SMITH BAY WHARF

DRAFT ENVIRONMENTAL IMPACT STATEMENT

APPENDIX K

PREPARED FOR KANGAROO ISLAND PLANTATION TIMBERS BY ENVIRONMENTAL PROJECTS

JANUARY 2019

SMITH BAY WHARF

DRAFT ENVIRONMENTAL IMPACT STATEMENT

APPENDIX K

PREPARED FOR KANGAROO ISLAND PLANTATION TIMBERS BY ENVIRONMENTAL PROJECTS

JANUARY 2019

APPENDIX **K**

APPENDIX K – MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

Appendix K1 – EPBC Referral of Proposed Action – EPBC/2016/7814

Referral of proposed action

Proposed action title:	**Kangaroo Island Plantation Timbers Ltd Smith Bay Wharf Development**

1 Summary of proposed action

1.1 **Short description**

Following a recently-announced acquisition, Kangaroo Island Plantation Timbers Ltd (KIPT) will own and manage approximately 19,500 ha of timber plantations on Kangaroo Island, much of which is either already mature or is approaching maturity. In order to export harvested plantation timber to overseas markets KIPT proposes to build a deep-water wharf at Smith Bay on the north coast of Kangaroo Island (Figure 1). There is no such facility on the island at present.

The facility will consist of a hardstand causeway extending approximately 200 m into the sea to a floating pontoon berth whose outer edge will be positioned at the 10 m depth contour (i.e. approximately 230 m from shore). It is not anticipated that specialised equipment will be required at the wharf as logs will be loaded by ships' cranes.

Timber will be stockpiled on-shore adjacent to the wharf facilities over an area of approximately 5.6 ha. Ancillary services will include power, water, septic/sewerage facilities, telecommunications and security.

Harvested timber will be transported to the wharf via public roads using semi-trailer trucks.

KIPT is committed to developing the wharf as a multi-user, multi-cargo facility. Other freight, which is likely to be containerised and/or carried as deck cargo, will also be loaded using ships' cranes.

It is anticipated that log ships would use the wharf for about 50 to 75 days a year and would have priority over other vessels.

The proposed development is considered to be of major economic and social importance to not only Kangaroo Island, but to South Australia.

1.2 **Latitude and longitude**

	Latitude			Longitude		
Location point	**degrees**	**minutes**	**seconds**	**degrees**	**minutes**	**seconds**
SW	35	35	45.59	137	25	34.20
NW	35	35	30.30	137	25	33.94
NW sea	35	35	20.55	137	25	37.13
NE sea	35	35	26.51	137	25	53.82
NE	35	35	35.69	137	25	48.99
SE	35	35	47.14	137	25	43.75

1.3	**Locality and property description** KIPT proposes to construct the wharf at Smith Bay on the north coast of Kangaroo Island, approximately 18 km north west of Kingscote. KIPT owns the land at Smith Bay adjacent to which the wharf will be constructed. KIPT would also require (and has sought from the South Australian Government) an easement over adjacent crown land and consent to occupy a section of the seabed.		
1.4	**Size of the development footprint or work area (hectares)**		The on-shore facilities will cover approximately 10 ha, of which 5.6 ha will be log storage. The causeway and wharf facilities will cover approximately 3 ha. The dredged berth pocket and approaches will cover approximately 1 ha and 8 ha, respectively (Figures 2a, 2b and 2c).
1.5	**Street address of the site**		North Coast Road, Smith Bay, Kangaroo Island
1.6	**Lot description** Suburb of Wisanger, Hundred of Menzies, D92343 Allotments 51 and 52 (Figure 3)		
1.7	**Local Government Area and Council contact (if known)** Kangaroo Island Council. The Council contact is Aaron Wilksch. However, Council has indicated that it wishes the Minister for Planning to declare that the development be assessed under Section 46 of the SA Development Act 1993, for determination by the Governor. An application has been lodged with the Minister seeking such a declaration.		
1.8	**Time frame** It is anticipated that construction will commence in early to mid 2017 and be completed in early 2018.		
1.9	**Alternatives to proposed action**		No The proposed wharf development is the only practical means by which harvested timber can be exported from Kangaroo Island. Other possible sites were investigated and found to be unsuitable, either for practical, social or environmental reasons.
1.10	**Alternative time frames, locations or activities**		No KIPT considers Smith Bay to be the most suitable site for the wharf as deep water is relatively close to shore, shore facilities will be on cleared and degraded land, it is relatively close to the timber resource and the Smith Bay area and adjacent roads are of lesser importance as tourist destinations and routes.
1.11	**Commonwealth, State or Territory assessment**		
			Yes, please also complete section 2.5
1.12	**Component of larger action**		No
			Yes, please also complete section 2.7
1.13	**Related actions/proposals**		Yes
			These will comprise forestry operations at existing timber plantations that will supply timber for export via the Smith Bay

			wharf.
1.14	**Australian Government funding**		No
			Yes, please also complete section 2.8
1.15	**Great Barrier Reef Marine Park**		No
			Yes, please also complete section 3.1 (h), 3.2 (e)

2 Detailed description of proposed action

2.1 Description of proposed action

Overview

As a result of a recent acquisition, Kangaroo Island Plantation Timbers Ltd (KIPT) now controls approximately 25,500 ha of land on Kangaroo Island. Around 23,000 ha (90%) is planted with hardwood species (Blue gum *Eucalyptus globulus* and Shining gum *Eucalyptus nitens*) and 2,500 ha (10%) with softwood (Monterey pine *Pinus radiata*). Being older, the softwood estate represents about 19% of the Company's standing timber. Furthermore, KIPT owns land at Smith Bay considered suitable for a deepwater timber export facility. The Company also owns Kangaroo Island's only sawmill.

KIPT's standing timber assets on the Island will exceed 3.6 million tonnes following a recent acquisition and will grow to at least 5.4 million tonnes by the time of harvest. Even without trees owned by other parties, the KIPT resource is sufficient to establish a sustainable plantation forestry industry on the Island, based on the export of timber to markets in North Asia and Southeast Asia, and the production of fence posts on Kangaroo Island from offcuts and thinnings.

The export of harvested timber directly to markets overseas requires the development of a deep-water wharf on Kangaroo Island. At present there is no such facility on the Island.

KIPT and other forestry users will produce 600 ktpa of logs in the first four years before settling on a sustainable flow of 450 ktpa thereafter, based on current plantation areas and species. This equates to no more than 21 shipments per annum in the first four years, and 14 shipments annually thereafter.

KIPT currently expects that it will use a 'boxy' handymax logger (ship) with carrying capacity of up to 30 kt and a draft of 10 m tropical fresh.

Once established, KIPT expects that the wharf will be used for 50-75 days per annum for timber exports, which will be sufficient for the sustainable yield of the entire Kangaroo Island forestry estate, including trees owned by other parties. The wharf will therefore have significant excess capacity.

Consequently, a principal objective of KIPT's wharf development is that it be a genuine multi-user facility available for use principally by the agricultural sector, but also for a wide variety of other users. Smith Bay, however, would be developed as a domestic rather than international port, with export vessels officially entering and leaving Australia at a recognised port, such as Fremantle.

The existing public boat ramp adjacent to the site (which is also suitable for loading barges) will be upgraded as part of the development.

KIPT will fund the full capital cost of the proposed wharf development, recovering the capital cost from a charge on timber exports. No financial assistance would be required from government to construct or operate the export facility. No capital contribution will be charged to those using the facility for non-forestry cargoes (such as agriculture).

Site and design considerations

KIPT's Smith Bay site is considered to be the most suitable site for the development of the wharf for several reasons.

- It is the closest practicable north coast site to the timber resource. This will minimise the on-land transport costs, which include the direct costs incurred by KIPT (e.g. the number of vehicles required, labour, fuel, maintenance and repairs etc), and the indirect costs such as wear and tear on the roads and the frequency of interactions with other traffic, especially tourists.

- It has the capacity to berth large ocean-going vessels relatively close to shore, which will enable timber to be shipped efficiently and cost-effectively directly to Asian markets. Deep water (i.e. >10 m) is only approximately 200 m from shore, which minimizes the need for dredging and means that suitable wharf facilities can be cost effectively constructed.
- It is sheltered from the prevailing south westerly winds and ocean swells.
- The land is relatively flat and therefore suitable for the safe storage of at least 30 kt of timber ready for loading.
- The land consists of cleared pasture and the disused footings of a former aquaculture operation and will therefore only require very minor clearance of native vegetation along a small section of the foreshore.
- The Smith Bay area is less frequently visited by tourists compared with much of Kangaroo Island.

Wharf design

A number of wharf designs were considered at the preliminary design stage. They included:

- building a near shore sheet piled wharf structure with direct connection to land along the back of the wharf / reclaimed area, and dredging from - 3 m down to - 10 m;
- building a causeway out to -5 m chart datum (CD)(i.e. below the lowest astronomical tide), with a sheet piled wharf structure forming a berth face and dredging from - 5 m to - 10 m;
- building a causeway out to -10 m CD from which a sheet piled wharf structure would form a berth face (Aztec Analysis 2016).

Subsequent geotechnical and geophysical investigations of the development site revealed the presence of high level rock that would be difficult and expensive to dredge. Furthermore, it was considered that full height sheet pile wharf structure would not be feasible, due to the expected difficulty in driving sheets with sufficient embedment into the high level rock.

Consequently, three further options that required less dredging and sheet piling were investigated. These included:

- combi-pile retaining wall (tubular steel piles with intermittent sheet piles);
- narrow suspended deck structure with sheet pile retaining wall behind;
- floating barge wharf with approach causeway (Aztec Analysis 2016).

The outcome of the design investigations was that the barge type floating wharf was recommended for the Smith Bay facility. This option involves the installation of a floating wharf / barge, which is restrained in place by guide / restraint dolphins. The wharf / barge would be minimum 120 m long and 35 m wide. Mooring dolphins at either end of the wharf would be required for vessel head and stern lines.

The berth face of the wharf / barge would be positioned approximately parallel to shore along the 10 m depth contour. The 250 m x 40 m berth pocket along the seaward edge of the wharf would be dredged to -13 m, with the approaches dredged to -12 m to accommodate bulk carriers with 30,000 deadweight tonnage (DWT) cargo capacity. An additional estimated 220 m lengthening of the approach causeway, through water 10-13 m deep, would be required to eliminate the need for dredging altogether. This is considered cost-prohibitive.

The wharf would be accessed by an approach causeway and a linkspan bridge/ramp at the seaward end of the causeway. Some (or all) of the causeway could be substituted with a suspended jetty structure if deemed to be more economical, constructible and/or environmentally acceptable.

The preliminary designs of the wharf and causeway are show in Figures 2a, 2b and 2c.

The key benefits of the floating wharf option are:

- reduction in dredging quantity;
- improved berthing conditions;
- lower capital cost;
- reduced construction time;
- reduced construction risk (Aztec Analysis 2016).

Onshore storage yard design

The on-shore timber storage area is divided into three storage area plateaus in order to provide flat storage areas on the otherwise gently sloping site. Approximately half of the storage area site has narrow plateaus that were formed to create level surfaces for previous abalone tanks. The existing narrow plateaus are not of sufficient width to cater for practical log storage. The preliminary design has a balance cut and fill to combine two adjacent existing plateaus to form wider plateaus.

The plan area for timber storage achieved with the preliminary design is approximately 5.6 ha. With this arrangement, it is anticipated that it will be possible to store approximately 8,000 tonnes per hectare, resulting in a storage capacity of approximately 45,000 tonnes, which would equate to 150% of anticipated vessel size. The storage area also needs to accommodate containerised agricultural and general cargo.

The preliminary layout of the timber storage yard is show in Figure 2a.

2.2 Feasible alternatives to taking the proposed action

N/A

2.3 Alternative locations, time frames or activities that form part of the referred action

N/A

2.4 Context, including any relevant planning framework and state/local government requirements

The Smith Bay proposal is considered to be consistent with:

- the goals expressed in the South Australian Strategic Plan of developing and maintaining a sustainable mix of industries across the State, increasing the value of exports, and promoting regional development; and
- targets expressed in the South Australian Economic Development Board's 2011 report on Kangaroo Island (Paradise Girt by Sea) of doubling farm gate income on Kangaroo Island within 10 years, by reducing the costs of transport of goods to and from the Island through the provision of a mulit-user wharf suitable for bulk or containerised freight.

KIPT is in the process of applying for major project/development status under Section 46 of the South Australian *Development Act 1993*. The proposal is considered to qualify as a major project/development under the Development Act as:

- the project will have major economic, social and environmental impacts on Kangaroo Island, and the wider South Australian economy, and is therefore appropriate for assessment as such; and
- the Kangaroo Island Council has indicated that it does not have the resources to assess a proposal of this nature.

The development will therefore be assessed under the state *Development Act 1993* as either an Environmental Impact Statement (EIS) or Public Environment Report (PER), rather than as a Development Report (DR).

At a local planning level the development will need to comply with the requirements of the Kangaroo Island Development Plan (KIDP).

The Smith Bay site is within the Coastal Conservation Zone of the KIDP, which means that the proposed development is non-complying. Under this plan, non-complying developments are not prohibited per se, but must be considered on their merits.

The KIDP favours or encourages economic initiatives and employment opportunities that support a robust and sustainable economic climate on Kangroo Island that contributes to the well-being of the local community. The Plan expressly acknowledges the potential for the plantation forestry industry to contribute to the Island's economy, but does not encourage further expansion of forestry plantations on the island. This implies that the further contribution which forestry can make to the Island's economy will occur by exploiting the existing plantation resource, which cannot occur without a deep-water export facility.

The KIDP acknowledges the need for a deep-water wharf on Kangaroo Island, and refers to the 'multi-user benefits' that a wharf could provide to the Island.

The KIDP also includes specific provisions and requirements relating to bulk handling and storage facilities, which is relevant given the need for laydown and stockpiling areas on land.

The KIDP refers to ongoing maintenance of the roads on the Island as a significant issue. In this context, the Plan expressly refers to the potential for the forestry industry to generate significant additional heavy vehicle movements, potentially causing significant wear and tear on the Island's existing road infrastructure.

Aspects of the proposal associated with transport of timber to the wharf will require additional assessment. In particular, the transport routes from the plantations to the wharf will need to be considered, and this is the subject of an independent study.

2.5 Environmental impact assessments under Commonwealth, State or Territory legislation

KIPT has applied for major project/development status under Section 46 of the *Development Act 1993*. The Development Assessment Commission (DAC) is yet to provide a determination concerning the level of environmental assessment (Environmental Impact Statement, Public Environment Report or Development Report), although a Public Environment Report is considered most likely. Marine and terrestrial ecology studies have recently been undertaken.

2.6 Public consultation (including with Indigenous stakeholders)

Public consultation will be undertaken as part of the state environmental impact assessment process (either EIS or PER).

Preliminary discussions with the Kangaroo Island Council indicate that there is broad support for the proposed development, subject to assessment.

One of the key advantages of the Smith Bay site is that it is surrounded by sparsely populated farmland, with only one residence directly overlooking the Smith Bay site.

This residence is owned by KIPT. The site is not adjacent to any existing or proposed tourism businesses.

The most important stakeholder in the area is Southseas Abalone, a WA-based company that operates an onshore abalone farm 500 m to the east of the proposed Smith Bay site. Over the last two years, KIPT has consulted with Southseas Abalone over its concerns regarding the potential for airborne dust emissions from the site, possible effects on water quality at their seawater intake and perception issues. KIPT is seeking to ensure that these concerns are addressed and that appropriate protocols are in place.

Consultation with indigenous stakeholders is not applicable to the development as, at the time of European settlement, Kangaroo Island was not inhabited by aboriginal communities. In fact, it was last inhabited approximately 2,000 years ago (Tyler et al. 1979).

2.7 A staged development or component of a larger action

N/A

2.8 Related actions

The proposed action only has related actions in the context of it being dependent upon forestry operations to produce the timber that will be exported via the wharf at Smith Bay.

The timber plantations on Kangaroo Island are an existing activity that require no further approval. Forestry operations will be conducted in accordance with approved environmental management plans under the relevant forestry certification schemes (AFS, PEFC and FSC).

Likewise, shipping operations will be conducted under the appropriate standards relating particularly to ballast water discharge and anti-biofouling protocols, with the additional imposition of the biosecurity measures relating specifically to Kangaroo Island.

3 Description of environment & likely impacts

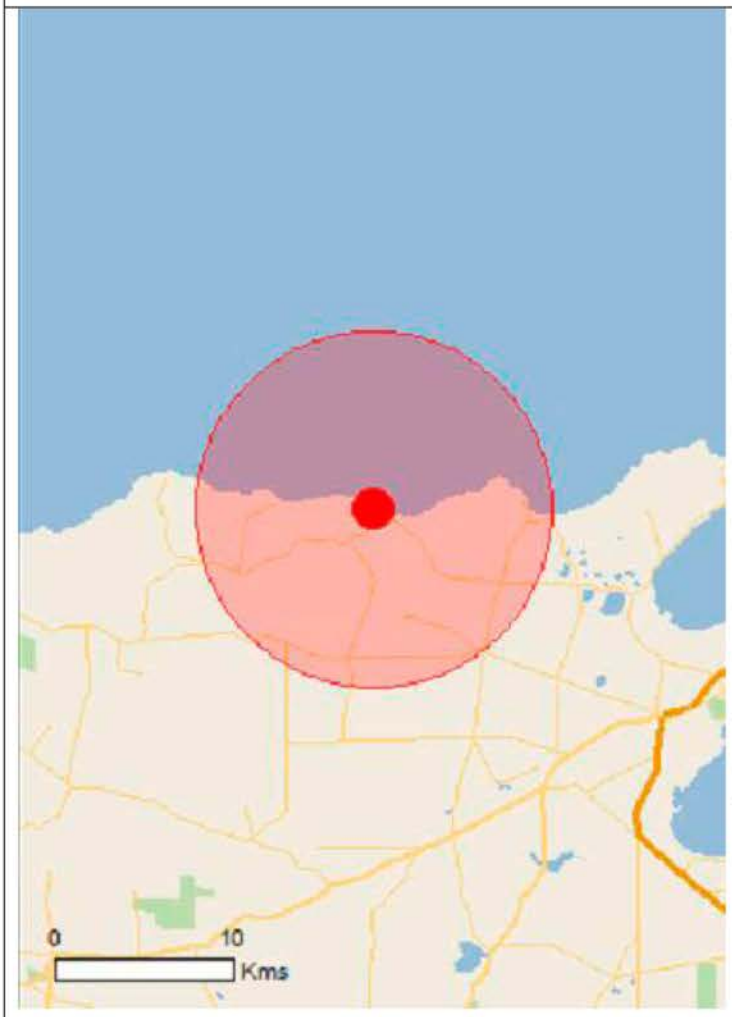
3.1 Matters of national environmental significance

The EPBC Protected Matters Search was regenerated on 23rd August 2016, at a 10 km buffer from the middle of the project area. The EPBC search has been undertaken to identify potential species and communities listed under the *Environment Protection and Biodiversity Conservation Act 1999* which may occur within the project area. Each of the listed species and communities will be reviewed to determine the likelihood of occurrence at the site. Potential impacts on the listed terrestrial species/communities that have a possible likelihood of occurrence within the project area will be assessed.

A terrestrial field survey was conducted by EBS on the 17th August 2016 to ground truth the vegetation present at the wharf site and determine the likelihood of occurrence of any threatened flora and fauna (EBS Ecology 2016). Similarly, a marine ecology field survey was conducted by SEA on the 3rd August 2016 (SEA 2016).

The information provided in the following sections is based on the August 2016 Protected Matters Search. A summary of the results of this search is provided in Table 1 and discussed in the following sections.

Table 1. Summary of the results of the EPBC Protected Matters Search Tool (10 km buffer).

Search area	Matters of National Environment Significance under the EPBC Act	Identified within search area
	World Heritage Properties	None
	National Heritage Places	None
	Wetlands of International Importance	None
	Great Barrier Reef Marine Park	None
	Commonwealth Marine Area	None
	Listed Threatened Ecological Communities	1
	Listed Threatened Species	40
	Listed Migratory Species	35
	Commonwealth Land	None
	Commonwealth Heritage Places	None
	Listed Marine Species	69
	Whales and other Cetaceans	12
	Critical Habitats	None
	Commonwealth Reserves Terrestrial	None
	Commonwealth Reserves Marine	None
	State and Territory Reserves	6
	Regional Forest Agreements	None
	Invasive Species	48
	Nationally Important Wetlands	None
	Key Ecological Features (Marine)	None

3.1 (a) World Heritage Properties

Description

N/A

Nature and extent of likely impact

N/A

3.1 (b) National Heritage Places

Description

N/A

Nature and extent of likely impact

N/A

3.1 (c) Wetlands of International Importance (declared Ramsar wetlands)

Description

N/A

Nature and extent of likely impact

N/A

3.1 (d) Listed threatened species and ecological communities

Description

The Protected Matters Search Tool identified the following nationally threatened species/ecological communities as potentially occurring or having habitat potentially occurring within the search area:

- 7 flora species
- 34 fauna species
- 1 ecological community.

These species/ecological communities, and their likelihood of occurrence within the project site, are shown in Table 2 and Table 3 below.

Table 2. Threatened species listed under the EPBC Act identified from the Protected Matters Search Tool (10 km buffer).

Scientific name	Common name	EPBC Status	Likelihood of occurrence within project site
FLORA			
Caladenia tensa	Rigid Spider-orchid	EN	Unlikely
Cheiranthera volubilis	Twining Finger Flower	VU	Unlikely
Pomaderris halmaturina subsp. halmaturina	Kangaroo Island Pomaderris	VU	Unlikely
Ptilotus beckerianus	Ironstone Mulla Mulla	VU	Unlikely
Pultenaea villifera var. glabrescens	Yellow Bush-pea, Splendid Bush-pea	VU	Unlikely
Spyridium eriocephalum var. glabrisepalum	MacGillivray Spyridium	VU	Unlikely
Thelymitra matthewsii	Spiral Sun-orchid	VU	Unlikely
FAUNA			
Birds			
Botaurus poiciloptilus	Australasian Bittern	EN	Unlikley
Calyptorhynchus lathami halmaturinus	Glossy Black-Cockatoo (Kangaroo Island)	EN	Possible – fly over (foraging habitat is situated 600 m and 2 km from the project site, but not within the site)
Diomedea epomophora epomophora	Southern Royal Albatross	VU, Mi (Ma)	Unlikely

Diomedea epomophora sanfordi	Northern Royal Albatross	EN, Mi (Ma)	Unlikely
Diomedea exulans (sensu lato)	Wandering Albatross	VU, Mi (Ma)	Unlikely
Diomedea exulans antipodensis	Antipodean Albatross	VU, Mi (Ma)	Unlikely
Halobaena caerulea	Blue Petrel	VU, Ma	Unlikely
Limosa lapponica baueri	Bar-tailed Godwit (baueri)	VU	Unlikely
Limosa lapponica menzbieri	Northern Siberian Bar-tailed Godwit	CE	Unlikely
Macronectes giganteus	Southern Giant Petrel	EN, Mi (Ma)	Unlikely
Macronectes halli	Northern Giant Petrel	VU, Mi (Ma)	Unlikely
Pachyptila turtur subantarctica	Fairy Prion	VU, Ma	Unlikely
Phoebetria fusca	Sooty Albatross	VU, Mi (Ma)	Unlikely
Pterodroma mollis	Soft-plumaged Petrel	VU, Ma	Unlikely
Rostratula australis	Australian Painted Snipe	EN, Ma	Unlikely
Sternula nereis nereis	Australian Fairy Tern	VU	Possible – coastal in front of project area
Thalassarche cauta cauta	Shy Albatross	VU, Mi (Ma)	Unlikely
Thalassarche cauta steadi	White-capped Albatross	VU, Ma	Unlikely
Thalassarche melanophris	Black-browed Albatross	VU, Mi (Ma)	Unlikely
Thalassarche melanophris impavida	Campbell Albatross	VU, Mi (Ma)	Unlikely
Thalassarche steadi	White-capped Albatross	VU, Mi (Ma)	Unlikely
Thinornis rubricollis rubricollis	Hooded Plover (eastern)	VU, Ma	Likely
Zoothera lunulata halmaturina	Bassian Thrush (South Australian)	VU	Unlikely
Mammals			
Balaenoptera musculus	Blue Whale	EN, Mi (Ma)	Unlikely
Eubalaena australis	Southern Right Whale	EN, Mi (Ma)	Possible
Isoodon obesulus obesulus	Southern Brown Bandicoot	EN	Unlikely
Megaptera novaeangliae	Humpback Whale	VU, Mi (Ma)	Unlikely
Neophoca cinerea	Australian Sea-lion	VU, Ma	Likely
Sminthopsis aitkeni	Kangaroo Island Dunnart	EN	Unlikely
Tachyglossus aculeatus multiaculeatus	Kangaroo Island Echidna	EN	Known – diggings were recorded during the 2016 survey by EBS
Reptiles			
Caretta caretta	Loggerhead Turtle	EN, Mi (Ma)	Unlikely
Chelonia mydas	Green Turtle	VU, Mi (Ma)	Unlikely
Dermochelys coriacea	Leatherback Turtle	EN, Mi (Ma)	Unlikely
Sharks			
Carcharodon carcharias	Great White Shark	VU, Mi (Ma)	Likely

Table 3. Threatened ecological communities listed under the EPBC Act identified from the Protected Matters Search Tool (10 km buffer).

Threatened ecological community	EPBC Status	Likelihood of occurrence
Kangaroo Island Narrow-leaved Mallee (*Eucalyptus cneorifolia*) Woodland	CE	Unlikley – patch did not qualify as Threatened ecolgocial community

Conservation Codes: CE: Critically Endangered, **EN**: Endangered, **VU**: Vulnerable, **R**: Rare.

THREATENED ECOLOGICAL COMMUNITIES

The Kangaroo Island Narrow-leaved Mallee (*Eucalyptus cneorifolia*) Woodland is a nationally-protected ecological community.

Simple minimum condition thresholds have been developed for the KI Mallee Woodland ecological community, based on patch widths of 60 metres (https://www.environment.gov.au/system/files/resources/ab8e9576-38e6-4dc7-9b36-becca5028f42/files/kangaroo-island-mallee-woodlands.pdf):

- Patches that have a width of 60 metres or more tend to retain intact native vegetation and qualify as the listed community.
- Patches that are less than 60 metres wide along most of their length tend to be degraded, with low native species diversity and high weed cover, and are excluded from the listing. This

excludes most stands on farms that serve as windbreaks or shelterbelts, as well as narrow remnants that lie along road verges.

A small patch of this community was recorded during the August 2016 field survey. This vegetation was situated on the access track into the project area. The section of vegetation did not meet the condition requirements to be qualified as a TEC, as it was not 60 metres wide as per the requirements. A second patch adjacent to the southern property fence line of the project area is most likely to meet the size category of the TEC, but was not assessed as it wasn't within the study area for the wharf proposal.

Other remnant patches of Kangaroo Island Narrow-leaved Mallee are known to occur adjacent to public roads surrounding the project area. The transport route to the wharf, however, has not yet been finalised. Any clearance, trimming or other effects associated with the transport of timber to the wharf along public roads will be the subject of a separate ecological assessment.

FAUNA

One of the 34 threatened fauna species was identified as known, two are likely and four as possibly occurring within the Smith Bay project site, from the Protected Matters Search:

- *Tachyglossus aculeatus multiaculeatus (*Kangaroo Island Echidna) – EN known to occur
- *Neophoca cinerea (*Australian Sea-lion) – VU, Ma likely to occur
- *Carcharodon carcharias* (Great White Shark) – VU, Mi (Ma), likely to occur
- *Calyptorhynchus lathami halmaturinus* (Glossy Black-Cockatoo (Kangaroo Island)) – EN possibly occuring
- *Sternula nereis nereis* (Australian Fairy Tern) – VU possibly occuring
- *Thinornis rubricollis* (Hooded Plover) – VU likely to occur
- *Eubalaena australis* (Southern Right Whale) – EN, Mi (Ma) possibly occurring.

These species are discussed below (Table 4). Further background on the threatened fauna species is provided in the Smith Bay Ecological Assessment – KIPT Kangaroo Island Report (EBS Ecology 2016).

Table 4. Description of EPBC listed fauna species assessed as having potential to occur within the KIPT Smith Bay Project Site.

Species (and EPBC status)	Description
***Tachyglossus aculeatus multiaculeatus (Kangaroo Island Echidna)* – Endangered**	The Kangaroo Island echidna is restricted to Kangaroo Island, South Australia and its extent of occurrence is estimated at 4400 km^2 (Woinarski et al. 2014). It occurs at a single location (KI) and there is continuing decline in the number of mature individuals. Kangaroo Island echidnas are relatively common throughout most of the Island's remaining natural vegetation, but at a lower density than prior to European settlement due to habitat loss (Rismiller 1999). They are declining due to predation by cats and pigs, and due to road mortality. Recruitment does not keep up with the rate of non-natural and natural deaths (P. Rismiller, pers. comm.). The number of mature individuals is estimated at 5000 and the population size reduction is approaching 30% in 75 years (i.e. three generations). The species' extent of occurrence is considered to be restricted, and the geographic distribution is precarious for the survival of the species because its occurrence is restricted to a single location and decline in number of mature individuals may be inferred. Echidna scratchings were observed during the field survey completed by EBS on 17 August 2016; no individuals were observed. There is suitable habitat for this species surrounding the project area. It is recommended that the project area be micro-sited prior to construction activities occurring; if individuals were observed, an authorised professional would be able to relocate any individuals found to a suitable area nearby.
***Neophoca cinerea* (Australian Sea-lion) – Vulnerable**	Breeding colonies occur on islands or remote sections of coastline. The breeding range extends from the Houtman Abrolhos, Western Australia (WA), to The Pages Island, east of Kangaroo Island, South Australia (SA). Overall, 66 breeding colonies have been recorded to date: 28 in WA and 38 in SA (Shaughnessy 1999). The Australian Sea-lion exhibits high site fidelity and little movement of females between colonies has been observed. There is little or no interchange of females between breeding colonies, even between those separated by short distances (Campbell et al. 2008).

