameter

The mean diameter of mangrove seedlings at each location for each season was always <10 mm and generally similar among sites (Figure 9).

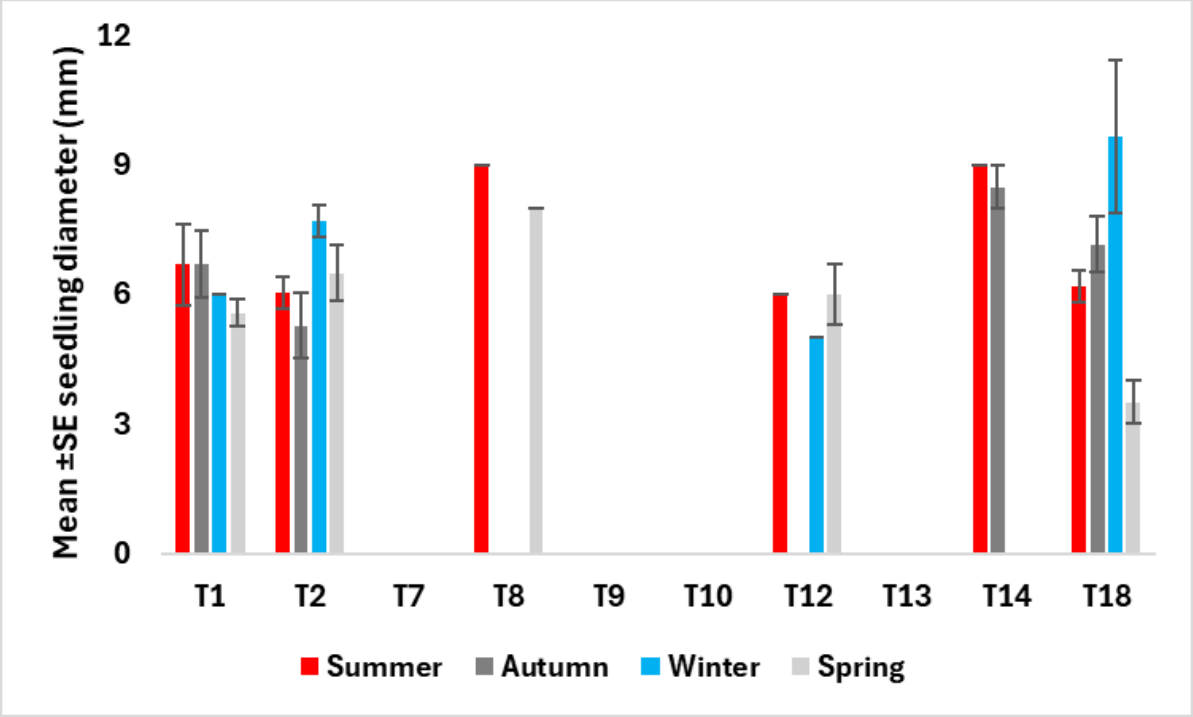


Figure 9. Mean ±SE seedling diameter (mm) in quadrats for each site in each season.

3.8 Mangrove pneumatophores

3.8.1 Pneumatophore counts

Counts of pneumatophores were highly variable across the survey area (Figure 10). Transect 2 had the highest pneumatophore count across all seasons except Winter, with the lowest pneumatophore counts at sites T9 and T13 (Figure 10).

Counts of pneumatophores in quadrats did not differ significantly between seasons (PERMANOVA permuted *p*-value = 0.3574) but were significantly different among sites (PERMANOVA permuted *p*-value = 0.0001). This is not surprising since unlike seedlings pneumatophores are part of an established tree and their presence and number is not expected to alter unless external factors such as erosion, deposition, mechanical removal (including storm damage) or an extreme dieback event occurs. Differences in numbers between sites are indicators of substrate and hydrology conditions experienced at each site. Higher densities of pneumatophores indicate low oxygen availability in the root zone and frequent or prolonged inundation. Mangroves produce more pneumatophores to increase gas exchange when sediments are waterlogged, anoxic, or fine grained. This aligns with the observations for sites T1, T2 and T18. High pneumatophore density is also associated with higher turbulence and roughness at the forest fringe, where sediments are more frequently inundated and often coarser/sandier due to winnowing such as tidal channels (T7 and T8) or tidal flats exposed to wave zones (T14). This is supported by the results for pneumatophore height recorded for T7 and T14 that also record some of the tallest pneumatophores as an adaptation to experiencing regularly higher tidal inundation water levels.

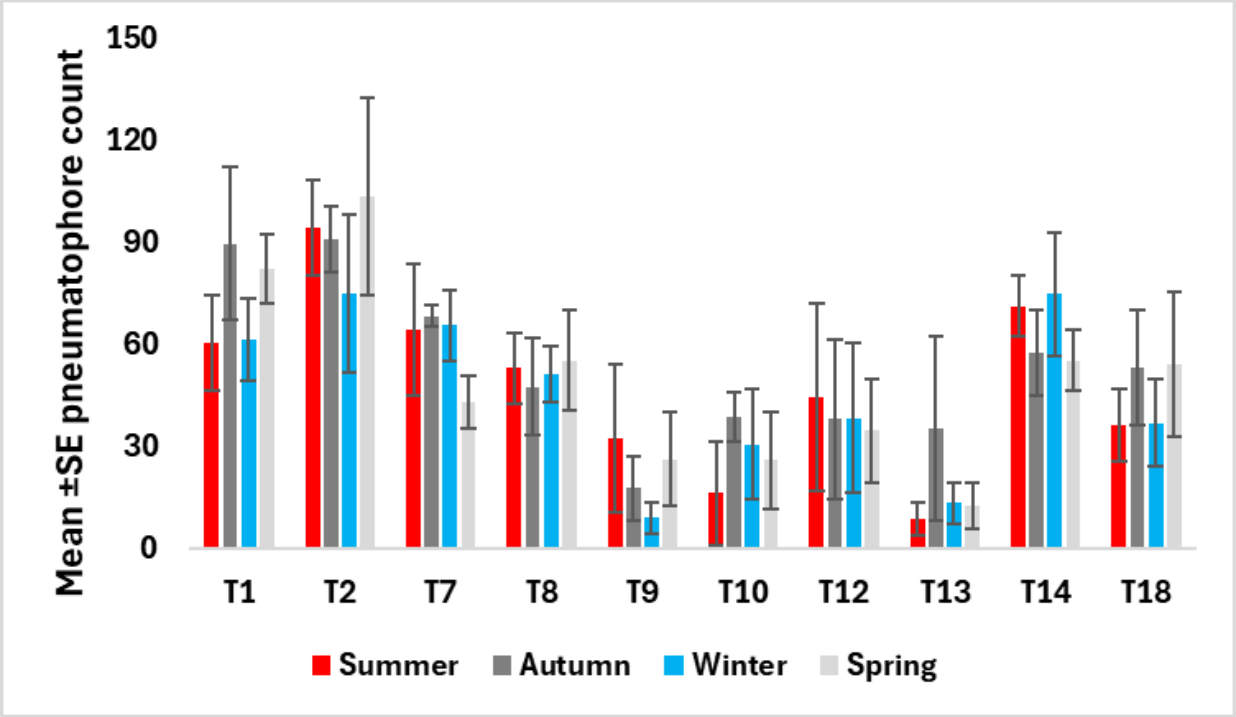


Figure 10. Mean ±SE pneumatophore counts in quadrats for each site in each season.

3.8.2 Pneumatophore height

The mean height of mangrove pneumatophores was highly variable across the survey area (Figure 11). Transects 7 and 14 had the tallest pneumatophores, while T9 generally had the shortest pneumatophores (Figure 11).

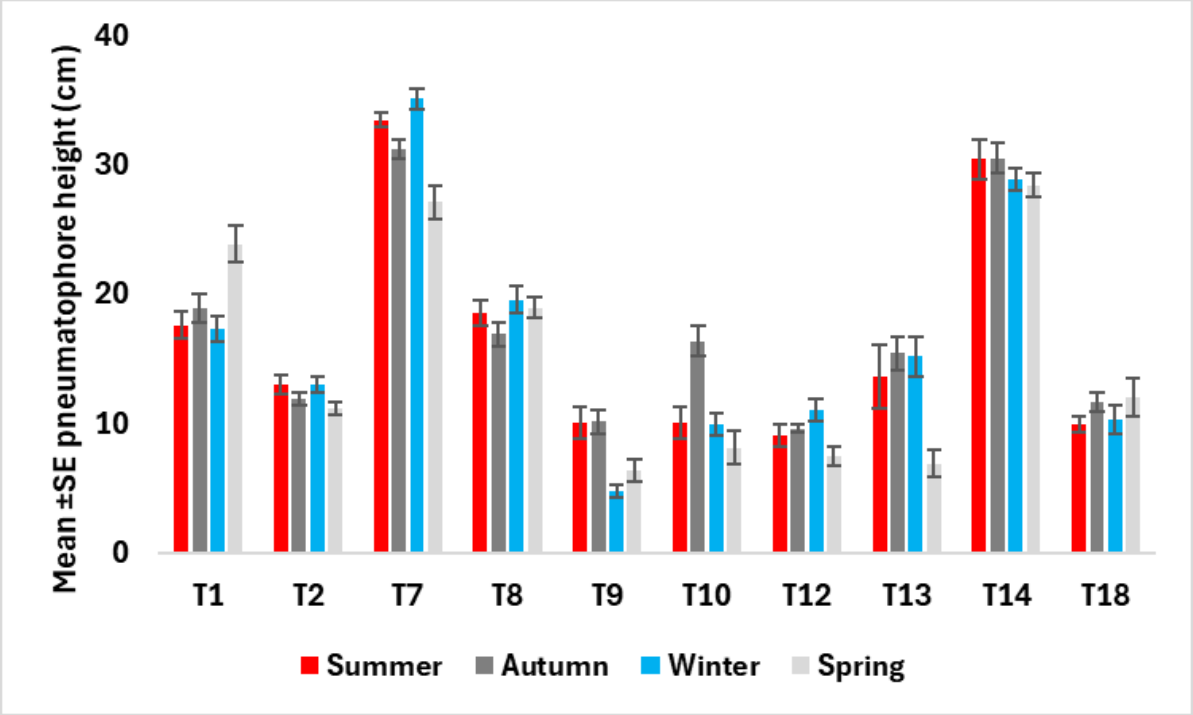


Figure 11. Mean ±SE pneumatophore heights (cm) in quadrats for each site in each season.

3.8.3 Pneumatophore diameter

The mean diameter of pneumatophores at each location for each season was always <15 mm and generally similar among sites (Figure 12).

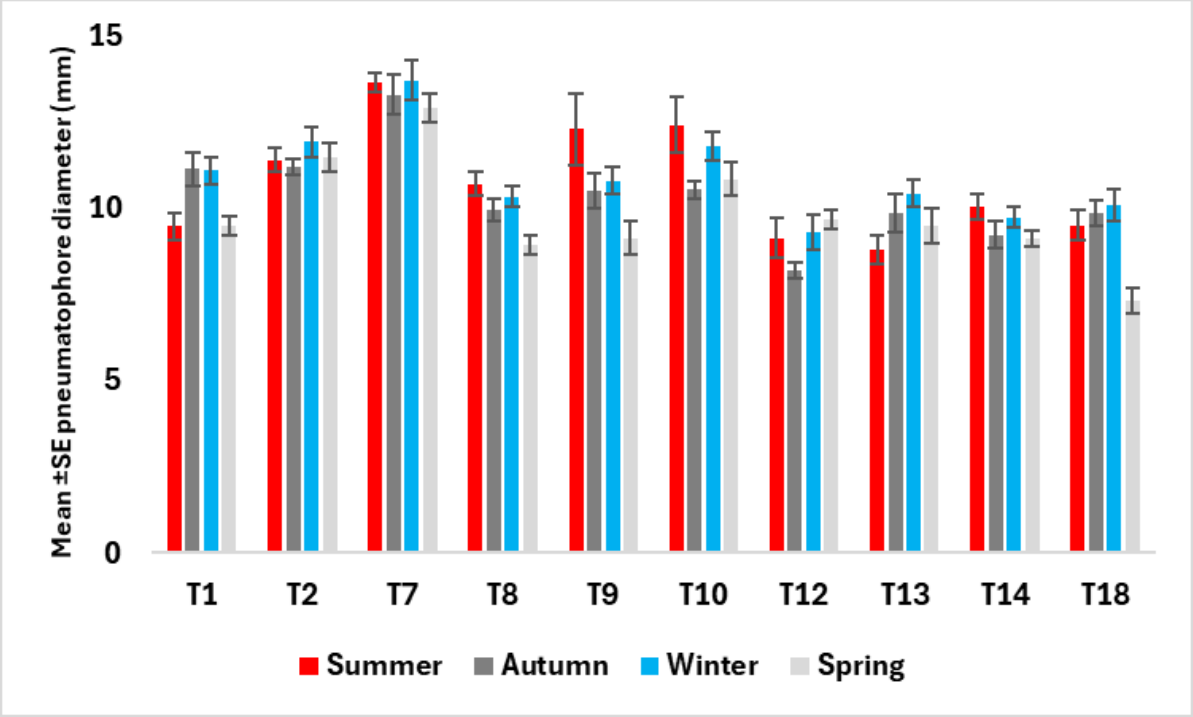


Figure 12. Mean ±SE pneumatophore diameters (mm) in quadrats for each site in each season.

3.9 Permanent photo points

Four images per photo point (one each facing north, east, south and west) were taken. Images are supplied in the appendices of this report for Spring (Appendix C), Summer (Appendix D), Autumn (Appendix E) and Winter (Appendix F).

4. DISCUSSION

4.1 Ecological gradients structure the mangrove mosaic

Spatial patterns at the Mullaquana Mangrove Monitoring site are primarily controlled by geomorphic position and hydrodynamics. Upper-shore transects (T1, T2, T18) occupy fine, often anoxic muds with prolonged inundation along creek-fringing and upper-intertidal flats. These areas support dense, relatively young stands with high pneumatophore density and strong canopy condition, reflected in higher THI^{+} values (e.g., T2 = 0.80). Mid-shore transects (T7 – T10) are transitional flats and creek margins where mangroves co-occur with samphire; canopy cover and fauna activity are moderate and more variable. Lower-shore sites (T12 - T14) occur on foreshore and dune-adjacent settings exposed to waves and storm energy; trees are older, single-trunked and show evidence of storm pruning, with lower seedling occurrence and patchier canopy.

Figure 13 synthesises these gradients and links them to expected functional attributes (pneumatophore traits, recruitment potential, canopy structure). Figure 14 shows the Spring 2025 THI⁺ distribution, with most sites in moderate–good condition (0.59–0.67) and creek/upper-shore settings (T7, T2) trending highest.

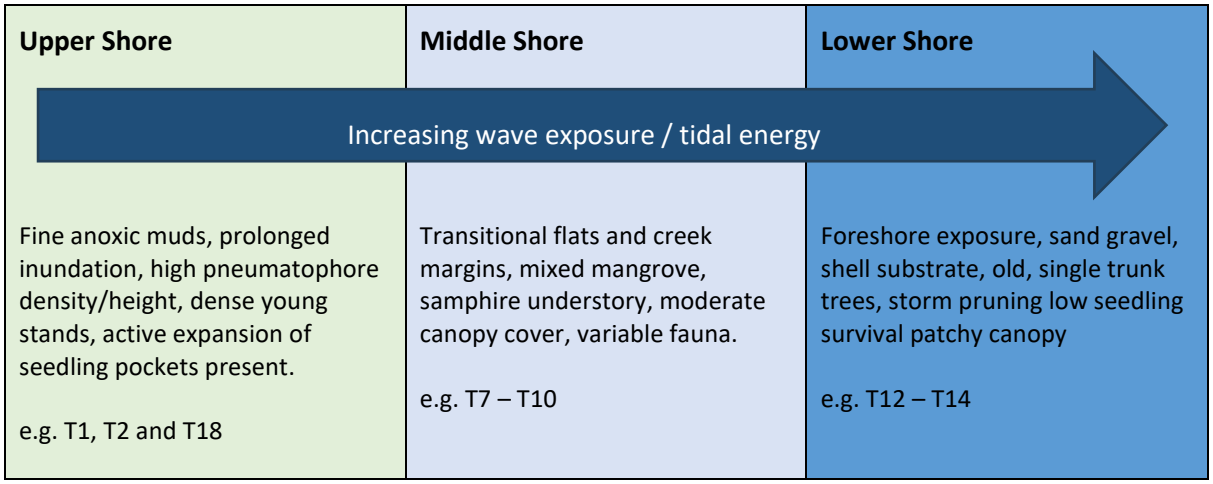


Figure 13. Ecological Gradient diagram.

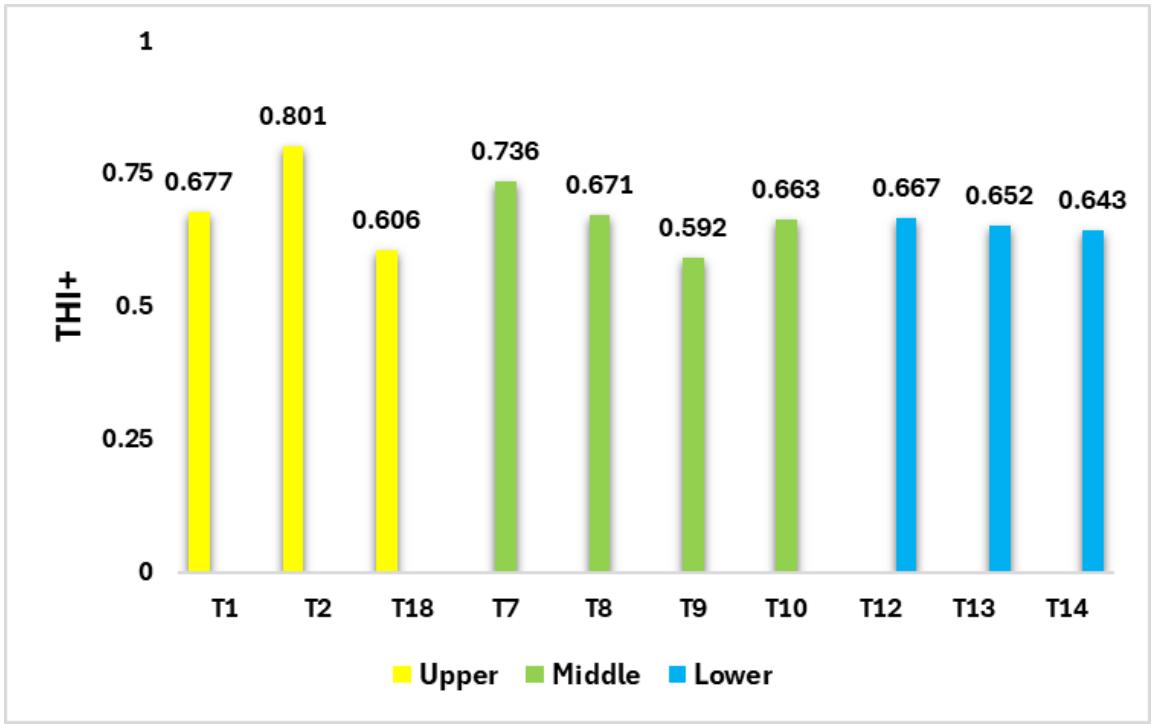


Figure 14. Tree Health Index (THI+) in Spring 2025.

4.2 Seasonal variability is present but small relative to site differences

Across the single-year baseline, no significant seasonal signal was detected for mangrove height (PERMANOVA p = 0.207) or canopy cover (ANOSIM R = 0.008, p = 0.126), and the composite health score also showed no seasonal difference (ANOSIM R = 0.008, p = 0.089). In contrast, leaf condition and infauna/epifauna ranks varied among seasons with very small effect sizes: Autumn differed from Summer for leaves, and for fauna Autumn differed from all seasons while Spring differed from Winter. These patterns are consistent with short-term physiological and behavioural responses (e.g., storm-related branch loss at lower-shore sites, temperature-driven activity changes in (*P. erythodactylum*) superimposed on a stable geomorphic setting.

4.3 Recruitment is limited and spatially constrained

Seedling counts were low and patchy, with sustained presence at T2, T18 and parts of T1, and absence at T7, T9, T10, T13. Seasonal effects on seedling counts were non-significant, while site differences were strong, indicating that substrate stability, exposure and burial dominate recruitment outcomes. The scarcity of seedlings in lower-shore settings indicates a recruitment bottleneck were wave action and sand movement limit establishment.

4.4 Pneumatophore traits reflect inundation regime and sediment oxygenation

Pneumatophore density and height varied among sites, with high densities in upper/creek zones and taller structures at creek and foreshore margins (e.g., T7, T14), consistent with adaptation to prolonged inundation and elevated water levels. Counts did not vary significantly among seasons but differed strongly among sites, as expected for established structures governed by hydrodynamics and sediment oxygenation rather than intra-annual change.

4.5 Sensitivity of indicators for impact detection

Given baseline variability, the following indicators are recommended for detecting potential project-related change:

- Early-response: leaf chlorosis/condition, canopy cover reduction, epifaunal assemblage shifts.
- Intermediate: seedling recruitment/survival, pneumatophore height/density (hydrodynamic/sedimentation shifts).
- Lagging: DBH and adult mortality.

While this baseline assessment was based on univariate analyses appropriate for characterising initial condition, future monitoring programs incorporating longer time series and raw, unweighted variables may benefit from multivariate analytical approaches to further resolve interacting drivers of change.

5. CONCLUSION

The 2025 seasonal mangrove surveys at Mullaquana Station establish a clear and comprehensive ecological baseline for the proposed Northern Water project. Across the four seasonal surveys, mangrove communities displayed moderate to very good health, with THI^{+} scores ranging from 0.59 to 0.80 depending on transect and tidal position. Upper-shore and creek-line sites, particularly T2 and

T7, exhibited the strongest condition, characterised by dense stands, healthy foliage, and high pneumatophore densities. In contrast, lower-shore foreshore transects (T12-T14) experienced greater structural stress, with older single-trunk trees showing storm-induced branch loss and comparatively lower leaf-health rankings.

Seasonal effects were minor relative to site differences, with no statistically significant seasonal variation in mangrove height, canopy cover, or total health scores. Small but detectable shifts in leaf condition and fauna presence, particularly reduced crab activity in winter and slight leaf stress in autumn, were consistent with expected short-term responses to temperature, storms, and hydrodynamic exposure.

Recruitment across the study area was low and spatially constrained, with seedlings consistently recorded only at a limited number of sites (T1, T2, T18). Seedling absence at exposed foreshore transects indicates a geomorphically driven recruitment bottleneck. Pneumatophore density and height patterns further underscore the strong influence of tidal regime and substrate oxygenation across zones. Together, these findings demonstrate that mangrove condition at Mullaquana is driven far more by ecological gradients (upper–mid–lower shore) than by seasonal changes.

Overall, the mangrove community is structurally stable and ecologically functional, showing no indications of widespread decline. This makes the 2025 dataset a reliable benchmark for detecting future project-related change and for informing long-term monitoring and impact assessments.

6. RECOMMENDATION

Future monitoring programs may incorporate multivariate analytical approaches (e.g. PERMANOVA or ordination methods) applied to raw, unweighted variables collected consistently across sites and seasons. This would enable assessment of combined site and seasonal effects and improve understanding of interacting drivers of variation relative to the established baseline. Analytical methods should continue to align with data structure, with rank-based approaches retained where variables are recorded as ordinal data.

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Appendix A Drone images



Figure 15. Map depicting the location of transects and photo points inside the survey area at Mullaquana Station. Image taken in Autumn 2025. Source: J Diversity Pty Ltd.



Figure 16. Map depicting the location of transects and photo points inside the survey area at Mullaquana Station. Image taken in Winter 2025. Source: J Diversity Pty Ltd.



Figure 17. Map depicting the location of transects and photo points inside the survey area at Mullaquana Station. Image taken in Spring 2025. Source: J Diversity Pty Ltd.

Appendix B Tide Heights



Figure 18. Tide charts for the survey area at Mullaquana Station from Wednesday February 19 – Sunday February 23, 2025 (https://tides.willyweather.com.au/sa/flinders-ranges-and-outback/mullaquana.html).

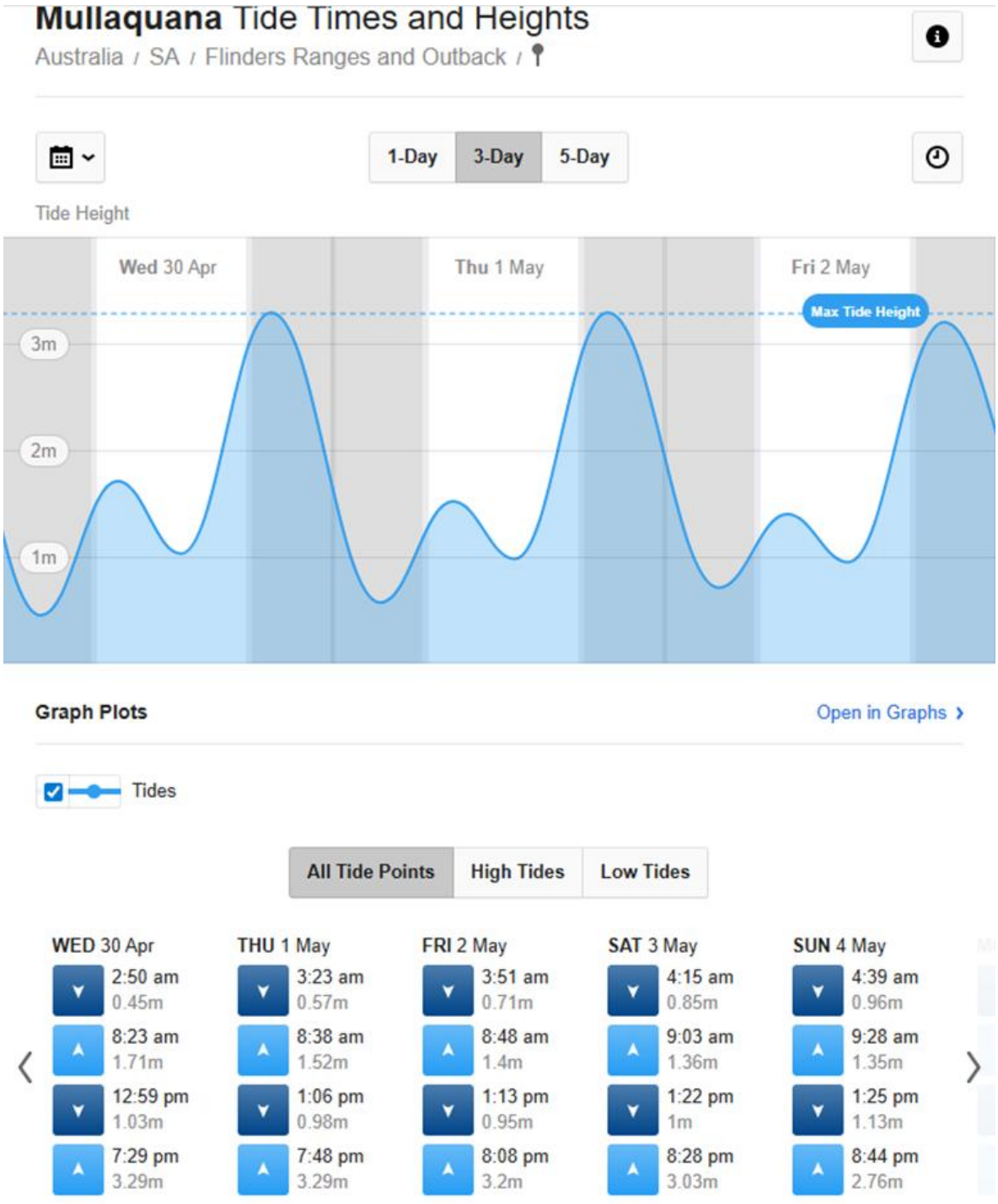


Figure 19. Tide charts for the survey area at Mullaquana Station from Wednesday April 30 – Sunday May 4, 2025 (https://tides.willyweather.com.au/sa/flinders-ranges-and-outback/mullaquana.html).



Figure 20. Tide charts for the survey area at Mullaquana Station from Monday August 11 – Friday August 15, 2025 (https://tides.willyweather.com.au/sa/flinders-ranges-and-outback/mullaquana.html).



Figure 21. Tide charts for the survey area at Mullaquana Station from Tuesday November 18 – Saturday November 22, 2025 (https://tides.willyweather.com.au/sa/flinders-ranges-and-outback/mullaquana.html).

Appendix C Permanent photo points Spring survey

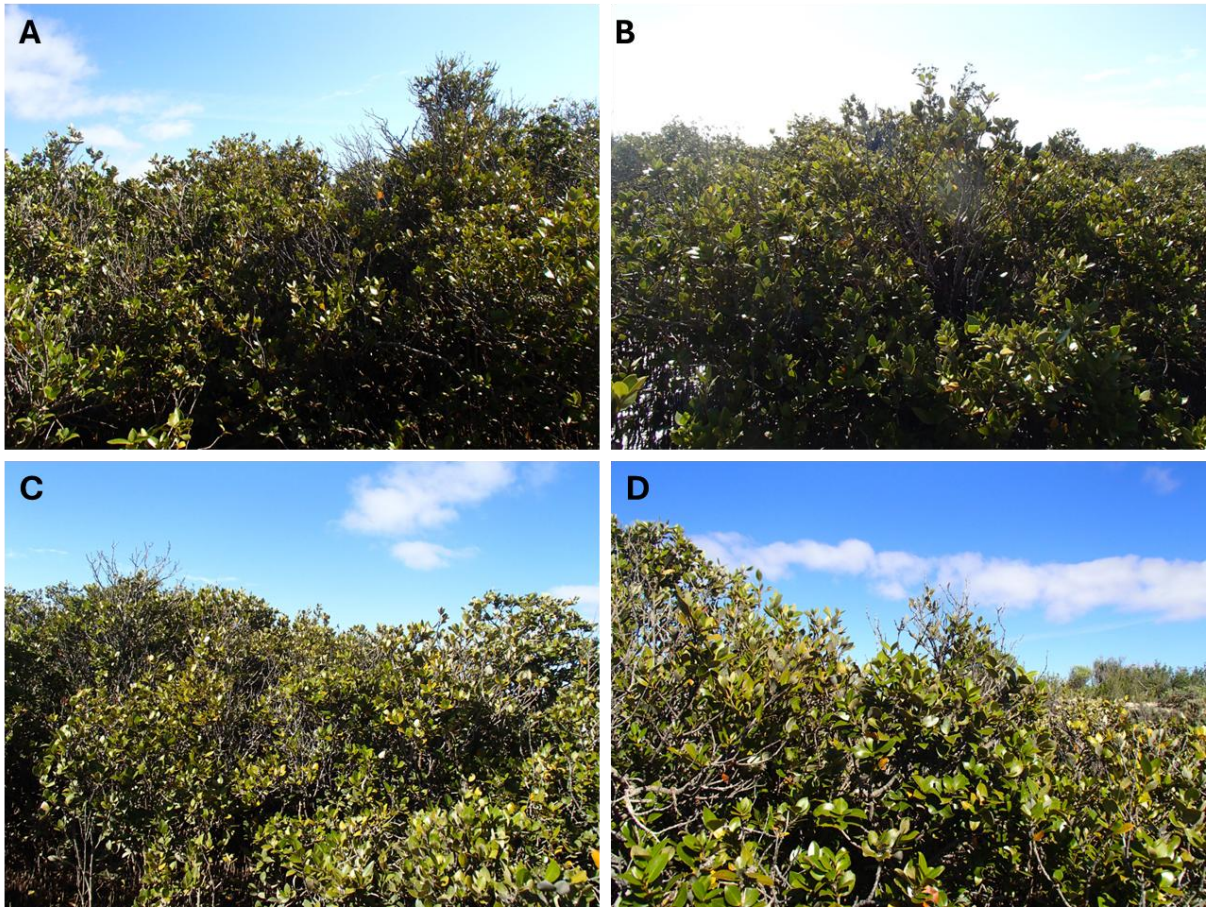


Figure 22. Photos showing the mangrove community at the permanent photo point on Transect 1: A) facing North; B) facing East; C) facing South; and D) facing West.

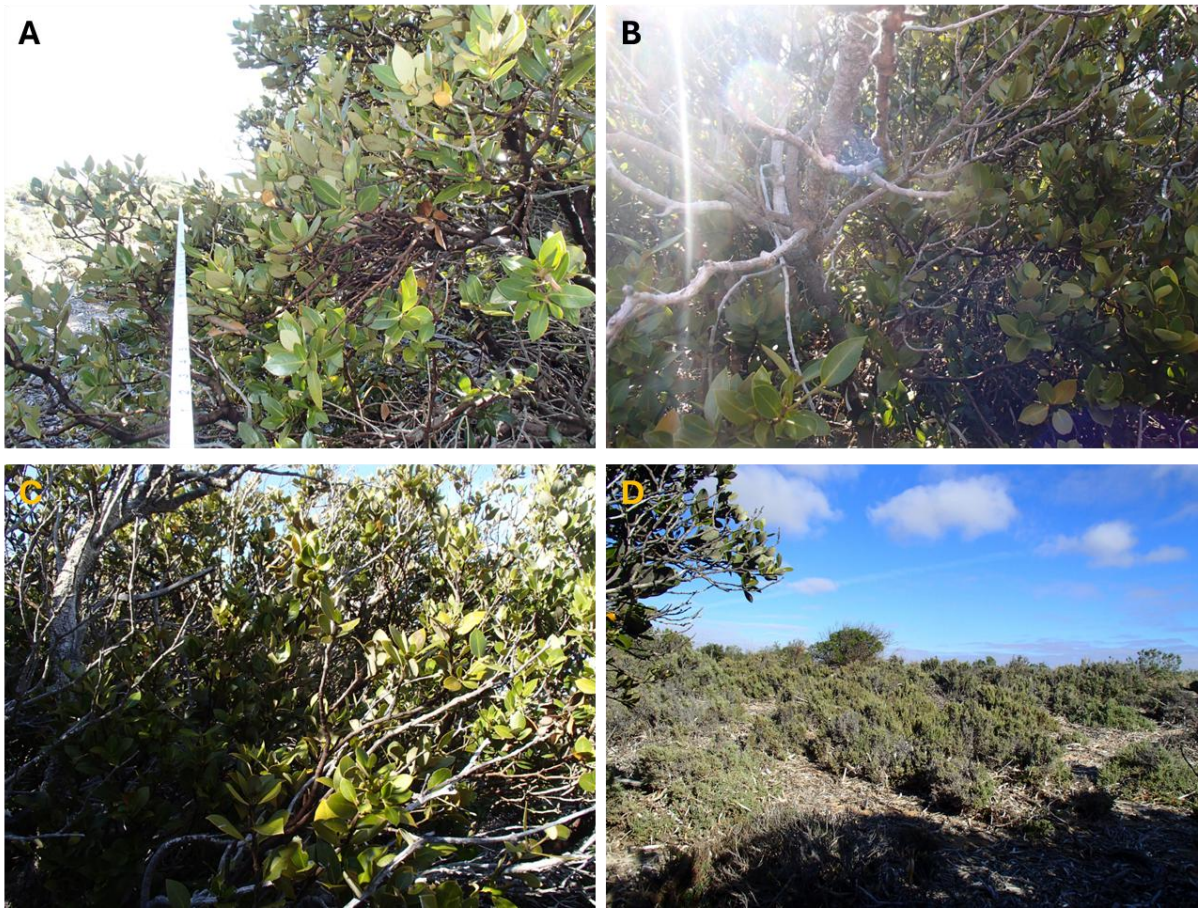


Figure 23. Photos showing the mangrove community at the permanent photo point on Transect 2: A) facing North; B) facing East; C) facing South; and D) facing West.

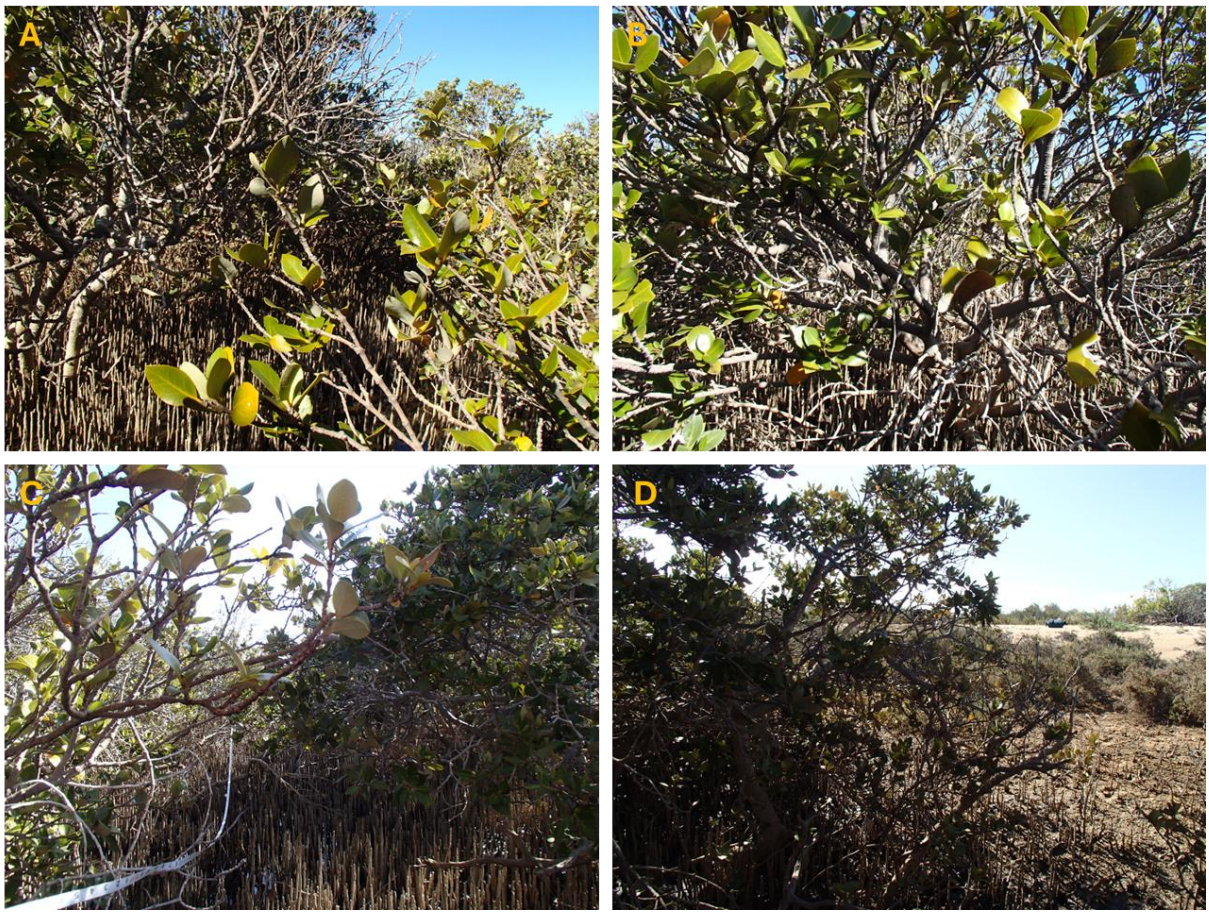


Figure 24. Photos showing the mangrove community at the permanent photo point on Transect 7: A) facing North; B) facing East; C) facing South; and D) facing West.

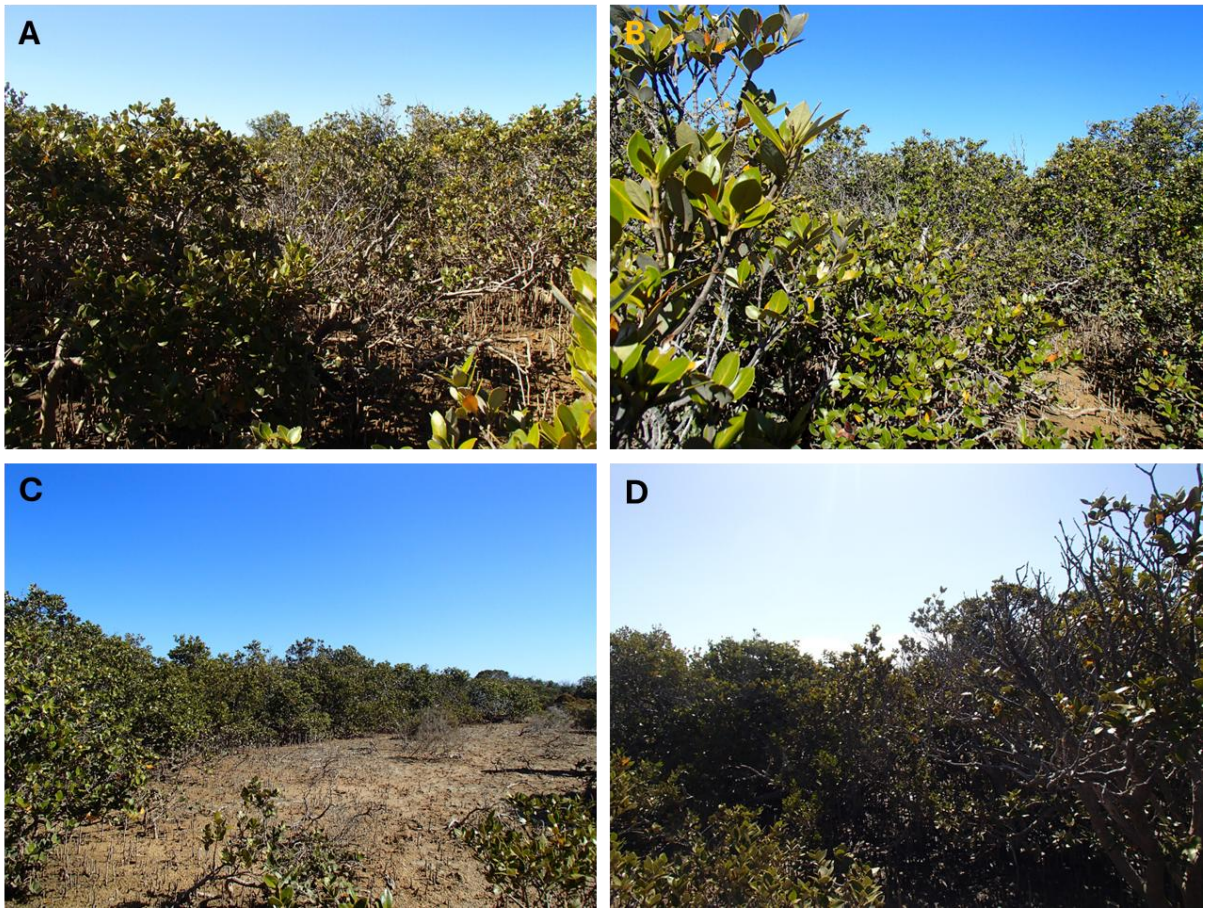


Figure 25. Photos showing the mangrove community at the permanent photo point on Transect 8: A) facing North; B) facing East; C) facing South; and D) facing West.

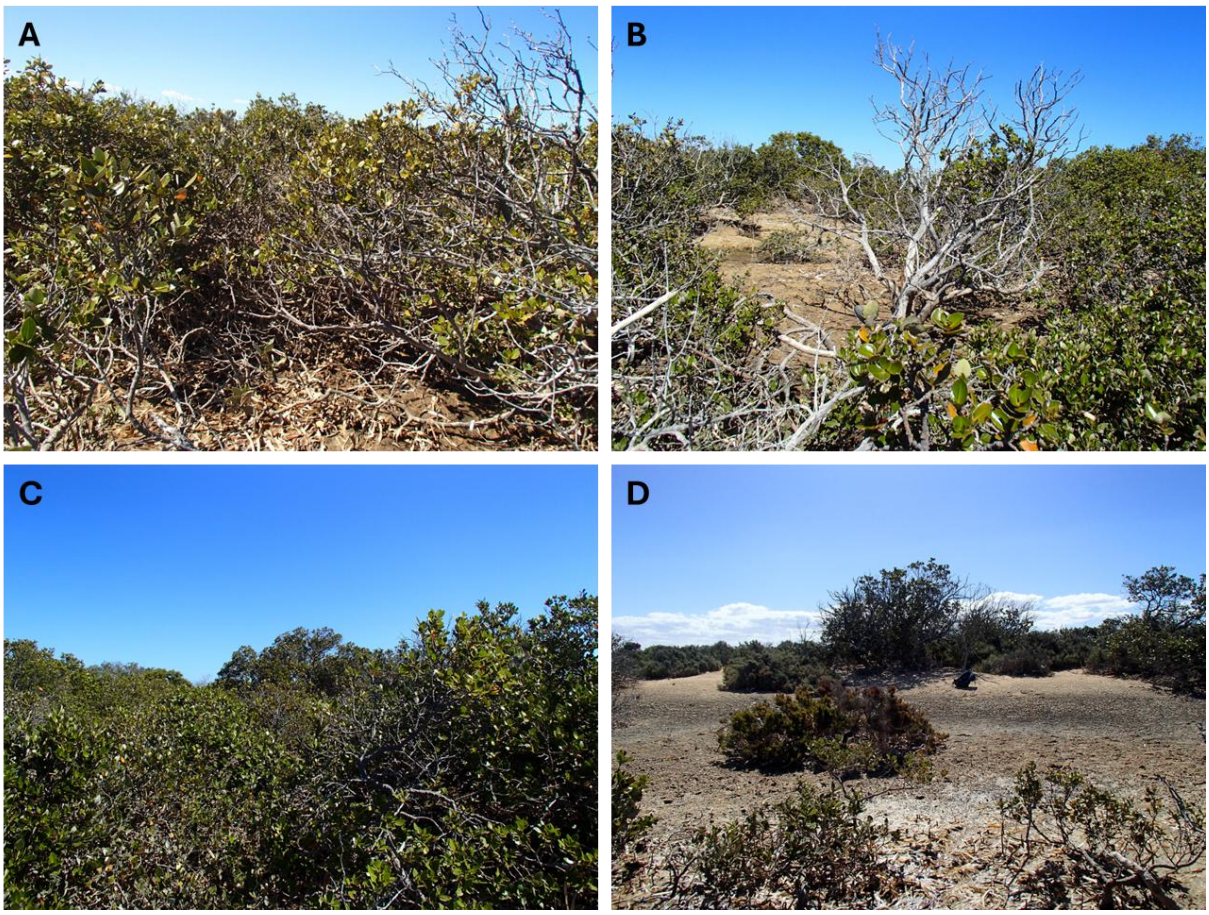


Figure 26. Photos showing the mangrove community at the permanent photo point on Transect 9: A) facing North; B) facing East; C) facing South; and D) facing West.



Figure 27. Photos showing the mangrove community at the permanent photo point on Transect 10: A) facing North; B) facing East; C) facing South; and D) facing West.

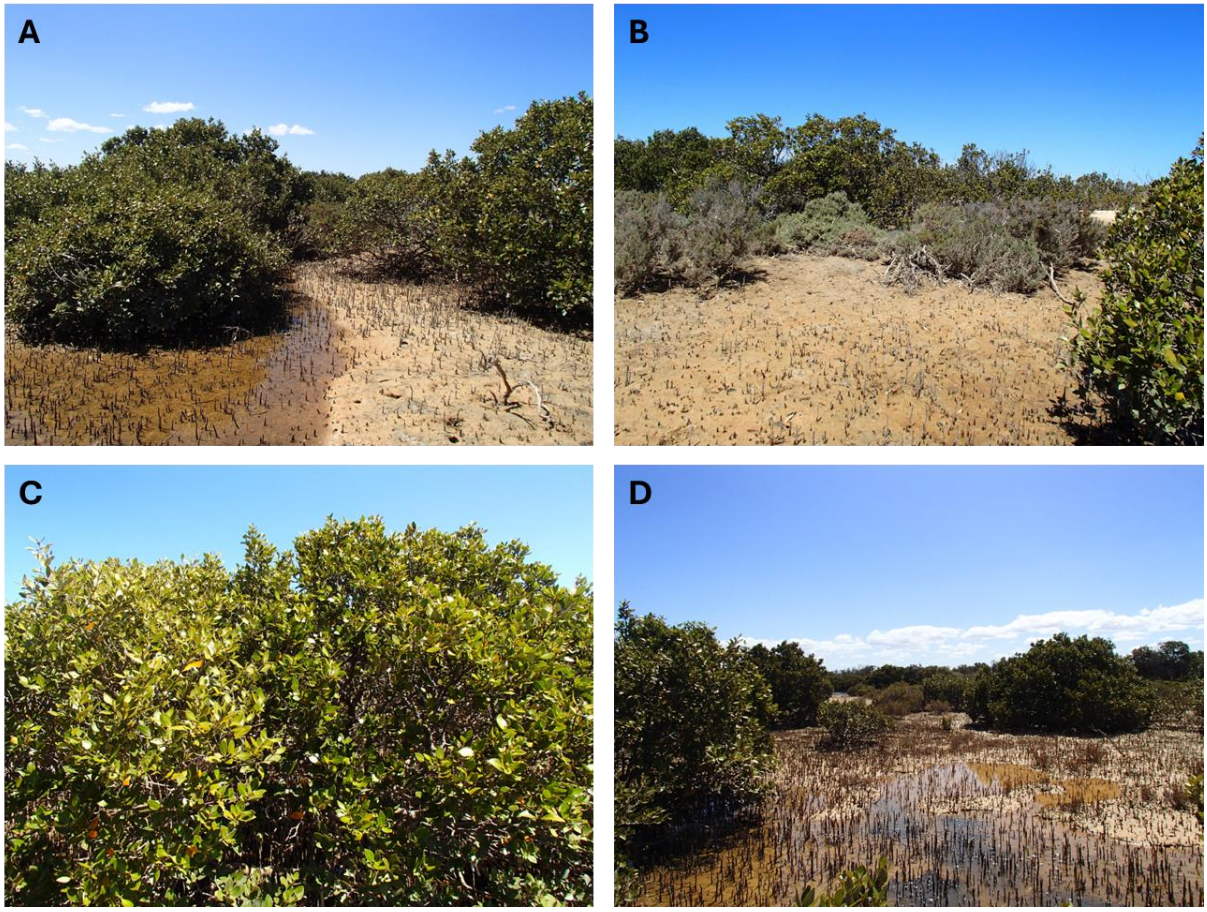


Figure 28. Photos showing the mangrove community at the permanent photo point on Transect 12: A) facing North; B) facing East; C) facing South; and D) facing West.



Figure 29. Photos showing the mangrove community at the permanent photo point on Transect 13: A) facing North; B) facing East; C) facing South; and D) facing West.



Figure 30. Photos showing the mangrove community at the permanent photo point on Transect 14: A) facing North; B) facing East; C) facing South; and D) facing West.

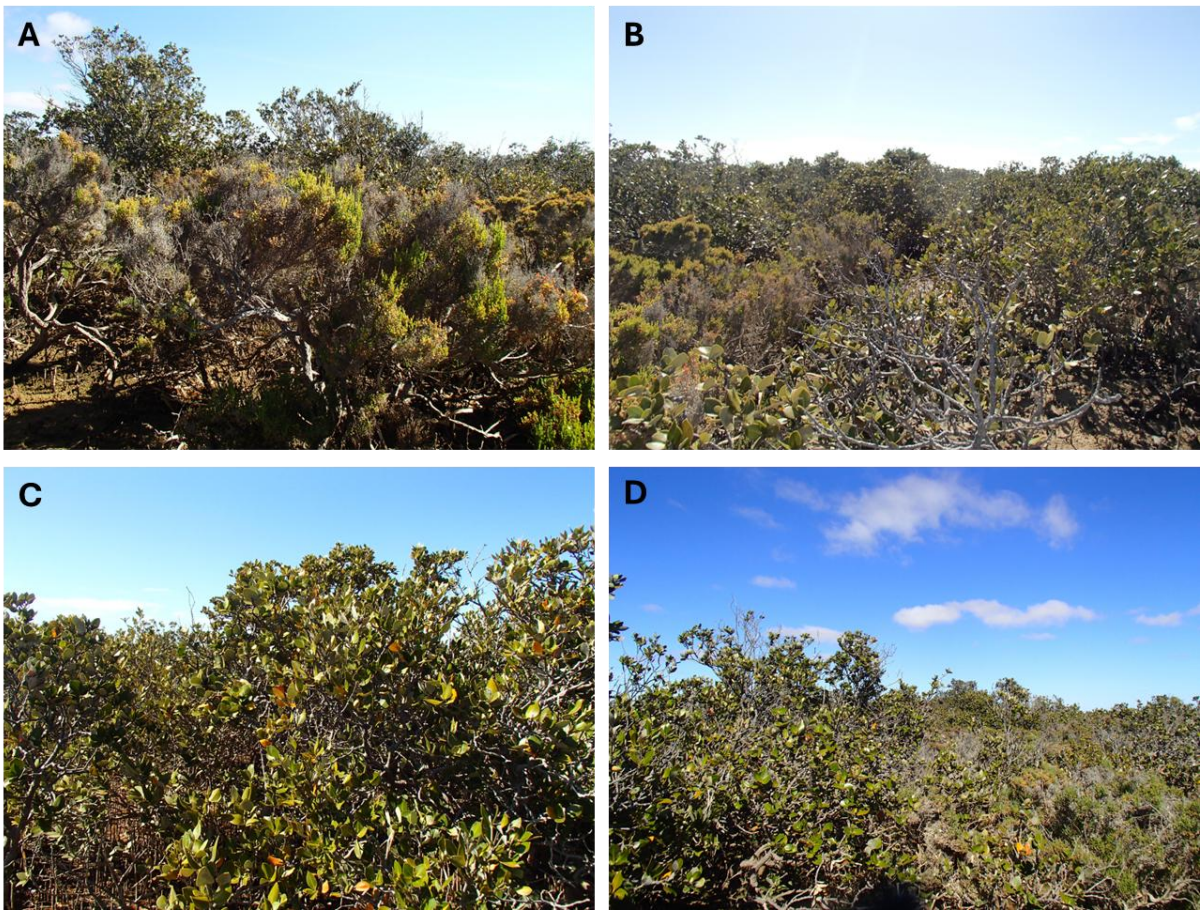


Figure 31. Photos showing the mangrove community at the permanent photo point on Transect 18: A) facing North; B) facing East; C) facing South; and D) facing West.

Appendix D Permanent photo points Summer survey

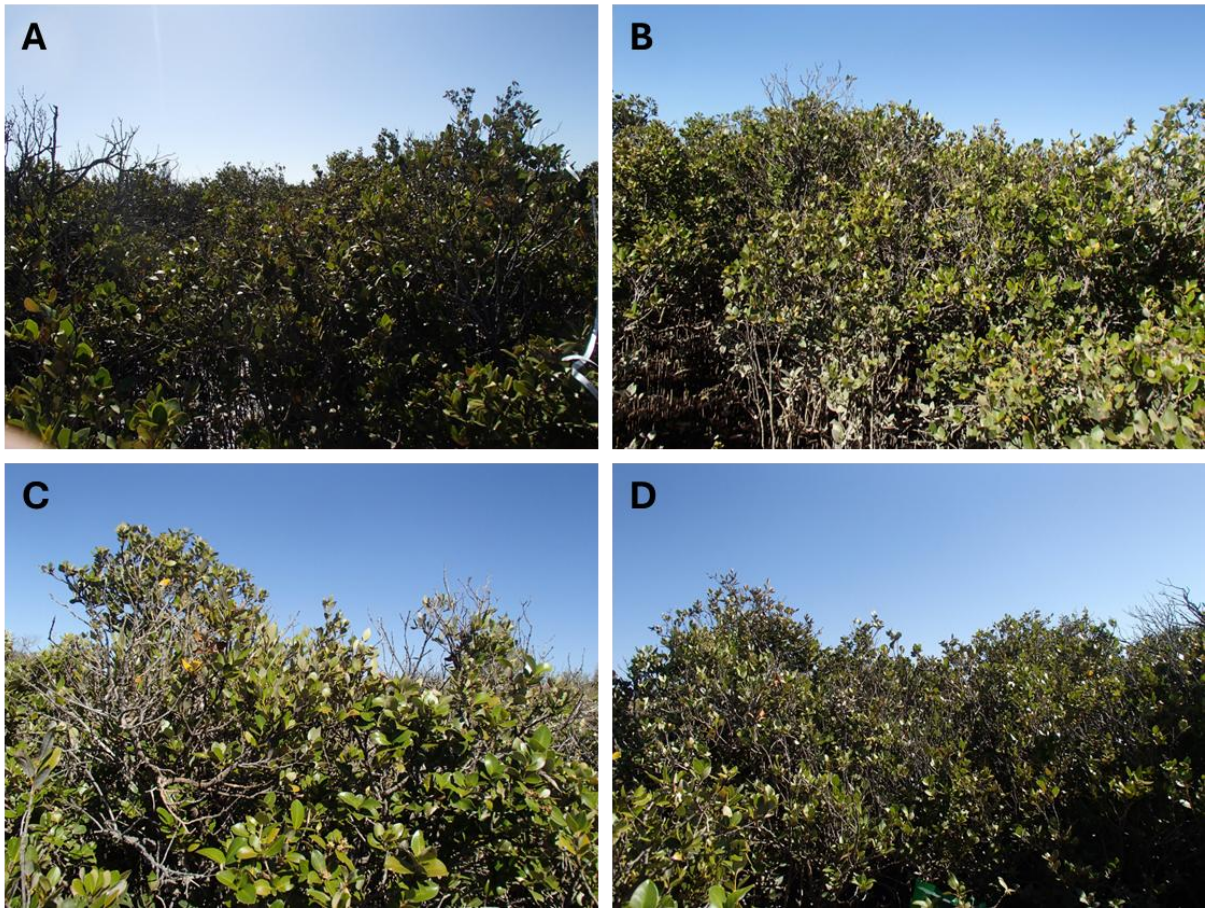


Figure 32. Photos showing the mangrove community at the permanent photo point on Transect 1: A) facing North; B) facing East; C) facing South; and D) facing West.



Figure 33. Photos showing the mangrove community at the permanent photo point on Transect 2: A) facing North; B) facing East; C) facing South; and D) facing West.

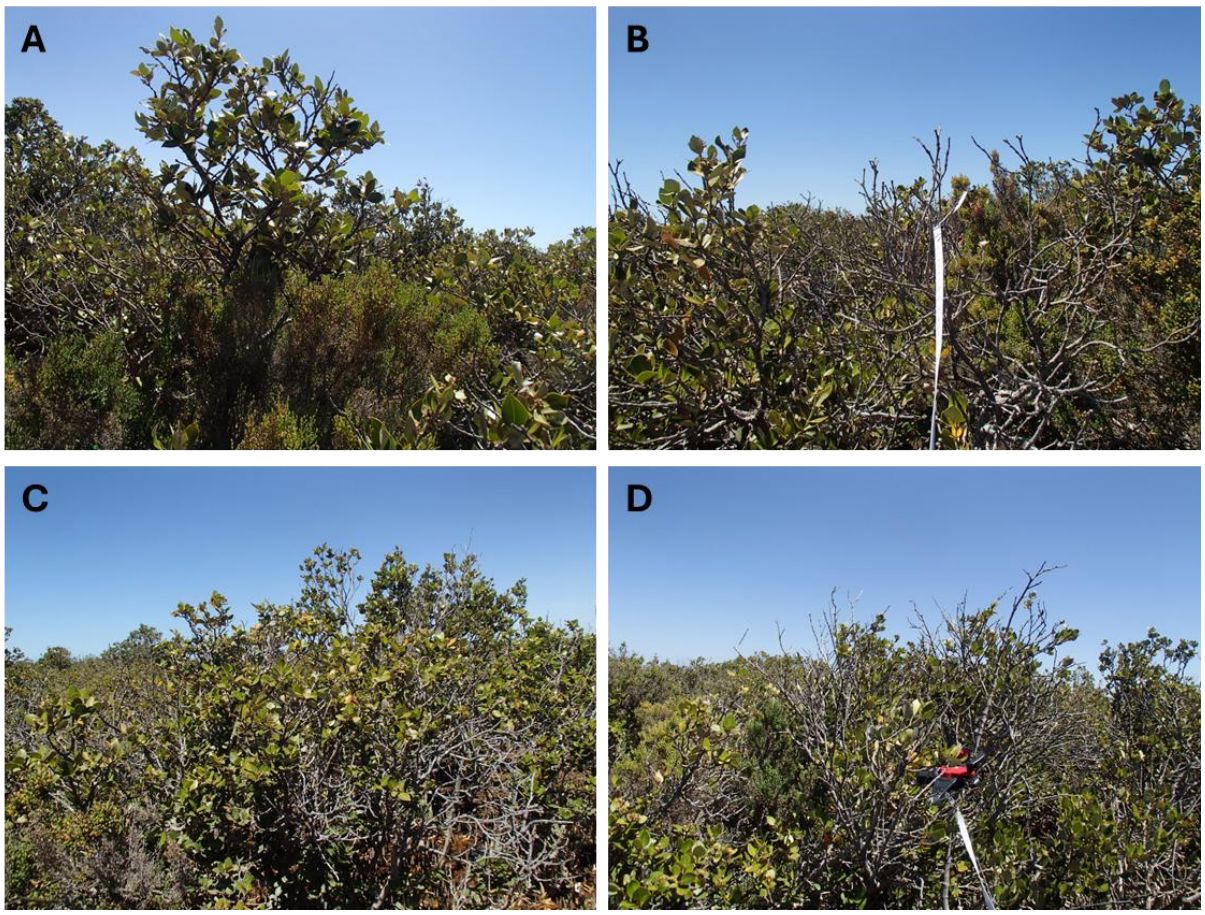


Figure 34. Photos showing the mangrove community at the permanent photo point on Transect 3: A) facing North; B) facing East; C) facing South; and D) facing West.



Figure 35. Photos showing the mangrove community at the permanent photo point on Transect 4: A) facing North; B) facing East; C) facing South; and D) facing West.



Figure 36. Photos showing the mangrove community at the permanent photo point on Transect 5: A) facing North; B) facing East; C) facing South; and D) facing West.

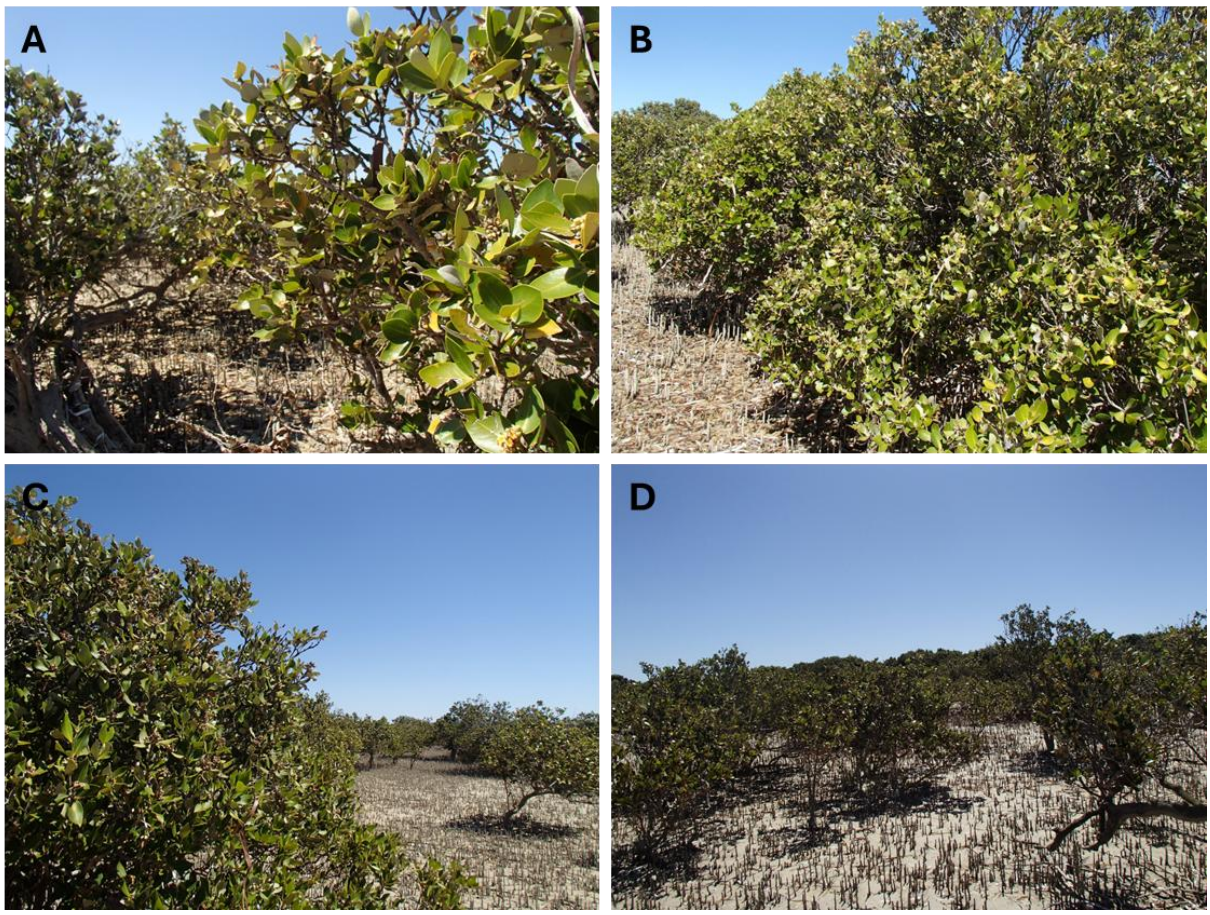


Figure 37. Photos showing the mangrove community at the permanent photo point on Transect 6: A) facing North; B) facing East; C) facing South; and D) facing West.



Figure 38. Photos showing the mangrove community at the permanent photo point on Transect 7: A) facing North; B) facing East; C) facing South; and D) facing West.

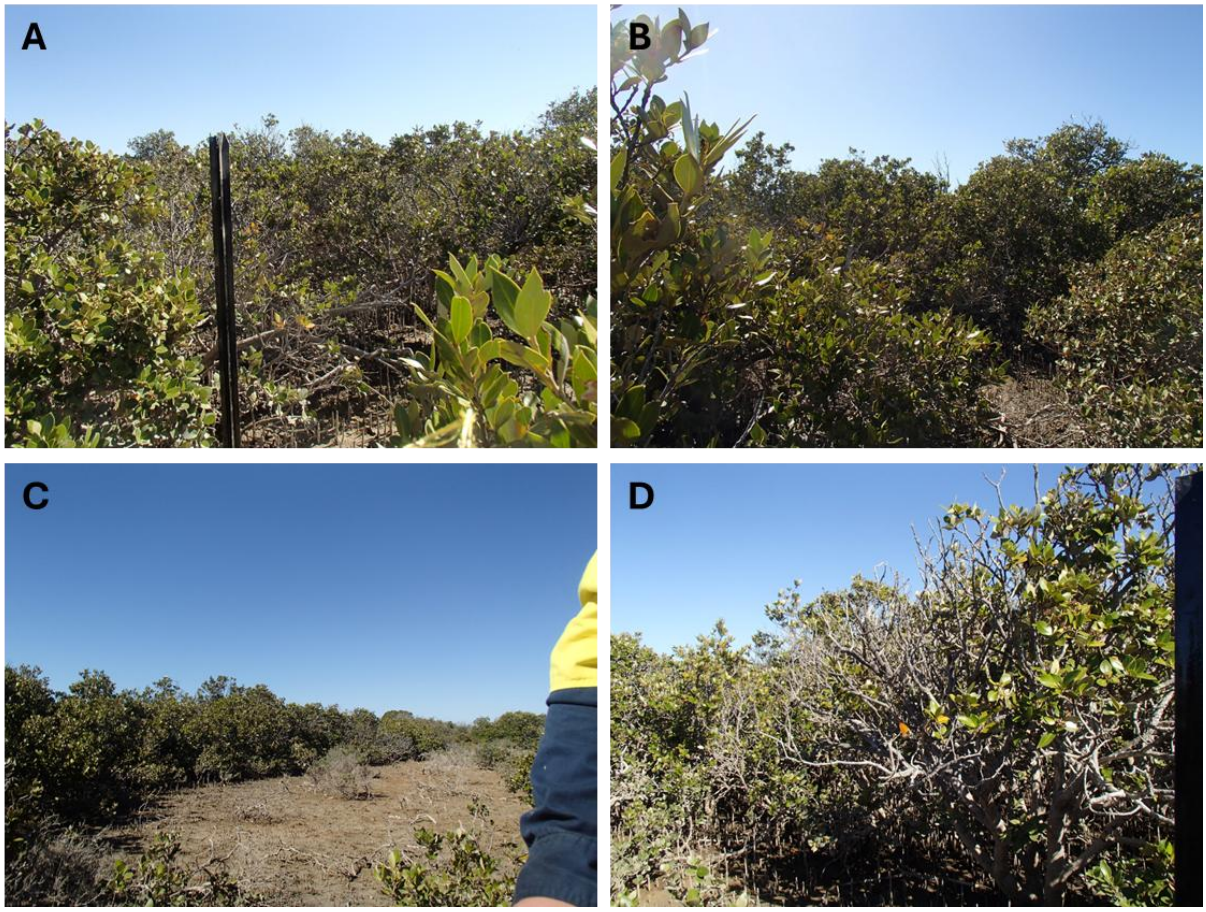


Figure 39. Photos showing the mangrove community at the permanent photo point on Transect 8: A) facing North; B) facing East; C) facing South; and D) facing West.