	About 30% of the population occurs at sites in WA and 70% in SA. The Australian Sea-lion is neither increasing in population numbers nor expanding its range (DAFF 2007). Due to the species' long breeding cycle (17.6 months) the time required to increase population size is longer than for species with shorter breeding cycles (Orsini & Newsome 2005). An analysis of pup production at the Seal Bay colony on Kangaroo Island, SA, indicates a rate of decrease of 0.77% per year (12% decline between 1985–2003) (Shaughnessy et al. 2006). Smaller populations are highly vulnerable to extinction especially in the context of loss to fisheries bycatch and the high site fidelity of females (Goldsworthy et al. 2010). Australian Sea-lions use a wide variety of habitats (Gales et al.1994) for breeding sites (called rookeries) and, during the non-breeding season, for haul-out sites (rest stops, which are also useful for predator avoidance, thermal regulation and social activity) (Campbell 2005). Australian Sea-lions prefer the sheltered side of islands and avoids exposed rocky headlands that are preferred by the New Zealand Fur Seal (*Arctocephalus forsteri*). The Australian Sea-lion has records mainly distributed along the southern coastline of KI (Atlas of Living Australia, http://www.ala.org.au/). It is unlikely that this species would breed within the coastal zone of the project area, given that habitat is unsuitable. However, there is the possibility that this species may pass through the area. Risk to this species is unknown in terms of knowing what impact increased shipping traffic might have on individuals if present in the area. The coastal zone associated with the project area should be micro-sited prior to construction
***Calyptorhynchus lathami halmaturinus* (Glossy Black-Cockatoo (Kangaroo Island)) – Endangered**	The Glossy Black-Cockatoo (Kangaroo Island) is currently restricted to Kangaroo Island in South Australia. It has been recorded at sites on the northern and western coasts of the island, from Sandy Creek to Antechamber Bay, and along inland river systems including Cygnet, Stun'sail Boom, Harriet and Eleanor Rivers (Baxter 1989b; Garnett et al. 1999; Glossy Black-Cockatoo Recovery Program, unpublished records; Higgins 1999; Joseph 1982; Mooney & Pedler 2005; Pepper 1997). Recent reports from the Glossy Black-Cockatoo Recovery Team suggest the subspecies may breed at American River. This site is considered to be the eastern-most breeding site for the species at present (Glossy Black-Cockatoo Recovery Program, unpublished records). The Glossy Black-Cockatoo (Kangaroo Island) inhabits woodlands that are dominated by Drooping Sheoak (*Allocasuarina verticillata*) and often interspersed with taller stands of Sugar Gum (*Eucalyptus cladocalyx*). These woodlands occur in small gullies adjacent to cleared land in coastal and sub-coastal areas, generally on shallow acidic soils on the steep and rocky slopes of gorges and valleys, along inland creek and river systems (Garnett & Crowley 2000; Joseph 1982; Mooney & Pedler 2005; Pepper 1996, 1997). Though most activity is confined to Drooping Sheoak and Sugar Gum, the Glossy Black-Cockatoo (Kangaroo Island) occasionally utilises other tree species, including Blue Gum (*Eucalyptus leucoxylon*), Manna Gum (*E. viminalis*) for breeding and Slaty Sheoak (*Allocasuarina muelleriana*) for foraging (Joseph 1982; P. Mooney 2007, pers. comm.; Pepper 1993, 1996). The Glossy Black-Cockatoo (Kangaroo Island) does not occur in any of the threatened ecological communities, nor is it associated with any other threatened species, listed under the EPBC Act. Glossy Black Cockatoo (Kangaroo Island) have been sighted and identified regularly feeding approximately 2 km from the site at Smith Bay (DEWNR, pers. comm.). The proposed site is located 600 m from Glossy Black Cockatoo (Kangaroo Island) feeding habitat with another situated along the North Coast Raod (approximately 2 km away) (DEWNR, pers. comm.). The 2015 annual population census recorded 15 individuals utilising roadside vegetation along the North Coast Road. The flock comprised six adult pairs and three immature birds, which represents approximately 4% of the KI population (DEWNR, pers. comm.).
***Sternula nereis nereis* (Australian Fairy Tern) – Vulnerable**	The Australian Fairy Tern is found on coastal beaches, inshore and offshore islands, sheltered inlets, sewage farms, harbours, estuaries and lagoons. It favours both fresh and saline wetlands and near-coastal terrestrial wetlands, including lakes and salt-ponds (Pizzey and Doyle 1980). Sheltered estuaries to the east of the project area appear suitable for this species, although there have been no recent records for the coastal area in proximity to the project site. Generally confined to the coastal zone but possible fly over. The closest record to the project area was 23 individuals recorded at Bay of Shoals 19/10/2005, where birds were observed as feeding and roosting (Atlas of

	Living Australia, http://www.ala.org.au/).
***Thinornis rubricollis* (Hooded Plover) – Vulnerable**	The Hooded Plover (eastern) is widely dispersed on or near sandy beaches in south-eastern Australia. Its range extends from about Jervis Bay in New South Wales to the western reaches of the Eyre Peninsula in South Australia, and includes Tasmania and various offshore islands such as Kangaroo Island, King Island and Flinders Island (Barrett et al. 2003; Garnett & Crowley 2000; Marchant & Higgins 1993; Matthews 1913-14). Approximately 10 m of the shore at Smith Bay has been artificially cleared of boulders and now offers a sheltered sandy section, which is used as a public boat ramp. The dispersed nature of the breeding distribution means that all populations are important, and that loss of any population would result in fragmentation. The Hooded Plover (eastern) occurs in coastal areas, on or near high energy sandy beaches. They are generally found close to shore, but may occasionally visit sites located a short distance inland (e.g. lakes near the coast). Hooded Plovers (eastern) mainly inhabit sandy ocean beaches and their adjacent dunes. They have been claimed to have reasonably narrow preferences when it comes to beach habitat, but recent studies suggest that a variety of beach types may be used. Hooded Plovers (eastern) are sometimes found in habitats other than beaches, e.g. on rock platforms, reefs, around near coastal lakes and lagoons. The Department of Environment, Water and Natural Resources (DEWNR) has records from the biennial KI census of a pair of Hooded Plover at Smith Bay in 2010, 2014 and 2016 (DEWNR, pers. comm.).
***Carcharodon carcharias (Great White Shark)* – Vulnerable**	The Great White Shark is the world's largest predatory fish, growing to about 6 meters. It occupies a cosmopolitan range throughout most seas and oceans with concentrations in temperate coastal seas. It is principally known as a pelagic dweller of temperate continental shelf waters. It is found from the intertidal zone to far offshore, and from the surface down to depths over 250 m. One of its most important habitats is along the southern coast of Australia, and in particular off Port Lincoln and Kangaroo Island. Recent tagging and tracking studies have demonstrated that they often undertake long distance coastal movements. Their diet consists of a variety of bony fish, such as snapper and bluefin tuna, sea lions, seals and carrion such as dead whales. Their decline has been attributed to sports-fishing, commercial drumline trophy-hunting and commercial bycatches (IUCN Red List, http://www.iucnredlist.org/details/3855/0).
***Eubalaena australis (Southern Right Whale)* – Endangered**	The Southern Right Whale is a baleen whale that feeds on krill in Antarctic waters during summer and migrates to southern Australian waters in winter to calve in winter/spring. Its name derives from early whalers who considered it to be the 'right' whale to hunt as it lives close inshore, floats when dead and produces copious amounts of oil. Consequently, it was hunted during the 19th century to near extinction. Over the last three decades, however, its population has increased significantly with more and more females being observed at calving locations such as Victor Harbor and at the head of the Great Australian Bight (Edgar 1997).

Nature and extent of likely impact

The criteria to be considered when determining whether an action will have a significant impact on a listed threatened species of National Environmental Significance are as follows. The action must not:

- lead to a long-term decrease in the size of a population;
- reduce the area of occupancy of the species;
- fragment an existing population into two or more populations;
- adversely affect habitat critical to the survival of a species;
- disrupt the breeding cycle of a population;
- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;
- result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat;
- introduce disease that may cause the species to decline; or
- interfere with the recovery of the species.

The Wharf development at Smith Bay will not result in any of the these impacts on the identified threatened species or the ecological community as discussed below.

Terrestrial environment

The shore-based component of the development (i.e. the timber storage area) will occur on cleared agricultural land, some of which has previously been used for commercial abalone farming. The land immediately adjacent to the proposed development site continues to be used as an abalone farm and pasture. The proposed development site is virtually devoid of native vegetation and consequently provides only degraded habitat for native species of flora or fauna.

No EPBC listed flora species are known to occur within the project area.

A single patch of the nationally-protected ecological community Kangaroo Island Narrow-leaved Mallee (*Eucalyptus cneorifolia*) Woodland occurs adjacent to the access track into the project area. However, it does not meet the requirements of an ecological community as it is not 60 metres wide. Furthermore, none of the trees would be cleared during the upgrading of the access track. Potential effects on roadside vegetation associated with the transport of timber to the wharf along public roads will be the subject of a separate ecological assessment.

None of the fauna species identified as having potential to occur in the region within the Protected Matters Search Tool results is likely to utilise the site as important or critical habitat.

Echidna (*Tachyglossus aculeatus multiaculeatus*) scratchings were recorded along the western boundary of the site and on adjacent properties, indicating that there is probably a resident population of Echidnas in the relatively large stand of remnant vegetation approximately 500 m west of the site. However, no echidnas were observed on the site during the survey. Although there is a slight risk that echidnas may occasionally be killed by truck movements along the access track, there is no credible risk that it would lead to a long-term decrease in the size of a population. Should it be considered expedient, a fauna proof fence would be erected along the western side of the access track to minimise to the greatest extent possible the likelihood of road-kills occurring.

Several bird species including the Glossy Black-Cockatoo (*Calyptorhynchus lathami halmaturinus*), Australian Fairy Tern (*Sternula nereis nereis*) and the Australian Fairy Tern (*Sternula nereis nereis*) may occasionally fly over the site or use the remnant habitat in the area. Specific use of the site by these species may be as follows:

- The Glossy Black-Cockatoo (Kangaroo Island) may fly over the project area to access remnant patches of Drooping Sheoak (*Allocasuarina verticillata*) feeding habitat located along the North Coast Road 600 m and 2 km from the site (DEWNR, pers. comm.). The Glossy Black-Cockatoo's use of remnant habitat along the transport routes (public roads) and within the timber plantations is outside the scope of this referral and is not therefore considered here.
- The Australian Fairy Tern may occasionally forage on the coastal beach created by the boat ramp within the project area.
- Hooded Plovers may occasionally forage on the sandy beach within the project area as they move to other foraging and breeding beaches along the north coast of Kangaroo Island. This is likely as a pair of Hooded Plovers has been recorded at Smith Bay in 2010, 2014 and 2016 (DEWNR, pers. comm.).

The site, however, is not important or critical habitat for these species. Although some beach habitat would be affected during construction and operation of the wharf, it comprises only a minute proportion of similar beach habitat along the north coast of Kangaroo Island. Being highly mobile, these species would relocate to alternative habitat that is abundant throughout the region.

It is concluded that the project proses no credible risk to any of the threatened terrestrial fauna species that may inhabit the project area.

Marine environment

Although the seafloor adjacent to the development site was dredged many years ago to provide access by barges to shore, the marine habitats remain in good condition and continue to support a diversity of marine flora and fauna.

Consequently, the marine environment adjacent to the site may occasionally provide foraging or resting habitat for several threatened marine species including the Great White Shark, the Australian Sea-lion and the Southern Right Whale that may inhabit the wharf area for a short time as they travel along the coast. The proposed wharf area, however, would not comprise important or critical habitat for any of these species.

During construction and operation of the wharf, each of these species may avoid the wharf area and relocate to similar marine habitats that are very abundant along the north coast of Kangaroo Island. Similarly, they would be able to easily avoid ships that approach and leave the wharf at relatively slow speeds. Although ships are know to occasionally strike whales, such incidents are extremely rare and would not be capable of affecting the population of Southern Right Whales.

It is concluded that the project proses no credible risk to any of the threatened marine species that may traverse the project area.

3.1 (e) Listed migratory and marine species

Description

The Protected Matters Search identified 57 listed migratory and marine species that may occur or may have habitat occurring within the project area. These species and their likelihood of occurrence within the project area are shown in Table 5 below.

Table 5. Migratory and marine species listed under the EPBC Act identified from the Protected Matters Search Tool (10 km buffer).

Scientific name	Common name	EPBC Status	Likelihood of occurrence within project site
Birds			
Apus pacificus	Fork-tailed Swift	Mi (Ma)	Possible
Ardea alba	Great Egret	Ma	Possible
Ardea ibis	Cattle Egret	Ma	Possible
Arenaria interpres	Ruddy Turnstone	Mi (W), Ma	Possible
Calidris acuminata	Sharp-tailed Sandpiper	Mi (W), Ma	Possible
Calidris ruficollis	Red-necked Stint	Mi (W), Ma	Possible
Catharacta skua	Great Skua	Ma	Unlikely
Gallinago hardwickii	Latham's Snipe, Japanese Snipe	Mi (W), Ma	Unlikely
Haliaeetus leucogaster	White-bellied Sea-Eagle	Ma	Known
Larus pacificus	Pacific Gull	Ma	Known
Limosa lapponica	Bar-tailed Godwit	Mi (W), Ma	Unlikely
Merops ornatus	Rainbow Bee-eater	Ma	Unlikely
Motacilla cinerea	Grey Wagtail	Mi (T), Ma	Unlikely
Motacilla flava	Yellow Wagtail	Mi (T), Ma	Unlikely
Myiagra cyanoleuca	Satin Flycatcher	Mi (T), Ma	Unlikely
Pandion haliaetus	Osprey	Mi (W), Ma	Possible – fly over
Phalacrocorax fuscescens	Black-faced Cormorant	Ma	Possible
Puffinus carneipes	Flesh-footed Shearwater	Mi (Ma)	Unlikely
Tringa nebularia	Common Greenshank	Mi (W), Ma	Possible
Fish			
Acentronura australe	Southern Pygmy Pipehorse	Ma	Unlikely
Campichthys tryoni	Tryon's Pipefish	Ma	Possible
Filicampus tigris	Tiger Pipefish	Ma	Unlikely
Heraldia nocturna	Upside-down Pipefish	Ma	Unlikely
Hippocampus abdominalis	Eastern Potbelly Seahorse	Ma	Possible
Hippocampus breviceps	Short-head Seahorse	Ma	Possible

Histiogamphelus cristatus	Rhino Pipefish	Ma	Possible
Hypselognathus rostratus	Knifesnout Pipefish	Ma	Possible
Kaupus costatus	Deepbody Pipefish	Ma	Possible
Leptoichthys fistularius	Brushtail Pipefish	Ma	Possible
Lissocampus caudalis	Australian Smooth Pipefish	Ma	Possible
Lissocampus runa	Javelin Pipefish	Ma	Unlikely
Maroubra perserrata	Sawtooth Pipefish	Ma	Unlikely
Notiocampus ruber	Red Pipefish	Ma	Unlikely
Phycodurus eques	Leafy Seadragon	Ma	Possible
Phyllopteryx taeniolatus	Weedy Seadragon	Ma	Unlikely
Pugnaso curtirostris	Pug-nosed Pipefish	Ma	Possible
Solegnathus robustus	Robust Pipefish	Ma	Unlikely
Stigmatopora argus	Spotted Pipefish	Ma	Possible
Stigmatopora nigra	Wide-bodied Pipefish	Ma	Possible
Stipecampus cristatus	Ring-backed Pipefish	Ma	Known – sighted during marine survey
Urocampus carinirostris	Hairy Pipefish	Ma	Unlikely
Vanacampus margaritifer	Mother-of-pearl Pipefish	Ma	Unlikely
Vanacmapus phillipii	Port Phillip Pipefish	Ma	Possible
Vanacampus poecilolaemus	Long-snouted Pipefish	Ma	Possible
Vanacampus vercoi	Verco's Pipefish	Ma	Possible
Mammals			
Arctocephalus forsteri	Long-nosed Fur-seal	Ma	Possible
Arctocephalus pusillus	Australian Fur-seal	Ma	Unlikely
Whales and other Cetaceans			
Balaenoptera acutorostrata	Minke Whale	Ma	Unlikely
Balaenoptera edeni	Bryde's Whale	Mi (Ma)	Unlikely
Caperea marginata	Pygmy Right Whale	Mi (Ma)	Unlikely
Delphinus delphis	Common Dolphin	Ma	Likely
Grampus griseus	Risso's Dolphin	Ma	Unlikely
Lagenorhynchus obscurus	Dusky Dolphin	Mi (Ma)	Unlikely
Lamna nasus	Porbeagle, Mackerel Shark	Mi (Ma)	Unlikely
Orcinus orca	Killer Whale, Orca	Mi (Ma)	Unlikely
Tursiops aduncus	Indian Ocean Bottlenose Dolphin	Ma	Likely
Tursiops truncates s.str.	Common Bottlenose Dolphin	Ma	Unlikely

Conservation Codes:, **Mi(Ma)**: Migratory – Marine, **Mi(T)**: Migratory Terrestrial, **Mi (W)** – Migratory Wetlands, **Ma** (Marine).

Two marine species were seen during the site survey:

- *Haliaeetus leucogaster* (White-bellied Sea-eagle) and
- *Larus pacificus* (Pacific Gull).

Nine of the 57 listed migratory and marine bird species identified in the Protected Matters Search are considered as possibly occurring within the KIPT Smith Bay project site:

- *Apus pacificus* (Fork-tailed Swift) - Mi (Ma)
- *Ardea alba* (Great Egret, White Egret) - Mi (W)
- *Ardea ibis* (Cattle Egret) - Mi (W)
- *Arenaria interpres* (Ruddy Turnstone) - Mi (W)
- *Calidris acuminata* (Sharp-tailed Sandpiper) - Mi (W)
- *Calidris ruficollis* (Red-necked Stint) - Mi (W)
- *Pandion haliaetus* (Osprey) - Mi (W)
- *Phalacrocorax fuscescens* (Black-faced Cormorant) – Ma
- *Tringa nebularia* (Common Greenshank) – Mi (W), Ma.

Sixteen of the 57 listed migratory and marine fish species identified in the Protected Matters Search are considered as possibly occurring within the KIPT Smith Bay project site:

- *Campichthys tryoni* (Tryon's Pipefish) - Ma
- *Hippocampus abdominalis* (Eastern Potbelly Seahorse) - Ma
- *Hippocampus breviceps* (Short-head Seahorse) - Ma
- *Histiogamphelus cristatus* (Rhino Pipefish) - Ma

- *Hypselognathus rostratus* (Knifesnout Pipefish) - Ma
- *Kaupus costatus* (Deepbody Pipefish) - Ma
- *Leptoichthys fistularius* (Brushtail Pipefish) - Ma
- *Lissocampus caudalis* (Australian Smooth Pipefish) - Ma
- *Phycodurus eques* (Leafy Seadragon) - Ma
- *Pugnaso curtirostris* (Pug-nosed Pipefish) - Ma
- *Stigmatopora argus* (Spotted Pipefish) - Ma
- *Stigmatopora nigra* (Wide-bodied Pipefish) - Ma
- *Stipecampus cristatus* (Ring-backed Pipefish) - Ma
- *Vanacmapus phillipii* (Port Phillip Pipefish) - Ma
- *Vanacampus poecilolaemus* (Long-snouted Pipefish) - Ma
- *Vanacampus vercoi* (Verco's Pipefish) – Ma.

One of the 57 listed migratory and marine mammal species identified in the Protected Matters Search is considered as possibly occurring within the KIPT Smith Bay project site:

- *Arctocephalus forsteri* (Long-nosed Fur-seal) - Ma

Two of the 57 listed migratory and marine whales and other cetacean species identified in the Protected Matters Search are considered as likely to occur and one possibly occurring within the KIPT Smith Bay project site:

- *Delphinus delphis* (Common Dolphin) – Ma – likely
- *Tursiops aduncus* (Indian Ocean Bottlenose Dolphin) – Ma – likely
- *Balaenoptera edeni* (Bryde's Whale) – Mi (Ma) – possible.

All species known or considered as possibly occurring within the project site are discussed in Table 6 below, except for species that are also threatened (covered in Section 3.1d above). Further background on migratory species is provided in the Smith Bay Ecological Assessment – KIPT, Kangaroo Island Report (EBS Ecology 2016).

Table 6. Descriptions of migratory and marine species listed under the EPBC Act assessed as having potential to occur within the KIPT Smith Bay Project Site.

Species (and EPBC status)	Description
Birds	
***Haliaeetus leucogaster* (White-bellied Sea-Eagle) - Marine**	The White-bellied Sea-Eagle is typically found in coastal habitats including offshore islands. The habitats occupied by White-bellied Sea-Eagles are characterised by the presence of large areas of open water (larger rivers, swamps, lakes, the sea). White-bellied Sea-Eagles generally forage over large expanses of open water; this is particularly true of birds that occur in coastal environments close to the sea-shore, where they forage over in-shore waters (Marchant and Higgins 1993; Smith 1985). White-bellied Sea-Eagles are long lived, take many years to mature and defend specific territories centred around favoured nesting and roost sites, which can be used for successive generations (Dennis et al 2014). White-bellied Sea-Eagles have several guard roosts in the vicinity of their nesting territory where they spend considerable amounts of the day. Unlike in other areas of Australia, the majority of South Australian White-bellied Sea-Eagle nests and guard roosts are on isolated and open cliffs devoid of major vegetation (Dennis et al 2014). Therefore, nests and guard roosts can be disturbed much more easily in these exposed locations and from a greater distance than they are in more vegetated habitats (Dennis et al 2011a). South Australia has a small and isolated population of the species with only 70-80 pairs, mostly occurring on offshore Islands (Dennis et al 2014). Kangaroo Island contains a significant proportion of the known population with 26.4% of the state's known population focused around 18 occupied territories (Dennis et al 2011b). In South Australia, the breeding season for White-bellied Sea-Eagles is from May to December inclusive, while the most sensitive period of the breeding season being from mid-May to September (Dennis et al 2011a). Disturbance at the start of the season may impact whether the birds breed that year or not, and disturbance during

	the later nestling period could leave the chicks unprotected from exposure or predators. A single White-bellied Sea-Eagle was observed foraging within the coastal zone of the project area during the site visit in August 2016. This species is also known to breed in the general area. The species has recent records within the coastal zone near the project area with a record at Emu Bay on 18/4/2011 (Atlas of Living Australia, http://www.ala.org.au/). This coastal species is known in the project area and is likely to utilise it as a fly-over pathway for foraging. The project area is not suitable for breeding.
***Larus pacificus* (Pacific Gull) – Marine**	The Pacific Gull is endemic to southern Australia. The subspecies *L. p. georgii* is found on the coasts of south-western Western Australia and western South Australia. The Pacific Gull is usually found on sandy beaches but also rocky coasts and offshore islands. The species forages along sandy beaches, feeding mainly on molluscs, fish, crabs and other marine animals. They are usually seen singularly or in pairs. The Pacific Gull breeds from October to December in single pairs or small, loose colonies on offshore islands, cliffs and headlands. The Pacific Gull was observed within the coastal zone of the project area during the site visit in August 2016. The closest record of this species to the project area is at Cape D'Estaing on 30/9/2002, near Emu Bay. There were also several other records for this species around Emu Bay. This coastal species could be a possibly fly-over, however is unlikely to utilise the coastal zone for breeding.
***Apus pacificus* (Fork-tailed Swift) - Migratory (Marine)**	The Fork-tailed Swift is of Asian origin. The species is almost exclusively aerial during its stay in Australia. This species can be classed as common throughout its range and is frequently observed ahead of large storm fronts, hawking for insects. It mostly occurs over inland plains but sometimes above foothills or in coastal areas. It is an Australian summer visitor. It is considered a possible fly-over species in relation to the project area.
***Ardea alba* (Great Egret, White Egret) - Migratory (Wetland)**	The Great Egret has been reported in a wide range of wetland habitats (e.g. inland and coastal, freshwater and saline, permanent and ephemeral, open and vegetated, large and small, natural and artificial). It prefers shallow water, particularly when flowing, but may be seen on any watered area, including damp grasslands. Great Egrets can be seen alone or in small flocks, often with other egret species, and roost at night in groups. It is partially migratory, with northern hemisphere birds moving south from areas with cold winters. Populations across Australia are considered to fluctuate in size in recognition of the highly variable availability of suitable wetland habitat. The species occupies individual sites erratically, and often in highly variable numbers, across a wide geographic area. It may potentially occur at wetlands within the broader area, flying over the project area infrequently or using the project area occasionally to travel between sites. It is expected that this species could occur as an infrequent visitor to the site, with generally low numbers of individuals across the region.
***Ardea ibis* (Cattle Egret) - Migratory (Wetland)**	The Cattle Egret utilises grasslands, woodlands and wetlands with a preference for moist areas with tall grass, or shallow open wetlands, and wetland margins. It is common in northern Australia, but uncommon in most of its range in southern Australia. Suitable habitats exist within and near the project area. The species is known to move freely between preferred habitat types. It is expected that this species is likely to occur as an infrequent visitor to the site, with generally low numbers of individuals across the region.
***Arenaria interpres* (Ruddy Turnstone) - Migratory (Wetland)**	The Ruddy Turnstone is a migratory wading species which is a common visitor to Spencer Gulf during its routine non-breeding migration (Sept-Mar). The species prefers rockier coastline in southern Australia but is also observed on tidal mudflats and mangroves. It feeds around coastal lagoons and occasionally in low vegetation in saltmarsh or in grassy areas above the tideline. The species has recent records within the coastal zone near the project area (DEWNR, pers. comm.); this is in the same vicinity where the Hooded Plover was recorded. This coastal species could be a possibly fly-over.
***Calidris acuminata* (Sharp-tailed Sandpiper) - Migratory (Wetland)**	The Sharp-tailed Sandpiper is commonly found during the Australian winter. It prefers muddy edges of shallow fresh or brackish wetlands with inundated or emergent sedges, saltmarsh or other low vegetation. There are no recent records of this species along the coast in proximity to the project area; the most recent was 29/10/2012 situated near salt lagoon on the North Coast Road adjacent to Bay of Shoals (Atlas of Living Australia, http://www.ala.org.au/). This coastal species could be a possibly fly-over.
***Calidris ruficollis* (Red-necked Stint) - Migratory**	The Red-necked Stint is mostly found in sheltered coastal areas. It forages on bare wet mud on intertidal mudflats, sandflats or in very shallow water (DOE 2016). There