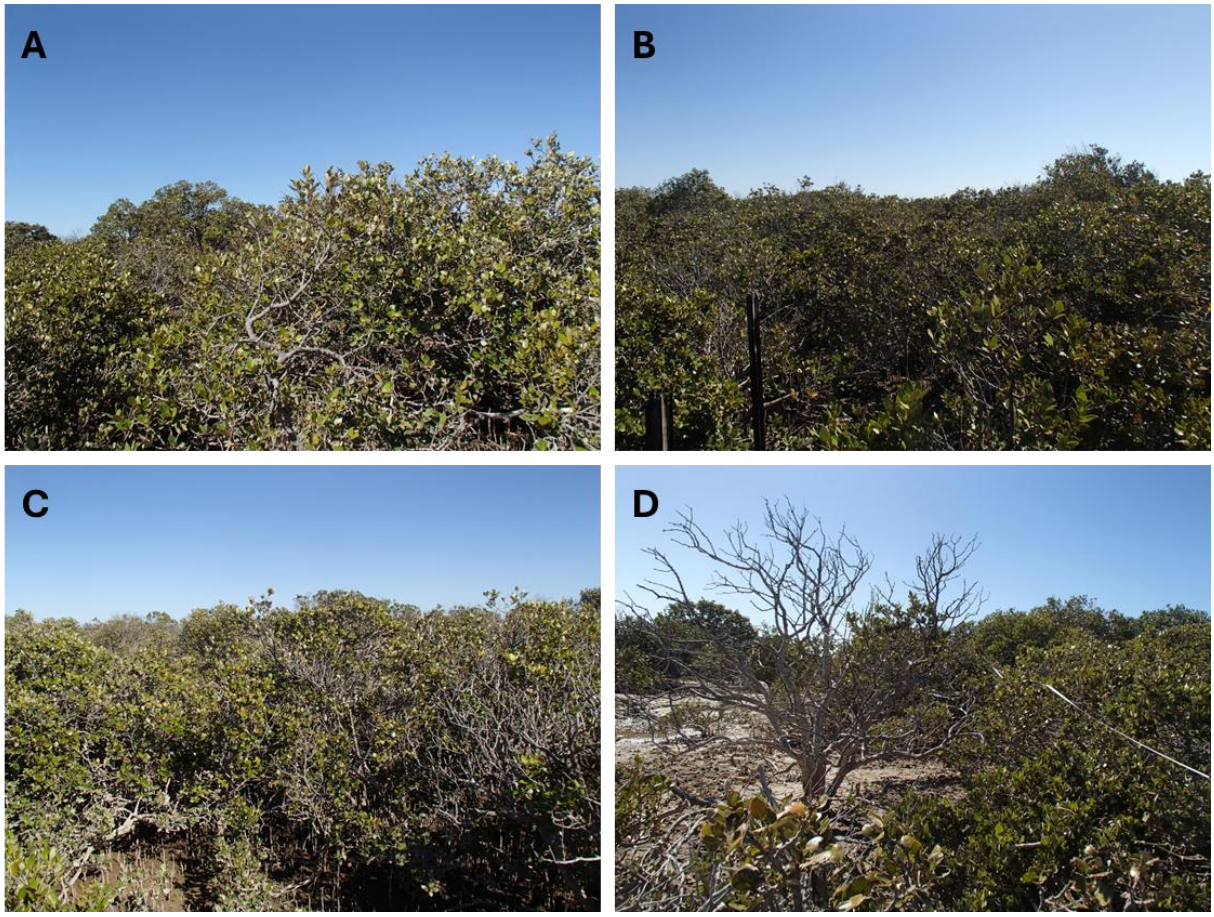


Figure 40. Photos showing the mangrove community at the permanent photo point on Transect 9: A) facing North; B) facing East; C) facing South; and D) facing West.

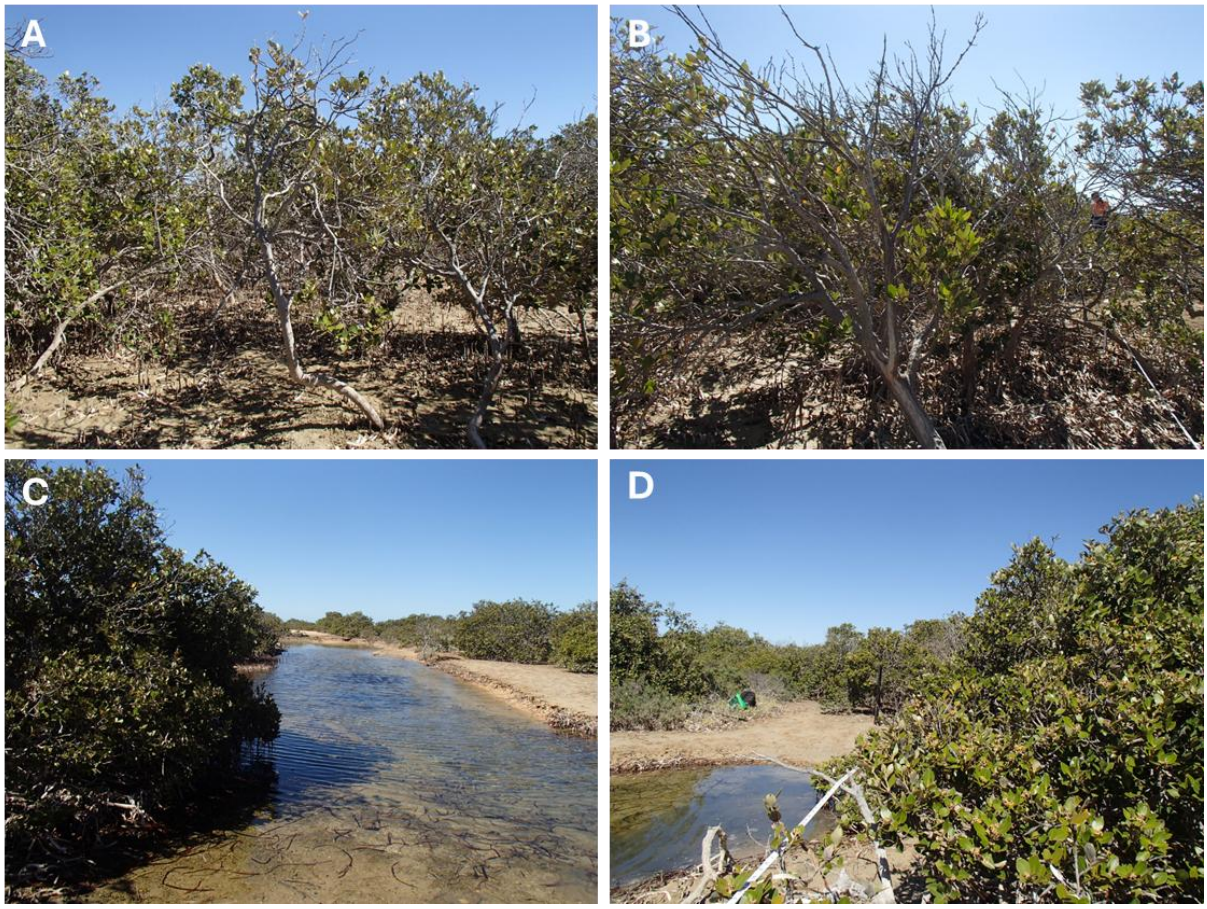


Figure 41. Photos showing the mangrove community at the permanent photo point on Transect 10: A) facing North; B) facing East; C) facing South; and D) facing West.

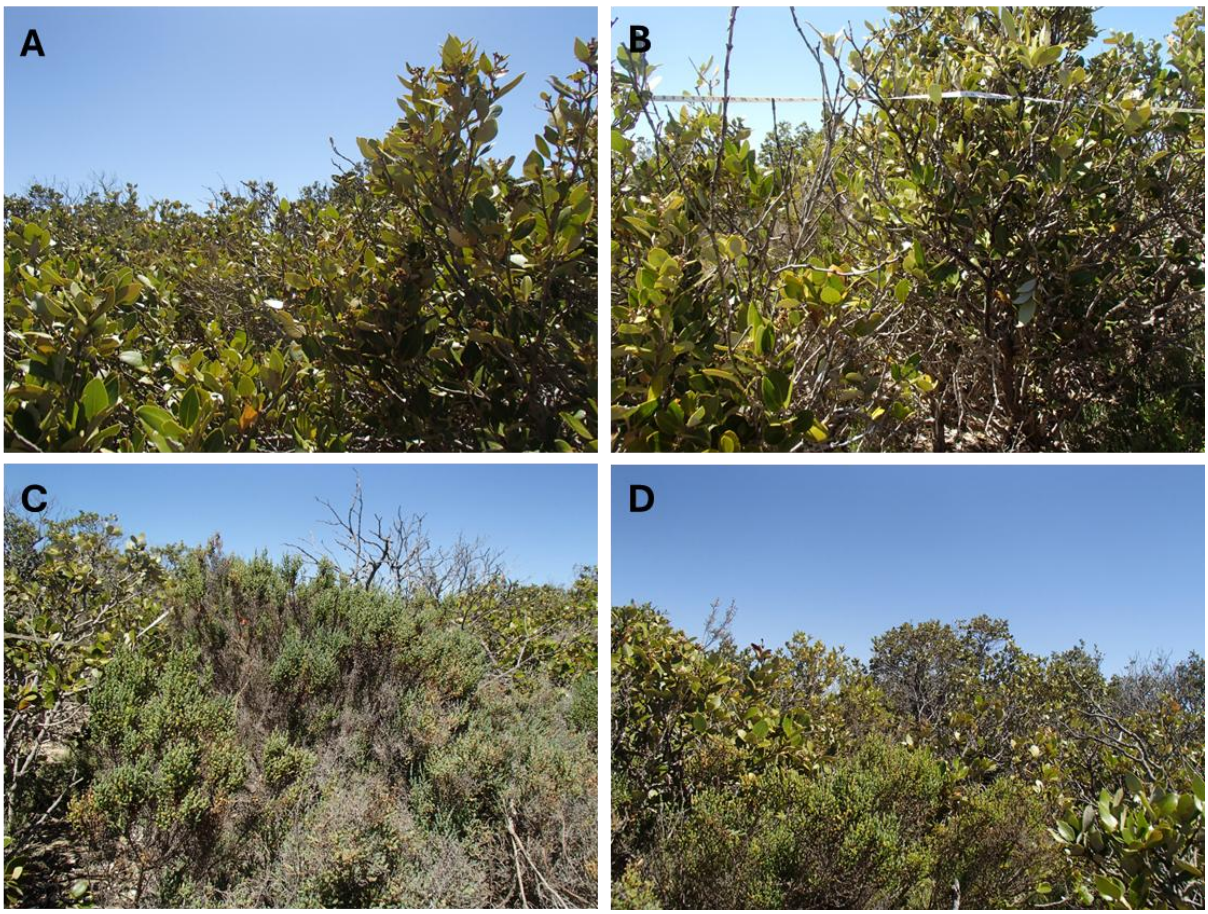


Figure 42. Photos showing the mangrove community at the permanent photo point on Transect 11: A) facing North; B) facing East; C) facing South; and D) facing West.

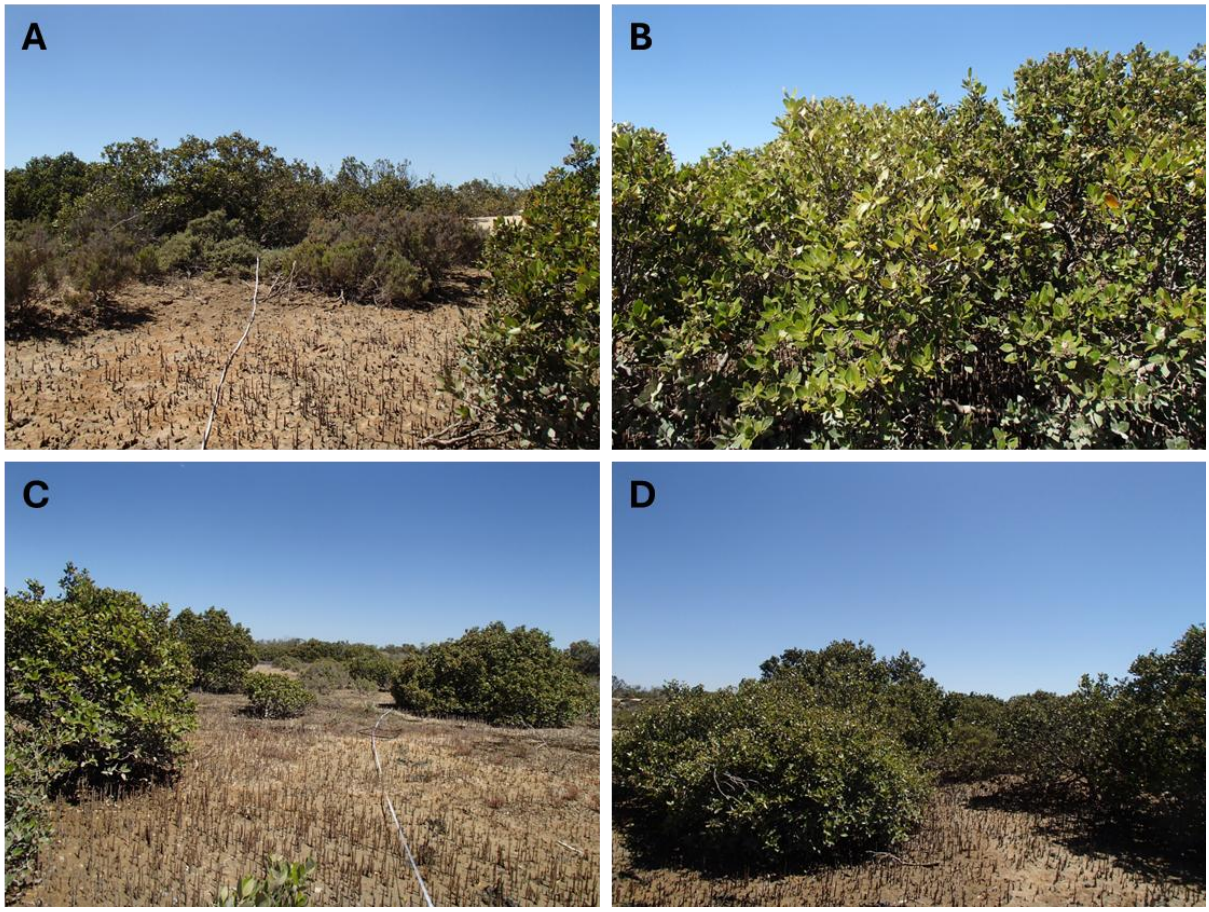


Figure 43. Photos showing the mangrove community at the permanent photo point on Transect 12: A) facing North; B) facing East; C) facing South; and D) facing West.



Figure 44. Photos showing the mangrove community at the permanent photo point on Transect 13: A) facing North; B) facing East; C) facing South; and D) facing West.

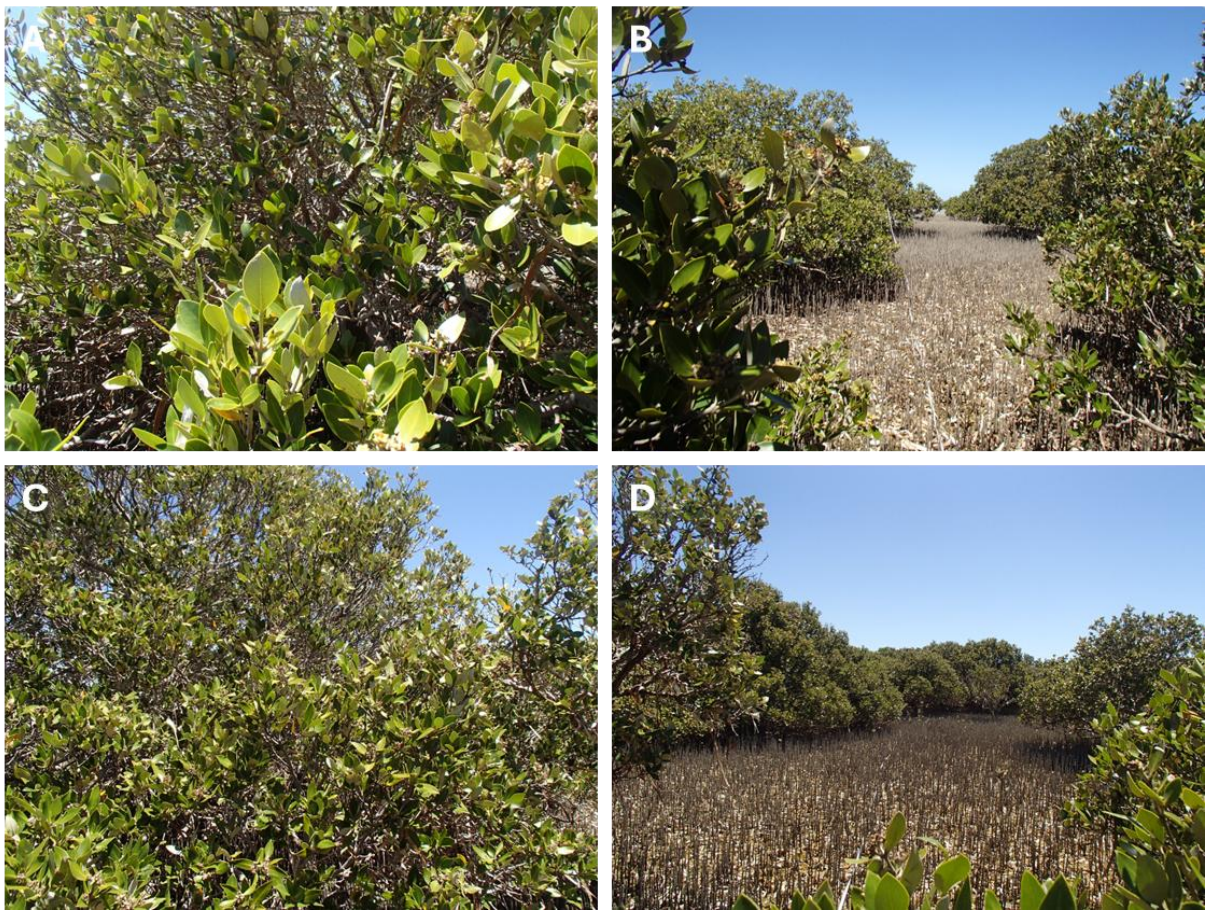


Figure 45. Photos showing the mangrove community at the permanent photo point on Transect 14: A) facing North; B) facing East; C) facing South; and D) facing West.



Figure 46. Photos showing the mangrove community at the permanent photo point on Transect 15: A) facing North; B) facing East; C) facing South; and D) facing West.

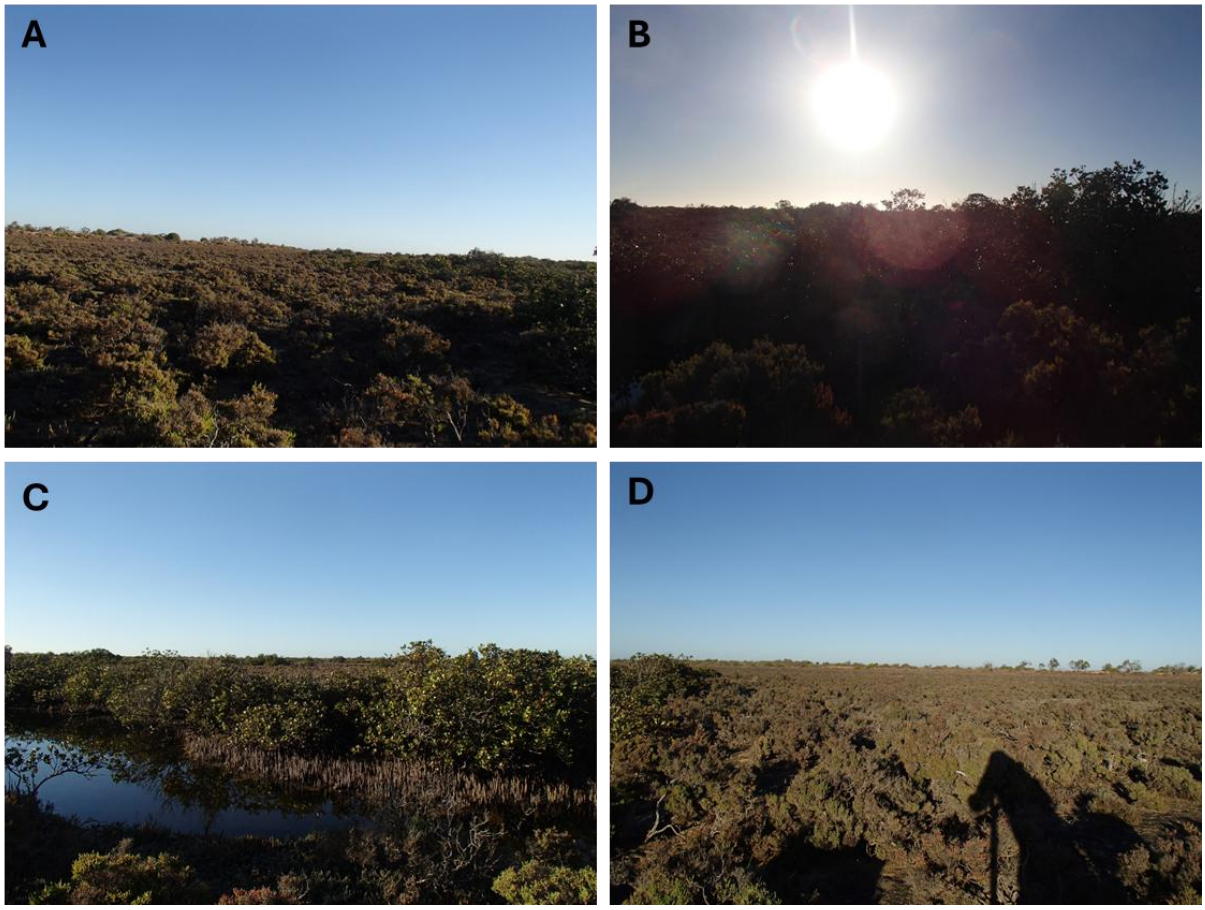


Figure 47. Photos showing the mangrove community at permanent photo point 16, which was not located along a transect: A) facing North; B) facing East; C) facing South; and D) facing West.

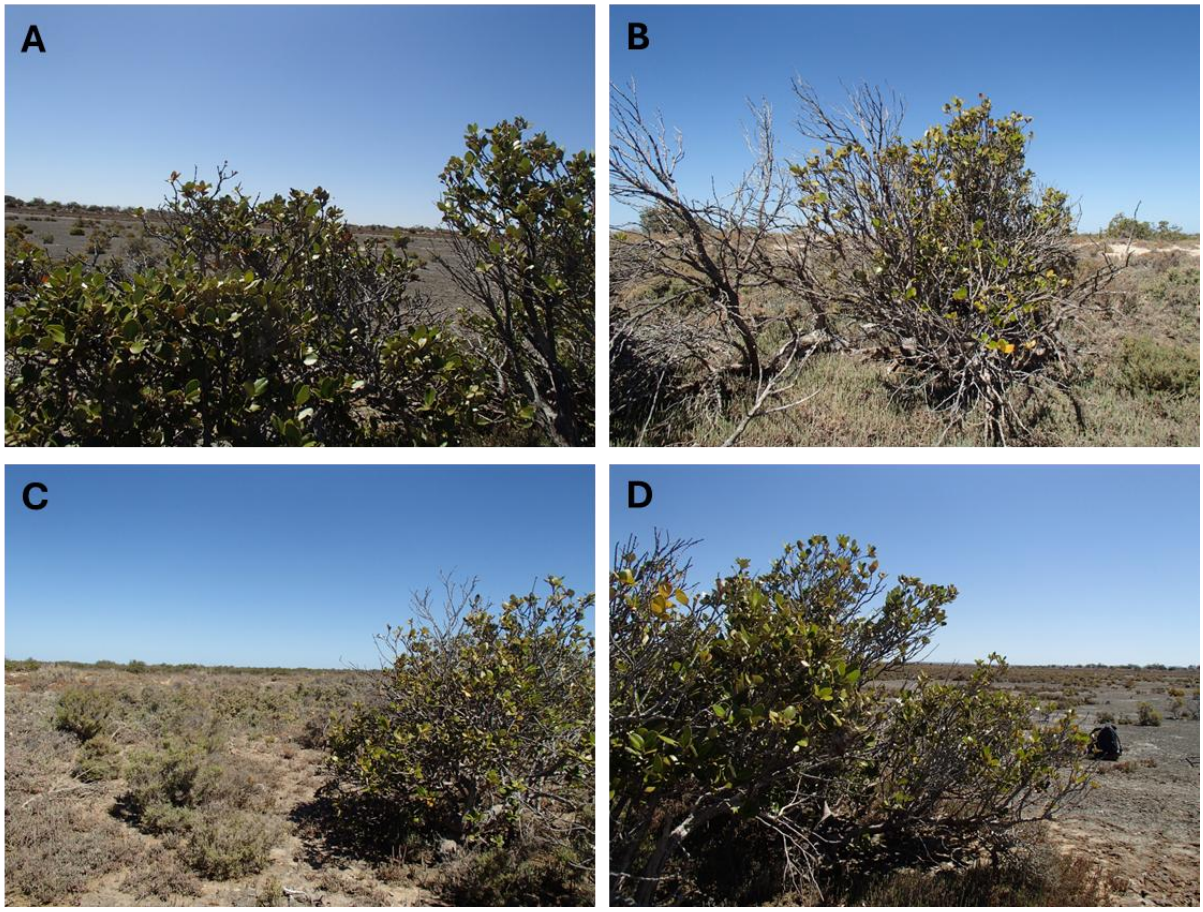


Figure 48. Photos showing the mangrove community at the permanent photo point on Transect 17: A) facing North; B) facing East; C) facing South; and D) facing West.

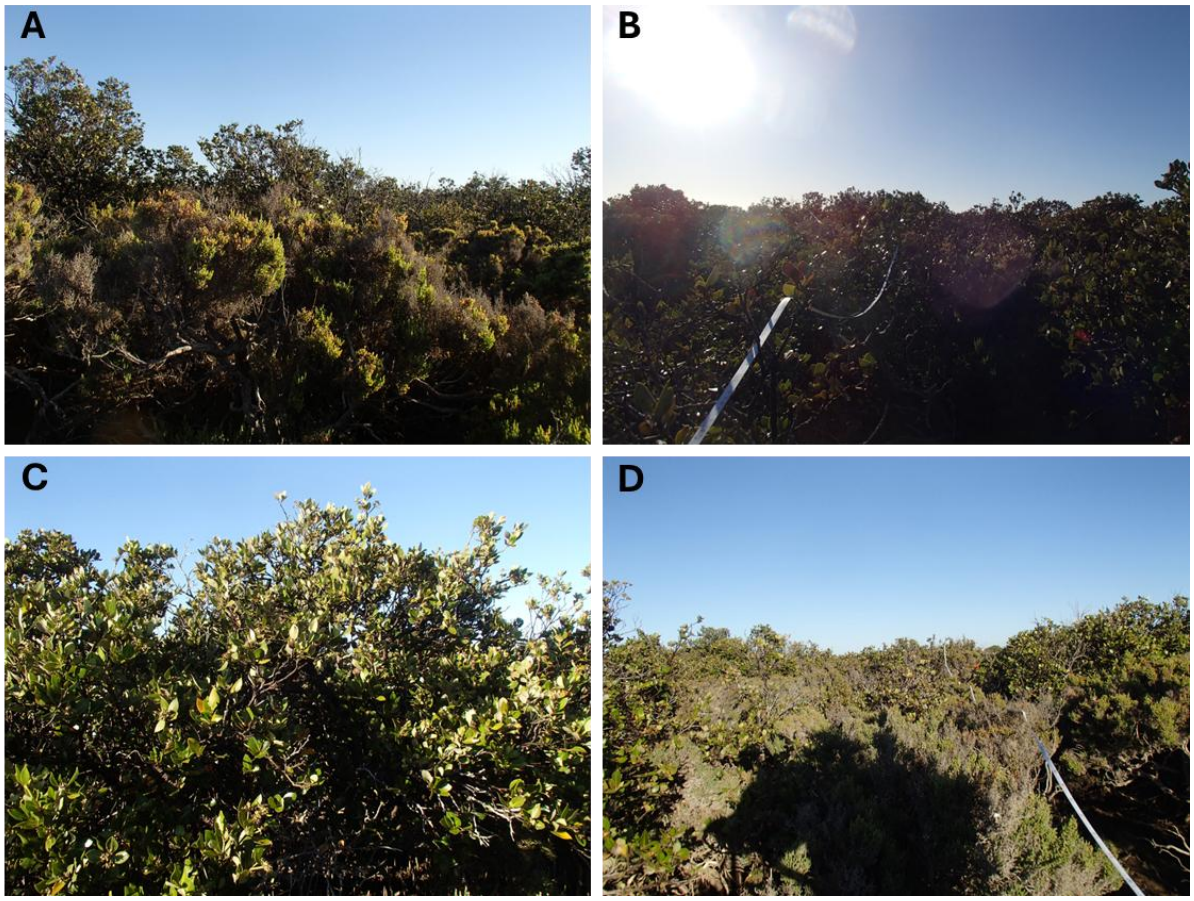


Figure 49. Photos showing the mangrove community at the permanent photo point on Transect 18: A) facing North; B) facing East; C) facing South; and D) facing West.

Appendix E Permanent photo points Autumn survey

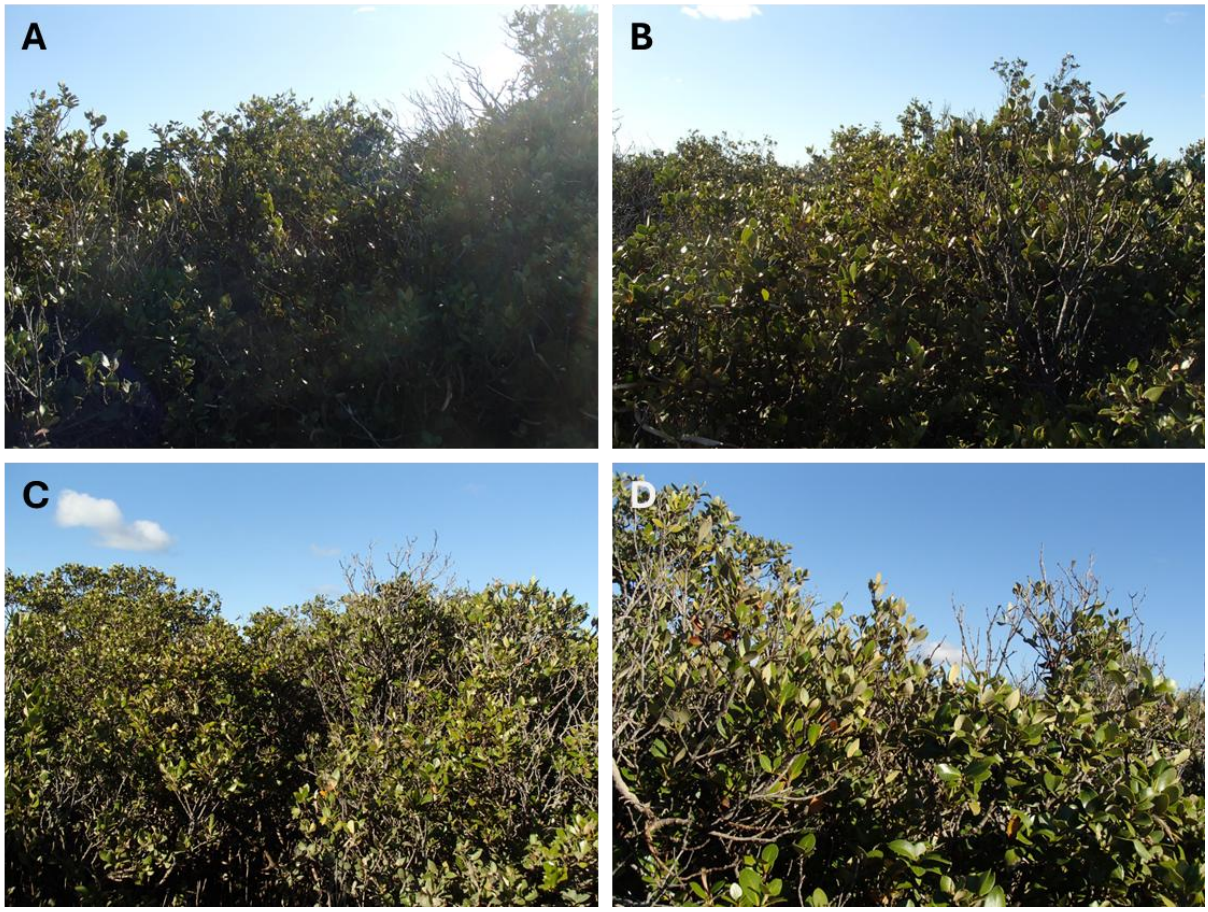


Figure 50. Photos showing the mangrove community at the permanent photo point on Transect 1: A) facing North; B) facing East; C) facing South; and D) facing West.



Figure 51. Photos showing the mangrove community at the permanent photo point on Transect 2: A) facing North; B) facing East; C) facing South; and D) facing West.

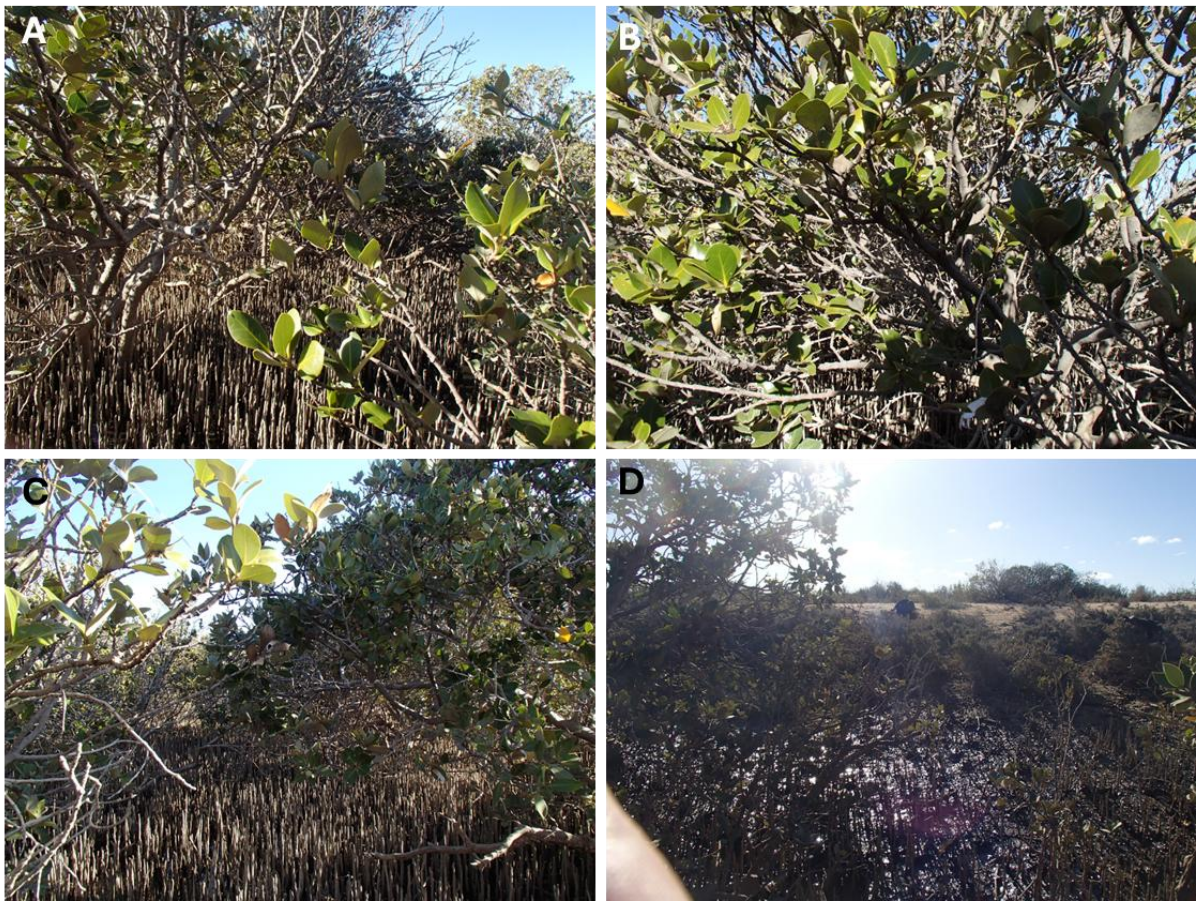


Figure 52. Photos showing the mangrove community at the permanent photo point on Transect 7: A) facing North; B) facing East; C) facing South; and D) facing West.

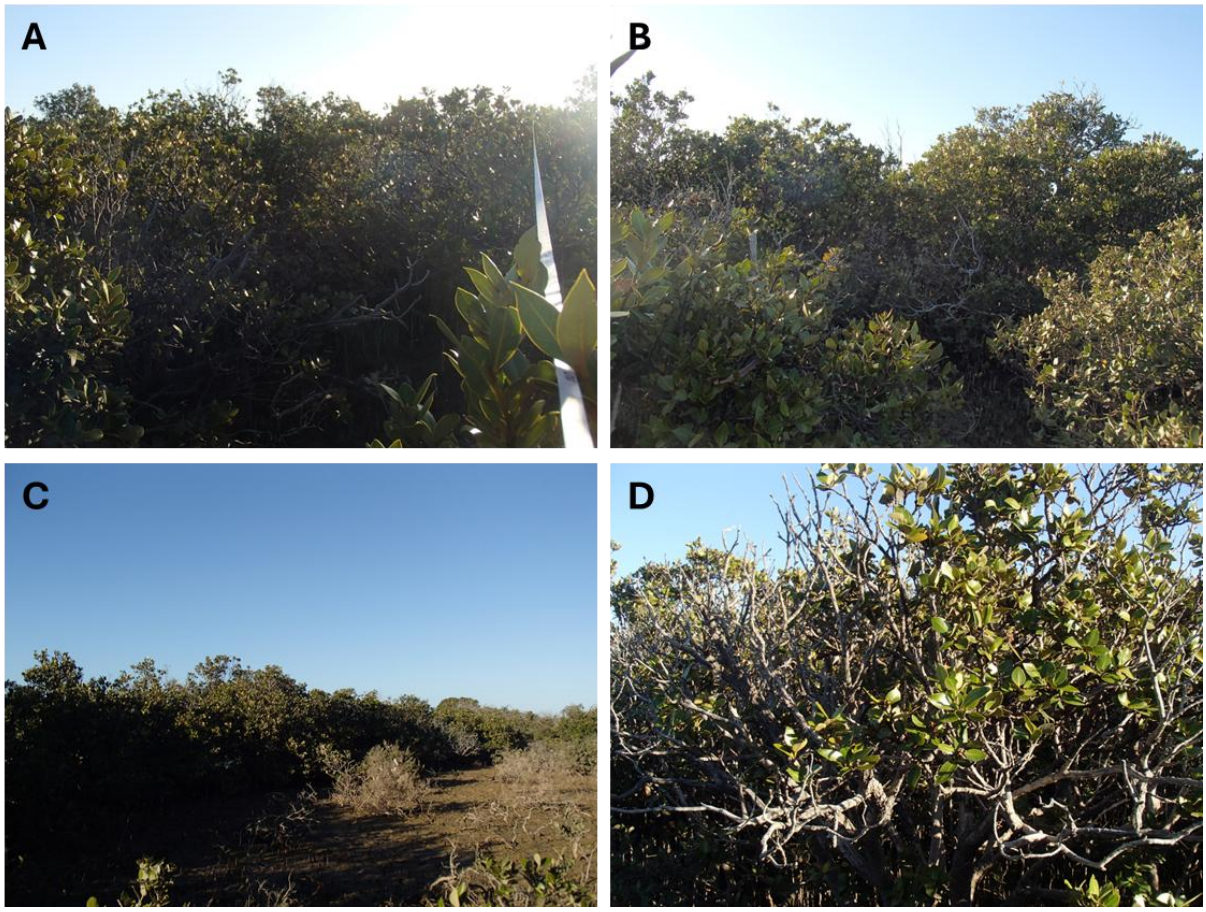


Figure 53. Photos showing the mangrove community at the permanent photo point on Transect 8: A) facing North; B) facing East; C) facing South; and D) facing West.

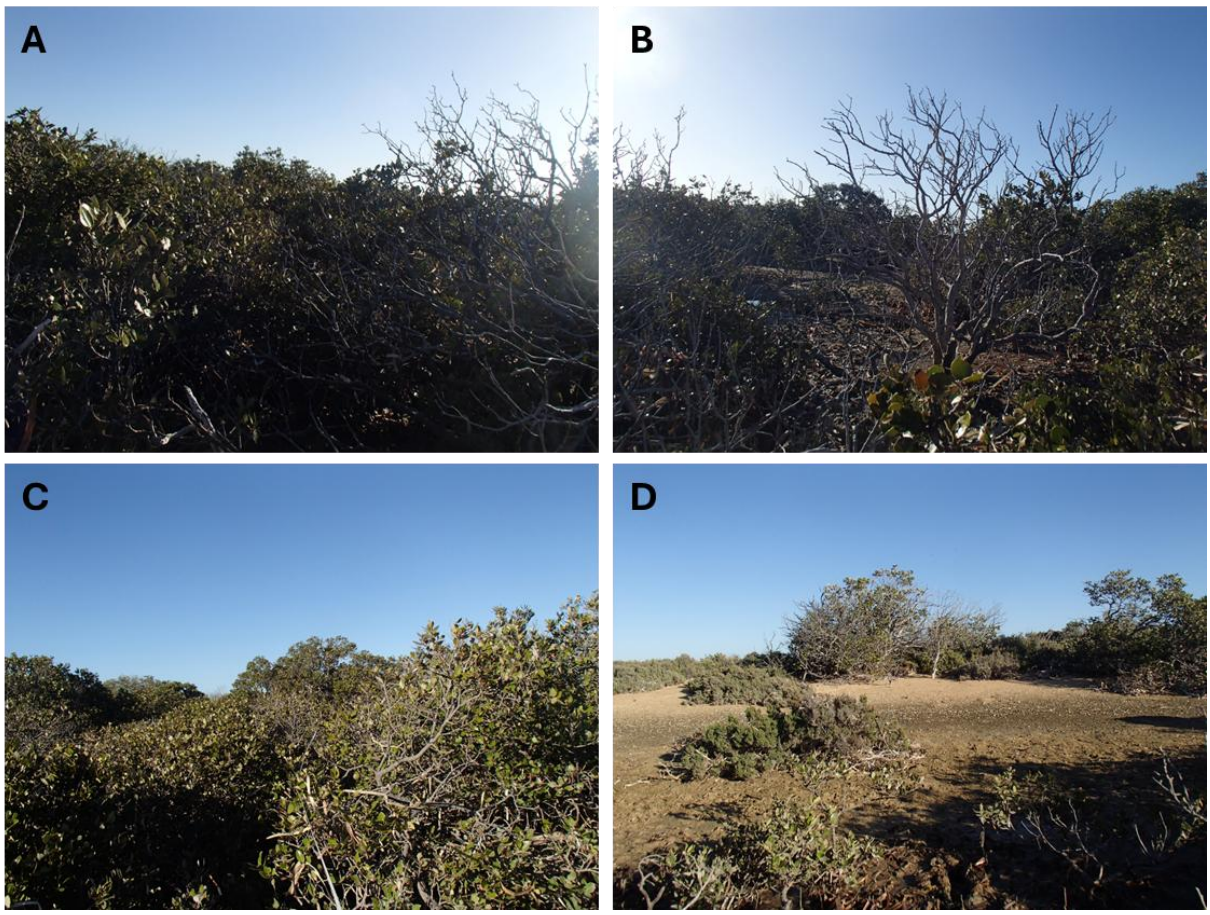


Figure 54. Photos showing the mangrove community at the permanent photo point on Transect 9: A) facing North; B) facing East; C) facing South; and D) facing West.

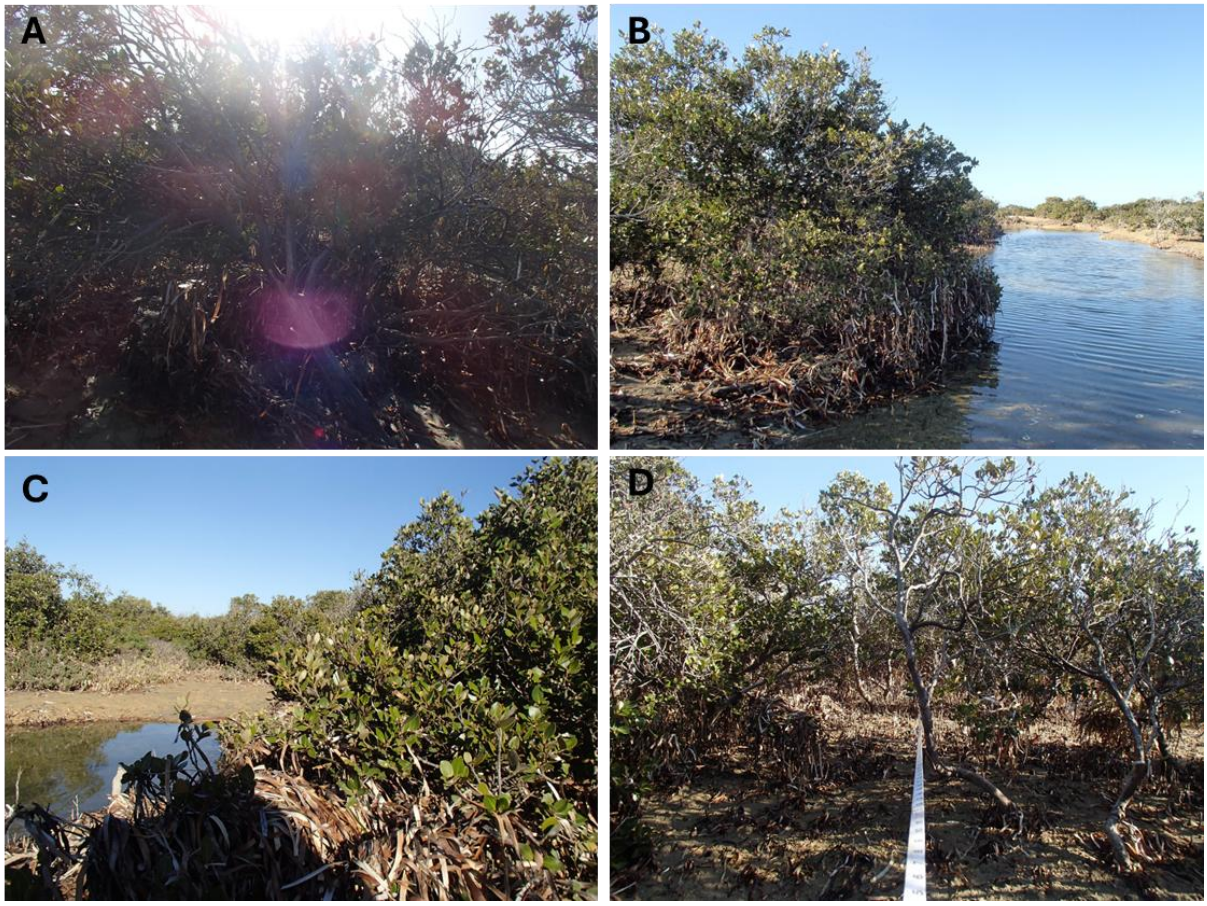


Figure 55. Photos showing the mangrove community at the permanent photo point on Transect 10: A) facing North; B) facing East; C) facing South; and D) facing West.

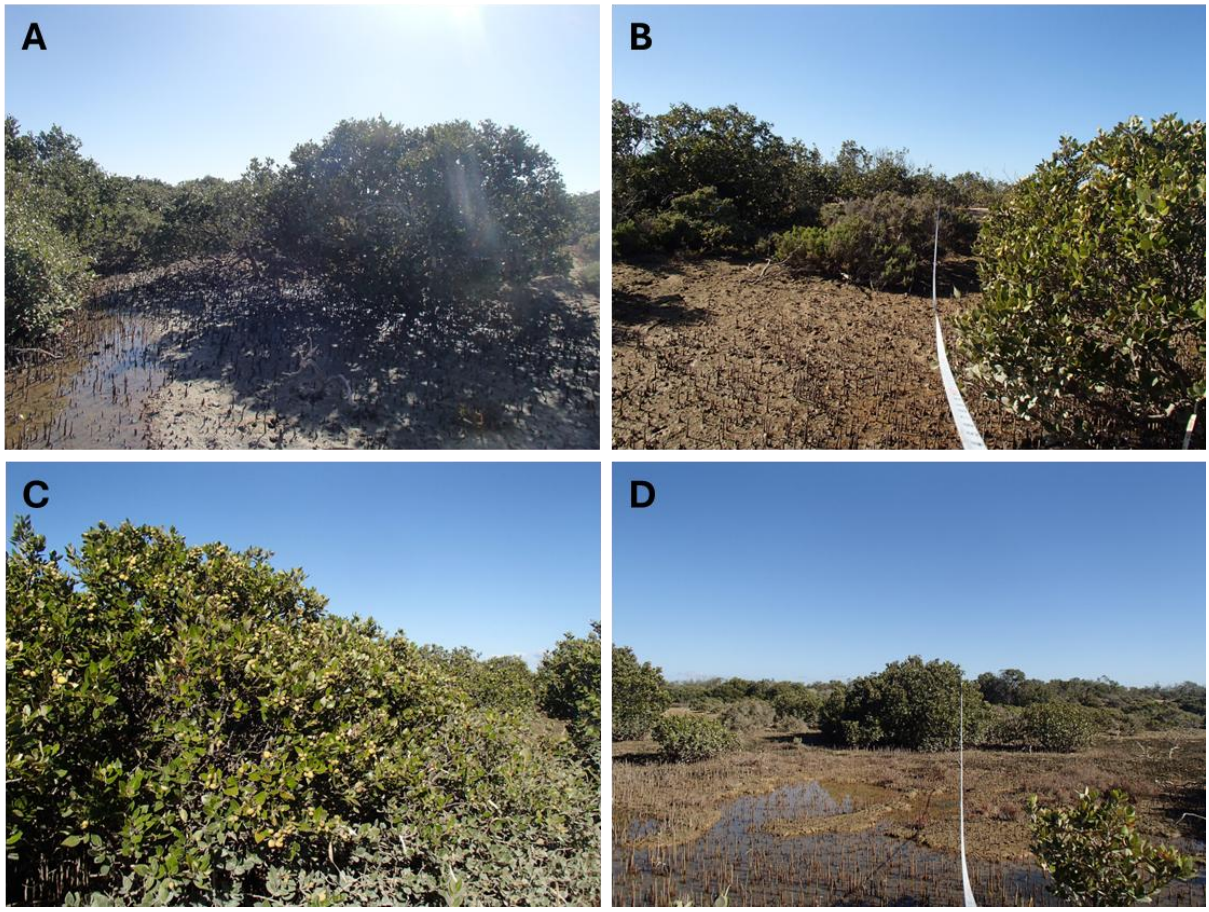


Figure 56. Photos showing the mangrove community at the permanent photo point on Transect 12: A) facing North; B) facing East; C) facing South; and D) facing West.



Figure 57. Photos showing the mangrove community at the permanent photo point on Transect 13: A) facing North; B) facing East; C) facing South; and D) facing West.

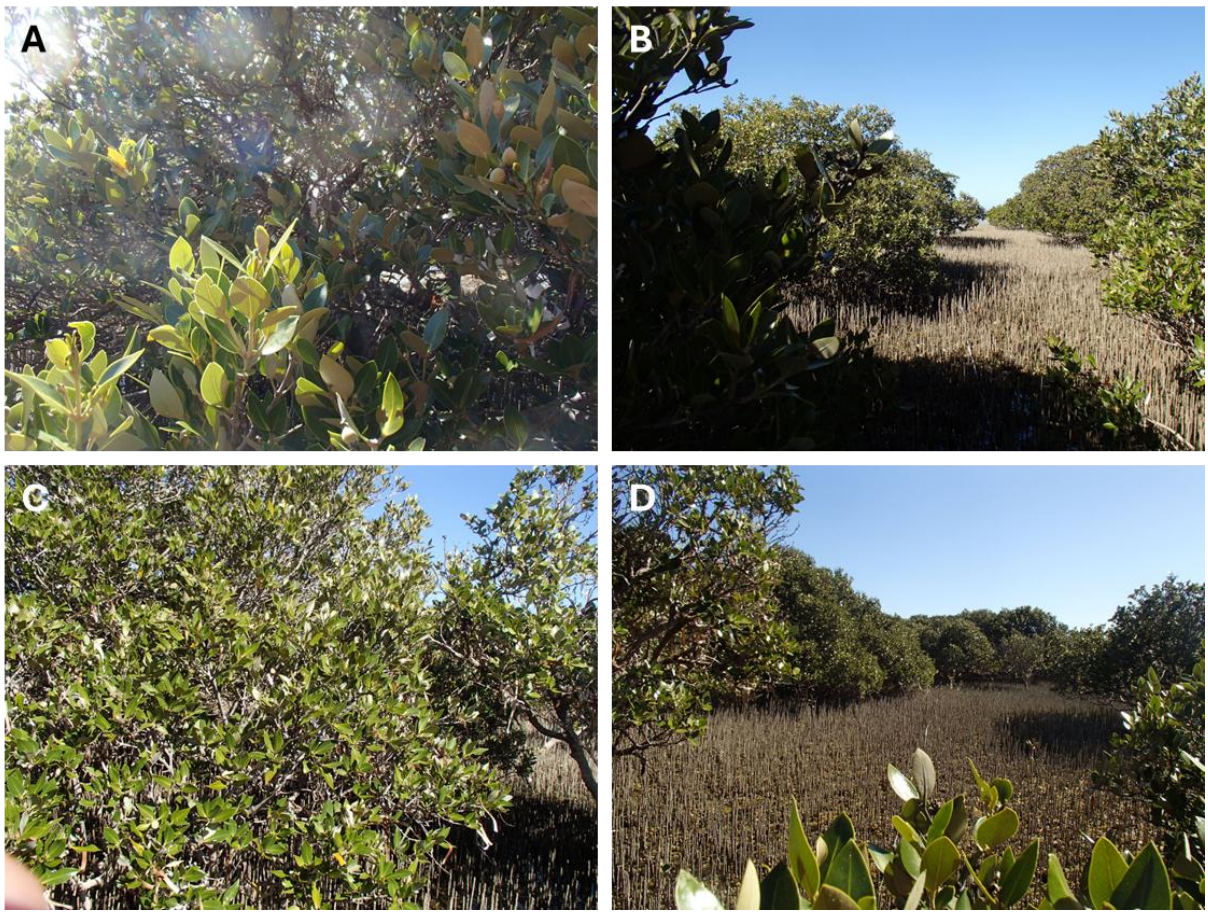


Figure 58. Photos showing the mangrove community at the permanent photo point on Transect 14: A) facing North; B) facing East; C) facing South; and D) facing West.

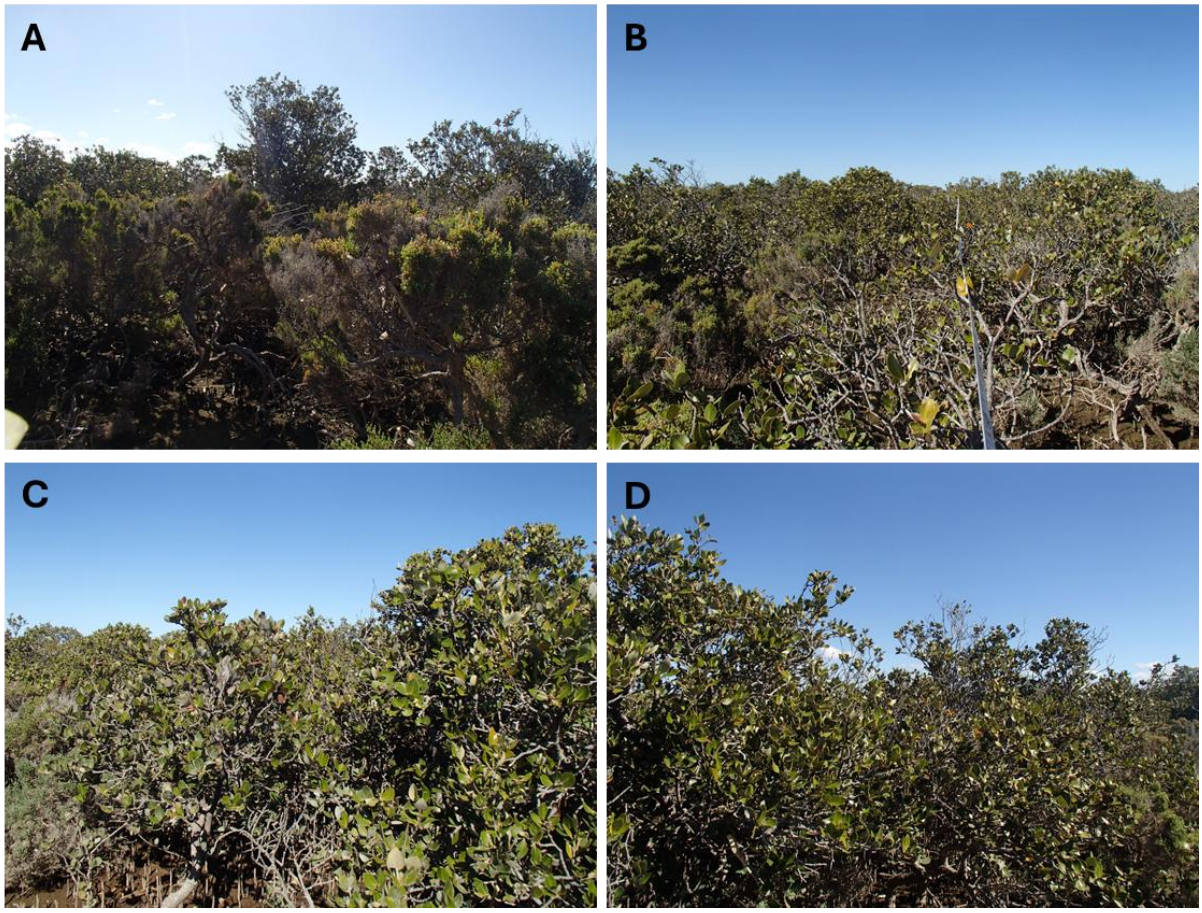


Figure 59. Photos showing the mangrove community at the permanent photo point on Transect 18: A) facing North; B) facing East; C) facing South; and D) facing West.

Appendix F Permanent photo points Winter survey

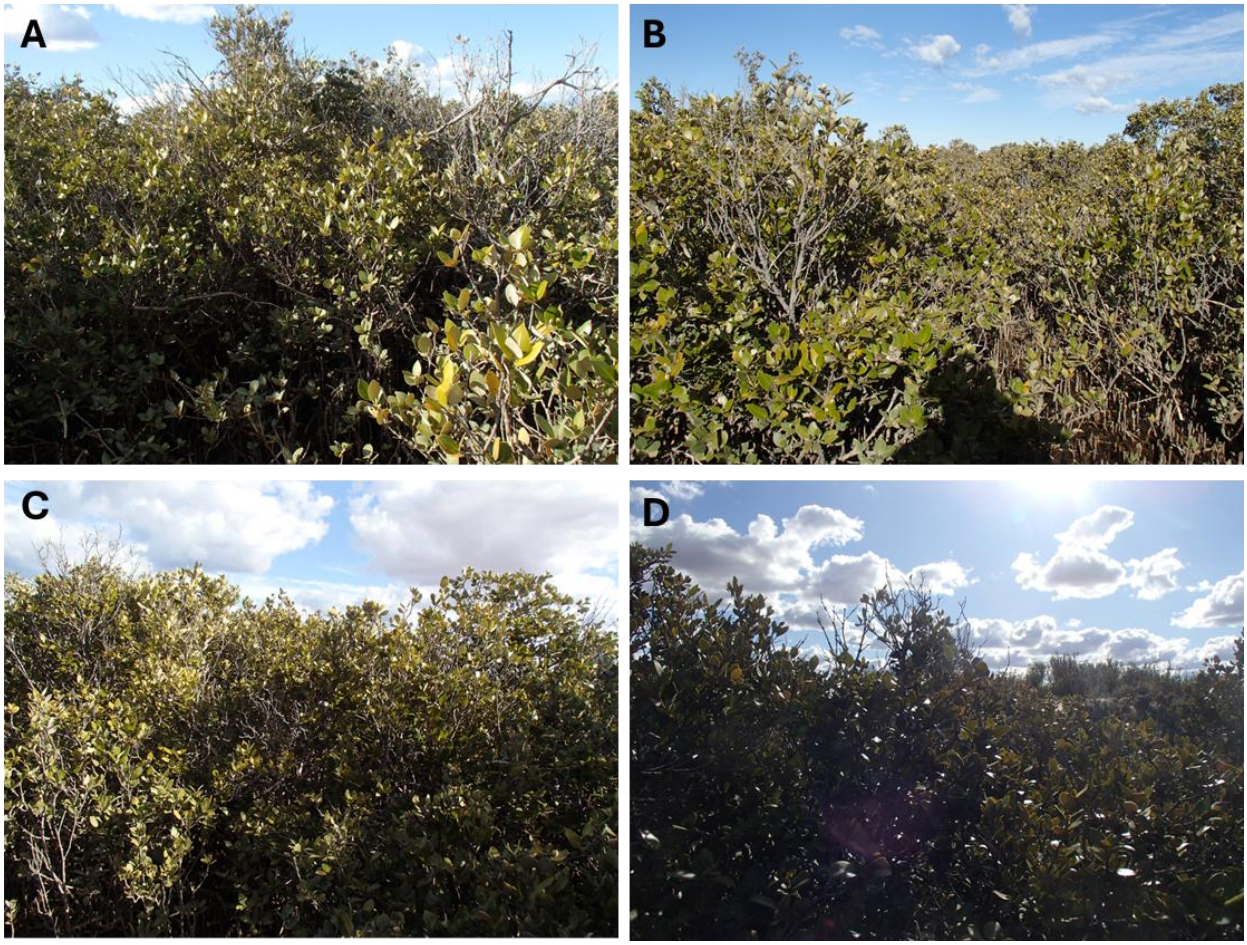


Figure 60. Photos showing the mangrove community at the permanent photo point on Transect 1: A) facing North; B) facing East; C) facing South; and D) facing West.

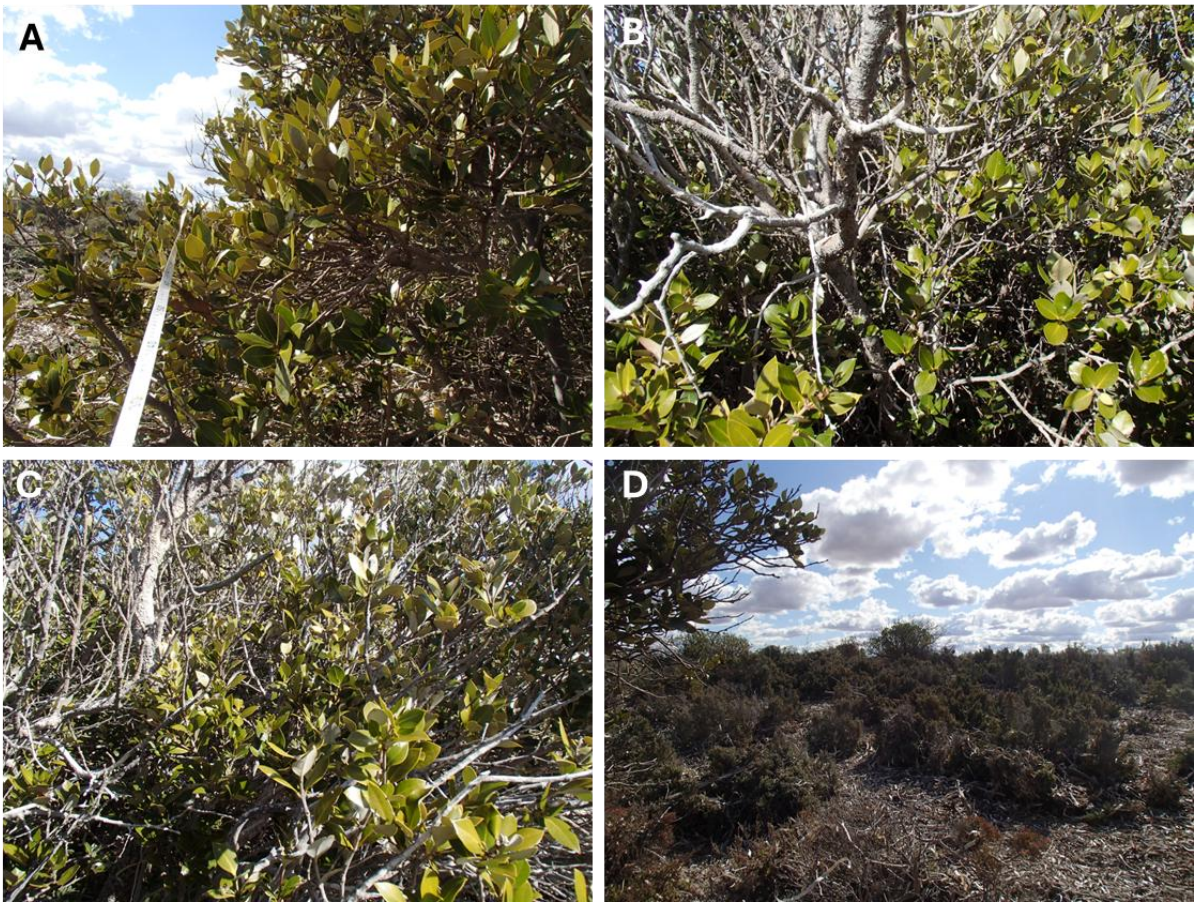


Figure 61. Photos showing the mangrove community at the permanent photo point on Transect 2: A) facing North; B) facing East; C) facing South; and D) facing West.



Figure 62. Photos showing the mangrove community at the permanent photo point on Transect 7: A) facing North; B) facing East; C) facing South; and D) facing West.

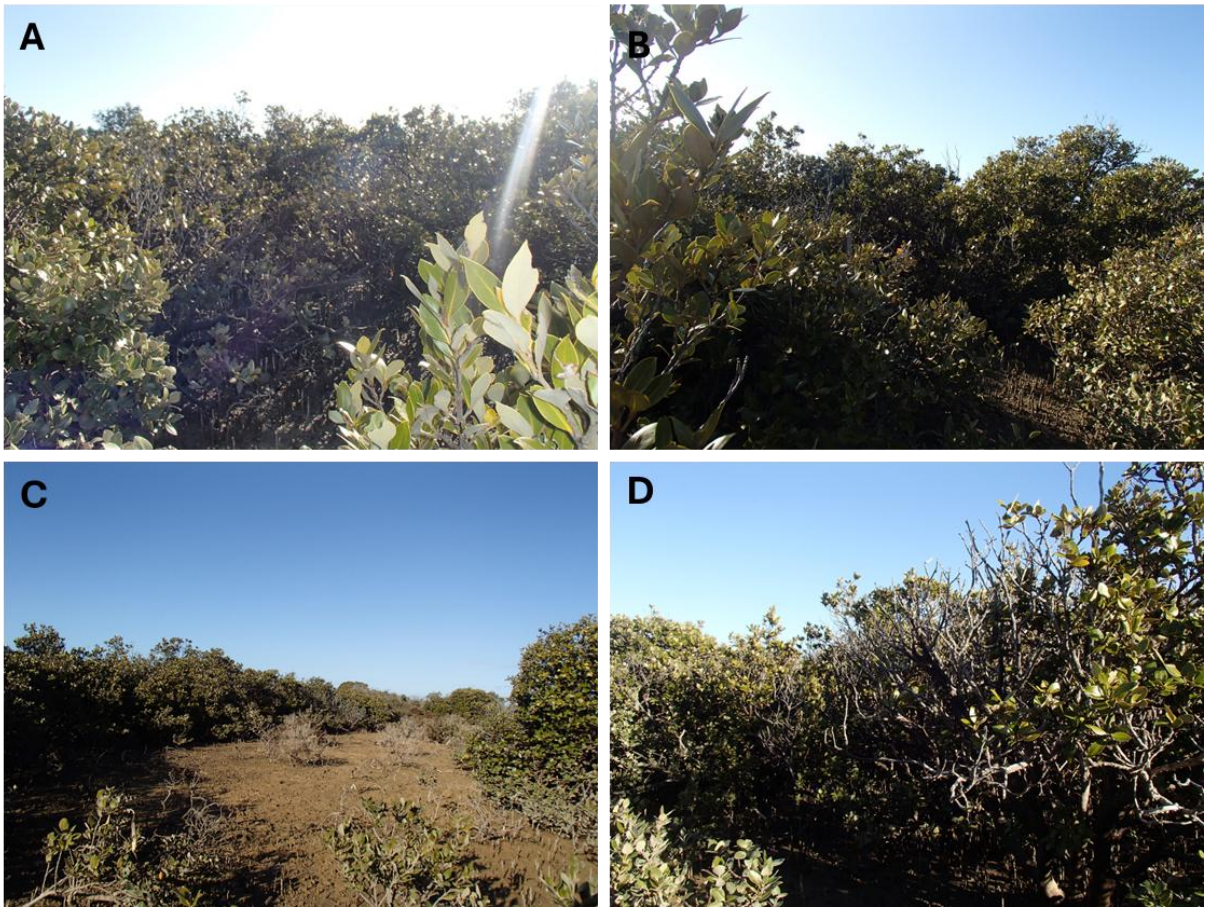


Figure 63. Photos showing the mangrove community at the permanent photo point on Transect 8: A) facing North; B) facing East; C) facing South; and D) facing West.