(Wetland)	are no recent records of this species. However an individual record is recorded from the Atlas of Living Australia (DEWNR, pers. comm.) from 6/2/1984 at the northern end of Emu Bay, 6 km to the east of the development site. This coastal species could be a possibly fly-over.
Pandion haliaetus **(Osprey) - Migratory (Wetland)**	The Osprey is a medium size raptor that usually occurs singularly or in pairs. It occurs in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. It requires extensive areas of open fresh, brackish or saline water for foraging. The breeding population of Osprey in SA is small and fragmented. A single observation of an Osprey was made south of Point Marsden on 6/6/2010 in open limestone coastline with low coastal cliffs. The osprey can be observed regularly at Emu Bay and possibly on the eastern side of Cape d'Estaing (the project site); it should be noted that the KI Osprey population is estimated to have suffered a 50% decline in the number of breeding pairs between 2010 and 2015, particularly along the north coast of KI (DEWNR, pers. comm.). Whilst no suitable habitat is present within the coastal zone of the project area, cliffs do occur either side of the project area along the coastal fringe. This predominantly coastal species is considered a possible fly-over in relation to the project area.
Phalacrocorax fuscescens **(Black-faced Cormorant) – marine**	The Black-faced Cormorant is found along the southern coasts of mainland Australia and Tasmania, and is common in Bass Strait and in Spencer Gulf, South Australia. Black-faced Cormorants frequent coastal waters and are found in flocks in large bays, deep inlets, rocky headlands and islands. They seldom visit beaches. Black-faced Cormorants are sedentary. The Black-faced Cormorant breeds throughout the year in large colonies on off-shore islands. The nest is always on the ground, usually of seaweed and grasses on bare rock (Higgins and Davies 1996). The closest record of this species to the project area is at Cape D'Estaing on 30/9/2002, near Emu Bay. This coastal species could be a possibly fly-over.
Tringa nebularia **(Common Greenshank) – Migratory**	The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats. It uses both permanent and ephemeral terrestrial wetlands and forages and roosts in shallow ponds and at the edge of wetlands. Birds are mostly present between August and April, though some data suggested birds have remained in SA through the winter months. The closest record of this species to the project area is at Shoal Bay on 15/7/2000. The species would generally be found in the coastal area but is considered a possible fly-over species.
Fish	
Campichthys tryoni **(Tryon's Pipefish) - Ma**	Occurs in Queensland but a single, damaged specimen from the South Australian gulf area (Gomon et al. 2008). On shallow reef flats and reef margins bordering on to sand channels. Usually secretive under large rubble pieces. Dredged on rubble substrates in estuaries and inner reefs (Kuiter 2009, Gomon et al. 2008)
Hippocampus abdominalis **(Eastern Potbelly Seahorse) - Ma**	On IUCN Red list, but Data Deficient. Suggested status in Australia is Lower Risk, but Conservation Dependent. Occurs throughout southern Australia from the Great Australian Bight to Victoria and Tasmania. In SA it has been recorded in the western and central part of the State, including the Great Australian Bight, Eyre Peninsula, Spencer Gulf, Yorke Peninsula and Gulf St Vincent. It occupies a wide variety of habitats including near reef edges, under jetties and wharves, attached to Ecklonia kelp holdfasts and mooring chains, and floating attached to bits of seagrass or macroalgae. It has also been found in seagrass beds and near the entrances to estuaries. In deeper water it is often associated with sponges and sometimes bryozoans. It occurs from the shallow subtidal depths to at least 35 m (Baker 2006).
Hippocampus breviceps **(Short-head Seahorse) - Ma**	On IUCN Red list (data deficient). Suggested status in Australia is data deficient. Mainly a south-eastern Australian species including Bass Strait, eastern Tasmania, Victoria and SA. In SA, the species has been recorded mainly in Gulf St Vincent, Yorke Peninsula, Spencer Gulf and Eyre Peninsula and parts of the Great Australian Bight. The species occurs mainly in protected coastal bays and estuaries, including shallow coastal reefs and reef patches near sand with macroalgal communities such as *Cystophora* and *Sargassum*, and along the edge of seagrass stands (e.g. *Amphibolis* spp.). They are often found attached to (or among) the fronds of macroalgae and can be common in localised areas. Depth range is shallow sub-tidal to 15 m (Baker 2006).
Histiogamphelus cristatus **(Rhino Pipefish) - Ma**	Widespread from SA/Victorian border, Encounter Bay, Kangaroo Island (near Penneshaw), Gulf St Vincent and Spencer Gulf to the Great Australian Bight. It is a shallow sub-tidal species that has been recorded from seagrass beds, including sparse seagrass that borders onto sand and rubble substrates, and sometimes in estuaries. Also recorded around jetties in Tasmania and WA (Baker 2006).
Hypselognathus rostratus **(Knifesnout Pipefish) - Ma**	Broadly distributed from the Bass Strait region to SA. In SA the species has been found in various locations with differing oceanographic conditions, ranging from sheltered waters in bays of the eastern Great Australian Bight, and the mid-north of

	both gulfs, to more exposed islands offshore from Eyre Peninsula. Records range from Encounter Bay through to the eastern Great Australian Bight, with most reports coming from various locations in Gulf St Vincent and Spencer Gulf, and a single record from near Kingscote. Adults are reported to be regular visitors on sand flats off Victor Harbor in about 10 m depth. The species probably inhabits unsilted seagrass meadows, at "moderate depths". Has been collected from *Posidonia* seagrass beds in Spencer Gulf in SA and very shallow *Zostera* seagrass in Gulf St Vincent (Baker 2006).
***Kaupus costatus* (Deepbody Pipefish) - Ma**	This pipefish is known mainly from SA, and isolated populations in Victoria and Bass Strait. It has been recorded widely throughout SA including the Ceduna area, throughout Spencer Gulf and Gulf St Vincent, the lower Fleurieu locations, Investigator Strait, the north-eastern bays of Kangaroo Island (Bay of Shoals and Stokes Bay), and American River. Relatively common along the north eastern side of Gulf St Vincent. The species has been recorded from *Zostera* seagrass beds on north-eastern Kangaroo Island. It is usually found in quiet (i.e. low energy), shallow (usually 3 m or less) seagrass beds in silty-bottomed, clear-water environments (Baker 2006).
***Leptoichthys fistularius* (Brushtail Pipefish) - Ma**	Brushtail Pipefish has a discontinuous distribution across southern Australia, from Bass Strait and north-east Tasmania, Victoria, SA, and southern WA. In SA, records range from the mid south-east through to Eyre Peninsula, with most records from the gulfs region. There have been records near Kingscote and in the Bay of Shoals. The species is found in shallow seagrass beds, including *Zostera* species. Adults are usually found in seaward estuaries and bays with vast areas of dense seagrass, between 3 m – 20 m deep. The species was found in abundance in Spencer Gulf in deeper coastal water (>5 m) seagrass meadows, especially monospecific stands of *Posidonia* (Baker 2006).
***Lissocampus caudalis* (Australian Smooth Pipefish) - Ma**	Smooth Pipefish is widespread along Australia's south coast, including Kangaroo Island (near Kingscote, in Pelican Lagoon and the Bay of Shoals), and considered locally common in some areas. Smooth Pipefish has been reported from a variety of habitats, mostly less than 15 m deep, including mixed rubble areas and low macroalgae-covered reefs in semi-exposed shallow coastal bays, rock pools / tide pools, *Zostera* seagrass beds in shallow inshore waters, *Amphibolis antarctica* seagrass beds in shallow water (i.e. 3 m – 4 m), and amongst floating *Sargassum* plants (Baker 2006).
***Phycodurus eques* (Leafy Seadragon) - Ma**	On the IUCN Red list as Lower Risk, but Near Threatened. Suggested status in Australia is Lower Risk, but Conservation Dependent. Leafy Seadragons are found mainly in SA and WA, where they are commonly recorded. There are records from Investigator Strait and Penneshaw. Leafy Seadragons occur mainly near the edges of stands of *Ecklonia* macroalgae, but have also been recorded in the vicinity of other canopy macroalgae, seagrasses, various mixed habitats (e.g. the junction between *Cystophora* and *Sargassum* communities with seagrasses such as *Amphibolis* and/or *Posidonia*), and artificial structures such as jetties and tyre reefs. The recorded depth range is 1 m to about 50 m (Baker 2006).
***Pugnaso curtirostris* (Pug-nosed Pipefish) - Ma**	Occurs along the southern Australian coast, including Victoria, Bass Strait, SA, Tasmania and southern WA. There are records from Stokes Bay, Boxing Bay and Kingscote. The Pug-nosed Pipefish is more commonly recorded than many other pipefish species, but usually in low numbers per site. The species has been recorded from a variety of habitats, from low tide level to about 11 m deep. Habitats include mangrove-lined creeks, *Zostera* seagrass, *Posidonia* and *Amphibolis* seagrass (including seagrass patches near reef), macroalgae on low reef patches in sand, "broken areas of seabed along channels", large rubble on sand, and in shallow, low-energy estuaries and protected bays (Baker 2006).
***Stigmatopora argus* (Spotted Pipefish) - Ma**	Found across southern Australia, from central NSW to WA and Tasmania. Spotted Pipefish is the most abundant and widely dispersed pipefish in SA. There are records from Kingscote and American River. It lives in high densities in seagrass beds in the shallow subtidal, to about 20 m. It occurs in higher densities in *Posidonia* seagrass, compared with *Zostera* and *Amphibolis* (Baker 2006).
***Stigmatopora nigra* (Wide-bodied Pipefish) - Ma**	An abundant species across southern Australia, from southern Queensland to WA. South Australian records are from American River and the gulfs region, including Barker Inlet, Section Bank / Outer Harbour area, Port Giles, Port Willunga and estuarine creeks off Port Pirie. It is often recorded in beds of intertidal *Zostera* and shallow subtidal *Heterozostera*, as well as near bare sand, *Posidonia* seagrass and mangroves (Baker 2006).
***Stipecampus cristatus* (Ring-backed Pipefish) - Ma**	Individual found at Smith Bay in *Posidonia* meadow during August 2016 survey. Known from Victoria, Bass Strait and islands, northern Tasmania, and SA. Large numbers recorded in Port Philip Bay in Spring for breeding. In SA, it has been recorded in south-central Spencer Gulf, Gulf St Vincent (including the metropolitan area and near Edithburgh), and lower western Eyre Peninsula. It has been found in a

	variety of habitats including among brown and red macroalgae in sheltered reef habitats, macroalgal habitats and areas of sand, clean sandy areas containing sparse seagrass, near tidal channels in large estuaries, estuaries among open seagrass, and the edge of a *Posidonia* seagrass bed. The species is usually recorded between 3 m and 15 m (Baker 2006).
***Vanacmapus phillipii* (Port Phillip Pipefish) - Ma**	Port Phillip Pipefish is an abundant species across southern Australia, ranging from NSW through to WA. In SA it has been regularly recorded in Gulf St Vincent (eastern and western sides), northern, central and southern Spencer Gulf coasts, northern Kangaroo Island (Kingscote and Western River Cove), and the bays of the west coast of SA. It is found in estuaries and seagrass beds in shallow coastal waters, including very shallow sand and mud flats with *Zostera* and *Posidonia* seagrass, in shallow channels edged by mangroves, and shallow *Zostera* seagrass beds at the edge of mud flats that are exposed at low tide (Baker 2006).
***Vanacampus poecilolaemus* (Long-snouted Pipefish) - Ma**	Long-snouted Pipefish is known mainly from SA, particularly Gulf St Vincent and Spencer Gulf, Kangaroo Island (Kingscote and American River), and the eastern Great Australian Bight. The Long-snouted Pipefish is found in estuaries and shallow bays, including intertidal / shallow subtidal seagrass beds (*Zostera*) in quiet, silty-bottomed, clear-water areas, in subtidal *Posidonia* seagrass beds, and on shallow reefs with macroalgae. It has been recorded in waters from 1 m to around 10 m deep (Baker 2006).
***Vanacampus vercoi* (Verco's Pipefish) – Ma**	Suggested status in Australia is Lower Risk, but Near Threatened. Currently known only from the central part of the South Australian coast. It has been recorded in central and southern Spencer Gulf, south-western Gulf St Vincent/southern Yorke Peninsula, and north-eastern Kangaroo Island in Pelican Lagoon. It is found in a variety of habitats including shallow macroalgae and seagrass, often in tidal channels, over a narrow depth range (mainly to 3 m deep), tide pools, *Zostera* seagrass, and possibly "broken bottom" (rubble) habitat adjacent to seagrass. It is possible that the species is relatively common, but lives in inaccessible micro-habitats (Baker 2006).
Mammals	
***Arctocephalus forsteri* (Long-nosed Fur-seal) - Ma**	The Long-nosed Fur-seal (previously known as the New Zealand Fur-seal) is a species of Fur-seal found mainly around the southern coast of Australia and New Zealand. Most of the Australian population is in South Australia, between Kangaroo Island and Eyre Peninsula. There have been isolated records of stray individuals along the north coast of Kangaroo Island, including at Stokes Bay and Kingscote. However, the north coast of Kangaroo Island is not a significant habitat for this species compared with other parts of Kangroo Island such as Admirals Arch. Fur-seal populations in southern Australia were heavily exploited during the early 19th century resulting in major population reductions. Numbers have slowly recovered in recent years. In South Australia there are 29 breeding colonies that produced 20,431 pups in 2013-14, resulting in a total population in South Australia of 97,200. Most pups were on Kangaroo Island (49.6%) (Shaughnessy et al. 2015).
Whales and other Cetaceans	
***Delphinus delphis* (Common Dolphin) – Ma**	The Common dolphin occurs widely throughout the world, including around the Australian mainland and Tasmania. In South Australia it is relatively abundant in both sheltered bays and in the open ocean. It is highly likely that Common dolphins would occur in Smith Bay at times. It often occurs in large schools that can exceed 1000 animals. Groups occupy home ranges, feeding on small fish and cephalopods. Common dolphins often follow boats but are wary of divers (Edgar 1997).
***Tursiops aduncus* (Indian Ocean Bottlenose Dolphin) – Ma**	The Bottlenose dolphin occurs widely throughout the world, including around the Australian mainland and Tasmania. It is also common throughout South Australian waters. It is highly likely that the Bottlenose dolphins would occur in Smith Bay at times. This species moves into estuaries more often than other dolphins and usually lives in groups of 5 to 20 animals. A resident pod of Bottlenose dolphins inhabits the Port River estuary. Bottlenose dolphins are inquisitive and often approach divers and boats (Edgar 1997).

Information generally sourced from DOE (2016).

Nature and extent of likely impact

The criteria to be considered when determining whether an action will have a significant impact on any listed migratory species are as follows. The action must not:

- substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species;
- result in an invasive species that is harmful to the migratory species becoming established in an

area of important habitat for the migratory species; or
- seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

The criterion to be considered when determining whether an action will have a significant impact on any listed marine species is as follows. The action must not:
- have a substantial adverse effect on a population of a marine species or cetacean including its life cycle (for example, breeding, feeding, migration behaviour, life expectancy) and spatial distribution.

The Wharf development at Smith Bay will not result in any of the these impacts on the identified listed migratory or marine species as discussed below.

Migratory and marine birds

Although a number of migratory and marine bird species may occasionally fly over the site, or use the adjacent beach, the habitat provided at the site would be of minor or no importance to these species.

Several of the marine shorebirds, such as the Pacific Gull and Black-faced Cormorant, may at times forage or rest on the beach habitat at the site. Being highly mobile, they would move to the abundant alternative beach habitat in the area during construction and operation of the wharf, resulting in no measurable effect on these species.

The habitat at the site would be of little value to wetland species such as the two Egrets, Common Greenshank and Red-necked Stint, which would only fly over the site en-route to their preferred wetland habitat. They would probably continue to fly over the site during construction and operation of the wharf.

Coastal raptors such as the White-bellied Sea-Eagle and Osprey would fly over the site whilst foraging along the coast. Although both species are also known to nest mainly on cliffs along the north coast of Kangaroo Island both east and west of Smith Bay, the Smith Bay site does not provide suitable nesting habitat. The closest known White-bellied Sea-Eagle and Osprey nests are 4.1 km and 12.4 km from Smith Bay, respectively (see Figure 4).

Both species would probably continue to fly over the site during construction and operation of the wharf, but may not forage in the general vicinity of the wharf. Since the wharf area would only comprise a minute proportion of the foraging habitat along the north coast of Kangaroo Island, the reduction in foraging habitat would have no effect on either species.

Similarly, the increase in shipping activity (approximately one ship every four weeks), is unlikely to have any effect on the foraging or nesting behaviour of either species of raptor. Nesting would not be affected by shipping movements as ships would always approach and leave the wharf directly from and to deep off-shore water rather than along the coast. Ships would therefore never pass any closer than about 3-4 km from a nesting site. It is considered that power boats that regularly traverse the north coast of Kangaroo Island close to the cliffs would be a far greater source of disturbance to the nesting activities of White-bellied Sea-Eagles and Ospreys than distant ships.

It is concluded that the project proses no credible risk to any of the migratory or marine birds that may inhabit the project area.

Pipefish

The seagrass and macro-algae habitat off Smith Bay was recently found to support the Ring-backed pipefish and may support other species of pipefish.

Syngnathids have attracted much global-scale conservation attention over the last two decades due to a vigorous international trade in seahorses and pipehorses for traditional medicine, and for aquaria and curios. In 2002, the entire genus of Hippocampus was listed in the Convention on International Trade in Endangered Species of Wild Fauna and Flora. At a National level, syngnathids have been afforded a high level of legislative protection, compared with almost all other marine fish, as marine species under the EPBC Act 1999. In South Australia syngnathids are protected from capture under the South Australian Fisheries Act 1982.

Although none of the sygnathids is currently listed as rare in South Australia their conservation status remains uncertain for several reasons:

- They range from the apparently rare and localised, to the widely distributed and very common.
- There is also lack of agreement about some species identities.
- For some species, particularly the more cryptic pipefishes, the apparent limited distribution and uncommonness of the species is likely to be an artefact of sampling difficulty (Baker 2006).

Population characteristics of the Ring-backed pipefish include:

- apparently restricted distribution of populations in SA (known mainly from the gulfs);
- low population densities;
- strong habitat association;
- probably small home range and low mobility;
- probable monogamy; and
- site-attached reproduction with small brood sizes (Reef Watch 2014).

Dredging of the wharf pocket and approaches will result in the loss of some seagrass habitat and the potential loss of some pipefish. Although pipefish have limited mobility, some are likely to have the ability to move a short distance away from the area of direct impact during construction. Furthermore, there is an abundance of similar habitat in Smith Bay, Emu Bay and other bays along the north coast of Kangaroo Island which would be expected to support a similar density of pipefish.

A study of the mobile epi-fauna inhabiting seagrass meadows on the north coast of Kangaroo Island using beam trawls recorded 119 pipefish comprising 10 species (Kinloch et al. 2007). Although the Ring-backed Pipefish was not recorded during this study, the overall density of pipefish within the seagrass meadows was found to be approximately one per 20 square metres.

The loss of a very small amount of pipefish habitat and potentially some pipefish during construction will have a negligible effect upon the overall population or viability of pipefish in Smith Bay and on the north coast of Kangaroo Island.

There is no reasonable or foreseeable possibility that construction of the wharf at Smith Bay will fragment or decrease the size of populations of any species of pipefish, affect their critical habitat or disrupt their breeding cycles.

It is concluded that the project proses no credible risk to the viability of pipefish on the north coast of Kangaroo Island.

Dolphins and seals

The Common Dolphin, Indian Ocean Bottle-nose Dolphin and the Long-nosed Fur Seal are all relatively adundant in South Australian coastal waters and would frequently traverse Smith Bay as they forage along the north coast of Kangaroo Island. Smith Bay, however, would not comprise important or critical habitat for any of these species.

During construction and operation of the wharf each of these species may avoid the wharf area and relocate to similar marine habitats that are very abundant in the Smith Bay region. The loss of a very small amount of marine habitat adjacent to the wharf would not affect affect these species as there is a vast amount of similar habitat along the north coast of Kangaroo Island.

It is concluded that the project proses no credible risk to the dolphins or seals that traverse Smith Bay.

3.1 (f) Commonwealth marine area
(If the action is in the Commonwealth marine area, please complete 3.2(c) instead. This section is for actions taken outside the Commonwealth marine area that may have impacts on that area.)

Description
N/A

Nature and extent of likely impact

N/A

3.1 (g) Commonwealth land
(If the action is on Commonwealth land, please complete 3.2(d) instead. This section is for actions taken outside Commonwealth land that may have impacts on that land).

Description
N/A

Nature and extent of likely impact

N/A

3.1 (h) The Great Barrier Reef Marine Park

Description
N/A

Nature and extent of likely impact

N/A

3.1 (i) A water resource, in relation to coal seam gas development or large coal mining development

Description
N/A

Nature and extent of likely impact

N/A

3.2 Nuclear actions, actions taken by the Commonwealth (or Commonwealth agency), actions taken in a Commonwealth marine area, actions taken on Commonwealth land, or actions taken in the Great Barrier Reef Marine Park

3.2 (a)	**Is the proposed action a nuclear action?**		No

If yes, nature & extent of likely impact on the whole environment

3.2 (b)	**Is the proposed action to be taken by the Commonwealth or a Commonwealth agency?**		No

If yes, nature & extent of likely impact on the whole environment

3.2 (c)	**Is the proposed action to be taken in a Commonwealth marine area?**		No

If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(f))

3.2 (d)	**Is the proposed action to be taken on Commonwealth land?**		No

If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(g))

3.2 (e)	**Is the proposed action to be taken in the Great Barrier Reef Marine Park?**		No

If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(h))

3.3 Description of the project area and affected area for the proposed action

3.3 (a) Flora and fauna

Terrestrial environment

The Smith Bay site has been almost entirely cleared of native terrestrial vegetation for previous agricultural and industrial use, and as such, supports little native flora and fauna. Only small remnant patches of native vegetation (mainly Coastal Mallee *Eucalyptus diversifolia* and Common Boobialla *Myoporum insulare*) remain on the dunes along the foreshore. None of the remnant flora is of conservation significance.

In addition to the nationally listed flora species that could occur (see Section 3.1d), 13 state threatened flora species have been recorded within 10 km of the project area (EBS Ecology 2016). EBS Ecology considers that none of these species is likely to occur at the proposed development site.

Thirty flora species were recorded during the ecological survey of the site, which included 19 exotic flora species (see EBS Ecology 2016). A map showing the location of threatened flora records within the Smith Bay region is provided by EBS Ecology (2016).

In addition to the nationally listed fauna species that could occur in the region (see Section 3.1d), 18 state threatened fauna species have been recorded within 10 km of the project area (see EBS Ecology 2016). Of the 18 state listed fauna species, 13 were birds, four were mammals and one was a reptile. EBS Ecology considers that eight of the 18 species may at times potentially occur within the project area. The only fauna species of conservation significance recorded at the site during the August 2016 survey were the White-bellied Sea-Eagle and signs (scratchings) of the Kangaroo Island Echidna.

Marine environment

Smith Bay is a relatively low energy environment as it is largely sheltered from the prevailing south westerly swells in the Southern Ocean. The relatively sheltered conditions along the north coast of Kangaroo Island have supported the development of isolated but extensive seagrass communities in sheltered bays where there is sandy substrate. Reef communities have developed in the areas with rocky substrate.

The marine environment adjacent to the proposed development site supports a mixture of dense seagrass communities on sand and macro-algae communities on rock. The seafloor at the site consists mainly of rock and reef with a relatively thin veneer of sand that has accumulated in places over the rock.The cover is approximately 30% seagrass, 60% macro-algae and 10% bare rock or sand.

The seagrass communities consist of a mixture *of Posidonia sinuosa, P. coriacea, Amphibolis antarctica* and *A. griffithii* (see SEA 2016). In the shallower water (< 10 m) they are generally very healthy and vigorous communities, which probably reflect the clear water in the area. In the deeper water (> 10 m), the seagrass communities become sparser, as their depth limit is approached, and are dominated by *Posidonia sinuosa* . The macroalgae community is dominated by *Cystophora* spp., *Caulerpa* spp., *Sargassum* spp. and *Scaberia aghardii*.

The invertebrates and fish communities recorded at the site were found to be typical of the reef and seagrass habitats on the north coast of Kangaroo Island (see SEA 2016). The only species of conservation significance found during the marine survey was the Ring-backed pipefish *Stipecampus cristatus.* The seagrass and reef habitat at Smith Bay is typical habitat for pipefish and may support other pipefish species (SEA 2016).

Other species of conservation significance that may occur in the area include the Western Blue Groper (*Achoerodus gouldii*), Harlequin Fish (*Othos dentex*), Western Blue Devil (*Paraplesiops meleagris*), and Long-snouted boarfish (*Pentaceropsis recurvirostris*).

3.3 (b) Hydrology, including water flows

Several ephemeral creeks enter Smith Bay. The largest traverses the western edge of the parcel of land adjoining the Smith Bay site and discharges to the sea approximately 100 m west of the site. Although the creeks have been highly disturbed by past agricultural practices, they continue to support some remnant vegetation along their banks.

3.3 (c) Soil and Vegetation characteristics

Interim Biogeographical Regionalisation of Australia (IBRA) is a landscape based approach to classifying the land surface across a range of environmental attributes, which is used to assess and plan for the protection of biodiversity. The project area falls within the Kanmantoo IBRA bioregion and Kangaroo Island IBRA sub-region and Stokes Bay Environmental Association.

Approximately 54% (22,949 ha) of the Stokes Bay Environmental Association is mapped as remnant native vegetation, of which 44% (10,167 ha) is formally conserved.

The foreshore is lined by small sand dunes (up to 2 m high), with the beach consisting of granite boulders that have been rounded and polished by wave action. One small sandy beach exists at the site where the boulders have been removed to create a boat launching/landing site. It was probably created to facilitate the export of timber and wool from Smith Bay between the world wars.

The seafloor consists mainly of rock and reef with a relatively thin veneer of sand that has accumulated in places over the rock.

A geotechnical investigation using several onshore boreholes and offshore seismic refraction revealed the seabed conditions to typically be estuarine muds and sands (minimal thickness of 1-3 m) underlain by a mixture of cobbles/boulders over mudstone/siltstone. A likely slip fault line was inferred to be present (Aztec Analysis 2016).

3.3 (d) Outstanding natural features

There is a geological monument 2 km to the east of the site. This is the "Smith Bay Glacial Pavements" which extends further along the coast towards Emu Bay for about 1 km.

3.3 (e) Remnant native vegetation

Five broad vegetation associations were defined within the project area (Table 8). The condition of native vegetation associations ranged from 0:1 (very poor) to 6:1 (moderate). A map of the vegetation associations and condition is provided in the Smith Bay Ecological Assessment (EBS Ecology 2016).

Most of the native vegetation within the project area has been cleared. Native vegetation is now restricted to relatively small areas of natural regeneration and small areas of remnant vegetation. Most of the area is now Exotic Grassland / Herbland. The stand of Kangaroo Island Narrow-leaf Mallee occurs next to the access track into the proposed development site, rather than on the site.

Table 8. Vegetation Associations located within the KIPT Smith Bay project area.

Vegetation association		Condition	Area (ha)
1	Exotic Grassland / Herbland (grazing pasture paddock)	0:1	12
2	*Enchylaena tomentosa* (Ruby Saltbush) Low Open Shrubland	1:1	1.5
3	Planted *Eucalyptus* spp. / planted garden species	0:1	0.4
4	*Eucalyptus diversifolia* (Coastal White Mallee) / *Myoporum insulare* (Common Boobialla) Low Open Woodland	5:1	1
5	*Eucalyptus cneorifolia* (Kangaroo Island Narrow-leaf Mallee) Tall Open Forest	6:1	0.4
	Total Area		15.3

3.3 (f) Gradient (or depth range if action is to be taken in a marine area)

The onshore section of the Smith Bay site is sloping with a relatively shallow gradient (perhaps 5%).

The offshore section of the development site shelves relatively rapidly into deep water. The 10 m depth contour is approximately 185 m from shore, and the 13 m contour approximately 330 m.

3.3 (g) Current state of the environment

The onshore section of the Smith Bay site is highly disturbed by past clearance and agricultural practices and is in poor condition ecologically. Much of the area is now an Exotic Grassland / Herbland and the project area is dominated by weeds. Only 11 native flora species were observed at the site, compared with 19 weed species (of which 4 are declared weeds) (EBS Ecology 2016).

The offshore section of the site supports a healthy marine ecosystem that is typical of similar marine ecoystems along the north coast of Kangaroo Island.

Bathymetric studies of the seabed show evidence of historical dredging at Smith Bay. It is believed the dredged channel was made when the site was used as a timber and wool export facility between the World Wars. The sides of the existing dredged pocket are still sharply defined, suggesting limited if any longshore drift.

The abalone farm adjacent to the site discharges seawater used to support abalone to Smith Bay via pipes on the upper section of the rocky beach. There was no evidence that the discharged seawater is having adverse ecological effects on the marine environment adjacent to the proposed development site.

3.3 (h) Commonwealth Heritage Places or other places recognised as having heritage values

N/A

3.3 (i) Indigenous heritage values

No indigenous heritage values are known to exist at the Smith Bay site.

3.3 (j) Other important or unique values of the environment

The nearest parks or reserves to Smith Bay are:

- Lathami Conservation Park approximately 20 km west;
- Parndana Conservation Park approximately 20 km south west;
- Busby Islet Conseration Park approximately 17 km east;
- Cygnet Estuary Conservation Park approximately 16 km south east;
- Encounter Marine Park approximately 12 km south east; and
- Spencer Gulf Marine Park approximately 20 km west.

There is also one property under a Heritage Agreement (HA864) approximately 2.5 km south-west of the project area.

There are no protected areas or wetlands of national significance within the project area.

3.3 (k) Tenure of the action area (e.g. freehold, leasehold)

KIPT has freehold title to the development site, through its subsidiary Cinerea Pty Ltd.

3.3 (l) Existing uses of area of proposed action

There is currently a land-based abalone farm immediately to the east of the development site. Most of the other land in the area is used for agriculture (pasture and cropping).

3.3 (m) Any proposed uses of area of proposed action

The area of the proposed action is owned by KIPT and will be used to develop the proposed wharf.

The adjacent site will continue to be used as an abalone farm.

4 Environmental outcomes

Although there is no credible risk that construction and operation of the wharf at Smith Bay will significantly affect any of the listed species that may occur in the project area, there is some risk of minor effects on pipefish and the Kangaroo Island Echidna.

Construction of the wharf will result in the loss of some seagrass habitat and the probable loss of some pipefish. Although pipefish have limited mobility, some are likely to have the ability to move a short distance away from the area of direct impact to adjacent seagrass habitat, which would lessen the effect. Furthermore, there is an abundance of similar habitat in Smith Bay, Emu Bay and other bays along the north coast of Kangaroo Island which would be expected to support a similar density of pipefish. There is, however, little baseline data on pipefish populations in the area (Baker 2007).

Nevertheless, it is considered that the loss of a very small amount of pipefish habitat and potentially some pipefish during construction will have a negligible effect upon the overall population or viability of pipefish in Smith Bay and on the north coast of Kangaroo Island.

Similarly, access by trucks into the Smith Bay site may result in the occasional mortality of Kangaroo Island Echidnas that appear at times to leave the remnant woodland approximately 500 m west of the site and forage along the access track. Although echidnas are relatively common on Kangaroo Island, their population is considered to be declining due mainly to habitat loss and predation by cats and pigs (Rismiller, 1999).

Occasional road-kills by traffic associated with the project would have a negligible effect on the overall population or viability of echidnas in the area or on Kangaroo Island.

It is concluded with a high degree of certainty that construction and operation of the wharf at Smith Bay will not fragment or decrease the size of populations of any of the listed species, affect critical habitat or disrupt breeding cycles.

5 Measures to avoid or reduce impacts

The main measures that will be adopted to avoid, reduce, manage or offset impacts are outlined below.

Marine measures

The loss of seagrass and pipefish habitat will be off-set in the following way.