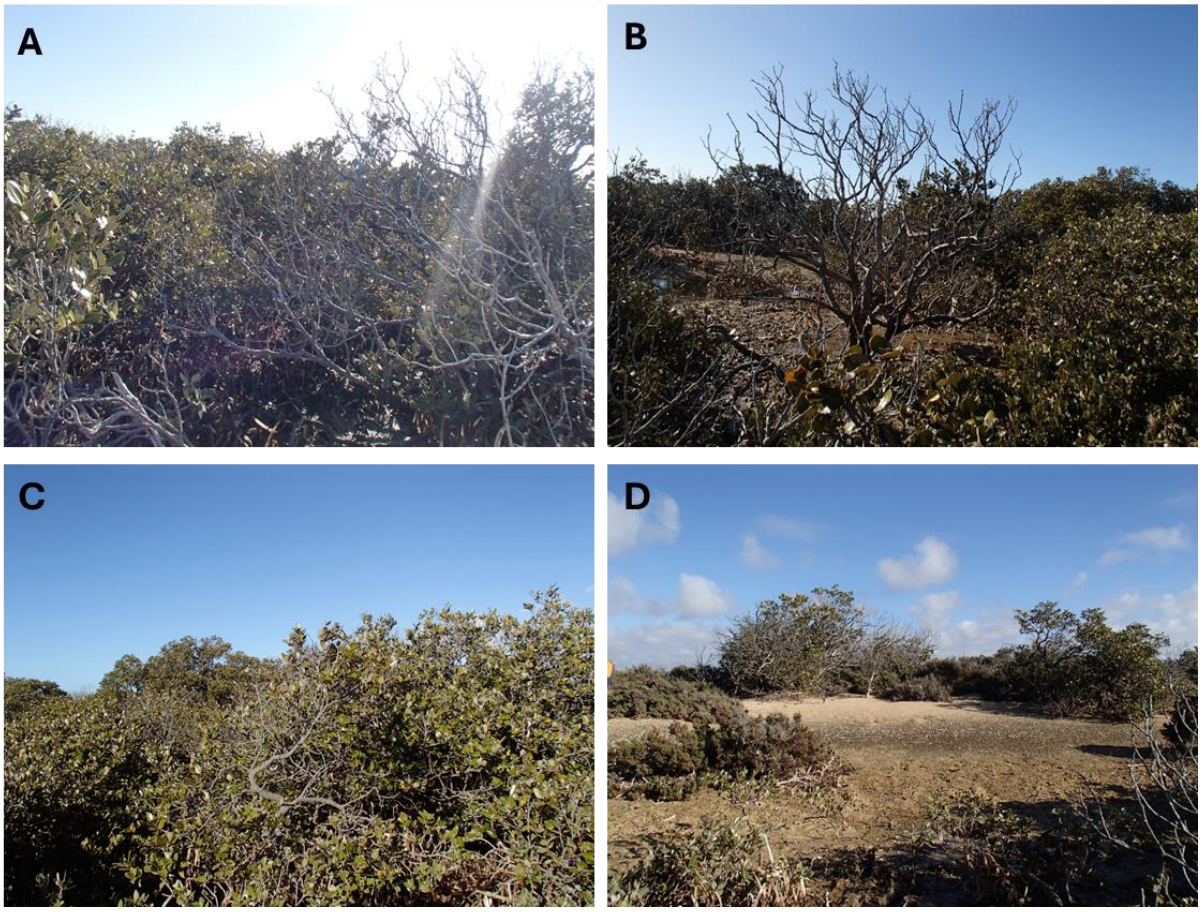


Figure 64. Photos showing the mangrove community at the permanent photo point on Transect 9: A) facing North; B) facing East; C) facing South; and D) facing West.

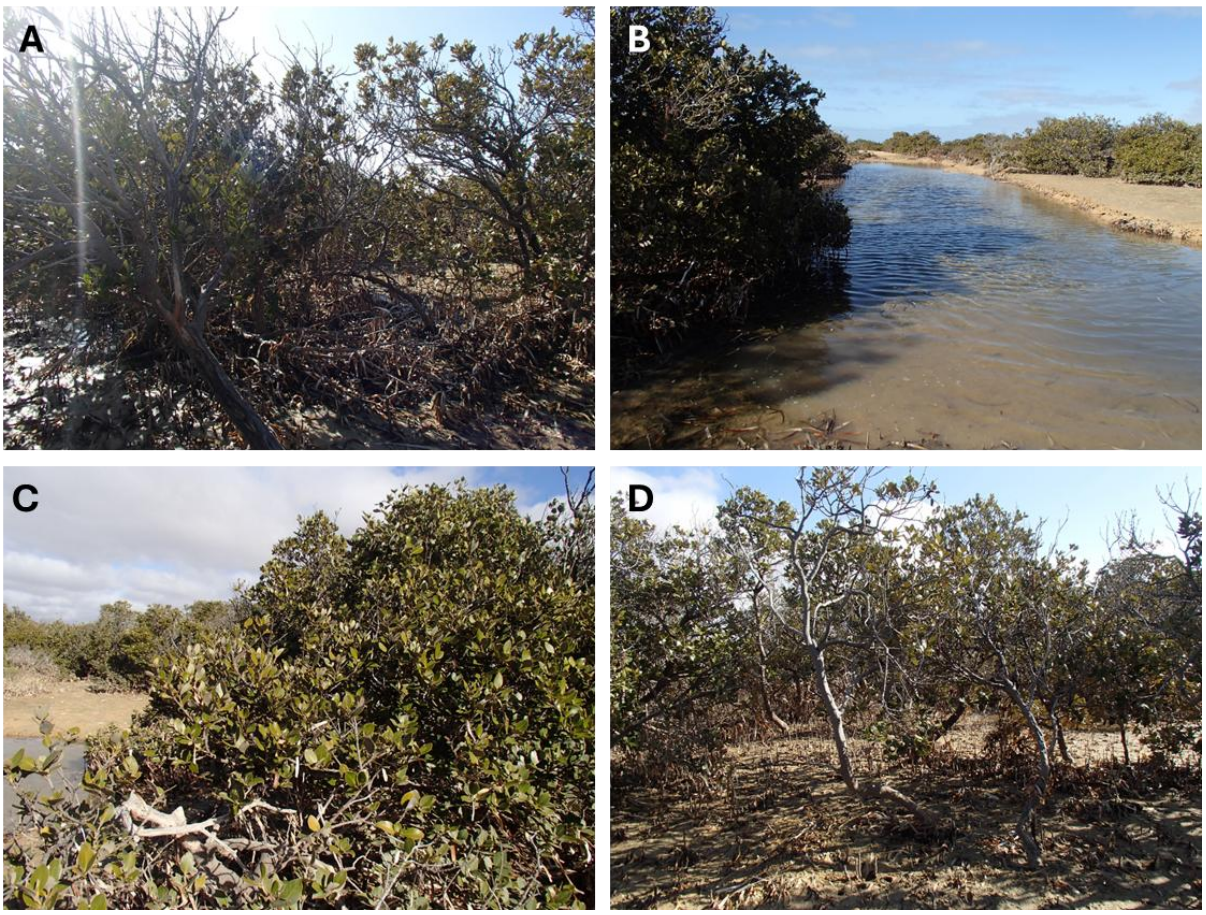


Figure 65. Photos showing the mangrove community at the permanent photo point on Transect 10: A) facing North; B) facing East; C) facing South; and D) facing West.

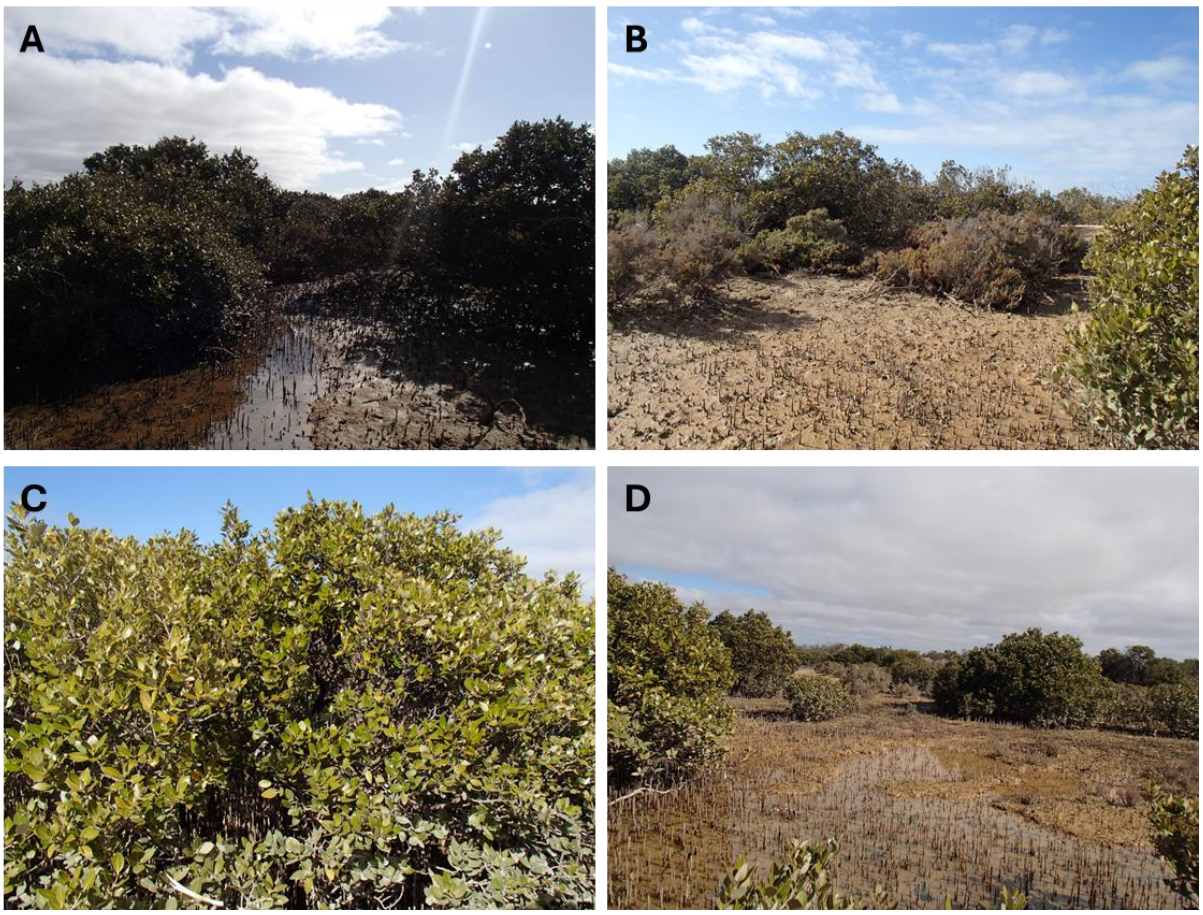


Figure 66. Photos showing the mangrove community at the permanent photo point on Transect 12: A) facing North; B) facing East; C) facing South; and D) facing West.



Figure 67. Photos showing the mangrove community at the permanent photo point on Transect 13: A) facing North; B) facing East; C) facing South; and D) facing West.



Figure 68. Photos showing the mangrove community at the permanent photo point on Transect 14: A) facing North; B) facing East; C) facing South; and D) facing West.

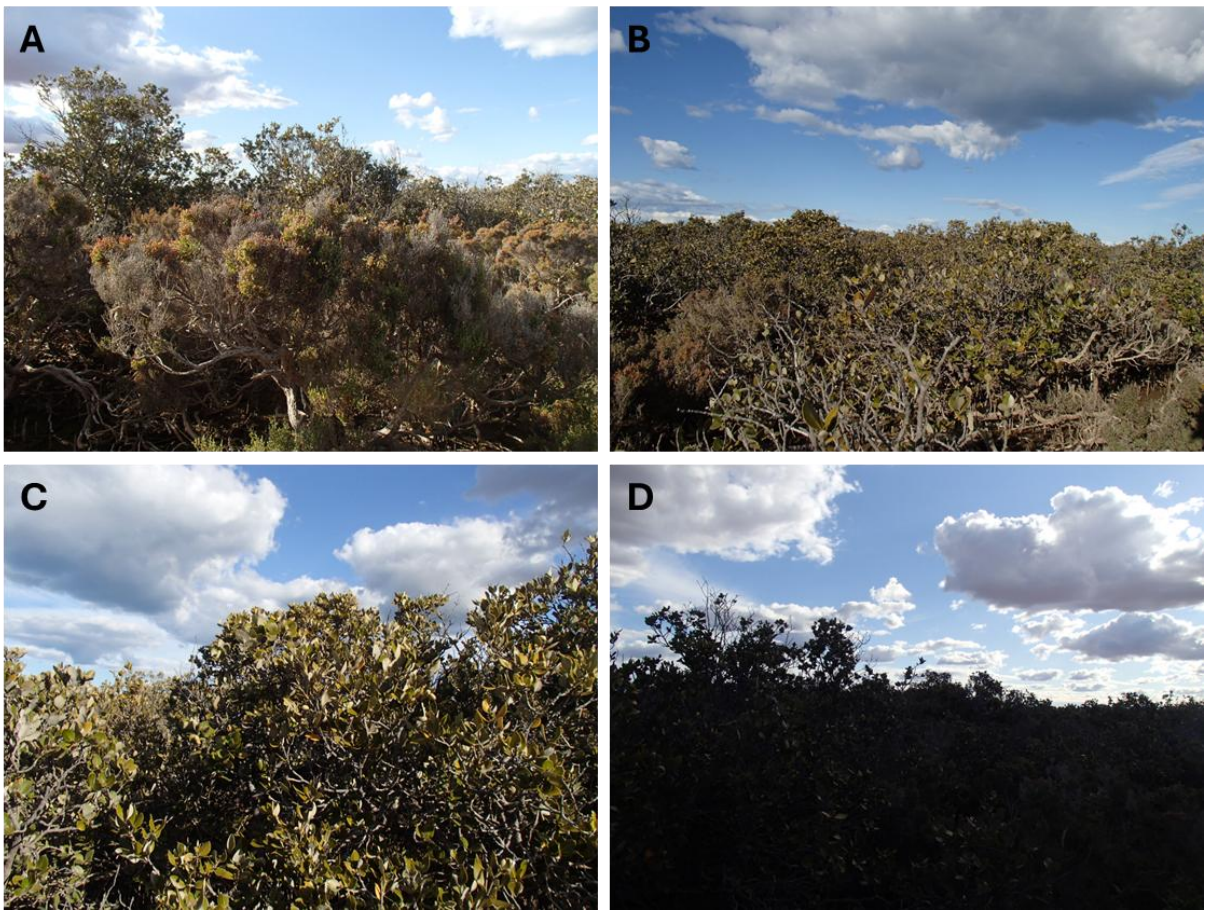


Figure 69. Photos showing the mangrove community at the permanent photo point on Transect 18: A) facing North; B) facing East; C) facing South; and D) facing West.



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Appendix G-5:

Marine Sediments Summary Baseline Report

Northern Water Project

Department for Infrastructure and Transport

Marine Sediments – Summary Baseline Report

63753 | 173,702 (Rev 0)

7 July 2026



We acknowledge the Traditional Custodians of Country throughout Australia and their connection to land, sea and community.

We pay our respect to Elders past, present and emerging and in the spirit of reconciliation we commit to working together for our shared future where every person is respected, valued and has strong sense of belonging.

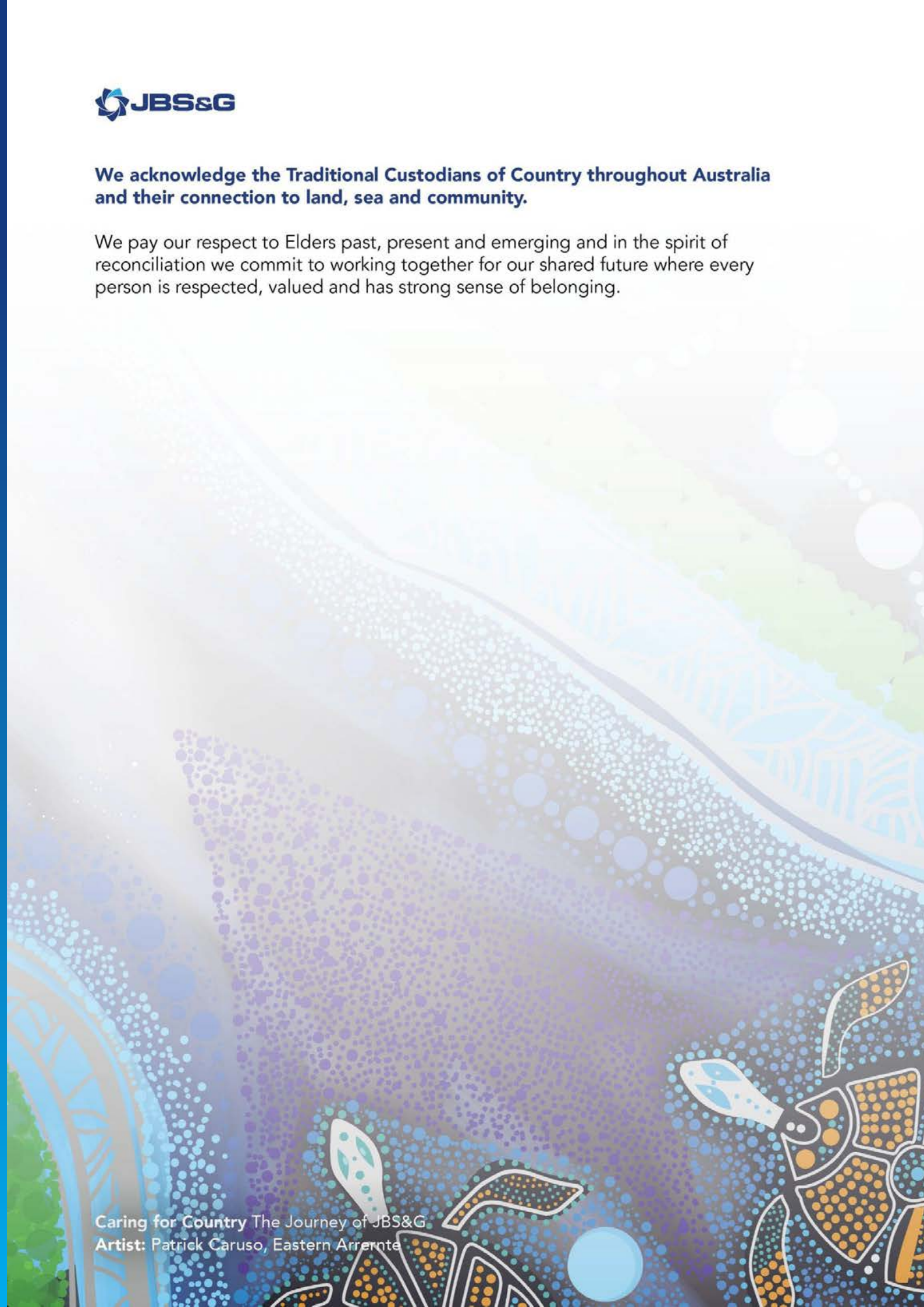


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Appendices

Appendix A **Dinoflagellate resting cysts in sediment cores from Spencer Gulf South Australia**

Appendix B **Northern Water Marine Baseline Sediment Characterisation**

Abbreviations

Term	Definition
EIS	Environmental Impact Statement
GL	Gigalitres
HAB	Harmful algal bloom
LOR	Limit of reporting
NAGD	National Assessment Guidelines for Dredging
OCP	Organochlorine pesticides
PAH	Polycyclic aromatic hydrocarbons
PCB	Polychlorinated biphenyls
PIRSA	(Department of) Primary Industries and Regions South Australia
PSD	Particle Size Distribution
QA/QC	Quality Assurance/Quality Control
SA	South Australia
SB	Sand with Bioturbation (habitat type identified in Project Marine Ecology Habitat Mapping)
SI	Sand with Invertebrates (habitat type identified in Project Marine Ecology Habitat Mapping)
Sn	Tin
SPT	Sodium polytungstate
TBT	Tributyltin
TOC	Total Organic Carbon
TRH	Total Recoverable Hydrocarbons
ZO	Zostera seagrass (habitat type identified in Project Marine Ecology Habitat Mapping)

1. Introduction

1.1 Project context

The Northern Water Project (the Project) proposes a secure, climate-resilient water source for industry located in South Australia's Upper Spencer Gulf and Far North. Central to the Project is a seawater reverse osmosis desalination plant at Mullaquana Station, approximately 25 km south-west from the centre of Whyalla, delivering up to 51 GL/year via a pipeline network extending north to Olympic Dam, with connections to key mining operations.

The Project involves marine infrastructure mostly tunnelled beneath the seabed, but some elements of the intake and outfall will protrude above the seabed or be laid on it. The extent of physical disturbance to the seabed will depend on the selected construction methodology and final design of the outfall pipe. The expected seabed disturbance is a small area for the intake structure and outfall diffuser structure, and potentially the pipe itself between the two, within the designated seabed disturbance area / marine Project footprint shown in Figure 1-1.

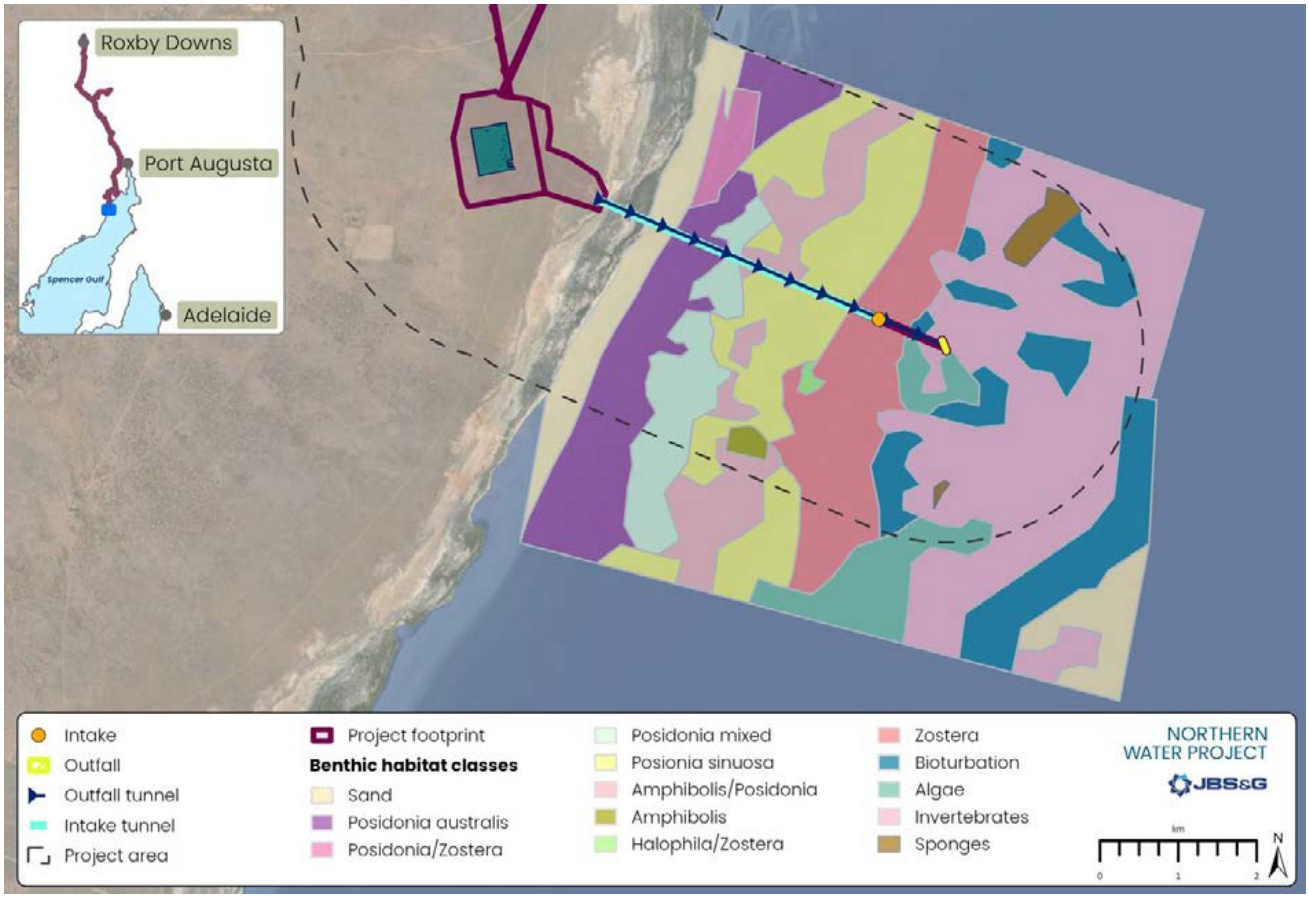


Figure 1-1: Proposed desalination plant marine infrastructure and potential seabed disturbance area (marine Project footprint) showing habitat classification across the site.

1.2 Rationale for the sediment assessments

A key driver for the sediment assessment work was the geographical and temporal extent of a significant harmful algae bloom (HAB) in South Australian (SA) waters. The HAB was detected for the first time in March 2025, in the waters off the Fleurieu Peninsula, particularly near Waitpinga and Parsons Beach. The dominant species was initially identified as *Karenia mikimotoi.* Further studies have since shown the dinoflagellate *K. cristata*, known to produce the neurotoxin brevotoxin, to be one of the dominant dinoflagellate species of the HAB.

The persistent HAB has affected waters throughout Gulf St Vincent, Spencer Gulf coastal waters and to Kangaroo Island (PIRSA 2026). Elevated ocean temperatures across the state's coastal waters are thought to have contributed to the onset and persistence of the HAB (PIRSA 2026). The last notable HAB of this type in South Australia was recorded in Coffin Bay, SA in 2014.

Many algal species form resting cysts which remain dormant in marine sediments until disturbed (Anderson et al, 2017). These cysts act as a seed bank, capable of germinating when environmental conditions become favourable, and can potentially lead to HABs (Anderson et al, 2017). While the genus *Karenia* do not necessarily produce resting cysts, there is some evidence that they sometimes form temporary resting cells (C. Bolch, personal communication).

In response to the current HAB situation in SA, the Project team considered it would add value to the Project Environmental Impact Assessment, as well as to the State response, to characterise the existing sediments in proximity to the proposed Project seabed disturbance area and their potential to cause environmental impacts if disturbed. The intention is to establish a sediment baseline to enable the assessment of potential impacts to the environment from seabed disturbance associated with the Project.

1.3 Objectives and scope

The key objective of the sediment assessments was to establish a sediment baseline near the proposed intake and outfall locations, where there is intended seabed disturbance as part of the Project.

With construction works likely to cause short term disturbance to marine sediments, this scope of work will help describe the baseline conditions and inform an assessment of the potential for remobilisation of resting cells or dormant cysts of harmful algae and or other chemical contaminants.

The scope of work was to:

- Determine the existing abundance and composition of algal cysts and resting cells within sediments (Appendix A)
- Characterise sediments for particle size distribution, nutrients, metals and other potential contaminants (Appendix B).

Appendix A and B provide these detailed assessments.

This study provides a factual baseline and does not provide an assessment of potential impacts; impact assessment is provided in the Project Environmental Impact Assessment (EIS). The coastal processes technical study looks at sediment dynamics and assesses changes to sediment movement from construction and the physical presence of the infrastructure on the seabed, and the EIS draws on this and other data sources to undertake the full assessment of sediment disturbance as a result of the Project.

1.4 Purpose of report

This report provides an overview and summary of the sediment baseline studies (Appendix A and Appendix B) undertaken for the Project. This report and its appendices present the factual baseline upon which the impact assessment, presented in the Project EIS, is based.

2. Methodology

The key elements of the sediment analyses included:

- In-field sediment sampling (undertaken by James Brook of JDiversity Pty. Ltd.)
- Dinoflagellate resting cysts in sediment cores (undertaken by phytoplankton specialist Dr Christopher Bolch, of Microalgal Services)
- Physical and chemical:
    - Particle Size Distribution: PSD analysis plus Hydrometer for clay/fines (undertaken by Envirolab)
    - Heavy metals (primary lab Eurofins and Envirolab as the secondary lab)
    - Organic Compounds (polycyclic aromatic hydrocarbons (PAHs) and total recoverable hydrocarbons (TRH)) (primary lab Eurofins and Envirolab as the secondary lab)
    - Nitrogen content (primary lab Eurofins and Envirolab as the secondary lab).

2.1 Field sampling

Sediments were sampled on 23 October 2025 as a supplementary program to the Project marine ecology surveys. Sediments were sampled from six sites surrounding the intake and outfall area as shown in Figure 2-1.

The sediment sampling and laboratory analytical methods were designed to characterise shallow sediments to a depth of approximately 0.5 metres for the area surrounding the proposed marine intake and outfall proximal to where sediment disturbance may occur as part of Project.

The sediment sampling methodology is summarised in Table 1**.**

Table 1. Field sampling methodology

Task / item	Description
Sampling sites	The six sites spanned three habitat types derived for the Project by J Diversity (J Diversity 2025): Sand with bioturbation (SB), sand with invertebrates (SI), Zostera seagrass (ZO). Sites aligned with the existing marine ecological survey sites that were closest to the intake and outfall locations and included: SB3, SB4, SI3, SI4, ZO3, and ZO4 (shown in Figure 2-1).
Sampling Depth	Sediment cores were recovered up to a maximum depth of 0.5 metres into the sediment (or until refusal) using a manual sediment coring tube.
Sample Collection	Typically, three to four core samples were collected per site due to the volume required for chemical and physical analysis.
Lithology Logging	The lithological characteristics of each sediment core were logged on-site by divers.
Homogenisation & Sample Preparation	The cores for physical and chemical analyses were homogenised at the sampling site before being transferred into laboratory-supplied containers. The cores for dinoflagellate cyst analyses were kept intact in the core tube for transport to the laboratory.
Equipment Cleaning	Reusable equipment was thoroughly cleaned between sites to minimise cross-contamination.

Sample Preservation and Transport	Samples were immediately placed on ice in insulated coolers for transport to testing laboratories.
Quality assurance / quality control (QA/QC)	All samples submitted for laboratory analysis were accompanied by appropriate chain of custody (COC) documentation as per standard JBS&G protocols (see Appendix B)

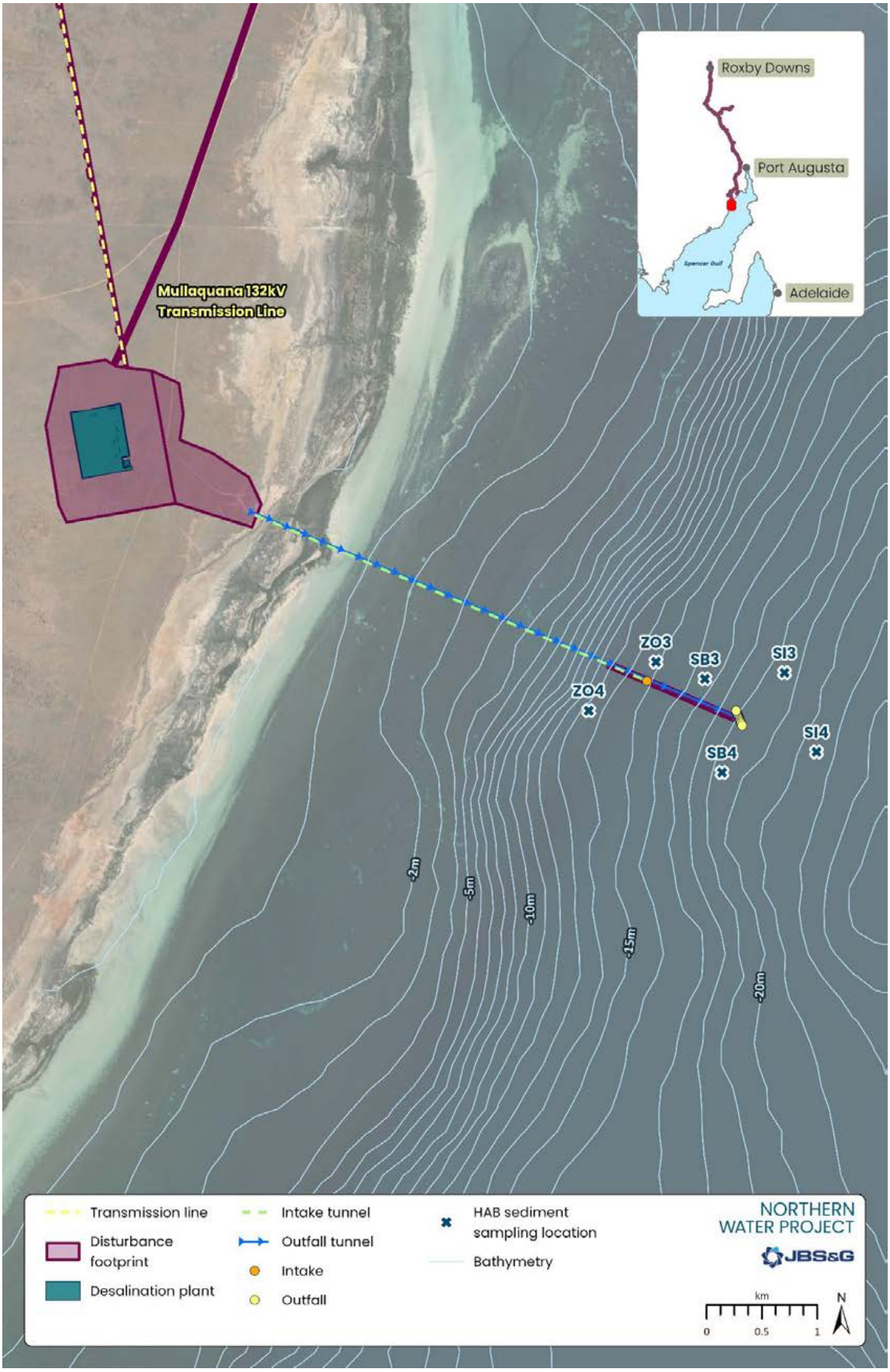


Figure 2-1: Sediment sampling sites

2.2 Analyses of dinoflagellate cysts / harmful algae in sediments

Three approaches to quantify dinoflagellate cysts in sediments were applied as per advice from phytoplankton specialist Chris Bolch.

1. Non-quantitative **all species screening** of each sample with pre-concentration using sodium polytungstate (SPT) gradients. This approach provides proportional estimates of abundance as part of the total community. The SPT concentration significantly improves capacity to detect HAB species resting stages.
2. Dinoflagellate cyst species **relative abundance** - All dinoflagellate cyst species relative abundance (percent of total cyst flora) provides a broad environmental/ecological context within which to interpret the presence of harmful/toxic and introduced taxa.
3. **Toxic/harmful algal species** confirmation by **germination**, to determine whether there were dormant *Karenia* cells present that may pose a serious risk if sediments are remobilised. Detection of *Karenia* resting stages is difficult, as the morphology of these resting stages are not well described and difficult to distinguish from the resting stages of other plankton (C. Bolch, personal communication). However, by undertaking specialised sediment incubations, specialist Chris Bolch has had previous success collecting and identifying *Karenia* and or other HAB cells that are released through germination.

The dinoflagellate resting cyst methodology is described in Appendix A, and involved:

- Each of the six cores was cut to extract a surface (top 8 cm) and a bottom sample (17-25cm).
- Both surface and deep sub-samples were processed, concentrated and screened for dinoflagellate resting cysts
- Low yield, particularly in the bottom samples meant only the surface samples were sufficient for a robust cyst community analysis.
- Surface sub-samples (5-7 g) of wet sediment were mixed thoroughly to form a watery slurry and sonicated for two minutes before being washed through sieves (mesh sizes of 300 µm and 125 µm, and collected on a 20 µm sieve). Material was then resuspended in filtered seawater and live cysts were concentrated using density gradient centrifugation according to Bolch (1997). The concentrate was re-suspended before examination under microscopy at magnifications of 200-400 x.
- Germination experiments were undertaken with processed concentrated cysts from the six surface sub-samples. Sub-samples (10 g) of the surface sediment were processed as described above, but with no sonication step (to avoid destroying cells/cysts). The cyst suspension from each sample were cultured and incubated at 18 degrees (exposed to light and dark conditions) and examined for germinated cells every 3 days for 15 days. Swimming dinoflagellate cells were isolated and identified under a microscope.

2.3 Physical and chemical analyses

Physical Analyses

Limited particle size distribution (PSD) analysis was conducted using various sieve sizes between 0.002 mm and 75 mm, and further hydrometer analysis was conducted for clay and fine silts <0.075 mm.

Chemical Analysis

Chemical analysis of all sediment samples recovered during the sampling program was undertaken by laboratories accredited by the National Association of Testing Authorities (NATA).

The laboratory analytical program was guided by the analytes for which there are Screening Levels presented in the National Assessment Guidelines for Dredging (NAGD) (Commonwealth of Australia 2009), and comprised the following:

- Heavy metals and metalloids (antimony, arsenic, cadmium, chromium (total), copper, lead, mercury, nickel, silver, and zinc)
- Total recoverable hydrocarbons (TRH)
- Polycyclic aromatic hydrocarbons (PAH)
- Organochlorine pesticides (OCP)
- Polychlorinated biphenyls (PCB)
- Nitrate
- Ammonia
- Tributyltin (TBT as tin (Sn))
- Total organic carbon (TOC) (to assist with normalisation of organic contaminant results, if identified).

To understand the baseline quality of the material within the assessment area the analytical results were compared to screening criteria provided in the NAGD.

Quality Assurance/Quality Control

A quality assurance / quality control (QA/QC) program in accordance with that discussed in Section 5.3 of Appendix B, was undertaken throughout the sampling program. The QA/QC program was implemented to allow an assessment of the quality and reliability of the data produced for the assessment. Additionally, all requirements for the laboratory analytical reports were assessed and met. Based on the results of the data quality assessment and evaluation of the QA/QC data collected, it is considered that:

- The field and laboratory quality assurance measures implemented provide an acceptable level of confidence that the data collected and reported is appropriately complete, comparable and representative
- The field and laboratory quality control measures implemented provide an acceptable level of confidence that the data collected and reported is appropriately accurate and precise.

Therefore, it was concluded that the data collected was sufficiently reliable and suitable for the purpose of the assessment.

3. Results

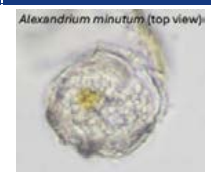
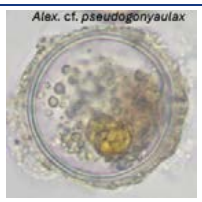
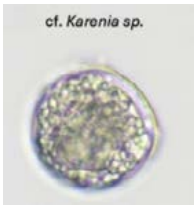
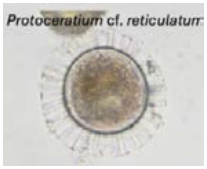
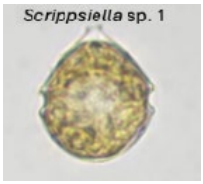
3.1 Dinoflagellate cysts in sediments

There were no confirmed *Karenia* species found in sediments during this study. Fragile resting stages resembling those described for *Karenia mikimotoi* were observed in some surface core samples; however, germination experiments did not detect any germling cells belonging to the genus *Karenia*. This suggests that either these cysts are *Karenia* species, or that these cysts may no longer be viable.

Key findings of the investigation into dinoflagellate cysts in sediments include:

- Overall low numbers of HAB species and with low viability. The species composition and relative abundance is relatively typical of marine sediments.
- All HAB species identified in sediments are widely distributed in southern Australian waters.
- The overall yield of living resting stages from deep sediment samples was lower than that from surface sub-samples.
- The overall dinoflagellate assemblage was dominated at family level by *Peridinoid* taxa. While this family is predominantly heterotrophic (*Protoperidium, Oblea, Dubridinium, Diplopelta* etc), it also includes autotrophic groups (*Calciodinellidae*) such as *Scrippsiella* and *Calciodinellum*.
- Sub-dominant dinoflagellates were the *Gonyaulacoids* (*Alexandrium, Gonyaulax, Lingulodinium, Protoceratium*).
- The low number of *Protoceratium* cysts indicates the site is indicative of a more oceanic, low nutrient environment rather than nutrient enriched/estuarine conditions, and the cyst community structure suggests the cysts are likely deposited at the location from a shelf or upwelling production source.
- Surface sediments were rich in unknown flattened ovoid cysts with dinoflagellate affinities but no germination success.
- The overall yield of living resting stages from deep sediment samples was lower than that from surface sub-samples, and the majority of species showed low viability in germination studies.
- Cyst concentrations were generally low across all sites, with only a few potentially harmful dinoflagellate species detected at low to moderate relative abundance. The potentially harmful species identified are described in Table 2.

Table 2: Potential toxic or harmful species identified surrounding the Project seabed disturbance area.

Taxon	Distribution / info	Effects and toxins	Observed cysts
Alexandrium cf. minutum.	• Found along the southern coast of Australia including near Adelaide.	• Paralytic shellfish toxins	
Alexandrium cf. pacificum	• Widespread in temperate to warm-temperate regions; may be confused with *A. catenella* and *A. australiense* without germination studies.	• Paralytic shellfish toxins	
Alexandrium pseudogonyaulax	• Widely distributed in Australia. • Typically in enclosed estuaries and lagoons. • Possible different non-toxic species.	• Toxicity unknown but may be linked to fish kills overseas.	
Lingulodinium polyedrum	• Common species in Australian temperate marine waters	• Produces yessotoxins • Reported fish kills in Australia are unconfirmed.	Image not available
Karenia species	• Typically present in sediments. • Morphologically similar specimens to that described for *K. mikimotoi* observed, however, germination experiments did not detect *Karenia,* suggesting that the cysts were either not *Karenia* or, more likely, were no longer viable.	• Produces the neurotoxin brevetoxin. mass mortalities in fish, invertebrates, and marine mammals, along with severe human respiratory distress and shellfish poisoning	
Margalefidinium polykrikoides	• Widespread distribution	• Produces fish toxins – responsible for extensive fish kills and death of other marine fauna globally. No known HAB event in Australian waters.	
Protoceratium reticulatum.	• Common species	• Produces yessotoxins that can accumulate in shellfish and cause mortality of invertebrates (only overseas to date)	
Pseudocochlodinium profundisulcus	• Widely distributed	• Known to cause HABs and fish/marine fauna kills in China Sea	Image not available
Scrippsiella species.	• Common genus in coastal and estuarine areas • Prolific cyst formation	• Not toxic – but high biomass blooms can occur	

3.2 Sediment characterisation

The sediment analysis conducted by JBS&G Australia Pty Ltd for the area surrounding the proposed marine sediment disturbance area off Mullaquana Station is provided in Appendix B and provides a detailed overview of the current state and provides a baseline from which to assess potential impacts on marine environments from Project construction and operation.

Samples were taken across multiple sites as described in Section 2.1, including SB3, SB4, SI3, SI4, ZO3, and ZO4 in October 2025.

Particle Size Distribution

Sediments surrounding the seabed disturbance area span fine silt to coarse gravel in various proportions as shown in Figure 3-1. Bathymetry and / or the presence of Zostera seagrass appear to correlate with grain size with a higher percentage of coarse sand and gravel in the samples within the shallower Zostera bed, and higher percentage of fine materials in the deeper unvegetated substrate.

Median grain size categories across the area change with benthic habitat classification and range from **very fine sand** at the "sand with invertebrates" (SI) sites, to **fine sand** at the "sand with bioturbation" (SB) sites and **medium sand** at the Zostera sites.

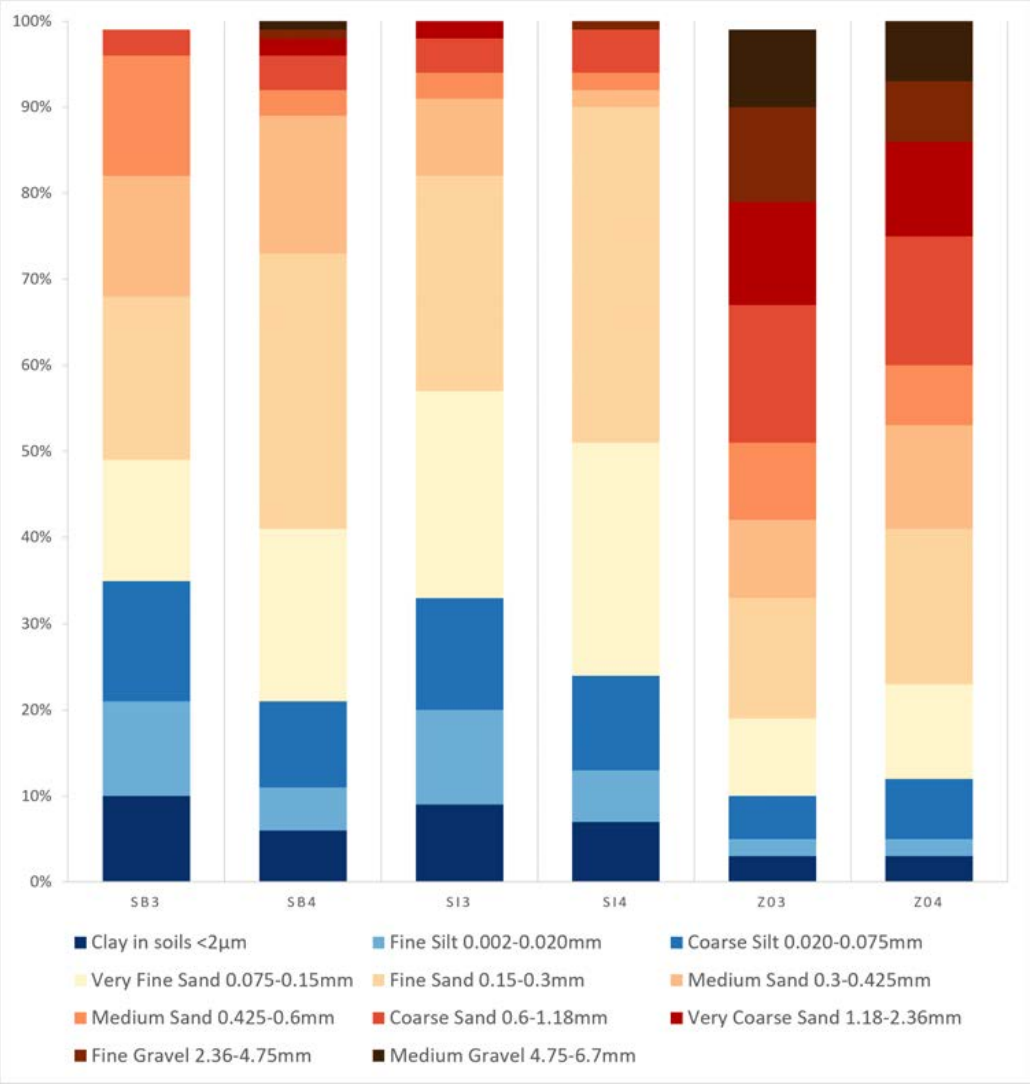


Figure 3-1: Percentage of each grain size category at each sampling site near the seabed disturbance area

Baseline Sediment Analytical Summary

The baseline sediment results concluded that there were minimum detected concentrations of analytes reported and no exceedance to the criteria. Notably, there were no detectable concentrations above laboratory limit of reporting (LOR) for the following analytes, with the exception of a singular TRH result (refer to Appendix B Summary tables):

- Select heavy metals (Antimony, Cadmium, Copper, Mercury, Nickel and Silver)
- Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)
- Total Recoverable Hydrocarbons (TRH), with the exception of ZO3 (C10-C16, 53 mg/kg)
- Polycyclic Aromatic Hydrocarbons (PAHs)
- Organochlorine Pesticides (OCP)
- Polychlorinated Biphenyls (PCB).

Notable results where concentrations were reported above LOR are:

- Total nitrogen concentrations within all samples range from 421 to 1,300 mg/kg
- Four of the reported heavy metals were reported in the following ranges (refer to Appendix B Summary tables):
    - Arsenic above LOR (2 mg/kg) at all sites (reported at 2.0 to 3.5 mg/kg)
    - Chromium (III+VI) above LOR (5 mg/kg) at sandy sites (reported at 6.8 to 10 mg/kg)
    - Lead above LOR (5mg/kg) for SI4 only (5.4 mg/kg)
    - Zinc above LOR (5 mg/kg) for all sandy sites (8.7 to 12 mg/kg).

The detected concentrations above reflect the background concentrations within the area, and do not exceed relevant environmental criteria (refer to Appendix B Summary tables).

4. Conclusion

The key finding of the investigation into dinoflagellate resting cysts in sediment cores was that while some toxic species are present at low levels, the overall risk of impact from remobilisation based on these results is broadly mitigated by their low viability and by their typical and widespread distribution in southern Australian waters.

Although cyst concentrations, heavy metals, and nutrients levels were generally low, the Project EIS will further assess the potential for sediment disturbance to lead to HABs or other environmental impacts due to resuspension of fine organics, heavy metals, nutrients etc.

5. Limitations

Scope of services

This report ("the report") has been prepared by JBS&G in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and JBS&G. In some circumstances, a range of factors such as time, budget, access and/or site disturbance constraints may have limited the scope of services. This report is strictly limited to the matters stated in it and is not to be read as extending, by implication, to any other matter in connection with the matters addressed in it.

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Environmental conclusions

Within the limitations imposed by the scope of services, the preparation of this report has been undertaken and performed in a professional manner, in accordance with generally accepted environmental consulting practices. No other warranty, whether express or implied, is made, including to any third parties, and no liability will be accepted for use or interpretation of this report by any third party.

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6. References

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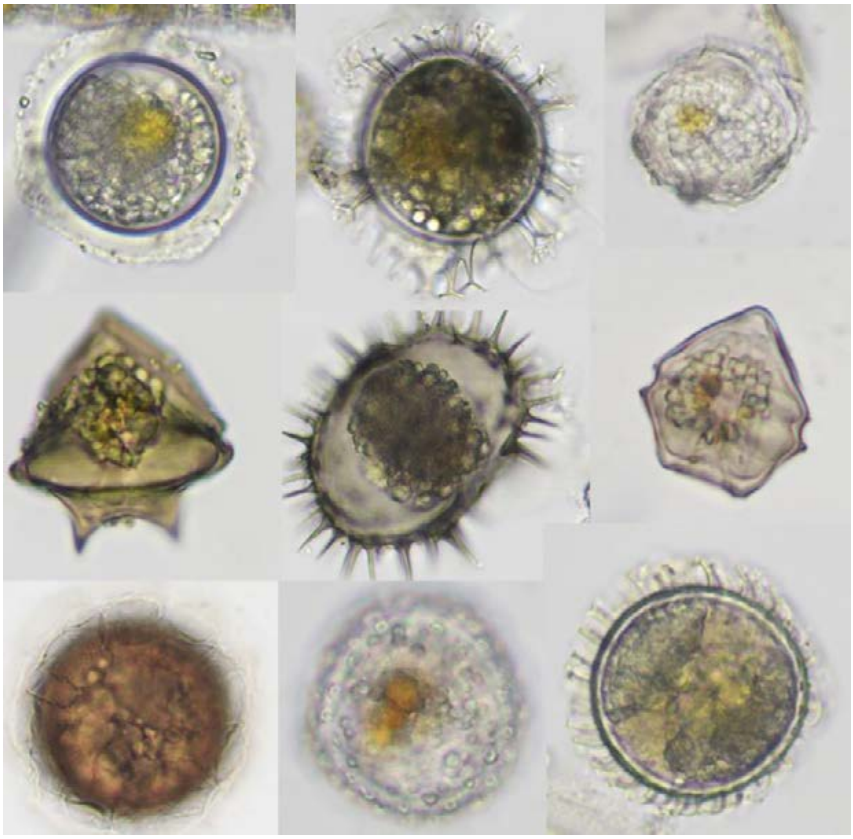
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Appendix A Dinoflagellate resting cysts in sediment cores from Spencer Gulf South Australia

Report to JBS&G Environmental Consultants

Dinoflagellate resting cysts in sediment cores from Spencer Gulf South Australia



December 2025

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1. Background

The Northern Water Project (the Project) proposes a secure climate-resilient water source for industry in South Australia's Upper Spencer Gulf and Far North. Delivery of the Project will involve construction and operation of a 51 gigalitre per year (GL/year) seawater reverse osmosis desalination plant located at Mullaquana Station on the Upper Spencer Gulf, and associated water transfer system extending north to Olympic Dam, with connections to key mining operations.

The marine infrastructure is mostly tunnelled beneath the seabed, but some elements of the intake and outfall will protrude above the seabed or be laid on it. The key objective of this study was to determine the existing abundance and composition of algal cysts and resting cells within sediments where there is intended seabed disturbance as part of the Project.

Abbreviations used in this report:
BTX – Brevetoxins; EPS – extra-cellular polysaccharide; FSW – Filtered Seawater; HAB – Harmful Algal Bloom; ROS – reactive oxygen species;

2. Sediment characteristics and cyst yield

Sediments in all cores were composed of a mix of white clay and fine sand, transitioning to increasing proportion of shell grit down-core (See Table 1; Figure 1).

Table 1. Samples received for analysis.

Core Code	Depth (cm)	Description and notes
SB3	31	Fine white clay, interspersed with shell grit, increasing shell grit proportion and size toward bottom of cores. Surface disturbed by tilting during transit.
SB4	30	Fine white clay, interspersed with shell grit, increasing shell grit proportion and size toward bottom of cores. Surface disturbed by tilting during transit.
SI3	31	Fine white clay, interspersed with shell grit, increasing shell grit proportion and size toward bottom of cores. Surface disturbed by tilting during transit.
SI4	27	Fine white clay, interspersed with shell grit, increasing shell grit proportion and size toward bottom of cores. Surface disturbed by tilting during transit.
Z03	34	Fine white clay, interspersed with shell grit, increasing shell grit proportion and size toward bottom of cores. Surface disturbed by tilting during transit.
Z04	35	Fine white clay, interspersed with shell grit, increasing shell grit proportion and size toward bottom of cores. Surface disturbed by tilting during transit. Core semi-dry due to leakage around bottom silicon bung.

Cores were cut and sub-sampled to obtain a surface and deep sediment sub-sample from each core (Figure 1). Both surface and deep sub-samples were processed, concentrated and analyzed separately for dinoflagellate resting cysts.

After size-fractionation, samples contained a moderate to low proportion of fine organic material for further concentration. After density gradient centrifugation, the overall yield of living resting stages was low relative to typical of near-coastal and estuarine mud (eg. sapropel), particularly for the deep sediment samples (17-25 cm). Deep sub-samples yielded fewer living resting stages than surface sub-samples. Recovery from surface samples was sufficient for a relatively robust cyst community analysis.

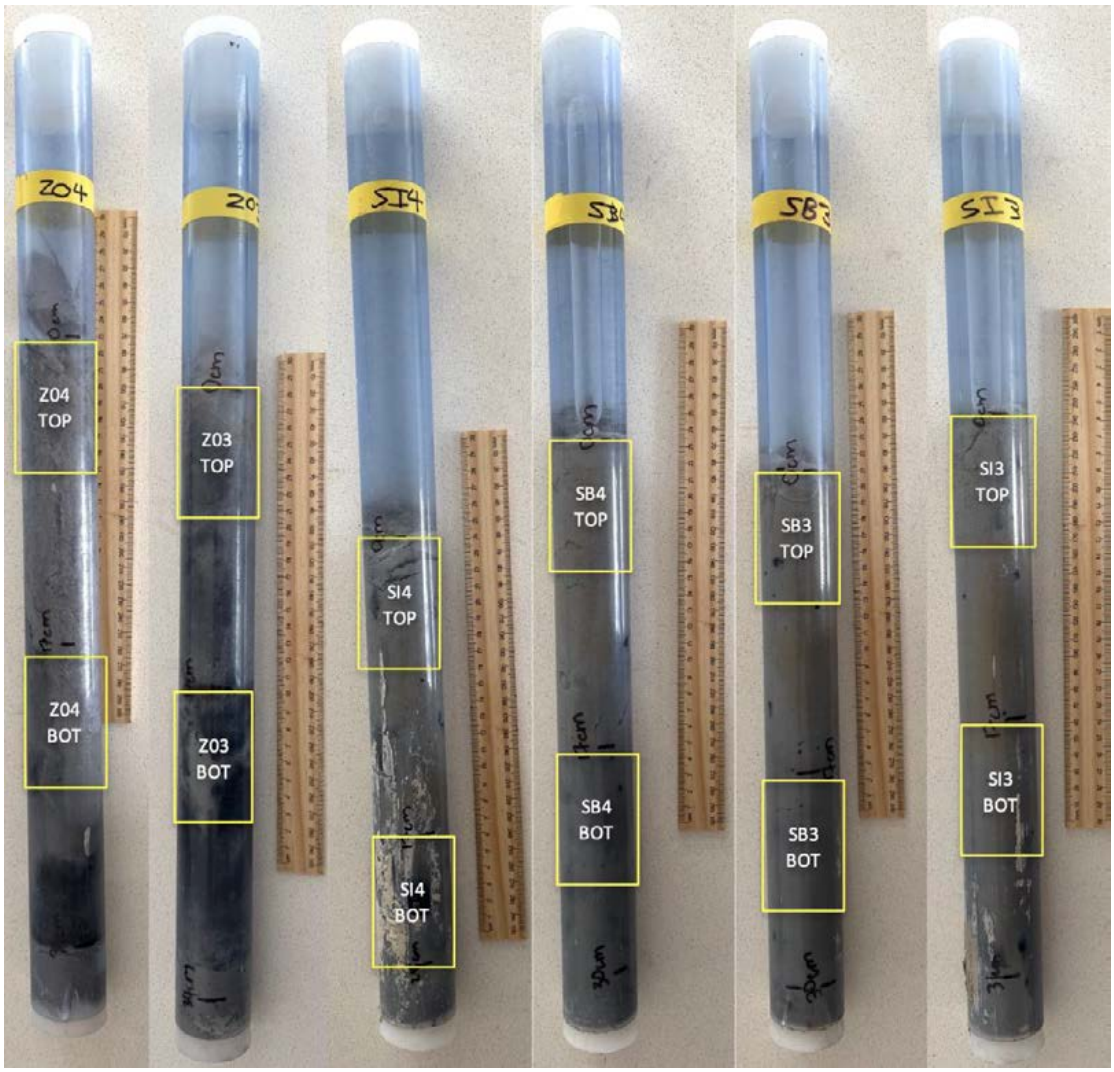


Figure 1. Sediment cores received for analysis. Surface interface marked as 0 cm, and the core cut point (17cm from surface). Position of core sub-samples indicated by yellow boxes.

2. Species assemblage of samples

The dinocyst assemblage of most cores was diverse and dominated at family level by peridinoid taxa (Table 2). While this family is predominantly heterotrophic (*Protoperidium, Oblea, Dubridinium, Diplopelta* etc), it also includes autotrophic groups (Calciodinellidae) such as *Scrippsiella* and *Calciodinellum*. Sub-dominant were the gonyaulacoids (*Alexandrium*, *Gonyaulax*, *Lingulodinium, Protoceratium*).

Cysts of *Protoceratium* were generally in low relative abundance indicating a more oceanic, low nutrient environment rather than nutrient enriched/estuarine conditions. The presence and moderate abundance of *Protoperidinium latissimum* is indicative of warm-temperate waters. Overall, the community structure indicates cysts are being deposited at the sites predominantly from shelf or upwelling-associated production rather than production from more protected bay/estuarine areas.

At genus- to species-level, surface sediments of all cores were dominated by flattened ovoid resting stages of unknown affinities. Gross morphology was similar to resting stages reported for raphidophytes of the genus *Chattonella*, however, the cellular organisation and numerous pale-greenish chloroplasts are atypical of raphidophyte cysts. A large central pale zone (perhaps a nucleus) suggested dinoflagellate affinities, however a dinoflagellate nucleus with condensed chromosomes was not evident in the cytoplasm. Germination attempts with these cysts were unsuccessful therefore the identity of this dominant type remains unknown.

3. Sediment/cyst germination

Germination experiments with processed concentrated cysts from surface sub-samples yielded a range of diatoms, ciliates and other flagellated protists (not shown). Several different morphotypes of dinoflagellate were observed in incubations and picked for detailed microscopy. Microscopy showed the cells belonged to the genera *Gymnodinium* (2 morphotypes), *Scrippsiella* (2 morphotypes), and *Protoceratium* cf. *reticulatum*. No *Karenia* species cells were detected from cyst/sediment germination experiments with surface sediment samples.

4. Potentially toxic or harmful cysts detected

4.1 *Alexandrium* cf*. minutum*. Small (20-30 um diameter) hemispherical-shaped (flattened ovoid), clear-walled mucoid cysts with globular contents and yellow/orange accumulation body. Can be confused with non-calcitic forms of *Scrippsiella* cysts that have a similar shape but instead have a dark red accumulation body. Widely distributed along the eastern, southern and western coast (SW region) of Australia, including the Gulf of St Vincent. Has caused high density blooms (including red-discolouration) in the Port River and West Lakes area near Adelaide. All Australian populations examined to date produce paralytic

shellfish toxins (PST) and PST production has been confirmed from South Australian isolates from the Adelaide region (Bolch et al. 1991).

4.2 *Alexandrium* cf. *pacificum*. Medium-sized (35-50 um long) ovoid to cylindrical mucoid cysts with globular contents and yellow/orange accumulation body. Cysts of *A. pacificum* are difficult to distinguish from the related cold-water species *A. catenella* or related low-toxicity *A. australiense* without confirmation via germination experiments. However, the known distribution of *A. catenella* is restricted to eastern and south-eastern Tasmanian waters. *Alexandrium australiense* is distributed more widely along south-eastern Australian coast, and known from the Bonney upwelling area offshore from Port MacDonnell, SA. *Alexandrium pacificum* is widely distributed in temperate and warm-temperate regions of southern and eastern Australia, including the eastern coast of South Australia and the Gulf of St Vincent. All Australian populations of *Alexandrium pacificum* produce paralytic shellfish toxins (PST) and are associated with regular toxic blooms and shellfish toxicity at several sites along the NSW coast.

4.3 *Alexandrium pseudogonyaulax*. A species widely distributed in Australia and common in enclosed shallow estuaries and lagoons but usually comparatively rare in well-flushed and well-mixed estuaries and coastal bays (Bolch, unpublished data). It is possible that these cysts belong to a related non-toxic *Alexandrium* species that produce spherical mucoid resting cysts, such as *A. affine* or *A. margalefi* (both non-toxic), but these species are typically somewhat smaller. Similar cysts are produced by several species of *Alexandrium* as well as related non-toxic gonyaulacoid genera (e.g *Fragilidium*), therefore confidence in identity of these cysts is relatively low without confirmation by germination studies. While no HAB events or toxicity have been reported due to this species from Australian waters, European and Mediterranean strains produce Goniodomin A, implicated in mass mortality of fish and marine fauna, and skin irritations in humans in recreational settings (swimming, water sports etc). The toxicity of Australian strains is unknown and there are no Australian reports linking this species to fauna toxicity or skin irritation in humans.

4.4 *Lingulodinium polyedra*. A common cosmopolitan species in Australian temperate marine waters. Known to produce yessotoxins (YTXs) that accumulate in shellfish, or cause mass mortalities of marine invertebrates. Toxicity of Australian populations is not known and there are no reports of harmful blooms from Australian waters.

4.5 *Karenia* species. The fragile resting stages of *Karenia* were described and confirmed from marine sediments only recently (*K. mikimotoi*; Liu et al. 2020). Whether other species in the genus produce similarly fragile resting stages is not yet clear. Morphologically similar specimens to that described for *K. mikimotoi* were observed in some surface core samples, however, germination experiments did not detect any germling cells belonging to *Karenia* species. This suggests that the cysts were either not *Karenia* or, more likely, were no longer viable. Long-term viability (many years) of dinoflagellate resting cysts is highly site dependent

and low viability is not uncommon. At some sites most dinoflagellate cysts remain dormant and viable for decades and are easily germinated; while at other sites, intact cysts of most species cannot be germinated. Preservation and dormancy of cysts varies considerably based on type and grain-size of sediment, level of anoxia versus bioturbation, and several other environmental variables.

4.6 *Margalefidinium polykrikoides*. A globally distributed, ichthyotoxic dinoflagellate responsible for extensive fish and marine fauna kills in several locations around the globe. Cysts and plankton cells corresponding to *M. polykrikoides* have been observed/reported at low concentration from many temperate areas of southeastern Australia, and the species appears to be widespread but not common. While there is one report of fish kills (Queensland) attributed to a "*Cochlodinium helix*-like" species (Hallegraeff 1992), there are no HAB events conclusively shown to be caused by this species in Australian waters.

4.7 *Protoceratium reticulatum*. A common cosmopolitan species in Australian temperate marine waters. While known in some regions of the globe for producing yessotoxins (YTXs) that accumulate in shellfish, or causing mass mortalities of marine invertebrates, there are no reports of harmful blooms of *P. reticulatum* from Australian waters.

4.8 *Pseudocochlodinium profundisulcus* (syn. *Cochlodinium geminatum*). A widely distributed species known to cause HABs and fish/marine fauna kills in Chinese waters (China Sea). Cysts and cells corresponding to this species are widely distributed but rare (low relative abundance) in temperate and warm-temperate Australian coastal waters and marine sediments (Bolch, unpublished data). To date, there have been no recorded HABs caused by this species in Australian waters.

4.9 *Scrippsiella* species. A common genus in coastal and estuarine waters. *Scrippsiella* species are prolific cyst-formers and thus often dominate the live cyst component in estuarine sediments. While generally not harmful or toxic, high biomass blooms in enclosed/shallow estuaries can cause death of marine fauna through localized oxygen-excess (daytime) or oxygen depletion when blooms crash (die-off) due to nutrient depletion. The relatively low proportion of these cysts indicates the cores come from areas with open waters, not typically areas where high biomass *Scrippsiella* blooms occur.

5. Risks and impacts

Disturbance and/or relocation of sediments risks release or relocation of cysts of toxic or harmful species that, given suitable water column conditions, could contribute to inception or enhancement of a harmful bloom in nearby embayments/estuaries. Risk of release does not significantly decrease with time since deposition because most species cysts are very long-lived. While cyst viability decreases with time, half-lives

are in the order of decades (Lewis et al. 1999) and cysts can remain viable in anoxic sediments for centuries (e.g. Miyazono et al. 2012). However, factors mitigating the risk are: 1) Cyst concentrations at all sites were generally low; 2) the majority of species (except *Scrippsiella*) showed low viability in germination studies, 3) all HAB/toxic species detected were at low-moderate relative abundance, and 4) all potential HAB species detected are already widely distributed in the southern Australian waters.

Resuspension, relocation and redistribution of sediments can release/distribute other materials and organisms (e.g. fine organics, heavy metals, nutrients, bacteria, protists etc) that can have undesirable effects or impact on the marine environment or marine fauna/flora. These factors are not considered in this report.

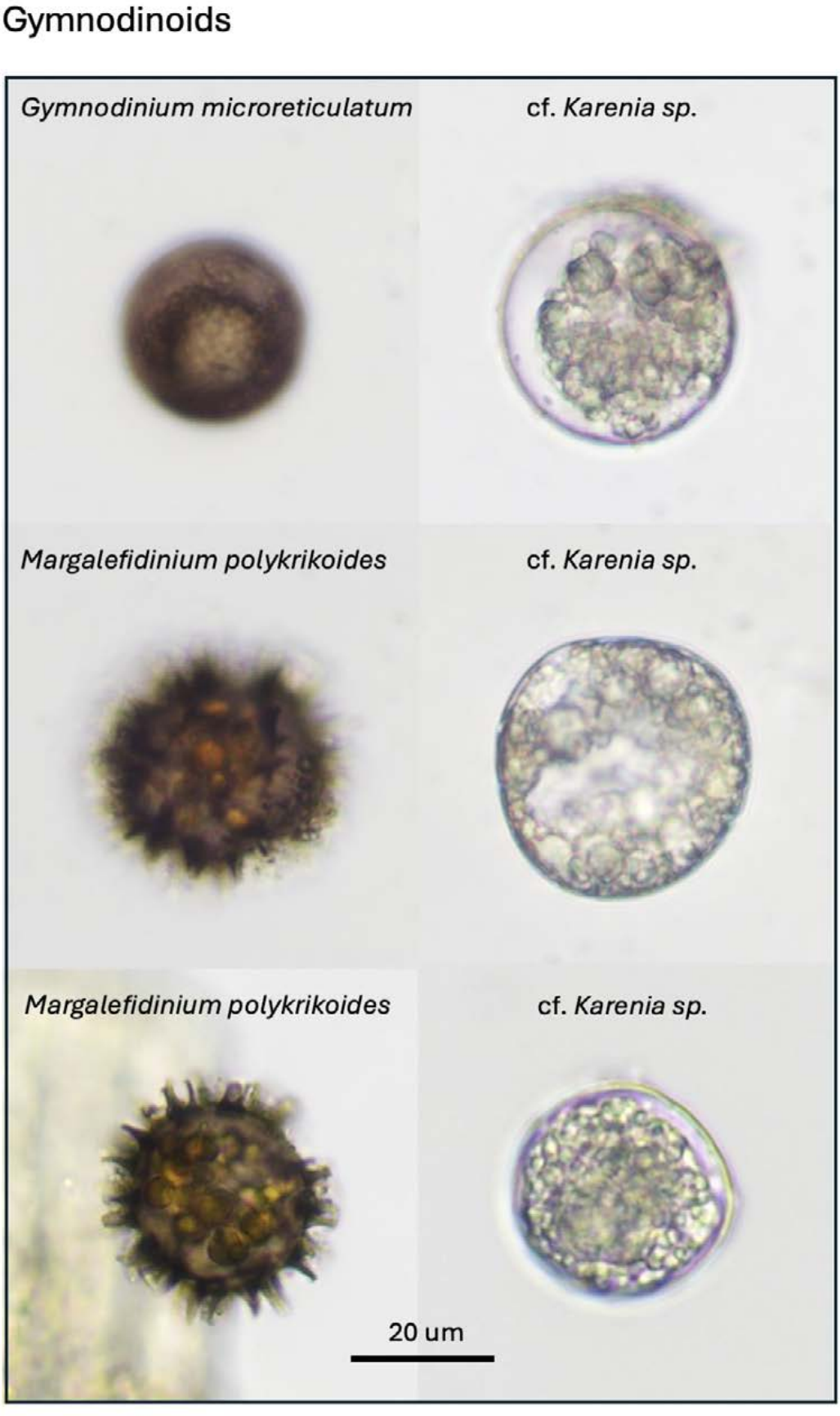
Table 2. Species relative abundance (%) and total count of living dinoflagellate and HAB resting stages at the sites sampled.

Species	Effects and toxins	Surface sediment (0-8 cm)						Deep sediment (17-25 cm)					
		SB3	SB4	SI3	SI4	Z03	Z04	SB3	SB4	SI3	SI4	Z03	Z04
Gymnodinioids													
Gymnodinium microreticulatum													2.6
Karenia species (putative)	Marine fauna kills (ROS, BTX)	2.1	0.9	5.6	4.4	5.6	8.9	14.3					
Nematodinium armatum		2.1	0.9	3.2	0.9								
Pseudocochlodinium profundisulcus	High biomass; shellfish and fish kills					1.4	1.8						2.6
Margalefidinium polykrikoides	High biomass; shellfish and fish kills (ROS, allelopathic)				3.5	6.9							
Gonyaulacoids													
Alexandrium cf. *pacificum*	Paralytic shellfish toxins					1.4							
Alexandrium pseudogonyaulax	Goniodomins; EPS and other bioactive	2.1											7.9
Alexandrium minutum	Paralytic shellfish toxins	1.1	1.9		1.8	5.6	8.9		8.3		11.1		
Alexandrium sp. (spherical)			0.9		2.7						5.6		
Gonyaulax sp. (S. mirabilis)		5.3	2.8	1.6	0.9		1.8						5.3
Gonyaulax spinifera (S. ramosus)		9.5	5.6	4.0	4.4		3.6		8.3	8.3	5.6		5.3
Gonyaulax scrippsae			1.9	0.8	2.7					8.3	11.1		10.5
Gonyaulax baltica (S. bulloideus)		2.1	0.9		0.9					8.3			
Gonyaulax nezaniae (S. bentori)													5.3
Gonyaulax sp. 1			1.9										
Lingulodinium polyedra	Yessotoxins; high biomass HABs		4.7		2.7								
Protoceratium reticulatum	Yessotoxins; high biomass HABs	5.3	10.3	6.5	8.8								

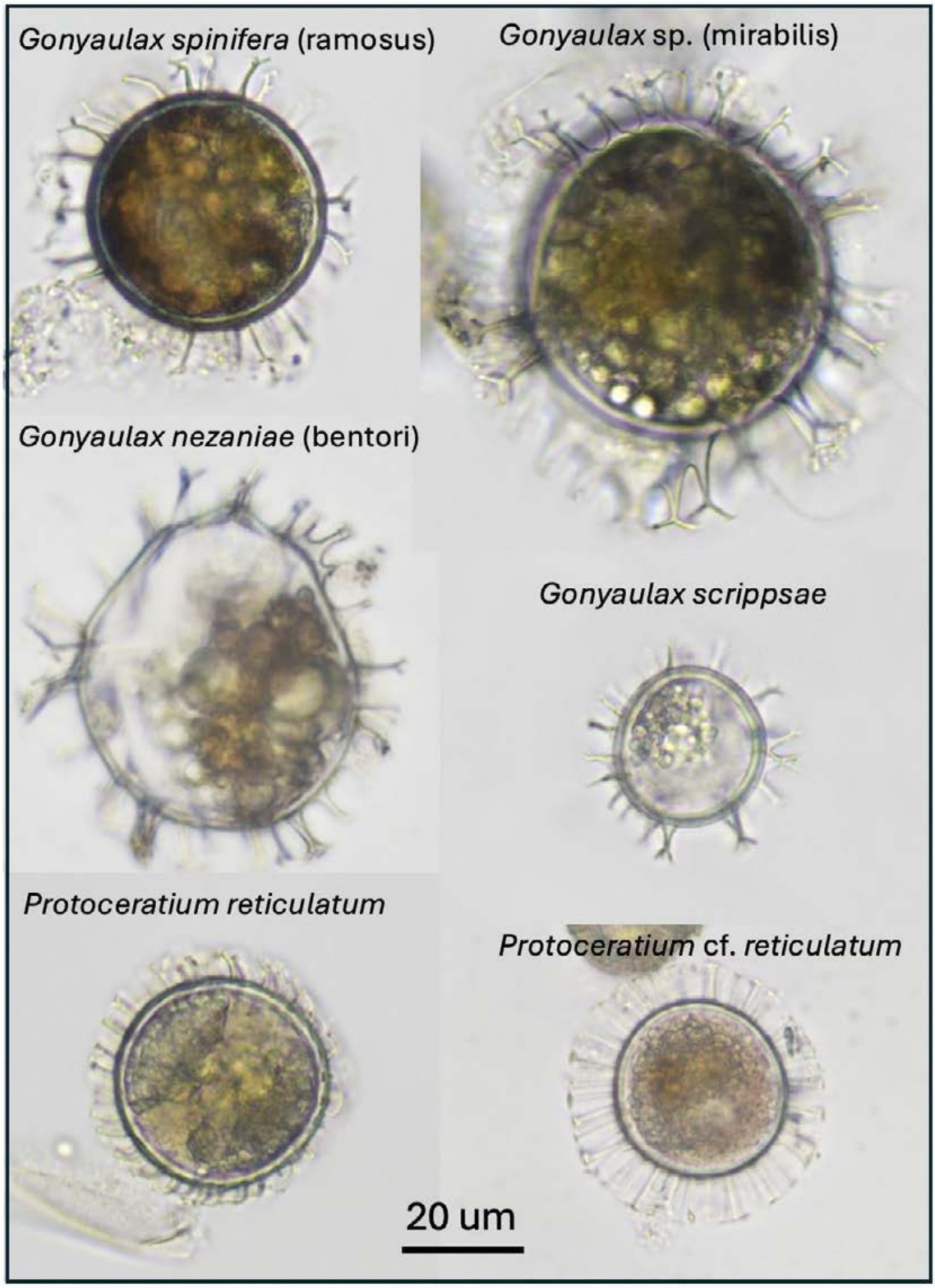
Species	Effects and toxins	Surface sediment (0-8 cm)						Deep sediment (17-25 cm)					
		SB3	SB4	SI3	SI4	Z03	Z04	SB3	SB4	SI3	SI4	Z03	Z04
Peridinioids													
Calciodinellids (autotrophic)													
Calciodinellum sp.		3.2		2.4	1.8	1.4			8.3		11.1	12.5	
Scrippsiella cf. *crystallina*		11.6	5.6	11.3	6.2	4.2	1.8		20.8	8.3	11.1		
Scrippsiella cf. *lachrymosa*		1.1	0.9	1.6				14.3	4.2	8.3			2.6
Scrippsiella precaria												12.5	
Scrippsiella trochoidea (spp.complex)	High biomass HABs	7.4	5.6	5.6	2.7	5.6	7.1	14.3					
Scrippsiella sp. (non calcitic)	High biomass HABs	4.2	3.7	4.0	4.4	6.9	1.8						
Heterotrophic Peridinoids													
Archaeperidinium sp. 1 (small spiny brown round)				0.8	0.9		3.6			8.3			
Archaeperidinium sp. 2 (short dense spines)		7.4	0.9	4.0									2.6
Diplopelta parva					3.5	4.2					5.6		
Dubridinium sp. (orange-brown ovoid)				2.4	1.8		5.4					12.5	
Oblea sp. (pale/clear spiny)					0.9					8.3			
Protoperidinium cf. *americanum*		3.2	6.5	3.2	4.4	8.3			4.2	8.3			
Protoperidinium achromatium			0.9			1.4							
Protoperidinium biconicum			1.9										
Protoperidinium conicum				0.8	5.3	2.8	1.8						2.6
Protoperidinium latissimum					0.9							37.5	7.9
Protoperidinium leonis				1.6									
Protoperidinium oblongum		1.1	2.8	1.6			3.6				11.1	12.5	
Protoperidinium subinerme					1.8								

Species	Effects and toxins	Surface sediment (0-8 cm)						Deep sediment (17-25 cm)					
		SB3	SB4	SI3	SI4	Z03	Z04	SB3	SB4	SI3	SI4	Z03	Z04
Protoperidinium sp.2 (small peridinoid shape 1)		3.2	0.9			2.8							2.6
Protoperidinium sp.3 (large dark spherical)		2.1	2.8			5.6	3.6			8.3	11.1		18.4
Protoperidinium sp.5 (small brown round)		5.3	8.4						20.8	8.3	5.6		5.3
Protoperidinium sp.7 (small peridinoid shape 2)			1.9				5.4						2.6
Protoperidinium sp.8 (small spherical pale brown)		5.3	7.5	1.6	3.5	9.7		14.3	4.2	8.3	5.6	12.5	15.8
Incertae sedis (unknown)													
Raphidophyte cyst (putative)	Marine fauna kills (ROS)	11.6	14.0	36.3	26.5	23.6	37.5	14.3					
Unknown sp. 1 (spherical clear)		1.1	0.9		0.9	1.4	1.8	14.3	8.3	8.3	5.6		
Unknown sp. 2 (clear spherical, irregular spines)						1.4			4.2				
Unknown sp. 3 (ovoid/cylindrical clear)		3.2	1.9	0.8	0.9		1.8	14.3	8.3				
Total cyst count (n)		**95**	**107**	**124**	**113**	**72**	**56**	**7**	**24**	**12**	**18**	**8**	**38**

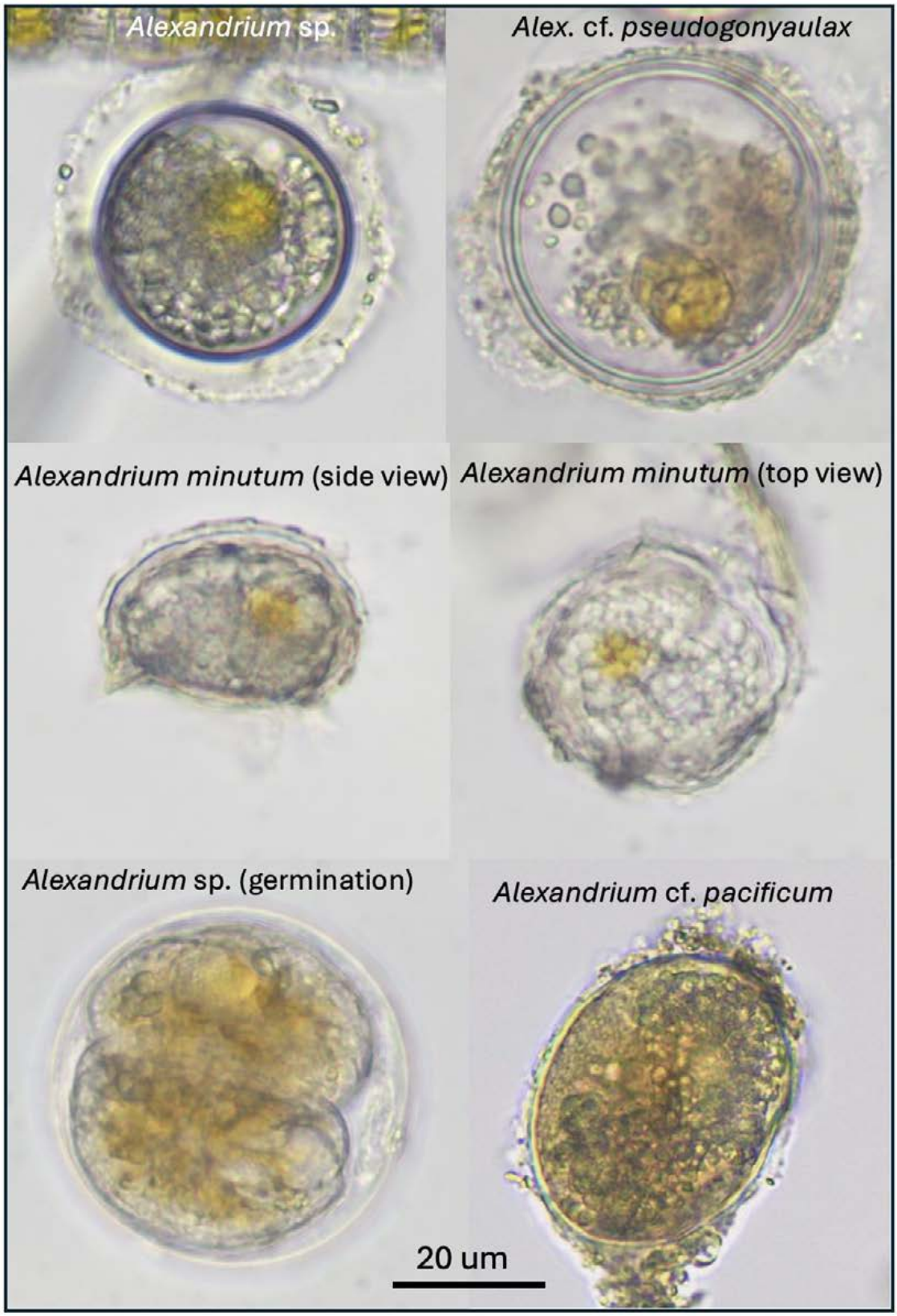
Dinoflagellate resting cysts observed in sediment samples



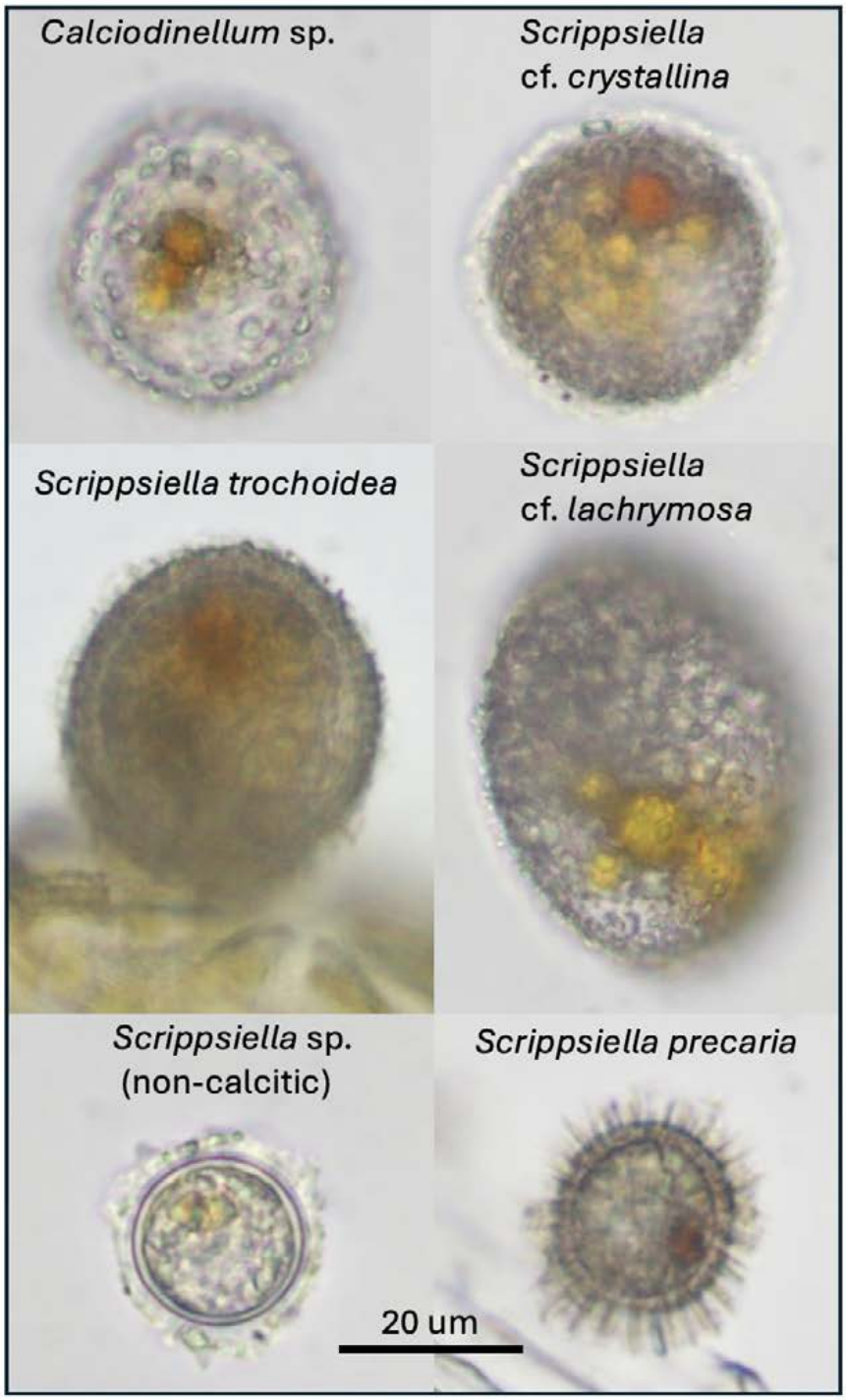
Gonyaulacoids



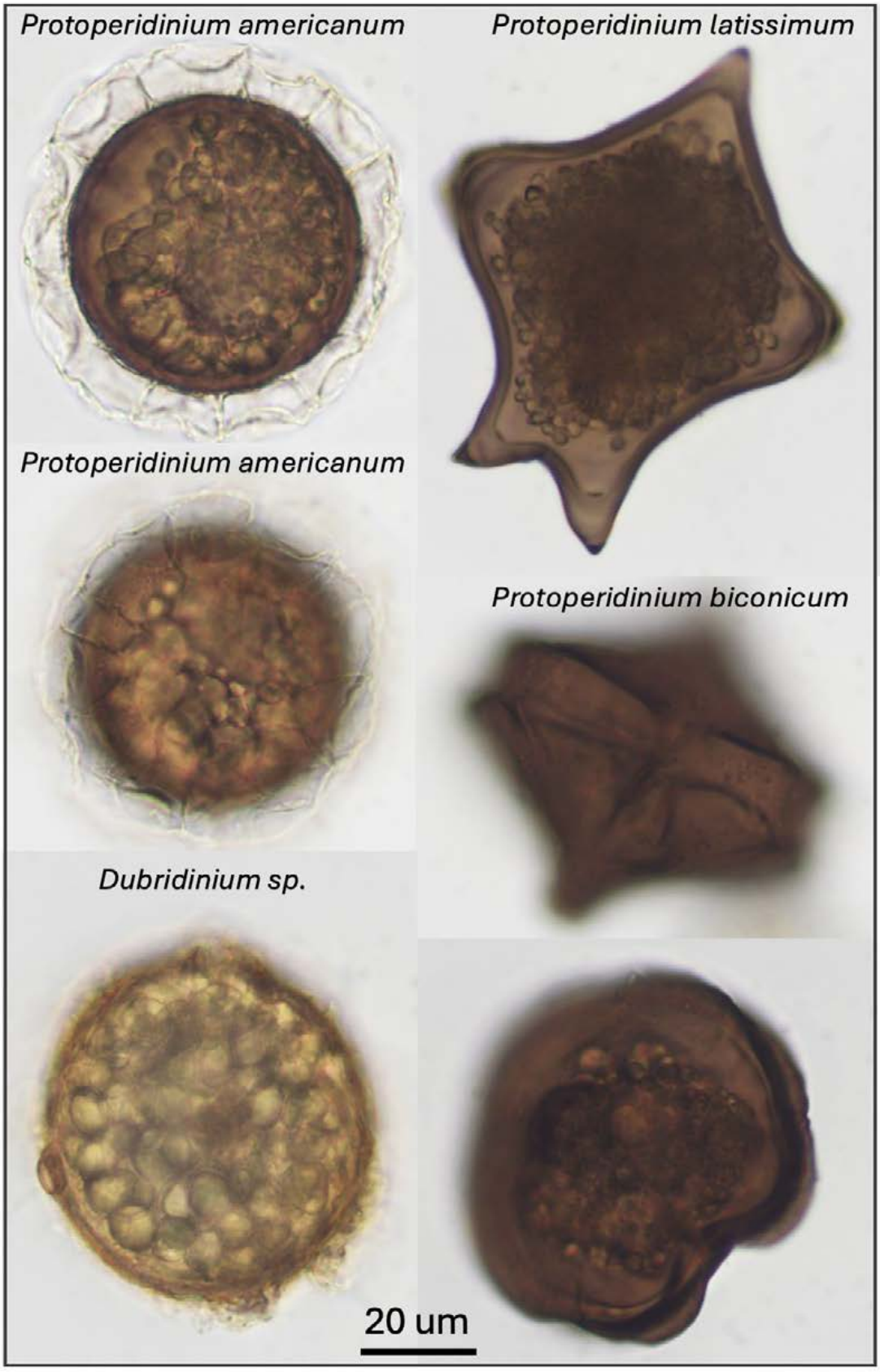
Gonyaulacoids: *Alexandrium*



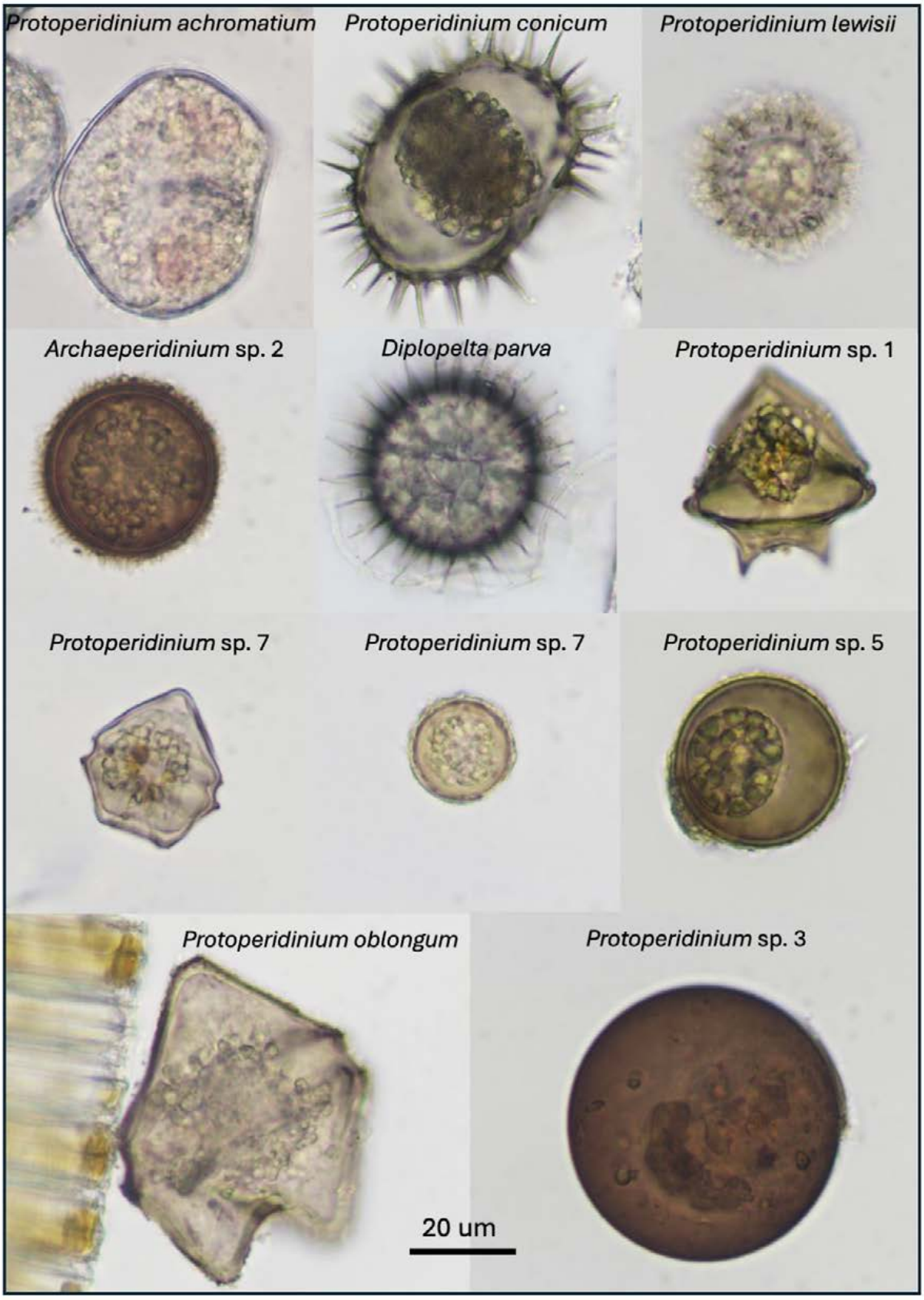
Peridinoids: Calciodinellidae



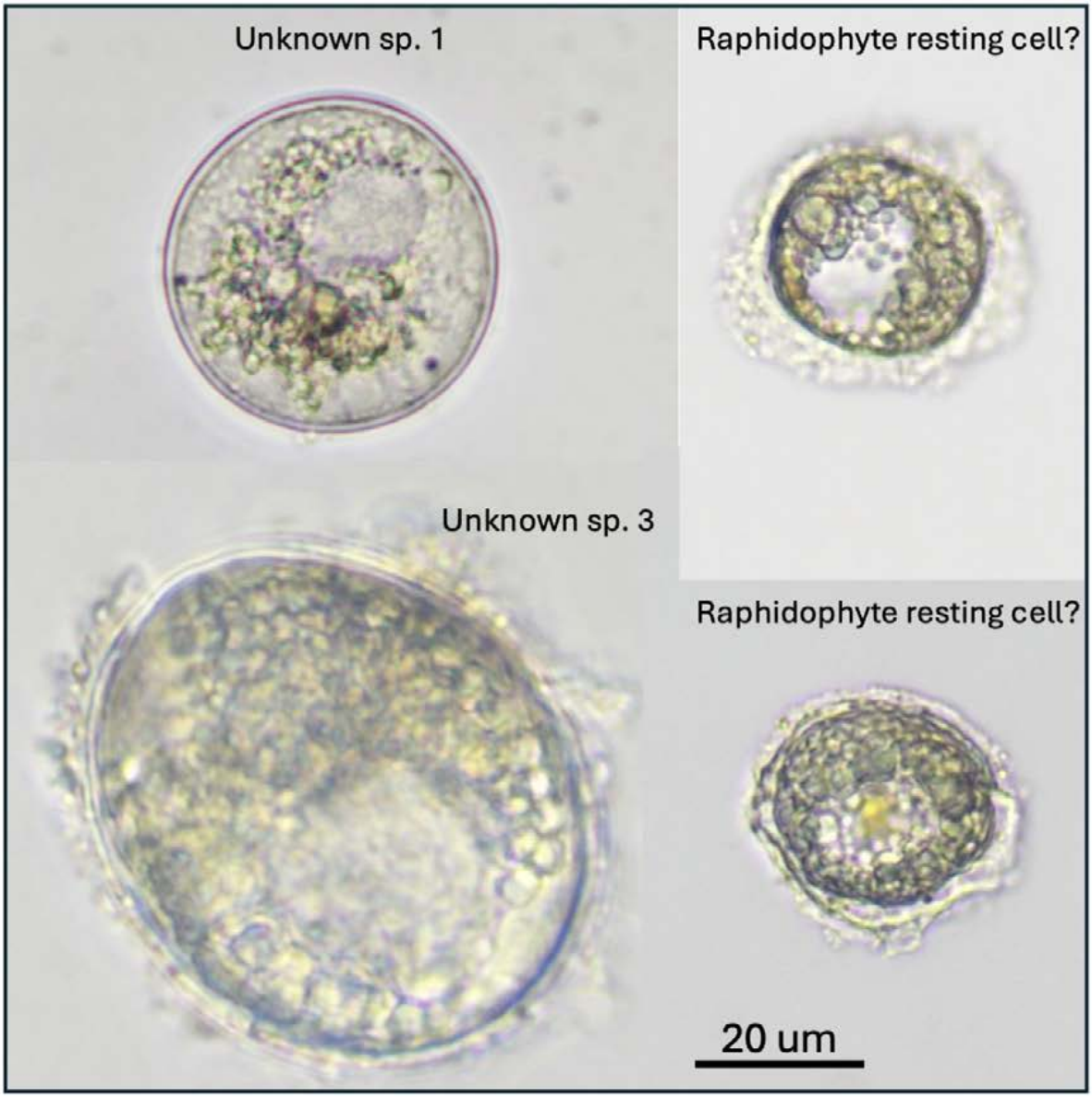
Peridinoids



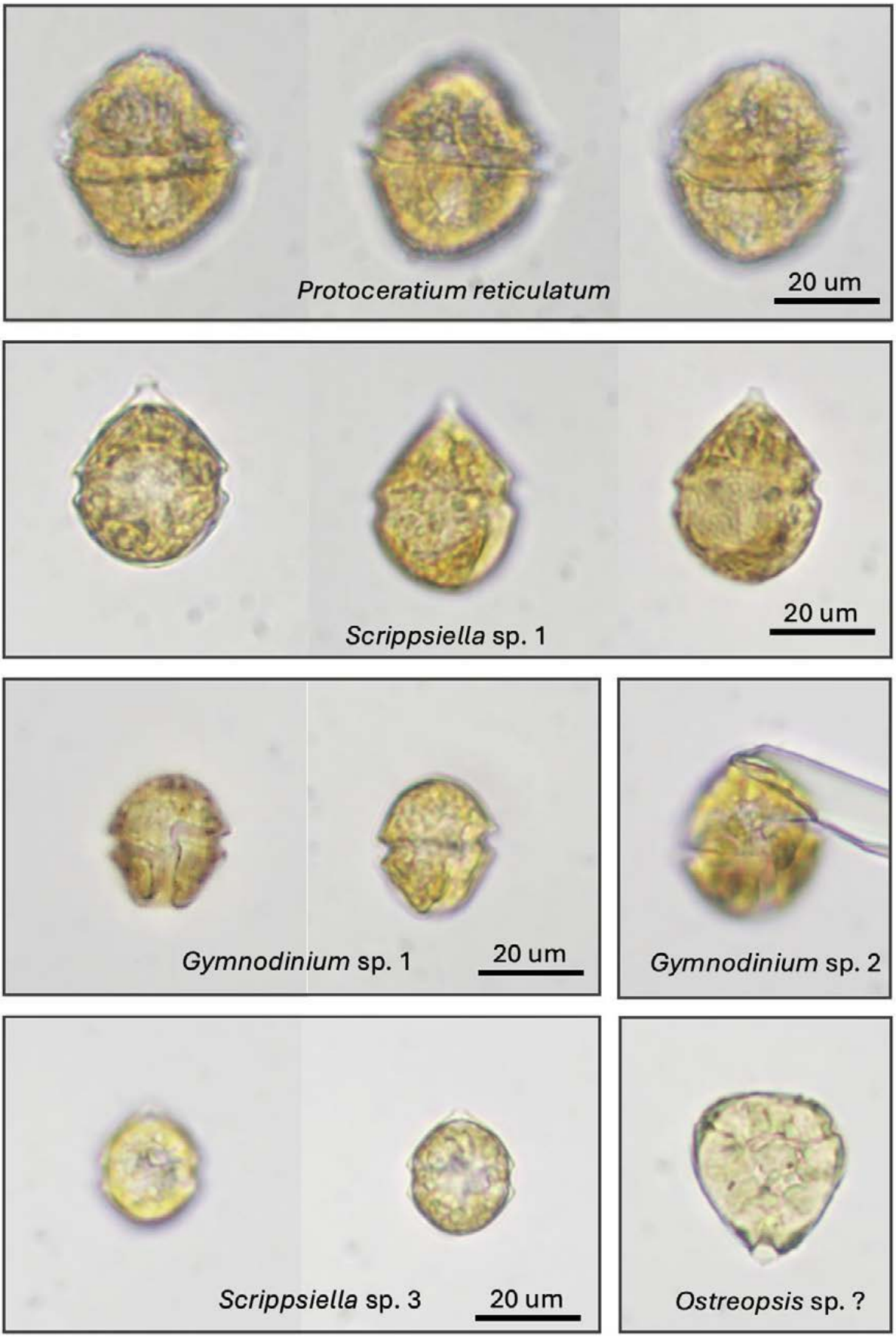
Peridinoids



Uncertain affinities



Germinated taxa from cyst incubations



Sample processing methods

Cores were measured and photographed, cut at 17 cm from the surface layer (mean mid-core depth) for sub-sampling. The top 8cm of each half core was then carefully gravity-extruded into separate storage containers. Containers were were topped with a thin layer of filtered seawater, capped and sealed with ducting tape, and stored at 10 degrees until processing for microscopy and germination studies.

Samples for microscopy were processed and live cysts concentrated according to Bolch (1997). Briefly, sub-samples of wet sediment (5-7 g) were placed into plastic jars, 50 ml of filtered seawater added, and samples thoroughly mixed to produce a watery slurry. The slurry was sonicated for 2 minutes with a probe sonicator (Microson; 20 watts RMS) to disaggregate cysts from fine particles. Samples were washed (using FSW) through a 300um and 125um Nytal mesh sieve and collected onto a 20um Nytal mesh sieve. Material collected on the 20um sieve was resuspended in 10 ml of FSW and live cysts concentrated using a density gradient centrifugation (Bolch 1997). The cyst concentrate was re-suspended in 0.5ml of FSW prior to direct examination using wet mounts and brightfield microscopy and photographed at 200 to 400x magnification using a Zeiss AxioStar or Nikon NiU microscope. All putative dinoflagellate cysts were identified to genus or species level where possible.

For germination studies to determine presence of *Karenia* species, sub-samples (10g) of the surface sediments were processed as described above, but with the sonication step omitted (Liu et al. 2020). The density gradient-concentrated cyst suspension from each sample was placed into six-well culture plates and 10ml of K/2 culture medium added. Plates were incubated at 18 degrees and light intensity of 40um moles m-2 s-1, with 14:12 light:dark cycle. Incubation wells were examined for germinated cells every 3 days for 15 days. Swimming dinoflagellate cells were isolated using flame-drawn micropipette (Bolch and Percy 2013), transferred to glass slides and examined by microscopy to determine genus/species identity.

Note: <u>All identifications are putative</u>. Definitive identification to species level is not possible for the majority of cyst species without undertaking laboratory germinations.

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Lewis J, Harris ASD, Jones KJ & Edmonds RL (1999). Long-term survival of marine planktonic diatoms and dinoflagellates in stored sediment samples. Journal of Plankton Research, 21 (1999), pp. 343-354.

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Miyazono A., Nagai S., Kudo I., Tanizawa K. Viability of *Alexandrium tamarense* cysts in the sediment of Funka Bay, Hokkaido, Japan: Over a hundred year survival times for cysts. Harmful Algae. 2012: 16:81–88. doi: 10.1016/j.hal.2012.02.001.

Appendix B Northern Water Marine Baseline Sediment Characterisation

Geosyntec consultants | JBS&G A Geosyntec Company

Northern Water Pipeline Baseline Sediment Characterisation

Northern Water

Limited Baseline Sediment Characterisation Report (Rev0)

JBS&G 63753 | 172,455 (Rev0)

26 June 2026



We acknowledge the Traditional Custodians of Country throughout Australia and their connection to land, sea and community.

We pay our respect to Elders past, present and emerging and in the spirit of reconciliation we commit to working together for our shared future where every person is respected, valued and has strong sense of belonging.

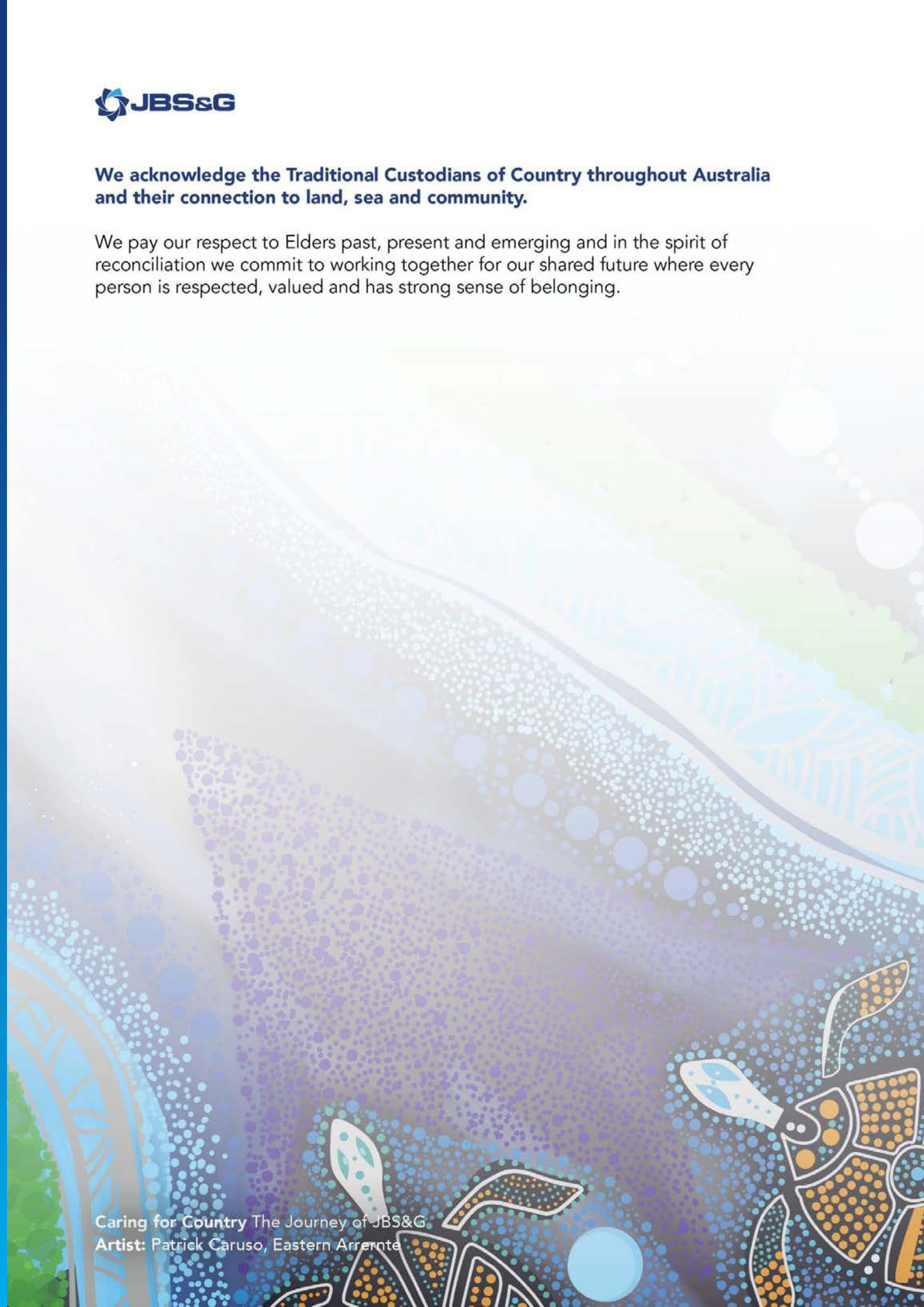


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1. Introduction and Background

JBS&G Australia Pty Ltd (JBS&G) was engaged by the Department for Infrastructure and Transport, Northern Water Project Delivery Office (DIT, the Client) to undertake a limited baseline in-situ sediment characterisation program relating to the South Australian Government's Northern Water Project (the Project). The Project aims to provide a secure climate resilient water source for industry in South Australia's Upper Spencer Gulf and Far North. Delivery of the Project will involve the construction and operation of a 51 gigalitre per year (GL/year) seawater reverse osmosis desalination plant located at Mullaquana Station on the Upper Spencer Gulf, and associated water transfer system (including pipelines, transfer pump stations, and product water storages) and electricity infrastructure. As part of the approvals for this project a limited (opportunistic) baseline assessment was undertaken to assess shallow sediment quality near the offshore intake and outfall where the main sediment disturbance will occur during construction.

A site location plan showing the general location of the site is included as **Figure 1** (attached)**.**

An assessment of the shallow sediment quality, as relevant at the time of the assessment discussed in this report, was undertaken for the purpose of understanding the existing contamination status of the sediment. The sediment was characterised by physical and chemical analysis, as well as benthic observations made and recorded during sampling

2. Objectives

The objective of the limited (opportunistic) baseline shallow sediment characterisation program was to gather information on the physical and chemical characteristics of the sediment that may be disturbed near the intake and outfall of the Project offshore pipeline.

3. Scope of Works

The sediment characterisation sampling program was undertaken in general accordance with, and with reference to, the guidance and procedures presented in the following:

- *National Assessment Guidelines for Dredging*, Commonwealth of Australia, 2009 (the NAGD).
- *Dredge guideline,* South Australian Environment Protection Authority (SA EPA), 2020.
- *National Environment Protection (Assessment of Site Contamination) Measure 1999* (the ASC NEPM, as amended 2013).

The limited sampling program included the retrieval of six sediment samples throughout the proposed pipeline intake and outfall footprint. The field program was completed on 23 October 2025.

4. Previous Reports

4.1 WSP, Factual Site Investigation Report Mullaquana (Northern Water Project Delivery Office), September 2025

WSP previously undertook a detailed site investigation as part of the project to characterise subsurface geological, hydrogeological, and environmental conditions. The field program comprised drilling nine offshore boreholes from a maximum depth 12 m below sea level to approximately 60 m below sea level

using wash-bore and diamond-core techniques from a jack-up barge, completing eight offshore cone penetration tests (CPTs), conducting in-situ testing in all boreholes, and undertaking geotechnical and environmental laboratory testing on collected soil, rock, and water samples. All sampling was undertaken in accordance with an agreed plan aligned with relevant national and state guidelines.

Overall, no visual or olfactory indicators of contamination—such as staining, odours, or elevated Photoionisation Detector (PID) readings—were identified in any borehole. Analytical results reported all contaminants below applicable human health and ecological investigation levels, indicating that excavated material would be suitable for retention onshore under commercial/industrial land use.

Comparison against waste classification criteria indicated exceedances of Waste Fill thresholds for arsenic at nine locations and nickel at three locations. Two locations also exceeded the intermediate waste criteria for TRH (C10–C36 fraction ranges), and two exceeded low-level contaminated waste criteria for benzo(a)pyrene. WSP noted that hydrocarbon analysis confirmed the presence of non-toxic, mineral-based lubricating oil—consistent with drilling fluids rather than naturally occurring hydrocarbons—indicating that impacts were likely introduced during drilling.

Laboratory analysis of selected samples for potential acid sulfate soils (PASS) did not identify any net acid generating (NAG) potential, and no samples exhibited positive Net Acid Production Potential (NAPP). Although acid sulfate potential was indicated in field at several depths within the rock, the confirmatory laboratory testing found no exceedances of applicable rock criteria. As such, the material is not expected to be classified as acid-generating rock.

5. Sampling Program and Laboratory Analytical Methods

5.1 Sediment Sampling Methodology

JBS&G was advised that for the assessment area to be disturbed, a baseline characterisation of shallow sediments to a depth of 0.5 m was proposed for the project. This formed the basis for the proposed sampling methodology adopted, which is summarised as follows:

- Sediment cores were recovered from each sampling location to a maximum depth of 0.5 m (or prior refusal) using a sediment coring tube manually driven into the sediments by a dive team with the aid of a mallet. Due to the volume of sediment required for the chemical and physical analysis to be performed on each sample, typically 3-4 cores were recovered from each location.
- Sediment samples were recovered following homogenisation of the cores, in accordance with the recommend sampling methodology in the NAGD;
- Prior to homogenisation, the lithology of each sediment core was logged by the diver onsite;
- Following homogenisation, the recovered samples were collected into laboratory supplied sample containers using a dedicated pair of nitrile disposable gloves;
- All reusable sampling equipment was thoroughly cleaned between sampling locations to minimise the potential for cross-contamination;
- After homogenisation, the recovered samples were immediately placed on ice in an insulated cooler for subsequent transport to the testing laboratories; and
- All samples submitted for laboratory analysis were accompanied by appropriate chain of custody (COC) documentation as per standard JBS&G protocols (refer to **Appendix A**).

5.2 Laboratory Analytical Program

5.2.1 Physical Analysis

The laboratory analytical program included the following physical analysis completed on all samples:

- Particle size distribution (PSD) (Method: AS1289.C6.1-1977 Determination of Particle Size by Sieving) including sieve sizes of 0.002mm, 0.02mm, 0.075mm, 0.15mm, 0.3mm, 0.425mm, 0.6mm, 1.18mm, 2.36mm, 4.75mm, 6.7mm, 9.5mm, 13.2mm, 19mm, 26.5mm, 37.5mm, 63mm and 75mm; and
- Hydrometer analysis of clay and fine silts to assess grain sizes <0.075 mm.

5.2.2 Chemical Analysis

Chemical analysis of sediment samples was undertaken on all samples recovered during the sampling program. The laboratory analytical program was guided by the analytes for which there are Screening Levels presented in the NAGD and comprised the following:

- Heavy metals and metalloids (antimony, arsenic, cadmium, chromium (total), copper, lead, mercury, nickel, silver, and zinc);
- Total recoverable hydrocarbons (TRH);
- Polycyclic aromatic hydrocarbons (PAH);
- Organochlorine pesticides (OCP);
- Polychlorinated biphenyls (PCB);
- Nitrate;
- Ammonia;
- Tributyltin (TBT as Sn); and
- Total organic carbon (TOC) (to assist with normalisation of organic contaminant results, if identified).

5.3 QA/QC procedures

An objective of the sampling program was to collect data that were sufficiently reliable and robust to enable comparison to the relevant screening criteria adopted for the assessment. As such, a range of Quality Assurance / Quality Control (QA/QC) procedures were implemented throughout the program, including the following:

- Collection and analysis of blind-coded field duplicate samples for intra-laboratory and inter-laboratory data precision assessment;
- Use of a dedicated pair of disposable nitrile gloves during sample recovery from each sediment core, and the use of dedicated laboratory supplied sample containers to minimise the potential for cross-contamination between sampling locations; and
- Use of appropriate chain of custody documentation to accompany samples submitted for laboratory analysis.

In order to assess the quality and reliability of the analytical data, Data Quality Indicators (DQIs) were established for the project. The DQIs are discussed below in relation to precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCS) parameters, and are shown in **Table 5.1.** The DQIs have been adopted with reference to the ASC NEPM, the United States Environmental Protection Agency (US EPA) *Guidance on Systematic Planning Using the Data Quality Objectives Process (EPA QA/G-4)*, and the requirements of the national accreditation for the nominated laboratories[1].

- **Precision** – measures the reproducibility of measurements under a given set of conditions. The precision of the laboratory data and sampling techniques is assessed by calculating the Relative Percentage Difference (RPD) of duplicate samples.
- **Accuracy** – measures the bias in a measurement system. The accuracy of the laboratory data that were generated during this study is a measure of the closeness of the analytical results obtained by a method to the 'true' value. Accuracy is assessed by reference to the analytical results of laboratory control samples, laboratory spikes and analyses against reference standards.
- **Representativeness** –expresses the degree which sample data accurately and precisely represent a characteristic of a population or an environmental condition. Representativeness is achieved by collecting samples on a representative basis across a site, and by using an adequate number of sample locations to characterise a site to the required accuracy.
- **Comparability** – expresses the confidence with which one data set can be compared with another. This is achieved through maintaining a level of consistency in techniques used to collect samples; ensuring analysing laboratories use consistent analysis techniques and reporting methods.
- **Completeness** – is defined as the percentage of measurements made which are judged to be valid measurements. The completeness goal is set at there being sufficient valid data generated during the study.
- **Sensitivity** – expresses the appropriateness of the chosen laboratory methods, including the limits of reporting, in producing reliable data in relation to the adopted criteria.

If any of the DQIs are not met, further assessment will be necessary to determine whether the non-conformance will significantly affect the usefulness of the data. Corrective actions may include requesting further information from samplers and/or analytical laboratories, downgrading of the quality of the data or alternatively, re-collection of the data.

[1] Noting Eurofins, Envirolab, and SGS are accredited by the National Association of Testing Authorities (NATA) for the analytical works performed with the exception of silica analysis by XRD.

Table 5.1: Summary of QA/QC Program

Data Quality Measures	Frequency (where relevant)	Data Quality Indicator
Precision		
Blind duplicates (intra-laboratory and inter-laboratory)	1 / 20 samples (5%)	<30% RPD[#1]
Laboratory duplicates[#2]	1 / 20 samples (5%)	<30% RPD[#1]
Accuracy		
Method blanks	1 / analyte, per lab batch	Less than the laboratory limit of reporting (<LOR)
Laboratory control samples	1 / analyte, per lab batch	70-130% or as nominated in the laboratory's QC report
Matrix spikes	1 / analyte, per lab batch	70-130% or as nominated in the laboratory's QC report
Representativeness		
Sampling appropriate for media and analytes	-	-[#3]
Samples extracted and analysed within holding times.	All samples	Samples analysed within relevant laboratory specified holding times
Rinsate blank	1 per day where reusable equipment is used	<LOR
Trip spike	1 per sample event where samples are scheduled for TRH/VOC analysis	Laboratory analytical recovery within 70-130% of spike concentration for volatile TRH and BTEX
Laboratory blanks	1 / analyte, per lab batch	<LOR
Comparability		
Standard operating procedures for sample collection & handling	All Samples	Samples collected in accordance with relevant procedure[#3]
Standard analytical methods used for all analyses	All Samples	All samples analysed by a laboratory that is NATA accredited for the analyses performed
Consistent field conditions, sampling staff and laboratory analysis	All Samples	-[#3]
Limits of reporting appropriate and consistent	All Samples	Laboratory LOR is below adopted guideline values and allows relevant comparability between results where more than one laboratory is used
Completeness		
Sample description and COCs completed and appropriate	All Samples	-[#3]
Appropriate documentation	All Samples	-[#3]
Satisfactory frequency and result for QC samples	All QA/QC samples	5% frequency is met, RPDs within acceptable range identified above
Data from critical samples is considered valid	-	Critical samples valid

Data Quality Measures	Frequency (where relevant)	Data Quality Indicator
Sensitivity		
Analytical methods and limits of recovery appropriate for media and adopted site assessment criteria	All Samples	Laboratory LOR is below adopted guideline values

[#1]If the RPD between duplicates is greater than the pre-determined data quality indicator, a judgment will be made as to whether the excess is critical in relation to the validation of the data set or unacceptable sampling error is occurring in the field.

[#2] Duplicate sample analysis performed by the laboratory as part of its internal QA/QC program for the data.

[#3] A qualitative assessment of compliance with standard procedures and appropriate sample collection methods will be completed during the DQI compliance assessment.

5.4 Adopted Assessment Criteria

The analytical results were compared to screening criteria derived from the following guidance documents, to understand the baseline quality of the material within the assessment area:

- NAGD (Commonwealth of Australia, 2009).

To enable appropriate comparison to the NAGD Screening Levels, results for organic contaminants and TBT (as Sn) are to be normalised to 1% TOC by adjusting laboratory reported results (where detectable concentrations are reported above the laboratory limit of reporting) by a multiplication factor based on the relevant or average TOC result for each dredge area. Further, where one or more results for any one analyte exceeds the relevant screening value, the 95% upper confidence limit of the arithmetic mean (95% UCL) is to be calculated for comparative purposes in accordance with the NAGD guidelines (where a sufficient number of sample results exists).

Further, it is noted that the NAGD Screening Levels are based on the Interim Sediment Quality Guideline Low (ISQG-Low) values presented in the 2000 version of the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC/ARMCANZ, 2000), and updated in the CSIRO Land and Water Science Report 08/07, *Revision of the ANZECC/ARMCANZ Sediment Quality Guidelines* (Simpson et. al. 2013). Since the publishing of the NAGD guidelines, and Simpson et. al. (2013), the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* went through a revision and update process (ANZG, 2018). This revision included an update to the ISQG-Low values, now referred to as Toxicant Default Guidelines Values (DGVs). The principal changes are summarised in **Table 5.2** below.

Table 5.2: Summary of Screening Levels Differences Between NAGD (2009) and ANZG (2018)

Analyte/Toxicant	NAGD Screening Level	ANZG Toxicant DGV
Total PCBs	23 µg/kg	*34 µg/kg*
Pesticide, DDD	2 µg/kg	*3.5 µg/kg*
Pesticide, DDE	2.2 µg/kg	**1.4 µg/kg**
Pesticide, DDT	1.6 µg/kg	**1.2 µg/kg**
Dieldrin	280 µg/kg	**2.8 µg/kg**
Chlordane	0.5 µg/kg	*4.5 µg/kg*
Lindane	0.32 µg/kg	*0.9 µg/kg*
Endrin	10 µg/kg	**2.7 µg/kg**
Total petroleum hydrocarbons	550 mg/kg	**280 mg/kg**

Notes: ANZG (2018) Toxicant DGVs that are higher than NAGD Screening Values are shown in *italics*, whilst DGVs that are lower are shown in **bold**.

To assist with the sediment characterisation process, the analytical results were also compared to the ANZG (2018) Toxicant DGVs.

6. Limited Baseline Results Summary

6.1 Field Observations

A summary of the sediment lithology, and approximate water depths overlying the sediment at each sample location, are presented below in **Table 6.1.** A photographic log from each of the locations has been included in **Appendix B**.

Table 6.1 Summary of field observations

Sample	Water Depth (m)	Description	Date sampled
SB3	18	brown silt/clay	23/10/25
SI4	23	brown silt/clay	23/10/25
SB4	20	brown silt/clay	23/10/25
SI3	20	brown silt/clay	23/10/25
ZO3	15	Yellow sand/silt, some fibre	23/10/25
ZO4	13	Yellow sand/silt, some fibre	23/10/25

6.2 Laboratory Results

A summary of the laboratory chemical analytical results showing comparison against the adopted assessment criteria for samples analysed is provided in the **Summary Tables**. Copies of the certified laboratory analytical reports are provided in **Appendix A**. A summary of the laboratory results with respect to physical analyses, and sediment chemistry is summarised below in the following sections.

6.2.1 Physical Analyses

Limited PSD and Hydrometer analysis was undertaken on the collected sediment samples. The results of the PSD analyses with graphical presentation of results are provided in **Appendix C**. The Hydrometer analytical results [reflecting the clay and fine silts (CFS) portion of the samples] are also included with the PSD graphs**.** Median grain size (D_{50}) of the sediments encountered at each location is presented in **Table 6.2** below.

Table 6.2: Physical Analysis Results Summary

Sample ID	Reported D_{50} Range (mm)	Sediment Type based on D_{50}
SB3	0.15-0.3 mm	Fine Sand
SI4	0.075-0.15 mm	Very Fine Sand
SB4	0.15-0.3 mm	Fine Sand
SI3	0.075-0.15 mm	Very Fine Sand
ZO3	0.425-0.6 mm	Medium Sand
ZO4	0.3-0.425 mm	Medium Sand

6.2.2 Sediment Chemistry

All of the sediment analytical results for targeted inorganic and organic contaminants were reported below the NAGD Screening Levels, the ANZG Toxicant DGVs, and/or were reported below the laboratory LOR.

With the exception of the TRH results discussed below, all results for organic analytes and TBT (as Sn) were below the respective laboratory LORs. As such, normalisation of the results relative to 1% TOC was not required to be undertaken. Furthermore, given that all chemical analytical results were below the NAGD Screening Levels, calculation of the 95% UCL value for specific contaminants was not required.

It is noted that one primary sample (ZO3) and a duplicate sample (DUP02, collected with primary sample ZO4) had minor concentrations of TRH C10-C16 fraction range reported (53 and 58 mg/kg, respectively). The minor hydrocarbon concentrations are considered likely to be of phytogenic origin rather than petrogenic (i.e. results are considered unlikely to be related to petroleum hydrocarbon impacts). Notwithstanding, all TRH results were well below the NAGD and ANZG screening criteria. Given this, and noting the results were

reported in samples that had TOC concentrations >1%, normalisation of the TRH results relative to 1% TOC was not required as TOC concentrations >1% will reduce the relative contaminant value, not increase it.

6.2.2.1 Total Organic Carbon

Relatively low TOC values were reported in the sediment samples, with TOC results for all samples ranging from a low of 0.2% to a maximum of 1.5%. Marginally higher TOC results were observed within the locations with coarser material, and those where minor TRH concentrations were reported. This potentially supports JBS&G's conclusion that the minor hydrocarbon concentrations are likely to be of phytogenic origin rather than petrogenic.

7. Data Quality Assessment

A QA/QC program in accordance with that discussed in **Section 5.3** was undertaken throughout the sampling program. The QA/QC program was implemented to allow an assessment of the quality and reliability of the data produced for the assessment. A detailed assessment of the data quality has been completed with reference to the relevant DQIs, including assessment of any outliers or exceptions, and is provided in **Appendix E**. The laboratory analytical reports, including associated laboratory QA/QC results, are provided in **Appendix A**.

Based on the results of the data quality assessment and evaluation of the QA/QC data collected, it is considered that:

- The field and laboratory quality assurance measures implemented provide an acceptable level of confidence that the data collected and reported is appropriately complete, comparable and representative; and
- The field and laboratory quality control measures implemented provide an acceptable level of confidence that the data collected and reported is appropriately accurate and precise.

Therefore, it is concluded that the data collected is sufficiently reliable and suitable for the purpose of the assessment. Notwithstanding, limitations relating to some laboratory LORs in comparison to the adopted guidelines are noted in **Appendix E** with related recommendations.

8. Limitations

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the client and other parties. The report has been prepared specifically for the client for the purposes of the commission, and no warranties, express or implied, are offered to any third parties and no liability will be accepted for use or interpretation of this report by any third party.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose. This report should not be amended in any way without prior approval by JBS&G, or reproduced other than in full including all attachments as originally provided to the client by JBS&G.

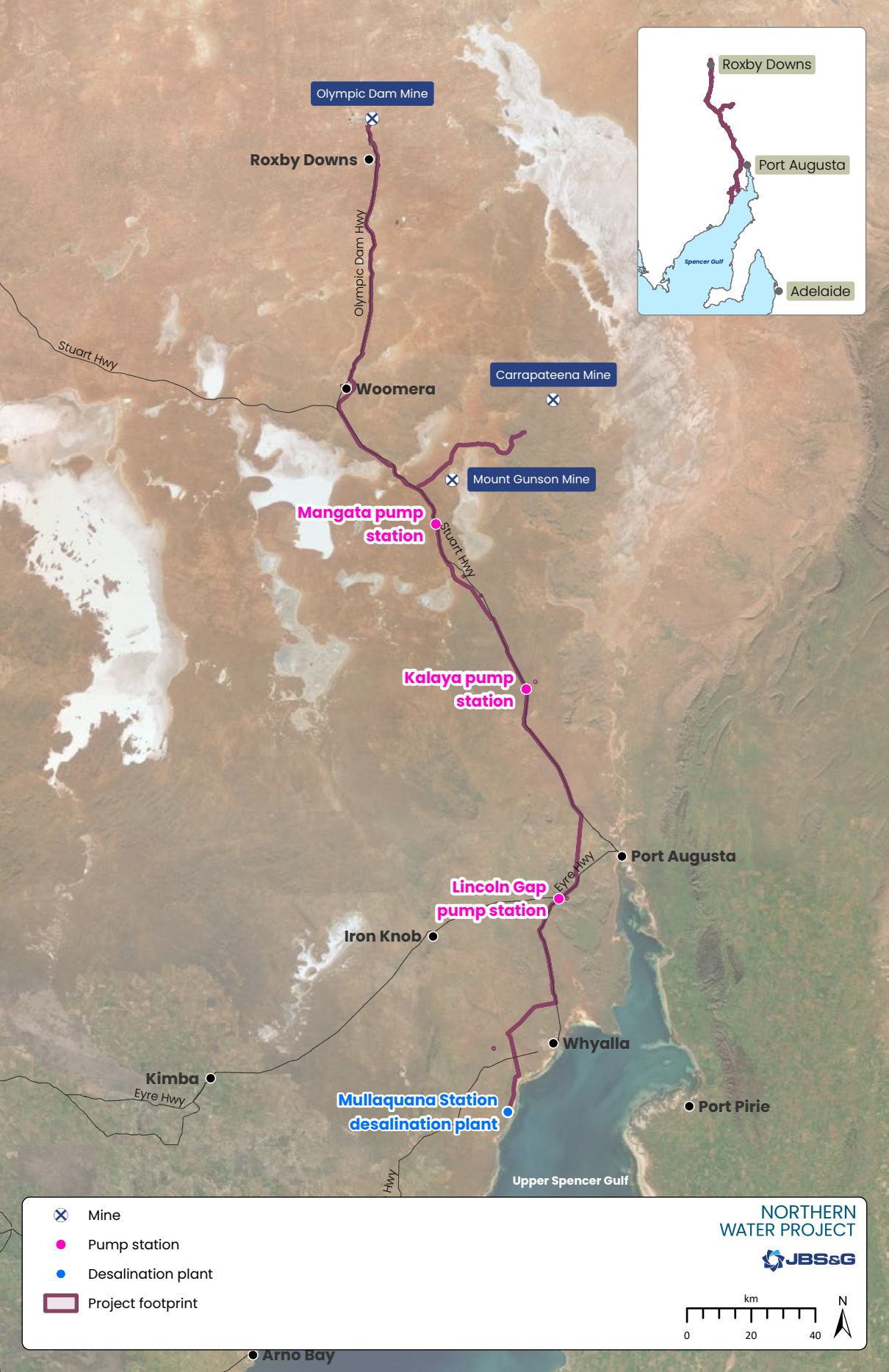
Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements or agreed scope of work.

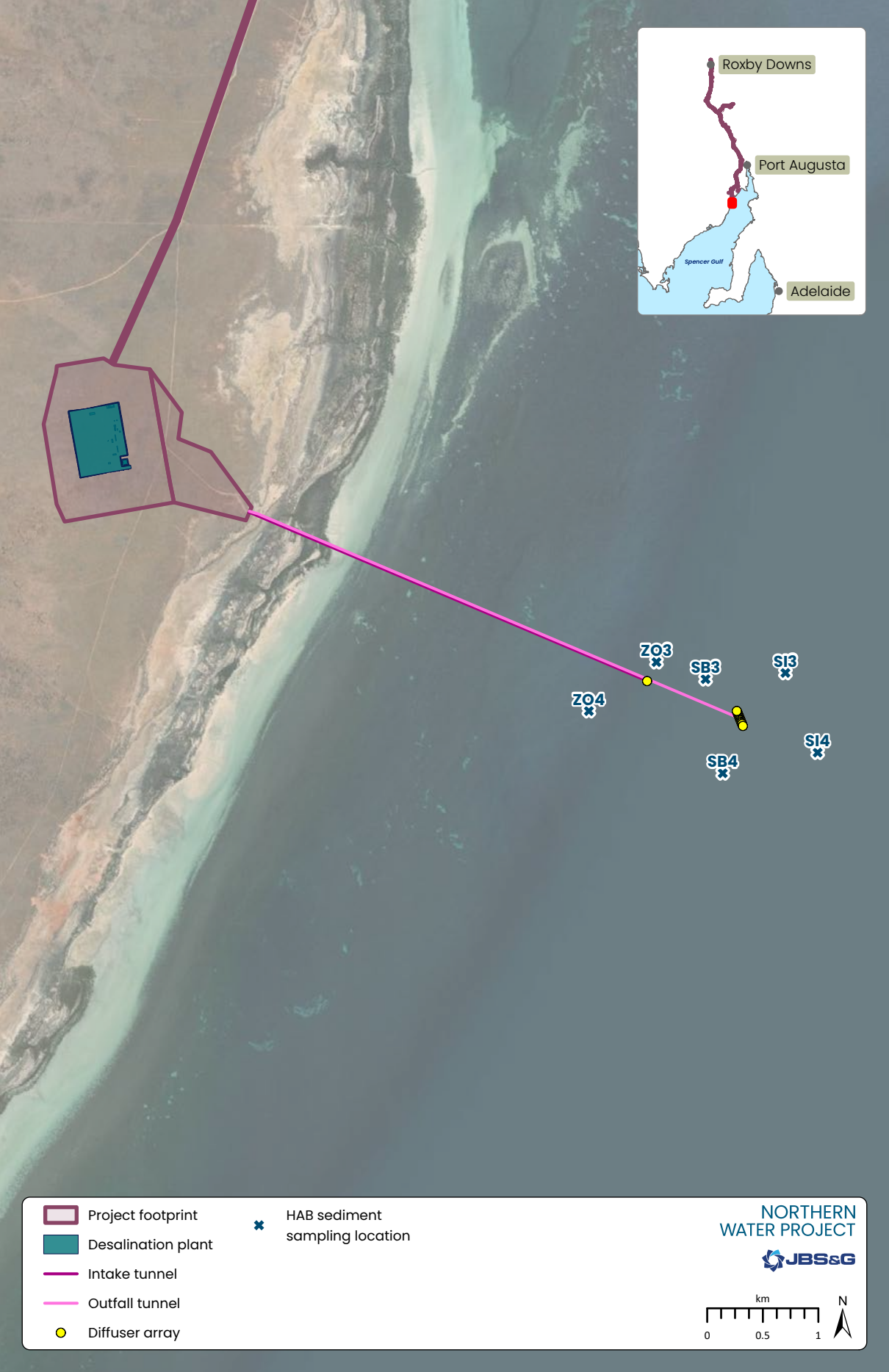
Limited sampling and laboratory analyses were undertaken as part of the investigations undertaken, as described herein. Conditions between sampling locations and media may vary, and this should be considered when extrapolating between sampling points. Chemical analytes are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site.

Changes to the conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigations.

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, JBS&G reserves the right to review the report in the context of the additional information.