- Under the *Native Vegetation Act 1991* the loss of approximately 8 ha of seagrass during construction of the wharf will require the preparation of an offset strategy that will result in a significant environmental benefit (SEB).
- Offset opportunities are provided by the existing significant seagrass dieback (and loss of pipefish habitat) in Nepean Bay on Kangaroo Island that has been caused by high nutrient loads from agricultural run-off entering the bay via the Cygnet River.
- An appropriate offset strategy will therefore be to support strategies to reduce nutrient inputs to the Nepean Bay. This will be achieved by providing appropriate financial support to the Natural Resources Kangaroo Island's ongoing 'Catchment to Coast Project' that aims to arrest and reverse the seagrass decline by reducing nutrient inputs to Nepean Bay via the Cygnet River. The Project has developed a model of the Cygnet River catchment that predicts nutrient and sediment loads in its tributaries and thereby targets improvements in the management of the catchment.
- The amount of financial support provided to the 'Catchment to Coast Project' will be negotiated with the Native Vegetation Council and Natural Resources Kangaroo Island.

During dredging operations adverse effects on seawater turbidity and sedimentation effects will be mitigated by the use of silt curtains that will be placed around the construction area from the surface to the sea floor to contain mobilized sediment.

Should investigations reveal longshore drift to be a significant issue at Smith Bay, the first section of the causeway (50 m) is likely to be replaced by a pier structure that will allow sand to move along the coast.

BiosecuritySA will be consulted to determine the most appropriate shipping and wharf operating procedures (to be documented in a marine pest management plan) to minimize the risk of introducing marine pests to Smith Bay.

Terrestrial measures

Under the *Native Vegetation Act 1991* the clearance of a small amount of terrestrial vegetation at the Smith Bay site will require the preparation of an offset strategy that will be developed in consultation with the Native Vegetation Council. This may involve planting an appropriate amount of native vegetation such as Drooping Sheoak at appropriate locations around the Smith Bay development site, or other sites if they are deemed to be more appropriate.

Measures will be taken to ensure that road-kills of the Kangaroo Island Echidna on the access track into Smith Bay are avoided or minimised. These are likely to include the erection of signs warning truck drivers of the presence of echnidas and of the need to remain vigilant. An echidna proof fence may also be erected along the western side of the access track. Determination of the most appropriate measures will be made in consultation with DEWNR.

The small remnant patch of the Kangaroo Island Narrow-leaved Mallee (*Eucalyptus cneorifolia*) Woodland that occurs along the access track into the project area will be appropriately marked to ensure that it is protected from clearance or damage during the upgrading of the access track.

In addition to the above environmental management and offset strategies, KIPT also proposes to provide significant ongoing support to the Glossy Black Cockatoo Recovery Plan on Kangaroo Island to ensure that KIPT's activities on Kangaroo Island result in a net environment benefit to the Glossy Black Cockatoo (see Mooney and Pedler 2005). The nature of this support will be determined in consultation with DEWNR and the Glossy Black Cockatoo Recovery Plan personnel. However, it is likely to include financial support of existing programs and potentially the development of specific programs on the land owned by KIPT. These programs may include the planting of Drooping Sheoak feeding habitat, the protection of existing known nesting habitat, and the development of artificial nesting habitat.

6 Conclusion on the likelihood of significant impacts

6.1 Do you THINK your proposed action is a controlled action?

No	No, complete section 5.2
	Yes, complete section 5.3

6.2 Proposed action IS NOT a controlled action.

The proposed action is unlikely to have significant impacts on a matter protected under the EPBC Act for the following reasons:

- Smith Bay does not provide important or critical habitat for any of the listed species.
- The terrestrial component of the Smith Bay site is virtually devoid of native vegetation and therefore provides very little viable habitat for the species listed under the EPBC Act.
- The loss of a small amount of rocky beach and dune habitat would have an insignificant effect on several migratory bird species that may use the Smith Bay foreshore as there is a vast amount of similar habitat along the north coast of Kangaroo Island.
- Breeding cycles of the White-bellied Sea-Eagle would not be adversely affected as there is no breeding habitat on or near the Smith Bay development site.
- The loss of a small amount of pipefish habitat and potentially some pipefish during construction would have a negligible effect upon the overall population or viability of pipefish as there is an abundance of similar pipefish habitat in Smith Bay, Emu Bay and other bays along the north coast of Kangaroo Island. These bays would be expected to support a similar density of pipefish to Smith Bay.
- Although other listed marine species such as whales, dolphins, seals and sea-lions that occasionally traverse Smith Bay may be disturbed by contruction and operation of the wharf and avoid the bay, the impact would be of negligible significance as there is a vast amount of similar habitat along the north coast of Kangaroo Island.
- The possible loss of occasional Kangaroo Island Echidnas via mortalities associated with construction traffic and timber trucks would have a negligible effect on the overall population of echidnas on Kangaroo Island.

6.3 Proposed action IS a controlled action

	Matters likely to be significantly impacted
N/A	World Heritage values (sections 12 and 15A)
N/A	National Heritage places (sections 15B and 15C)
N/A	Wetlands of international importance (sections 16 and 17B)
N/A	Listed threatened species and communities (sections 18 and 18A)
N/A	Listed migratory species (sections 20 and 20A)
N/A	Protection of the environment from nuclear actions (sections 21 and 22A)
N/A	Commonwealth marine environment (sections 23 and 24A)
N/A	Great Barrier Reef Marine Park (sections 24B and 24C)
N/A	A water resource, in relation to coal seam gas development and large coal mining development (sections 24D and 24E)
N/A	Protection of the environment from actions involving Commonwealth land (sections 26 and 27A)
N/A	Protection of the environment from Commonwealth actions (section 28)
N/A	Commonwealth Heritage places overseas (sections 27B and 27C)

7 Environmental record of the person proposing to take the action

		Yes	No
7.1	**Does the party taking the action have a satisfactory record of responsible environmental management?** Plantation timber growing to the Australian Forestry Standard / PEFC is an environmentally-responsible activity that, in addition to producing a sustainable resource, provides carbon capture and storage benefits.	Yes	
7.2	**Provide details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against:** **(a) the person proposing to take the action, or** **(b) if a permit has been applied for in relation to the action - the person making the application.** **If yes, provide details**		No
7.3	**If the person taking the action is a corporation, please provide details of the corporation's environmental policy and planning framework and if and how the framework applies to the action.** Kangaroo Island Plantation Timbers Ltd's sole activity is to manage and market its plantation timber assets on Kangaroo Island. Although the Company does not yet have an environmental policy and planning framework, its aim is to operate to the highest possible environmental standards. The majority of the timberland it controls is already managed under the Australian Forestry Standard / PEFC.		N/A
7.4	**Has the party taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?** **Provide name of proposal and EPBC reference number (if known)**		No

8 Information sources and attachments

8.1 References

Aztec Analysis (2016). Kangaroo Island Plantation Timbers Proposed Export Facility at Smith Bay Preliminary Design Report. KIPT, Angas St, Adelaide.

Baker, J.L. (2006). Syngnathid fish (seahorses, seadragons, pipehorses and pipefishes), in (Eds. McClatchie, S., Middleton, J., Pattiaratchi, C., Currie, D., & Kendrick, G.) The South-west Marine Region: Ecosystems and Key Species Groups, Department of Water and Natural Resources, Canberra.

Barrett, G., A. Silcocks, S. Barry, R. Cunningham & Poulter, R. (2003). *The New Atlas of Australian Birds*. Melbourne, Victoria: Birds Australia.

Baxter, C.I. (1989b). *An Annotated List of the Birds of Kangaroo Island*. Kingscote, Kangaroo I, SA National Parks & Wildlife Service.

Campbell, R.A., N.J. Gales, G.M. Lento & Baker, C.S. (2008). Islands in the sea: extreme female natal site fidelity in the Australian sea lion, Neophoca cinerea. Biology Letters. 23:139-142.

Campbell, R. (2005). Historical distribution and abundance of the Australian sea lion (Neophoca cinerea) on the west coast of Western Australia. Fisheries Research Report no. 148. Department of Fisheries, Western Australia.

Dennis, T.E., Detmar S.A. & Patterson, C. (2014). Discussion Paper.

Dennis, T. E., Detmar, S. A. Brooks, A. V. & Dennis, H. M. (2011a). Distribution and status of White-bellied Sea-Eagle, *Haliaeetus leucogaster*, and Eastern Osprey, *Pandion cristatus*, populations in South Australia. *South Australian Ornithologist* 37: 1–16

Dennis, T. E., McIntosh, R. R. & Shaughnessy, P. D. (2011b). Effects of human disturbance on productivity of White-bellied Sea-Eagles *Haliaeetus leucogaster*. *Emu – Austral Ornithology* 111: 179–185.

Department of Agriculture, Fisheries & Forestry (DAFF) (2007). National Assessment of Interactions between Humans and Seals: Fisheries, Aquaculture and Tourism. Canberra: DAFF. Available from: http://www.daff.gov.au/__data/assets/pdf_file/0009/159381/sealassessment.pdf.

EBS Ecology (2016). Smith Bay Ecological Assessment. Sub-consultant's report prepared for LBW EP on behalf of KIPT Pty Ltd.

Edgar, G.J. (1997). Australian Marine Life: The Plants and Animals of Temperate Waters. Reed New Holland.

Gales, N.J., P.D. Shaughnessy & Dennis T.E. (1994). Distribution, abundance and breeding cycle of the Australian sea lion Neophoca cinerea (Mammalia: Pinnipedia). Journal of Zoology, London. 234:353-370.

Garnett, S.T. & G.M. Crowley (2000). *The Action Plan for Australian Birds 2000*. Canberra, ACT: Environment Australia and Birds Australia. Available from: http://www.environment.gov.au/biodiversity/threatened/publications/action/birds2000/index.html.

Garnett, S.T., L.P. Pedler & Crowley, G.M. (1996). *Census of the Glossy Black-Cockatoo on Kangaroo Island 19-26th September 1996*.

Garnett, S.T., L.P. Pedler & Crowley, G.M. (1999). The breeding biology of the Glossy Black-Cockatoo *Calytorhynchus lathami* on Kangaroo Island, South Australia. *Emu*. 99:262--279.

Goldsworthy, S.D., B. Page, P.D. Shaughnessy & Linnae, A. (2010). Mitigating Seal Interactions in the SRLF and the Gillnet Sector SESSF in South Australia. FRDC Project Number: 2007/041. Final Report to the Fisheries Research and Development Corporation.

Gomon, M. F., Bray, D. J. & Kuiter, R. H. (2008). *Fishes of Australia's Southern Coast*. Reed New Holland, Chatswood NSW.

Higgins, P.J., ed. (1999). *Handbook of Australian, New Zealand and Antarctic Birds Volume Volume 4: Parrots to Dollarbird*. Melbourne: Oxford University Press.

Higgins, P.J. & Davies, S.J.J.F. (1996). *Handbook of Australian, New Zealand and Antarctic Birds Volume 3: Snipe to Pigeons*. Melbourne: Oxford University Press.

Joseph, L. (1982). The Glossy Black-Cockatoo on Kangaroo Island. *Emu*. 82:46--49.

Kinloch, MA, Brock, DJ, Kirkman, H & Laperousaz, T (2007). *Seagrass Biodiversity on Kangaroo Island*. KI NRM Board Coast and Marine Program Report No. CMP07/004.

Marchant, S. & Higgins, P.J., eds. (1993). *Handbook of Australian, New Zealand and Antarctic Birds. Volume 2 - Raptors to Lapwings*. Melbourne, Victoria: Oxford University Press.

Mathews, G.M. (1913-1914). *The Birds of Australia. Volume 3*. London: Witherby and Company.

Mooney, P.A. & Pedler, L.P. (2005). *Recovery Plan for the South Australian Subspecies of the Glossy Black-Cockatoo* (Calyptorhynchus lathami halmaturinus)*: 2005-2010*. Adelaide, South Australian Department for Environment and Heritage. Available from: http://www.environment.gov.au/biodiversity/threatened/publications/recovery/c-lathami-halmaturinus/index.html. In effect under the EPBC Act from 21-Oct-2005. Ceased to be in effect under the EPBC Act from 01-Apr-2016.

Orsini, J-P. & Newsome, D. (2005). Human perception of hauled out Australian sea lions *(Neophoca cinera)* and implications for management: A case study from Carnac Island, Western Australia. *Tourism in Marine Environments*. 2:23-37.

Pepper, J.W. (1993). A new food source for the Glossy Black-Cockatoo. *South Australian Ornithologist*. 31:144-145.

Pepper, J.W. (1996). *The behavioural ecology of the Glossy Black-Cockatoo* Calyptorhynchus lathami halmaturinus. Ph.D. Thesis. University of Michigan, Ann Arbor, USA

Pepper, J.W. (1997). A survey of the South Australian Glossy Black-Cockatoo *(Calyptorhynchus lathami halmaturinus)* and its habitat. *Wildlife Research*. 24:209-223.

Pizzey, G. and Doyle, R. (1980). A Field Guide to the Birds of Australia. Collins, Sydney.

Reef Watch (2014). *Seadragons and their friends: a guide to Syngnathidae fishes in South Australia.* Conservation Council of South Australia. Prepared by Janine Baker.

Rismiller, P. (1999) The Echidna: Australia's Enigma. Levin Associates, Hugh Lauter Publishing.

SEA (2016). *Smith Bay Marine Ecological Survey and Assessment.* Sub-consultant's report prepared for LBW EP on behalf of KIPT Pty Ltd.

Shaughnessy, P.D. (1999). *The Action Plan for Australian Seals*. Canberra: Environment Australia. Available from: http://www.deh.gov.au/coasts/publications/seals-action-plan.html.

Shaughnessy, P.D., R.R. McIntosh, S.D. Goldsworthy, T.E. Dennis & Berris, M. (2006). Trends in abundance of Australian sea lions, Neophoca cinerea, at Seal Bay, Kangaroo Island, South Australia. **In:** *Sea Lions of the World*. Page(s) 37-63. Fairbanks, Alaska: Alaska Sea Grant College Program. University of Alaska.

Shaughnessy, P.D., Goldsworthy, S.D. & Mackay, A.I., 2015. The long-nosed fur seal (*Arctocephalus forsteri*) in South Australia in 2013–14: abundance, status and trends *Australian Journal of Zoology* 63(2) 101-110.

Smith, G.C. (1985). Analysis of prey remnants from Osprey Pandion haliaetus and White-bellied Sea-eagle Pandion leucogaster feeding roosts. Emu. 85:198-200.

Southgate, R. (2002). *Population Viability Analysis for the South Australian Glossy Black-Cockatoo*. Department for Environment and Heritage, South Australia.

Tyler M.J., Twidale C.R. & Ling J.K. (1979). Natural History of Kangaroo Island. Royal Society of South Australia.

Woinarski J.C.Z., Burbidge A.A. & Harrison P. (2014). The action plan for Australian mammals 2012. CSIRO Publishing, Melbourne.

8.2 Reliability and date of information

The information collated in Section 3 of the referral is considered to be reliable and up to date. The only uncertainty is considered to be whether the diversity and abundance of pipefish in Smith Bay is similar to other bays along the north coast of Kangaroo Island as there is little baseline data.

8.3 Attachments

Indicate the documents you have attached. All attachments must be less than three megabytes (3mb) so they can be published on the Department's website. Attachments larger than three megabytes (3mb) may delay the processing of your referral.

		✓ attached	Title of attachment(s)
You must attach	figures, maps or aerial photographs showing the locality of the proposed action (section 1)	✓	Figure 1. Smith Bay location map. Figure 2a. General layout of the wharf and log storage area at Smith Bay. Figure 2b. Design and layout of the floating wharf. Figure 2c. Design and cross section of the causeway. Figure 3. The project site: Allotments 51 and 52, North Coast Road, Kangaroo Island.
	GIS file delineating the boundary of the referral area (section 1)		
	figures, maps or aerial photographs showing the location of the proposed action in respect to any matters of national environmental significance or important features of the environments (section 3)	✓	Figure 4. Distance from Smith Bay to known raptor nesting sites (DEWNR, pers. comm.).
If relevant, attach	copies of any state or local government approvals and consent conditions (section 2.5)		
	copies of any completed assessments to meet state or local government approvals and outcomes of public consultations, if available (section 2.6)		
	copies of any flora and fauna investigations and surveys (section 3)	✓	EBS Ecology (2016). Smith Bay Ecological Assessment. Sub-consultant's report prepared for LBW EP on behalf of KIPT Pty Ltd. SEA (2016). *Smith Bay Marine Ecological Survey and Assessment.* Sub-consultant's report prepared for LBW EP on behalf of KIPT Pty Ltd.
	technical reports relevant to the assessment of impacts on protected matters that support the arguments and conclusions in the referral (section 3) conclusions in the referral (section 3 and 4)		
	report(s) on any public consultations undertaken, including with Indigenous stakeholders (section 3)		

9 Contacts, signatures and declarations

Proposed action title:

9.1 Person proposing to take action

Name and Title:	
Organisation :	
Trust deed	□ attached; OR □ not applicable
ACN / ABN	
Postal address:	
Telephone: Email:	
I qualify for exemption from fees under section 520(4C)(e)(v) of the EPBC Act because I am:	□ an individual; OR □ a small business entity (within the meaning given by section 328-110 (other than subsection 328-119(4)) of the *Income Tax Assessment Act 1997*); OR □✓ not applicable.
If you are small business entity you must provide the Date/Income Year that you became a small business entity:	
I would like to apply for a waiver of full or partial fees under regulation 5.21A of the EPBC Regulations. Under regulation 5.21A(5), you must include information about the applicant (if not you) the grounds on which the waiver is sought and the reasons why it should be made:	□✓ not applicable.
Declaration:	I declare that to the best of my knowledge the information I have given on, or attached to this form is complete, current and correct. I understand that giving false or misleading information is a serious offence. I declare that I am not taking the action on behalf of or for the benefit of any other person or entity.
Signature:	Date:

9.2 Designated proponent

Name of proposed proponent:	John Sergeant Managing Director Kangaroo Island Plantation Timbers Ltd
ACN / ABN:	19 091 247 166
Postal address:	79 Angas Street, ADELAIDE SA 5000
Telephone:	04 12345 359
Email:	john.sergeant@kipt.com.au
Declaration by the proposed proponent:	I .John Sergeant, the proposed proponent, consent to the proposed designation of myself as the proponent for the purposes of the action described in this referral.
Declaration by the person proposing to take the action:	I ....., the person proposing to take the action, consent to the proposed designation of..... as proponent for the purposes of the action described in this referral.
Signature:	 Date: 8 November 2016

9.3 Person preparing the referral information (if different from section 9.1)

Name:	Maria Pedicini
Title:	Director and Principal Environmental Scientist
Organisation:	LBW Envirionmental Projects
ACN / ABN :	58 126 992 274
Postal address:	PO Box 225 Stepney SA 5069
Telephone:	08 8331 2417
Email:	maria.pedicini@lbwep.com.au
Declaration:	I declare that to the best of my knowledge the information I have given on, or attached to this form is complete, current and correct. I understand that giving false or misleading information is a serious offence.
Signature:	 Date: 8 November 2016

Attachment A

Geographic Information System (GIS) data supply guidelines

If the area is less than 5 hectares, provide the location as a point layer. If the area greater than 5 hectares, please provide as a polygon layer. If the proposed action is linear (eg. a road or pipeline) please provide a polyline layer.

GIS data needs to be provided to the Department in the following manner:

- Point, Line or Polygon data types: ESRI file geodatabase feature class (preferred) or as an ESRI shapefile (.shp) zipped and attached with appropriate title
- Raster data types: Raw satellite imagery should be supplied in the vendor specific format.
- Projection as GDA94 coordinate system.

Processed products should be provided as follows:

- For data, uncompressed or lossless compressed formats is required - GeoTIFF or Imagine IMG is the first preference, then JPEG2000 lossless and other simple binary+header formats (ERS, ENVI or BIL).
- For natural/false/pseudo colour RGB imagery:
    - If the imagery is already mosaiced and is ready for display then lossy compression is suitable (JPEG2000 lossy/ECW/MrSID). Prefer 10% compression, up to 20% is acceptable.
    - If the imagery requires any sort of processing prior to display (i.e. mosaicing/colour balancing/etc) then an uncompressed or lossless compressed format is required.

Metadata or 'information about data' will be produced for all spatial data and will be compliant with ANZLIC Metadata Profile. (http://www.anzlic.org.au/policies_guidelines#guidelines).

The Department's preferred method is using ANZMet Lite, however the Department's Service Provider may use any compliant system to generate metadata.

Attachment B

Privacy and Confidentiality Notice

The Department is required under section 74(3) of the *Environment Protection and Biodiversity Conservation Act 1999* (**EPBC Act**) to publish the information (including personal information of the author and/or third parties) provided in this referral on the internet. The information published may include your personal information.

Information including your personal information included in this referral will be used for the purposes of administering the EPBC Act. The information may be provided to various Commonwealth, State and Territory agencies for the purposes of administering the Act or other Commonwealth, State or Territory legislation. For example, if the proposed action (or a component of it) is to be taken in the GBRMP, the Minister is required to provide a copy of your referral to GBRMPA (see section 73A, EPBC Act). For information about how the GBRMPA may use your information, see http://www.gbrmpa.gov.au/privacy/privacy_notice_for_permits.

The Department will collect, use, store and disclose the personal information contained in this referral in a manner consistent with its obligations under the *Privacy Act 1988* and the Department's privacy policy.

The Department's privacy policy contains details about how respondents may access and make corrections to personal information that the Department holds about the respondent, how respondents may make a complaint about a breach of an Australian Privacy Principle, and how the Department will deal with that complaint.

A copy of the Department's privacy policy is available at: http://environment.gov.au/privacy-policy.

The Department is not obliged to publish information that the Minister is satisfied in commercial-in-confidence. If you believe that this referral contains information that is commercial-in-confidence, you must clearly identify such information and the reason for its confidentiality at the time of making the referral. The Minister cannot be satisfied that particular information included in a referral is commercial-in-confidence unless you demonstrate to the Minister (by providing reasons in writing) that:

- release of the information would cause competitive detriment to the person; and
- the information is not in the public domain; and
- the information is not required to be disclosed under another law of the Commonwealth, a State or a Territory; and
- the information is not readily discoverable.

The Department is subject to certain legislative and administrative accountability and transparency requirements of the Australian Government including disclosures to the Parliament and its Committees. While the Department will treat all referral information provided in this referral sensitively, any information contained in or relating to a referral, including information identified by a person as commercial-in-confidence, may be disclosed by the Department:

- to its employees and advisers in order to evaluate or assess a referral;
- to the Parliamentary Secretary;
- within the Department or other agencies where this serves the legitimate interest of the Australian Government;
- in response to a request by a House or Committee of the Parliament of the Commonwealth of Australia;
- where information is authorised or permitted by law to be disclosed; and
- where the information is in the public domain other than by the Department's disclosure of that information.

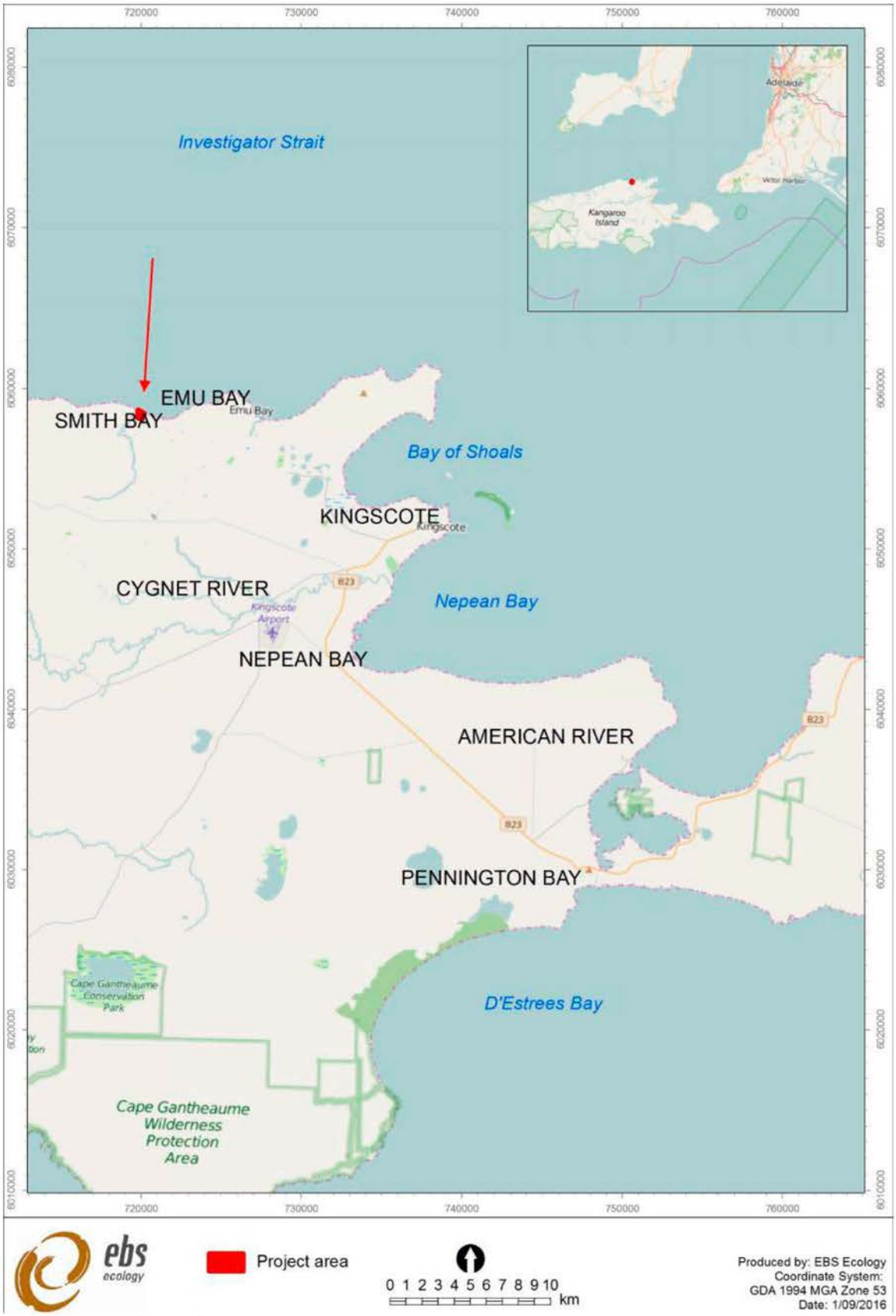


Figure 1. Smith Bay location map.

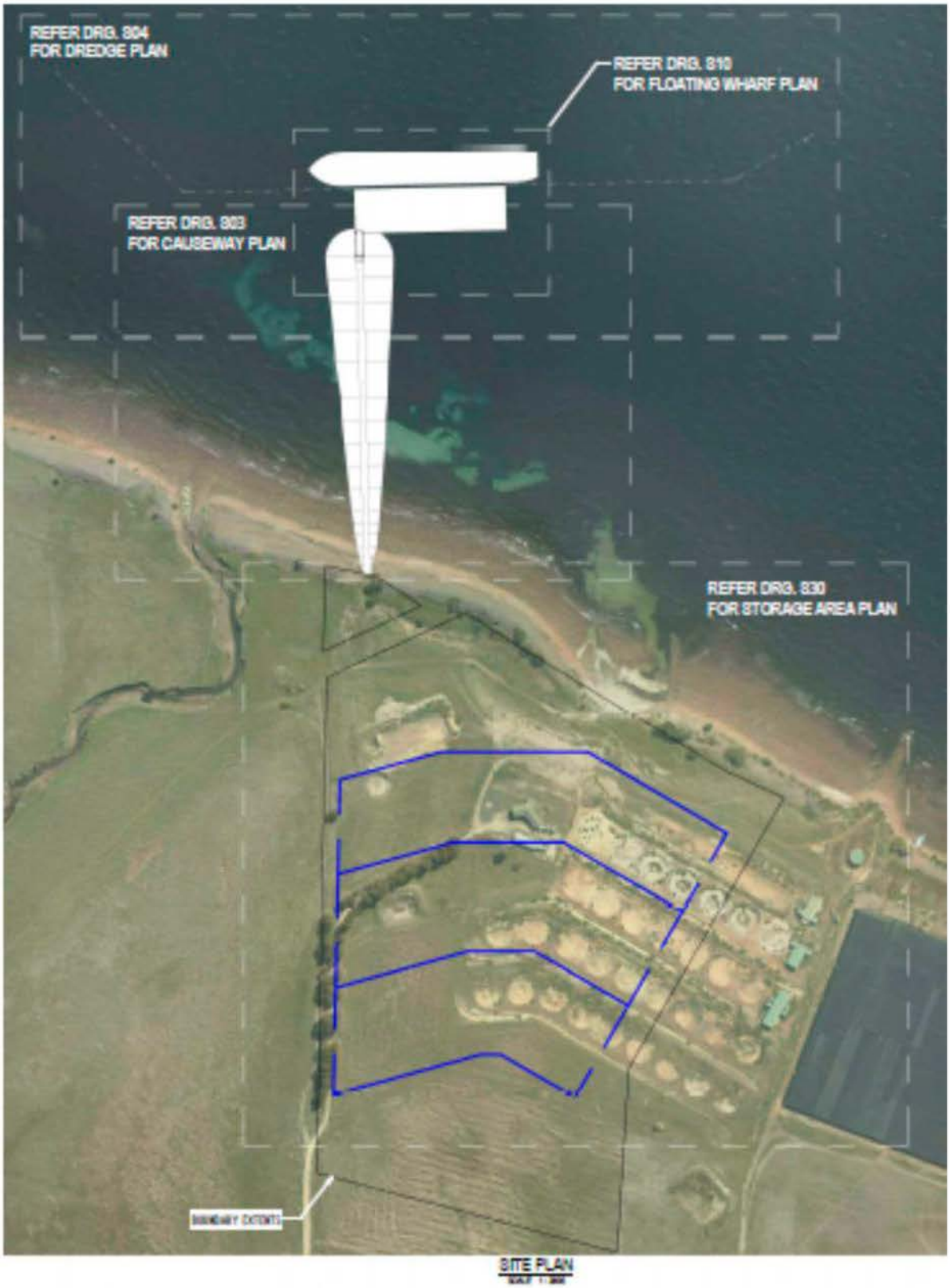


Figure 2a. General layout of the wharf and log storage area at Smith Bay.

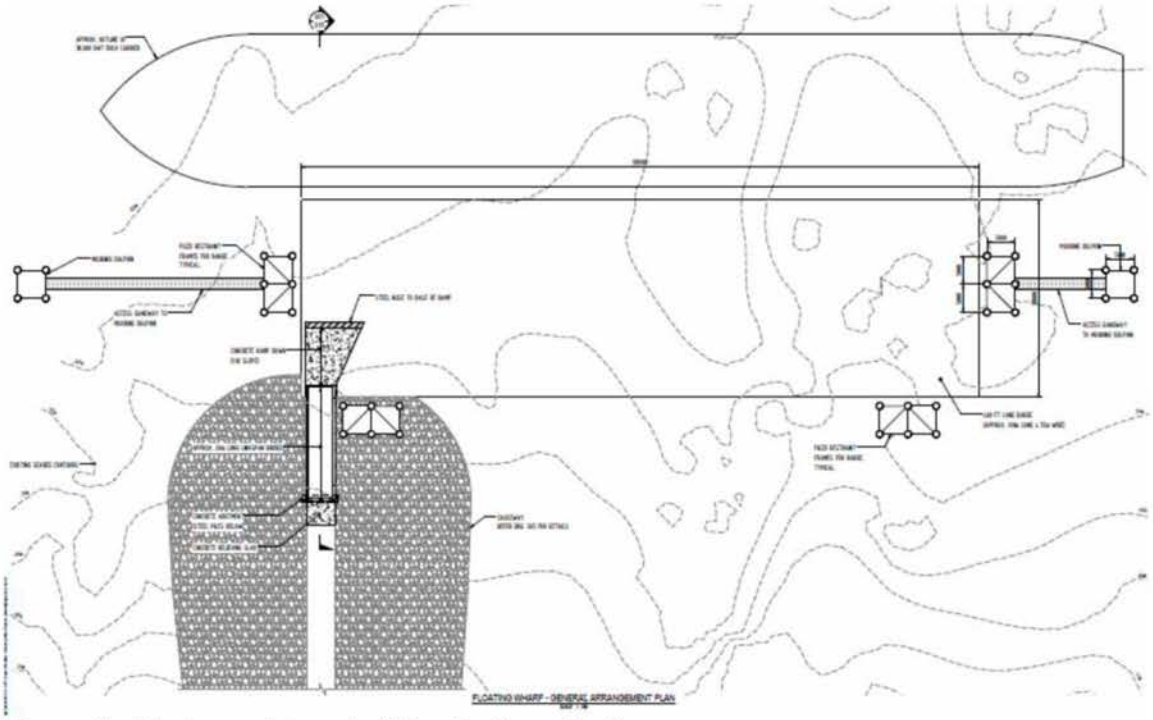


Figure 2b. Design and layout of the floating wharf.

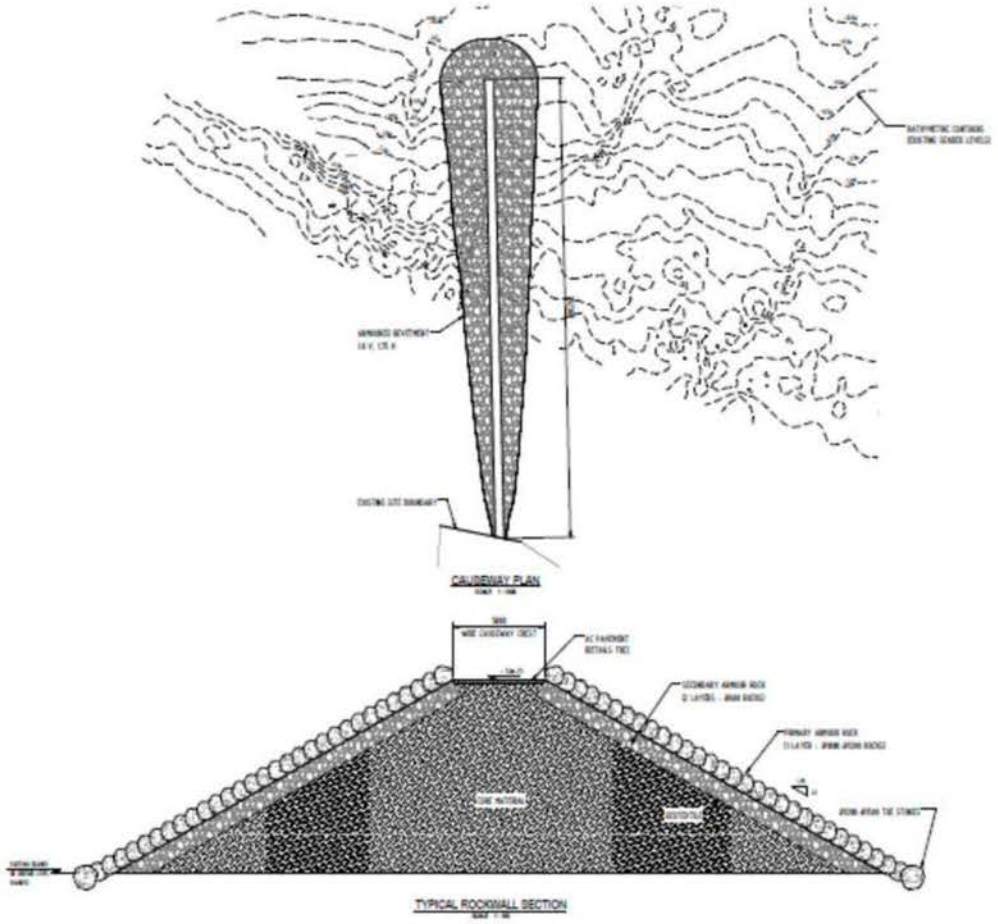


Figure 2c. Design and cross section of the causeway.

Figure 3. The project site: Allotments 51 and 52, North Coast Road, Kangaroo Island.

Figure 4. Distance from Smith Bay to known raptor nesting sites (DEWNR, pers. comm.).

Appendix K2 – EPBC Act Protected Matters Report – DoEE

Australian Government
Department of the Environment and Energy

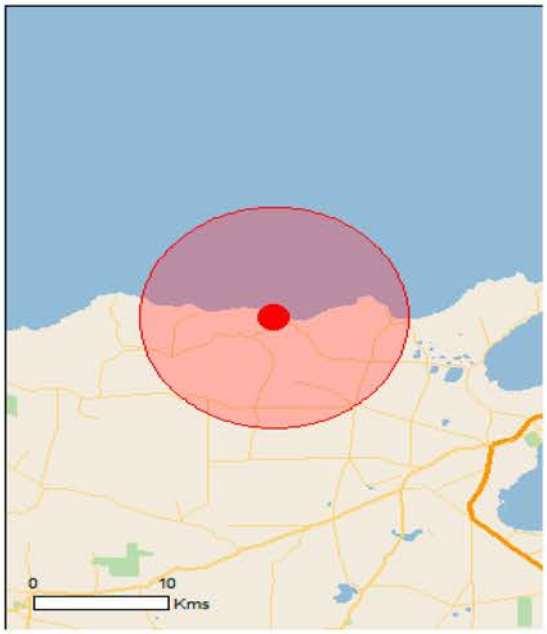
EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

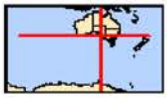
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 03/04/18 13:34:58



Coordinates
Buffer: 10.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	44
Listed Migratory Species:	40

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	74
Whales and Other Cetaceans:	12
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	6
Regional Forest Agreements:	None
Invasive Species:	48
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Kangaroo Island Narrow-leaved Mallee (Eucalyptus cneorifolia) Woodland	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calyptorhynchus lathami halmaturinus Glossy Black-Cockatoo (Kangaroo Island), Glossy Black-Cockatoo (South Australian) [64436]	Endangered	Breeding likely to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat may occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area

Name	Status	Type of Presence
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Breeding likely to occur within area
Thalassarche cauta cauta Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thinornis rubricollis rubricollis Hooded Plover (eastern) [66726]	Vulnerable	Species or species habitat known to occur within area
Zoothera lunulata halmaturina Bassian Thrush (South Australian) [67121]	Vulnerable	Species or species habitat likely to occur within area
Mammals		
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Isoodon obesulus obesulus Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat known to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat likely to occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Vulnerable	Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Sminthopsis aitkeni Kangaroo Island Dunnart [300]	Endangered	Species or species habitat may occur within area
Tachyglossus aculeatus multiaculeatus Kangaroo Island Echidna [87597]	Endangered	Species or species habitat likely to occur within area
Plants		
Caladenia tensa Greencomb Spider-orchid, Rigid Spider-orchid [24390]	Endangered	Species or species habitat likely to occur within area
Cheiranthera volubilis Twining Finger Flower [3125]	Vulnerable	Species or species habitat likely to occur within area
Pomaderris halmaturina subsp. halmaturina Kangaroo Island Pomaderris [21964]	Vulnerable	Species or species habitat likely to occur within area
Ptilotus beckerianus Ironstone Mulla Mulla [3787]	Vulnerable	Species or species habitat likely to occur within area
Pultenaea villifera var. glabrescens Yellow Bush-pea, Splendid Bush-pea [10271]	Vulnerable	Species or species habitat known to occur within area
Spyridium eriocephalum var. glabrisepalum MacGillivray Spyridium [13771]	Vulnerable	Species or species habitat likely to occur within area
Thelymitra matthewsii Spiral Sun-orchid [4168]	Vulnerable	Species or species habitat may occur within area
Veronica derwentiana subsp. homalodonta Mount Lofty Speedwell [82836]	Critically Endangered	Species or species habitat likely to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Sharks		
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat known to occur

Name	Threatened	Type of Presence within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sandfordi Northern Royal Albatross [89827]	Endangered*	Foraging, feeding or related behaviour likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Tasmanian Shy Albatross [89224]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Balaena glacialis australis Southern Right Whale [75529]	Endangered*	Breeding known to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat likely to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Migratory Terrestrial Species		
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Arenaria interpres Ruddy Turnstone [872]		Species or species habitat likely to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Arenaria interpres Ruddy Turnstone [872]		Species or species habitat likely to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Catharacta skua Great Skua [59472]		Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Larus pacificus Pacific Gull [811]		Foraging, feeding or related behaviour known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Phalacrocorax fuscescens Black-faced Cormorant [59660]		Foraging, feeding or related behaviour likely to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area
Thalassarche cauta Tasmanian Shy Albatross [89224]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis Hooded Plover [59510]		Species or species habitat known to occur within area
Thinornis rubricollis rubricollis Hooded Plover (eastern) [66726]	Vulnerable	Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area
Fish		
Acentronura australe Southern Pygmy Pipehorse [66185]		Species or species habitat may occur within area
Campichthys tryoni Tryon's Pipefish [66193]		Species or species habitat may occur within area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Stigmatopora olivacea a pipefish [74966]		Species or species habitat may occur within area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Vanacampus vercoi Verco's Pipefish [66286]		Species or species habitat may occur within area
Mammals		
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat may occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area

Whales and other Cetaceans [Resource Information]

Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Delphinus delphis Common Dophin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area

Name	Status	Type of Presence
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat likely to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Unnamed (No.HA1277)	SA
Unnamed (No.HA241)	SA
Unnamed (No.HA392)	SA
Unnamed (No.HA792)	SA
Unnamed (No.HA864)	SA
Unnamed (No.HA895)	SA

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Carduelis chloris European Greenfinch [404]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Meleagris gallopavo Wild Turkey [64380]		Species or species habitat likely to occur

Name	Status	Type of Presence within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Pavo cristatus Indian Peafowl, Peacock [919]		Species or species habitat likely to occur within area
Phasianus colchicus Common Pheasant [920]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Mammals		
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Annona glabra Pond Apple, Pond-apple Tree, Alligator Apple, Bullock's Heart, Cherimoya, Monkey Apple, Bobwood, Corkwood [6311]		Species or species habitat likely to occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species habitat likely to occur within area
Cryptostegia grandiflora Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		Species or species habitat likely to occur within area
Cylindropuntia spp. Prickly Pears [85131]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Hymenachne amplexicaulis Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Mimosa pigra Mimosa, Giant Mimosa, Giant Sensitive Plant, ThornySensitive Plant, Black Mimosa, Catclaw Mimosa, Bashful Plant [11223]		Species or species habitat likely to occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Olea europaea Olive, Common Olive [9160]		Species or species habitat may occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Prosopis spp. Mesquite, Algaroba [68407]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Solanum elaeagnifolium Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle, Prairie-berry, Satansbos, Silver-leaf Bitter-apple, Silverleaf-nettle, Trompillo [12323]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area
Ulex europaeus Gorse, Furze [7693]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-35.59443 137.42821

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

Department of the Environment
GPO Box 787
Canberra ACT 2601 Australia
+61 2 6274 1111

Appendix K3 – MNES Background Information

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

No table of contents entries found.

1. CUMULATIVE IMPACT ASSESSMENT

Cumulative impacts are defined as the successive and combined impacts (positive or negative) of one or more activities on society, the economy and the environment (Franks et. al. 2010). The cumulative impacts of the proposed development have been assessed in combination with other developments on Kangaroo Island.

Other actions under the EPBC Act that have been or are being taken, or have been approved on Kangaroo Island are summarised in Table 1-1. The locations are shown on Figure 1-1.

Table 1-1: Other proposals recently assessed under the EPBC Act on Kangaroo Island

Reference	Title and proponent	Description	MNES triggered	Current status
2016/7697	American River Hotel and Harbour development, City & Central Consulting Pty Ltd	Proposal to establish a tourist resort at American River, including hotel, lodges, cabins and cottages as well as restaurants, bars and conferences facilities	Glossy black-cockatoo (*Calyptorhynchus lathami halmaturinus*) Kangaroo Island echidna (*Tachyglossus aculeatus multiaculeatus*) Heath goanna (*Varanus rosenbergi*) Scarlet robin (*Petroica boodang campbelli*) White-bellied sea-eagle (*Haliaeetus leucogaster*)	EPBC Act decision: approval not required SA Government has approved the proposal
2014/7201	Kangaroo Island Golf Course, Programmed Turnpoint Pty Ltd	Proposal to develop an international standard, links-style golf course resort	Eastern osprey (*Pandion haliaetus*) White-bellied sea-eagle (*Haliaeetus leucogaster*)	EPBC Act decision: assessed under Bilateral Agreement with SA SA Government has approved the proposal Construction yet to begin
2011/6076	Eastern Plains Fire Trial Phase 3, DEWNR	Prescribed burn plan	*Beyeria subtecta* *Caladenia ovata* *Olearia microdisca* *Spyridium eriocephalum var. glabrisepalum* *Leionema equestre* Southern brown bandicoot (*Isoodon obesulus obesulus*)	EPBC Act decision: approval not required Proposal assumed complete
2011/5981	Seal Bay Guided Tour Experience, DEWNR	New visitor experience at Seal Bay Conservation Park	Australian sea-lion (*Neophoca cinerea*)	EPBC Act decision: lapsed proposal Proposal assumed abandoned

Reference	Title and proponent	Description	MNES triggered	Current status
2010/5524	Helicopter Joyflight Operation, Heli Experiences	Proposal to provide helicopter joyride flights from Hanson Bay	Eastern osprey (*Pandion haliaetus*) White-bellied sea-eagle (*Haliaeetus leucogaster*)	EPBC Act decision: approved with conditions Proposal complete
2009/4780	Phase 1 Eastern Plains Fire Trial, DEWNR	Prescribed burn plan	*Beyeria subtecta* *Caladenia ovata* *Olearia microdisca* *Spyridium eriocephalum var. glabrisepalum* *Leionema equestre* Southern brown bandicoot (*Isoodon obesulus obesulus*)	EPBC Act decision: approval not required Proposal assumed complete
2007/3518	Middle River Reservoir Spillway Upgrade, SA Water	Proposal to temporarily increase the capacity of the Middle River Reservoir	Glossy black-cockatoo (*Calyptorhyncus lathami halmaturinus*)	EPBC Act decision: not a controlled action Proposal assumed complete
2005/2294	Prescribed Research Burns, DEH	Prescribed burn plan	*Beyeria subtecta* *Caladenia ovata* *Olearia microdisca* *Spyridium eriocephalum var. glabrisepalum* *Leionema equestre*	EPBC Act decision: approval not required Proposal assumed complete
2005/2264	Southern Ocean Lodge, Hanson Bay, Baillie Lodges	Proposal for a premium nature-based tourism development including 25 accommodation suites, lodge, spa retreat and staff village	Hooded plover (*Thinornis rubricollis rubricollis*) Eastern osprey (*Pandion haliaetus*) White-bellied sea-eagle (*Haliaeetus leucogaster*)	EPBC Act decision: approved with conditions Proposal complete
2004/1782	Prescribed burn, Hog Bay Road, DEH	Prescribed burn plan	Kangaroo Island Phebalium (*Leionema equestre*) Small-flowered daisy-bush (*Olearia microdisca*) MacGillivray spyridium (*Spyridium. eriocephalum var. glabrisepalum*)	EPBC Act decision: approval not required Proposal assumed complete

Reference	Title and proponent	Description	MNES triggered	Current status
2004/1721	Duntroon 2D Seismic Survey, Woodside Energy	Proposal to undertake two-dimensional marine seismic survey approximately 50 km south-west of Kangaroo Island for the purposes of petroleum exploration	Blue whale (*Balaenoptera musculus*) Southern right whale (*Eubalaena australis*)	EPBC Act decision: not a controlled action Proposal assumed complete
2004/1631	Subdivision and development at American River, Mr Gabriel Bittar	Proposal for a commercial development	Glossy black-cockatoo (*Calyptorhyncus lathami halmaturinus*)	EPBC Act decision: not approved
2003/980	American River marina and boat launching facility, Kinsmen Developments Pty Ltd	Proposal to develop a marina and boat launching facility at American River	Southern right whale (*Eubalaena australis*)	EPBC Act decision: approval required Proposal subsequently withdrawn
2003/1184	Ecological Burn to Stimulate Endangered Plant, DEH	Prescribed burn plan	Small-flowered daisy-bush (*Olearia microdisca*)	EPBC Act decision: approval not required Proposal assumed complete
2001/450	Controlled Burning Regime, NPW SA	Prescribed burn plan	Kangaroo Island dunnart (*Sminthopsis aitkeni*)	EPBC Act decision: approval not required Proposal assumed complete
2001/448	Planned Burning Event, NPW SA	Prescribed burn plan	Kangaroo Island dunnart (*Sminthopsis aitkeni*)	EPBC Act decision: approval not required Proposal assumed complete
2000/16	Upgrade and Seal West End Highway, Transport SA	Proposal to upgrade West End Highway and seal the road	Kangaroo Island dunnart (*Sminthopsis aitkeni*) *Ptilotus beckerianus* *Cheiranthera volubilis*	EPBC Act decision: approval not required Proposal is complete.

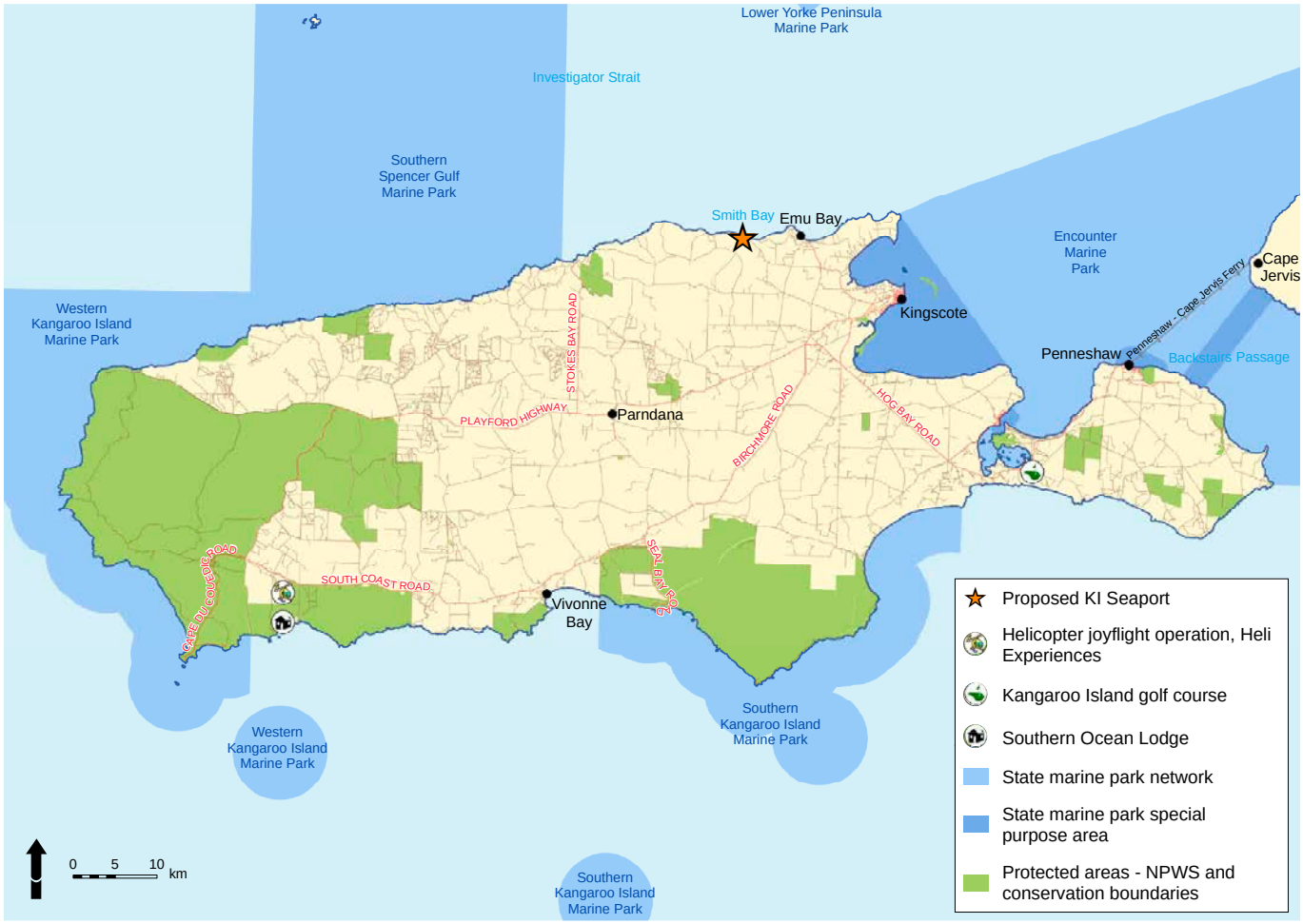


Figure 1-1: Proposals approved under the EPBC Act on Kangaroo Island

An assessment of the proposed KIPT development's contribution to cumulative impacts on four Matters of National Environmental Significance (MNES) species – the southern right whale, hooded plover (eastern, Kangaroo Island echidna and southern brown bandicoot (eastern) – is provided in Table 1-2. It is considered that there is a negligible contribution to cumulative impacts from the development.

Table 1-2: The proposed development's contribution to cumulative impacts on threatened and migratory species

Threatened species	Potential cumulative impact	Pressure from current and other planned activities	Proposed development's contribution to cumulative impacts
Southern right whale (*Eubalaena australis*)	Injury and mortality Behaviour disruption	Potential threats to the southern right whale include: • Vessel disturbance by collision or disrupting the behaviour of individuals • Habitat modification through the development of infrastructure such as ports, marinas, aquaculture facilities or ocean/marine production facilities which could physically displace the whale or disrupt normal behaviour. (DSEWPaC 2012) A small increase in shipping along the southern Australian coastline has the potential to result in death of an individual whale through vessel strike. However, the probability of this happening has been estimated at just once in about 300 years (BMT WBM 2017), so this risk is unlikely to lead to a long-term decrease in the population. Existing shipping, ferry and cruise ship activity all have the potential to impact southern right whales. Existing activity for cruise ships (21 cruise ships in 2018 and 30 projected in 2019) (http://www.cleancruising.com.au/port.asp?port=AUKAN) and ferry activity (up to 12 return crossings per day in summer with a reduced frequency during winter and rough seas) (https://www.sealink.com.au/kangaroo-island-ferry/timetables/) has not resulted in significant southern right whale deaths from vessel strike. A second ferry, carrying passengers only, commenced operations in June 2018 between Cape Jervis and American River via Penneshaw. This ferry currently makes one return crossing a day, which could increase based on demand (https://www.kic.com.au/ferry-and-transfer-timetables/). No additional port facilities are currently planned for Kangaroo Island.	The development would contribute an additional 10–20 shipping movements a year to the existing shipping, cruise ship and ferry activity. It is therefore considered that the contribution to any cumulative impacts on the southern right whale would be negligible.

Threatened species	Potential cumulative impact	Pressure from current and other planned activities	Proposed development's contribution to cumulative impacts
Kangaroo Island echidna (*Tachyglossus aculeatus multiaculeatus*)	Injury and mortality Habitat loss	Potential threats to the Kangaroo Island echidna include: • Deaths caused by electric fences • Deaths caused by road traffic • Habitat loss through vegetation clearing. Echidnas have previously been killed by vehicles. There are currently no other proposals for the local area.	The proposal would add 10 traffic movements to the access road during construction. Material would be transported from a quarry on the Island (potentially a quarry near Chapman River) to build the causeway. During operation, the development would contribute up to 47,000 trips annually, or an average of 127 a day, subject to haul truck capacity and annual production rate, along Freeoak Road. However, it is unlikely that the study area is a major component of the echidnas' home range. It is therefore considered that the development's contribution to any cumulative impacts on the echidna would be negligible.
Hooded plover (eastern) (*Thinornis rubricollis rubricollis*)	Injury and mortality Disturbance to roosting Degradation of habitat Behaviour disruption	Potential threats to the hooded plover (eastern) include: • Entanglements and ingestion of marine debris • Disturbance or damage to eggs, chicks and nesting birds through human activities, particularly off-leash dogs • Inappropriate coastal erosion control measures such as brush matting • Degradation of habitat by weed invasion. A search did not identify any other proposed activities along the northern coastline of Kangaroo Island.	The development would contribute to vehicle movements on the foreshore during construction (approximately 10 vehicle movements a day for 12 months). This would be a short-term minor increase in vehicle activity. Vehicle movements could be a vector for weed incursion; however, measures for controlling this risk would be included in the Construction Environmental Management Plan (CEMP). The site would be fenced off from the remainder of the foreshore during construction, operation and decommissioning. This would limit access to any potential foraging or breeding sites for plovers. Existing public access to the foreshore of Smith Bay is via an access track which runs along the western boundary of the study area. The development would not significantly increase the numbers of vehicles or boats along the foreshore during operation, therefore the impact on plovers is considered negligible.

Threatened species	Potential cumulative impact	Pressure from current and other planned activities	Proposed development's contribution to cumulative impacts
Southern brown bandicoot (eastern) (*Isoodon obesulus obesulus*)	Injury and mortality Predation Habitat loss	Potential threats to the southern brown bandicoot include: • Deaths caused by road traffic • Predation by introduced species such as cats and foxes • Habitat loss and degradation. A search did not identify any other proposed activities along the northern coastline of Kangaroo Island.	During operation, the development would contribute up to 47,000 trips annually, or an average of 127 a day, subject to haul truck capacity and annual production rate, along the access road. However, this is not considered critical habitat for the bandicoot. The development would contribute to vehicle movements during construction along Freeoak Road (approximately 10 vehicle movements a day for 12 months). This would be a short-term minor increase in vehicle activity. The development would not remove any significant stands of remnant vegetation around the study area that would be critical bandicoot habitat. It would not contribute significantly to the introduction of pest species. It is therefore considered that the development's contribution to any cumulative impacts on the bandicoot would be negligible.

2. SPECIES SUMMARY

2.1.1 Southern right whale

Table 2-3 summarises the species presence in the study area, known threats to the species and the relevant Commonwealth and State documents applicable to the species recovery.

Table 2-3: Southern right whale summary

Southern right whale (*Eubalaena australis*)
Baseline data results
Southern right whales are frequently reported close inshore on the southern and northern coasts of Kangaroo Island during the winter months, and females with calves have been observed in sheltered bays. The study area lies within an area described as the 'current core coastal range' for southern right whales but is not near any of the known aggregation areas and is just outside the 'historic high use' area (DSEWPaC 2012a). The National Conservation Values Atlas identifies the entire coastline of Kangaroo Island as seasonal calving habitat (see Figure 2 1). Encounter Bay is identified as a breeding area in the National Conservation Values Atlas (DoE 2014). A drilling crew saw a southern right whale and her calf in Smith Bay in September 2017.
International status
Migratory species under the Bonn Convention

Southern right whale (*Eubalaena australis*)
EPBC status
Endangered
***National Parks and Wildlife Act 1972* status**
Vulnerable
Key threats
The known and potential threats to the southern right whale are mainly anthropogenic and include: • entanglement from commercial fishing equipment that can harm or kill individual whales • vessel disturbance by collision or disrupting the behaviour of individuals • the potential for other countries to recommence commercial whaling, which may impact population recovery • climate variability and change which affects reproductive output during warming events and may lead to decreased productivity • interference from loud noises or long exposure to noise may interrupt communication, cause physical damage (hearing loss) or lead whales to avoid principle habitat areas • habitat modification through the development of infrastructure such as ports, marinas, aquaculture facilities or ocean/marine production facilities which could physically displace whales or disrupt normal behaviour • overharvesting of prey (DSEWPaC 2012a).
Recovery plans
For the southern right whale, the following Recovery Plan is considered relevant to the Project: Conservation Management Plan for the southern right whale: A recovery plan under the *Environment Protection and Biodiversity Conservation Act 1999* 2011–2021. The Management Plan sets out a long-term recovery objective to minimise anthropogenic threats and allow the whale's conservation status to improve so it can be removed from the threatened species list under the EPBC Act. It includes five interim recovery objectives: • to demonstrate that whale numbers are showing signs of increasing, and increasing at or near the maximum biological rate • to clearly understand the nature and degree of difference between the south-eastern and south-western Australian populations • to maintain or improve current levels of legal and management protection • to ensure an appropriate adaptive management regime is in place • to minimise anthropogenic threats.