Figures


Roxby Downs
Port Augusta
Spencer Gulf
Adelaide
Olympic Dam Mine
Roxby Downs
Olympic Dam Hwy
Stuart Hwy
Woomera
Carrapateena Mine
Mount Gunson Mine
Mangata pump station
Stuart Hwy
Kalaya pump station
Port Augusta
Eyre Hwy
Lincoln Gap pump station
Iron Knob
Whyalla
Kimba
Eyre Hwy
Mullaquana Station desalination plant
Port Pirie
Hwy
Upper Spencer Gulf
Arno Bay
Mine
Pump station
Desalination plant
Project footprint
NORTHERN WATER PROJECT
JBS&G
km
0
20
40
N


Roxby Downs
Port Augusta
Spencer Gulf
Adelaide
ZO3
SB3
SI3
ZO4
SI4
SB4
Project footprint
Desalination plant
Intake tunnel
Outfall tunnel
Diffuser array
HAB sediment sampling location
NORTHERN WATER PROJECT
JBS&G
km
0
0.5
1
N

Summary Tables

ANALYTICAL SUMMARY TABLE
Project Number: 63753
Project Name: Northern Water Project

	Metals & Metalloids										TRHs (NEPC 2013)							BTEXN														
	Antimony	Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Mercury	Nickel	Silver	Zinc	C6-C10	C10-C16	C16-C34	C34-C40	C10-C40 (Sum of total)	F1 (C6-C10 minus BTEX)	F2 (C10-C16 less Naphthalene)	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	Naphthalene_VOC	Acenaphthene	Acenaphthylene	Anthracene	Benz[a]anthracene	Benzo(a)pyrene	Benzo(a)pyrene TEQ (LOR)	Benzo(a)pyrene TEQ calc (Half)
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR	10	2	0.4	5	5	5	0.1	5	2	5	20	50	100	100	100	20	50	0.1	0.1	0.1	0.1	0.2	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
ANZG (2018) - Sediment Quality DGV	2	20	1.5	80	65	50	0.15	21	1	200	280				280																	
ANZG (2018) - Sediment Quality GV-high	25	70	10	370	270	220	1	52	4	410	550				550																	
NADG 2009 ISQG	2	20[#1]	1.5	80	65	50	0.15	21[#1]	1	200	550				550																	
NADG 2009 SQG-High	25	70	10	370	270	220	1	52	3.7	410																						

Location Code	Field ID	Date	Depth	Lab Report Number																													
SB3	SB3	23 Oct 2025		394448	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB3	SB3	23 Oct 2025		1286669	<10	3.4	<0.4	10	<5	<5	<0.1	<5	<2	9.7	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6
SB4	SB4	23 Oct 2025		394448	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB4	SB4	23 Oct 2025		1286669	<10	3.5	<0.4	9.0	<5	<5	<0.1	<5	<2	9.3	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6
SI3	SI3	23 Oct 2025		394448	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SI3	SI3	23 Oct 2025		1286669	<10	2.5	<0.4	6.8	<5	<5	<0.1	<5	<2	8.7	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6
SI4	SI4	23 Oct 2025		394448	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SI4	SI4	23 Oct 2025		1286669	<10	3.5	<0.4	9.3	<5	5.4	<0.1	<5	<2	12	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6
ZO3	ZO3	23 Oct 2025		394448	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ZO4	ZO4	23 Oct 2025		394448	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ZO3	ZO3	23 Oct 2025		1286669	<10	2.3	<0.4	<5	<5	<5	<0.1	<5	<2	<5	<20	53	<100	<100	<100	<20	53	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6
ZO4	ZO4	23 Oct 2025		1286669	<10	2.0	<0.4	<5	<5	<5	<0.1	<5	<2	<5	<20	<50	<100	<100	<100	<20	<50	<0.1	<0.1	<0.1	<0.1	<0.2	<0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6

Comments
#1 Sediments in Australia commonly have high natural levels of As and Ni
#2 Where a numerical maximum value (ISQG-High) for TBT is required, the USEPA's final chronic value of 80 µg/kg may be used.
#3 Values relate to ESB-based SQGs for freshwater sediments and 620 ug/kg for marine sediments (normalised to 1% organic carbon, dry weight) as presented in Appendix A4 of Simpson et. al. 2013
#4 Values relate to ESB-based SQGs for freshwater sediments & 220.0 ug/kg fpr marine sediments (normalised to 1% organic carbon, dry weight) as presented in Appendix A4 of Simpson et. al. 2013

ANALYTICAL SUMMARY TABLE
Project Number: 63753
Project Name: Northern Water Project

	PAH													Organochlorine Pesticides																
	Benzo(a)pyrene TEQ calc (Zero)	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Sum of total)	4,4-DDE	a-BHC	b-BHC	d-BHC	g-BHC (Lindane)	Aldrin	Dieldrin	Aldrin + Dieldrin	Chlordane	DDT	DDD	DDT+DDE+DDD	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.01	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
ANZG (2018) - Sediment Quality DGV													10	0.0014				0.0009		0.0028		0.0045	0.0012						0.0027	
ANZG (2018) - Sediment Quality GV-high													50	0.007				0.0014		0.007		0.009	0.005						0.06	
NADG 2009 ISQG													10					0.00032		0.28		0.0005	0.0016	0.002					0.01	
NADG 2009 SQG-High													45-50	0.027				0.001		0.27[#3]		0.006	0.046						0.12[#4]	
Location Code	**Field ID**	**Date**	**Depth**	**Lab Report Number**																											
SB3	SB3	23 Oct 2025		394448	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB3	SB3	23 Oct 2025		1286669	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
SB4	SB4	23 Oct 2025		394448	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB4	SB4	23 Oct 2025		1286669	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
SI3	SI3	23 Oct 2025		394448	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SI3	SI3	23 Oct 2025		1286669	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
SI4	SI4	23 Oct 2025		394448	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SI4	SI4	23 Oct 2025		1286669	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Z03	Z03	23 Oct 2025		394448	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Z04	Z04	23 Oct 2025		394448	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ZO3	ZO3	23 Oct 2025		1286669	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
ZO4	ZO4	23 Oct 2025		1286669	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Comments
#1 Sediments in Australia commonly have high natural levels of As and Ni
#2 Where a numerical maximum value (ISQG-High) for TBT is required, the USEPA's final chronic
#3 Values relate to ESB-based SQGs for freshwater sediments & 220.0 ug/kg for marine sedimen
#4 Values relate to ESB-based SQGs for freshwater sediments & 220.0 ug/kg fpr marine sedimen

ANALYTICAL SUMMARY TABLE
Project Number: 63753
Project Name: Northern Water Project

								Polychlorinated Biphenyls								Non-Metallic Inorganics							Organotin	Moisture Content	Other	
	Endrin ketone	Heptachlor	Heptachlor Epoxide	Hexachlorobenzene	Methoxychlor	Toxaphene	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Sum of total)	Ammonia as N	Nitrate (as N)	Nitrite (as N)	Nitrite + Nitrate as N	Nitrogen (Organic)	Nitrogen (Total)	Kjeldahl Nitrogen Total	Tributyltin as SN	Moisture Content	Moisture Content (dried @ 103°C)	TOC
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/kg	%	%	%
LOR	0.005	0.005	0.005	0.005	0.005	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	10	5	5	5	10	10	10	0.5	0.1	1	0.1
ANZG (2018) - Sediment Quality DGV														0.034								9			
ANZG (2018) - Sediment Quality GV-high														0.28								70			
NADG 2009 ISQG														0.023								9[#2]			
NADG 2009 SQG-High																						70			
Location Code	**Field ID**	**Date**	**Depth**	**Lab Report Number**																							
SB3	SB3	23 Oct 2025		394448	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	47	-	-
SB3	SB3	23 Oct 2025		1286669	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<10	<5	<5	<5	960	960	960	-	-	45	0.5
SB4	SB4	23 Oct 2025		394448	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	46	-	-
SB4	SB4	23 Oct 2025		1286669	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<10	<5	<5	<5	1,300	1,300	1,300	-	-	39	0.2
SI3	SI3	23 Oct 2025		394448	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	43	-	-
SI3	SI3	23 Oct 2025		1286669	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<10	<5	<5	<5	860	860	860	-	-	39	0.9
SI4	SI4	23 Oct 2025		394448	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	40	-	-
SI4	SI4	23 Oct 2025		1286669	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<10	<5	<5	<5	1,100	1,100	1,100	-	-	42	1.0
Z03	Z03	23 Oct 2025		394448	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	32	-	-
Z04	Z04	23 Oct 2025		394448	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	32	-	-
ZO3	ZO3	23 Oct 2025		1286669	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<10	<5	<5	<5	560	560	560	-	-	29	1.5
ZO4	ZO4	23 Oct 2025		1286669	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	29	<5	<5	<5	421	450	450	-	-	38	1.3

Comments
#1 Sediments in Australia commonly have high natural levels of As and Ni
#2 Where a numerical maximum value (ISQG-High) for TBT is required, the USEPA's final chronic
#3 Values relate to ESB-based SQGs for freshwater sediments & 220.0 ug/kg for marine sedimen
#4 Values relate to ESB-based SQGs for freshwater sediments & 220.0 ug/kg fpr marine sedimen

Appendix A Certified Laboratory Analytical Reports

CHAIN OF CUSTODY RECORD

eurofins | Environment Testing ABN 50 005 085 521

Sydney Laboratory — 179 Magowar Road Girraween NSW 2086 — Ph 02 9900 8400 — Email: EnviroSampleRM@eurofins.com

Brisbane Laboratory — Unit 1 21 Smallwood Place Murarrie QLD 4172 — Ph 07 3902 4600 — Email: EnviroSamplesBris@eurofins.com

Perth Laboratory [ABN 91 050 139 889] — 46-48 Banksia Road Welshpool WA 6106 — Ph 08 6253 4444 — Email: EnviroSamplesPerth@eurofins.com

Melbourne Laboratory — 6 Monterey Road Dandenong South VIC 3175 — Ph 03 8564 5000 — Email: EnviroSamplesMelb@eurofins.com

Newcastle Laboratory — 1/2 Frost Drive, Mayfield West, NSW — Ph 02 4968 8448 — Email: EnviroSamplesNTL@eurofins.com

Company	JBS & G Australia (SA) Pty.	Project No	53753
Address	100 Hutt St, Adelaide, South Australia 5000	Project Name	MWP
Contact Name	Michael Cowin	Project Manager	Michael Cowin
Phone No	0401 275 633	EDD Format (Excel, Equis etc.)	
Special Directions	Trace level OCPs & PCBs	Facility Code	
Unique Identifier	F89facb4892cd3	Sampler(s)	Amanda Bourne
Purchase Order		Handed over by	Andrew James
Quote ID No		Email for Invoice	invoices@jbsg.com.au
		Email for Results	jbaglobemailer@jbsg.com.au; rscoville@jbsg.com.au; amayo@jbsg.com.au; ryellow@jbsg.com.au, aquezada@jbsg.com.au; abowes@jbsg.com.au

Analytes (Please mark any required analytes with an "X" in the SUITE below. SUITE code must be used to obtain SUITE pricing)

Non-Coded Tests

Containers (Change containers here if size of necessary)

Required Turnaround Time (TAT) Default TAT is 5 Days

5 DAYS STANDARD

*Surcharge applies

Other TAT Requirements:

No	Client Sample ID	Sampled Date/Time dd/mm/yy hh:mm	Matrix Soil (S) Water (W)	Ammonia	Boron	Mo	TOC	Speciated Nitrogens plus Phosphorus as P	500mL Plastic	60mL Plastic	60mL Plastic - Metals - Unfiltered	60mL Plastic - Metals - Field Filtered	250mL Amber Glass	40mL VOA vial	Jar (Glass or HDPE)	Other (Additional, N/A, Guidelines - please specify)	Sample Comments / Dangerous Goods / Hazard Warning
1	SB4	23/10/25	Soil	X	X	X	X	X							2		
2	SB3	23/10/25	Soil	X	X	X	X	X							2		
3	SI4	23/10/25	Soil	X	X	X	X	X							2		
4	SI3	23/10/25	Soil	X	X	X	X	X							2		
5	ZO3	23/10/25	Soil	X	X	X	X	X							2		
6	ZO4	23/10/25	Soil	X	X	X	X	X							2		
7	DUP02	23/10/25	Soil	X	X	X		X							2		
8																	
9																	
10																	
11																	
12																	
13																	
14																	
15																	
16																	
17																	
18																	
19																	
20																	
>20																	
>50																	
>100																	
>150																	
>200																	
	Total Counts			7	7	7	6	7							14		

Method of Shipment: ☐ Hand Delivered ☐ Postal — Name: Patpmal — Signature — Date: 30/10 — Time: 2:30 pm — Temperature: 11.2°C +0.5°C = 11.7°C on ice

Laboratory Use Only: ACT | AGL | BNE | DRW | GEE | NBA | MEL | NTL | PER | SYD | TSV | WCL — Signature — Date — Time — Report No

Eurofins Environment Testing Australia Pty Ltd - (V.SCOC01_2.0)

Submission of samples to the laboratory will be deemed an acceptance of Eurofins Environment Testing Australia Pty Ltd Terms and Conditions unless agreed otherwise. A copy of Eurofins Environment Testing Australia Pty Ltd Terms and Conditions is available on request.

Jalpa Patel

1286669

CHAIN OF CUSTODY DOCUMENTATION

JBS&G
ACN 100 220 479 · ABN 62 100 220 479
PHONE: 08 8431 7113 FAX: 08 8431 7115

CLIENT:	JBS&G	LABORATORY:	Envirolab
PROJECT NUMBER (ESdat Ref):	63753	PROJECT NAME:	NWP
SAMPLERS:	James	QUOTE NO:	
TURNAROUND TIME:	STANDARD	QC LEVEL:	NEPM (2013)

PLEASE SEND RESULTS TO:	PLEASE SEND INVOICE TO:
jbsglabresults@jbsg.com.au; mcowin@jbsg.com.au; amayo@jbsg.com.au; aquerzoli@jbsg.com.au; npatten@jbsg.com.au; abowne@jbsg.com.au	invoices@jbsg.com.au

SAMPLE ID	MATRIX	DATE	TYPE & PRESERVATIVE	ANALYSIS REQUIRED: TRH, BTEXN, PAH, OCP, PCB, Metals (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg) Plus Anitimony and Silver
SPLIT02	Sediment	23/10/2025	2 Jars	X
TOTAL				1

NOTES: Sample to be received from Eurofins

RELINQUISHED BY:		METHOD OF SHIPMENT:	RECEIVED BY:	FOR RECEIVING LAB USE ONLY:
NAME:	A James	CONSIGNMENT NOTE NO.	NAME:	LAB BATCH NO:
DATE:	30/10/2025		DATE:	COOLER SEAL – Yes..... No ..... Intact ..... Broken .....
OF: JBS&G		TRANSPORT CO.	OF:	COOLER TEMP ..... deg C

Jalpa Patel

1286669

JBS & G Australia (SA) P/L
100 Hutt St
Adelaide
SA 5000

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Mike Cowin**

Report **1286669-S**
Project name NWP
Project ID 63753
Received Date Oct 30, 2025

Client Sample ID			**SB4**	**SB3**	**SI4**	**SI3**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**M25-Oc0095047**	**M25-Oc0095048**	**M25-Oc0095049**	**M25-Oc0095050**
Date Sampled			**Oct 23, 2025**	**Oct 23, 2025**	**Oct 23, 2025**	**Oct 23, 2025**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50	< 50
TRH C10-C36 (Total)	50	mg/kg	< 50	< 50	< 50	< 50
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)*[N01]	50	mg/kg	< 50	< 50	< 50	< 50
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	< 100	< 100
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	82	86	79	76
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5

Client Sample ID			SB4	SB3	SI4	SI3
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M25-Oc0095047	M25-Oc0095048	M25-Oc0095049	M25-Oc0095050
Date Sampled			Oct 23, 2025	Oct 23, 2025	Oct 23, 2025	Oct 23, 2025
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	78	74	50	71
p-Terphenyl-d14 (surr.)	1	%	98	87	76	110
Organochlorine Pesticides (Trace level)						
4.4'-DDD	0.005	mg/kg	< 0.005	< 0.005	< 0.005	< 0.005
4.4'-DDE	0.005	mg/kg	< 0.005	< 0.005	< 0.005	< 0.005
4.4'-DDT	0.005	mg/kg	< 0.005	< 0.005	< 0.005	< 0.005
a-HCH	0.005	mg/kg	< 0.005	< 0.005	< 0.005	< 0.005
Aldrin	0.005	mg/kg	< 0.005	< 0.005	< 0.005	< 0.005
b-HCH	0.005	mg/kg	< 0.005	< 0.005	< 0.005	< 0.005
Chlordanes - Total	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
d-HCH	0.005	mg/kg	< 0.005	< 0.005	< 0.005	< 0.005
Dieldrin	0.005	mg/kg	< 0.005	< 0.005	< 0.005	< 0.005
Endosulfan I	0.005	mg/kg	< 0.005	< 0.005	< 0.005	< 0.005
Endosulfan II	0.005	mg/kg	< 0.005	< 0.005	< 0.005	< 0.005
Endosulfan sulphate	0.005	mg/kg	< 0.005	< 0.005	< 0.005	< 0.005
Endrin	0.005	mg/kg	< 0.005	< 0.005	< 0.005	< 0.005
Endrin aldehyde	0.005	mg/kg	< 0.005	< 0.005	< 0.005	< 0.005
Endrin ketone	0.005	mg/kg	< 0.005	< 0.005	< 0.005	< 0.005
g-HCH (Lindane)	0.005	mg/kg	< 0.005	< 0.005	< 0.005	< 0.005
Heptachlor	0.005	mg/kg	< 0.005	< 0.005	< 0.005	< 0.005
Heptachlor epoxide	0.005	mg/kg	< 0.005	< 0.005	< 0.005	< 0.005
Hexachlorobenzene	0.005	mg/kg	< 0.005	< 0.005	< 0.005	< 0.005
Methoxychlor	0.005	mg/kg	< 0.005	< 0.005	< 0.005	< 0.005
Toxaphene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
DDT + DDE + DDD (Total)*	0.005	mg/kg	< 0.005	< 0.005	< 0.005	< 0.005
Aldrin and Dieldrin (Total)*	0.005	mg/kg	< 0.005	< 0.005	< 0.005	< 0.005
Vic EPA IWRG 621 OCP (Total)*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Vic EPA IWRG 621 Other OCP (Total)*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Polychlorinated Biphenyls (NAGD)						
Aroclor-1016	0.005	mg/kg	< 0.005	< 0.005	< 0.005	< 0.005
Aroclor-1221	0.005	mg/kg	< 0.005	< 0.005	< 0.005	< 0.005
Aroclor-1232	0.005	mg/kg	< 0.005	< 0.005	< 0.005	< 0.005
Aroclor-1242	0.005	mg/kg	< 0.005	< 0.005	< 0.005	< 0.005
Aroclor-1248	0.005	mg/kg	< 0.005	< 0.005	< 0.005	< 0.005
Aroclor-1254	0.005	mg/kg	< 0.005	< 0.005	< 0.005	< 0.005
Aroclor-1260	0.005	mg/kg	< 0.005	< 0.005	< 0.005	< 0.005
Total PCB*	0.005	mg/kg	< 0.005	< 0.005	< 0.005	< 0.005
Dibutylchlorendate (surr.)	1	%	100	122	50	102
Tetrachloro-m-xylene (surr.)	1	%	86	86	65	115

Client Sample ID			SB4	SB3	SI4	SI3
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M25-Oc0095047	M25-Oc0095048	M25-Oc0095049	M25-Oc0095050
Date Sampled			Oct 23, 2025	Oct 23, 2025	Oct 23, 2025	Oct 23, 2025
Test/Reference	LOR	Unit				
Ammonia (as N)	10	mg/kg	< 10	< 10	< 10	< 10
Nitrate & Nitrite (as N)	5	mg/kg	< 5	< 5	< 5	< 5
Nitrate (as N)	5	mg/kg	< 5	< 5	< 5	< 5
Nitrite (as N)	5	mg/kg	< 5	< 5	< 5	< 5
Organic Nitrogen (as N)*	10	mg/kg	1300	960	1100	860
Total Kjeldahl Nitrogen (as N)	10	mg/kg	1300	960	1100	860
Total Nitrogen (as N)*	10	mg/kg	1300	960	1100	860
Total Organic Carbon	0.1	%	0.2	0.5	1.0	0.9
Heavy Metals						
Antimony	10	mg/kg	< 10	< 10	< 10	< 10
Arsenic	2	mg/kg	3.5	3.4	3.5	2.5
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	9.0	10	9.3	6.8
Copper	5	mg/kg	< 5	< 5	< 5	< 5
Lead	5	mg/kg	< 5	< 5	5.4	< 5
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	< 5	< 5	< 5	< 5
Silver	2	mg/kg	< 2	< 2	< 2	< 2
Zinc	5	mg/kg	9.3	9.7	12	8.7
Sample Properties						
% Moisture	1	%	39	45	42	39

Client Sample ID			ZO3	ZO4	DUP02
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			M25-Oc0095051	M25-Oc0095052	M25-Oc0095053
Date Sampled			Oct 23, 2025	Oct 23, 2025	Oct 23, 2025
Test/Reference	LOR	Unit			
Total Recoverable Hydrocarbons					
TRH C6-C9	20	mg/kg	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50
TRH C10-C36 (Total)	50	mg/kg	< 50	< 50	< 50
TRH C6-C10	20	mg/kg	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	53	< 50	58
TRH >C10-C16 less Naphthalene (F2)*[N01]	50	mg/kg	53	< 50	58
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	< 100
BTEX					
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1

Client Sample ID			ZO3	ZO4	DUP02
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			M25-Oc0095051	M25-Oc0095052	M25-Oc0095053
Date Sampled			Oct 23, 2025	Oct 23, 2025	Oct 23, 2025
Test/Reference	LOR	Unit			
BTEX					
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	68	76	60
Polycyclic Aromatic Hydrocarbons					
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	64	64	109
p-Terphenyl-d14 (surr.)	1	%	52	59	123
Organochlorine Pesticides (Trace level)					
4.4'-DDD	0.005	mg/kg	< 0.005	< 0.005	-
4.4'-DDE	0.005	mg/kg	< 0.005	< 0.005	-
4.4'-DDT	0.005	mg/kg	< 0.005	< 0.005	-
a-HCH	0.005	mg/kg	< 0.005	< 0.005	-
Aldrin	0.005	mg/kg	< 0.005	< 0.005	-
b-HCH	0.005	mg/kg	< 0.005	< 0.005	-
Chlordanes - Total	0.01	mg/kg	< 0.01	< 0.01	-
d-HCH	0.005	mg/kg	< 0.005	< 0.005	-
Dieldrin	0.005	mg/kg	< 0.005	< 0.005	-
Endosulfan I	0.005	mg/kg	< 0.005	< 0.005	-
Endosulfan II	0.005	mg/kg	< 0.005	< 0.005	-
Endosulfan sulphate	0.005	mg/kg	< 0.005	< 0.005	-
Endrin	0.005	mg/kg	< 0.005	< 0.005	-
Endrin aldehyde	0.005	mg/kg	< 0.005	< 0.005	-
Endrin ketone	0.005	mg/kg	< 0.005	< 0.005	-
g-HCH (Lindane)	0.005	mg/kg	< 0.005	< 0.005	-
Heptachlor	0.005	mg/kg	< 0.005	< 0.005	-
Heptachlor epoxide	0.005	mg/kg	< 0.005	< 0.005	-
Hexachlorobenzene	0.005	mg/kg	< 0.005	< 0.005	-
Methoxychlor	0.005	mg/kg	< 0.005	< 0.005	-
Toxaphene	0.1	mg/kg	< 0.1	< 0.1	-
DDT + DDE + DDD (Total)*	0.005	mg/kg	< 0.005	< 0.005	-
Aldrin and Dieldrin (Total)*	0.005	mg/kg	< 0.005	< 0.005	-

Client Sample ID			ZO3	ZO4	DUP02
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			M25-Oc0095051	M25-Oc0095052	M25-Oc0095053
Date Sampled			Oct 23, 2025	Oct 23, 2025	Oct 23, 2025
Test/Reference	LOR	Unit			
Organochlorine Pesticides (Trace level)					
Vic EPA IWRG 621 OCP (Total)*	0.01	mg/kg	< 0.01	< 0.01	-
Vic EPA IWRG 621 Other OCP (Total)*	0.01	mg/kg	< 0.01	< 0.01	-
Polychlorinated Biphenyls (NAGD)					
Aroclor-1016	0.005	mg/kg	< 0.005	< 0.005	-
Aroclor-1221	0.005	mg/kg	< 0.005	< 0.005	-
Aroclor-1232	0.005	mg/kg	< 0.005	< 0.005	-
Aroclor-1242	0.005	mg/kg	< 0.005	< 0.005	-
Aroclor-1248	0.005	mg/kg	< 0.005	< 0.005	-
Aroclor-1254	0.005	mg/kg	< 0.005	< 0.005	-
Aroclor-1260	0.005	mg/kg	< 0.005	< 0.005	-
Total PCB*	0.005	mg/kg	< 0.005	< 0.005	-
Dibutylchlorendate (surr.)	1	%	51	70	-
Tetrachloro-m-xylene (surr.)	1	%	70	59	-
Ammonia (as N)	10	mg/kg	< 10	29	< 10
Nitrate & Nitrite (as N)	5	mg/kg	< 5	< 5	13
Nitrate (as N)	5	mg/kg	< 5	< 5	13
Nitrite (as N)	5	mg/kg	< 5	< 5	< 5
Organic Nitrogen (as N)*	10	mg/kg	560	421	650
Total Kjeldahl Nitrogen (as N)	10	mg/kg	560	450	650
Total Nitrogen (as N)*	10	mg/kg	560	450	660
Total Organic Carbon	0.1	%	1.5	1.3	-
Heavy Metals					
Antimony	10	mg/kg	< 10	< 10	< 10
Arsenic	2	mg/kg	2.3	2.0	< 2
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	< 5	< 5	< 5
Copper	5	mg/kg	< 5	< 5	< 5
Lead	5	mg/kg	< 5	< 5	< 5
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	< 5	< 5	< 5
Silver	2	mg/kg	< 2	< 2	< 2
Zinc	5	mg/kg	< 5	< 5	< 5
Sample Properties					
% Moisture	1	%	29	38	34

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
JBS&G Suite 2			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Oct 31, 2025	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Oct 31, 2025	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Oct 31, 2025	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Oct 31, 2025	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Polycyclic Aromatic Hydrocarbons	Melbourne	Oct 31, 2025	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Metals M8	Melbourne	Nov 07, 2025	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Organochlorine Pesticides (Trace level)	Melbourne	Nov 03, 2025	14 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8270) trace			
Polychlorinated Biphenyls (NAGD)	Melbourne	Nov 03, 2025	14 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8082)- NAGD			
Total Organic Carbon	Melbourne	Nov 03, 2025	28 Days
- Method: LTM-INO-4060 Total Organic Carbon in water and soil			
Heavy Metals	Melbourne	Nov 07, 2025	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Nitrogens (speciated)			
Ammonia (as N)	Melbourne	Oct 31, 2025	28 Days
- Method: LTM-INO-4450 Determination of Nitrogen Species by Discrete Analyser			
Nitrate & Nitrite (as N)	Melbourne	Oct 31, 2025	28 Days
- Method: LTM-INO-4450 Nitrogens by Discrete Analyser			
Nitrate (as N)	Melbourne	Oct 31, 2025	28 Days
- Method: LTM-INO-4450 Nitrogens by Discrete Analyser			
Nitrite (as N)	Melbourne	Oct 31, 2025	28 Days
- Method: LTM-INO-4450 Nitrogens by Discrete Analyser			
Total Kjeldahl Nitrogen (as N)	Melbourne	Oct 31, 2025	28 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
% Moisture	Melbourne	Oct 31, 2025	14 Days
- Method: LTM-GEN-7080 Moisture			

eurofins

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Company Name: JBS & G Australia (SA) P/L
Address: 100 Hutt St
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SA 5000

Project Name: NWP
Project ID: 63753

Order No.:
Report #: 1286669
Phone: 08 8431 7113
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Received: Oct 30, 2025 2:30 PM
Due: Nov 7, 2025
Priority: 5 Day
Contact Name: Mike Cowin

Eurofins Analytical Services Manager : Karl Bulow

Sample Detail						Antimony	Silver	Split - External Lab*	Total Organic Carbon	Nitrogens (speciated)	Moisture Set	JBS&G Suite 2	Organochlorine Pesticides (Trace level)	Polychlorinated Biphenyls (NAGD)
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X		X	X	X	X	X	X
External Laboratory								X						
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**									
1	SPLIT02	Oct 23, 2025		Soil	M25-Oc0095046			X						
2	SB4	Oct 23, 2025		Soil	M25-Oc0095047	X	X		X	X	X	X	X	X
3	SB3	Oct 23, 2025		Soil	M25-Oc0095048	X	X		X	X	X	X	X	X
4	SI4	Oct 23, 2025		Soil	M25-Oc0095049	X	X		X	X	X	X	X	X
5	SI3	Oct 23, 2025		Soil	M25-Oc0095050	X	X		X	X	X	X	X	X
6	ZO3	Oct 23, 2025		Soil	M25-Oc0095051	X	X		X	X	X	X	X	X
7	ZO4	Oct 23, 2025		Soil	M25-Oc0095052	X	X		X	X	X	X	X	X
8	DUP02	Oct 23, 2025		Soil	M25-Oc0095053	X	X			X	X	X		
Test Counts						7	7	1	6	7	7	7	6	6

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the sampling date; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
µg/L: micrograms per litre	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony Forming Unit	**Colour:** Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons							
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Organochlorine Pesticides (Trace level)							
Toxaphene	mg/kg	< 0.1			0.1	Pass	
Method Blank							
Ammonia (as N)	mg/kg	< 10			10	Pass	
Nitrite (as N)	mg/kg	< 5			5	Pass	
Total Kjeldahl Nitrogen (as N)	mg/kg	< 10			10	Pass	
Method Blank							
Heavy Metals							
Antimony	mg/kg	< 10			10	Pass	
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Silver	mg/kg	< 2			2	Pass	
Zinc	mg/kg	< 5			5	Pass	
Method Blank							
Total Organic Carbon	%	< 0.1			0.1	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Organochlorine Pesticides (Trace level)							
4.4'-DDD	mg/kg	< 0.005			0.005	Pass	
4.4'-DDE	mg/kg	< 0.005			0.005	Pass	
4.4'-DDT	mg/kg	< 0.005			0.005	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
a-HCH	mg/kg	< 0.005			0.005	Pass	
Aldrin	mg/kg	< 0.005			0.005	Pass	
b-HCH	mg/kg	< 0.005			0.005	Pass	
Chlordanes - Total	mg/kg	< 0.01			0.01	Pass	
d-HCH	mg/kg	< 0.005			0.005	Pass	
Dieldrin	mg/kg	< 0.005			0.005	Pass	
Endosulfan I	mg/kg	< 0.005			0.005	Pass	
Endosulfan II	mg/kg	< 0.005			0.005	Pass	
Endosulfan sulphate	mg/kg	< 0.005			0.005	Pass	
Endrin	mg/kg	< 0.005			0.005	Pass	
Endrin aldehyde	mg/kg	< 0.005			0.005	Pass	
Endrin ketone	mg/kg	< 0.005			0.005	Pass	
g-HCH (Lindane)	mg/kg	< 0.005			0.005	Pass	
Heptachlor	mg/kg	< 0.005			0.005	Pass	
Heptachlor epoxide	mg/kg	< 0.005			0.005	Pass	
Hexachlorobenzene	mg/kg	< 0.005			0.005	Pass	
Methoxychlor	mg/kg	< 0.005			0.005	Pass	
Method Blank							
Polychlorinated Biphenyls (NAGD)							
Aroclor-1016	mg/kg	< 0.005			0.005	Pass	
Aroclor-1221	mg/kg	< 0.005			0.005	Pass	
Aroclor-1232	mg/kg	< 0.005			0.005	Pass	
Aroclor-1242	mg/kg	< 0.005			0.005	Pass	
Aroclor-1248	mg/kg	< 0.005			0.005	Pass	
Aroclor-1254	mg/kg	< 0.005			0.005	Pass	
Aroclor-1260	mg/kg	< 0.005			0.005	Pass	
Total PCB*	mg/kg	< 0.005			0.005	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Polychlorinated Biphenyls (NAGD)							
Aroclor-1016	mg/kg	< 0.005			0.005	Pass	
Aroclor-1221	mg/kg	< 0.005			0.005	Pass	
Aroclor-1232	mg/kg	< 0.005			0.005	Pass	
Aroclor-1242	mg/kg	< 0.005			0.005	Pass	
Aroclor-1248	mg/kg	< 0.005			0.005	Pass	
Aroclor-1254	mg/kg	< 0.005			0.005	Pass	
Aroclor-1260	mg/kg	< 0.005			0.005	Pass	
Total PCB*	mg/kg	< 0.005			0.005	Pass	
Method Blank							
Nitrate & Nitrite (as N)	mg/kg	< 5			5	Pass	
Nitrate (as N)	mg/kg	< 5			5	Pass	
Total Organic Carbon	%	< 0.1			0.1	Pass	
Method Blank							
Total Recoverable Hydrocarbons							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total*	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Organic Carbon	%	< 0.1			0.1	Pass	
Method Blank							
Total Kjeldahl Nitrogen (as N)	mg/kg	< 10			10	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C10-C14	%	90			70-130	Pass	
TRH >C10-C16	%	105			70-130	Pass	
LCS - % Recovery							
Ammonia (as N)	%	116			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	%	91			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Antimony	%	112			80-120	Pass	
Arsenic	%	110			80-120	Pass	
Cadmium	%	106			80-120	Pass	
Chromium	%	116			80-120	Pass	
Copper	%	116			80-120	Pass	
Lead	%	118			80-120	Pass	
Mercury	%	89			80-120	Pass	
Nickel	%	114			80-120	Pass	
Silver	%	109			80-120	Pass	
Zinc	%	111			80-120	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	79			70-130	Pass	
Acenaphthylene	%	118			70-130	Pass	
Anthracene	%	99			70-130	Pass	
Benz(a)anthracene	%	104			70-130	Pass	
Benzo(a)pyrene	%	129			70-130	Pass	
Benzo(b&j)fluoranthene	%	129			70-130	Pass	
Benzo(g.h.i)perylene	%	94			70-130	Pass	
Benzo(k)fluoranthene	%	97			70-130	Pass	
Chrysene	%	115			70-130	Pass	
Dibenz(a.h)anthracene	%	110			70-130	Pass	
Fluoranthene	%	100			70-130	Pass	
Fluorene	%	114			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	103			70-130	Pass	
Naphthalene	%	120			70-130	Pass	
Phenanthrene	%	102			70-130	Pass	
Pyrene	%	94			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides (Trace level)							
4.4'-DDD	%	80			70-130	Pass	
4.4'-DDE	%	89			70-130	Pass	
4.4'-DDT	%	94			70-130	Pass	
a-HCH	%	94			70-130	Pass	
Aldrin	%	90			70-130	Pass	
b-HCH	%	98			70-130	Pass	
Chlordanes - Total	%	87			70-130	Pass	
d-HCH	%	94			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Dieldrin	%	110			70-130	Pass	
Endosulfan I	%	93			70-130	Pass	
Endosulfan II	%	81			70-130	Pass	
Endosulfan sulphate	%	80			70-130	Pass	
Endrin	%	120			70-130	Pass	
Endrin aldehyde	%	101			70-130	Pass	
Endrin ketone	%	102			70-130	Pass	
g-HCH (Lindane)	%	87			70-130	Pass	
Heptachlor	%	96			70-130	Pass	
Heptachlor epoxide	%	102			70-130	Pass	
Hexachlorobenzene	%	111			70-130	Pass	
Methoxychlor	%	111			70-130	Pass	
LCS - % Recovery							
Polychlorinated Biphenyls (NAGD)							
Aroclor-1016	%	91			70-130	Pass	
Aroclor-1260	%	96			70-130	Pass	
Total PCB*	%	94			70-130	Pass	
LCS - % Recovery							
Total Organic Carbon	%	87			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Benzo(a)pyrene	%	92			70-130	Pass	
LCS - % Recovery							
Polychlorinated Biphenyls (NAGD)							
Aroclor-1016	%	74			70-130	Pass	
Aroclor-1260	%	84			70-130	Pass	
Total PCB*	%	79			70-130	Pass	
LCS - % Recovery							
Nitrate & Nitrite (as N)	%	82			70-130	Pass	
Nitrate (as N)	%	72			70-130	Pass	
Nitrite (as N)	%	102			70-130	Pass	
Total Organic Carbon	%	87			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	91			70-130	Pass	
Acenaphthylene	%	92			70-130	Pass	
Anthracene	%	87			70-130	Pass	
Benz(a)anthracene	%	83			70-130	Pass	
Benzo(a)pyrene	%	92			70-130	Pass	
Benzo(b&j)fluoranthene	%	90			70-130	Pass	
Benzo(g.h.i)perylene	%	72			70-130	Pass	
Benzo(k)fluoranthene	%	88			70-130	Pass	
Chrysene	%	89			70-130	Pass	
Dibenz(a.h)anthracene	%	74			70-130	Pass	
Fluoranthene	%	78			70-130	Pass	
Fluorene	%	87			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	76			70-130	Pass	
Naphthalene	%	88			70-130	Pass	
Phenanthrene	%	78			70-130	Pass	
Pyrene	%	88			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides (Trace level)							
4.4'-DDD	%	106			70-130	Pass	
4.4'-DDE	%	82			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
4.4'-DDT	%	93			70-130	Pass	
a-HCH	%	99			70-130	Pass	
Aldrin	%	112			70-130	Pass	
b-HCH	%	80			70-130	Pass	
Chlordanes - Total	%	100			70-130	Pass	
d-HCH	%	104			70-130	Pass	
Dieldrin	%	84			70-130	Pass	
Endosulfan I	%	102			70-130	Pass	
Endosulfan II	%	108			70-130	Pass	
Endosulfan sulphate	%	96			70-130	Pass	
Endrin	%	94			70-130	Pass	
Endrin aldehyde	%	81			70-130	Pass	
Endrin ketone	%	89			70-130	Pass	
g-HCH (Lindane)	%	112			70-130	Pass	
Heptachlor	%	97			70-130	Pass	
Heptachlor epoxide	%	115			70-130	Pass	
Hexachlorobenzene	%	108			70-130	Pass	
Methoxychlor	%	93			70-130	Pass	
LCS - % Recovery							
Total Organic Carbon	%	86			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C6-C9	%	92			70-130	Pass	
TRH C6-C10	%	89			70-130	Pass	
Naphthalene	%	78			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	82			70-130	Pass	
Toluene	%	88			70-130	Pass	
Ethylbenzene	%	91			70-130	Pass	
m&p-Xylenes	%	87			70-130	Pass	
Xylenes - Total*	%	88			70-130	Pass	
LCS - % Recovery							
Total Kjeldahl Nitrogen (as N)	%	109			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C10-C14	M25-Oc0098426	NCP	%	96			70-130	Pass	
TRH >C10-C16	M25-Oc0098426	NCP	%	96			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	M25-Oc0094033	NCP	%	86			70-130	Pass	
Acenaphthylene	M25-Oc0094033	NCP	%	115			70-130	Pass	
Anthracene	M25-Oc0094033	NCP	%	92			70-130	Pass	
Benz(a)anthracene	M25-Oc0094033	NCP	%	102			70-130	Pass	
Benzo(a)pyrene	M25-Oc0094033	NCP	%	122			70-130	Pass	
Benzo(b&j)fluoranthene	M25-Oc0094033	NCP	%	99			70-130	Pass	
Benzo(g.h.i)perylene	M25-Oc0094033	NCP	%	94			70-130	Pass	
Benzo(k)fluoranthene	M25-Oc0094033	NCP	%	118			70-130	Pass	
Chrysene	M25-Oc0094033	NCP	%	102			70-130	Pass	
Dibenz(a.h)anthracene	M25-Oc0094033	NCP	%	111			70-130	Pass	
Fluoranthene	M25-Oc0094033	NCP	%	104			70-130	Pass	
Fluorene	M25-Oc0094033	NCP	%	111			70-130	Pass	
Indeno(1.2.3-cd)pyrene	M25-Oc0094033	NCP	%	104			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Naphthalene	M25-Oc0094033	NCP	%	106			70-130	Pass	
Phenanthrene	M25-Oc0094033	NCP	%	103			70-130	Pass	
Pyrene	M25-Oc0094033	NCP	%	107			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Antimony	M25-No0008462	NCP	%	96			75-125	Pass	
Arsenic	M25-No0008462	NCP	%	103			75-125	Pass	
Cadmium	M25-No0008462	NCP	%	115			75-125	Pass	
Chromium	M25-No0008462	NCP	%	121			75-125	Pass	
Copper	M25-No0008462	NCP	%	122			75-125	Pass	
Lead	M25-No0008462	NCP	%	118			75-125	Pass	
Mercury	M25-No0008462	NCP	%	86			75-125	Pass	
Nickel	M25-No0008462	NCP	%	112			75-125	Pass	
Silver	M25-No0008462	NCP	%	106			75-125	Pass	
Zinc	M25-No0009640	NCP	%	88			75-125	Pass	
Spike - % Recovery									
Organochlorine Pesticides (Trace level)				Result 1					
4.4'-DDD	M25-Oc0096550	NCP	%	98			70-130	Pass	
4.4'-DDE	M25-Oc0096550	NCP	%	92			70-130	Pass	
4.4'-DDT	M25-Oc0096550	NCP	%	98			70-130	Pass	
a-HCH	M25-Oc0096550	NCP	%	102			70-130	Pass	
Aldrin	M25-Oc0096550	NCP	%	103			70-130	Pass	
b-HCH	M25-Oc0096550	NCP	%	87			70-130	Pass	
Chlordanes - Total	M25-Oc0096550	NCP	%	101			70-130	Pass	
d-HCH	M25-Oc0096550	NCP	%	104			70-130	Pass	
Dieldrin	M25-Oc0096550	NCP	%	106			70-130	Pass	
Endosulfan I	M25-Oc0096550	NCP	%	86			70-130	Pass	
Endosulfan II	M25-Oc0096550	NCP	%	82			70-130	Pass	
Endosulfan sulphate	M25-Oc0096550	NCP	%	93			70-130	Pass	
Endrin	M25-Oc0096550	NCP	%	80			70-130	Pass	
Endrin aldehyde	M25-Oc0096550	NCP	%	91			70-130	Pass	
Endrin ketone	M25-Oc0096550	NCP	%	89			70-130	Pass	
g-HCH (Lindane)	M25-Oc0096550	NCP	%	104			70-130	Pass	
Heptachlor	M25-Oc0096550	NCP	%	104			70-130	Pass	
Heptachlor epoxide	M25-Oc0096550	NCP	%	96			70-130	Pass	
Hexachlorobenzene	M25-Oc0096550	NCP	%	103			70-130	Pass	
Methoxychlor	M25-Oc0096550	NCP	%	107			70-130	Pass	
Spike - % Recovery									
				Result 1					
Ammonia (as N)	M25-Oc0095050	CP	%	118			70-130	Pass	
Nitrate & Nitrite (as N)	M25-Oc0095050	CP	%	82			70-130	Pass	
Nitrate (as N)	M25-Oc0095050	CP	%	73			70-130	Pass	
Nitrite (as N)	M25-Oc0095050	CP	%	102			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C6-C9	M25-Oc0095051	CP	%	93			70-130	Pass	
TRH C6-C10	M25-Oc0095051	CP	%	89			70-130	Pass	
Naphthalene	M25-Oc0095051	CP	%	80			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	M25-Oc0095051	CP	%	81			70-130	Pass	
Toluene	M25-Oc0095051	CP	%	84			70-130	Pass	
Ethylbenzene	M25-Oc0095051	CP	%	91			70-130	Pass	
m&p-Xylenes	M25-Oc0095051	CP	%	86			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
o-Xylene	M25-Oc0095051	CP	%	85			70-130	Pass	
Xylenes - Total*	M25-Oc0095051	CP	%	86			70-130	Pass	
Spike - % Recovery									
				Result 1					
Total Kjeldahl Nitrogen (as N)	M25-Oc0097275	NCP	%	87			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Polychlorinated Biphenyls (NAGD)				Result 1	Result 2	RPD			
Aroclor-1016	M25-Oc0096109	NCP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1221	M25-Oc0096109	NCP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1232	M25-Oc0096109	NCP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1242	M25-Oc0096109	NCP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1248	M25-Oc0096109	NCP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1254	M25-Oc0096109	NCP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Aroclor-1260	M25-Oc0096109	NCP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Total PCB*	M25-Oc0096109	NCP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Antimony	M25-No0008462	NCP	mg/kg	< 10	< 10	<1	30%	Pass	
Arsenic	M25-No0008462	NCP	mg/kg	3.3	3.4	3.0	30%	Pass	
Cadmium	M25-No0008462	NCP	mg/kg	1.1	1.2	3.0	30%	Pass	
Chromium	M25-No0008462	NCP	mg/kg	15	16	2.0	30%	Pass	
Copper	M25-No0008462	NCP	mg/kg	16	16	2.0	30%	Pass	
Lead	M25-No0008462	NCP	mg/kg	12	12	1.0	30%	Pass	
Mercury	M25-No0008462	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	M25-No0008462	NCP	mg/kg	8.6	8.8	2.0	30%	Pass	
Silver	M25-No0008462	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Zinc	M25-No0008462	NCP	mg/kg	29	30	3.0	30%	Pass	
Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	M25-Oc0095001	NCP	%	8.7	7.8	10	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C6-C9	M25-Oc0095049	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C6-C10	M25-Oc0095049	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Naphthalene	M25-Oc0095049	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	M25-Oc0095049	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	M25-Oc0095049	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	M25-Oc0095049	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	M25-Oc0095049	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	M25-Oc0095049	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total*	M25-Oc0095049	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C6-C9	M25-Oc0095050	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	M25-Oc0095050	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	M25-Oc0095050	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	M25-Oc0095050	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C6-C10	M25-Oc0095050	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH >C10-C16	M25-Oc0095050	CP	mg/kg	< 50	< 50	<1	30%	Pass	
Naphthalene	M25-Oc0095050	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH >C16-C34	M25-Oc0095050	CP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	M25-Oc0095050	CP	mg/kg	< 100	< 100	<1	30%	Pass	

Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	M25-Oc0095050	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	M25-Oc0095050	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	M25-Oc0095050	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	M25-Oc0095050	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	M25-Oc0095050	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total*	M25-Oc0095050	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Organochlorine Pesticides (Trace level)				Result 1	Result 2	RPD			
4.4'-DDD	M25-Oc0095050	CP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
4.4'-DDE	M25-Oc0095050	CP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
4.4'-DDT	M25-Oc0095050	CP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
a-HCH	M25-Oc0095050	CP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Aldrin	M25-Oc0095050	CP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
b-HCH	M25-Oc0095050	CP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Chlordanes - Total	M25-Oc0095050	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
d-HCH	M25-Oc0095050	CP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Dieldrin	M25-Oc0095050	CP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Endosulfan I	M25-Oc0095050	CP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Endosulfan II	M25-Oc0095050	CP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Endosulfan sulphate	M25-Oc0095050	CP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Endrin	M25-Oc0095050	CP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Endrin aldehyde	M25-Oc0095050	CP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Endrin ketone	M25-Oc0095050	CP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
g-HCH (Lindane)	M25-Oc0095050	CP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Heptachlor	M25-Oc0095050	CP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Heptachlor epoxide	M25-Oc0095050	CP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Hexachlorobenzene	M25-Oc0095050	CP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Methoxychlor	M25-Oc0095050	CP	mg/kg	< 0.005	< 0.005	<1	30%	Pass	
Toxaphene	M25-Oc0095050	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Total Organic Carbon	M25-Oc0095050	CP	%	0.9	0.7	25	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C10-C14	M25-Oc0095052	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	M25-Oc0095052	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	M25-Oc0095052	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C10-C16	M25-Oc0095052	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	M25-Oc0095052	CP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	M25-Oc0095052	CP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Ammonia (as N)	M25-Oc0095052	CP	mg/kg	29	29	<1	30%	Pass	
Nitrate & Nitrite (as N)	M25-Oc0095052	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Nitrate (as N)	M25-Oc0095052	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Nitrite (as N)	M25-Oc0095052	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Total Kjeldahl Nitrogen (as N)	M25-Oc0097273	NCP	mg/kg	1200	1500	6.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs

Authorised by:

Catherine Wilson	Analytical Services Manager
Caitlin Breeze	Senior Analyst-Inorganic
Dylan Jones	Senior Analyst-Organic
Edward Lee	Senior Analyst-Organic
Joseph Edouard	Senior Analyst-Organic
Joseph Edouard	Senior Analyst-Volatile
Mary Makarios	Senior Analyst-Inorganic
Mary Makarios	Senior Analyst-Metal
Mary Makarios	Senior Analyst-Sample Properties
Mele Singh	Senior Analyst-Organic



Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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CHAIN OF CUSTODY DOCUMENTATION

JBS&G

ACN 100 220 479 · ABN 62 100 220 479
PHONE: 08 8431 7113 FAX: 08 8431 7115

CLIENT:	JBS&G	LABORATORY:	Envirolab
PROJECT NUMBER (ESdat Ref):	63753	PROJECT NAME:	NWP
SAMPLERS:	James	QUOTE NO:	
TURNAROUND TIME:	STANDARD	QC LEVEL:	NEPM (2013)

PLEASE SEND RESULTS TO:	PLEASE SEND INVOICE TO:
jbsglabresults@jbsg.com.au; mcowin@jbsg.com.au; amayo@jbsg.com.au; aquerzoli@jbsg.com.au; npatten@jbsg.com.au; abowne@jbsg.com.au	invoices@jbsg.com.au

SAMPLE ID	MATRIX	DATE	TYPE & PRESERVATIVE	ANALYSIS REQUIRED: TRH, BTEXN, PAH, OCP, PCB, Metals (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg) Plus Anitimony and Silver
SPLIT02	Sediment	23/10/2025	2 Jars	X
			TOTAL	1

NOTES
Sample to be received from Eurofins

Envirolab Services
25 Research Drive
Croydon South VIC 3136
Ph: (03) 9763 2500

Job No: M4K0006

Date Received: 5/11/25
Time Received: 12:30
Received by: >>
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

10.2°C

RELINQUISHED BY:		METHOD OF SHIPMENT:	RECEIVED BY:	FOR RECEIVING LAB USE ONLY:
NAME:	A James	CONSIGNMENT NOTE NO.	NAME:	LAB BATCH NO:
DATE:	30/10/2025		DATE:	COOLER SEAL – Yes..... No ..... Intact ..... Broken .....
OF: JBS&G		TRANSPORT CO.	OF:	COOLER TEMP ..... deg C

Jalpa Patel

1286669

Envirolab Services Pty Ltd
ABN 37 112 535 645 - 002
25 Research Drive Croydon South VIC 3136
ph +61 3 9763 2500
melbourne@envirolab.com.au
www.envirolab.com.au

Sample Receipt Advice MGK0006

Client Details

Client	JBS & G Australia Pty Ltd (Adelaide)
Attention	Andrew James

Sample Login Details

Your Reference	63753
Envirolab Reference	MGK0006
Date Sample Received	03/11/2025
Date Instructions Received	03/11/2025
Date Final Results Expected	11/11/2025

Sample Condition

Samples received in appropriate condition for analysis	Yes
Number of Samples	1 Soil
Turnaround Time	5 Days
Temperatures / Cooling Methods	10.2°C Ice Pack

Additional Info

Sample storage - waters are routinely disposed at approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Where no sampling date has been supplied for some or all samples, the date of sample receipt has been used as the associated sampling date. The sampling dates are used to assess compliance to recommended Technical Holding Times.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable

Samples will be analysed per our T&C's.

Please direct any queries to:

Chris De Luca

Phone 03 9763 2500
Email cdeluca@envirolab.com.au

Tianna Milburn

Phone 03 9763 2500
Email tmilburn@envirolab.com.au

Analysis underway, details on the following page

Sample Receipt Advice MGK0006

Analysis Grid

The • indicates the testing you have requested. ***THIS IS NOT A REPORT OF THE RESULTS.***

	Combination 5	Metals	Moisture
MGK0006-01 Soil | 23/10/2025 SPLIT02	•	•	•

Suite Details

Suite Name	Suite Analyses
Combination 5 |Soil	vTRH&MBTEXN, sTRH, PAH, OCP, PCB, As, Cd, Cr, Cu, Hg, Ni, Pb, Zn
Metals |Soil	Ag, Sb

CHAIN OF CUSTODY DOCUMENTATION

JBS&G
ACN 100 220 479 · ABN 62 100 220 479
PHONE: 08 8431 7113 FAX: 08 8431 7115

CLIENT:	JBS&G	LABORATORY:	Envirolab
PROJECT NUMBER (ESdat Ref):	63753	PROJECT NAME:	NWP
SAMPLERS:	James	QUOTE NO:	
TURNAROUND TIME:	STANDARD	QC LEVEL:	NEPM (2013)

PLEASE SEND RESULTS TO:

jbsglabresults@jbsg.com.au; mcowin@jbsg.com.au; amayo@jbsg.com.au; aquerzoli@jbsg.com.au; npatten@jbsg.com.au; abowne@jbsg.com.au

PLEASE SEND INVOICE TO:

invoices@jbsg.com.au

SAMPLE ID	MATRIX	DATE	TYPE & PRESERVATIVE	Particle size distribution (PSD)	TBT	TRH, BTEXN, PAH, OCP, PCB, Metals (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg) Plus Anitimony and Silver												
SB4 1	Sediment	23/10/2025	2 Jars, 1 bag	X	X													
SB3 2	Sediment	23/10/2025	2 Jars, 1 bag	X	X													
SI4 3	Sediment	23/10/2025	2 Jars, 1 bag	X	X													
SI3 4	Sediment	23/10/2025	2 Jars, 1 bag	X	X													
Z03 5	Sediment	23/10/2025	2 Jars, 1 bag	X	X													
Z04 6	Sediment	23/10/2025	2 Jars, 1 bag	X	X													
SPLIT02 NR	Sediment	23/10/2025	2 Jars			X												
TOTAL				6	6	1	0	0	0	0	0	0	0	0	0	0	0	0

NOTES

Sample to be received from Eurofins

ENVIROLAB GROUP
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 304444

Date Received: 31/10/25
Time Received: 0900
Received By: CW
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

RELINQUISHED BY:		METHOD OF SHIPMENT:	RECEIVED BY:	FOR RECEIVING LAB USE ONLY:
NAME:	A James	CONSIGNMENT NOTE NO.	NAME: ELS ADL OD	LAB BATCH NO:
DATE:	30/10/2025		DATE: 31/10/25 12:30pm	COOLER SEAL – Yes..... No ..... Intact ..... Broken .....
OF: JBS&G		TRANSPORT CO.	OF:	COOLER TEMP ..... deg C

ice cooling, 3.4°c

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 394448

Client Details

Client	JBS & G (Brisbane) Pty Ltd
Attention	JBS Esdat
Address	L3, 32 Turbot St, Brisbane, QLD, 4000

Sample Details

Your Reference	**63753**
Number of Samples	6 Sediment
Date samples received	03/11/2025
Date completed instructions received	03/11/2025

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client unless as indicated below in the method summaries. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	10/11/2025
Date of Issue	10/11/2025

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Diego Bigolin, Inorganics Supervisor
Jack Wallis, Senior Chemist
Timothy Toll, Senior Chemist

Authorised By
Nancy Zhang, Laboratory Manager

Tributyl Tin in Soil						
Our Reference		394448-1	394448-2	394448-3	394448-4	394448-5
Your Reference	UNITS	SB4	SB3	SI4	SI3	Z03
Date Sampled		23/10/2025	23/10/2025	23/10/2025	23/10/2025	23/10/2025
Type of sample		Sediment	Sediment	Sediment	Sediment	Sediment
Date extracted	-	06/11/2025	06/11/2025	06/11/2025	06/11/2025	06/11/2025
Date analysed	-	07/11/2025	07/11/2025	07/11/2025	07/11/2025	07/11/2025
Tributyltin as Sn	µg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate Tripropyltin	%	74	95	92	97	78

Tributyl Tin in Soil		
Our Reference		394448-6
Your Reference	UNITS	Z04
Date Sampled		23/10/2025
Type of sample		Sediment
Date extracted	-	06/11/2025
Date analysed	-	07/11/2025
Tributyltin as Sn	µg/kg	<0.5
Surrogate Tripropyltin	%	67

Moisture						
Our Reference		394448-1	394448-2	394448-3	394448-4	394448-5
Your Reference	UNITS	SB4	SB3	SI4	SI3	Z03
Date Sampled		23/10/2025	23/10/2025	23/10/2025	23/10/2025	23/10/2025
Type of sample		Sediment	Sediment	Sediment	Sediment	Sediment
Date prepared	-	04/11/2025	04/11/2025	04/11/2025	04/11/2025	04/11/2025
Date analysed	-	05/11/2025	05/11/2025	05/11/2025	05/11/2025	05/11/2025
Moisture	%	46	47	40	43	32

Moisture		
Our Reference		394448-6
Your Reference	UNITS	Z04
Date Sampled		23/10/2025
Type of sample		Sediment
Date prepared	-	04/11/2025
Date analysed	-	05/11/2025
Moisture	%	32

Particle Size Distribution in Soils						
Our Reference		394448-1	394448-2	394448-3	394448-4	394448-5
Your Reference	UNITS	SB4	SB3	SI4	SI3	Z03
Date Sampled		23/10/2025	23/10/2025	23/10/2025	23/10/2025	23/10/2025
Type of sample		Sediment	Sediment	Sediment	Sediment	Sediment
Date prepared	-	06/11/2025	06/11/2025	06/11/2025	06/11/2025	06/11/2025
Date analysed	-	07/11/2025	07/11/2025	07/11/2025	07/11/2025	07/11/2025
Cobbles >75mm	%	<1	<1	<1	<1	<1
Cobbles/Coarse Gravel 63-75mm	%	<1	<1	<1	<1	<1
Coarse Gravel 37.5-63mm	%	<1	<1	<1	<1	<1
Coarse Gravel 26.5-37.5mm	%	<1	<1	<1	<1	<1
Coarse Gravel 19-26.5mm	%	<1	<1	<1	<1	<1
Medium Gravel 13.2-19mm	%	<1	<1	<1	<1	<1
Medium Gravel 9.5-13.2mm	%	<1	<1	<1	<1	<1
Medium Gravel 6.7-9.5mm	%	<1	<1	<1	<1	<1
Medium Gravel 4.75-6.7mm	%	1	<1	<1	<1	9
Fine Gravel 2.36-4.75mm	%	1	<1	1	<1	11
Very Coarse Sand 1.18-2.36mm	%	2	<1	<1	2	12
Coarse Sand 0.6-1.18mm	%	4	3	5	4	16
Medium Sand 0.425-0.6mm	%	3	14	2	3	9
Medium Sand 0.3-0.425mm	%	16	14	2	9	9
Fine Sand 0.15-0.3mm	%	32	19	39	25	14
Very Fine Sand 0.075-0.15mm	%	20	14	27	24	9
Coarse Silt 0.020-0.075mm	%	10	14	11	13	5
Fine Silt 0.002-0.020mm	%	5	11	6	11	2
Clay <0.002mm	%	6	10	7	9	3

Particle Size Distribution in Soils		
Our Reference		394448-6
Your Reference	UNITS	Z04
Date Sampled		23/10/2025
Type of sample		Sediment
Date prepared	-	06/11/2025
Date analysed	-	07/11/2025
Cobbles >75mm	%	<1
Cobbles/Coarse Gravel 63-75mm	%	<1
Coarse Gravel 37.5-63mm	%	<1
Coarse Gravel 26.5-37.5mm	%	<1
Coarse Gravel 19-26.5mm	%	<1
Medium Gravel 13.2-19mm	%	<1
Medium Gravel 9.5-13.2mm	%	<1
Medium Gravel 6.7-9.5mm	%	<1
Medium Gravel 4.75-6.7mm	%	7
Fine Gravel 2.36-4.75mm	%	7
Very Coarse Sand 1.18-2.36mm	%	11
Coarse Sand 0.6-1.18mm	%	15
Medium Sand 0.425-0.6mm	%	7
Medium Sand 0.3-0.425mm	%	12
Fine Sand 0.15-0.3mm	%	18
Very Fine Sand 0.075-0.15mm	%	11
Coarse Silt 0.020-0.075mm	%	7
Fine Silt 0.002-0.020mm	%	2
Clay <0.002mm	%	3

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-107	Particle Size Distribution using in house method INORG-107 by way of sieving and/or hydrometer sedimentation testing.
ORG-25	Determination of Organometallic Compounds by derivatisation and analysis by GC-MSMS.

QUALITY CONTROL: Tributyl Tin in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	394448-2
Date extracted	-			06/11/2025	1	06/11/2025	06/11/2025		06/11/2025	06/11/2025
Date analysed	-			07/11/2025	1	07/11/2025	07/11/2025		07/11/2025	07/11/2025
Tributyltin as Sn	µg/kg	0.5	ORG-25	<0.5	1	<0.5	<0.5	0	95	90
Surrogate Tripropyltin	%		ORG-25	63	1	74	88	17	70	99

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volumes) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

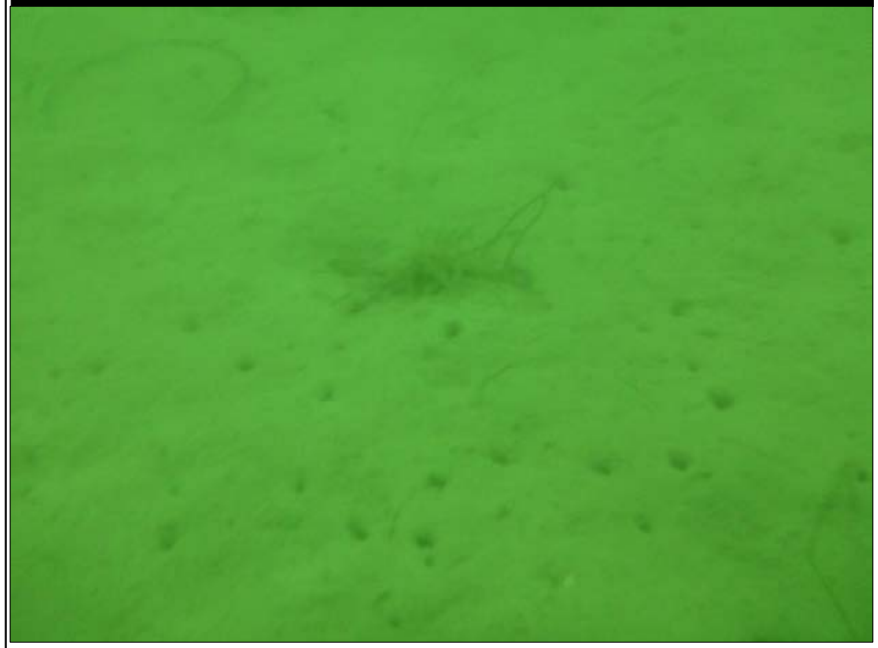
Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

For Dust Deposit Gauge (DDG) analysis the sampling, sampling period and funnel exposure area do not fall under Envirolab's NATA accreditation (unless the Newcastle laboratory where responsible for the sampling), hence the annotation on the DDG units of reporting.

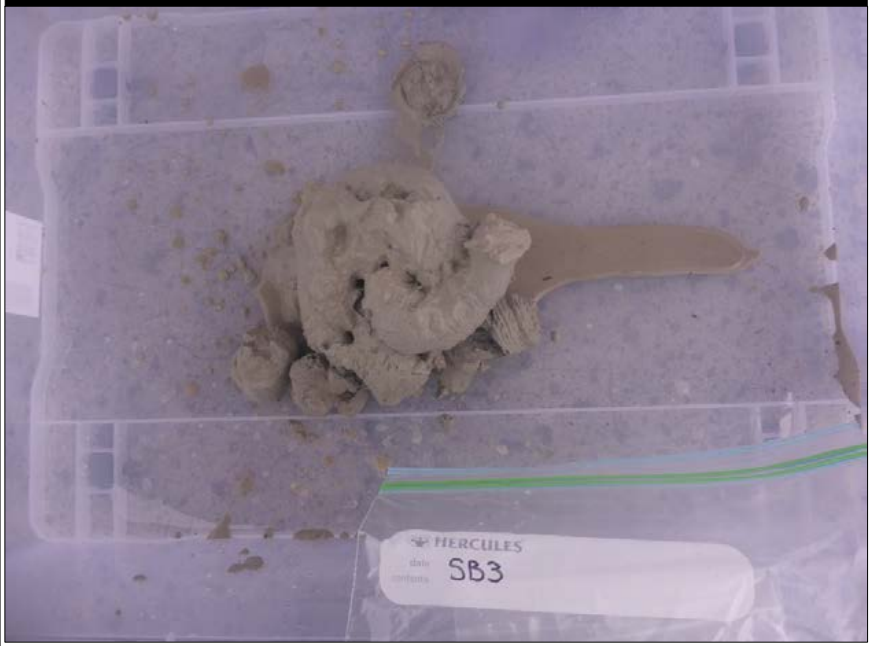
Urine Analysis - The BEI values listed are taken from the 2022 edition of "TLVs and BEIs Threshold Limits" by ACGIH.