Southern right whale (*Eubalaena australis*)

Threat abatement plans

For the southern right whale, the following threat abatement plan is considered relevant to the proposal: Threat Abatement Plan for the impacts of marine debris on vertebrate marine life (2009).

The Plan sets out four objectives to mitigate the impacts of harmful marine debris on the species:

- to contribute to the long-term prevention of the incidence of debris
- to remove existing debris from the environment
- to monitor the quantities, origins and impacts of debris
- to assess the effectiveness of management arrangements over time for the strategic reduction of debris.

Marine bioregional plans

The following marine bioregional plan is set out for the southern right whale: Marine bioregional plan for the South-west Marine Region (1999).

The Plan sets out three objectives to ensure the recovery and protection of threatened species:

- to conserve biodiversity
- to maintain ecosystem health
- to improve understanding of the region's biodiversity and ecosystems and imminent pressures.

National strategies

The National Strategy for Mitigating Vessel Strike of Marine Mega-fauna is a guiding framework for identifying:

- species most at risk of vessel collision
- areas where these species are most at risk of vessel collision
- appropriate management measures to reduce the risk of vessel collisions with marine mega-fauna.

The overarching goal of the Strategy is to provide guidance on understanding and reducing the risk of vessel collisions and the impacts they may have on marine mega-fauna (DoEE 2016).

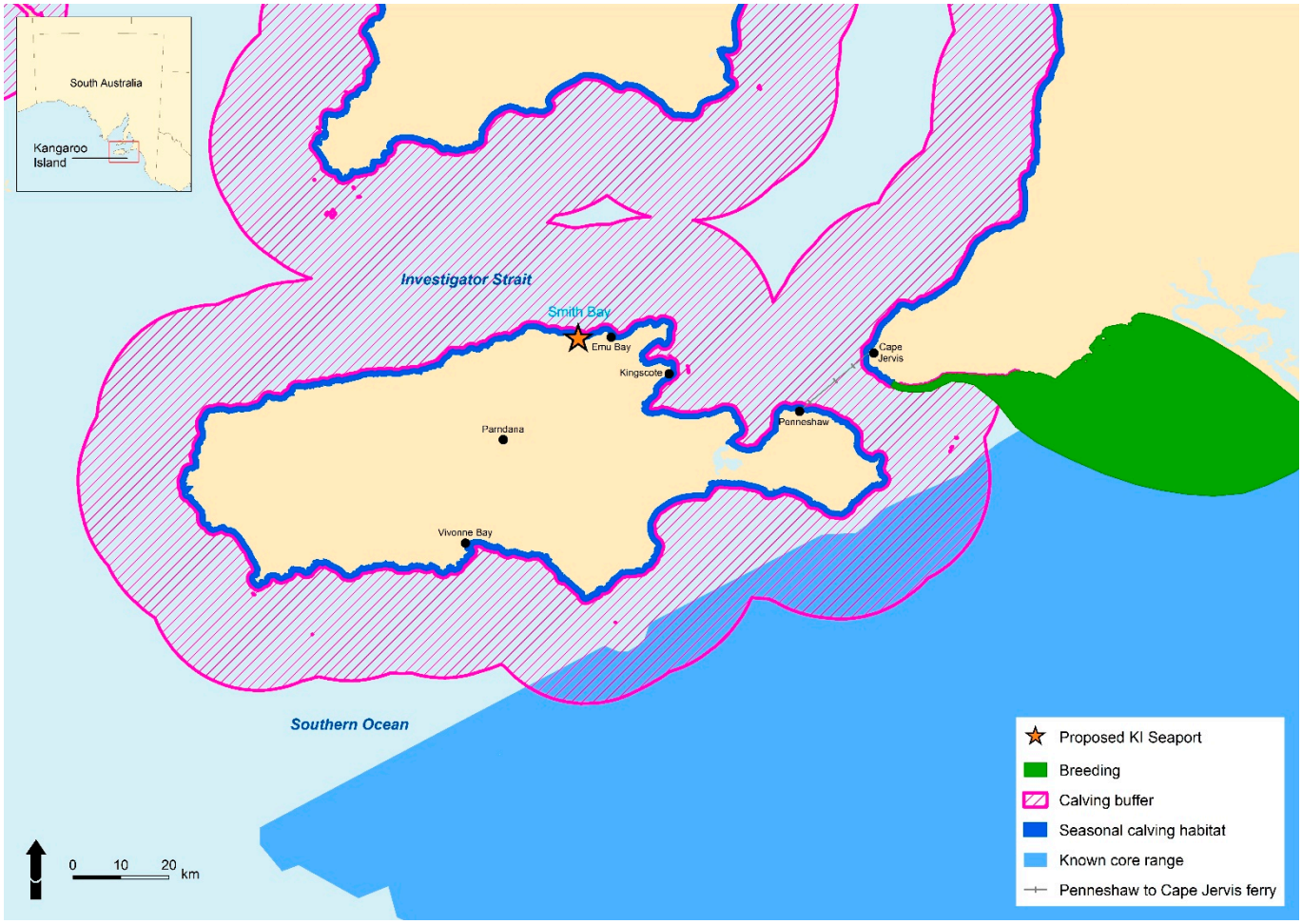


Figure 2-1: Biologically important areas for the southern right whale (Source: Department of the Environment 2014)

2.1.2 Hooded plover (eastern)

Table 2-4 summarises the hooded plover's presence in the study area, known threats to the species and the relevant Commonwealth and State documents applicable to its recovery.

Table 2-4: Hooded plover (eastern) summary

Hooded plover (eastern) (*Thinornis rubricollis rubricollis*)
Baseline data
Three sightings of hooded plovers in the eastern section of Smith Bay were 1.8 to 2.0 km from the study area, likely to be prime foraging habitat for the birds. Although nesting behaviour has not been recorded at Smith Bay, breeding at the site cannot be ruled out. The plovers inhabit coastal areas, on or near high-energy sandy beaches and their adjacent dunes, as well as rock platforms and reefs. They are generally found close to shore but may occasionally visit sites a short distance inland, such as lakes and lagoons.
EPBC Status
Vulnerable
***National Parks and Wildlife Act 1972* Status**
Vulnerable

Hooded plover (eastern) (*Thinornis rubricollis rubricollis*)

Key threats

The TSSC (2014) identified a number of threats to the hooded plover (eastern):

- disturbance or damage to eggs, chicks and nesting birds through human activities, particularly off-leash dogs
- predation by introduced foxes
- predation by scavenging birds including ravens, magpies, currawongs and silver gulls, which may be attracted to areas of human activity due to availability of food and rubbish
- indirect impacts of vehicles on prey availability on beaches
- beach wrack harvesting
- oil spills
- entanglements and ingestion of marine debris
- invasive weeds such as sea spurge (*Euphorbia paralias*), marram grass (*Ammophila* spp.), sea wheat-grass (*Thinopyrum junceiforme*), pyp grass (*Ehrharta villosa*) and beach daisy (*Arctotheca populifolia*)
- inappropriate coastal erosion control measures such as brush matting
- impacts of seawalls and measures to protect infrastructure against rising sea levels
- limits to dune retreat due to residential and other buildings on the foredune, primary and secondary dunes
- increasing frequency and severity of extreme weather events such as storms and storm surges, which flood nests and erode suitable habitat
- future threats from sea level rise, resulting in further narrowing of the coastal zone.

Recovery plans

There is no recovery plan in place for this species, as significant research and actions are being undertaken at national, state and local levels.

Threat abatement plans

There are currently no threat abatement plans for this species.

A draft Recovery Plan has been prepared for South Australia (Baker-Gabb & Weston 2006). The primary recovery actions outlined in this plan are:

- Establish current baseline data on distribution (general and specific), define relative threat baselines and ascertain the extent of occurrence of habitat modification.
- Identify gaps in knowledge/data, including distribution (general and nesting), relative recruitment rates, movements (e.g. from islands to the mainland), and different threats.
- Identify key locations for long-term monitoring.
- Analyse available data to determine specific, measurable, attainable, relevant and timely (SMART) targets at the site, district, region and state level.
- Ensure that the Recovery Plan remains relevant through regular review processes.
- Establish/identify monitoring network members by area. Seek their feedback/comments on draft maps and the Recovery Plan.
- Develop and test-run monitoring (and extra survey) protocols.

2.1.3 Kangaroo Island echidna

Table 2-5 summarises the echidna's presence in the study area, known threats to the species and the relevant Commonwealth and State documents applicable to its recovery.

Table 2-5: Kangaroo Island echidna summary

Kangaroo Island echidna (*Tachyglossus aculeatus multiaculeatus*)
Baseline data
Echidna diggings were recorded along the western boundary of the study area (EBS 2018). Although no echidnas were observed, suitable habitat for the species surrounds the study area. It is unlikely that the Kangaroo Island echidnas will have a large portion of their home range within the study site, however they could use it for foraging. The Kangaroo Island echidna is found in various types of vegetation and feeds on a wide variety of invertebrates, including ants and termites (Rismiller 1999, 2003). Echidna's extract invertebrates from soil, rotting vegetation and nests using their powerful claws and beak. It is generally found in vegetated areas and seeks shelter under thick bushes, hollow logs or occasionally in burrows, but will venture into open areas to forage (Augee 1995).
EPBC status
Endangered
Key threats
Key threats to echidnas include: • predation by introduced species such as cats and pigs • habitat loss through vegetation clearing • death due to electric fences • road mortality and • ingestion of soil and invertebrates that have been treated with herbicides and pesticides (TSSC 2015).
Recovery plans
There is no recovery plan in place for this species.
Threat abatement plans
No threat abatement plan has been identified as being relevant for this species.
Conservation and management actions
Conservation and management actions recommended by the Threatened Species Scientific Committee (TSSC) (2015) for this species include: • controlling pigs and cats in conservation estate (high priority) • preparing and implementing a biosecurity plan for Kangaroo Island (high priority) • limiting road mortality by regulation, enforcement and education (medium priority) • engaging with the Kangaroo Island community and visitors (medium priority) • limiting land clearing through education (low priority) • limiting deaths due to electric fences by ensuring land managers are aware of species' occurrence and providing protective measures (low priority).

2.1.4 Southern brown bandicoot (eastern)

Table 2-6 summarises the bandicoot's presence in the study area, known threats to the species and the relevant Commonwealth and State documents applicable to its recovery.

Table 2-6: Southern brown bandicoot (eastern) summary

Southern brown bandicoot (eastern) (*Isoodon obesulus obesulus*)
Baseline data
The southern brown bandicoot (eastern) has been seen within a 10 km radius of Smith Bay, but there are no recorded sightings of the species in the study area. The closest sighting was approximately 2 km south-west of the study area (EBS 2018). The bandicoots live mainly in coastal areas and prefer dense vegetation, including wetland fringes and heathland and exotic shrubs such as blackberry.
EPBC status
Endangered
***National Parks and Wildlife Act 1972* status**
Vulnerable
Key threats
Key threats to bandicoots include: • predation by introduced species such as cats and foxes • habitat loss and degradation • inappropriate fire regimes • deaths associated with road traffic, disease (toxoplasmosis) and displacement by rabbits (TSSC 2016).
Recovery plans
A recovery plan is required; however, there is no current plan in place for this species.

Southern brown bandicoot (eastern) (*Isoodon obesulus obesulus*)

Threat abatement plans

The following Threat Abatement Plans are considered relevant:

The Threat Abatement Plan for predation by feral cats (2015), which sets out four objectives for controlling feral cats including:

- control in different landscapes
- effectiveness of control options
- alternative strategies to aid threatened species recovery
- public support for cat management.

The Threat Abatement Plan for predation, habitat degradation, competition and disease transmission by feral pigs (2017) establishes six objectives:

- prioritising key species, ecological communities, ecosystems and locations for pig management
- integration of pig management into land management activities at regional, state and territory and national levels
- scientific research into impacts on nationally threatened species and ecological communities and pig ecology and control
- effectiveness of pig control programs
- capacity for pig management and increased awareness among landholders and land managers
- improved public awareness for pig control and environmental damage.

Conservation and management actions

Conservation and management actions recommended by the TSSC (2016) include:

- implementing control mechanisms for non-native predators such as foxes and cats (high priority)
- protecting and maintaining habitat in all areas where the bandicoot currently occurs (high priority)
- establishing corridors between fragmented populations (high priority)
- implementing appropriate fire regimes (high priority)
- avoiding forestry operations within bandicoot habitat (medium priority)
- implementing Phytophthora control and quarantine methods (medium priority)
- assessing options and risks associated with the potential to reintroduce individuals to extirpated or currently non-viable subpopulations (medium priority)
- managing weeds in a way that delivers overall benefit to bandicoots (control of weeds such as blackberry could be detrimental in some areas) (low–medium priority)
- implementing measures to reduce road kills (low–medium priority)
- developing conservation covenants on lands with high value for bandicoots (low–medium priority)
- establishing or maintaining a captive breeding program for insurance and reintroductions (low priority).

3. ASSESSMENT OF EFFECTIVENESS OF PROPOSED MITIGATION MEASURES

3.1 Southern Right Whale

Table 3-7 provides an assessment of the effectiveness of the proposed avoidance or mitigation measures for the southern right whale. The measures proposed for the development are considered effective.

Table 3-7: Assessment of the effectiveness of mitigation measures for the southern right whale

Impact	Avoidance or mitigation measure	Outcome of mitigation measure	Effectiveness of mitigation measure		
			Scale and intensity of impact	On-ground benefit from measure	Overall effectiveness of measure
Introduction of marine pest species and/or diseases	Compliance with the Australian Ballast Water Management Requirements Compliance with the Anti-fouling and in-water cleaning guidelines	No new species of marine pest are discovered in the study area or immediate surrounds that are directly related to shipping activity from the development	10–20 shipping movements a year would have a negligible impact on the numbers of marine pest species and/or diseases	No marine pest species and/or diseases are introduced into Smith Bay	Proposed measure is considered effective
Mortality from vessel strike	Compliance with AMSA Marine Notice 15/2016 (minimising the risk of collisions with cetaceans)	No fatalities or entanglements involving southern right whales and shipping activity associated with the development	Vessel strike has been modelled to be once in about 300 years Shipping activity would have a negligible impact on the species based on the number of shipping movements	No mortality from vessel strike	Proposed measure is considered effective
Permanent threshold shift from piling activity	Piling would occur only during daylight hours	No permanent threshold shift caused by the development	Construction activity would have a negligible impact on whale behaviour	No hearing damage to the southern right whale	Proposed measure is considered effective
	Implementation of a soft-start procedure for the commencement of piling activity	Whales would have adequate time to leave the area	Construction activity would have a negligible impact on whale hearing	No hearing damage to the southern right whale	Proposed measure is considered effective

Impact	Avoidance or mitigation measure	Outcome of mitigation measure	Effectiveness of mitigation measure		
			Scale and intensity of impact	**On-ground benefit from measure**	**Overall effectiveness of measure**
	Trained marine mammal observers (MMO) to monitor safety zones which comprise a shut-down zone and an observation zone • the observation zone would be monitored for marine species and determine whether they are entering the shut-down zone • the shut-down zone would require cessation of piling, as soon as practicable, if a marine species was sighted within the shut-down zone	No permanent threshold shift caused by the development	Construction activity would have a negligible impact on whale behaviour	No hearing damage to the southern right whale	Proposed measure is considered effective
	Control of construction program to schedule piling to occur outside of the months when cetaceans may be present in the area	No whale behaviour disruption caused by the development	Construction activity would have a negligible impact on whale behaviour	No injuries or mortalities to whales	Proposed measure is considered effective
Behaviour disruption from the installation of infrastructure (causeway and pontoon)	Smith Bay does not contain breeding or nursery habitat Causeway extends 250 m into the bay	No whale behaviour disruption caused by the development	The causeway would have a negligible impact on whale behaviour The causeway and pontoon would cover an area of approximately 1.6 ha The entire coastline of KI has been identified as season calving habitat (DoE 2014)	Negligible changes to whale behaviour	Proposed measure is considered effective

Impact	Avoidance or mitigation measure	Outcome of mitigation measure	Effectiveness of mitigation measure		
			Scale and intensity of impact	On-ground benefit from measure	Overall effectiveness of measure
Behaviour disruption from vessel noise	Shipping routes are not within an area of high aggregation or historic high use	No whale behaviour disruption caused by the development	Shipping activity would have a negligible impact on whale behaviour	Negligible changes to whale behaviour	Proposed measure is considered effective
Ingestion of harmful marine debris	Implementation of a waste management plan for shipping operations	No ingestion of harmful marine debris by whales as a result of the development	Shipping activity would have a negligible impact on the species based on the number of movements (10–20 vessels per year)	No injuries or mortalities to whales	Proposed measure is considered effective

3.2 Hooded Plover (Eastern)

Table 3-8 provides an assessment of the effectiveness of the proposed avoidance or mitigation measures on the hooded plover (eastern). The measures proposed for the development are considered effective.

Table 3-8: Assessment of the effectiveness of mitigation measures for the hooded plover (eastern)

Impact	Avoidance or mitigation measure	Outcome of mitigation measure	Effectiveness of mitigation measure		
			Scale and intensity of impact	On-ground benefit from measure	Overall effectiveness of measure
Native vegetation clearance	The footprint of the development would be minimised where possible	Removal of native vegetation would be minimised	Removal of 2.93 ha of native vegetation Vegetation is not of high quality	No impact to plover habitat	Proposed measure is considered effective
Mortality from vehicle strike	Incorporating plover awareness in employee induction	All personnel are aware of potential native fauna species on site and reporting requirements	A pair of hooded plovers has been sighted approximately 2 km from the study area. This is outside the construction zone. Access to this area would not be required during operation.	Recording all sightings of the species in accordance with the CEMP and OEMP	Proposed measure is considered effective

Impact	Avoidance or mitigation measure	Outcome of mitigation measure	Effectiveness of mitigation measure		
			Scale and intensity of impact	On-ground benefit from measure	Overall effectiveness of measure
Mortality from vehicle strike	Vehicle speed limits on access roads and in the study area	No native fauna are injured or killed as a result of vehicle movements associated with the development	A pair of hooded plovers has been sighted approximately 2 km from the study area. This is outside the construction zone. Access to this area would not be required during operation.	No native fauna injuries or deaths as a result of the development	Proposed measure is considered effective
Introduction of weeds, pest species and/or pathogens	Standard vehicle hygiene protocols implemented as part of the CEMP	No weed or pest species and/or pathogens introduced as a result of the development	Construction equipment would be sourced from Kangaroo Island where possible. All construction vehicles would be inspected for weeds and pathogens.	No new weed or pest species and/or pathogens introduced as a result of the development	Proposed measure is considered effective
Marine pollution (spills and/or marine debris)	Spill prevention measures to be implemented during construction, operation and decommissioning. Implementation of spill response plan	No injuries or deaths of plovers caused by pollution incidents as a result of the development	Suitable habitat for the species exists in the local area. Spill response would limit the impact of any pollution incidents.	No impact to plover habitat No injuries or deaths of hooded plovers as a result of the development	Proposed measure is considered effective

3.3 Kangaroo Island Echidna

Table 3-9 provides an assessment of the effectiveness of the proposed avoidance and mitigation measures for the Kangaroo Island echidna. The measures proposed for the development are considered effective with the exception of the measures to reduce vehicle strike.

Table 3-9: Assessment of the effectiveness of mitigation measures for the Kangaroo Island echidna

Impact	Avoidance or mitigation measure	Outcome of mitigation measure	Effectiveness of mitigation measure		
			Scale and intensity of impact	On-ground benefit from measure	Overall effectiveness of measure
Native vegetation clearance	The development's footprint would be minimised where possible	Removal of native vegetation would be minimised	Removal of 2.93 ha of native vegetation	No unapproved clearance of native vegetation	Proposed measure is considered effective
Mortality from vehicle strike	Incorporating echidna awareness in employee induction Signage along Freeoak Road	All personnel are aware of potential native fauna species on site and reporting requirements	Extent of impact is uncertain	Minimising the number of deaths caused by vehicle strike Reporting of the majority of vehicle strikes	Uncertain
Mortality from vehicle strike	Vehicle speed limits on Freeoak Road and within the study area	No native fauna are injured or killed as a result of vehicle movements associated with the development	Extent of impact is uncertain	Minimising the number of deaths caused by vehicle strike	Uncertain
Mortality from vehicle strike – transport routes	Signage along the transport routes	No native fauna are injured or killed as a result of vehicle movements associated with the development	Extent of impact is uncertain	Minimising the number of deaths caused by vehicle strike	Uncertain
Mortality from vehicle strike – transport routes	Choosing the preferred route for forestry vehicles	Minimise travel time and distance travelled for forestry vehicles	Extent of impact is uncertain	Minimising travel time	Proposed measure is considered effective
Vegetation clearance along transport route	Choosing the preferred route for forestry vehicles based on ecological values	Minimise vegetation removal and impacts to echidna burrows	Timber transport route is about 100 km	Minimising vegetation removal Minimising burrow disturbance and mortalities	Proposed measure is considered effective

Impact	Avoidance or mitigation measure	Outcome of mitigation measure	Effectiveness of mitigation measure		
			Scale and intensity of impact	On-ground benefit from measure	Overall effectiveness of measure
Injuries and mortality from construction (and decommissioning) activity	The area would be micro-sited before construction activities began. An authorised and suitably experienced professional would determine the best possible management option if any individuals were found, which may include relocation	No native fauna are injured or killed as a result of construction and decommissioning activities	It is unlikely that individuals will have a major portion of their home range in the study area	No recorded injuries or deaths as a result of construction (and decommissioning) activity	Proposed measure is considered effective
Introduction of weeds, pest species and/or pathogens	Standard vehicle hygiene protocols implemented as part of the CEMP	No weed or pest species and/or pathogens introduced as a result of the development	Vehicles would be sourced locally where possible. All construction vehicles would be subject to standard vehicle hygiene protocols	It is likely that the number of weed and pest species would be reduced from the existing baseline levels	Proposed measure is considered effective
Introduction of predators	Waste and rubbish would be minimised and managed to prevent attracting predators and injuries to echidnas	No increase in the number of predators as a result of the development	Waste volumes generated from construction and operation would be minor	No additional predators would be attracted to the area	Proposed measure is considered effective
Attraction of predators (feral cats) to roadkill	Roadkill would be collected and disposed of to remove the potential food source for feral cats	No increase in the number of predators as a result of the development	Regular collections of roadkill would be undertaken	No additional predators would be attracted to the area	Proposed measure is considered effective

3.4 Southern brown bandicoot (eastern)

Table 3-10 provides an assessment of the effectiveness of the avoidance and mitigation measures for the southern brown bandicoot (eastern). The measures proposed for the development are considered effective.

Table 3-10: Assessment of the effectiveness of mitigation measures for the southern brown bandicoot (eastern)

Impact	Avoidance or mitigation measure	Outcome of mitigation measure	Effectiveness of mitigation measure		
			Scale and intensity of impact	On-ground benefit from measure	Overall effectiveness of measure
Native vegetation clearance	The development's footprint would be minimised where possible	Removal of native vegetation would be minimised	Removal of 2.93 ha of poor-quality native vegetation	No unapproved vegetation clearance	Proposed measure is considered effective
Mortality from vehicle strike	Incorporating bandicoot awareness in employee induction Signage along Freeoak Road	All personnel are aware of potential native fauna species on site and reporting requirements	Vegetation is not critical habitat for the species, so it is unlikely that individuals will use the study area or access road	Minimising the number of deaths caused by vehicle strike Reporting of all vehicle strikes	Proposed measure is considered effective
Mortality from vehicle strike	Vehicle speed limits on Freeoak Road and in the study area	No native fauna are injured or killed as a result of vehicle movements associated with the development	Vegetation is not critical habitat for the species, so it is unlikely that individuals will use the study area or access road	Minimising the number of deaths caused by vehicle strike	Proposed measure is considered effective
Mortality from vehicle strike – transport routes	Signage along the transport routes	No native fauna are injured or killed as a result of vehicle movements associated with the development	Timber transport route is about 100 km	Minimising the number of deaths caused by vehicle strike	Proposed measure is considered effective
Mortality from vehicle strike – transport routes	Choosing the preferred route for forestry vehicles	Forestry traffic will avoid night-time operations	Timber transport route is about 100 km	Minimising travel time	Proposed measure is considered effective
Vegetation clearance along transport route	Choosing the preferred route for forestry vehicles based on ecological values	Minimise vegetation removal	Timber transport route is about 100 km	Minimising vegetation removal	Proposed measure is considered effective

Impact	Avoidance or mitigation measure	Outcome of mitigation measure	Effectiveness of mitigation measure		
			Scale and intensity of impact	On-ground benefit from measure	Overall effectiveness of measure
Injuries and potential mortality from falling into open excavations	Trenching guidelines implemented as part of the CEMP	No native fauna are injured or killed as a result of open excavations during construction and decommissioning	Vegetation is not critical habitat for the species, so it is unlikely that individuals will use the study area	No recorded injuries or fatalities as a result of open excavations	Proposed measure is considered effective
Introduction of weeds, pest species and/or pathogens	Standard vehicle hygiene protocols implemented as part of the CEMP	No weed or pest species and/or pathogens are introduced as a result of the proposal	Vehicles would be sourced locally where possible. All construction vehicles would be subject to standard vehicle hygiene protocols	It is likely that the number of weed and pest species would be reduced from the existing baseline levels	Proposed measure is considered effective
Attraction of predators (feral cats) to roadkill	Roadkill would be collected and disposed of to remove the potential food source for feral cats	No increase in the number of predators as a result of the development	Regular collections of roadkill would be undertaken	No additional predators would be attracted to the area	Proposed measure is considered effective

REFERENCES

Australian Maritime Safety Authority (AMSA) 2016, 'Minimising the risk of collisions with cetaceans', viewed 30 August 2017, <https://apps.amsa.gov.au/MOReview/MarineNoticeExternal.html>.

Baker-Gabb, D, & Weston, M 2006, 'South Australian Recovery Plan for the Hooded plover, *Thinornis rubricollis*, 4th draft, August 2006, Department of Environment and Heritage, South Australian Government, Adelaide.

BMT WBM 2017, 'Whale Strike Probability Modelling', technical note (electronic transmission) to David Wiltshire from Tony Devlin, 24 January 2017.

Brown, GW & Main, ML 2010, *Draft national recovery plan for the southern brown bandicoot Isoodon obesulus obesulus*, Arthur Rylah Institute for Environmental Research, Department of Sustainability and Environment, Heidelberg, Melbourne.

Department of Environment and Conservation (DEC) 2006, Southern Brown Bandicoot (*Isoodon obesulus*) Recovery Plan, Government of New South Wales, Sydney.

Department of the Environment and Energy 2014, National Conservation Values Atlas - Biologically important areas of regionally significant marine species, viewed 13 November 2018, <http://www.environment.gov.au/webgis-framework/apps/ncva/ncva.jsf>.

Department of the Environment and Energy (DoEE) 2016, 'Draft National Strategy for Mitigating Vessel Strike of Marine Mega-fauna', Australian Government, Canberra.

Department of the Environment, Water, Heritage and the Arts (DEWHA) 2008, 'Threat Abatement Plan for predation by the European red fox', Australian Government, Canberra

Department of Sustainability, Environment, Water, Population and Communities 2012a, 'Conservation Management Plan for the Southern right whale', Australian Government, Canberra.

Department of Sustainability, Environment, Water, Population and Communities 2012b, 'Conservation Management Plan for the Southern Right Whale: A Recovery Plan under the Environment Protection and Biodiversity Conservation Act 1999 2011–2021', Australian Government, Canberra.

EBS Ecology 2018, *Smith Bay Ecological Assessment*, sub-consultant's report prepared for Environmental Projects on behalf of KIPT Pty Ltd, May 2018, unpublished report.

Franks, DM, Brereton, D, Moran, CJ, Sarker, T & Cohen, T 2010, 'Cumulative Impacts – A good practice guide for the Australian coal mining industry', Centre for Social Responsibility in Mining and Centre for Water in the Minerals Industry, Sustainable Minerals Institute, University of Queensland, Brisbane.

Garnett, ST & Crowley, GM 2000, 'The Action Plan for Australian Birds 2000', Environment Australia and Birds Australia, Canberra, ACT, viewed 19 June 2018, <http://www.environment.gov.au/resource/action-plan-australian-birds-2000>.

Garnett, ST, Szabo JK & Dutson, G 2011, The Action Plan for Australian Birds 2010, CSIRO Publishing, Melbourne.

Haby, N & Long, K 2005, 'Recovery plan for the southern brown bandicoot in the Mount Lofty Ranges, South Australia 2004 to 2009', Department of Environment and Heritage, Government of South Australia, and the Natural Heritage Trust.

Natural Resources Kangaroo Island (NRKI) 2015, 'Feral cat eradication on Kangaroo Island 2015–2030 Prospectus', Government of South Australia and Kangaroo Island Council, viewed 6 July 2018, <http://www.naturalresources.sa.gov.au/files/sharedassets/kangaroo_island/plants_and_animals/pest_animals/feral_cat/ki_feral_cat_eradication_project_prospectus.pdf>.

Natural Resources Kangaroo Island (NRKI) 2018, Kangaroo Island Feral Cat Eradication Program, viewed 18 June 2018, <http://www.naturalresources.sa.gov.au/kangarooisland/plants-and-animals/pest-animals/Kangaroo-Island-Feral-Cat-Eradication-Program>.

Threatened Species Scientific Committee (TSSC) 2014, Conservation Advice: *Thinornis rubricollis rubricollis*, hooded plover (eastern), Department of the Environment, Australian Government, Canberra.

Threatened Species Scientific Committee 2015, Conservation Advice: *Tachyglossus aculeatus mtuliaculeatus*, Kangaroo Island echidna, Department of the Environment, Australian Government, Canberra.

Threatened Species Scientific Committee 2016, Conservation Advice: *Isoodon obesulus obesulus*, Southern brown bandicoot (eastern), Department of the Environment, Australian Government, Canberra.

Appendix K4 – DoEE Referral Decision on EPBC/2016/7814

EPBC Ref: 2016/7814

Mr John Sergeant
Managing Director
Kangaroo Island Plantation
Timbers Ltd
79 Angas Street
ADELAIDE SA 5000

Dear Mr Sergeant

Decision on referral
Smith Bay Wharf development, Kangaroo Island, SA

Thank you for submitting a referral under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).This is to advise you of my decision about the referral of the proposed action, to build and operate a deep-water export wharf facility at Smith Bay on the north coast of Kangaroo Island, South Australia.

As a delegate of the Minister for the Environment and Energy, I have decided under section 75 of the EPBC Act that the proposed action is a controlled action and, as such, it requires assessment and a decision about whether approval for it should be given under the EPBC Act.

The information that I have considered indicates that the proposed action is likely to have a significant impact on the following matters protected by the EPBC Act:

- Listed threatened species and communities (sections 18 & 18A)
- Listed migratory species (sections 20 & 20A)
- Commonwealth marine areas (sections 23 & 24A)

Based on the information available in the referral, the proposed action is likely to have a significant impact on, but not limited to, the following matters of national environmental significance:

- The proposed action is likely to have a significant impact on two EPBC Act listed threatened species; the endangered and migratory Southern Right Whale (*Eubalaena australis*) and the endangered Kangaroo Island Echidna (*Tachyglossus aculeatus multiaculeatus*).
- The proposed action may also have a significant impact on two other EPBC Act listed threatened species; the vulnerable Hooded Plover (eastern) (*Thinornis rubricollis rubricollis*) and Southern Brown Bandicoot (eastern) (*Isoodon obesulus obesulus*).

Please note that this decision only relates to the potential for significant impacts on matters protected by the Australian Government under Chapter 2 of the EPBC Act.

A copy of the document recording this decision is enclosed.

At this stage, a decision has not been made on the approach that must be used to assess the project. To assist in determining the most appropriate assessment approach the Department will be contacting the South Australian Department for Environment, Water & Natural Resources to confirm whether the assessment bilateral agreement between the Commonwealth Government and the SA Government will be applied to this proposal. You should expect to receive further advice on this issue from the project manager who will contact you shortly to discuss the assessment process.

You may elect under section 132B of the EPBC Act to submit a management plan to be considered during the assessment at any time before an approval decision is made. If a management plan is submitted or revised after approval it is likely to incur additional fees under cost recovery. Please refer to Attachment A for more details.

Please also note that once a proposal to take an action has been referred under the EPBC Act, it is an offence under section 74AA to take the action while the decision making process is on-going (unless that action is specifically excluded from the referral or other exemptions apply). Persons convicted of an offence under this provision of the EPBC Act may be liable for a penalty of up to 500 penalty units. The EPBC Act is available on line at: http://www.environment.gov.au/epbc/about/index.html

The Department has recently published an *Environmental Impact Assessment Client Service Charter* (the Charter) which outlines the Department's commitments when undertaking environmental impact assessments under the EPBC Act. A copy of the Charter can be found at: http://www.environment.gov.au/epbc/publications/index.html.

In your letter of 28 November 2016, you note that the re-use of the dredged material to construct the causeway may require a permit under the *Environment Protection (Sea Dumping) Act 1981* (Sea Dumping Act). The Sea Dumping Act applies to all vessels, aircraft and platforms in Australian waters and to all Australian vessels and aircrafts in any part of the sea. Permits are required for all sea dumping operations. Permits are most commonly issued for dredging operations and the creation of artificial reefs. For more information refer to: https://www.environment.gov.au/topics/marine/marine-pollution/sea-dumping/sea-dumping-act. The proposed action may require a sea dumping permit if the dumping of the dredged material is regulated by the Sea Dumping Act.

The Department is aware that a Historic Shipwreck may occur in the proximity to the proposed action. The Chum 1942, Australian National Shipwrecks Database ID. 5259, will be listed under the Commonwealth *Historic Shipwrecks Act 1976* (the Shipwreck Act) on 1 January 2017. It is an offence to destroy, damage, cause interference with or the disposal of a historic shipwreck or relic, or cause a historic shipwreck or relic to be removed without a permit issued under the Shipwreck Act. Some historic shipwrecks lie within protected zones with a radius of up to 800 metres. It is an offence to enter a protected zone without a permit. Should any shipwreck or article associated with a shipwreck be discovered, the Shipwreck Act requires the find to be reported. If you need further information, to apply for a permit, or to report a discovery, contact details can be found at: http://www.environment.gov.au/heritage/historic-shipwrecks. I have also attached a fact sheet with additional information on Historic Shipwrecks.

If you have any questions about the referral process or this decision, please contact the project manager, [redacted] and quote the EPBC reference number shown at the beginning of this letter.

Yours sincerely

Bruce Edwards
Assistant Secretary
Assessments (WA, SA, NT) and Air Branch
14 December 2016

ELECTION TO HAVE A MANAGEMENT PLAN APPROVED AFTER APPROVAL FORM

Note: election must be given to the Minister before the Minister grants an approval under section 133 of the *Environment Protection and Biodiversity Conservation Act 1999.*

PERSON PROPOSING TO TAKE ACTION

1. Name and Title:
2. Organisation (if applicable):
3. EPBC Referral Number (if known):
4. ACN/ABN (if applicable):
5. Postal Address:
6. Telephone:
7. Email:
8. Name of designated proponent (if not the same person named at item 1 above and if applicable):
9. ACN/ABN of designated proponent (if not the same person named at item 1 above):

I agree:

□ to elect to submit a management plan(s) for approval after the Minister grants approval under section 133 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), in accordance with section 132B of the EPBC Act. Note a $3233 fee may apply; OR

□ to submit a management plan(s) for approval prior to the Minister granting approval under section 133 of the EPBC Act:

Name of plan(s):_____

Timing of submitting plan (e.g. included as part of assessment documentation) _____; OR

□ not applicable, no management plans are required for this proposal.

Declaration:

□ I declare that to the best of my knowledge the information I have given on this form is complete, current and correct.

□ I understand that giving false or misleading information is a serious offence.

Signature _____ **Date:** _____

Australian Government
Department of the Environment

Historic Shipwrecks Guidance for Offshore Developments

The Commonwealth *Historic Shipwrecks Act 1976* (Historic Shipwrecks Act) protects all shipwrecks and associated relics that occurred 75 or more years ago, regardless of whether their physical location is known. More recent shipwrecks may be protected through declaration by the Minister under the Historic Shipwrecks Act. Some historic shipwrecks have a shipwreck protected zone which may include an area of up to 200 hectares.

The jurisdiction of the Historic Shipwrecks Act is not limited to Commonwealth marine areas as defined by the *Environment Protection and Biodiversity Conservation Act 1999*; it applies also to waters beyond the seaward limits of the Australian States and Territories, including coastal waters. The requirements of the Historic Shipwrecks Act must be considered when applying for any State, Territory or Commonwealth planning approval for actions or developments in all coastal and offshore waters.

What are my responsibilities?

Any actions involving contact with the seabed, or activities in close proximity to the seabed, have the potential to damage, destroy or interfere with historic shipwrecks and it is strongly recommended that proponents seek professional advice and develop risk mitigation strategies to prevent committing an offence. When undertaking actions in the marine environment, proponents and their contractors must conform to all requirements of the Historic Shipwrecks Act including:

- not damage, destroy or interfere with any historic shipwreck or relic that may be encountered during the course of a proposed action without a permit;
- not enter or conduct activities within a shipwreck protected zone without first obtaining a permit under the Historic Shipwrecks Act; and
- provide a written notification of the discovery of any suspected shipwreck or relics identified during the course of the proposed action.

For your convenience, permit applications and notifications of discoveries can be done online through the Australian National Shipwrecks Database at the following web address:

https://dmzapp17p.ris.environment.gov.au/shipwreck/public/wreck/search.do

Photo credits: (top) Wreckage from the shipwrecked schooner SS Alert that has washed up on Arthur Beach © Parks and Wildlife Service Tasmania, (bottom) Courtesy of the WA Museum.

HER154.1215

How can I assess the risk?

The best way to assess then mitigate the risk of damaging, destroying or interfering with historic shipwrecks is to determine if they exist in the affected area. Depending on age, design and types of materials used in construction, the remains of historic shipwrecks may be visible on the seafloor or could be partly or fully buried.

Appropriate strategies to identify and assess impacts on historic shipwrecks could include:

- desktop studies to identify known or potential historic shipwreck locations including consulting the Australian National Historic Shipwrecks Database at the following web address https://www.environment.gov.au/topics/heritage/historic-shipwrecks/australian-national-shipwreck-database
- remote sensing techniques such as magnetometer, side scan sonar, sub-bottom profiling and multi-beam sonar surveys;
- physical assessment of any located sites to ascertain if they are shipwrecks and if so, the extent of the sites;
- consideration of safety issues relating to chemicals, toxic material and un-exploded ordinance located on shipwreck sites;
- assessment of the potential direct impacts on shipwreck sites that may be posed by the proposed activity; and
- modelling possible indirect impacts such as water movement, sedimentation associated with dredging and spoil or oil contamination.

What risk mitigation measures could I take?

If historic shipwrecks are identified in the vicinity of a proposed action and can be directly or indirectly impacted, the proponent must undertake measures to protect them. A risk mitigation plan is a useful tool to guide the measures to be taken.

Practical measures could include:

- establishing protective buffer zones during actions;
- real time monitoring of activities;
- site stabilisation measures; and
- chemical, electrochemical and physical monitoring before, during and after the action to gauge the effectiveness of mitigation measures.

Photo: HMS Pandora (1791) Copyright Queensland Museum

What can I do if impacts are unavoidable?

In the rare case that a direct impact cannot be avoided, actions to lessen the impact and help retain the heritage values of the shipwreck will need to be conducted.

Practical measures for sites directly impacted include:

- site survey, recording and documentation;
- archaeological excavation including methodology that is compliant with the rules of the UNESCO 2001 *Convention on the Protection of the Underwater Cultural Heritage*;
- moving or conducting in-situ reburial of a shipwreck and relics;
- selective recovery and conservation of the shipwreck and relics; and
- chemical, electrochemical and physical monitoring before, during and after the action to gauge the effectiveness of mitigation measures.

Who can help with advice?

Contact details for advice on shipwrecks related planning and protection matters located at State, Territory or Commonwealth heritage agencies can be found at the following web address:

www.environment.gov.au/topics/heritage/historic-shipwrecks/shipwreck-contacts

Inquiries should be directed to your local State or Territory agency in the first instance.

Appendix K5 – Draft MNES Monitoring Plan

Identifier	Species	Aspect	Impact	Management measure	Responsibility - Implementation of management measure	Monitoring	Reporting	Auditing	Relevant Government Agency/ Agencies
MNES1	Southern right whale	Shipping, Construction	Vessel strike, mortality	Vessel compliance with AMSA notice Marine Notice 15/2016 (Minimising the risk of collisions with cetaceans)	Shipping operator		Vessel strike of a whale in Australian waters by a vessel associated with KIPT's operations would be reported to the appropriate authorities via the national ship strike database which is managed by the Department of the Environment and Energy (DoEE)		Australian Maritime Safety Authority (AMSA), Commonwealth Department of the Environment and Energy (DoEE)
MNES2	Southern right whale	Construction - Piling	Permanent threshold shift	Piling will only occur during daylight hours	KIPT - construction			Audits of CEMP implementation	Commonwealth Department of the Environment and Energy (DoEE), Department of Planning, Transport and Infrastructure (DPTI)
MNES3	Southern right whale	Construction - Piling	Permanent threshold shift	A soft start procedure will be implemented for the commencement of piling activity to gradually increase noise levels	KIPT - construction			Audits of CEMP implementation	Commonwealth Department of the Environment and Energy (DoEE), Department of Planning, Transport and Infrastructure (DPTI)

Identifier	Species	Aspect	Impact	Management measure	Responsibility - Implementation of management measure	Monitoring	Reporting	Auditing	Relevant Government Agency/ Agencies
MNES4	Southern right whale	Construction - Piling	Permanent threshold shift	Alternative piling methodologies with lower noise emissions will be evaluated	KIPT - construction				Commonwealth Department of the Environment and Energy (DoEE),
MNES5, MNES6	Southern right whale	Construction - Piling	Permanent threshold shift	Safety zones which compromise shut down zones and observation zones will be implemented: the observation zone would be monitored for marine species and determine whether they are entering the shut-down zone; the shut-down zone would require cessation of piling, as soon as practicable, if a marine species was sighted within the shut-down zone	KIPT - construction	Trained marine mammal observers will be used to monitor the safety zones	Sightings of whales would be reported to the Victor Harbor Whale Centre. Whale strikes would be reported to the national ship strike database managed by the Department of the Environment and Energy	Audits of CEMP implementation	Commonwealth Department of the Environment and Energy (DoEE),
MNES8	Southern right whale Hooded plover (eastern)	Shipping - waste generation	Ingestion of harmful marine debris	Appropriate management of waste on ships would minimise any potential increase in marine debris, that might harm southern right whales or hooded plovers.	Shipping operator			Audits of OEMP implementation	Australian Maritime Safety Authority (AMSA)

Identifier	Species	Aspect	Impact	Management measure	Responsibility - Implementation of management measure	Monitoring	Reporting	Auditing	Relevant Government Agency/ Agencies
MNES9: BIOSEC28, BIOSEC30, BIOSEC31, MNES14	Southern right whale	Shipping - ballast water	Introduction of marine pest species/and or diseases	Compliance with the Australian Ballast Water Management Guidelines	Shipping operator	As per the Marine Pest Management Plan	New marine pests would be reported to Fishwatch	Review of the Marine Pest Management Plan	Commonwealth Department of Agriculture and Water Resources (DAWR), Department of Primary Industries and Regions, South Australia (PIRSA) - Biosecurity SA, Natural Resources Kangaroo Island (NRKI)
	Southern right whale	Shipping - ballast water	Introduction of marine pest species/and or diseases	Implementation of the Marine Pest Management Plan	KIPT - operation	Monitoring plan as detailed in the Marine Pest Management Plan	New marine pests would be reported to Fishwatch	Review of the Marine Pest Management Plan	Department of Primary Industries and Regions, South Australia (PIRSA) - Biosecurity SA, Natural Resources Kangaroo Island (NRKI)
BIOSEC44	Southern right whale	Shipping - biofouling	Introduction of marine pest species/and or diseases	Compliance with State Anti-fouling and in-water cleaning guidelines	Shipping operator			Audits of Biosecurity Management Plan	Environment Protection Authority (EPA)

Identifier	Species	Aspect	Impact	Management measure	Responsibility - Implementation of management measure	Monitoring	Reporting	Auditing	Relevant Government Agency/ Agencies
MNES10	Southern right whale Hooded plover (eastern)	Shipping	Ingestion of harmful marine debris, injury and/or mortality	The operational environmental management plan (OEMP) would include measures to prevent oil and chemical spills from the wharf, including developing spill response plans to protect the marine environment.	KIPT - operations	Trends in spill and pollution incidents would be monitored	Spills (>20L) in the marine environment would be reported to the EPA and/or AMSA	Audits of implementation of Emergency Response Management Plan	Commonwealth Department of the Environment and Energy (DoEE), Australian Maritime Safety Authority (AMSA)
						Waste management practices (both marine and terrestial) during construction and operation would be monitored		Spill Response Plan OEMP implementation	Environment Protection Authority (EPA)
MNES42	Southern right whale	Operation - installation of causeway	Behaviour disruption from the installation of permanent infrastructure	Causeway extends 250 m into Smith Bay. Smith Bay does not contain breeding or nursery habitat	KIPT - construction, Controlled Action to be approved by DoEE				Commonwealth Department of the Environment and Energy (DoEE)

Identifier	Species	Aspect	Impact	Management measure	Responsibility - Implementation of management measure	Monitoring	Reporting	Auditing	Relevant Government Agency/ Agencies
MNES15, TT14	Kangaroo Island echidna Southern brown bandicoot	Operation - transport routes	Mortality from vehicle strike	The preferred route for forestry vehicles would be chosen to minimise the time and distance travelled wherever possible, thus minimising the opportunity for vehicle strike to occur.	DPTI to approve the use of high productivity vehicles and to approve the transport route				Department of Planning, Transport and Infrastructure (DPTI)
TT14	Kangaroo Island echidna Southern brown bandicoot	Operation - transport routes	Vegetation clearance along transport routes	The preferred route for forestry vehicles would be chosen based on ecological values	KIPT - operations, DPTI, Kangaroo Island Council				Department of Planning, Transport and Infrastructure (DPTI)
					Vegetation clearance and transport impact route assessment would require approval by the Department of the Environment and Energy and/ or DEW Native Vegetation Council				Commonwealth Department of the Environment and Energy (DoEE), Department for Environment and Water (DEW) - Native Vegetation Council

Identifier	Species	Aspect	Impact	Management measure	Responsibility - Implementation of management measure	Monitoring	Reporting	Auditing	Relevant Government Agency/ Agencies
MNES16, TT16	Kangaroo Island echidna Southern brown bandicoot	Operation - transport routes	Mortality from vehicle strike	The number of vehicles required to transport timber products would be minimised wherever possible by using high productivity vehicles such as B-doubles and A-doubles.	DPTI to approve the use of high productivity vehicles				Department of Planning, Transport and Infrastructure (DPTI)
MNES17	Kangaroo Island echidna Southern brown bandicoot	Operation - vehicle movements along Freeoak Road and transport routes	Mortality from vehicle strike	Driver education and awareness training as part of inductions	KIPT - Construction and KIPT - Operation			CEMP audit - includes check of training and induction records	Commonwealth Department of the Environment and Energy (DoEE)
MNES18	Kangaroo Island echidna Southern brown bandicoot	Construction - vehicle movements	Mortality from vehicle strike	Signage indicating echidna presence would be erected on Freeoak Road (entry to the site)	KIPT - construction				Commonwealth Department of the Environment and Energy (DoEE)

Identifier	Species	Aspect	Impact	Management measure	Responsibility - Implementation of management measure	Monitoring	Reporting	Auditing	Relevant Government Agency/ Agencies
MNES20	Kangaroo Island echidna	Operation - vehicle movements	Attraction of predators (feral cats) to roadkill	The transport route would be inspected regularly for roadkill. Deceased echidnas would be collected and provided to the University of Adelaide for research purposes.	KIPT - operations	Review of incidences of vehicle strike and identification of any trends (location, seasonal, time of day etc.).	Drivers would be encouraged to report vehicle strikes during timber haulage	Audit of Offsets Implementation Plan	Commonwealth Department of the Environment and Energy (DoEE)
	Southern brown bandicoot			Deceased bandicoots would be collected and disposed of.			Numbers and locations of roadkill (echidnas and bandicoots) would be reported to DoEE		
							Operators would be encouraged to report feral cat sightings via the Feral Cat Scan app		Department for Environment and Water (DEW) - Natural Resources Kangaroo Island (NRKI)

Identifier	Species	Aspect	Impact	Management measure	Responsibility - Implementation of management measure	Monitoring	Reporting	Auditing	Relevant Government Agency/ Agencies
MNES21	Kangaroo Island echidna	Construction, decommissioning	Mortality from vehicle strike	The general area would be inspected before construction activities began. If echidna inviduals were observed, an authorised and suitably experienced professional would be engaged to determine the best possible management option for the individual, which may include relocation. Particular care would be taken not to relocate lactating females, as they may have young located in burrows that would therefore be abandoned.	KIPT - construction	Sightings of fauna prior to construction works	Fauna deaths would be reported to DEW, Fauna deaths involving MNES species would be reported to DoEE	CEMP audit	Department for Environment and Water (DEW) - fauna permits
MNES22	Kangaroo Island echidna	Construction	Habitat fragmentation, removal of vegetation	The footprint of the proposal would be minimised where possible to limit required vegetation clearance (construction)	KIPT - construction				

Identifier	Species	Aspect	Impact	Management measure	Responsibility - Implementation of management measure	Monitoring	Reporting	Auditing	Relevant Government Agency/ Agencies
MNES23	Kangaroo Island echidna Southern brown bandicoot	Construction	Injury and/ or mortality from falling into open excavations	Trenching guidelines would be set to ensure that uncovered trenches did not pose a risk to fauna (Construction, decomissioning)	KIPT - construction	Any fauna deaths during construction	Fauna deaths would be reported to DEW, Fauna deaths involving MNES species would be reported to DoEE	CEMP audit	Commonwealth Department of the Environment and Energy (DoEE) Department for Environment and Water (DEW)
MNES24	Kangaroo Island echidna Southern brown bandicoot	Costruction, Operation, Decommissioning	Mortality from vehicle strike	Vehicle speed limits would be in place on the study area and along Freeoak Road to reduce the risk of vehicle strikes (Construction, decomissioning, operation)	KIPT - Construction and KIPT - Operation	Monitoring vehicle speed on Freeoak Road and within the study area	Fauna deaths would be reported to DEW, Fauna deaths involving MNES species would be reported to DoEE as part of the Offsets Implementation Plan	CEMP and OEMP audits	Commonwealth Department of the Environment and Energy (DoEE) Department for Environment and Water (DEW)
						Wherever possible vehicle strikes would be recorded using the Echidna CSI (Conservation Science Initative) mobile application,		Offsets Implementation Plan	
						Review of incidences of vehicle strike and identification of any trends (location, seasonal, time of day etc.).			

Identifier	Species	Aspect	Impact	Management measure	Responsibility - Implementation of management measure	Monitoring	Reporting	Auditing	Relevant Government Agency/ Agencies
MNES25	Kangaroo Island echidna Southern brown bandicoot	Construction, Operation, Decommissioning	Injury and/ or mortality, Introduction of predators	Waste and rubbish would be minimised and managed to prevent the attraction of predators and scavengers to minimise risks to native fauna (Construction, decomissioning, operation)	KIPT - Construction and KIPT - Operation				Department for Environment and Water (DEW) - Natural Resources Kangaroo Island
MNES26	Kangaroo Island echidna Southern brown bandicoot Hooded plover (eastern)	Construction, Operation, Decommissioning	Introduction of pest plants, pest animals and/or pathogens	Standard vehicle hygiene protocols would be followed to reduce the risk of introducing or spreading weeds and pathogens (Construction, decomissioning and operation)	KIPT - Construction and KIPT - Operation			CEMP and OEMP audits	Department of Primary Industries and Regions, South Australia (PIRSA) - Biosecurity SA, Natural Resources Kangaroo Island (NRKI)

Identifier	Species	Aspect	Impact	Management measure	Responsibility - Implementation of management measure	Monitoring	Reporting	Auditing	Relevant Government Agency/ Agencies
MNES27	Kangaroo Island echidna	Operation - woodchip storage	Mortality	The base of woodchip piles would be inspected for echidnas during ship-loading activities in case any have been able to infiltrate physical or nuisance barriers (such as fencing) which would ordinarily perturb echidnas from migrating to the site.	KIPT - operations				
MNES28	Kangaroo Island echidna	Construction and Operation	Mortality from ingestion of herbicides and pesticides	Weeds would be managed as required, and the application of herbicides and pesticides would be undertaken in consultation with NRKI and Dr Peggy Rismiller to minimise the risk of echidna deaths from the ingestion of soil and invertebrates that have been treated with herbicides and pesticides.	KIPT - Construction and KIPT - Operation	Fauna deaths after application of herbicides	Fauna deaths would be reported to DEW, Fauna deaths involving MNES species would be reported to DoEE	CEMP and OEMP audits	Department for Environment and Water (DEW) - Natural Resources Kangaroo Island (NRKI), Commonwealth Department of the Environment and Energy (DoEE)

Identifier	Species	Aspect	Impact	Management measure	Responsibility - Implementation of management measure	Monitoring	Reporting	Auditing	Relevant Government Agency/ Agencies
MNES33	Hooded plover (eastern)	Beach access during construction	Mortality, disruption of breeding	If a hooded plover (eastern) nest was discovered in Smith Bay, a protection zone (determined in consultation with DEW) would be imposed around the location for the entire breeding season (construction, operation)	DEW would be required to approve mitigation measure prior to implementation by KIPT - Construction			CEMP and OEMP audits	Department for Environment and Water (DEW), Commonwealth Department of the Environment and Energy (DoEE)
MNES34	Hooded plover (eastern)	Beach access during construction	Mortality, disruption of breeding	Inductions would include information to assist operators to identify hooded plovers (eastern) and their nests (construction, operation)	KIPT - Construction	Presence of hooded plover (eastern) nests in Smith Bay would be monitored during the breeding season (November to January). BirdLife do biennial surveys for the hooded plover which includes Smith Bay.		CEMP audit - includes check of training and induction records	Department for Environment and Water (DEW) - Kangaroo Island Natural Resources Management Board, Commonwealth Department of the Environment and Energy (DoEE)

Identifier	Species	Aspect	Impact	Management measure	Responsibility - Implementation of management measure	Monitoring	Reporting	Auditing	Relevant Government Agency/ Agencies
MNES35	Hooded plover (eastern)	Construction - operation of equipment	Mortality	The CEMP would include measures to prevent oil and chemical spills from dredging equipment, including spill response plans to protect the marine environment.	KIPT - Construction	Trends in spill and pollution incidents would be monitored	Spills (>20L) in the marine environment would be reported to the EPA and/or AMSA	Spill Response Plan	Australian Maritime Safety Authority (AMSA), South Australian Environmental Protection Authority (SA EPA), Commonwealth Department of the Environment and Energy (DoEE)
MNES37	Hooded plover (eastern)	Beach access during construction	Mortality, disruption of breeding	Contractor activity zones would be clearly identified and sign-posted	KIPT - Construction	Deviation from the identified access tracks to be used for construction activity would be monitored		CEMP audits would include site inspection for any new and unauthorised tracks that have been created	Commonwealth Department of the Environment and Energy (DoEE)
MNES38, MNES39	Southern right whale Kangaroo Island echidna Hooded plover (eastern) Southern brown bandicoot	Construction and Operation	Ingestion of harmful debris, attraction of scavengers, mortality	Waste management practices (both marine and terrestrial) during construction and operation would be monitored	KIPT - Construction and KIPT - Operation	Review of waste management records. Review of spill incidents and trend analysis	Spills (>20L) in the marine environment would be reported to the EPA and/or AMSA	CEMP and OEMP audits would review waste management practices and records	South Australian Environmental Protection Authority (SA EPA), Commonwealth Department of the Environment and Energy (DoEE), Australian Maritime Safety Authority (AMSA)

Appendix K6 – Echidna Technical Report

TABLE OF CONTENTS

LIST OF TABLES

1. KANGAROO ISLAND ECHIDNA

1.1 Conservation status

The Kangaroo Island echidna (Tachyglossus aculeatus subsp. aculeatus) is listed as endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (DoEE 2018c), although it is not listed under State legislation. The listing is linked to the echidna's restricted range of a single population within the Island's total area of about 4,400 square kilometres (Woinarski et al. 2014). In a 2015 assessment of the echidna's viability, the Threatened Species Scientific Committee (TSSC) noted that its prospects for survival were precarious because it was restricted to a single location – Kangaroo Island – and that breeding was not keeping up with the rate of natural and other echidna deaths, so the population continued to decline. The number of mature individuals is estimated at fewer than 5,000 and the reduction in numbers is approaching 30 per cent in 75 years, that is, three generations (Woinarski et al. 2014).

Additional background information on the Kangaroo Island echidna is provided in Appendix K3 – MNES Background Information.

1.2 Threats

The key threats to the Kangaroo Island echidna are predation by feral cats and pigs, habitat loss and fragmentation, and being struck by vehicles, TSSC noted in 2015. It also claimed they are at risk of being killed by electric fences and from eating invertebrates affected by herbicides and pesticides.

Cats are believed to kill about 25 per cent of young echidnas, as well as some adults (Rismiller & McKelvey 2000). An average of 35 echidna road deaths are reported each year, with many more going unreported (Woinarski et al. 2014).

Vehicle strikes are making an increasing impact on Kangaroo Island echidnas as road traffic has reportedly increased, according to Dr Peggy Rismiller, an environmental physiologist and wildlife biologist who has lived and studied echidnas on the Island for 30 years. She noted in August 2017, the Echidna Watch program recorded at least 35 kills a year, and in one year recorded 40 deaths on a single road, the newly sealed South Coast Highway, although this could be attributed to one-off a change in road conditions. As noted by Woinarski et al (2014), road kills of echidnas are likely to be underestimated due to the number of incidents presumed unreported, so it is difficult to accurately assess the overall impact on the Kangaroo Island echidna population. However, the number of reported vehicle strikes along Playford Highway, Gosse Road, Parndana Road and Stokes Bay Road have increased over recent years (P Rismiller 2017 pers. comm., 14 August). Dr Rismiller said the majority of strikes occurred between May and August during the courtship and breeding season, when male echidnas travelled great distances and were highly active.