Appendix B Soilbore Photograph log

SB3 – SAMPLING LOCATION (X:730303, Y:6319467)



SB3 - SAMPLE



SI3 – SAMPLING LOCATION (X:731021, Y:6319523)



SI3 - SAMPLE



JBS&G

Job No: 63753

Client: Department of Infrastructure and Transport

Version: Rev A	Date: 03-12-2025
Drawn By: PY	Checked By: MC

Not to Scale

Coordinate System: GDA 2020 MGA Zone 54

Offshore Mullaquana

APPENDIX B

SI4 – SAMPLING LOCATION (X:431311, Y:6319467)



SI4 - SAMPLE



SB4 (X:730457, Y:6318806)

JBS&G

Job No: 63753

Client: Department of Infrastructure and Transport

Version: Rev A	Date: 03-12-2025
Drawn By: PY	Checked By: MC

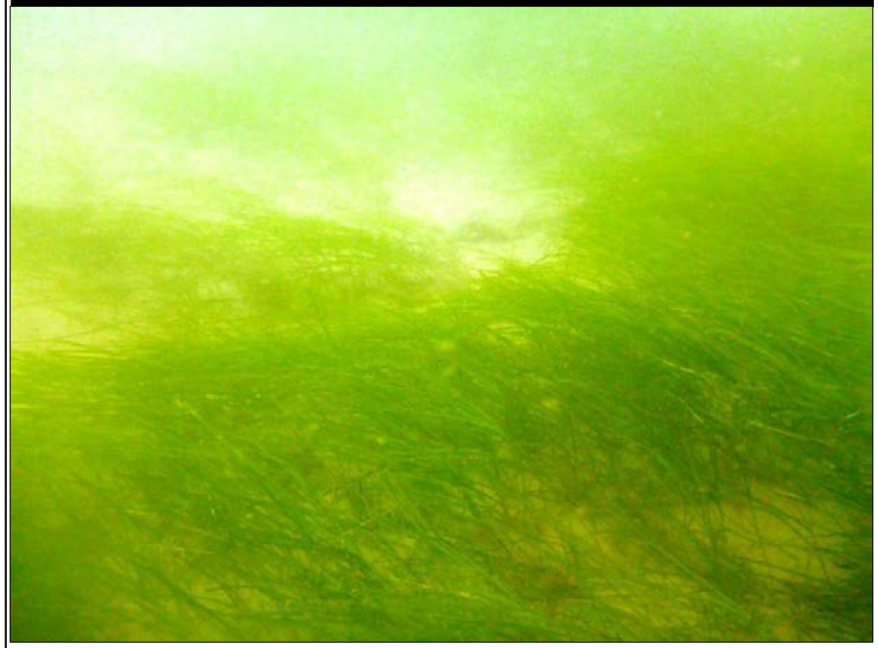
Not to Scale

Coordinate System: GDA 2020 MGA Zone 54

Offshore Mullaquana

APPENDIX B

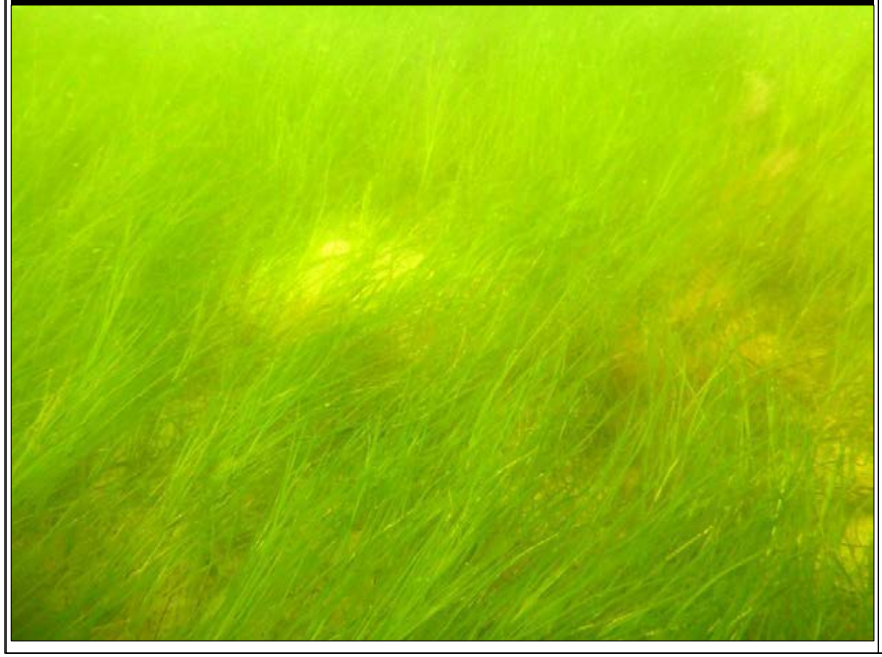
Z03 – SAMPLING LOCATION (X:729861, Y:6319620)



Z03 - SAMPLE



Z04 – SAMPLING LOCATION (X:729253, Y:6319180)



Z04 - SAMPLE



JBS&G

Job No: 63753

Client: Department of Infrastructure and Transport

Version: Rev A	Date: 03-12-2025
Drawn By: PY	Checked By: MC

Not to Scale

Coordinate System: GDA 2020 MGA Zone 54

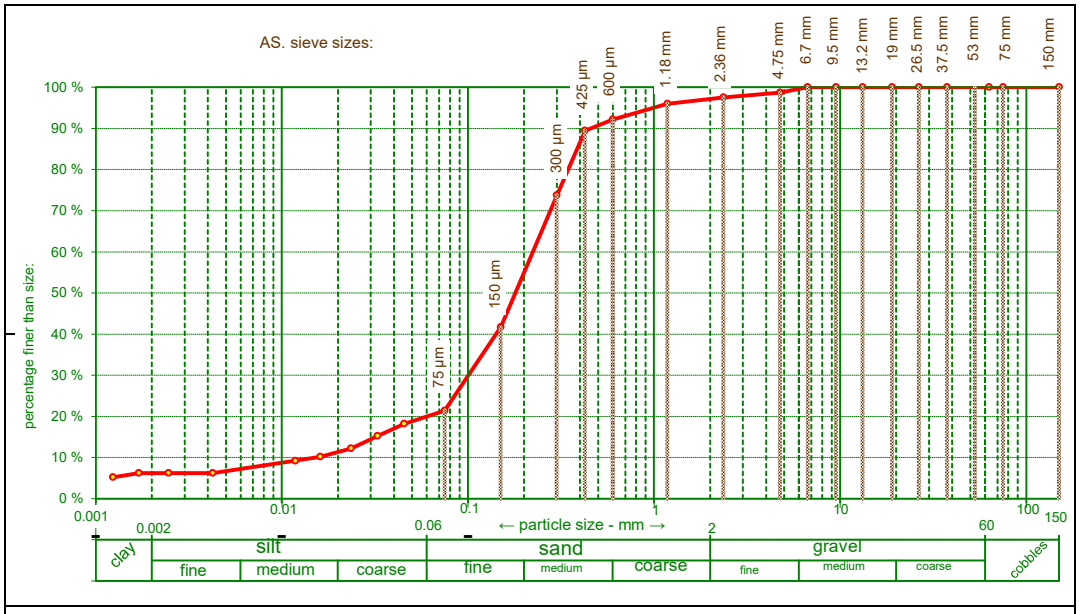
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APPENDIX B

Appendix C PSD Graphs

PARTICLE SIZE DISTRIBUTION

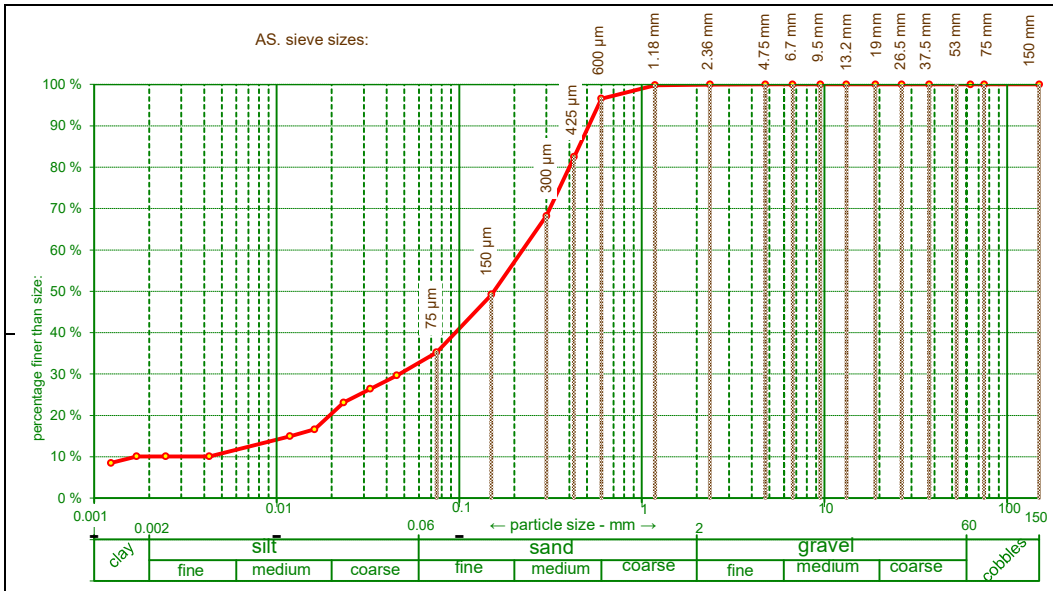
SB4



Sieve Analysis		Hydrometer Analysis				
Sieve Size mm	% Passing	Particle Size µm	% Passing			
75	100.0	45.4	18.2			
63	100.0	32.8	15.2			
37.5	100.0	23.6	12.2			
26.5	100.0	16.1	10.2			
19	100.0	11.8	9.2			
13.2	100.0	4.3	6.2			
9.5	100.0	2.5	6.2			
6.7	100.0	1.7	6.2			
4.75	98.7	1.2	5.2	NOTES:		
2.36	97.5					
1.18	96.0					
600 µm	92.2					
425 µm	89.4					
300 µm	73.7					
150 µm	41.7					
75 µm	21.4					

PARTICLE SIZE DISTRIBUTION

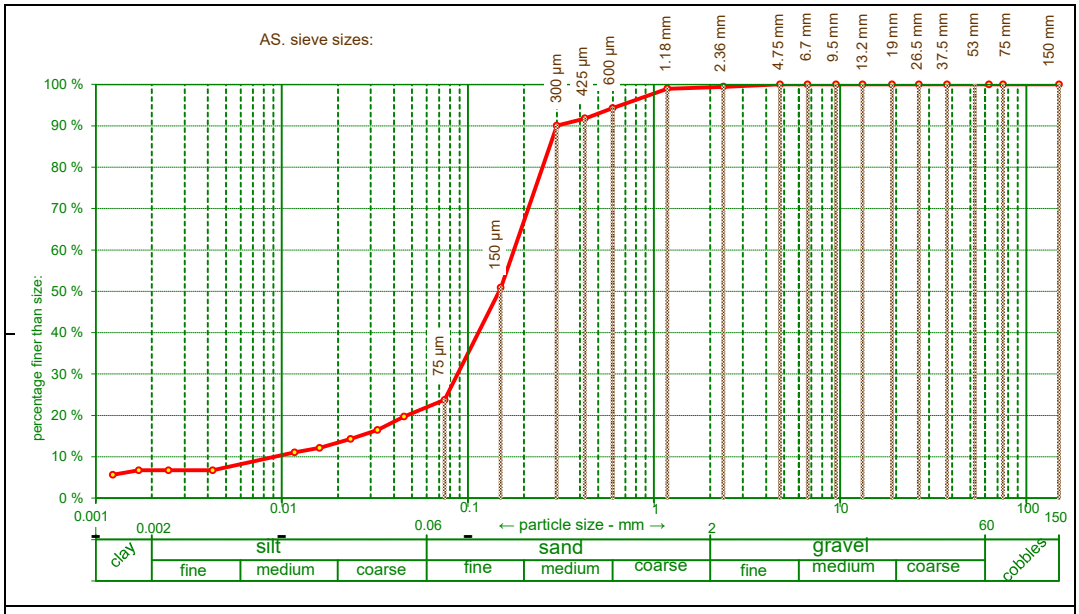
SB3



Sieve Analysis		Hydrometer Analysis				
Sieve Size mm	% Passing	Particle Size µm	% Passing			
75	100.0	45.4	29.6			
63	100.0	32.6	26.4			
37.5	100.0	23.3	23.1			
26.5	100.0	16.1	16.6			
19	100.0	11.8	15.0			
13.2	100.0	4.3	10.1			
9.5	100.0	2.5	10.1			☐ ☐
6.7	100.0	1.7	10.1			☐ ☐
4.75	100.0	1.2	8.5	NOTES:		
2.36	99.9					
1.18	99.8					
600 µm	96.5					
425 µm	82.5					
300 µm	68.2					
150 µm	49.2					
75 µm	35.2					

PARTICLE SIZE DISTRIBUTION

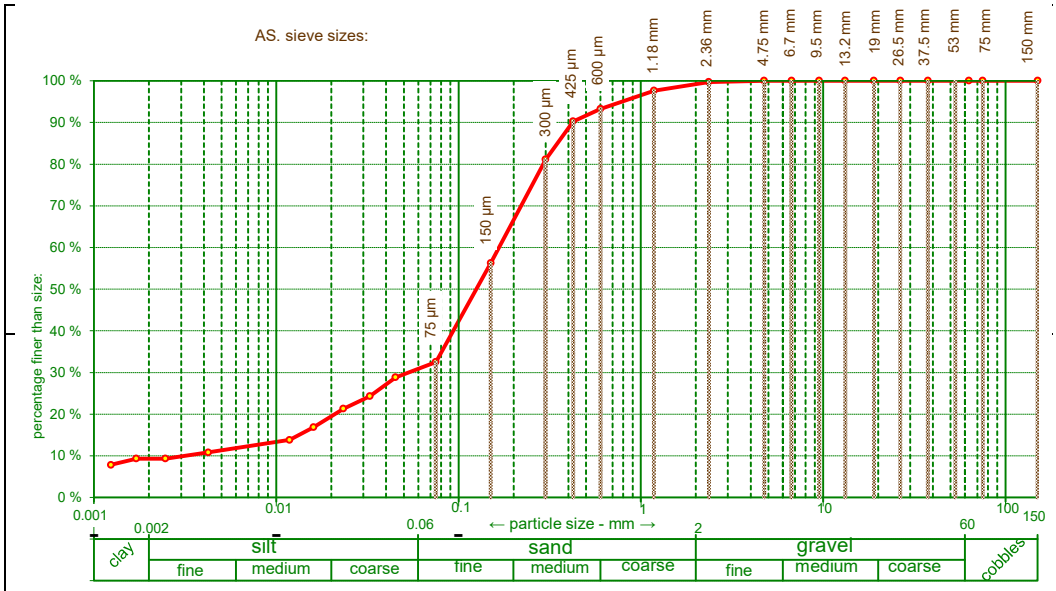
SI4



Sieve Analysis		Hydrometer Analysis				
Sieve Size mm	% Passing	Particle Size µm	% Passing			
75	*100.0*	*45.4*	*19.7*			
63	*100.0*	*32.8*	*16.5*			
37.5	*100.0*	*23.4*	*14.3*			
26.5	*100.0*	*16.0*	*12.1*			
19	*100.0*	*11.8*	*11.1*			
13.2	*100.0*	*4.3*	*6.7*			
9.5	*100.0*	*2.5*	*6.7*			
6.7	*100.0*	*1.7*	*6.7*			
4.75	*100.0*	*1.2*	*5.6*	NOTES:		
2.36	*99.5*					
1.18	*99.0*					
600 µm	*94.3*					
425 µm	*91.8*					
300 µm	*90.0*					
150 µm	*50.9*					
75 µm	*23.7*					

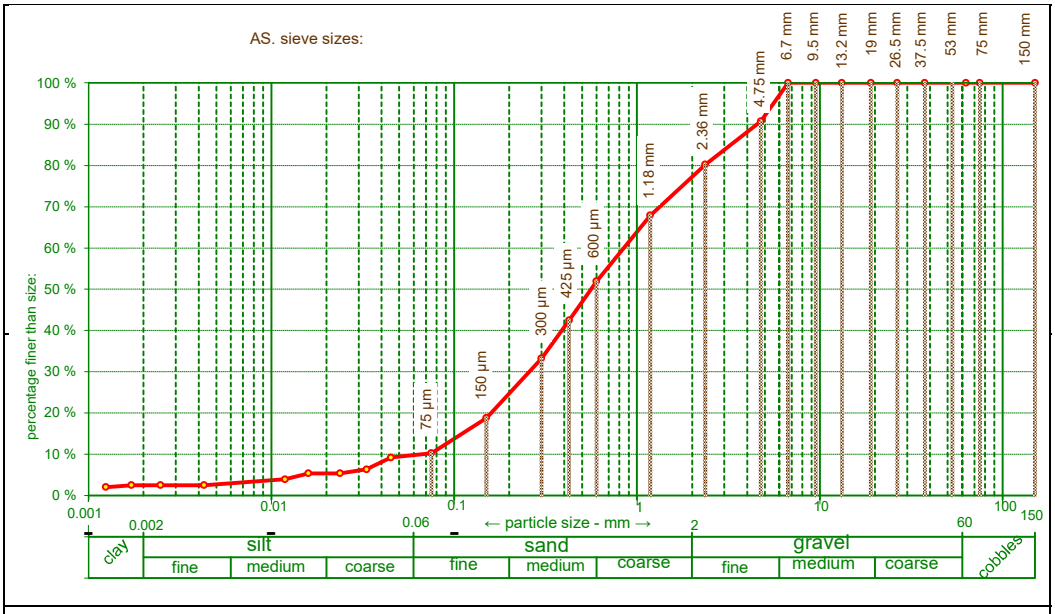
PARTICLE SIZE DISTRIBUTION

SI3



Sieve Analysis		Hydrometer Analysis				
Sieve Size mm	% Passing	Particle Size µm	% Passing			
75	100.0	45.1	28.8			
63	100.0	32.6	24.3			
37.5	100.0	23.3	21.3			
26.5	100.0	16.0	16.8			
19	100.0	11.8	13.8			
13.2	100.0	4.2	10.8			
9.5	100.0	2.5	9.3			☐ ☐
6.7	100.0	1.7	9.3			☐ ☐
4.75	100.0	1.2	7.8	NOTES:		
2.36	99.7					
1.18	97.6					
600 µm	93.3					
425 µm	90.3					
300 µm	81.1					
150 µm	56.3					
75 µm	32.5					

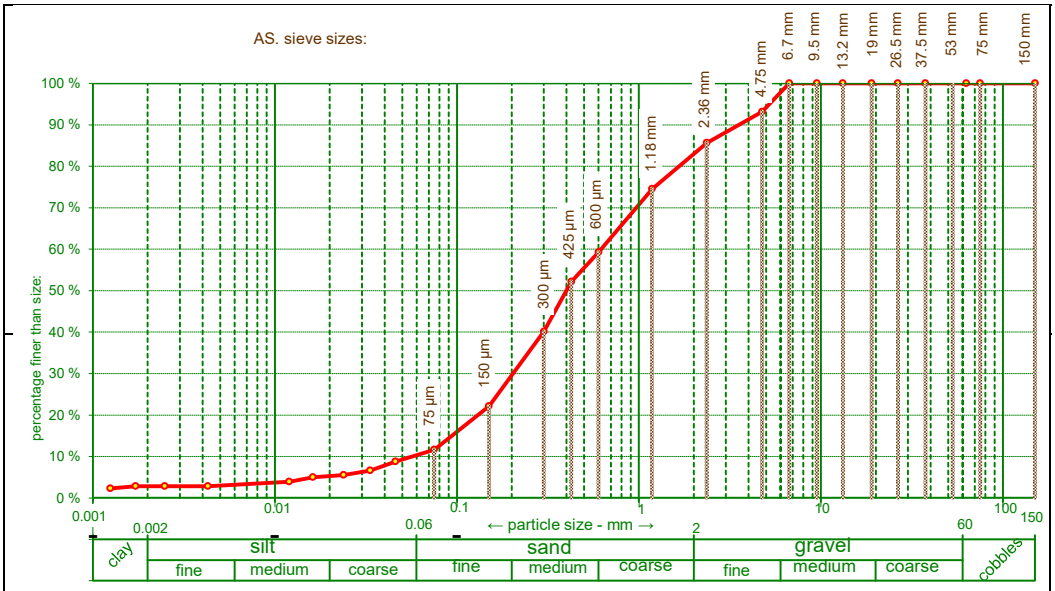
PARTICLE SIZE DISTRIBUTION **Z03**



Sieve Analysis		Hydrometer Analysis				
Sieve Size mm	% Passing	Particle Size µm	% Passing			
75	100.0	45.1	9.2			
63	100.0	33.2	6.3			
37.5	100.0	23.7	5.4			
26.5	100.0	16.0	5.4			
19	100.0	11.9	3.9			
13.2	100.0	4.3	2.5			
9.5	100.0	2.5	2.5			
6.7	100.0	1.7	2.5			
4.75	90.7	1.2	2.0	NOTES:		
2.36	80.2					
1.18	67.9					
600 µm	51.9					
425 µm	42.5					
300 µm	33.2					
150 µm	18.8					
75 µm	10.3					

PARTICLE SIZE DISTRIBUTION

Z04



Sieve Analysis		Hydrometer Analysis				
Sieve Size mm	% Passing	Particle Size µm	% Passing			
75	100.0	46.0	8.8			
63	100.0	33.4	6.6			
37.5	100.0	23.9	5.5			
26.5	100.0	16.2	5.0			
19	100.0	12.0	3.9			
13.2	100.0	4.3	2.8			
9.5	100.0	2.5	2.8			☐ ☐
6.7	100.0	1.7	2.8			☐ ☐
4.75	93.1	1.2	2.3	NOTES:		
2.36	85.7					
1.18	74.5					
600 µm	59.2					
425 µm	52.2					
300 µm	40.1					
150 µm	22.1					
75 µm	11.6					

Appendix D Coordinates for Sampling Locations

Sample Location ID	Latitude	Longitude	Coordinate System	Water depth (m)
ZO4	-33.24206	137.46054	GDA 2020 MGA Zone 54	18
ZO3	-33.23796	137.46695	GDA 2020 MGA Zone 54	23
SB3	-33.23925	137.47173	GDA 2020 MGA Zone 54	20
SB4	-33.24685	137.4736	GDA 2020 MGA Zone 54	20
SI4	-33.24499	137.48271	GDA 2020 MGA Zone 54	15
SI3	-33.23859	137.47942	GDA 2020 MGA Zone 54	13

Appendix E Detailed Data Quality Review

The results of the QA/QC program assessment against the relevant assessment DQIs discussed in **Section 4.3** are summarised below in **Table D.1** The associated field duplicate RPD table, and the rinsate blank and trip blank table, are included in the **Summary Tables.** The results for laboratory QA/QC measures are included in **Appendix A.**

Table D.1: QA/QC Chemical and Physical Results Summary

Data Quality Measures	Frequency and Results	DQI Summary
Precision		
Blind duplicates (intra-laboratory) Chemical	One primary (ZO4) and intra-laboratory duplicate (DUP02) pair was collected and analysed to ensure the minimum density of 1/20 samples for each of the relevant analytes was achieved. All results were less than or equal to acceptable upper RPD limit of 30% with the exception some results within the non-metallic inorganics suite that was analysed. DUP02 had higher results for Nitrogen and Nitrate. In this cause the higher result was adopted and did not exceed the criteria compared for analysis. The higher results are most likely due to the heterogeneity of the soils and represent the various in the material. Therefore, all intra-laboratory results passed the QA/QC protocol and the data is adequately validated.	Frequency met DQI met with noted exceptions
Blind duplicates (inter-laboratory) Chemical	One primary (ZO4) and inter-laboratory (SPLIT02) duplicate pair was collected and analysed to ensure the minimum density of 1/20 samples for each of the relevant analytes was achieved. All results less than or equal to acceptable upper RPD limit of 30%, All results were less than or equal to acceptable upper RPD limit of 30%, with the exception of three result for arsenic, Chromium (III+VI) and Zinc between primary sample Z04 and and the intra-laboratory duplicate (SPLIT02). It is noted that the primary sample result was reported close to the laboratory LOR where precision and accuracy can be compromised. Results for the material are comparable to the other results seen in the samples and the higher results adopted for comparison. The results are assumed to be reflective of material site contamination, rather variations in the heterogeneity of the soil. As such, the elevated RPD is not considered to affect the overall interpretation of results.	Frequency met DQI met with noted exceptions
Laboratory duplicates[3]	Laboratory duplicate frequency met for chemical analyses. All results less than acceptable upper RPD limit of 30%, refer **Appendix A.**	Frequency met DQI met
Accuracy		
Method blanks	Laboratory method blanks analysed for relevant analytes in each lab batch. All results within acceptable range, refer **Appendix A.**	Frequency met DQI met
Rinsate blank	One rinsate collected at the end of each sampling day. All metals concentrations reported below the laboratory LOR.	Frequency met DQI met
Trip spike	One trip blank accompanying samples from each day of sampling. Trip blank results were <LOR for all analytes tested.	Frequency met DQI met
Laboratory control samples	Laboratory control samples analysed for relevant analytes in each lab batch. All results within acceptable range, refer **Appendix A.**	Frequency met DQI met

Data Quality Measures	Frequency and Results	DQI Summary
Matrix spikes	Laboratory matrix spike samples analysed for relevant analytes in each lab batch. All results within acceptable range, refer **Appendix A.**	Frequency met DQI met
Representativeness		
Sampling appropriate for media and analytes	All sampling conducted in accordance with adopted procedures described in **Section 5.**	DQI met
Samples extracted and analysed within holding times.	All samples extracted and analysed within holding times, refer **Appendix A.**	DQI met
Laboratory blanks	Laboratory method blanks analysed for relevant analytes in each lab batch. All results within acceptable range, refer **Appendix A.**	Frequency met DQI met
Comparability		
Standard operating procedures for sample collection & handling	Same experienced field staff used the same standard operating procedures throughout the works	DQI met
Standard analytical methods used for all analyses	Standard analytical methods used as listed in the laboratory reports in **Appendix A.**	DQI met
Consistent field conditions, sampling staff and laboratory analysis	Sampling was completed by appropriately trained JBS&G field staff in a single day, with the laboratory NATA accredited for the analytical works performed	DQI met
Limits of reporting appropriate and consistent	It is noted that the laboratory LORs for a small number of analytes (antimony and select OCPs) were above the NAGD Screening Values and ANZG DGVs. However, given the work documented herein was a limited (opportunistic) baseline assessment, this is not considered to materially impact on the data quality assessment. Notwithstanding, should there be a need to formally characterise sediments for offshore disposal in the future, then consideration should be given to adopting lower (e.g. trace level) LORs for relevant analytes.	DQI met with noted exceptions
Completeness		

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		Name	Name	Signature	Date
Rev0	Amanda Bowne	Michael Cowin (CEnvP SC Specialist #41162)	Michael Cowin		26/06/2026

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Appendix G-6:

Baseline Survey for Larval Fish and Larval Decapod Crustaceans

Fisheries

Northern Water Project: Baseline Surveys for Fish Larvae, Fish Eggs, and Decapod Larvae at Mullaquana Station, South Australia



Diaz, F., Grammer, G. L., Wiltshire, K. H., White, C., Miskiewicz, A. G., Silva, V., Catalano, S., Cheesman, C. and Ivey, A.

SARDI Publication No. F2025/000336-1
SARDI Research Report Series No. 1285

SARDI Aquatic and Livestock Sciences
PO Box 120 Henley Beach SA 5022

April 2026

Final Report to the Department for Infrastructure and Transport

Government of South Australia
Department of Primary Industries and Regions

SARDI
SOUTH AUSTRALIAN RESEARCH AND DEVELOPMENT INSTITUTE

Northern Water Project: Baseline Surveys for Fish Larvae, Fish Eggs, and Decapod Larvae at Mullaquana Station, South Australia

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The Department of Primary Industries and Regions cares for the Country and communities of South Australia.

We ensure the land, sea, water and sky are healthy for future generations and strive to better understand their spiritual and cultural significance for Aboriginal people across the state.

In the spirit of reconciliation, our commitment is to build progressive and trusting relationships, to share knowledge and learn from each other.

We recognise and own a difficult past, and together we will walk forward.

We acknowledge the many Aboriginal people of this Country as the oldest continuous living culture in the world.

This publication may be cited as:
Diaz, F., Grammer, G. L., Wiltshire, K. H., White, C., Miskiewicz, A. G., Silva, V., Catalano, S., Cheesman, C. and Ivey, A. (2026). Northern Water Project: Baseline Surveys for Fish Larvae, Fish Eggs, and Decapod Larvae at Mullaquana Station, South Australia. Final Report to the Department for Infrastructure and Transport. South Australian Research and Development Institute (Aquatic and Livestock Sciences), Adelaide. SARDI Publication No. F2025/000336-1. SARDI Research Report Series No. 1285. 82pp.

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Date: 27 April 2026

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ACKNOWLEDGEMENTS

We thank David Delaine, Andreas Reuter and Angus Fotheringham (SARDI) for their assistance during the plankton surveys; Judy Tarus (SARDI) for her assistance processing plankton samples; Rachel Nicholls and Adele Barca (SARDI) for preparing next generation sequencing libraries and decapods for Sanger sequencing. Dr Michael Drew (SARDI) provided expertise in the identification of Snapper eggs and interpretation of *in situ* hybridization (ISH) results. We thank Dr Fred Bailleul (SARDI) for coding and running the Inverse Distance Weighted Interpolation analysis, and Dr Jason Earl (A/Sub-Program Leader, Pelagic Fishes, SARDI) for reviewing this report and providing helpful suggestions to improve its readability. The report was formally reviewed by Dr Greg Ferguson and Dr Amelia Desbiens (SARDI), Dr Lexi Schwarz (Department for Infrastructure and Transport, DIT) and two reviewers from JBS&G appointed by DIT. The report was approved for publication by Dr Stephen Mayfield (Program Leader, Fisheries, SARDI Aquatic and Livestock Sciences).

EXECUTIVE SUMMARY

The Northern Water Project (the Project) aims to provide a secure climate resilient water source for industry in South Australia's Upper Spencer Gulf and Far North. Delivery of the Project will involve the construction and operation of a 51 GL/year seawater reverse osmosis desalination plant located at Mullaquana Station on the Upper Spencer Gulf, and associated water transfer system (including pipelines, transfer pump stations, and water storages) and electricity infrastructure. The environmental impact assessment for the Project requires baseline surveys of the assemblages of decapod larvae (prawns, lobsters, and crabs), fish larvae, and fish eggs near the proposed submarine intake and outfall structures.

This report presents the results of four plankton surveys conducted every three months, in approximation of season, from November 2024 to July 2025 (i.e., November – Spring, February – Summer; May – Autumn, and July – Winter), to quantify the abundance of decapod larvae, fish larvae, and fish eggs at the proposed desalination plant site near Mullaquana Station, and at a reference site 2.5 km to the south. During each survey, a total of 36 plankton samples were collected: 18 from the proposed desalination plant site and 18 from the reference site, with each site sampled during both day and night hours to ensure that fish and decapod assemblages were adequately represented.

During the study period, a significant harmful algal bloom of *Karenia* spp. identified in the coastal waters around the Fleurieu Peninsula in March 2025, expanded into Investigator Strait, Gulf St Vincent and southern Spencer Gulf. Water sampling indicated that the algal bloom was not present near Mullaquana Station during this study (SARDI, Unpublished data). However, widespread mortalities of finfish, elasmobranchs, cephalopods, and crustaceans were recorded elsewhere in Spencer Gulf from March to August 2025 (iNaturalist, 2025), and are indicative of potential regional ecological effects that may have also affected plankton communities at the study sites, and should be considered when interpreting the results of this study.

Plankton samples were analysed using combined morphological and DNA-metabarcoding procedures to identify larvae and eggs to the lowest reliable taxonomic level. A subset of samples from the February and July surveys were also screened for 20 priority invasive marine species (IMS) using species-specific quantitative polymerase chain reaction (qPCR) assays.

The decapod assemblage was dominated by Brachyura (true crabs) and Caridea (shrimps), with Dendrobranchiata (prawns and lucifers), Axiidea, Anomura, and Gebiidea represented in lower numbers. The larvae of Western King Prawn and Blue Swimmer Crab were detected in November

2024 and February 2025, aligning with the known reproductive periods for these species in South Australia. Although Western King Prawn and Blue Swimmer Crab larvae comprised a small proportion of the total decapod assemblage, their seasonal occurrence suggests that the Mullaquana Station area may be important in the early life history of these species.

The fish larvae assemblage was dominated by Gobiidae (Gobies) and Engraulidae (Anchovies), with Tetrarogidae (Soldierfish), Pinguipedidae (Grubfish), and Terapontidae (Grunters) occurring in low numbers. An additional 14 families were also represented in relatively low numbers. Compositional shifts in dominant taxa were observed across surveys: Gobiidae dominated in November and May, Engraulidae peaked in February, and Tetrarogidae were most abundant in July, likely reflecting species-specific spawning periods and local oceanographic conditions influencing transport and retention of larvae.

Larvae of commercial and recreational fishery species, including Skipjack Trevally, Bluespotted Flathead, Sand Flathead, Yellowfin Whiting, and King George Whiting, and some protected species (e.g., Syngnathidae; Seahorses and Pipefishes) were recorded in low numbers. In contrast, Anchovy larvae and eggs were abundant during the February survey. No Snapper eggs or larvae were detected across all four surveys.

Concentrations of decapod larvae and fish eggs were highest in November and February, while fish larvae concentrations peaked in February. The number of species detected across all three groups increased in November and February, coinciding with the main spawning period of multiple taxa in Spencer Gulf. Although diurnal or site differences were not significant, higher concentrations of fish larvae and eggs were generally detected at night. The similar assemblage compositions recorded between the two surveyed sites likely reflect similar habitat characteristics and oceanographic connectivity.

No priority IMS were detected among the 20 taxa screened, except for a single occurrence of European Fan Worm in February. However, the estimated DNA concentration was below the threshold for confirmed species presence, suggesting the detection most likely reflects transient DNA material advected from established populations in the wider Whyalla region. DNA-metabarcoding of samples from the four surveys did not detect any invasive decapod crabs.

Overall, larvae of commercially and recreationally important and protected species represented a minor component of the plankton assemblage off Mullaquana Station. However, the area may support Anchovy, Western King Prawn, and Blue Swimmer Crab larvae at different times.

Keywords: Desalination plant, Spencer Gulf, DNA-metabarcoding, invasive marine species.

1. INTRODUCTION

1.1. Project Background

The Northern Water Project (the Project) aims to provide a secure climate resilient water source for industry in South Australia's Upper Spencer Gulf and Far North. This initiative supports the growth of industries and key mining resources crucial for contributing to decarbonisation initiatives, sustainability and unlocking long-term economic prosperity for South Australia. Delivery of the Project will involve the construction and operation of a 51 GL/year seawater reverse osmosis desalination plant located at Mullaquana Station on the Upper Spencer Gulf, and associated water transfer system (including pipelines, transfer pump stations, and water storages) and electricity infrastructure (Northern Water, 2025). The site is situated 25 km south of Whyalla on the eastern coast of the Eyre Peninsula (Figure 1). To inform the environmental impact assessment for the Project, this investigation focused on two key environmental areas of concern at Mullaquana Station: (1) zooplankton, including decapod larvae, fish larvae and fish eggs, and (2) invasive marine species (IMS).

Spencer Gulf in South Australia (SA) is a large inverse estuary that spans 325 km in length, with a maximum width of 130 km and narrowing to less than 1 km in the upper Gulf. It experiences limited water exchange with shelf waters during the summer months and increased flushing during winter (Middleton et al., 2013). Typically, net current flow is strong and northward along the coast, with a weak return flow in the central part of the Gulf (Middleton et al., 2013). The Gulf contains a range of subtidal marine habitats, including seagrass beds, soft bottoms with sparse algal and invertebrate communities, rocky reefs, and the pelagic zone (Doubleday et al., 2017). Spencer Gulf also supports a variety of commercial and recreational fisheries. Among the most important species of decapod crustaceans caught within the Gulf are Western King Prawn (*Melicertus latisulcatus*), Blue Swimmer Crab (*Portunus armatus*) and Sand Crab (*Ovalipes australiensis*). Fish species include Snapper (*Chrysophrys auratus*), Australian Sardine (*Sardinops sagax*), Anchovy (*Engraulis australis*), Southern Garfish (*Hyporhamphus melanochis*), King George Whiting (*Sillaginodes punctatus*) and Snook (*Sphyraena novaehollandiae*) (Steer et al., 2020). Furthermore, the young life stages of some protected species (e.g., Syngnathidae; Seahorses and Pipefishes) are found within the plankton assemblage of the Gulf (COOE, 2010). Most of these species spend part of their life cycle as larvae within the zooplankton assemblage; however, studies on their abundance and diversity in Spencer Gulf waters are scarce.

This report summarises the assemblages of decapod larvae, fish larvae, and fish eggs at Mullaquana Station over four surveys (November 2024, February 2025, May 2025, and July 2025)

at: 1) the location of the intake and outfall structures for the proposed desalination plant; and 2) a nearby reference site (2.5 km to the south).

1.2. Invasive Marine Species

Invasive marine species impact fishing and aquaculture, affect amenity and infrastructure, undermine recreational, community, and indigenous values of marine systems, and place communities that depend on these systems at risk (Hayes & Sliwa, 2003; Hewitt et al., 2011; Molnar et al., 2008; Schaffelke & Hewitt, 2007). Shoreline construction activities pose risks of introducing IMS or influencing the success of IMS present in an area through disturbance and the provision of new artificial habitat (Airoldi and Bulleri, 2011; Johnston et al., 2017). Knowledge of the occurrence of IMS at the Mullaquana Station site is needed to understand and manage associated risks.

Few surveys of IMS in Spencer Gulf have been performed, with recent data lacking. Five sites in Upper Spencer Gulf (False Bay, Fitzgerald Bay, Point Lowly boat ramp, Whyalla marina and Whyalla mangroves) were surveyed for IMS in 2009 using scrapings and visual inspections of hard substrates (Dittmann et al., 2010). Additional IMS surveys, using visual inspections and molecular testing of plankton, were carried out in 2016 in Whyalla, but targeted a limited suite of IMS (Wiltshire et al., 2017). Other data on IMS occurrences in Spencer Gulf are available from a review of introduced species records in SA (Wiltshire et al., 2010).

Molecular techniques for surveillance of marine pests offer cost and time savings over traditional techniques. Technical advances have provided a platform for the development of practical, specific, sensitive, and rapid molecular surveillance tools for marine pests (Bott et al., 2010b; DAWE 2018; Deveney et al., 2017). The South Australian Research and Development Institute (SARDI) has developed and validated quantitative polymerase chain reaction (qPCR) assays for detection of key species and a method for DNA extraction from bulk plankton, facilitating targeted molecular marine pest surveillance for important IMS (Deveney et al., 2017; Giblot-Ducray and Bott, 2013; Wiltshire et al., 2023; 2019a; 2019b). Molecular surveillance using plankton tows and qPCR assays for IMS has been carried out at ports around Australia to inform domestic ballast water management and has been demonstrated to be an effective approach for assessing IMS status (Wiltshire et al., 2022; 2020; 2019a; 2019c).

1.3. Rationale, Objective, and Approach

A baseline survey of the assemblage of fish larvae, fish eggs, and decapod larvae (prawns, lobsters, and crabs) in the area of the planned submarine intake and outfall structures of the

Project at Mullaquana Station is needed to inform the environmental impact assessment process. Baseline monitoring of these assemblages is also required to the south of these structures as a reference site, along with an understanding of risks posed by IMS.

The objectives of this project are to:

1) Identify and quantify the species of fish larvae, fish eggs, and decapod larvae present in the plankton assemblage near the submarine intake and outfall structures of the proposed desalination plant and at a reference site to the south using a mixture of taxonomic and genetic techniques. Emphasis was placed on species of commercial importance, e.g., King George Whiting, Snapper, Garfish, Sardine, Anchovy, Western King Prawn and Blue Swimmer Crab.
2) Describe and compare the fish larvae, fish eggs and decapod assemblages in the Mullaquana Station area across survey months, time of day and sites.
3) Assess the presence of priority IMS by applying species-specific qPCR assays to DNA extracted from subsamples of the plankton samples that were collected for the fish and crustacean surveys.

2. METHODS

2.1. Study Area and Survey Design

Plankton surveys for fish larvae, fish eggs and decapod crustaceans were conducted off Mullaquana Station on 15 November 2024, 3 February 2025, 19-20 May 2025, and 29-30 July 2025. Sampling was undertaken near the proposed intake and outfall structures of the proposed desalination plant (Figure 1), and at a reference site located 2.5 km to the south with similar depth and habitat characteristics. Surveys were conducted at approximately three-month intervals, in approximation of season (i.e., November – Spring, February – Summer, May – Autumn, and July – Winter), to capture expected seasonal variation in zooplankton assemblages.

During each survey, three transects were surveyed at each site. Transects were spaced approximately 500 m apart and perpendicular to the shore. Each transect comprised three sampling stations that were approximately 300 m apart, totalling nine sampling stations at each site (Figure 1; Appendix 1). Depths at the sampling stations ranged from 15 to 20 m. At each station, one sample was collected during the day and another at night to ensure adequate representation of fish larvae, fish eggs, and decapod crustacean assemblages.

2.2. Plankton Sampling

Plankton samples were collected at each station using paired California Vertical Egg Tow (CalVET) nets (Figure 2). Each net has an internal opening diameter of 0.3 m, length of 1.8 m, 330 µm mesh and plastic removeable cod-ends. CalVET nets were fitted with *General Oceanics* 2030 flowmeters, and the factory calibration coefficients were used to quantify the volume of seawater filtered (m^3) during each tow.

Plankton nets were deployed from SARDI Research Vessels *Seriola* and *Apalie* (~7 m vessels) fitted with a davit and capstan. An oblique tow of approximately 250 m in length was used at each sampling station to collect plankton samples. Oblique tows were completed by attaching a separate float line to the net to prevent contact with the bottom. This assembly was then lowered from the vessel to the seafloor (~ 5x water depth of rope). Once deployed, the net was towed at approximately 1 m/s. When the net reached the surface, it was retrieved or allowed to descend again to be repeated if further distance was desired. A gentle arc towards the working side of the boat was necessary to keep the net in clean undisturbed water outside of the wake of the boat.

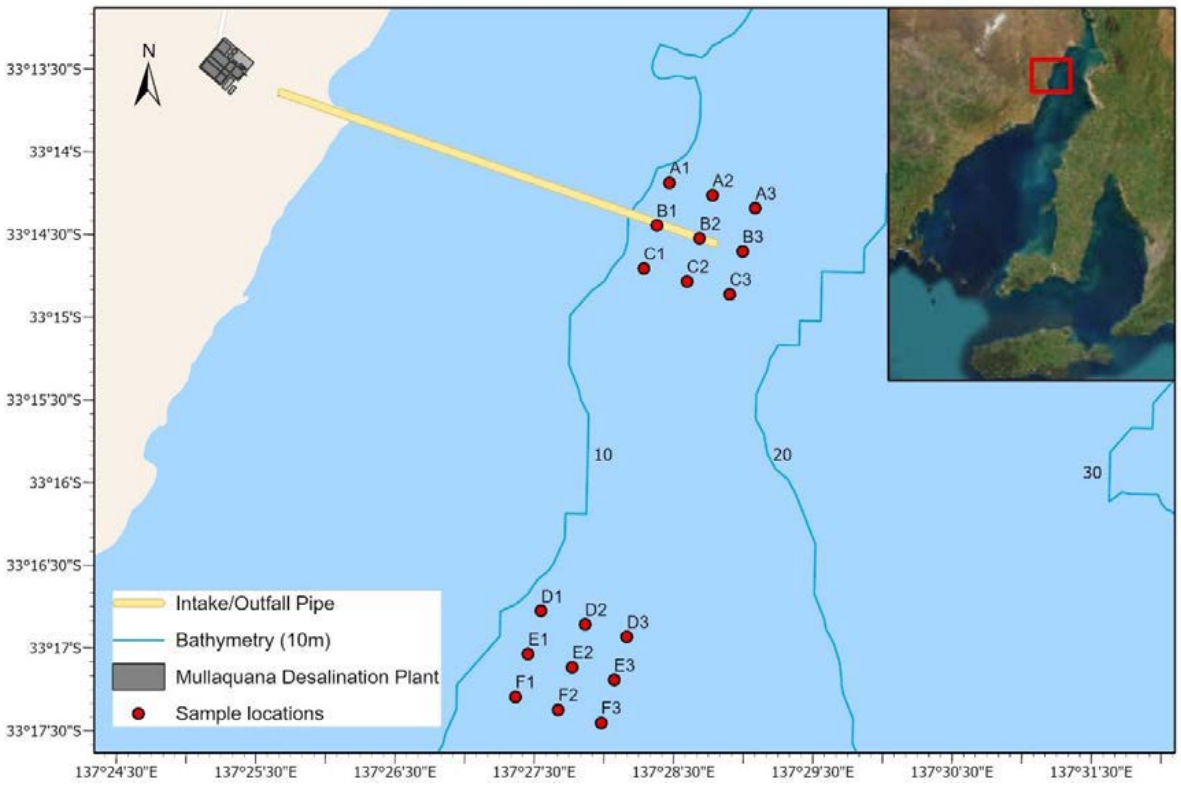


Figure 1. Map of the planned sub-surface intake and outfall (yellow) structures for the Project at Mullaquana Station, on the eastern coastline of the Eyre Peninsula in Upper Spencer Gulf. Plankton samples (red dots) were collected from locations A, B and C (Proposed desalination plant site) and D, E, and F (Reference site). Bathymetry in metres is designated in figure.

Once the net was retrieved, the frame was lifted from the water, and a lazy-line attached to a davit was used to bring the net and cod-ends into the vessel. The contents of the nets were washed down with seawater from a deck hose, cod-ends removed, and the contents washed into a fine mesh collecting sieve to drain. The samples were transferred to a 500 mL jar with as little water as possible and topped up with a minimum ratio of 10:1 of 100% ethanol (EtOH):sample. To ensure high-quality sample preservation for genetic analyses, the preserved samples were kept chilled in a portable ice chest on the vessel until they were transferred to a spark free refrigerator in the laboratory.

At the middle sampling station of each transect, a *Sea-Bird* Conductivity-Temperature-Depth (CTD) recorder was lowered to a depth of 1 m from the seafloor. Estimates of water temperature and salinity were extracted from each CTD profile.



Figure 2. Example of CalVET plankton net deployment off Mullaquana Station, SA. Left = Net, cod ends and flowmeters are attached and inspected in preparation for tow. Right = CalVET net ascending after a tow.

2.3. Sample Processing and Identification of Larvae

In the laboratory, fish larvae, fish eggs, and decapod crustaceans were manually separated from the plankton in each sample and counted to provide an estimate of total abundance. Accurate counts of the larvae and eggs were achieved using a handheld tally counter. Crustaceans (decapod larvae only) and fish eggs were sorted to the lowest reliable Operational Taxonomic Unit (OTU) at SARDI using key reference guides. Fish larvae were identified to the lowest OTU by A. Miskiewicz (Ichthyological Investigations, Wollongong, NSW). To avoid cross-contamination of samples in preparation for DNA-metabarcoding, workstations, tools and benchtops were decontaminated between samples using LookOut® DNA Erase (Sigma-Aldrich).

The number of fish larvae, fish eggs, and decapods comprising each OTU (e.g., infraorder, family, genus, or species) was recorded. Initial counts were verified and refined during this process. High resolution photographs were taken of each OTU in every sample for future reference using a dissecting microscope equipped with an Olympus DP28 camera (decapods and fish eggs) and an Olympus T5 camera (fish larvae). Fish larvae collected in May and July were also photographed with an Olympus DP28 camera. After being photographed, fish larvae, fish eggs, and decapods were independently recombined to create one mixed-species sample for DNA-metabarcoding. This procedure was applied to all samples except fish eggs collected in November and February (Figure 3). During spring and summer, the Upper Spencer Gulf is a

known spawning and recruitment area for many fish species, including Snapper (Drew et al., 2022). Consequently, fish eggs collected in November and February were divided into two groups based on size to facilitate the identification of Snapper eggs at Mullaquana Station. This followed the method described by Drew et al. (2022), which involved separating eggs within the 0.75–0.90 mm size range and exhibiting morphological characteristics consistent with Snapper eggs from the remainder of the sample. Fish eggs identified as potential Snapper were assessed using molecular validation via *in situ* hybridization (ISH; Oxley et al., 2017), followed by individual Sanger sequencing to confirm species-level accuracy of the ISH results (see DNA-metabarcoding and ISH techniques).

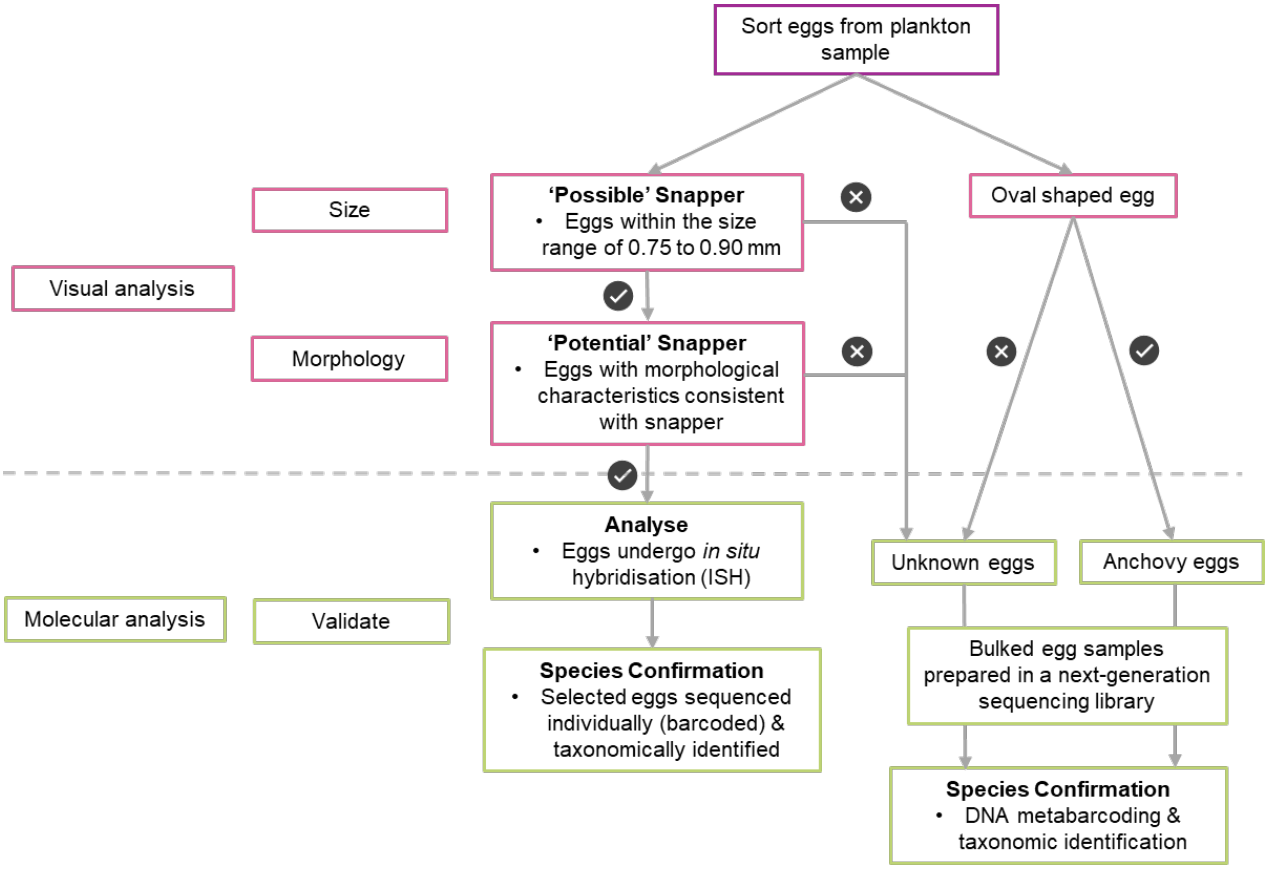


Figure 3. Schematic representation of the procedure used for identifying snapper eggs from plankton samples collected in November 2024 and February 2025 at Mullaquana Station, SA. Eggs within the 0.75–0.90 mm size range and showing Snapper-like morphology were selected and subjected to *in situ* hybridization (ISH), followed by sequencing for molecular confirmation.

2.4. DNA-metabarcoding and ISH Techniques

Modern DNA-metabarcoding techniques were applied to determine the presence/absence of fish larvae, fish eggs, and decapod crustacean species in each plankton sample, producing a 'species list' that was combined with morphological examination to both verify identifications and, where possible, provide finer taxonomic resolution. For example, if an OTU could only be identified to family level using morphology, it likely could be identified to genus or species level using DNA-metabarcoding (particularly true for fish taxa, which are well-represented in published sequence databases). The photographs taken of each sample were used to reconcile the visual identification of the larvae to the lowest possible OTU with the results from DNA-metabarcoding (i.e., 'species list').

DNA-metabarcoding involves targeting and amplifying short, highly variable DNA regions from multiple taxa within the same sample, which are then simultaneously sequenced using fast and cost-effective high-throughput Next Generation Sequencing methods (Illumina). The unique genetic signature of individual taxa within the single sample are then identified and taxonomically resolved by matching sequences to those in publicly available reference databases, such as the Barcode of Life (BOLD) and National Centre of Biotechnology Information (NCBI).

This technique specifically targets a short 313 bp fragment of the *COI* gene with universal metazoan primers (mICOIintF & jgHCO2198; Leray et al., 2013) to determine the presence/absence of fish larvae, fish eggs and decapod crustacean species in each sample. See Appendix 2 for a detailed description of the DNA-metabarcoding techniques and procedures used in this project.

The resulting dataset was partially processed by the Australian Genome Research Facility (AGRF, North Melbourne, VIC, Australia), with sequence reads paired using PEAR (version 0.9.5) (Zhang et al., 2014) and primers identified and removed. The paired-end reads are subsequently quality filtered, with removal of low-quality reads, full-length duplicate sequences and singleton sequences using Quantitative Insights into Microbial Ecology (QIIME 1.8) (Caporaso et al., 2010), USEARCH (version 8.0.1623) (Edgar, 2010) and UPARSE software (Edgar, 2013). Sequences were clustered followed by chimera filtering using the SILVA database (silva32) as a reference. Reads were mapped to OTUs using a minimum identity of 97%, with the BOLD (bold_identification tool, version 0.0.27) and NCBI databases used for taxonomic classification. Some species of common decapod crustaceans found in Spencer Gulf have not been sequenced for the *COI* gene and are subsequently missing from the publicly available databases (e.g., BOLD and NCBI). Consequently, an in-house database (sequence alignments and phylogenetic tree) of

COI DNA sequences from identified adult specimens of selected decapods collected from Spencer Gulf has been created by SARDI (Appendix 2). Voucher specimens have been archived in the South Australian Museum.

The AGRF partially processed dataset (absolute counts for each OTU) was then analysed at SARDI. This included filtering the dataset to OTUs with > 0.01% contribution to the whole dataset (fish larvae, fish eggs, and decapod crustacean larvae analysed separately), performing taxonomic checks of OTUs firstly using BOLD and NCBI, and secondly against the in-house generated sequence database, then collapsing OTUs for those with matching taxonomic classifications and placement in the in-house generated alignment and phylogenetic tree.

Potential Snapper eggs were assessed firstly using molecular validation through ISH, following the methods and procedures outlined in Oxley et al. (2017), and secondly via Sanger sequencing for a subset of individual ISH-processed eggs, using the methods described previously.

2.5. Molecular Testing for IMS

A subset of the collected plankton samples was tested for key IMS using species-specific qPCR assays. This subset comprised a total of 60 samples (30 each from the February and July surveys), including all samples from the proposed desalination plant site (n = 36), and samples from the northern and southern transects from the reference site (n = 24) from each survey time. Both day and night samples were included for each station and survey time.

Following the initial sample sorting of decapod crustaceans, fish larvae and fish eggs (see Section 2.3), the remaining plankton was split using a Folsom Plankton Sample Splitter, with half used for DNA extraction for IMS testing, and the other fraction retained. The fraction for IMS testing was filtered using a manifold and sterile single-use filter cups with 0.45 µm filters (Pall Microcheck®). Filter papers were transferred to 50 mL centrifuge tubes, frozen at −20 °C, and freeze-dried until completely dehydrated. DNA extraction and qPCR analysis were carried out by the SARDI Molecular Diagnostics laboratory. DNA was extracted from freeze-dried plankton using 20 mL of DNA extraction buffer per sample containing an inhibition control (standardised quantity of an exogenous organism) and physical disruption (Ophel-Keller et al*.,* 2008). This extraction method has been demonstrated to be efficient and consistent in application to environmental samples (Haling et al., 2011). Final volume of the DNA was 160 µL in elution buffer.

Each DNA extract was tested in singleplex quantitative polymerase chain reaction (qPCR) performed on ViiA 7 or QuantStudio7 real-time PCR systems (Applied Biosystems, Foster City, CA, USA) using species-specific qPCR assays for the 20 target IMS (Table 1) plus the inhibition

control. Testing also included negative controls and the appropriate calibration standard for each target IMS. For eight of the assays (marked '†' in Table 1), Q-control standards have been implemented. These standards use a modified oligonucleotide designed to enable monitoring for cross contamination of samples by the calibration standard during PCR setup, avoiding false positives due to this rare potential occurrence. For each PCR analysis batch, reference samples known not to cause inhibition were also extracted after addition of the inhibition control and tested by qPCR. A scaling factor was calculated for each plankton sample by comparing the yield of inhibition control DNA in the reference samples to that detected in the sample.

To avoid cross-contamination between samples from the sites and collection times, samples from each survey and site (proposed desalination and reference site) were processed on different days, and benchtops and apparatus decontaminated using LookOut® DNA Erase (Sigma-Aldrich) between samples. Samples from each site and survey were freeze-dried separately, with decontamination of the freeze-drier carried out between each set.

Twelve laboratory processing blanks were included in testing as negative controls. Processing blanks consisted of two filtration blanks, two freeze-drying blanks and two extraction blanks for each set of samples (February and July) processed for each site. Filtration blanks were prepared by filtering 120 mL of Milli-Q water per blank sample through sterile single-use filter cups immediately following filtration of the samples from each site and survey, with filters transferred to 50 mL centrifuge tubes and frozen at −20 °C with the corresponding plankton samples. Freeze-drier and extraction blanks were prepared by placing sterile 0.45 µm filter membranes into 50 mL centrifuge tubes. Filtration and freeze-drier blanks were freeze-dried with the corresponding plankton samples for each sample set. All processing blanks were then extracted and tested with the corresponding set of plankton samples

The qPCR assays targeted nine bivalve species, one gastropod, five crabs, one polychaete, two tunicates, one sea star, and one macroalga (Table 1). For *Arcuatula senhousia,* the assay applied targets maternal (F-type) COI, which is present in all individuals; an assay targeting paternal (M-type) COI (present only in males) was not used because using both assays together does not improve overall detection likelihood for this species (see Wiltshire et al., 2025). Assays for five invasive crabs (marked with '*' in Table 1) were applied despite decapod larvae having been removed from the samples prior to processing for qPCR analyses. These assays were used to allow detection of any sources of target DNA in plankton other than larvae, e.g., gametes, zygotes, or shed adult cells, because such detections would still indicate IMS presence. It should be noted, however, that a lack of detection by the relevant assays alone provides low confidence in target

species absence relative to other assays, and DNA-metabarcoding results also need to be considered in determining status of the tested crab species.

The tested IMS include five species known to occur in SA, six that are established elsewhere in Australia, and nine that are currently exotic to Australia, but which are regarded as a high risk for introduction. The species known from SA are the Vase Tunicate (*Ciona intestinalis*) and the European Fan Worm (*Sabella spallanzanii*), which are widespread in SA and established in Whyalla (Wiltshire et al., 2017; 2010); the Pacific Oyster (*Magallana gigas*), which is present as a farmed species in several aquaculture areas (although not in Upper Spencer Gulf) and as a feral species in Port Adelaide; the Japanese Kelp (*Undaria pinnatifida*), a recent occurrence in south-eastern SA; and the European Shore Crab (*Carcinus maenas*), which is established in the Adelaide region and has been recorded in the Coorong and at Port Vincent (Wiltshire et al., 2022; 2010; PIRSA data). Testing included the Asian Shore Crab *Hemigrapsus sanguineus*, which is established in Port Philip Bay, Victoria (NIMPIS 2024) and has been identified as a high-risk species for introduction to Spencer Gulf (Gillanders et al., 2016). Other tested IMS that occur in Australia are the Bag Mussel (*Arcuatula senhousia*), found in Victoria, Tasmania and Western Australia; the European Clam (*Varicorbula gibba*) and Northern Pacific Sea Star (*Asterias amurensis*), both found in Victoria and Tasmania; the Japanese Soft-Shell Clam (*Mya japonica*), found in Tasmania; the New Zealand Screwshell (*Maoricolpus roseus*), found in south-eastern Australia; and the Carpet Sea Squirt (*Didemnum vexillum*), a recently established species in Western Australia which has also been detected in New South Wales (NIMPIS 2024).

Table 1. Assays applied for key IMS and reference for assay development. †Assay with Q-control standard implemented. Present indicates species known to occur in Australia (Aus) or South Australia (SA); - indicates species currently exotic to Australia; * Decapod species.

Species	Common name	Present	Assay name	Assay development reference
Arcuatula (=*Musculista*) *senhousia*†	Asian Bag Mussel	Aus	AsenF	Wiltshire et al., 2025
Perna canaliculus†	NZ Greenlip Mussel	-	Pcan	Bott and Giblot-Ducray, 2011b
Perna perna	Brown Mussel	-	Pper	Simpson et al., 2018; Dias et al., 2013
Perna viridis	Asian Green Mussel	-	Pvir	Simpson et al., 2018; Dias et al., 2013
Mytella strigata (=*M. charruana*)	Charru Mussel	-	Mstr	Wiltshire et al., 2021b
Mytilopsis sallei†	Black-striped False Mussel	-	Msal	Bott et al., 2012
Varicorbula (=*Corbula*) *gibba*†	European Basket Shell	Aus	Vgib	Wiltshire et al., 2025
Magallana (=*Crassostrea*) *gigas*†	Pacific Oyster	SA	Mgig	Bott and Giblot-Ducray, 2012
Mya japonica	Japanese Soft-shell Clam	Aus	Mjap	Giblot-Ducray et al., 2022
Maoricolpus roseus	New Zealand Screw Shell	Aus	Mros	Giblot-Ducray et al., 2022
Asterias amurensis†	Northern Pacific Sea Star	Aus	Aamu	Bott et al., 2010a; Bax et al., 2006
Carcinus maenas†*	European Shore Crab	SA	Cmae	Bott and Giblot-Ducray, 2011a
*Charybdis japonica**	Asian Paddle Crab	-	Cjap	Simpson et al., 2018
*Rhithropanopeus harrisii**	Harris Mud Crab	-	Rhar	Simpson et al., 2018
*Hemigrapsus sanguineus**	Asian Shore Crab	Aus	Hsan	Wiltshire et al., 2021a
*Eriocheir sinensis**	Mitten Crab	-	Esin	Andersen et al., 2018
Sabella spallanzanii	European Fan Worm	SA	Sspa	Ophel-Keller et al., 2007
Ciona intestinalis	Vase Tunicate	SA	Cint	Bott and Giblot-Ducray, 2011a
Didemnum vexillum	Carpet Sea Squirt	Aus	Dvex	Simpson et al., 2018
Undaria pinnatifida†	Japanese Kelp	SA	Upin	Bott and Giblot-Ducray, 2011a

2.6. Data Analyses

The species/taxa identified using morphological characteristics for each sample and their counts formed the raw data to describe the fish larvae, fish egg, and decapod assemblages off Mullaquana Station. Water volume data obtained from flowmeters was used to standardise the counts of each taxon (decapods, fish larvae and eggs) per sample to individuals per cubic metre (i.e., ind/m^3; concentration) to enable comparison among groups and to estimate larvae/egg concentrations.

A combination of descriptive statistics and the Mann–Whitney *U* or the Kruskal-Wallis *H* non-parametric statistical tests were used to explore patterns in concentration for each taxon according to survey months (November, February, May, and July), diurnal variations (day vs night), and differences across sampling sites (proposed desalination plant site vs reference site). Interaction terms among factors were considered during preliminary analyses; however, replication within each site × month × day/night combination was limited (nine samples per combination), resulting in low statistical power to reliably detect interaction effects and an increased risk of model over-parameterisation (Quinn and Keough, 2002). Consequently, analyses focused on main effects, consistent with statistical guidance for factorial ecological designs with limited replication.

Bonferroni corrections were applied to *post hoc* pairwise comparisons to adjust for multiple testing. Concentrations per taxon were also mapped for the study area using the Inverse Distance Weighted Interpolation Method (IDW). In IDW, the predicted value for an unmeasured location is based on the measured values surrounding that location. The measurements closest to the prediction location have a stronger impact on the predicted value compared to those that are further away.

A Permutational Multivariate Analysis of Variance (PERMANOVA; Anderson, 2017) was used to test for changes in community composition of decapod and fish larvae among different surveys, time of day and sites. PERMANOVA partitions variation in a multivariate dissimilarity matrix (based on Bray-Curtis distances) among factors using a permutation-based analysis of variance. PERMANOVA analyses are known to be largely unaffected by heterogeneity in the data and provides a robust test for community differences with highly variable counts (some taxa are represented more than others). The PERMANOVA analysis (function '*adonis2*' in R package '*vegan*') was run with 1,000 permutations for each variable tested and provided a statistic value of R^2; values close to 1 indicates dissimilarity among groups, while R^2 values close to 0 indicates no difference. The *p* value indicates the significance of the R^2 statistic.

Following significant PERMANOVA results, a Similarity Percentage (SIMPER) analysis was conducted to identify which taxa contributed most to the observed differences in community composition among groups. While PERMANOVA determines whether there are significant

differences among groups, it does not identify which species or taxa are driving these differences. SIMPER, developed by Clarke (1993), addresses this by decomposing the Bray-Curtis dissimilarity matrix between all pairs of groups and ranking taxa based on their contributions to the overall dissimilarity. This allows for interpretation of the biological meaning behind significant PERMANOVA results by highlighting key taxa that differentiate communities. The SIMPER analysis was carried out using the *'simper'* function in the *'vegan'* package in R.

To visualise significant differences in community composition for decapod and fish larvae, a Non-metric Multi-Dimensional Scaling (NMDS) analysis was performed. The NMDS approach aimed to condense the dataset into a 2D ordination. An ordination is a map of the sampling locations where proximity among samples reflects the similarity of their biological communities. In this 2D ordination, the closer the groups of points referring to sample locations for the variable analysed, the more similar the two groups (Clarke and Warwick, 2001).

DNA-metabarcoding results were used to construct a species/taxa list of fish larvae, fish eggs, and decapod crustaceans for each sample, which was then compared with the species list obtained from morphological identification. The number of reads and % identity obtained for each taxon identified genetically were used as guides to match with morphologically identified taxa. The number of reads refers to the number of times a specific DNA sequence was observed in a sample. These numbers provide information about the relative abundance of species or OTUs in each sample. However, it is essential to consider that some sequences may amplify more efficiently than others due to primer mismatches or differences in DNA quality, which can skew the read numbers; therefore, we used them only as a guide (Bokulich et al., 2013; McKnight et al., 2019). The % identity refers to the percentage of nucleotide bases matching a reference sequence from the publicly available database (e.g., BOLD or NCBI, the closest match to a sequence in these databases is used). In species identification using DNA-metabarcoding, a high % identity (often 97% or above) is usually required to confidently assign a sequence to a particular species (Altschul et al., 1990; Ratnasingham and Hebert, 2007). In our study, taxonomic lineages were assigned to each OTU as follows: for fish larvae and egg samples, ≥ 98% (species), 95-97.99% (genus), 90-94.99% (family), < 89.99% (removed from the dataset, unless the DNA-metabarcoding family classification matched the morphological identification); and for decapod larvae, ≥ 98% (species), 95-97.99% (genus), 90-94.99% (family), 80-89.99% (tentative 'family', or infraorder), < 79.99% (removed from the dataset).

A sequential process comparing morphology and DNA-metabarcoding species lists was established by recording the presence/absence of a determined taxon at a higher taxonomic level (e.g., infraorder) and then continuing to the next level (e.g., family, genus, species) considering the number of reads and % identity for each taxon. This process allowed

confirmation of some species identities and provided a potential species list within specific taxonomic categories (e.g., infraorder) that could not be resolved using morphology.

Results of qPCR testing for IMS were analysed using a Bayesian occupancy-abundance model developed by Wiltshire (2023). This model provides an estimate of the planktonic concentration of tested IMS for each site and sampling time that accounts for differences in assay performance, effective volume sampled, and PCR inhibition. In the absence of detection, the model shows the maximum plausible planktonic concentration of each IMS that could occur without detection given the number of samples, assay performance, sample volume, and PCR inhibition. Data used by the model were the results for each assay in each sample, sample volume derived from flowmeter data, and scale factor as a measure of PCR inhibition.

Assay performance was incorporated in the model using informative priors for diagnostic sensitivity (DSe = likelihood of detection where target DNA is present) and specificity (DSp = likelihood of non-detection when target DNA is absent) of each assay. The effect of PCR inhibition was included as a modifier to DSe (i.e., model DSe was reduced for samples with scale factor > 1). Beta priors were used for the DSe intercept of each assay (i.e., DSe in the absence of inhibition), and for DSp, with beta parameters calculated using the *prevalence* package *betaExpert* function (Devleesschauwer et al., 2014) from the mean and 95% highest density interval (HDI) of previous estimates of DSe and DSp for each assay (Wiltshire et al., 2023; 2021b; 2019b; 2025). DSe and DSp have not been formally assessed for the Cint assay, therefore, average values of DSe and DSp across the other 19 assays were used as an estimate of performance for the Cint assay. The effect of inhibition, as measured by the scale factor, on effective DSe in each sample was modelled using a complementary log-log link and the natural logarithm of scale factor (lnSF). The coefficient of the lnSF effect was given a normal prior with mean of -0.3 and precision of 100, based on the mean lnSF effect across assays and variation in the effect between assays found by Wiltshire et al. (2023).

Markov chain Monte Carlo (MCMC) simulation in JAGS v. 4.3.0 (Plummer, 2017) was used for parameter estimation. MCMC simulations were obtained from three chains using 10,000 iterations thinned at a rate of 10, following 40,000 iterations for burn-in. JAGS was run using the *R2jags* package (Su and Yajima, 2015). Convergence was assessed by Gelman-Rubin convergence statistic and by visual inspection of trace, density and autocorrelation plots generated using the *MCMCplots* package (McKay, 2015). 95% HDIs, a Bayesian analog to confidence intervals[1], were calculated using the *HDInterval* package (Meredith and Kruschke, 2018).

[1] Specifically, the HDI is the smallest interval containing a given probability mass (e.g., 95% as used here) of a distribution. See Kruschke (2014) for details.

All datasets were checked for consistency and accuracy in Microsoft Excel and then in the *R* programming environment. All data analyses were carried out in the *R* programming environment (version 4.2.2; R Core Team 2023).

3. RESULTS

3.1. Water Temperature and Salinity

Results from the CTD profiles showed survey variations in water column temperature and salinity. In November 2024, the mean temperature was 18.5 °C (range: 18.4–18.6 °C), increasing to 24.3 °C (range: 24.1–24.4 °C) in February 2025 before declining to 18.1 °C (range: 17.4–18.5 °C) in May 2025. The lowest temperature was recorded in July 2025 at 12.6 °C (range: 12.5–12.9 °C). Salinity values were relatively stable, with a mean of 36.2 psu in November 2024, increasing to 39.5 psu in February 2025 and peaking at 40.1 psu in May 2025, before slightly decreasing to 39.8 psu in July 2025.

3.2. Summary of Samples Collected

During each if the four surveys, 18 samples were collected at both the proposed desalination and reference sites across day and night sampling periods (nine per period), resulting in a total of 36 samples per survey (Table 2).

Plankton abundance exhibited substantial temporal variability across surveys. In November, 6,153 decapods, 123 fish larvae, and 5,066 fish eggs were recorded. Decapod and fish larvae abundance increased in February, reaching 9,819 decapods and 1,936 fish larvae, whereas fish egg numbers decreased to 3,519. Plankton abundance subsequently declined in May (2,400 decapods, 41 fish larvae, and 4 fish eggs), with similarly low counts recorded in July (1,211 decapods, 155 fish larvae, and 53 fish eggs). Across all surveys, decapod larvae dominated the plankton community, consistently exceeding the number of fish larvae and eggs. Relative contributions of decapods ranged from 54% to 98% of total plankton counts, while fish larvae and eggs comprised much smaller proportions (1–13% and <1–45%, respectively).

Table 2. Summary of samples collected, and total number of decapod larvae, fish larvae, and fish eggs caught during November, February, May and July 2024-2025 surveys at the proposed desalination and reference sites off Mullaquana Station, SA (*Decapods, fish larvae and fish eggs).

	Site	Number of samples	Total decapod larvae	Total fish larvae	Total fish eggs	*Total plankton
November 2024	Desalination	18	4,077	89	2,725	6,891
	Reference	18	2,076	34	2,341	4,445
February 2025	Desalination	18	4,714	1,135	1,493	7,342
	Reference	18	5,105	801	2,026	7,932
May 2025	Desalination	18	1,432	23	2	1,457
	Reference	18	968	18	2	988
July 2025	Desalination	18	638	92	30	760
	Reference	18	573	63	23	659
Year total		144	19,583	2,255	8,642	30,474

3.3. Survey, Diurnal and Site Effects on Plankton Concentration

Significant differences in plankton concentration across surveys were detected for the three groups analysed (Table 3, Figures 4 and 5, Decapod larvae H (3) = 104.9, $p < 0.05$; Fish larvae H (3) = 99.9, $p < 0.05$; Fish eggs H (3) = 114.9, $p < 0.05$). These differences were subsequently examined using Bonferroni-corrected pairwise comparisons. There was a significant decrease in concentration of decapods between May–July compared to November–February (pairwise comparisons, $p < 0.05$), while concentration levels remained similar during November–February ($p = 0.2$) and May–July ($p = 0.1$).

Significant differences in fish larvae concentrations were observed among most surveys (pairwise comparisons, $p < 0.05$), except between July and November, where no significant difference was detected ($p = 0.96$). Fish larvae concentrations peaked in February and were substantially lower during other survey months. Fish egg concentrations were relatively similar and peaked during November and February, however a sharp reduction in concentration was observed in May–July compared to November and February surveys (pairwise comparisons, $p < 0.05$).

Decapod and fish larvae were more abundant at night during February, while fish eggs showed higher concentrations at night in both November and February (Table 3, Figures 4 and 5). Despite these patterns, differences between day and night concentrations were not statistically significant for any of the groups analysed (Decapods W = 2,535, $p = 0.96$; Fish larvae W = 2,136, $p = 0.07$; Fish eggs W = 2,209, $p = 0.12$). Similarly, there were no differences in concentration of decapods, fish larvae or fish eggs between the proposed desalination plant and reference sites (Figures 5 and 6, Table 4; Decapods W = 2,935, $p = 0.1$; Fish larvae W = 3,104, $p = 0.1$; Fish eggs W = 2,702, $p = 0.7$).

Table 3. Survey and diurnal mean concentration (individuals per cubic metre) of decapod larvae, fish larvae, and fish eggs encountered within the study area. SE = standard error of mean.

Survey		Concentration (ind/m^3)	Decapod larvae	Fish larvae	Fish eggs
November	**Day**	Mean	6.692	0.124	2.558
		SE	0.624	0.031	0.689
	Night	Mean	6.318	0.125	7.314
		SE	1.038	0.021	0.548
February	**Day**	Mean	6.726	1.063	2.178
		SE	0.555	0.075	0.212
	Night	Mean	9.916	2.222	3.797
		SE	0.867	0.341	0.367
May	**Day**	Mean	1.699	0.016	0.002
		SE	0.148	0.007	0.001
	Night	Mean	2.092	0.052	0.005
		SE	0.182	0.013	0.003
July	**Day**	Mean	1.595	0.113	0.073
		SE	0.184	0.018	0.014
	Night	Mean	0.953	0.236	0.038
		SE	0.071	0.039	0.012
Year Total		Mean	4.499	0.494	1.996
		SE	0.459	0.068	0.231

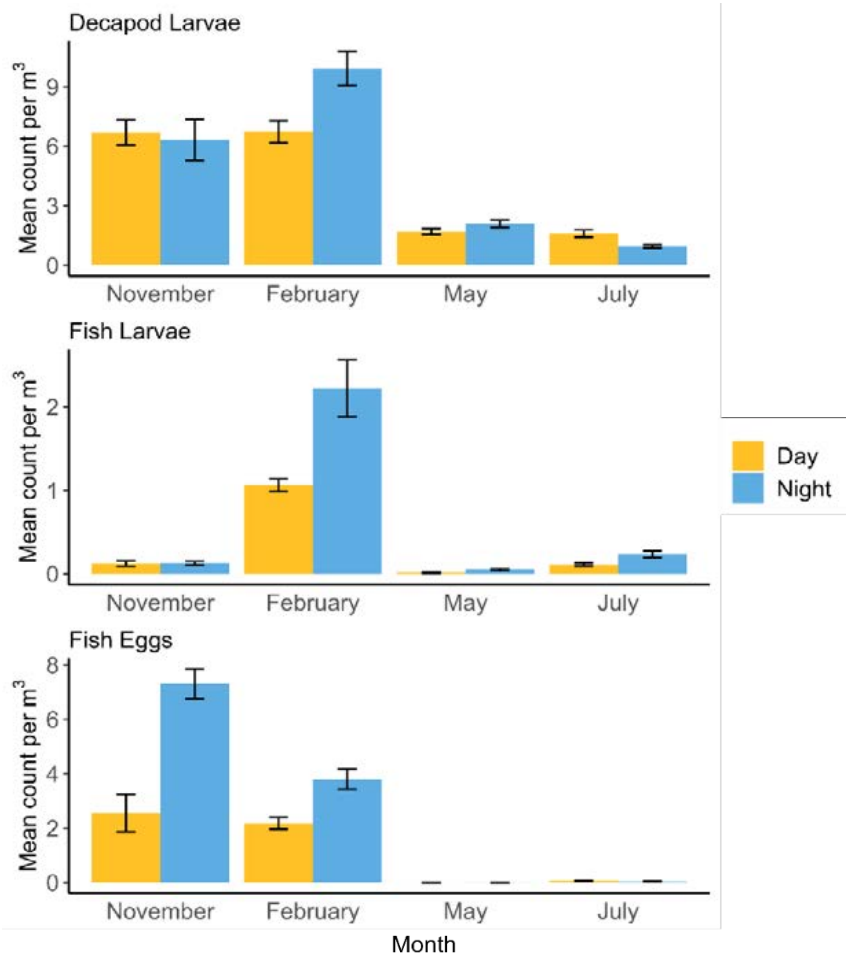


Figure 4. Survey and diurnal variations in concentration (individuals per cubic metre) of decapod larvae, fish larvae, and fish eggs off Mullaquana Station, SA. Error bars: standard error.

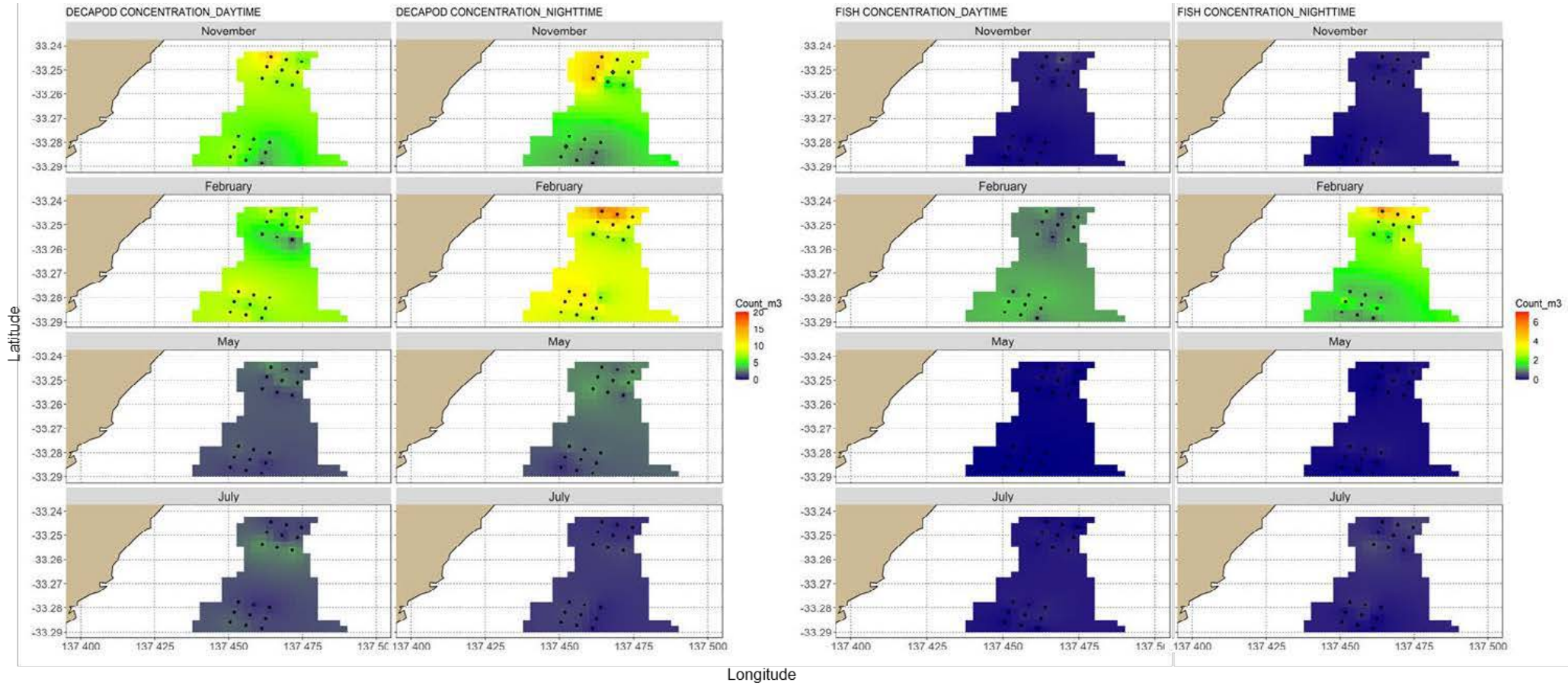


Figure 5. Inverse Distance Weighted (IWD) interpolation maps showing day and night concentrations (individuals per cubic metre) of decapod and fish larvae during surveys conducted in November, February, May, and July 2024-2025 for two sites off Mullaquana Station, SA. Note that concentration scales differ among taxonomic groups.

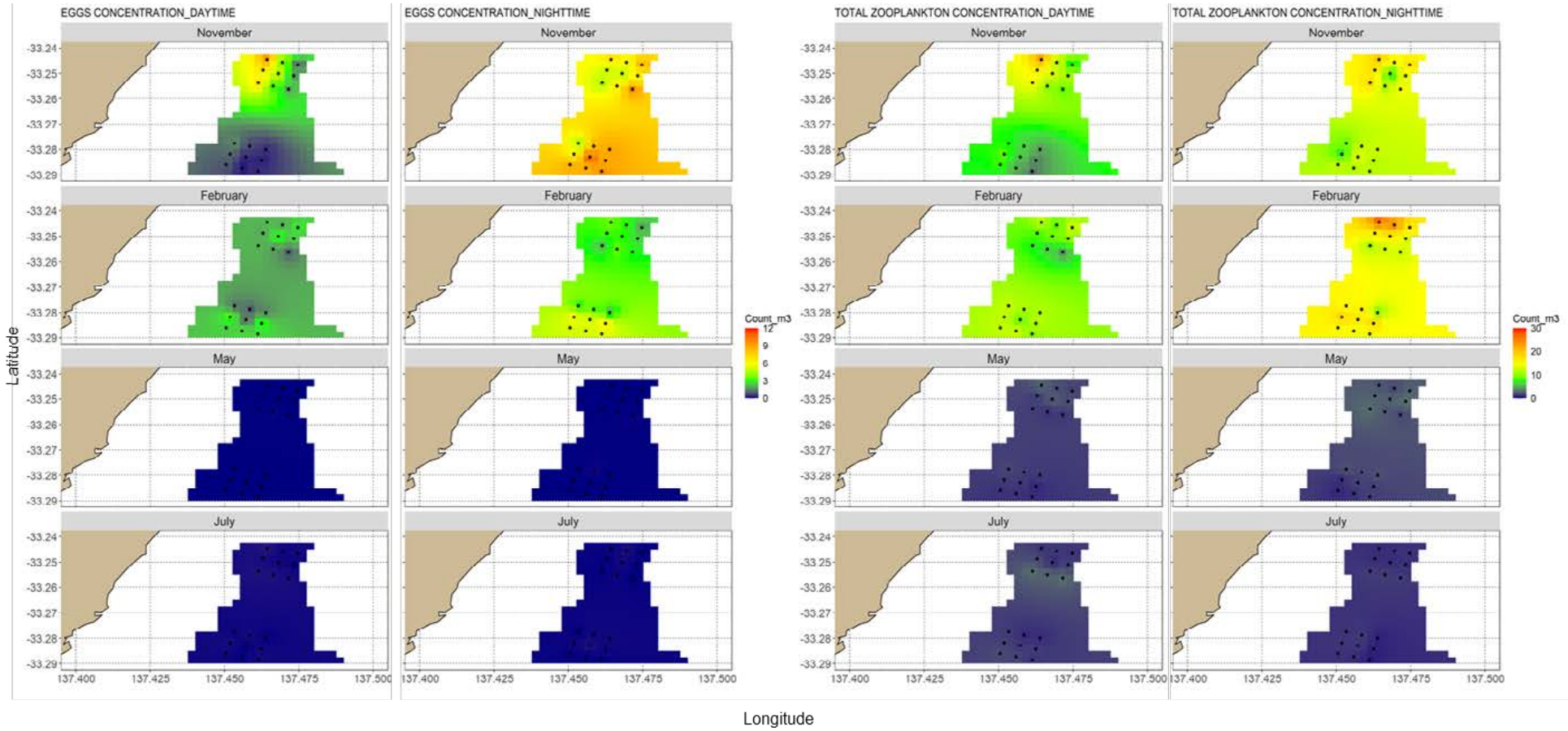


Figure 5 (continued). Inverse Distance Weighted (IWD) interpolation maps showing day and night concentrations (individuals per cubic metre) of fish eggs and total zooplankton (decapods, fish larvae, and eggs) during surveys conducted in November, February, May, and July 2024-2025 for two sites off Mullaquana Station, SA. Note that concentration scales differ among taxonomic groups.

Table 4. Mean concentration (individuals per cubic metre) of decapod larvae, fish larvae, and fish eggs collected at the proposed desalination plant (Desal) and reference (Ref) sites between November 2024 and July 2025 off Mullaquana Station, SA. SE = standard error of mean.

Survey	Site	Concentration (ind/m^3)	Decapod larvae	Fish larvae	Fish eggs
November	Desal	Mean	8.773	0.190	5.412
		SE	0.776	0.027	0.649
	Ref	Mean	4.260	0.059	4.460
		SE	0.393	0.013	0.996
February	Desal	Mean	8.130	1.967	2.536
		SE	1.067	0.375	0.180
	Ref	Mean	8.512	1.318	3.440
		SE	0.466	0.091	0.447
May	Desal	Mean	2.286	0.038	0.003
		SE	0.174	0.010	0.002
	Ref	Mean	1.507	0.029	0.003
		SE	0.106	0.012	0.003
July	Desal	Mean	1.392	0.217	0.064
		SE	0.197	0.039	0.015
	Ref	Mean	1.156	0.132	0.048
		SE	0.103	0.024	0.012

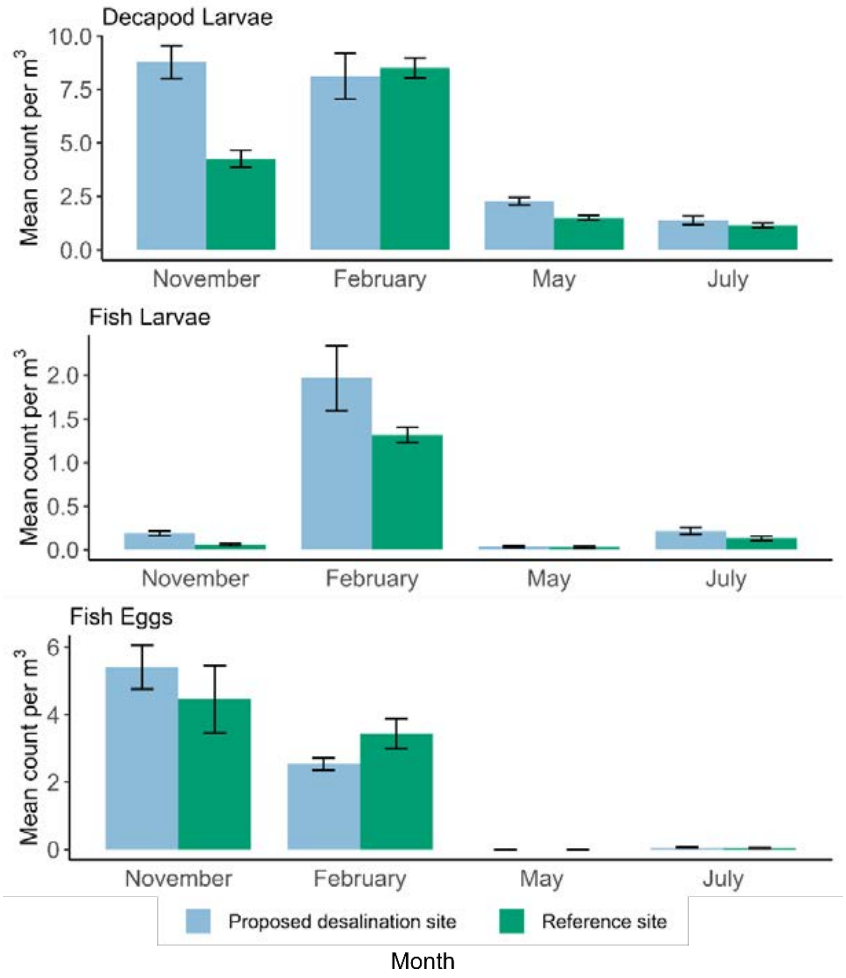


Figure 6. Survey and site variations in concentration (indviduals per cubic metre) of decapod larvae, fish larvae, and fish eggs off Mullaquana Station, SA. Error bars: standard error.

3.4. Assemblages of Decapod Larvae, Fish Larvae, and Fish Eggs

3.4.1. Decapod Assemblage

Morphological identification of decapod larvae for November, February, May, and July 2024-2025 surveys resulted in classification into six infraorders (Table 5, Figure 7). Morphological identification beyond infraorder level was difficult due to the lack of literature associated with classifying most early stages of decapods encountered; however, identification to family level was possible for some taxa (Appendix 3). DNA-metabarcoding results were used to corroborate and assist with morphological assignment to these six infraorders and to lower taxonomic levels, when possible, to produce a species list of decapods per survey for the study area (Appendices 3 and 5).

Overall, the dominant decapod group was Caridea (shrimps; 43.5%), followed by Brachyura (true crabs; 28.9%) and Dendrobranchiata (prawns; 13.5%). Anomura (hermit and porcelain crabs), Axiidea (ghost shrimps) and Gebiidea (mud lobsters) were represented in smaller proportions (Table 5; Figure 8). Although a peak in abundance of decapod larvae was detected in November and February, most decapod infraorders fluctuated in abundance across surveys (Figure 8). The lowest abundances were recorded in May and July, with small numbers of Dendrobranchiata, Axiidea and Anomura recorded during these surveys. Gebiidea was not recorded morphologically in both May and July surveys, however, DNA-metabarcoding results detected the presence of this infraorder, suggesting that a few larvae could have been present in the samples.

Decapod larvae community analyses were undertaken at the infraorder level to minimise the influence of taxonomic uncertainty and the high proportion of rare taxa observed at the family/species level. This approach reduces zero-inflation in the data matrix and provides a more robust basis for detecting differences in assemblage structure using PERMANOVA. The NMDS ordination revealed variations in decapod larvae assemblage, with distinct clustering of samples according to survey month (Figure 9). Assemblages from May and July were well separated from those of November, and particularly February, indicating temporal shifts in community composition. This was supported by the PERMANOVA analysis, which detected significant differences among surveys (F = 71.82, p = 0.001), explaining 61% of the total variation (R^2 = 0.61). SIMPER analysis indicated that changes in abundance of Caridea and Brachyura were the major contributors to dissimilarities among surveys (Figure 10). Dendrobranchiata contributed to a lesser extent, and infraorders Axiidea, Anomura and Gebiidea had minor contributions across comparisons. Diurnal (F = 1.66; R^2 = 0.01; p = 0.14) or site (F = 1.9; R^2 = 0.01; p = 0.12) differences in decapod larvae community composition were not detected.

DNA-metabarcoding results indicated the presence of Western King Prawn (*Melicertus* sp., Penaeidae) and Blue Swimmer Crab (*Portunus* sp., Portunidae) within the study area (Appendix 3). Species-level counts could not be reliably determined using morphology examination; however, approximate abundances were inferred from family- and infraorder-level counts of DNA-matching samples corresponding to these taxa.

In November, larvae morphologically assigned to Penaeidae (79 larvae in *Melicertus* matching samples) accounted for less than 1.4% of the total decapod assemblage. In February, Penaeidae abundance increased to 2,171 larvae, representing 22% of the decapod assemblage. No *Melicertus* larvae were detected by DNA analysis in the May or July surveys. However, these values should be interpreted as indicative of species presence and relative abundance rather than exact counts, as three Penaeidae species were genetically detected within the same morphological group.

For Blue Swimmer Crab, 21 matching samples were detected in November. Assuming all morphologically unidentified Brachyura larvae from these samples belonged to *Portunus*, the maximum possible count was 483 larvae (7.8% of the decapod assemblage). In February, 16 *Portunus*-matching samples were detected, corresponding to an estimated 398 unidentified Brachyura larvae (4% of the decapod assemblage). Only a single sample from the May 2025 survey contained sequences matching *Portunus* (0.2% of the decapod assemblage), corresponding to four unidentified Brachyura larvae. These estimates likely encompass multiple taxa and should not be regarded as accurate quantitative measures of Blue Swimmer Crab larvae abundance within the study area.

Table 5. Contribution of individual infraorders to the decapod assemblage on November, February, May, and July 2024-2025 surveys at the proposed desalination (Desal) and reference sites (Ref) off Mullaquana Station, SA.

		Nov-24				Feb-25				May-25				Jul-25				Total	
		Desal	Ref	Total		Desal	Ref	Total		Desal	Ref	Total		Desal	Ref	Total			
Infraorder	**Name**	**n**	**n**	**n**	**%**	**n**	**n**	**n**	**%**	**n**	**n**	**n**	**%**	**n**	**n**	**n**	**%**	**n**	**%**
Anomura	Hermit crabs	248	101	349	5.7	340	239	579	5.9	123	71	194	8.1	4	6	10	0.8	1,132	5.8
Axiidea	Ghost shrimps	355	124	479	7.8	447	496	943	9.6	22	30	52	2.2	6	1	7	0.6	1,481	7.6
Brachyura	True crabs	1,662	676	2,338	38.0	876	1,263	2,139	21.8	240	158	398	16.6	439	345	784	64.7	5,659	28.9
Caridea	Shrimps	1,713	1,038	2,751	44.7	1,878	1,750	3,628	36.9	1,046	704	1,750	72.9	179	208	387	32.0	8,516	43.5
Dendrobranchiata	Prawns	73	95	168	2.7	1,137	1,306	2,443	24.9	1	5	6	0.3	10	13	23	1.9	2,640	13.5
Gebiidea	Mud lobsters	26	42	68	1.1	36	51	87	0.9									155	0.8
Total		4,077	2,076	6,153		4,714	5,105	9,819		1,432	968	2,400		638	573	1,211		19,583	

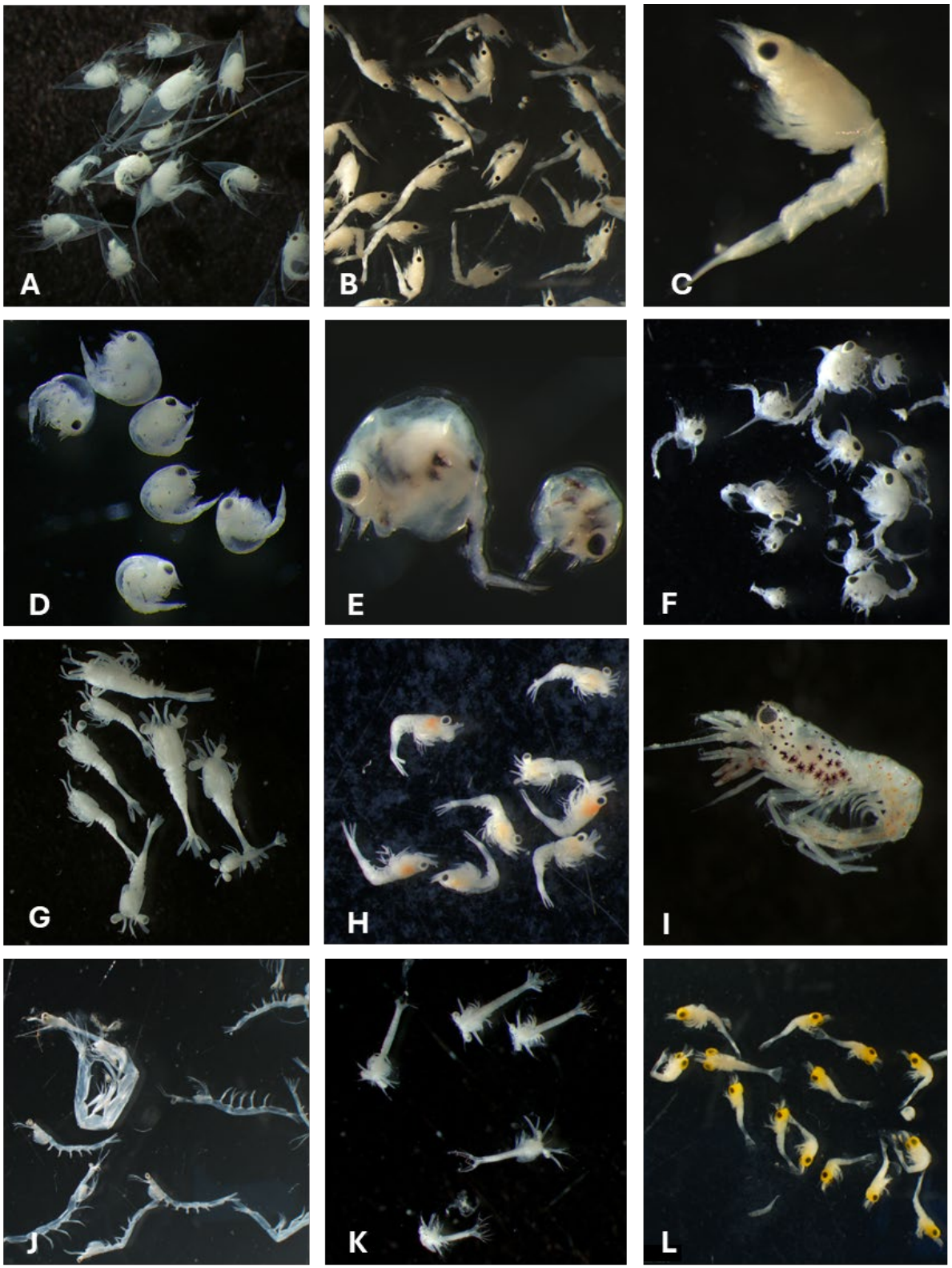


Figure 7. Examples of different decapod larvae encountered off Mullaquana Station during plankton surveys conducted between November 2024 and July 2025. A = Anomura (Hermit and Porcelain crabs); B-C = Axiidea (Ghost shrimps); D-E-F = Brachyura (True crabs); G-H-I = Caridea (Shrimps); J = Dendrobranchiata (Lucifer prawns); K = Dendrobranchiata (penaeid prawns); L = Gebiidea (Mud lobsters).

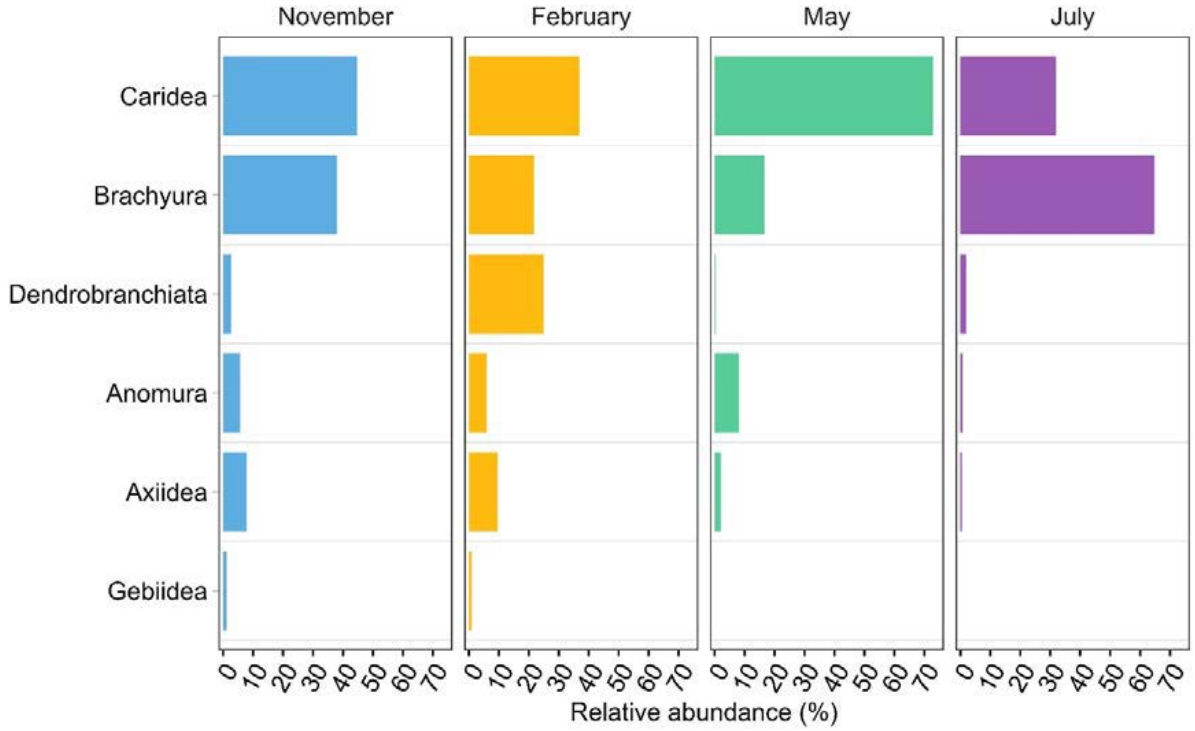


Figure 8. Relative abundance (%) of decapod larvae infraorders identified in surveys conducted between November 2024 and July 2025 off Mullaquana Station, SA.

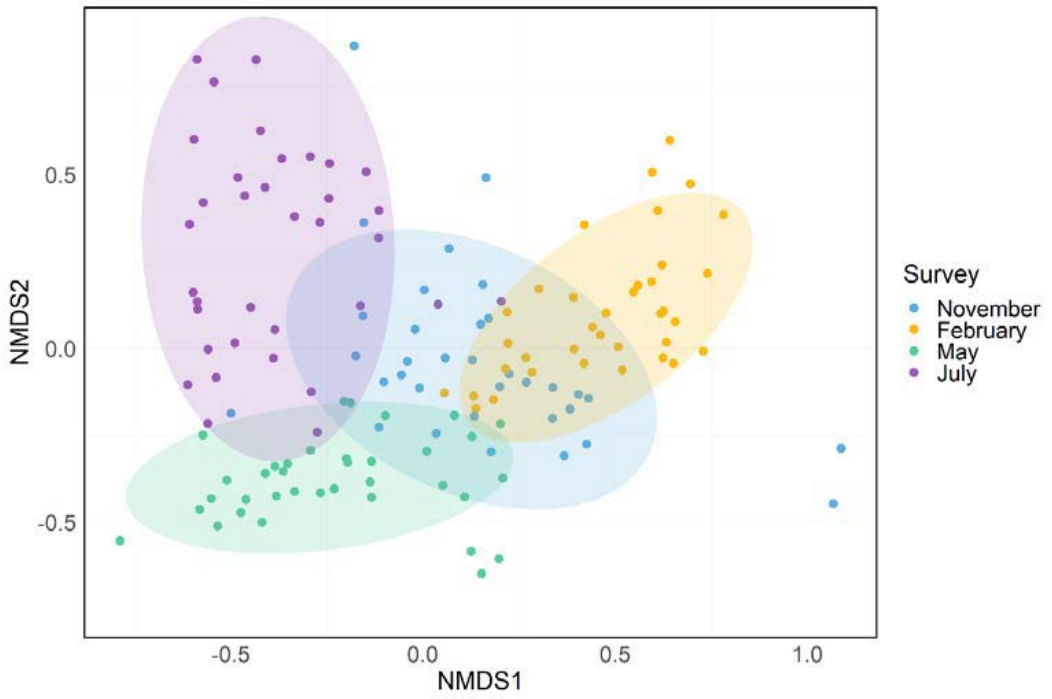


Figure 9. Non-metric multi-dimensional scaling (NMDS) plot of the decapod larvae community composition during 2024-2025 surveys off Mullaquana Station, SA.

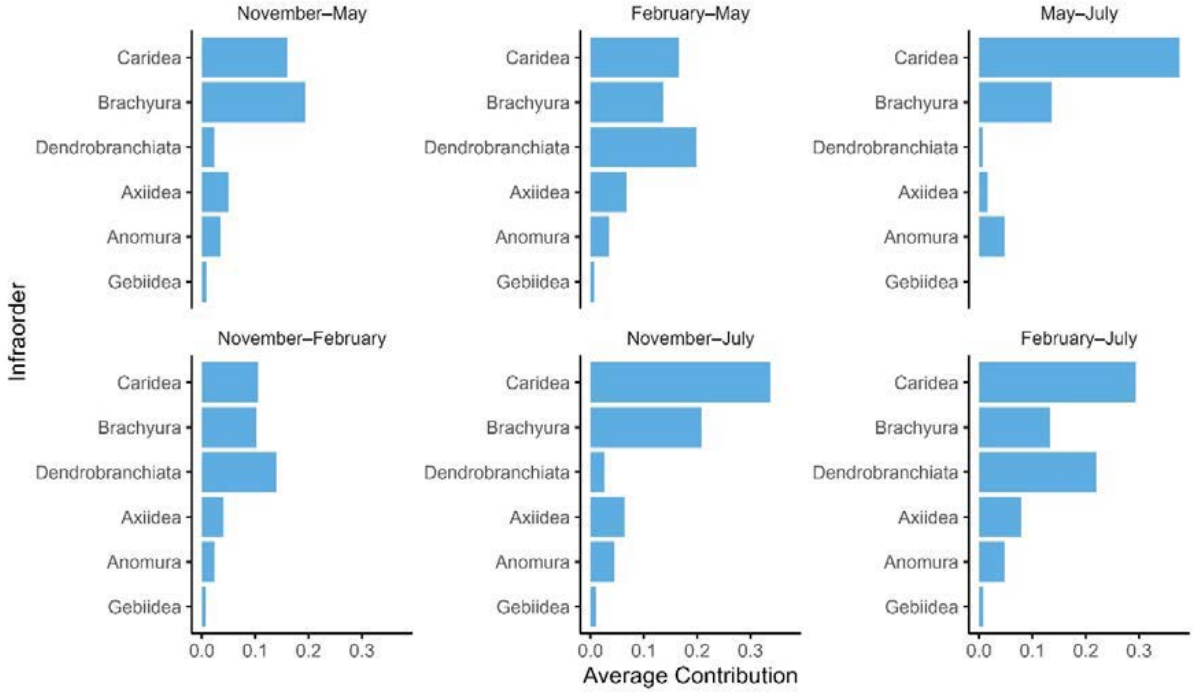


Figure 10. Average contribution of decapod infraorders to dissimilarities among surveys from SIMPER analysis. Bars represent the relative contribution of each infraorder to pairwise differences between surveys.

3.4.2. Fish Larvae Assemblage

Fish larvae from 32 species and 19 families were identified in the study area between November 2024 and July 2025 surveys (Figures 11 and 12; Table 6). DNA-metabarcoding results were used to corroborate and assist with morphological assignment of fish larvae to species level when possible, and to produce a species list per survey consisting of taxa identified genetically (Appendices 4 and 6).

Overall, the dominant fish families were Gobiidae (Gobies = 48%) and Engraulidae (Anchovies = 31%), followed by minor proportions of Tetrarogidae (Soldierfish = 6%), Pinguipedidae (Grubfish = 4%) and Terapontidae (Grunters = 4%). An additional 14 families were represented in small numbers (Figure 12; Table 6). In November, 21 species represented by 14 families were recorded, with Gobiidae (41%), Pinguipedidae (12%), and Callionymidae (10%) comprising the dominant groups. In February, larvae abundance increased markedly, with Gobiidae (52%) and Engraulidae (36%) dominating the assemblage; a further 13 species from 10 families were also present in smaller proportions. In May, the number of species declined, with 11 taxa from 9 families recorded, dominated by Gobiidae (44%) and Clinidae (24%). A species compositional change was evident in July, with 11 taxa from 9 families recorded; Tetrarogidae (85%) and Clinidae (5%) dominated, while the remaining 9 taxa contributed only marginally.

Fish larvae community analyses were undertaken at the family level to minimise the proportion of rare taxa observed at the species level (reduce zero-inflation of data matrix) and facilitate graphical representation of assemblage patterns, providing a more robust basis for detecting differences using PERMANOVA. The NMDS ordination showed temporal structuring of fish larvae assemblages, with February and July forming distinct clusters, whereas November and May showed substantial overlap (Figure 13). This pattern was supported by the PERMANOVA analysis, which detected a significant effect of survey month on assemblage composition (F = 34.85, p < 0.001), explaining 47.6% of the total variance (R^2 = 0.47). SIMPER analysis indicated that differences among surveys were primarily driven by variations in the abundance of Gobiidae and Engraulidae, with additional contributions from Tetrarogidae, Clinidae, and Monacanthidae (Figure 14). These results demonstrate temporal turnover in assemblage composition across survey months, largely driven by changes in dominant taxa. Diurnal (F = 0.69; R^2 = 0.01; p = 0.67) or site (F = 1.13; R^2 = 0.01; p = 0.3) differences in fish larvae community composition were not detected.

Larvae of commercial and recreational fishery species (Skipjack Trevally, Yellowfin Whiting, King George Whiting, Sand Flathead, and Bluespotted Flathead) were detected in low numbers (1% of the total fish larvae assemblage). Larvae of Snapper were not detected in these surveys. However, Anchovy larvae comprised a significant portion of the assemblage in February 2025 (36%, n = 698). Six individuals (0.3% of the total fish assemblage) of the protected family Syngnathidae (Seahorses and Pipefishes) were found.

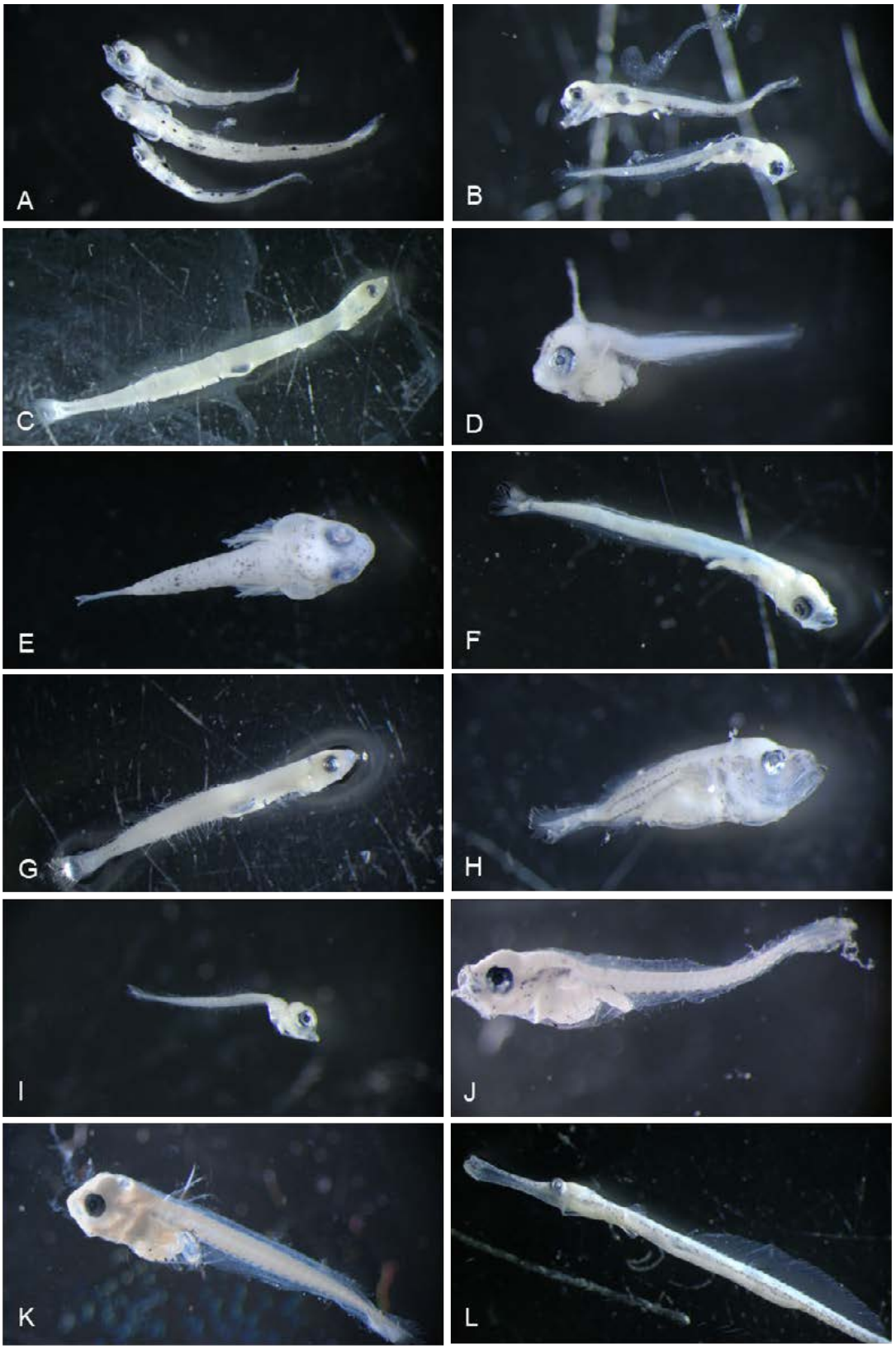


Figure 11. Examples of different fish larvae encountered off Mullaquana Station during plankton surveys conducted between November 2024 and July 2025. A-B = Gobiidae (Gobies); C = Engraulidae (Anchovy); D = Monocanthidae (Leatherjacket); E = Callionymidae (Stinkfish); F = Clinidae (Weedfish); G = Sillaginidae (Whiting); H = Neosebastidae (Little Gurnard); I = Pinguipedidae (Grubfish); J = Platycephalidae (Flathead); K = Tetrarogidae (Soldierfish); L = Syngnathidae (Pipefish).

Table 6. Contribution of individual taxa to the fish larvae assemblage at the proposed desalination (D) and reference sites (R) during November, February, May, and July 2024-2025 surveys off Mullaquana Station. (*) Indicates genus or species names that were resolved with DNA-metabarcoding. (**) Larvae initially identified to species by morphology and pigmentation and confirmed by barcoding.

			Nov-24				Feb-25				May-25				Jul-25				Overall	
			D	R	Total		D	R	Total		D	R	Total		D	R	Total			
Family	Common name	Taxa	n	n	n	%	n	n	n	%	n	n	n	%	n	n	n	%	n	%
Aploactinidae	Velvetfish	Aploactinid**						1	1	0.1									1	0.0
Blenniidae	Oyster blenny	*Omobranchus anolius***	1		1	0.8		2	2	0.1									3	0.1
Callionymidae	Painted Stinkfish	*Eocallionymus papilio**	8		8	6.5	1		1	0.1									9	0.4
	Spotted Dragonet	*Repomucenus calcaratus**	2	2	4	3.3	3	4	7	0.4		1	1	2.4					12	0.5
Carangidae	Skipjack Trevally	*Pseudocaranx wrighti***	7	2	9	7.3	3	4	7	0.4									16	0.7
Clinidae	Crested Weedfish	*Cristiceps australis**	1		1	0.8					6	4	10	24.4	7	1	8	5.2	19	0.8
Engraulidae	Anchovy	*Engraulis australis***	5	1	6	4.9	371	327	698	36.1	2		2	4.9					706	31.3
Gobiidae	Frillgoby	*Bathygobius kreftii**	3		3	2.4	26	21	47	2.4									50	2.2
	Longfin Goby	*Favonigobius lateralis**	32	10	42	34.1	12	57	69	3.6	7	11	18	43.9	2	2	4	2.6	133	5.9
	Flathead Goby	*Callogobius depressus**	2	3	5	4.1	610	284	894	46.2									899	39.9
Labridae	Little Weed Whiting	*Neoodax balteatus**	4	1	5	4.1													5	0.2
Monacanthidae	Rough Leatherjacket	*Scobinichthys granulatus**	1	1	2	1.6	2	3	5	0.3									7	0.3
	Pygmy Leatherjacket	*Brachaluteres jacksonianus**	1	3	4	3.3													4	0.2
	Bridled Leatherjacket	*Acanthaluteres spilomelanurus**	2		2	1.6										2	2	1.3	4	0.2
	Bluefin Leatherjacket	*Thamnaconus degeni**		1	1	0.8					1		1	2.4	3	1	4	2.6	6	0.3
	Sixspine Leatherjacket	*Meuschenia freycineti**									2		2	4.9					2	0.1
	Toothbrush Leatherjacket	*Acanthaluteres vittiger**	1		1	0.8						1	1	2.4	1		1	0.6	3	0.1

Table 6 (continued). Contribution of individual taxa to the fish larvae assemblage at the proposed desalination (D) and reference sites (R) during November, February, May, and July 2024-2025 surveys off Mullaquana Station. (*) Indicates genus or species names that were resolved with DNA-metabarcoding. (**) Larvae initially identified to species by morphology and pigmentation and confirmed by barcoding.

			Nov-24				Feb-25				May-25				Jul-25				Overall	
			D	R	Total		D	R	Total		D	R	Total		D	R	Total			
Family	Common name	Taxa	n	n	n	%	n	n	n	%	n	n	n	%	n	n	n	%	n	%
Neosebastidae	Little gurnard	*Maxillicosta scabriceps***									1		1	2.4	1		1	0.6	2	0.1
Paralichthyidae	Flounder	*Pseudorhombus arsius**						1	1	0.1									1	0.0
	Smalltooth Flounder	*Pseudorhombus jenynsii**	2		2	1.6													2	0.1
Pinguipedidae	Grub fish	*Parapercis haackei***	10	5	15	12.2	46	27	73	3.8	1		1	2.4					89	3.9
Platycephalidae	Sand Flathead	*Platycephalus bassensis**														1	1	0.6	1	0.0
	Bluespotted Flathead	*Platycephalus speculator**		1	1	0.8													1	0.0
Scorpaenidae	Scorpion Fish	*Scorpaenidae sp.**	1		1	0.8	21	25	46	2.4									47	2.1
Sillaginidae	Yellowfin Whiting	*Sillago schomburgkii**					1	2	3	0.2									3	0.1
	King George Whiting	*Sillaginodes punctatus**										1	1	2.4					1	0.0
	Whiting	*Sillago sp.*														1	1	0.6	1	0.0
Syngnathidae	Pipefish	*Stigmatophora argus**	2		2	1.6													2	0.1
	Pipefish	*Stigmatophora sp***									3		3	7.3		1	1	0.6	4	0.2
Terapontidae	Striped Grunter	*Pelates octolineatus**					39	43	82	4.2									82	3.6
Tetrarogidae	Soldierfish	*Gymnapistes marmoratus***	4	4	8	6.5									77	54	131	84.5	139	6.2
Triglidae	Spiny Gurnard	*Lepidotrigla papilio**													1		1	0.6	1	0.0
Total			89	34	123		1,135	801	1,936		23	18	41		92	63	155		2,255	

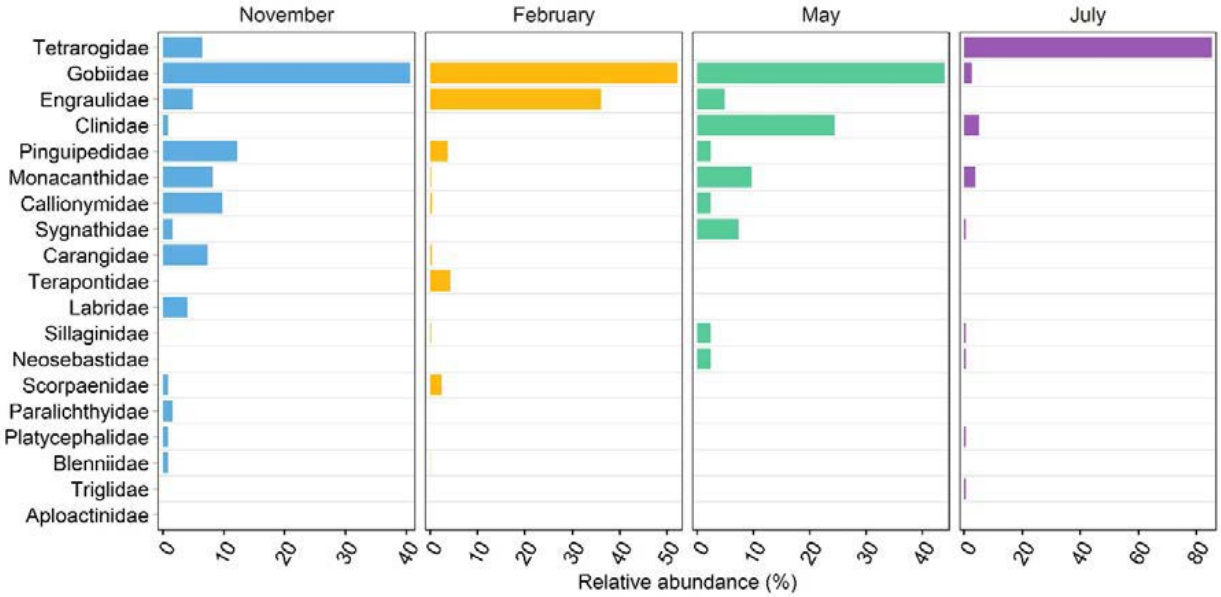


Figure 12. Relative abundance (%) of fish families encountered during surveys conducted in November, February, May, and July 2024–2025 off Mullaquana Station, SA. Note that % scales differ among surveys.

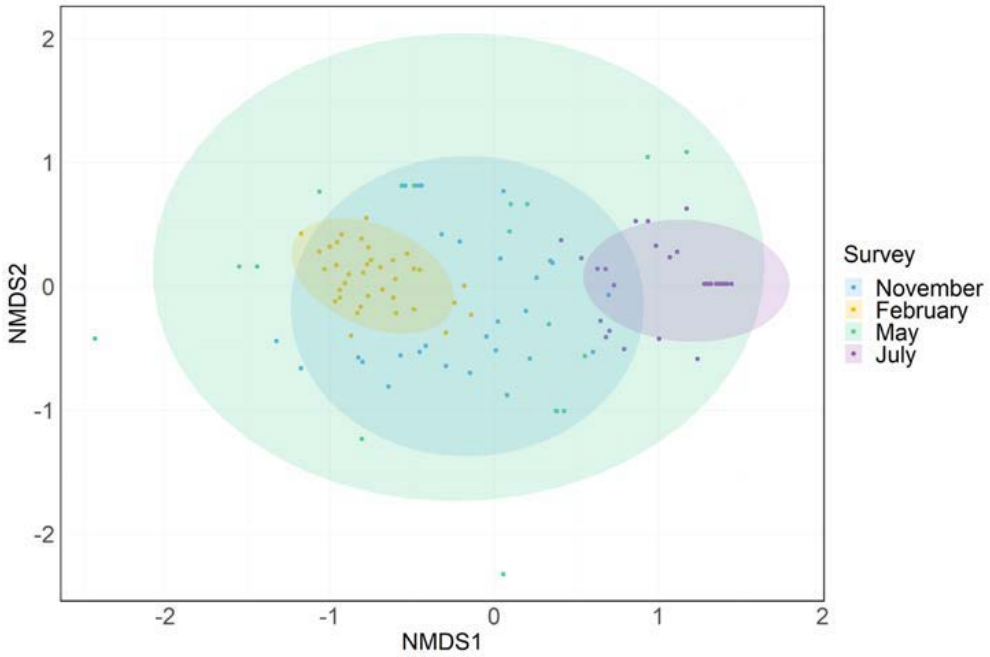


Figure 13. Non-metric multi-dimensional scaling (NMDS) plot of the fish larvae community composition during 2024-2025 surveys off Mullaquana Station, SA.

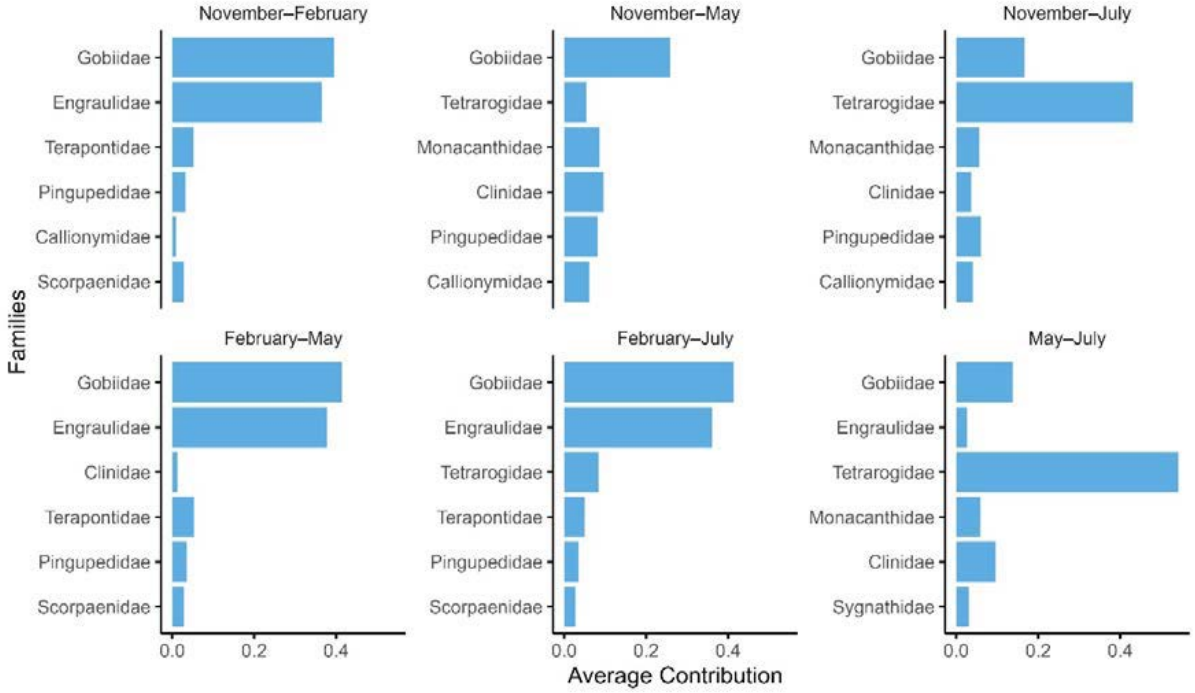


Figure 14. Average contribution of fish families to dissimilarities among surveys from SIMPER analysis (Only top six contributors are displayed). Bars represent the relative contribution of each family to pairwise differences between surveys.

3.4.3. Fish Egg Assemblage

During the surveys conducted between November 2024 and July 2025, a total of 8,642 fish eggs were collected (Table 2; Figures 4 and 5). Most eggs were collected in November (n = 5,066) and February (n = 3,519), while only small numbers were recorded in May (n = 4) and July (n = 53). Morphological identification of eggs was difficult due to the limited literature available for classifying most species present in the area. Anchovy and Sardine eggs were the only groups that could be reliably identified based on morphology (Figure 15). Additionally, Snapper eggs were specifically targeted during the November 2024 and February 2025 surveys.

Anchovy eggs comprised a major component of the assemblage in February (59.9%; n = 2,109) and occurred in much lower numbers in November (1.1%; n = 58). Only a single Sardine egg was detected in the July survey. All eggs morphologically classified as potential Snapper during the November 2024 survey were subsequently examined using ISH and DNA sequencing for species confirmation. The combined ISH and sequencing results demonstrated that none of these eggs (n = 35) were Snapper. A list of species corresponding to these eggs is provided in Table 7. No potential Snapper eggs were detected during the February, May, or July 2025 surveys. The remaining eggs could not be confidently identified

morphologically; however, a species list was generated for each survey and sampling site based on DNA-metabarcoding results (Table 8). Across the November, February, May and July 2024–2025 surveys, DNA-metabarcoding analysis detected 18 species belonging to 15 families. The highest number of species occurred in November (14 species), decreasing to 10 species in February and a single species in May. In July, six species were recorded. Anchovy, Sardine, Skipjack Trevally, Bluespotted Flathead and Yellowfin Whiting were the commercial and recreational fishery species identified in the fish egg assemblage.

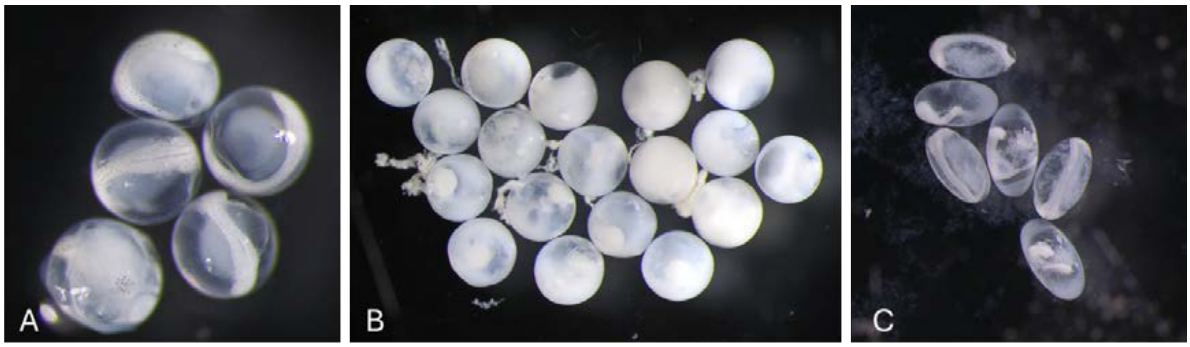


Figure 15. Example of fish eggs collected during November, February, May, and July 2024-2025 surveys off Mullaquana Station, SA. A = eggs that were identified as potential Snapper and underwent confirmation by ISH and DNA sequencing, B = mixed eggs of various unknown species awaiting species identification by DNA-metabarcoding. C = Anchovy eggs.

Table 7. Results of individually sequenced eggs initially suspected to be Snapper from the November 2024 survey.

Family	Species	Common name	Number of eggs
Chaetodontidae	*Chelmonops curiosus*	Western Talma	1
Paralichthyidae	*Pseudorhombus jenynsii*	Smalltooth Flounder	13
Pinguipedidae	*Parapercis haackei*	Wavy Grubfish	1
Platycephalidae	*Platycephalus speculator*	Bluespotted Flathead	17
Sillaginidae	*Sillago schomburgkii*	Yellowfin Whiting	1
Terapontidae	*Pelates octolineatus*	Striped Grunter	1
Triglidae	*Lepidotrigla papilio*	Spiny Gurnard	1
Total			35

Table 8. Summary of fish egg species detected by DNA-metabarcoding off Mullaquana Station during surveys conducted in November, February, May, and July 2024-2025. Grey shading indicates presence; white indicates absence. D = Proposed desalination site; R = Reference site.

Fish eggs DNA-metabarcoding species list			Survey							
			Nov		Feb		May		July	
Family	Taxa	Common name	D	R	D	R	D	R	D	R
Callionymidae	*Eocallionymus papilio*	Painted Stinkfish	■	■		■				
	Repomucenus calcaratus	Spotted Dragonet	■	■	■	■				
Carangidae	*Pseudocaranx wrighti*	Skipjack Trevally	■	■	■	■				
Clupeidae	*Sardinops sagax*	Australian Sardine								■
Congridae	*Conger cf. verreauxi*	Southern Conger		■						
Engraulidae	*Engraulis australis*	Australian Anchovy	■	■	■	■				
Gerreidae	*Parequula melbournensis*	Silverbelly	■	■					■	
Gobiidae	*Favonigobius lateralis*	Longfin Goby		■						
Labridae	*Neoodax balteatus*	Little Weed Whiting	■	■	■	■			■	■
	Siphonognathus attenuatus	Slender Whiting	■	■					■	■
Paralichthyidae	*Pseudorhombus jenynsii*	Smalltooth Flounder	■	■	■	■				
	Pseudorhombus arsius	Largetooth Flounder			■					
Pinguipedidae	*Parapercis haackei*	Wavy Grubfish	■	■	■	■				
Platycephalidae	*Platycephalus speculator*	Bluespotted Flathead	■	■	■	■				
Sillaginidae	*Sillago schomburgkii*	Yellowfin Whiting	■							
Terapontidae	*Pelates octolineatus*	Striped Grunter	■	■	■	■				
Tetrarogidae	*Gymnapistes marmoratus*	Soldierfish					■	■	■	■
Triglidae	*Lepidotrigla papilio*	Spiny Gurnard							■	

3.5. IMS Testing by qPCR

A single detection of *Sabella spallanzanii* (European Fan Worm) was recorded in the February survey, in a night sample from station A3 (proposed desalination plant site). This detection had a relatively high cycle threshold (C_T) value (34.8), indicative of low target DNA yield. There were no other detections of the tested IMS by the 20 qPCR assays applied in the 60 tested plankton or 12 processing blank samples. Q-control results for relevant assays showed no positive control contamination.

The scale factor was 1 for most samples, indicating no PCR inhibition. Five samples from the February survey (three from the proposed desalination site, and two from the reference site) showed negligible inhibition (scale factor < 1.5). One sample from February at the proposed desalination site had minor inhibition (scale factor between 1.5 and 2) and one moderate inhibition (scale factor = 2.7). Previous assessment of the applied assays has shown that minor to moderate inhibition (scale factor up to 10) rarely impairs detection (Wiltshire et al*.,* 2023). The occupancy-abundance model provided a median estimated planktonic concentration of < 0.005 planktonic targets m^{-3} for each site and survey (Figure 16). Given the

lack of qPCR detections, estimates were not made separately for day and night within each site and survey. The maximum plausible concentration, taken as the upper limit of the 95% high density interval (HDI) of each estimate, was below the threshold for a species to be considered present, which is ~ 0.0075 planktonic targets m^{-3}, or the lowest concentration typical for established IMS of ~ 0.015 planktonic targets m^{-3} (Wiltshire, 2023; 2021), for all species. For the species without detection, this indicates the maximum plausible concentration that could be present without having been detected. For *Sabella spallanzanii*, for which there was one detection, this estimate indicates a likely transient DNA source rather than species presence in the area. The model estimates were lower for the proposed desalination plant site (aside from for *Sabella spallanzanii*) than for the reference site due to the larger number of samples tested (36 *c.f.* 24), which provided greater confidence in absence. Differences between surveys were driven by slight variation in sample volume and the minor PCR inhibition in some samples, while differences in estimates between tested species reflect differences in assay performance.

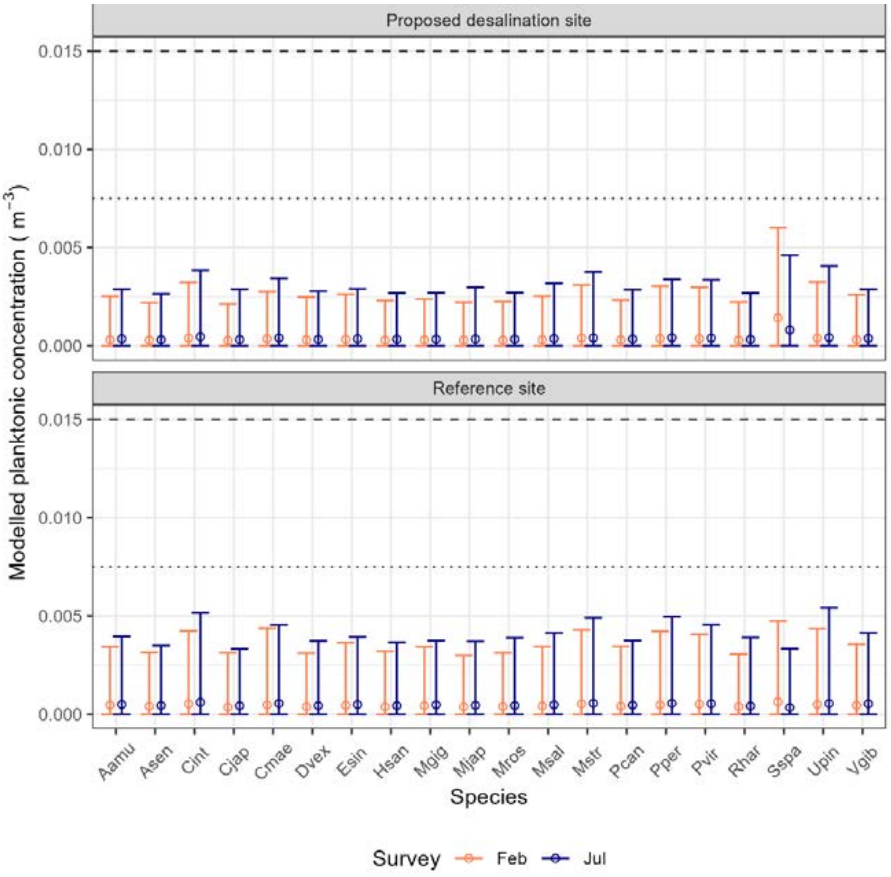


Figure 16. Model estimates (mean and 95% HDI) showing the plausible planktonic concentration of each tested species within each site and sample period. Refer to Table 1 for tested species and assay name abbreviations. Dotted line shows a concentration of 0.0075 planktonic targets m^{-3}, regarded as the minimum for a species to be considered present, and the dashed line shows a concentration of 0.015 planktonic targets m^{-3}, the lowest typical for an established IMS, based on Wiltshire (2023; 2021).

4. DISCUSSION

A desalination plant has been proposed at Mullaquana Station in Upper Spencer Gulf to supply freshwater for industrial use. As part of the environmental impact assessment process, assessments are required to evaluate potential impacts associated with the construction and operation of the desalination plant. Of relevance are potential effects on plankton communities arising from seawater intake processes and the discharge of desalination plant return water (e.g., Gomes et al., 2023; Panagopoulos and Haralambous, 2020), noting that the environmental impact statement for the Project will assess potential impacts on the local marine ecosystems, including commercially important and protected species. This report provides results of plankton sampling undertaken in November 2024 and February, May and July 2025 to determine assemblages of decapod larvae, fish larvae, and fish eggs at the location of the proposed intake and outfall structures for the Project, and a nearby reference site, with an emphasis on commercially important and protected species and IMS.

During this study, a significant harmful algal bloom of *Karenia* spp. identified in the coastal waters around the Fleurieu Peninsula in March 2025, expanded into Investigator Strait, Gulf St Vincent, and southern Spencer Gulf. Water sampling indicated that the algal bloom was not present near Mullaquana Station during this study (SARDI, Unpublished data). However, widespread mortalities of finfish, elasmobranchs, cephalopods, and crustaceans were recorded elsewhere in Spencer Gulf from March to August 2025 (iNaturalist, 2025), and are indicative of potential regional ecological effects that may have also affected plankton communities in the study area and should be considered when interpreting the results of this study.

4.1. Zooplankton Assemblage Patterns

Overall, the plankton community was consistently dominated by decapod larvae, with fish larvae and fish eggs contributing much smaller proportions of the plankton assemblage across all samples. Temporal differences in decapod larvae, fish larvae, and fish egg concentrations and assemblage compositions occurred across surveys. Decapod larvae and fish egg concentrations peaked during the November and February surveys, while fish larvae were most abundant in February. A higher number of taxa were also recorded for all three groups during these months, coinciding with the spawning period of several decapod and fish species in Spencer Gulf (e.g., Western King Prawn from October to January, Heldt and Hooper, 2023; several Marine Scalefish Fishery species from September to March, Steer et al., 2020; Anchovy from November to March, Dimmlich et al., 2004; Blue Swimmer Crab from November to February, Kumar et al., 2003; Australian Sardine from January to April, Ward and Staunton-Smith, 2002).

Although diurnal variations in decapod larvae, fish larvae, and fish egg concentrations and compositions were not statistically significant, higher concentrations, particularly for fish larvae and eggs, were observed at night. Such nocturnal activity has been reported for numerous fish species and is typically associated with opportunistic feeding strategies that exploit reduced predation pressure and competition at night (Daniels, 1987; Kavaliers and Colgan, 1985). Diel movement patterns are also common among many decapod species, with spawning and feeding frequently occurring at night (Heldt and Hooper, 2023; Hays, 2003; Kumar et al., 2003; Ward and Staunton-Smith, 2002).

No significant differences in decapod larvae, fish larvae, and fish egg concentrations or assemblage compositions were detected between the proposed desalination plant site and the nearby reference site. Coastal circulation in Spencer Gulf is characterised by moderate northward flows of approximately 3 cm s^{-1} (Middleton et al., 2013), which likely facilitate water column mixing and reduce spatial heterogeneity in plankton distributions. Furthermore, benthic habitat characteristics at both sites are similar, with shallow areas dominated by seagrass beds of *Posidonia* and *Amphibolis*, and sand and small algal cover extending further offshore (Noble et al., 2018).

4.1.1. Decapod Larvae

Decapod larvae in the study area were primarily represented by two major groups: Caridea (Shrimps) and Brachyura (True crabs). Larvae from infraorders Dendrobranchiata (Prawns and Lucifers), Axiidea (Ghost shrimps), Anomura (Hermit and porcelain crabs), and Gebiidea (Mud lobsters) were also detected in smaller proportions. Most decapod crustaceans were difficult to identify morphologically beyond infraorder level. However, by matching higher level morphological identifications with DNA-metabarcoding results, a species list was constructed to infer potential species or families of interest for this project.