1.3 Conservation programs in South Australia

The primary conservation objective for the Kangaroo Island echidna is to maintain its current range and abundance (TSSC 2015). DoEE has determined that a recovery plan is not required for this species because the approved conservation advice provides sufficient direction to implement priority actions and mitigate against key threats. Similarly, DoEE has said no Threat Abatement Plan is relevant for this species (TSSC 2015). Conservation and management actions are provided in Appendix K3 – MNES Background information.

Although no specific conservation programs have been identified for the Kangaroo Island echidna, ongoing feral animal control by Natural Resources Kangaroo Island (NRKI 2015), particularly implementation of the Feral Cat Eradication Program (a joint initiative of Kangaroo Island Council and NRKI), is likely to have a positive impact. Likewise, revegetation projects and programs to improve habitat quality, such as thorough targeted weed control within the echidnas' range are likely to be beneficial.

There is also ongoing research on the echidna by Dr Peggy Rismiller and associated researchers at the Pelican Lagoon Research Station. This work covers investigating deaths, including road kills as reported through the Echidna Watch program, as well as numerous studies on ecology, behaviour and conservation.

2. CALCULATIONS OF INCREASED MORTALITY

2.1 Approximation of the magnitude of echidna roadkill

A review of scientific literature found very little peer-reviewed information and published data on the rates of roadkill especially species-specific data and studies for echidnas. Two sources of data were reviewed to inform the process that was adopted to estimate the magnitude of echidna roadkill from the proposed KI Seaport development. These sources were a 2004 honours thesis by P. Leeuwenburg and unpublished roadkill data collected as part of the Echidna Watch Program.

A 2004 study on Kangaroo Island found that rates of roadkill for native species were significantly higher than the mainland (Leeuwenburg 2004). Roads in the south-west of the Island were sampled over March-August and found that the highest rates of roadkill were recorded on roads that were sealed, experienced persistent traffic throughout the day, medium traffic density (151-300 AADT), the roads were close to national parks and other tourism destinations (Leeuwenburg, 2004, p. 63). The southern end of the West End Highway had a roadkill rate of 11.026 roadkill / 2 weeks / 10 km / 100 vehicles. However, it needs to be noted that traffic data was assumed and could therefore be unreliable (Leeuwenburg, 2004, p. 64). Echidnas accounted for 0.3 per cent of the total number of roadkills recorded (2 echidnas out of a total sample size of 774).

A review of roadkill data from the Echidna Watch Program, which has been run by Dr Peggy Rismiller since 1992, found that over the last ten years there were approximately 400 echidna mortalities as a result of vehicle strike on Kangaroo Island. Out of those 400, 65 per cent were recorded in the months of June, July, August and September which is the echidna breeding season. Males are very active during the breeding season and will form trains behind a sexually mature female. The ratio of males to females recorded over the duration of the Echidna Watch Program is approximately 1:1. This includes reports of multiple fatalities in which up to three individuals, usually males and sometimes sub-adult males, will be the victims of roadkill in a single incident (P, Rismiller, 2018, pers. comm. 22 August).

Data obtained as part of the honours thesis by Leeuwenburg, does not address the seasonal variation in traffic that is experienced on Kangaroo Island, which increases over the summer period and during school holidays, and then decreases during winter months. Echidna activity also varies seasonally, which has an impact on when roadkills are more likely to occur. This study obtained data on roadkill for a six-month period for a single year. The results are not considered an accurate representation of the long-term temporal and geographic trends in echidna roadkill, however the roadkill rates in conjunction with data from the Echidna Watch Program, have been used as a basis for estimating the magnitude of roadkills from forestry traffic.

A list of potential traffic-related factors that could be considered when predicting the number of echidna roadkill incidents is provided in Table 2-1.

Table 2-1: Potential factors to consider when predicting numbers of echidna roadkill

Factor	Description	Relevance to echidna	Relative ranking	Likely impact – existing	Potential impact – proposed development
Traffic volume	Numbers of annual average daily traffic (AADT)	Likely	High	More vehicles are likely to result in more roadkills	The proposed development will increase traffic volume on the Kangaroo Island road network It is anticipated that six trucks will be on the roads at any one time. KIPT vehicles will travel approximately 3.4 million km per year See Chapter 21 – Traffic and Transport
Traffic patterns	Regular traffic throughout the day or Periods of peak and off-peak periods	Likely	Medium	Peak periods of traffic in the morning and late afternoon, that are possibly related to visitors on the Island, coincides with cooler temperatures during summer and periods of increased activity of echidnas, which would increase likelihood of roadkill	Forestry traffic is consistent throughout the day and generally does not have peak periods
Vehicle type	Light vehicle versus Heavy vehicle	Likely	High	Heavy vehicles are less maneuverable and take longer to slow down. They are therefore less likely to be able to avoid animals on the road	Forestry traffic will generally be travelling at lower speeds than other vehicles
Road surface	Sealed or un-sealed	Likely	Low	Sealed roads generally have higher vehicle speeds and vehicles would be more likely to hit echidnas	Forestry traffic will generally be travelling at lower speeds than other vehicles even if roads are signposted 100 km/h they will generally not be travelling that speed

Factor	Description	Relevance to echidna	Relative ranking	Likely impact – existing	Potential impact – proposed development
Time of the year	Winter months (June to September) is the echidna breeding season	Likely	High	Between 2008 – 2018 there have been approximately 400 echidna roadkills on KI and of these 65 % have been recorded in June – September (P. Rismiller 2018, pers. comm, 22 August)	Forestry traffic is anticipated to occur all year round. There are potentially times of the year that will experience higher numbers of roadkill than others
Road curvature	Straight, single bend or multiple bend	Unsure			Unlikely to be relevant
Land use	Land use either side of the road, including native vegetation, forestry, agriculture	Likely	High	Predictor of whether echidnas would have to cross the road to find foraging habitat, which would therefore increase the likelihood of being hit by vehicles	The transport route covers a variety of areas with different land use on either side of the road A separate and detailed impact assessment will be undertaken for the preferred transport route However, some areas along the proposed route will be preferable to echidnas over others if there is a food source
Proximity to national parks or remnant vegetation	General predictor of echidna population	Likely	High	Existence of roadside vegetation to provide travel corridors and probable resting or nursery burrow sites which is an indicator that echidnas will be in the area and therefore potentially subject to roadkill	The transport route will include roads near national parks which could result in echidna roadkills
Proximity to tourism destination	Roads are more likely to have higher numbers of vehicles driven by tourists	Likely	Low	May increase the incidence of echidna roadkill due to unfamiliarity with local roads	Not relevant to forestry vehicles
Road orientation	North-south or east-west roads	Likely	Medium	East-west roads have prime foraging habitat (P. Rismiller 2018, pers. comm., 15 July) for echidnas which could potentially increase the likelihood of roadkill along these roads	Some of the roads that will be used by the forestry vehicles are east-west and will therefore potentially be locations for higher rates of roadkill

Factor	Description	Relevance to echidna	Relative ranking	Likely impact – existing	Potential impact – proposed development
Echidna behaviour	Slow moving	Likely	High	Susceptible to roadkill as they are on the road for a longer period of time than a kangaroo or a wallaby	Heavy vehicles are unlikely to be able to swerve and avoid echidnas on the road
	Defence mechanism – they will freeze when they feel vibration caused by vehicle traffic on the road	Likely	High	Susceptible to roadkill as they are on the road for a longer period of time than a kangaroo or a wallaby	Heavy vehicles are unlikely to be able to swerve and avoid echidnas on the road
	Breeding season – echidnas form breeding trains of a single female followed by a number of males	Likely	High	One vehicle can cause multiple fatalities in a single incident	One vehicle can cause multiple fatalities in a single incident
Carrion	Feral cats are attracted to roadkill as a food source. If the roadkill is left on the side of the road, feral cats could be attracted to the food source and then prey on echidnas	Likely	Medium	Echidnas are killed by feral cats (25 per cent of young are killed yearly by cats in addition to adult echidnas) (Rismiller & McKelvey 2000)	Increasing the volume of traffic movements on Kangaroo Island is likely to increase roadkill rates of all species. Forestry traffic will contribute to an increase in roadkill on the Island Feral cats will be attracted to carcasses and they are a major predator of echidnas and other small mammals and birds on Kangaroo Island

A number of roadkill ‘hotspots’ have been identified as part of Dr Peggy Rismiller’s research. The roads that would be used by forestry traffic with historic records of echidna roadkills include:

- West End Highway
- South Coast Road
- Stokes Bay Road/North Coast Road.

Dr Peggy Rismiller noted in August 2017 that although the animals are active both day and night, they do avoid the heat and are less active in open exposed areas during the day in summer. Activity in areas of dense vegetation would occur regardless of the time of the day, as temperatures would be lower at any time of the day or night (P. Rismiller 2018, pers. comm., 15 July).

Chapter 21 – Traffic and Transport indicates that approximately 57 million kilometres are currently travelled on Kangaroo Island per annum with heavy vehicles generally accounting for approximately 7–15% of all vehicle traffic,

though it should be noted the vehicle data is collected only on main routes throughout the island (see Section 21.5.3). KIPT expects their trucking fleet (the major contributor to traffic for the proposed development) to travel an estimated 3.4 million kilometres per annum in the peak traffic year, a 6 per cent increase in kilometres travelled.

2.2 Variables

Table 2-2 provides a list of the variables used in the calculations of echidna deaths from roadkill as a result of the proposed KI Seaport operations.

Table 2-2: Variables used to calculate echidna roadkill rate from KIPT operations

Variable	Upper	Source	Lower	Source	Qualifying statements
Roadkill rate on Kangaroo Island	11.026/2 weeks/10 km/ 100 cars	Honours thesis, Leeuwenburg, P 2004	7.78/2 weeks/10 km/ 100 cars	Honours thesis, Leeuwenburg, P 2004	Data from March to August 2004 i.e. six-month period for a single year The thesis is not peer reviewed and/or published in a scientific paper Low number of echidna roadkills recorded
Percentage of total roadkill that is echidnas			0.3% (2 echidnas out of total sample size of 774)	Honours thesis, Leeuwenburg, P 2004	Echidnas will freeze as a defence mechanism Data was collected over a six-month period
Roadkill numbers for echidnas on Kangaroo Island	40 per year across Kangaroo Island	Data from Echidna Watch (P, Rismiller, 2018, pers. comm. 22 August).	2 reported in a six-month period	Honours thesis, Leeuwenburg, P 2004	Large variation in numbers of reported roadkill
Multiplication factor for a truck as opposed to a car	A truck is 2.5 times more likely to hit an echidna than a car		There is no difference between the likelihood of a truck hitting an echidna when compared to a car compared		Applying precautionary principle with lack of scientific evidence Based on the increased number of axels in a truck compared to a car Trucks will not be able to swerve to avoid an echidna
Distance travelled annually by KIPT vehicles	3.4 million km/year	See Chapter 21 – Traffic and Transport			Traffic data is only collected on the main routes used on the Island

2.3 Calculations

It is difficult to calculate echidna deaths from roadkill because of the paucity, and lack of reliability, of the statistical data on current roadkill deaths. Some estimates of annual echidna deaths as roadkill are in single digits and others are closer to 40 per annum. For the purposes of the EIS, the higher number has been adopted. Based on this number, four different statistical estimates were calculated of the number of additional echidna roadkill deaths likely to be attributable to the increased road usage resulting from timber haulage.

Upper estimate – with multiplication factor

Roadkills/km (all species)

Using the upper estimate calculated by Leeuwenburg 2004, 11.026 kills/2 weeks/10 km/100 cars (standardised for 100 vehicles)

= 11.026 kills/14 days/10 km/100 cars

= 11.026 kills per 14,000 km driven

= 0.0007875 kills/km

The total distance travelled by KIPT vehicles is approximately 3.4 million km/year

= 0.0007875 kills/km x 3,400,000 km/year

= 2,677.5 total roadkills per year

Assume the proportion of echidnas is 0.3 per cent of the total amount of roadkill (Leeuwenburg, 2004)

= 2,677.5 total roadkills per year x 0.3 per cent echidnas

= 8.0325 echidnas per year

Assume the multiplication factor of 2.5 to account for the increased likelihood of trucks hitting echidnas due to inability to avoid collisions by swerving or slowing, and many more wheels, than a light vehicle

= 8.0325 echidnas per year x 2.5

= 20.08125 echidnas per year

Upper estimate – no multiplication factor for trucks

= 8.0325 echidnas per year

Lower estimate – multiplication factor

Roadkills/km (all species)

Using the lower estimate calculated by Leeuwenburg 2004, 7.78 kills/2 weeks/10 km/100 cars (standardised for 100 vehicles)

7.78 kills/2 weeks/10 km/100 cars

= 0.0005562 kills/km

The total distance travelled by KIPT vehicles is approximately 3.4 million km/year

= 0.0005562 kills/km x 3,400,000 km/year

= 1,910.8 total roadkills per year

Assume the proportion of echidnas is 0.3 per cent of the total amount of roadkill (Leeuwenburg, 2004)

= 1,910.8 total roadkills x 0.3 per cent

= 5.7324 echidnas per year

Assume the multiplication factor of 2.5 to account for the increased likelihood of trucks hitting echidnas due to inability to avoid collisions by swerving or slowing, and many more wheels, than a light vehicle

= 5.7234 echidnas x 2.5

= 14.331 echidnas per year

Lower estimate – no multiplication factor

= 5.7234 echidnas per year

Answers from the calculations have been rounded up to the nearest whole number. The estimates of additional echidna deaths that could be attributed to KIPT forestry vehicle traffic are 6, 9, 15 and 21. When comparing this number to the numbers of roadkill that the Echidna Watch Program records on an annual basis for the entire Island (40), this range of echidna deaths is considered plausible. The impact of forestry haulage is considerably smaller than that attributable to tourism or agriculture, using similar methods of calculation. A range of between six and 21 echidnas per year, is the equivalent of 0.12 to 0.42 per cent of the overall population on Kangaroo Island, which has been estimated at 5,000.

An estimate of the number of echidna deaths from traffic associated with the development is estimated at between 6 and 21 a year. Based on the following inputs and assumptions in data:

- an increase in kilometres travelled (estimated to be 3.4 million km/year) (see Chapter 21 – Traffic and Transport) to the existing kilometres travelled on the road network (estimated to be 57 million km/year)
- anecdotal reports of 40 echidna deaths a year from roadkill on the Island plus many more that are not reported (P. Rismiller 2018, pers. comm., 22 August)
- quadrupling of echidna deaths from roadkill in the subsequent year after the western end of South Coast Road was sealed (P. Rismiller, 2018, pers. comm., 15 July)
- visibility at night time is worse and therefore rates of roadkill are likely to be higher at night.

2.4 Avoidance, mitigation, management and monitoring measures

See Chapter 14 – MNES for the impact assessment and proposed avoidance, mitigation, management and monitoring measures. See Appendix U1 – Draft Construction Environmental Management Plan and Appendix U2 – Draft Operational Environmental Management Plan. See Appendix K5 – Draft MNES Monitoring Plan.

2.5 Assessment of residual impacts

Based on the impact assessment in Chapter 14 – MNES, there is potential for residual significant impacts on the Kangaroo Island echidna as a result of the development due to vehicle strikes.

3. PROPOSED OFFSET STRATEGY

As required under the EPBC Act, offsets are required for any residual significant impact on the Kangaroo Island echidna. The EPBC offsets package would consist of direct offsets (i.e. actions that provide a measurable conservation gain).

Consultation with relevant stakeholders would be ongoing during the development of the detailed offsets package. The draft offsets plan would be provided to the relevant government agencies for approval before implementation.

A number of management options to either increase the population directly or reduce the magnitude of the threat, were investigated as part of developing a draft offset strategy. Options included captive breeding programs, habitat restoration, traffic route assessment, management of predators as well as vehicle type for timber transportation.

There has been little success in breeding in captivity programs for echidnas. Although some recent success was observed at the Perth Zoo when 13 young were born to four females over a period of four years (2011-2014) (Wallage et. al. 2015). This is not considered a viable option to increase the echidna population on Kangaroo Island. A more efficient way to provide a measurable conservation gain is to decrease the magnitude of the two major threats: which are predation by feral cats and roadkill.

3.1 Direct offsets

The objectives of the direct offsets component of the offsets package would be to reduce the threat posed by feral cats.

Due to the decreasing size of the echidna population, seasonal variation in local populations and the unknown magnitude of the impacts from vehicles (how many echidnas are likely to be killed along the transport route) the extent of a direct offset would need to be calculated in consultation with the Department of Environment and Energy. The EPBC Offsets Assessment Guide (DSEWPaC 2012c) is primarily aimed at vegetation removal and is not directly transferable to vehicle impacts.

It is not possible to prevent timber transport trucks from striking animals, but different transport options have been assessed to minimise the potential for impacts on native fauna that may be susceptible to vehicle strike (see Chapter 21 – Traffic and Transport, see Appendix P4).

3.1.1 Feral Cat Eradication Program

The Kangaroo Island Feral Cat Eradication Program is a joint program, led by NRKI and the Kangaroo Island Council, with the aim of eradicating feral cats from the Island by 2030. The State and Commonwealth governments are collaborating in the implementation of this program, which is a three-stage initiative:

- Stage 1. 2015–2018: trial feral cat control techniques, establish baseline monitoring programs and establish a process for gradual phasing out of all cat ownership.
- Stage 2. 2018–2023: eradicate feral cats from the Dudley Peninsula and monitor success of control actions.
- Stage 3. 2023–2020: eradicate feral cats from Kangaroo Island, monitor the success of controls (NRKI 2018).

Stage 1 of the program is near completion. Trials of control techniques on the Dudley Peninsula have been completed and results will be published following peer review (NRKI 2018a). The preliminary results included the following:

- non-toxic trials of the Felixer ® grooming trap were successful at identifying feral cats as targets 72 per cent of the time
- a trial of a detector dog was able to locate its target in over 90 per cent of the trials
- additional information on the ecology of feral cats was gained which will be used to develop the eradication plan (NRKI 2018b).

Contribution from KIPT

KIPT propose to provide a financial contribution to the Feral Cat Eradication Program as part of the direct offset component. Funding would be directed towards aspects of the eradication program that have been identified (in consultation with NRKI) as requiring additional funding. Components are likely to include the purchase of additional equipment and/or devices to manage feral cats as well as funding to engage contractors to implement various management activities. The funding would be provided directly to NRKI who would then direct the money towards appropriate activities.

Funding would also be used for recording and reporting roadkill data along the transport route. As previously mentioned, there is a lack of data on the rates of roadkill on the Island. This aspect is important to verify if echidnas are victims of roadkill incidents involving forestry vehicles and to quantify if there is any correlation between a reduction in feral cat numbers and the magnitude of the echidna population.

Separate to the offset package, KIPT would remove carcasses from the roadside on a regular basis. This activity would reduce the food source for feral cats and contribute to feral cat management on the Island.

An integral part of the offset strategy would be monitoring and recording any roadkill incidents along the transport route. This will provide data for any adaptive management response that may be required during implementation of the offset strategy.

Reporting on the success of the additional components of the program that KIPT would be contributing to would be undertaken in parallel with the existing reporting arrangements for the Feral Cat Eradication Program.

It is considered that these measures would have a direct impact on reducing the predation rate from feral cats on echidnas and can therefore be used as a direct offset under the EPBC Act.

It is difficult to determine how many echidnas a feral cat can kill over its lifetime, however they can kill 25 per cent of echidna young each year as well as predating on adult echidnas (Rismiller & McKelvey 2000). Contributing to the eradication of feral cats from the Island would be directly beneficial to the Kangaroo Island echidna as well as other small native birds and mammals.

3.1.2 Assessment against the EPBC Environmental Offsets Policy

An assessment of the proposed offsets package against the mechanisms provided in the EPBC Environmental Offsets Policy 2012 is provided in Table 3-1.

Table 3-1: Conservation gains from direct offsets

Mechanism to achieve conservation gain	Applicability to Kangaroo Island echidna
Improve existing habitat for the protected matter	This option is not considered viable as the echidna does not have any specific habitat requirements
Creating new habitat for the protected matter	This option is not considered viable due to the significant cost implications.
Reducing threats to the protected matter	A quantitative assessment of the impacts to the echidna population from vehicle strike cannot be calculated with any degree of robustness This is due to the uncertainty about population estimates, lack of traffic count data for Kangaroo Island and therefore the lack of baseline data for vehicle strikes per traffic movement. Threats to the echidna are listed in Appendix K3 – MNES Background Information. An existing program to manage feral cats is currently being implemented on the Island (NRKI 2018).
Increasing the values of a heritage place	Not applicable to this protected matter.
Averting the loss of a protected matter or its habitat that is under threat	The development would not clear any critical echidna habitat.

3.2 EPBC offset requirements

An assessment of the proposed offsets package against the requirements of the EPBC Environmental Offsets Policy 2012 (DSEWPaC 2012b) is provided in Table 3-2.

Table 3-2: Assessment of the proposed offsets package against the EPBC Offset Principles (Box 1 of the EPBC Offset Policy)

1. deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed action	The proposed package would address the reduction of a threat (cat control is considered a high-priority conservation action by the TSSC 2015). Awareness of echidnas on the road network would be part of all induction training relating to the development (limiting road deaths of fauna by regulation, enforcement and education is identified as a medium-priority conservation action by the TSSC 2015) (refer to Appendix K3 – MNES Background Information).
2. be built around direct offsets but may include other compensatory measures	The proposed package would include contributing to the Feral Cat Eradication Program by providing additional funding to implement additional aspects of the overall program that are not covered by existing funding arrangements. The offset plan would also include monitoring impacts and obtaining crucial data on roadkill from the proposed KI Seaport's traffic.

3. be in proportion to the level of statutory protection that applies to the protected matter	The proposed offsets package is considered appropriate for the current level of protection (endangered) that applies to the target species.
4. be of a size and scale proportionate to the residual impacts on the protected matter	Due to the uncertainties around the number of echidnas likely to be killed on roads, the residual impact cannot be determined. However, the offset package would be adequate to address any actual impact.
5. effectively account for and manage the risks of the offset not succeeding	The Feral Cat Eradication Program is in its third year of implementation and is an existing program subject to scientific peer review. Data collected on roadkill incidents would be made available to NRKI for all reporting requirements under existing funding arrangements.
6. be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs (this does not preclude the recognition of state or territory offsets that may be suitable as offsets under the EPBC Act for the same action, see Section 7.6)	The offsets package would provide additional funding for an existing program. The funding would be used to increase the effectiveness of feral cat eradication on the Island.
7. be efficient, effective, timely, transparent, scientifically robust and reasonable	Contributions from KIPT to the eradication program would be reported on in parallel to the existing reporting requirements of the program.
8. have transparent governance arrangements, including being able to be readily measured, monitored, audited and enforced	All financial contributions made by KIPT (an Australian Stock Exchange listed company) would be subject to the company's existing financial reporting processes.

4. CONCLUSIONS

The construction and operation of the proposed KI Seaport has the potential for a residual significant impact on the Kangaroo Island echidna for the following reasons:

- Echidnas are unlikely to have a large portion of their home range in the study area and construction is unlikely to affect their habitat availability in any meaningful way.
- There is a risk that trucks transporting timber products will increase the number of echidna roadkills. There is scientific uncertainty over the magnitude of this impact however the existing population is naturally small and an increase in mortality would have a significant effect. Driver education and awareness training would help manage this risk and continued monitoring of vehicle strikes would enable research to further clarify the nature of this risk.
- The transport route would be inspected regularly for roadkill. Deceased echidnas would be collected and provided to the University of Adelaide for research purposes. This would also remove a food source for feral cats, which are a threat to echidnas.

In accordance with the precautionary principle, scientific uncertainties exist for the Kangaroo Island echidna population and how it will be impacted by traffic. KIPT would implement an offsets plan for the Kangaroo Island echidna that would reduce impacts from feral cats on the echidna, refer to Section 3.

5. REFERENCES

Atlas of Living Australia (ALA) 2018, viewed September 2017 and June 2018, <https://www.ala.org.au/>.

Augee, ML 1995, 'Short-beaked echidna *Tachyglossus aculeatus*', in Strahan, R (ed), *The Mammals of Australia*, 2nd edn. Reed New Holland, Sydney, pp. 40-43.

Council of Australian Governments (COAG) 1992, National Strategy for Ecologically Sustainable Development – Part 1 Introduction, viewed 19 February 2018, <http://www.environment.gov.au/about-us/esd/publications/national-esd-strategy-part1>.

Department of the Environment 2013a, Matters of National Environmental Significance Significant Impact Guidelines 1.1: *Environment Protection and Biodiversity Conservation Act 1999*. Department of the Environment, Australian Government, Canberra, viewed 11 July 2018, <http://www.environment.gov.au/system/files/resources/42f84df4-720b-4dcf-b262-48679a3aba58/files/nes-guidelines_1.pdf>.

Department of the Environment 2018c, *Tachyglossus aculeatus multiaculeatu*s Species Profile and Threats Database, viewed 17 July 2017, <http://www.environment.gov.au/sprat>.

Department of the Environment and Energy 2018a, About the EPBC Act – Glossary, viewed 19 February 2018, <http://www.environment.gov.au/epbc/about/glossary>.

Department of the Environment and Energy 2018b, EPBC Act Protected Matters Report, Commonwealth of Australia, report created 3 April 2018.

Department of the Environment, Water, Heritage and the Arts (DEWHA) 2008, Threat Abatement Plan for predation by the European red fox, Australian Government, Canberra.

Department of Environment, Water and Natural Resources (DEWNR) 2016, Biological Databases of South Australia, database extract, recordset number DEWNRBDBSA160808-2, data sourced 8 August 2016.

Department of Sustainability, Environment, Water, Populations and Communities 2012b, *Environment Protection and Biodiversity Conservation Act 1999* – Environmental Offsets Policy, October 2012, Australian Government, Canberra, viewed 11 July 2018, <http://www.environment.gov.au/system/files/resources/12630bb4-2c10-4c8e-815f-2d7862bf87e7/files/offsets-policy_2.pdf>.

Department of Sustainability, Environment, Water, Populations and Communities 2012c, *Environment Protection and Biodiversity Conservation Act 1999* – Offsets assessment guide, October 2012, Australian Government, Canberra, viewed 11 July 2018, <http://www.environment.gov.au/system/files/resources/12630bb4-2c10-4c8e-815f-2d7862bf87e7/files/offset-assessment-guide.xlsm>.

EBS Ecology 2018, *Smith Bay Ecological Assessment*, sub-consultant's report prepared for Environmental Projects on behalf of KIPT Pty Ltd, May 2018, unpublished report.

Franks, DM, Brereton, D, Moran, CJ, Sarker, T & Cohen, T 2010, 'Cumulative Impacts – A good practice guide for the Australian coal mining industry', Centre for Social Responsibility in Mining and Centre for Water in the Minerals Industry, Sustainable Minerals Institute, University of Queensland, Brisbane, viewed 11 July 2018, <https://www.csrm.uq.edu.au/publications/cumulative-impacts-guide>.

Leeuwenburg, P 2004, ‘Roadkill on Kangaroo Island: Identification of Patterns and Predictors of Roadkill’, Honours thesis, University of South Australia.

Natural Resources Kangaroo Island (NRKI) 2015, Feral cat eradication on Kangaroo Island 2015–2030 Prospectus, Government of South Australia and Kangaroo Island Council, viewed 6 July 2018, <http://www.naturalresources.sa.gov.au/files/sharedassets/kangaroo_island/plants_and_animals/pest_animals/feral_cat/ki_feral_cat_eradication_project_prospectus.pdf>.

Natural Resources Kangaroo Island 2018a, ‘Kangaroo Island Feral Cat Eradication Program’, viewed 18 June 2018, <http://www.naturalresources.sa.gov.au/kangarooisland/plants-and-animals/pest-animals/Kangaroo-Island-Feral-Cat-Eradication-Program>.

Natural Resources Kangaroo Island 2018b, Summary of preliminary findings of the Kangaroo Island Feral Cat Eradication Program‘, viewed 13 August 2018, <https://www.naturalresources.sa.gov.au/kangarooisland/plants-and-animals/pest-animals/Kangaroo-Island-Feral-Cat-Eradication-Program/Summary_of_preliminary_findings_of_the_Kangaroo_Island_Feral_Cat_Eradication_Program>.

Rismiller, PD 1999, *The Echidna: Australia’s Enigma*, Levin Associates, Hugh Lauter Publishing.

Rismiller, PD & McKelvey, MW 2000, ‘Frequency of breeding and recruitment in the short-beaked echidna, *Tachyglossus aculeatus’, Journal of Mammalogy*, 81 (1), pp. 1-17.

Threatened Species Scientific Committee (TSSC) 2015, Conservation Advice: *Tachyglossus aculeatus multiaculeatus*, Kangaroo Island echidna, Department of the Environment, Australian Government, Canberra.

Wallage, A, Ferguson, A, Clarke, L, Thomas, L, Pyne, M, Beard, L, Lisle, A & Johnston, S 2015, ‘Advances in the captive breeding and reproductive biology of the short-beaked echidna *(Tachyglossus aculeatus)’ Australian Journal of Zoology*, 63, pp. 181–191.

Wildcare Australia n.d. ‘Rehab Easy Reference Sheet – Caring for Echidnas’, viewed 6 August 2018, <http://wildcareaustraliainc.camp9.org/resources/Documents/ERS/ERS%20-%20Caring%20for%20ECHIDNAS.pdf>.

Woinarski, JC, Burbridge, AA, & Harrison, P 2014, The Action Plan for Australian Mammals 2012, CSIRO Publishing, Melbourne.