At infraorder level, morphology and DNA-metabarcoding results corresponded in most instances (i.e., each infraorder recorded morphologically was also detected genetically). Gebiidea was the only exception in the May and July surveys, being detected by DNA-metabarcoding but not morphologically, indicating that only a few larvae may have been present. At family level, genetics provided higher taxonomic resolution, although direct matching between morphological counts and genetic detections was often difficult. Additionally, in some cases, the percentage of sequence identity was low (<90%), preventing confident species-level identifications. Nevertheless, the combined application of morphological identification and DNA metabarcoding proved effective in refining taxonomic resolution and narrowing species or families of interest.

Within Spencer Gulf, commercially important taxa within the Brachyura and Dendrobranchiata included the Blue Swimmer Crab, Sand Crab, and Western King Prawn. Genetically identified OTUs matching Western King Prawn and Blue Swimmer Crab were detected in samples collected in November 2024, and February and May 2025.

Although species-level identification was not possible based solely on morphology, penaeid larvae comprised less than 1.4% (79 larvae) of the total decapod assemblage in November 2024. Abundance increased to 22% of the assemblage (2,171 larvae) in February 2025. These results indicate the presence of Western King Prawn larvae in the study area, particularly during February, consistent with known seasonal spawning patterns for the species (Heldt and Hooper, 2023). However, as genetic analyses detected three penaeid species within the samples, these counts reflect total abundance of penaeids and cannot be confidently attributed to Western King Prawn alone. Therefore, the reported values should be considered indicative rather than quantitative estimates of Western King Prawn larval abundance.

Previous plankton surveys in Upper Spencer Gulf also recorded Dendrobranchiata larvae attributable to Penaeidae, predominantly during the summer months (COOE, 2010). The detection of *Melicertus* DNA and marked increase in Penaeidae larval abundance in February 2025 are consistent with these earlier observations and align with the documented spawning period of Western King Prawn in southern Australia (late spring–autumn; Heldt and Hooper, 2023). Collectively, these findings indicate that the study area functions as a seasonal habitat for Western King Prawn larvae during the spring–summer period.

Estimating the abundance of Blue Swimmer Crab (*Portunus armatus*) larvae was challenging due to the limited taxonomic resolution achievable from morphological identification of Portunid larvae. Nonetheless, DNA-metabarcoding confirmed the presence of *P. armatus* in samples collected in November 2024 and February and May 2025. Only a single sample from the May 2025 survey yielded sequences attributable to *Portunus*. By aligning detections of *Portunus* DNA with counts of morphologically unidentified brachyuran larvae, indicative abundance estimates suggest that *P. armatus* may have comprised up to 7.8%, 4.0% and 0.2% of the total decapod assemblage in November, February and May, respectively. These values should be interpreted cautiously, as the morphological counts likely include larvae from multiple brachyuran taxa and cannot be attributed exclusively to *P. armatus*.

The detection of *P. armatus* larvae in November and February aligns with previous studies of the species' reproductive and larval dynamics in the South Australian gulfs. Bryars and Havenhand (2004) reported that *P. armatus* larvae are typically present in plankton assemblages of Gulf St Vincent from late spring through to early autumn, with peak abundances occurring between December and February. This period coincides with the main

spawning season for the species in southern Australia, which generally extends over the summer-autumn months (Kumar et al., 2003). The timing of larval detections in this study, spanning late spring (November) and mid-summer (February), therefore corresponds closely with the expected reproductive window for *P. armatus* in the region. These findings indicate that early developmental stages occur within Upper Spencer Gulf during the warmer months, consistent with patterns observed elsewhere in southern Australia. No larvae of other commercially important decapod species were detected in the study area.

4.1.2. Fish Larvae and Eggs

The assemblage of fish larvae off Mullaquana Station was dominated by Gobiidae (Gobies) and Engraulidae (Anchovies), which together accounted for 80% of all fish larvae collected across the four surveys. Secondary contributions were made by members of the families Tetrarogidae (Soldierfish), Pinguipedidae (Grubfish), and Terapontidae (Grunters), with 14 additional families represented in low proportions. The number of families and their seasonal occurrences were broadly consistent with patterns reported previously in Spencer Gulf (COOE, 2010; Bruce and Short, 1992).

Morphological and DNA-metabarcoding identifications generally corresponded well at the family level, while genetic analyses provided greater resolution and was used to assign species when possible. Some families identified morphologically (e.g., Scorpaenidae, Tetrarogidae, Pinguipedidae, Sillaginidae) were not detected genetically in some samples, potentially due to low DNA concentrations, degradation, primer bias, or incomplete reference databases (Elbrecht and Leese, 2015; Shokralla et al., 2015). Despite these limitations, the combined morphological-genetic approach enabled most larvae collected in this project to be identified to species level.

A clear temporal shift in fish larvae composition was observed across surveys. Assemblages were dominated by Gobiidae (Gobies) in November and May, with February showing a mixture of Gobiidae and Engraulidae (Anchovy) larvae, and July characterised by a predominance of Tetrarogidae (Soldierfish). Gobies are small benthic species that reproduce year-round or over extended periods in southern Australia, and their dominance likely reflects their abundance in shallow nearshore habitats (Neira and Sporcic, 2002; Neira et al., 1992). In contrast, the increase in Anchovy larvae and eggs in February indicates a summer spawning peak, consistent with previous observations of Anchovy recruitment pulses in Spencer Gulf and other temperate systems (COOE, 2010; Neira and Sporcic, 2002). The July survey revealed a peak in tetrarogid larvae, matching observations from southwestern Australia where *Gymnapistes* larvae primarily occur in winter (Neira et al., 1992). These fluctuations likely reflect differences in species-specific spawning periods, water temperature, productivity, and

local oceanographic conditions that influence the transport and retention of larvae (Bruce and Short, 1992; Jenkins, 1986; Neira et al., 1992; Neira and Sporcic, 2002).

Patterns of fish egg assemblages closely reflected those observed in the fish larval assemblage, with most egg taxa also represented among the larvae. Exceptions included Western Talma (*Chelmonops curiosus*), Silverbelly (*Parequula melbournensis*), Slender Whiting (*Siphonognathus attenuates*), Australian Sardine (*Sardinops sagax*), and Southern Conger (*Conger* cf. *verreauxi*), which were detected only as eggs. The February peak in Anchovy eggs coincided with a corresponding peak in Anchovy larvae, while *Gymnapistes* eggs detected in May and July corresponded with a peak in larvae abundance in July. These sequential patterns indicate local spawning events followed by larval development within the study area, occurring during late summer and early winter.

Many commercial, recreational and protected fish species occur in Spencer Gulf. However, they were rarely detected in the larval assemblage off Mullaquana Station during this study. Larvae of Skipjack Trevally, Bluespotted Flathead, Sand Flathead, King George Whiting and Yellowfin Whiting, collectively comprised 1% of the total assemblage, and just six individuals from the protected family Syngnathidae were recorded. In contrast, Anchovy larvae were particularly abundant in February 2025, accounting for 36% of all fish larvae. Snapper larvae or eggs were not detected, suggesting that any spawning activity or early life development for this species occurs elsewhere in Spencer Gulf or under environmental conditions not present at the study sites during this study.

Fish larvae concentrations recorded in this study were comparable to those reported off Point Lowly (COOE, 2010) and fell within the range documented for Port Phillip Bay, Victoria (Neira and Sporcic, 2002), and off Port Stanvac, Gulf St Vincent (van Ruth, 2012; 2010). Similarly, fish egg concentrations were consistent with previous observations from Port Phillip Bay and the waters off Adelaide (Neira and Sporcic, 2002; van Ruth, 2012; 2010). These similarities likely reflect comparable habitat conditions across these regions, where seagrass meadows, rocky reefs, and other benthic habitats, such as bryozoan assemblages and oyster beds, provide essential habitat for early stages of fish and serve as spawning grounds for nearshore fish species (e.g., Baker, 2015; Ribeiro et al., 2006).

Overall, the composition and seasonal dynamics of fish egg and larval assemblages at Mullaquana Station are consistent with the area functioning as an important coastal habitat for early life stages of a diverse fish assemblage. Despite this diversity, assemblage structure was dominated by a small number of taxa, and seasonal variability in larval abundance was primarily driven by fluctuations in anchovies, gobies and soldierfish. These patterns are consistent with those described for other temperate nearshore assemblages in southern

Australia and likely reflect interactions among spawning phenology, local oceanographic processes, and habitat availability (Bruce and Short, 1992; COOE, 2010; Neira and Sporcic, 2002).

4.2. Invasive Marine species

Testing for IMS was conducted on 60 samples from the February and July surveys using qPCR assays targeting 20 priority species. A single detection of the European Fan Worm, *Sabella spallanzanii* was recorded in a February night sample from the proposed desalination site, with no other IMS detected. Sample volume, assay performance or PCR inhibition did not impair detection, and the maximum plausible planktonic concentration of each IMS that could be present despite non-detection was below the threshold for a species to be considered present. The estimated concentration for *S. spallanzanii* was also below this threshold, suggesting that the detection of this species was likely due to a transient DNA source rather than species presence at the sampling station. *S. spallanzanii* is known to occur in the Whyalla region (Dittmann et al., 2010; Wiltshire et al., 2017; 2010), hence DNA of this species may have been present in the tested sample due to advection from a population in the broader area around Mullaquana Station. Because decapod larvae were removed from the samples prior to IMS testing, qPCR results alone for the five crab species tested do not exclude the potential occurrence of invasive crab larvae, although the lack of detection indicates that other potential sources of planktonic DNA from these species (gametes, zygotes, shed adult cells) were unlikely to be present. DNA-metabarcoding of samples from the four surveys did not detect any invasive crabs, supporting absence of these species.

The IMS considered absent from Mullaquana Station include four species known from SA: the Vase Tunicate (*Ciona intestinalis*) and the European Fan Worm (*S. spallanzanii*), both established in Whyalla); the Pacific Oyster (*Magallana gigas*), which has a large feral population in Port Adelaide; and the Japanese Kelp (*Undaria pinnatifida*), known from south-eastern SA. However, the detection of *S. spallanzanii* DNA suggests that genetic material, and potentially larvae, of this species may be advected into the area. The European Shore Crab, (*Carcinus maenas*), established in the Adelaide region, and the Asian Shore Crab (*Hemigrapsus sanguineus*), known from Victoria and considered a high-risk IMS for Spencer Gulf, were not detected by either qPCR or DNA-metabarcoding.

4.3. Conclusions

This report provides baseline information on the assemblages of decapod and fish larvae, fish eggs, and the occurrence of key IMS within the proposed desalination plant development area off Mullaquana Station. Overall, larvae of commercially important and protected species comprised a minor component of the assemblage at the surveyed sites. However, the

February 2025 survey recorded high abundances of anchovy and penaeid larvae (e.g., prawn species), indicating that some species of interest may be more abundant during the summer months. Understanding temporal variability in the abundance of these taxa is important for interpreting larval assemblage patterns and assessing potential ecological sensitivities in the region.

All IMS targeted in this study were determined to be absent from the survey sites. DNA metabarcoding of samples collected across the four surveys did not detect any invasive crab species, supporting this conclusion. However, transient DNA from *S. spallanzanii* was detected and is known to occur in the broader area. The data from these surveys represent a one-year snapshot of plankton species composition and abundance in the Mullaquana Station area and should therefore be interpreted with caution. Continued monitoring will be essential to capture natural variability, better understand harmful algal bloom dynamics, strengthen temporal coverage, and detect any future anthropogenic influences associated with coastal development over time.

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6. APPENDICES

6.1. Appendix 1: GPS coordinates for sampling locations

The below table provides the GPS coordinates of plankton sampling stations at the proposed Northern Water desalination site (desal) and at a reference site off Mullaquana station, SA.

Site	Site type	Latitude	Longitude
A1	desal	-33.2445	137.4643
A2	desal	-33.2487	137.4629
A3	desal	-33.2537	137.4614
B1	desal	-33.2457	137.4695
B2	desal	-33.2501	137.468
B3	desal	-33.255	137.4664
C1	desal	-33.2467	137.4747
C2	desal	-33.251	137.4733
C3	desal	-33.2562	137.4715
D1	reference	-33.2775	137.4533
D2	reference	-33.2818	137.4519
D3	reference	-33.286	137.4505
E1	reference	-33.2788	137.4585
E2	reference	-33.2829	137.4572
E3	reference	-33.2873	137.4559
F1	reference	-33.28	137.4639
F2	reference	-33.2844	137.4625
F3	reference	-33.2885	137.4612

6.2. Appendix 2: DNA-metabarcoding techniques

DNA extraction

Fish larvae, fish eggs, decapod larvae

Ethanol was removed from the bulked fish larvae, fish eggs and decapod larvae samples, which were then air dried in a PCR cabinet for 5-10 mins, before 200-700 µl of LGC lysis buffer PVP (sbeadex™ livestock kit) was added. The amount of lysis buffer added was dependant on the volume of each sample, ensuring that the sample (fish larvae/fish eggs/decapod larvae) was completely submerged. Samples were then disrupted using either a TissueRuptor II with Disposable Probes (Qiagen) for typically larger samples, or Bel-Art® Disposable Pestle (Sigma-Aldrich), that was sterilised with LookOut® DNA Erase (Sigma-Aldrich), two water rinses and 70% ethanol, for typically smaller samples. Between 10-20 µl of Invitrogen™ proteinase K solution (20 mg/mL), RNA grade (ThermoFisher Scientific) was added and samples were incubated at 55 °C overnight. Samples were vortexed occasionally during incubation. If samples were not completely lysed by the next morning, an additional 10 µl of proteinase K solution was added and samples were returned to 55 °C until they were entirely digested. Samples were then centrifuged at full speed for 10 mins, with 100 µl of clear lysate transferred to a 96-well plate and sent to Intertek Adelaide Parkside (SA 5063; https://www.intertek.com) to complete the extraction. Any remaining lysate from the overnight digestion was transferred to a second 96-well plate and stored at -20 °C in the SARDI Molecular Sciences Laboratory. DNA extracts of the bulked samples were eluted in a total volume of 100 µl of elution buffer AMP.

Water samples

As a value-add opportunity, environmental DNA (eDNA) metabarcoding was trialled on water samples to assess its comparability with conventional DNA-metabarcoding performed on zooplankton samples containing larval specimens. Thirty-six water samples (1L volume) were collected from each of the July 2025 sampling sites via a Niskin sampler deployed at mid-depth and kept cold on board. Samples were filtered within 48 hr of collection in the SARDI Molecular Sciences Laboratory using a pump with PES sterile 0.22µm bottle top filters (WestLab). Each whole filter paper sample was subsampled twice, with one sample extracted using the FastDNA™ Spin Kit for Soil (MP Biomedicals) and the other sample extracted using the DNeasy® Blood and Tissue kit (Qiagen), following the manufacturer's instructions and protocol as described in Stat et al., (2019). DNA were eluted in 100 µl of each kits elution buffer. All samples were concentrated by ethanol precipitation using standard procedures and stored at -20 °C prior to downstream library preparation. The eDNA results will be presented

in a future extension report, which will also include analyses of the filtered water samples amplified with the three algal markers (18S V4, 18S V8–V9, 28S), in addition to the COI data generated in this study.

PCR amplification

Prior to PCR amplification, all DNA extracts were assessed for yield and purity using the NanoDrop™ One Microvolume UV-Vis spectrophotometer (ThermoFisher Scientific, USA). Three rounds of PCR were then performed using the approach described by Chaves-Moreno et al., (2015) but targeting the COI gene instead of the V1-V2 region of the 16S rRNA gene. For round 1, the universal COI primer set mICOIintF and jgHCO2198, which amplify a 313 bp highly variable fragment of the mitochondrial COI gene (Leray et al., 2013; Table 9), was used. PCR amplification was performed in a total volume of 25 µl with 1.25 µl of 10 µM of each universal forward and reverse primer, 2.5 µl of 10X TaKaRa Hot Start (HS) buffer, 2 µl of 2.5 mM dNTPs, 0.13 µl of TaKaRa *taq* HS Polymerase 2.5 U/µl (TaKaRa Bio USA) and 50 ng of DNA extract. PCR amplification was performed under the following conditions: 94 °C for 3 min followed by 20 cycles of denaturation at 94 °C for 30 s, annealing at 54 °C for 30 s and extension at 72 °C for 30 s, followed by a single cycle of 72 °C for 5 min. One microlitre of the first round PCR reaction mixture was used as a template in a second round PCR (20 cycles) for incorporating individual barcodes (Table 10, F primers comprising from 5’ to 3’: an Illumina adaptor sequence, 6 nt barcode, CA-linker and universal mICOIintF primer sequence) and an Illumina specific adapter (Table 10, R primer comprising from 5’ to 3’: an Illumina adaptor sequence and universal jgHCO2198 primer sequence). One microliter of this reaction mixture served as a template in the third round PCR reaction (15 cycles) for incorporating the Illumina multiplexing sequencing primer (Table 10, F primer comprising from 5’ to 3’: an Illumina multiplex sequencing primer and Illumina adaptor sequence from the round 2 primer) and the Illumina indexes (Table 10, R primers comprising from 5’ to 3’: an Illumina multiplex sequencing primer, 6 nt index and Illumina adaptor sequence from the round 2 primer), with reaction mixtures and cycling conditions as described for round 1, although the third-round amplification was performed in a final volume of 50 µl with reagent volumes doubled. All PCR reactions included positive (Common Galaxias, *Galaxias maculatus*) and negative (no template, UltraPure water only) controls.

Samples were visualised via gel electrophoresis (1% TAE agarose gels containing RedSafe™ Nucleic Acid Staining Solution; Scientifix), with products of the expected size purified using Agencourt AMPure XP beads (Beckman Coulter) and quantified in duplicate using the Quant-iT Picogreen dsDNA kit (Life Technologies) following the manufacturer’s instructions before being pooled in eqimolar ratios and sequenced on the MiSeq platform (Illumina, San Diego, CA, United States) using 250 nt paired-end sequencing chemistry through the Australian

Genome Research Facility (AGRF, North Melbourne, VIC, Australia). Amplicons generated from the positive control samples were also included within each library as a sequencing control.

A total of five libraries were prepared and sequenced as detailed below:

Library 1 (NWSP-Mulla1) – 94 samples (36 bulked fish eggs November 2024, 32 bulked fish larvae November 2024, 26 bulked fish eggs February 2025)

Library 2 (NWSP-Mulla2) – 65 samples (31 bulked decapod larvae November 2024, 34 bulked decapod larvae February 2025)

Library 3 (NWSP-Mulla3) – 66 samples (10 bulked fish eggs February 2025, 2 bulked eggs May 2025, 36 bulked fish larvae February 2025, 18 bulked fish larvae May 2025).

Library 4 (NWSP-Mulla4) – 94 samples (36 bulked decapod larvae May 2025, 36 bulked decapod larvae July 2025, 22 water samples (2x extraction protocols)).

Library 5 (NWSP-Mulla5) – 106 samples (23 bulked fish eggs July 2025, 33 bulked fish larvae July 2025, 50 water samples (2x extraction protocols)).

Table 9. COI primers used in PCR round 1 for fish larvae, fish eggs and decapod larvae library generation at SARDI, Molecular Sciences Laboratory.

Amplicon primers	Direction	Reference	Primer sequence (5'-3')
mICOIintF	F	Leray et al., (2013)	GGWACWGGWTGAACWGTWTAYCCYCC
jgHCO2198	R	Leray et al., (2013)	TAIACYTCIGGRTGICCRAARAAYCA

Table 10. COI primers used in PCR round 2 (only one barcode shown) and round 3 (only one index shown) for fish larvae, fish eggs and decapod larvae library generation at SARDI, Molecular Sciences Laboratory. Round 2 primers: universal primers (**red**) attached to the Illumina adaptor sequence (black), modified with a 6nt barcode (**pink**) attached to a CA-linker (**blue**) for the barcoding primers. Round 3 primers: multiplex sequencing primer (**bold**) attached to the Illumina adaptor sequence (black), including a 6nt index (**green**) for the indexing primers.

Amplicon primers	PCR round	Direction	Primer sequence (5'-3')
IlluFBC1_mICOIintF	2	F	ACACTCTTTCCCTACACGACGCTCTTCCGATCT**AAGCCTCA**GGWACWGGWTGAACWGTWTAYCCYCC
jgHCO2198_IlluRevAdap	2	R	GTGACTGGAGTTCAGACGTGTGCTCTTCCGATCT**TAIACYTCIGGRTGICCRAARAAYCA**
Illumina Multiplexing Primer	3	F	**AATGATACGGCGACCACCGAGATCT**ACACTCTTTCCCTACACGACGCTCTTCCGATCT
Illumina Index 1	3	R	**CAAGCAGAAGACGGCATACGAGATCGTGAT**GTGACTGGAGTTCAGACGTGTGCTCTTCCGATCT

DNA barcoding of adult decapod samples

Due to gaps in the publicly available sequence databases (e.g., BOLD and NCBI), which have poor representation of common decapod crustaceans found in Spencer Gulf, an in-house database of *COI* DNA sequences from identified adult specimens of selected decapods has been generated by SARDI. Crustacean OTUs from the DNA-metabarcoding libraries (library 2, library 4 to come) have been BLAST against the in-house reference database for a more comprehensive taxonomic identification, providing the potential to identify these OTUs to genus or species, compared to family or higher, if the publicly available sequence databases were solely relied upon. The *COI* sequences for these decapod species will be formally published in BOLD or NCBI, filling gaps for future researchers by providing the DNA sequence along with a larvae and adult specimen photo, morphological identification (R. King, Senior Research Scientist, Marine Invertebrates, SA Museum), and accession number to the vouchered adult specimen.

To date, a total of 41 adult crustacean individuals have been collected as by-catch during trawl surveys for the Spencer Gulf Prawn Fishery (April and November 2023, April 2024) and coastline surveys for the current project (Port Neill, December 2023). For each individual, a photograph has been taken (Figure 17), then a small tissue sample extracted using the Qiagen DNeasy Blood and Tissue Kit following the manufacturer's instructions. After nano-drop, to determine the DNA concentration, each sample has been PCR amplified for 35 cycles using the metabarcoding universal *COI* primers (mICOIintF & jgHCO2198, Leray et al., 2013). Positive amplicons (~313 bp) were visualised via gel electrophoresis and sent to AGRF for Sanger sequencing in the forward and reverse direction. Seven additional crab DNA extracts, that were collected, taxonomically identified by K. Wiltshire and S. Drabsch (SARDI) and used for marine pest assay testing, were also barcoded and included in the in-house reference database, resulting in a total of 48 individuals sequenced. Primer trimming, sequence editing, alignment generation, and phylogenetic tree analyses were performed using Geneious Prime (version 2023.2.1). These 48 barcoded individuals, representing 26 different species, have been useful in resolving the taxonomic classification for certain OTUs from library 2 (NWSP-Mulla2, and library 4 (NWSP-Mulla4) (Table 11), which may have otherwise been classified to family level or higher.

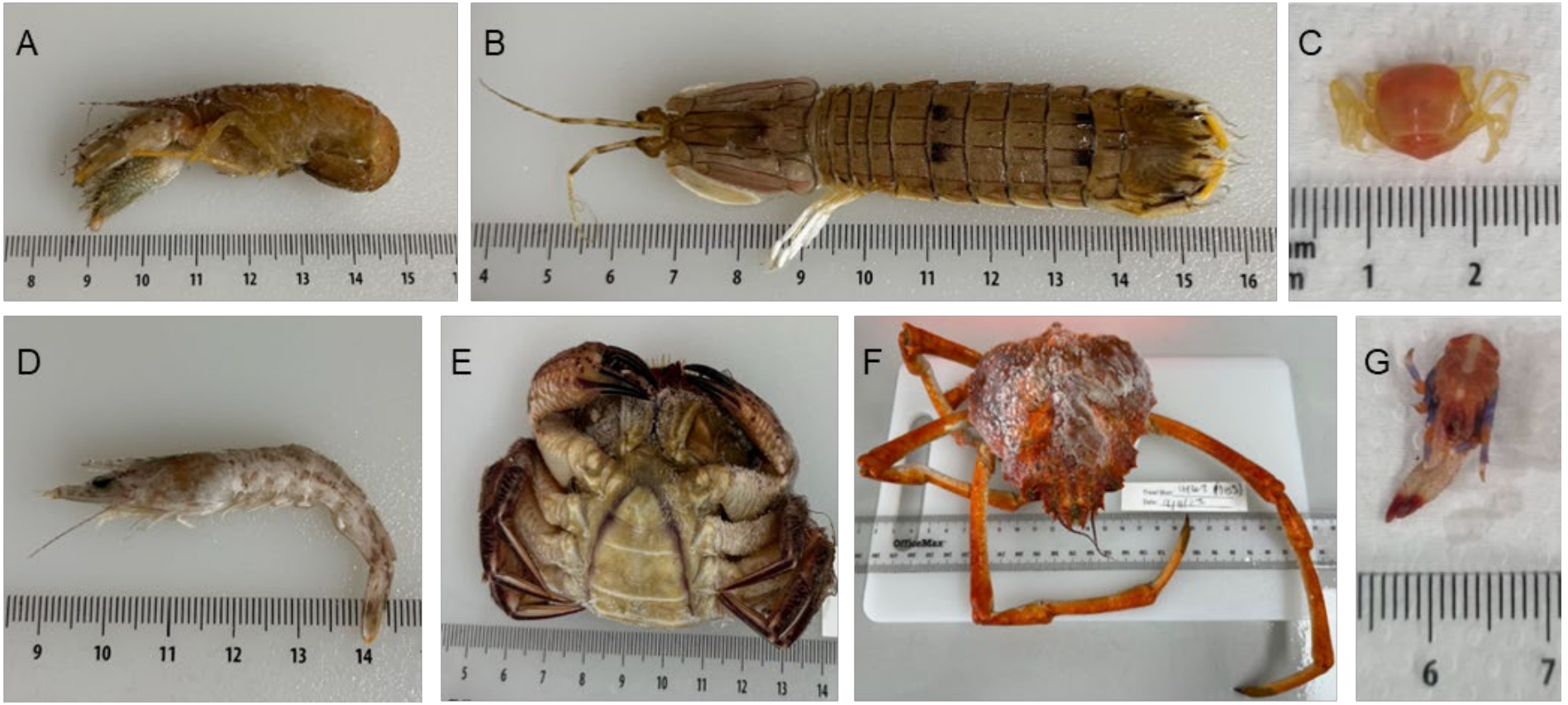


Figure 17. Examples of different adult crustacean individuals that have been collected from Spencer Gulf and barcoded to generate an in-house crustacean *COI* reference database. A = *Alpheus vilosus* (Hairy Snapping Shrimp); B = *Belosquilla laevis* (Smooth Mantis Shrimp); C = *Pinnotheres hickmani* (Hickman's Pea Crab); D = *Metapenaeopsis lindae* (Strawberry Prawn); E = *Nectocarcinus integrifrons* (Rough Rock Crab); F = *Leptomithrax gaimardii* (Great Spider Crab); G = *Galathea australiensis (*Striated Craylet*).*

Table 11. Adult crustacean samples (n = 41) and crab DNA extracts (n = 7) that have been barcoded in-house, including information on morphological taxonomic identification (species/genus/family; provided by R. King – SA Museum, K. Wiltshire and S. Drabsch – SARDI, or from position in phylogenetic tree – crab DNA extract samples), and matches with DNA-metabarcoding OTUs from library 2 (NWSP-Mulla2). Taxonomic designations (family, common name) were recorded following the Australian Faunal Directory. C= crab; HC= hermit crab; MS= mantis shrimp; MP= crab DNA extracts; PS= prawn/shrimp.

NO.	SAMPLE IDS	NO. OF SAMPLES	SPECIES/GENUS (FAMILY) – COMMON NAME	MATCHES WITH DNA-METABARCODING OTUS
1	PS1, PS3, PS6	3	*Alpheus villosus* (Alpheidae) – hairy snapping shrimp	
2	PS2, PS4, PS5	3	*Metapenaeopsis lindae* (Penaeidae) – strawberry prawn	NWSP-Mulla2_OTU3; NWSP-Mulla4_OTU33
3	PS7	1	*Synalpheus streptodactylus* (Alpheidae) – snapping shrimp	
4	MS1, MS2, MS3, MS4	4	*Belosquilla laevis* (Squillidae) – smooth mantis shrimp	
5	C1, C7, C8, C24	4	*Actaea calculosa* (Xanthidae) – facetted crab	NWSP-Mulla2_OTU48
6	C2, C4	2	*Pilumnus tomentosus* (Pilumnidae) – common hairy crab	NWSP-Mulla2_OTU33
7	C3, C13	2	*Austrodromidia octodentata* (Dromiidae) – bristled sponge crab	
8	C6	1	*Epipedodromia thomsoni* (Dromiidae) – flat sponge crab	
9	C5, C11	2	*Naxia aurita* (Majidae) – smooth seaweed crab	
10	C9, C10, C25	3	*Pisidia dispar* (Porcellanidae) – little porcelain crab	
11	C12	1	*Nectocarcinus integrifrons* (Carcinidae) – rough rock crab	NWSP-Mulla2_OTU5; NWSP-Mulla4 OTU2
12	C14	1	*Leptomithrax gaimardii* (Majidae) – great spider crab	
13	C15, C16, C17, C18, C19, C20	6	*Cyclograpsus granulosus* (Varunidae) – purple-mottled shore crab	
14	C21	1	Xanthidae sp./Oziidae sp.	
15	C22	1	*Haliacarcinus* sp. (Hymenosomatidae)	
16	C23	1	*Pinnotheres hickmani* (Pinnotheridae) – Hickman's pea crab	NWSP-Mulla2_OTU37; NWSP-Mulla4 OTU35
17	C26	1	*Galathea australiensis* (Galatheidae) – striated craylet	
18	C27	1	*Schizophrys aspera* (Majidae) – red sea toad	
19	C28	1	*Liocarcinus cf. corrugatus* (Polybiidae) – wrinkled swimming crab	
20	HC1, HC2, MP035	3	*Pagurus* (*Paguristes*) *frontalis* (Diogenidae) – common hermit crab	
21	MP033	1	*Brachynotus spinosus* (Varunidae) – little shore crab	NWSP-Mulla2_OTU103; NWSP-Mulla4 OTU29
22	MP034	1	*Macrophthalmus* sp. (Macrophthalmidae)	
23	MP052	1	*Litocheira bispinosa* (Litocheiridae) – two-spined slender-clawed crab	NWSP-Mulla2_OTU9,390;NWSP-Mulla4 OTU28,1058
24	MP067	1	*Ozius truncatus* (Oziidae) – reef crab	
25	MP071	1	*Halicarcinus* sp. 3-*Neorhynchoplax* sp. (Hymenosomatidae)	NWSP-Mulla2_OTU34
26	MP073	1	*Parasesarma* sp. (Sesarmidae)	
	TOTAL	**48**		

6.3. Appendix 3: Summary of DNA-metabarcoding and morphology 'species list' matching for decapod larvae identified in the study area for each survey. Green = genetic identification and morphology agree; Orange = genetic identification not outlined in morphology; Red = morphological identification not detected by DNA-metabarcoding. % Identity = average percentage of nucleotide bases matching a reference sequence from the publicly available database (BOLD or NCBI). N = indicates the counts obtained from morphological identification for each taxon.

November Survey						
DNA-barcoding species list				Morphology species list		
Infraorder	Family	Taxa	% Identity	Infraorder	Family	Counts
Anomura	Galatheidae		97.7	Anomura	Galatheidae	100
		Galathea corallicola	100.0			
		'Galatheidae' sp. 2	86.9			
	Paguridae	*'Paguridae' sp. 2*	87.5			
		Pagurixus handrecki	99.6			
	Porcellanidae	*'Porcellanidae' sp. 1*	87.9		Porcellanidae	241
					Unknown	11
Axiidea	Callianassidae		85.8	Axiidea	Callianassidae	462
		Callianassidae' sp. 2	84.8			
		'Callianassidae' sp. 2	84.8			
		'Callianassidae' sp. 4	84.0			
		Filhollianassa ceramica	100.0			
					Unknown	1
Brachyura				Brachyura		
	Cancridae		86.9			
		'Cancridae' sp. 1	86.9			
	Carcinidae		97.0			
		Cancinidae sp. 1	90.3			
		Nectocarcinus integrifrons	100.0			
	Corystidae		100.0			
		Gomeza bicornis	100.0			
	Hymenosomatidae		95.4		Hymenosomatidae	714
		Neorhynchoplax sp.	95.4			
	Leucosiidae		100.0		Leucosiidae	230
		Ebalia intermedia	100.0			
	Litocheiridae		100.0			
		Litocheria bispinosa	100.0			
	Parthenopidae		88.6			

		'Parthenopidae' sp. 1	88.6			
	Pilumnidae		99.3			
		'Pilumnidae' sp. 6	86.9			
		Pilumnus tomentosus	100.0			
	Pinnotheridae		100.0		Pinnotheridae	1
		Pinnotheres hickmani	100.0			
	Portunidae		95.0			
		'Portunidae' sp. 1	84.9			
		Portunus armatus	100.0			
		Portunus sp.	95.8			
	Varunidae		100.0			
		Brachynotus spinosus	100.0			
	Xanthidae		99.1		Xanthidea	24
		Actaea calculosa	100.0			
		'Xanthidae' sp. 1	88.7			
					Unknown	1397
Caridea	Alpheidae		88.5	Caridea	Alpheidae	613
		'Alpheidae' sp. 10	82.6			
		Alpheidae sp. 7	92.1			
		'Alpheidae' sp. 8	86.2			
		'Alpheidae' sp. 9	85.9			
		Alpheus sp. 1	96.3			
	Crangonidae		85.0		Crangonidae	3
		'Crangonidae' sp. 7	85.2			
		'Crangonidae' sp. 1	84.4			
		'Crangonidae' sp. 5	85.7			
		'Crangonidae' sp. 6	82.8			
	Hippolytidae		84.7		Hippolytidae	12
		'Hippolytidae' sp. 1	84.3			
		'Hippolytidae' sp. 3	84.5			
		Tozeuma pavoninum	99.2			
	Palaemonidae		88.2		Palaemonidae	1
		'Palaemonidae' sp. 4	84.9			
		'Palaemonidae' sp. 5	85.2			
		'Palaemonidae' sp. 5b	84.3			
		'Palaemonidae' sp. 5c	84.3			
		'Palaemonidae' sp. 5e	90.7			
		'Palaemonidae' sp. 7	80.2			
	Pandalidae		86.1		Pandalidae	1

		'Pandalidae' sp. 1	86.1			
		'Pandalidae' sp. 2	86.1			
	Processidae		91.3		Processidae	2
		Hayashidonus japonicus	99.2			
		Hayashidonus sp. 1	95.0			
		'Processidae' sp. 2	92.9			
		'Processidae' sp. 3	83.1			
		'Processidae' sp. 4	82.1			
					Unknown	2103
Dendrobranchiata	Luciferidae		81.0	Dendrobranchiata	Luciferidae	9
		Luciferidae sp.	81.0			
	Penaeidae		100.0		Penaeidae	159
		Melicertus sp. 1	100.0			
		Melicertus sp. 2	99.6			
		Metapenaeopsis lindae	100.0			
Gebiidea	Upogebiidae		82.5	Gebiidea	Upogebiidae	67
		'Upogebiidae' sp. 1	82.5			
					Laoediidae	1

February Survey

DNA-barcoding species list				Morphology species list		
Infraorder	**Family**	**Taxa**	**% Identity**	**Infraorder**	**Family**	**Counts**
Anomura	Galatheidae		98.1	Anomura	Galatheidae	40
		Galathea corallicola	100.0			
		'Galatheidae' sp. 2	86.9			
	Paguridae		98.0			
		'Paguridae' sp. 1	88.2			
		'Paguridae' sp. 2	87.5			
		Pagurixus handrecki	99.6			
	Porcellanidae		87.9		Porcellanidae	378
		'Porcellanidae' sp. 1	87.9			
					Unknown	164
Axiidea	Callianassidae		89.5	Axiidea	Callianassidae	907
		Biffarius limosus	99.2			
		'Callianassidae' sp. 2	84.8			

		'Callianassidae' sp. 4	84.0			
		Filhollianassa ceramica	100.0			
					Unknown	36
Brachyura			97.4	Brachyura		
	Cancridae		86.9			
		'Cancridae' sp. 1	86.9			
	Carcinidae		98.3			
		Cancinidae sp. 1	90.3			
		Nectocarcinus integrifrons	100.0			
	Corystidae		100.0			
		Gomeza bicornis	100.0			
	Hymenosomatidae		95.4		Hymenosomatidae	688
		Neorhynchoplax sp.	95.4			
	Leucosiidae		100.0		Leucosiidae	423
		Ebalia intermedia	100.0			
	Litocheiridae		100.0			
		Litocheria bispinosa	100.0			
	Pilumnidae		94.8			
		Actumnus setifer	100.0			
		'Pilumnidae' sp. 3	89.1			
		'Pilumnidae' sp. 6	86.9			
		Pilumnus tomentosus	100.0			
	Pinnotheridae		100.0		Pinnotheridae	74
		Pinnotheres hickmani	100.0			
	Portunidae		95.5			
		'Portunidae' sp. 1	84.9			
		Portunus armatus	100.0			
		Portunus sp.	95.8			
	Sesarmidae		94.6			
		Sesarmidae sp. 1	94.6			
	Xanthidae		100.0		Xanthidae	73
		Actaea calculosa	100.0			
					Unknown	878
Caridea	Alpheidae		87.8	Caridea	Alpheidae	1366
		'Alpheidae' sp. 10	82.6			
		Alpheidae sp. 7	92.1			
		'Alpheidae' sp. 8	86.2			
		'Alpheidae' sp. 9	85.9			
		Alpheus sp. 1	96.3			

		Synalpheus streptodactylus	100.0			
	Crangonidae		84.6			
		'Crangonidae' sp. 7	85.2			
		'Crangonidae' sp. 1	84.4			
		'Crangonidae' sp. 2	83.6			
		'Crangonidae' sp. 5	85.7			
	Hippolytidae		85.0		Hippolytidae	169
		'Hippolytidae' sp. 1	84.3			
		'Hippolytidae' sp. 3	84.5			
		Tozeuma pavoninum	99.2			
	Palaemonidae		88.4		Palaemonidae	36
		'Palaemonidae' sp. 4	84.9			
		'Palaemonidae' sp. 5	85.2			
		'Palaemonidae' sp. 5b	84.3			
		'Palaemonidae' sp. 5c	84.3			
		'Palaemonidae' sp. 5e	90.7			
		'Palaemonidae' sp. 7	80.2			
	Pandalidae		86.1		Pandalidae	1
		'Pandalidae' sp. 1	86.1			
		'Pandalidae' sp. 2	86.1			
	Processidae		92.5		Processidae	1
		Hayashidonus japonicus	99.2			
		Hayashidonus sp. 1	95.0			
		'Processidae' sp. 2	92.9			
		'Processidae' sp. 3	83.1			
		'Processidae' sp. 4	82.1			
					Unknown	2055
Dendrobranchiata	Luciferidae		81.0	Dendrobranchiata	Luciferidae	62
		Luciferidae sp.	81.0			
	Penaeidae		99.9		Penaeidae	2380
		Melicertus sp. 1	100.0			
		Melicertus sp. 2	99.6			
		Metapenaeopsis lindae	100.0			
					Unknown	1
Gebiidea	Upogebiidae		82.5	Gebiidea	Upogebiidae	87
		'Upogebiidae' sp. 1	82.5			

May Survey

DNA-barcoding species list				Morphology species list		
Infraorder	**Family**	**Taxa**	**% Identity**	**Infraorder**	**Family**	**Counts**
Anomura	Galatheidae		98.1	Anomura	Galatheidae	21
		Galathea corallicola	100.0			
		'Galatheidae' sp. 2	86.9			
	Paguridae		95.9			
		'Paguridae' sp. 2	87.5			
		Pagurixus handrecki	99.6			
	Porcellanidae		87.9		Porcellanidae	72
		'Porcellanidae' sp. 1	87.9			
					Unknown	101
Axiidea	Axiidae		100.0	Axiidea		
		Leonardsaxius werribee	100.0			
	Callianassidae		96.6		Callianassidae	34
		Biffarius limosus	99.2			
		'Callianassidae' sp. 2	84.8			
		Filhollianassa ceramica	100.0			
					Unknown	18
Brachyura	Cancridae		86.9	Brachyura		
		'Cancridae' sp. 1	86.9			
	Carcinidae		97.5			
		'Cancinidae' sp. 1	90.8			
		Nectocarcinus integrifrons	100.0			
	Hymenosomatidae		95.4		Hymenosomatidae	228
		Neorhynchoplax sp.	95.4			
	Leucosiidae		99.2		Leucosiidae	18
		Ebalia intermedia	100.0			
		'Leucosiidae' sp. 1	84.8			
	Litocheiridae		100.0			

		Litocheria bispinosa	100.0			
	Pinnotheridae		100.0		Pinnotheridae	5
		Pinnotheres hickmani	100.0			
	Portunidae		85.9			
		'Portunidae' sp. 1	84.9			
		Portunus armatus	100.0			
	Varunidae		100.0			
		Heliograpsus haswellianus	100.0			
	Xanthidea		100.0		Xanthidea	3
		Actaea calculosa	100.0			
					Unknown	144
Caridea	Alpheidae		95.7	Caridea	Alpheidae	53
		'Alpheidae' sp. 9	85.9			
		Alpheus sp. 1	96.3			
	Caridea		87.3			
		'Caridea' sp. 1	87.3			
	Crangonidae		84.4		Crangonidae	1
		'Crangonidae' sp. 1	84.4			
		'Crangonidae' sp. 3	82.7			
		'Crangonidae' sp. 5	85.7			
		'Crangonidae' sp. 6	82.8			
	Hippolytidae		84.7		Hippolytidae	250
		'Hippolytidae' sp. 1	84.3			
		Tozeuma pavoninum	99.2			
	Palaemonidae		90.1		Palaemonidae	2
		'Palaemonidae' sp. 5	85.2			
		'Palaemonidae' sp. 5e	90.7			
	Pandalidae		86.3		Pandalidae	3
		'Pandalidae' sp. 1	86.4			

		'Pandalidae' sp. 2	86.1			
	Processidae		87.5		Processidae	2
		Hayashidonus japonicus	99.2			
		'Processidae' sp. 3	83.1			
					Unknown	1439
Dendrobranchiata	Luciferidae		81.0	Dendrobranchiata	Luciferidae	1
		Luciferidae sp.	81.0			
	Penaeidae		100.0		Penaeidae	5
		Metapenaeopsis lindae	100.0			
Gebiidea	Upogebiidae		82.5			
		'Upogebiidae' sp. 1	82.5			

July Survey

DNA-barcoding species list				Morphology species list		
Infraorder	**Family**	**Taxa**	**% Identity**	**Infraorder**	**Family**	**Counts**
Anomura	Galatheidae		98.4	Anomura	Galatheidae	5
		Galathea corallicola	100.0			
		'Galatheidae' sp. 2	86.9			
	Paguridae		99.6			
		Pagurixus handrecki	99.6			
					Unknown	5
Axiidea	Axiidae		100.0	Axiidea	Axiidae	3
		Leonardsaxius werribee	100.0			
	Callianassidae		94.4		Callianassidae	4
		Biffarius limosus	99.2			
		'Callianassidae' sp. 2	84.8			
Brachyura	Cancridae		86.9	Brachyura		

		'Cancridae' sp. 1	86.9			
	Carcinidae		96.9			
		'Cancinidae' sp. 1	90.8			
		Nectocarcinus integrifrons	100.0			
	Hymenosomatidae		95.4		Hymenosomatidae	388
		Neorhynchoplax sp.	95.4			
	Leucosiidae		97.5		Leucosiidae	5
		Ebalia intermedia	100.0			
		'Leucosiidae' sp. 1	84.8			
	Litocheiridae		100.0			
		Litocheria bispinosa	100.0			
	Portunidae		84.9			
		'Portunidae' sp. 1	84.9			
	Varunidae		100.0		Varunidae	28
		Brachynotus spinosus	100.0			
					Unknown	363
Caridea	Alpheidae		96.3	Caridea	Alpheidae	3
		Alpheus sp. 1	96.3			
	Crangonidae		84.4		Crangonidae	3
		'Crangonidae' sp. 1	84.4			
		'Crangonidae' sp. 3	82.7			
		'Crangonidae' sp. 5	85.7			
		'Crangonidae' sp. 6	82.8			
	Hippolytidae		84.8		Hippolytidae	1
		'Hippolytidae' sp. 1	84.3			
		Tozeuma pavoninum	99.2			
	Pandalidae		86.4		Pandalidae	1
		'Pandalidae' sp. 1	86.4			
		'Pandalidae' sp. 2	86.1			
	Processidae		83.1			

		'Processidae' sp. 3	83.1			
					Palaemonidae	2
					Pasiphaeidae	3
					Unknown	374
Dendrobranchiata	Luciferidae		81.0	Dendrobranchiata	Luciferidae	23
		Luciferidae sp.	81.0			
Gebiidea	Upogebiidae		82.5			
		'Upogebiidae' sp. 1	82.5			

6.4. Appendix 4: Summary of DNA-metabarcoding and morphology 'species list' matching for fish larvae identified in the study area for each survey. Green = genetic identification and morphology agree; Orange = genetic identification not outlined in morphology; Red = morphological identification not detected by DNA-metabarcoding. % Identity = average percentage of nucleotide bases matching a reference sequence from the publicly available database (BOLD or NCBI). (*) Indicates genus or species names that were resolved with DNA-metabarcoding. (**) Larvae inititially identified to species by morphology and pigmentation and confirmed by barcoding.

November Survey					
DNA-barcoding species list			Morphology species list		
Family	Taxa	% Identity	Family	Taxa	Counts
Blenniidae	*Omobranchus anolius*	100	Blenniidae	*Omobranchus anolius***	1
Callionymidae	*Eocallionymus papilio*	100	Callionymidae	*Eocallionymus papilio**	8
	Repomucenus calcaratus	100		*Repomucenus calcaratus**	4
Carangidae	*Pseudocaranx wrighti*	100	Carangidae	*Pseudocaranx wrighti**	9
Clinidae	*Cristiceps australis*	100	Clinidae	*Cristiceps australis**	1
Engraulidae	*Engraulis australis*	100	Engraulidae	*Engraulis australis***	6
Gobiidae	*Bathygobius kreftii*	100	Gobiidae	*Bathygobius kreftii**	3
	Callogobius depressus	100		*Callogobius depressus**	5
	Favonigobius lateralis	100		*Favonigobius lateralis**	42
Labridae	*Neoodax balteatus*	100	Labridae	*Neoodax balteatus**	5
Monacanthidae	*Acanthaluteres spilomelanurus*	100	Monacanthidae	*Acanthaluteres spilomelanurus**	2
	Acanthaluteres vittiger	100		*Acanthaluteres vittiger**	1
	Brachaluteres jacksonianus	100		*Brachaluteres jacksonianus**	4
	Scobinichthys granulatus	100		*Scobinichthys granulatus**	2
	Thamnaconus degeni	100		*Thamnaconus degeni**	1
Paralichthyidae	*Pseudorhombus jenynsii*	100	Paralichthyidae	*Pseudorhombus jenynsii**	2
Pinguipedidae	*Parapercis haackei*	99.56	Pinguipedidae	*Parapercis haackei***	15
Platycephalidae	*Platycephalus speculator*	100	Platycephalidae	*Platycephalus speculator **	1
Scorpaenidae	Scorpaenidae sp.	87	Scorpaenidae	Scorpaenidae sp.**	1
Syngnathidae	*Stigmatopora argus*	99.58	Syngnathidae	*Stigmatopora argus**	2
Terapontidae	*Pelates octolineatus*	100			
			Tetrarogidae	*Gymnapistes marmoratus*	8

February Survey

DNA-barcoding species list			Morphology species list		
Family	**Taxa**	**% Identity**	**Family**	**Taxa**	**Counts**
Aploactinidae	Aploactinidae sp.	88.36	Aploactinidae	Aploactinid**	1
Blenniidae	*Omobranchus anolius*	100	Blenniidae	*Omobranchus anolius***	2
Callionymidae	*Eocallionymus papilio*	100	Callionymidae	*Eocallionymus papilio**	1
	Repomucenus calcaratus	100		*Repomucenus calcaratus**	7
Carangidae	*Pseudocaranx wrighti*	100	Carangidae	*Pseudocaranx wrighti***	7
Engraulidae	*Engraulis australis*	100	Engraulidae	*Engraulis australis***	698
Gobiidae	*Bathygobius kreftii*	100	Gobiidae	*Bathygobius kreftii**	47
	Favonigobius lateralis	100		*Favonigobius lateralis**	69
	Callogobius depressus	98.8		*Callogobius depressus**	894
Monacanthidae	*Scobinichthys granulatus*	100	Monacanthidae	*Scobinichthys granulatus**	5
Paralichthyidae	*Pseudorhombus arsius*	100	Paralichthyidae	*Pseudorhombus arsius**	1
Pinguipedidae	*Parapercis haackei*	100	Pinguipedidae	*Parapercis haackei***	73
			Scorpaenidae	Scorpaenid	46
Sillaginidae	*Sillago schomburgkii*	100	Sillaginidae	*Sillago schomburgkii**	3
Terapontidae	*Pelates octolineatus*	100	Terapontidae	*Pelates octolineatus**	82

May Survey

DNA-barcoding species list			Morphology species list		
Family	**Taxa**	**% Identity**	**Family**	**Taxa**	**Counts**
Callionymidae	*Repomucenus calcaratus*	100	Callionymidae	*Repomucenus calcaratus**	1
Clinidae	*Cristiceps australis*	100	Clinidae	*Cristiceps australis**	10
Engraulidae	*Engraulis australis*	100	Engraulidae	*Engraulis australis***	2
Gobiidae	*Favonigobius lateralis*	100	Gobiidae	*Favonigobius lateralis**	18
Monacanthidae	*Thamnaconus degeni*	100	Monacanthidae	*Thamnaconus degeni**	1
	Meuschenia freycineti	100		*Meuschenia freycineti**	2
	Acanthaluteres vittiger	100		*Acanthaluteres vittiger**	1
Neosebastidae	*Maxillicosta scabriceps*	99.6	Neosebastidae	*Maxillicosta scabriceps***	1
			Pinguipedidae	*Parapercis haackei***	1
Sillaginidae	*Sillaginodes punctatus*	100	Sillaginidae	*Sillaginodes punctatus**	1
Syngnathidae	*Stigmatophora* sp.	88	Syngnathidae	*Stigmatophora* sp.**	3

July Survey					
DNA-barcoding species list			Morphology species list		
Family	Taxa	% Identity	Family	Taxa	Counts
Clinidae	*Cristiceps australis*	100	Clinidae	*Cristiceps australis**	8
Gobiidae	*Favonigobius lateralis*	100	Gobiidae	*Favonigobius lateralis**	4
Labridae	*Neoodax balteatus*	100			
Monacanthidae	*Thamnaconus degeni*	100	Monacanthidae	*Thamnaconus degeni**	4
	Acanthaluteres vittiger	100		*Acanthaluteres vittiger**	1
	Acanthaluteres spilomelanurus	100		*Acanthaluteres spilomelanurus**	2
Neosebastidae	*Maxillicosta scabriceps*	100	Neosebastidae	*Maxillicosta scabriceps***	1
Platycephalidae	*Platycephalus bassensis*	100	Platycephalidae	*Platycephalus bassensis**	1
			Sillaginidae	*Sillago* sp.	1
Syngnathidae	*Stigmatophora* sp.	88	Syngnathidae	*Stigmatophora* sp.**	1
Tetrarogidae	*Gymnapistes marmoratus*	100	Tetrarogidae	*Gymnapistes marmoratus***	131
Triglidae	*Lepidotrigla papilio*	100	Triglidae	*Lepidotrigla papilio**	1

6.5. Appendix 5: Counts of decapod larvae for each sampling station, survey month (N = November; February = F; May = M; July = J), site (Desal = Desalination plant site; Ref = Reference site), and time of day. Taxonomic assignments are based on morphological identification, corroborated where possible using genetic data (Appendix 3).

Station	Survey	Site	Time	Anomura	Brachyura	Caridea	Axiidea	Dendrobranchiata	Gebiidea
A1-D	N	Desal	Day	27	108	191	38	1	4
A1-N	N	Desal	Night	9	219	80	20	5	4
A2-D	N	Desal	Day	25	81	127	17	3	2
A2-N	N	Desal	Night	7	223	102	16	3	
A3-D	N	Desal	Day	17	82	89	13	3	3
A3-N	N	Desal	Night	8	342	51	5		4
B1-D	N	Desal	Day	17	29	102	35	5	
B1-N	N	Desal	Night	22	77	107	31	9	
B2-D	N	Desal	Day	4	28	127	33	5	6
B3-D	N	Desal	Day	16	21	95	19	1	
B3-N	N	Desal	Night	9	60	43	7	1	
C1-D	N	Desal	Day	4	28	96	15	2	
C1-N	N	Desal	Night	37	108	107	20	7	
C2-D	N	Desal	Day	5	72	147	16	6	
C2-N	N	Desal	Night	20	93	80	35	3	1
C3-D	N	Desal	Day	8	55	103	13	8	2
C3-N	N	Desal	Night	13	36	66	22	11	
D1-D	N	Ref	Day	12	88	61	7		3
D1-N	N	Ref	Night	5	46	64	11		21
D2-D	N	Ref	Day	15	99	96		8	
D3-D	N	Ref	Day	11	88	66	20	3	1
D3-N	N	Ref	Night	3	27	51	26		12
E1-D	N	Ref	Day	7	35	108	6	1	
E1-N	N	Ref	Night	4	22	74	10	2	2
E2-D	N	Ref	Day	8	51	90	11	16	
E2-N	N	Ref	Night	7	30	42	5	4	2
E3-D	N	Ref	Day	5	48	70	3	7	
E3-N	N	Ref	Night	7	21	46	6	2	1
F1-D	N	Ref	Day	3	25	59	6	10	
F1-N	N	Ref	Night	5	32	50	1	17	
F2-D	N	Ref	Day	1	19	46	3	13	
F2-N	N	Ref	Night	2	18	38	2	4	
F3-D	N	Ref	Day		17	48	1	4	
F3-N	N	Ref	Night	6	10	29	6	4	

Station	Survey	Site	Time	Anomura	Brachyura	Caridea	Axiidea	Dendrobranchiata	Gebiidea
A1-D	F	Desal	Day	19	77	139	26	28	1
A1-N	F	Desal	Night	46	118	178	70	167	
A2-D	F	Desal	Day	13	25	96	12	24	
A2-N	F	Desal	Night	25	40	89	47	89	
A3-D	F	Desal	Day	3	22	63	4	51	3
A3-N	F	Desal	Night	17	40	60	20	78	1
B1-D	F	Desal	Day	12	35	96	22	9	
B1-N	F	Desal	Night	68	87	166	50	167	6
B2-D	F	Desal	Day	6	21	107	9	28	1
B2-N	F	Desal	Night	30	78	81	37	108	2
B3-D	F	Desal	Day	4	26	35	3	64	4
B3-N	F	Desal	Night	16	61	77	15	68	1
C1-D	F	Desal	Day	23	63	206	22	16	6
C1-N	F	Desal	Night	12	55	183	48	64	1
C2-D	F	Desal	Day	12	49	111	13	39	8
C2-N	F	Desal	Night	17	34	105	36	53	1
C3-D	F	Desal	Day	3	6	29	2	17	
C3-N	F	Desal	Night	14	39	57	11	67	1
D1-D	F	Ref	Day	28	92	115	20	62	2
D1-N	F	Ref	Night	7	60	130	42	110	
D2-D	F	Ref	Day	16	76	60	22	100	3
D2-N	F	Ref	Night	16	78	112	51	65	
D3-D	F	Ref	Day	3	58	62	5	130	1
D3-N	F	Ref	Night	10	56	100	34	46	3
E1-D	F	Ref	Day	33	122	170	28	75	12
E1-N	F	Ref	Night	17	64	117	20	93	7
E2-D	F	Ref	Day	9	73	44	13	88	4
E2-N	F	Ref	Night	14	74	102	50	38	2
E3-D	F	Ref	Day	4	74	50	13	114	1
E3-N	F	Ref	Night	14	49	126	29	54	2
F1-D	F	Ref	Day	12	71	115	17	57	2
F1-N	F	Ref	Night	6	35	92	18	25	
F2-D	F	Ref	Day	15	124	54	52	81	5
F2-N	F	Ref	Night	22	77	149	55	52	2
F3-D	F	Ref	Day	7	39	48	7	84	
F3-N	F	Ref	Night	6	41	104	20	32	5

Station	Survey	Site	Time	Anomura	Brachyura	Caridea	Axiidea	Dendrobranchiata	Gebiidea
A1-D	M	Desal	Day	2	18	88			
A1-N	M	Desal	Night	7	23	45	1		
A2-D	M	Desal	Day	4	15	27			
A2-N	M	Desal	Night	30	18	60	2		
A3-D	M	Desal	Day	1	3	56			
A3-N	M	Desal	Night	6	5	120	1		
B1-D	M	Desal	Day	3	11	51	1		
B1-N	M	Desal	Night	6	18	40	4		
B2-D	M	Desal	Day	3	16	69			
B2-N	M	Desal	Night	16	20	52	3		
B3-D	M	Desal	Day		11	31			
B3-N	M	Desal	Night	2	10	79	6	1	
C1-D	M	Desal	Day	2	9	44			
C1-N	M	Desal	Night	22	20	39	2		
C2-D	M	Desal	Day	2	9	69			
C2-N	M	Desal	Night	13	19	92			
C3-D	M	Desal	Day		5	35			
C3-N	M	Desal	Night	4	10	49	2		
D1-D	M	Ref	Day	2	10	53	1	1	
D1-N	M	Ref	Night	14	17	47	4		
D2-D	M	Ref	Day	2	9	51			
D2-N	M	Ref	Night	1	9	20	2		
D3-D	M	Ref	Day		5	35	1		
D3-N	M	Ref	Night	2	7	17	4		
E1-D	M	Ref	Day	4	7	47			
E1-N	M	Ref	Night	14	17	30		1	
E2-D	M	Ref	Day	2	10	40		1	
E2-N	M	Ref	Night	1	7	51	2		
E3-D	M	Ref	Day	0	4	38	1		
E3-N	M	Ref	Night	3	7	29	6	1	
F1-D	M	Ref	Day	0	1	69			
F1-N	M	Ref	Night	13	22	35	4		
F2-D	M	Ref	Day	3	5	24			
F2-N	M	Ref	Night	4	8	42	4		
F3-D	M	Ref	Day	1	3	34			
F3-N	M	Ref	Night	5	10	42	1	1	

Station	Survey	Site	Time	Anomura	Brachyura	Caridea	Axiidea	Dendrobranchiata	Gebiidea
A1-D	J	Desal	Day		21	6			
A1-N	J	Desal	Night	1	10	11	4		
A2-D	J	Desal	Day		45	3		1	
A2-N	J	Desal	Night		8	12		1	
A3-D	J	Desal	Day	1	62	20			
A3-N	J	Desal	Night		11	6		3	
B1-D	J	Desal	Day	1	23	7			
B1-N	J	Desal	Night		5	6	1	1	
B2-D	J	Desal	Day		10	8			
B2-N	J	Desal	Night		5	12	1	1	
B3-D	J	Desal	Day		60	11			
B3-N	J	Desal	Night		18	8		1	
C1-D	J	Desal	Day		20	8			
C1-N	J	Desal	Night	1	5	14			
C2-D	J	Desal	Day		38	7			
C2-N	J	Desal	Night		11	6		2	
C3-D	J	Desal	Day		73	22			
C3-N	J	Desal	Night		14	12			
D1-D	J	Ref	Day		21	20		1	
D1-N	J	Ref	Night		9	11			
D2-D	J	Ref	Day		32	14			
D2-N	J	Ref	Night	1	10	10		2	
D3-D	J	Ref	Day		57	12			
D3-N	J	Ref	Night		10	13		1	
E1-D	J	Ref	Day		9	15			
E1-N	J	Ref	Night		9	14			
E2-D	J	Ref	Day		22	11	1	2	
E2-N	J	Ref	Night	1	9	9			
E3-D	J	Ref	Day	2	44	20		1	
E3-N	J	Ref	Night	1	14	8		2	
F1-D	J	Ref	Day		16	8			
F1-N	J	Ref	Night		9	9		1	
F2-D	J	Ref	Day		40	15			
F2-N	J	Ref	Night		2	7		1	
F3-D	J	Ref	Day	1	25	8		1	
F3-N	J	Ref	Night		7	4		1	

6.6. Appendix 6: Counts of fish larvae for each sampling station, survey month (N = November; February = F; May = M; July = J), site (Desal = Desalination plant site; Ref = Reference site), and time of day. Taxonomic assignments are based on morphological identification, corroborated where possible using genetic data (Appendix 3).

Station	Survey	Site	Time	Aploactinidae	Blenniidae	Callionymidae	Carangidae	Clinidae	Engraulidae	Gobiidae	Labridae	Monacanthidae	Neosebastidae	Paralichthyidae	Pingupedidae	Platycephalidae	Sillaginidae	Tetrarogidae	Terapontidae	Triglidae	Scorpaenidae	Sygnathidae
A1-D	N	Desal	Day				1			2		1			1							
A1-N	N	Desal	Night				1			3		1						1				
A2-D	N	Desal	Day							2					1							
A2-N	N	Desal	Night							1												
A3-D	N	Desal	Day			2				2												1
A3-N	N	Desal	Night						1	3								1				
B1-D	N	Desal	Day			2			3	3		1		1	2			1				
B1-N	N	Desal	Night			1	2		1	1					2							
B2-D	N	Desal	Day							1								1				
B2-N	N	Desal	Night							3												
B3-D	N	Desal	Day							1												
B3-N	N	Desal	Night			1	1			2					1							1
C1-D	N	Desal	Day			1				1	1	1										
C1-N	N	Desal	Night			1				4	1			1							1	
C2-D	N	Desal	Day				1			1		1										
C2-N	N	Desal	Night					1		3	1				1							
C3-D	N	Desal	Day			1	1			2					1							
C3-N	N	Desal	Night		1	1				2	1				1							
D1-D	N	Ref	Day			1						1										
D1-N	N	Ref	Night									1										
D2-D	N	Ref	Day			1						1			1							
D2-N	N	Ref	Night																			
D3-D	N	Ref	Day																			
D3-N	N	Ref	Night																			
E1-D	N	Ref	Day																			
E1-N	N	Ref	Night												1			1				
E2-D	N	Ref	Day				1											1				
E2-N	N	Ref	Night							1		1										
E3-D	N	Ref	Day															1				
E3-N	N	Ref	Night							1												
F1-D	N	Ref	Day												1							
F1-N	N	Ref	Night									1						1				
F2-D	N	Ref	Day							1												
F2-N	N	Ref	Night				1		1	3						1						
F3-D	N	Ref	Day								1				1							
F3-N	N	Ref	Night							1					1							

Station	Survey	Site	Time	Aploactinidae	Blenniidae	Callionymidae	Carangidae	Clinidae	Engraulidae	Gobiidae	Labridae	Monacanthidae	Neosebastidae	Paralichthyidae	Pingupedidae	Platycephalidae	Sillaginidae	Tetrarogidae	Terapontidae	Triglidae	Scorpaenidae	Sygnathidae
A1-D	F	Desal	Day						3	22					1				13		1	
A1-N	F	Desal	Night			1			39	142					9						2	
A2-D	F	Desal	Day						7	11											4	
A2-N	F	Desal	Night				1		29	34					2				2			
A3-D	F	Desal	Day						28	7					1							
A3-N	F	Desal	Night						25	27					5				3			
B1-D	F	Desal	Day						7	6					1				2		1	
B1-N	F	Desal	Night			1			16	118					3		1				4	
B2-D	F	Desal	Day						11	8									3		1	
B2-N	F	Desal	Night				1		28	35					2						3	
B3-D	F	Desal	Day						9	6									2		1	
B3-N	F	Desal	Night						22	15					4				5			
C1-D	F	Desal	Day			1			11	16					3				5			
C1-N	F	Desal	Night						14	103											2	
C2-D	F	Desal	Day						20	10		1			2							
C2-N	F	Desal	Night						24	41		1							1			
C3-D	F	Desal	Day						25	8					6				1		1	
C3-N	F	Desal	Night			1	1		53	39					7				2		1	
D1-D	F	Ref	Day		1				12	15					1						4	
D1-N	F	Ref	Night			1	1		8	24					3						1	
D2-D	F	Ref	Day				1		36	20					3				2		1	
D2-N	F	Ref	Night				1		21	46					1				1		1	
D3-D	F	Ref	Day						37	2					1						1	
D3-N	F	Ref	Night						8	17					1				4		1	
E1-D	F	Ref	Day			1			32	21					3				1		3	
E1-N	F	Ref	Night						7	20		1					1		3		1	
E2-D	F	Ref	Day						16	31					3				10			
E2-N	F	Ref	Night						10	31									3		1	
E3-D	F	Ref	Day	1		1			31	3				1					1		1	
E3-N	F	Ref	Night			1			9	16					3				2		1	
F1-D	F	Ref	Day						34	8					1				1		3	
F1-N	F	Ref	Night						7	22					2				3		1	
F2-D	F	Ref	Day				1		22	30					1				1			
F2-N	F	Ref	Night		1				14	35					3				8		2	
F3-D	F	Ref	Day						17	7											1	
F3-N	F	Ref	Night						6	14		2			1		1		3		2	

Station	Survey	Site	Time	Aploactinidae	Blenniidae	Callionymidae	Carangidae	Clinidae	Engraulidae	Gobiidae	Labridae	Monacanthidae	Neosebastidae	Paralichthyidae	Pingupedidae	Platycephalidae	Sillaginidae	Tetrarogidae	Terapontidae	Triglidae	Scorpaenidae	Sygnathidae
A1-D	M	Desal	Day																			
A1-N	M	Desal	Night						1													
A2-D	M	Desal	Day							2												
A2-N	M	Desal	Night																			
A3-D	M	Desal	Day																			
A3-N	M	Desal	Night																			
B1-D	M	Desal	Day					1		1		1										
B1-N	M	Desal	Night							1												
B2-D	M	Desal	Day					1				1										
B2-N	M	Desal	Night					3							1							
B3-D	M	Desal	Day																			
B3-N	M	Desal	Night																			2
C1-D	M	Desal	Day																			
C1-N	M	Desal	Night							3												1
C2-D	M	Desal	Day																			
C2-N	M	Desal	Night									1										
C3-D	M	Desal	Day						1													
C3-N	M	Desal	Night					1					1									
D1-D	M	Ref	Day					1														
D1-N	M	Ref	Night							5												
D2-D	M	Ref	Day																			
D2-N	M	Ref	Night			1																
D3-D	M	Ref	Day																			
D3-N	M	Ref	Night																			
E1-D	M	Ref	Day																			
E1-N	M	Ref	Night					1		2												
E2-D	M	Ref	Day																			
E2-N	M	Ref	Night														1					
E3-D	M	Ref	Day																			
E3-N	M	Ref	Night																			
F1-D	M	Ref	Day																			
F1-N	M	Ref	Night					2		4												
F2-D	M	Ref	Day																			
F2-N	M	Ref	Night																			
F3-D	M	Ref	Day																			
F3-N	M	Ref	Night									1										

Station	Survey	Site	Time	Aploactinidae	Blenniidae	Callionymidae	Carangidae	Clinidae	Engraulidae	Gobiidae	Labridae	Monacanthidae	Neosebastidae	Paralichthyidae	Pingupedidae	Platycephalidae	Sillaginidae	Tetrarogidae	Terapontidae	Triglidae	Scorpaenidae	Sygnathidae
A1-D	J	Desal	Day															1				
A1-N	J	Desal	Night															4				
A2-D	J	Desal	Day					1										4				
A2-N	J	Desal	Night									1						2				
A3-D	J	Desal	Day															2				
A3-N	J	Desal	Night					1		1								9				
B1-D	J	Desal	Day					1										1				
B1-N	J	Desal	Night							1								9				
B2-D	J	Desal	Day					1										1				
B2-N	J	Desal	Night					1										6				
B3-D	J	Desal	Day					1					1					2				
B3-N	J	Desal	Night															8				
C1-D	J	Desal	Day																			
C1-N	J	Desal	Night									1						10		1		
C2-D	J	Desal	Day															5				
C2-N	J	Desal	Night															8				
C3-D	J	Desal	Day									1						4				
C3-N	J	Desal	Night					1				1						1				
D1-D	J	Ref	Day							1								5				
D1-N	J	Ref	Night															4				1
D2-D	J	Ref	Day															1				
D2-N	J	Ref	Night															1				
D3-D	J	Ref	Day															1				
D3-N	J	Ref	Night															4				
E1-D	J	Ref	Day															3				
E1-N	J	Ref	Night														1	5				
E2-D	J	Ref	Day					1										5				
E2-N	J	Ref	Night															4				
E3-D	J	Ref	Day							1						1		2				
E3-N	J	Ref	Night															1				
F1-D	J	Ref	Day															6				
F1-N	J	Ref	Night															5				
F2-D	J	Ref	Day									2						7				
F2-N	J	Ref	Night																			
F3-D	J	Ref	Day																			
F3-N	J	Ref	Night															1				