

GIPPSLAND LAKES OCEAN ACCESS

EPBC compliance – self-assessment

APPENDIX G1

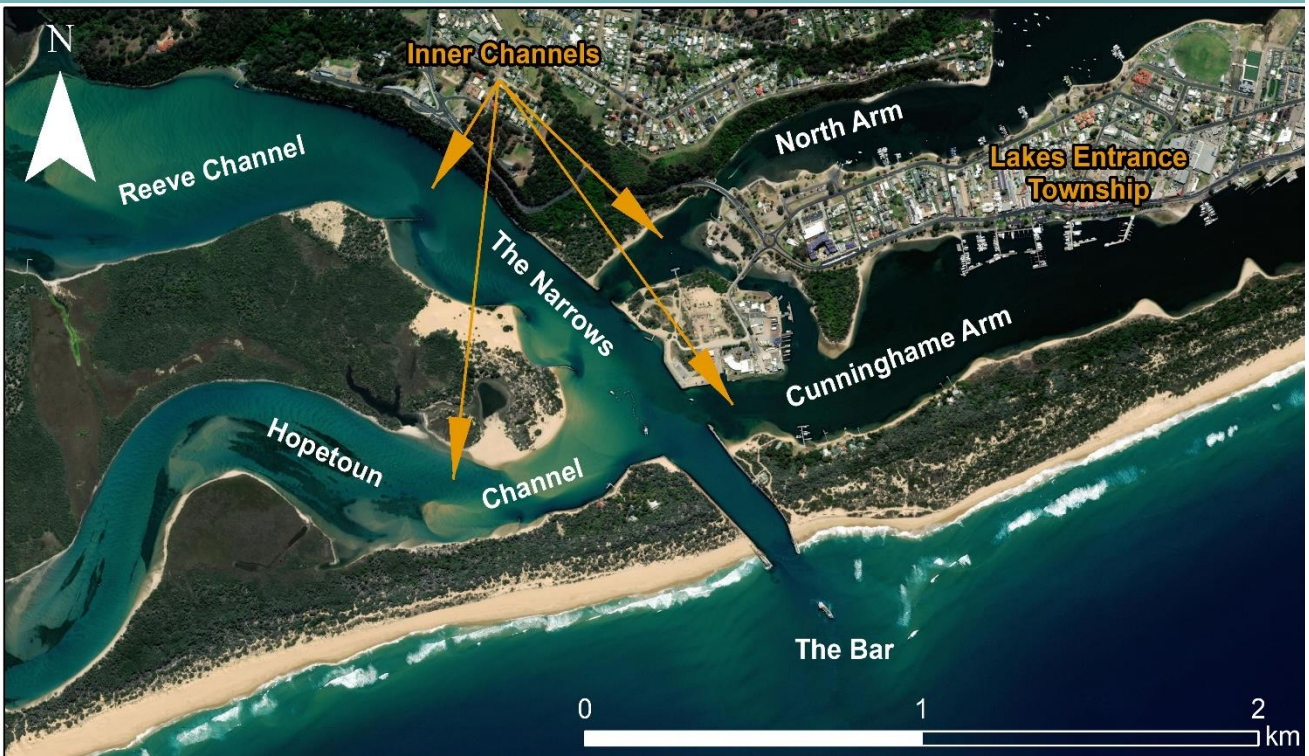
Supporting technical and
environmental studies



Gippsland Lakes Ocean Access

EPBC Compliance – Self-assessment

Final Report



Prepared for:
SWASH & Gippsland Ports

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ABBREVIATIONS

CSD	Cutter Suction Dredge
DAWE	Department of Agriculture, Water and the Environment (Australia: 2020 – present)
DELWP	Department of Environment, Land, Water and Planning (Victoria: 2015 – present)
DoE	Department of the Environment (Australia: 2013 – 2016)
DoEE	Department of Environment and Energy (Australia: 2016 - 2020)
DMG	Dredged Material Ground
DSE	Department of Sustainability and Environment (Victoria: 2002 – 2013)
EGCMA	East Gippsland Catchment Management Authority
EMP	Environmental Management Plan
EPBC	Environment Protection and Biodiversity Conservation Act 1999
ERR	Environmental Risk Register
GLOA	Gippsland Lakes Ocean Access
LTMMP	Long Term Monitoring and Management Plan
MNES	Matters of National Environmental Significance
PDS	Project Delivery Standards (also referred to as Audit Criteria)
PMST	Protected Matters Search Tool
SPRAT	Species Profile and Threat Database
TSHD	Trailing Suction Hopper Dredge

1 INTRODUCTION

The Gippsland Lakes Ocean Access (GLOA) program provides reliable navigational access between the Gippsland Lakes and Bass Strait for commercial and recreational vessels. The main component of the GLOA program is dredging of the Entrance and Inner Channels (**Figure 1**) with the Trailing Sucker Hopper Dredge (TSHD) Tommy Norton and placing dredged material offshore in allocated Dredged Material Grounds (DMGs). A smaller Cutter Suction Dredge (CSD), Kalimna, is also used to relocate sand from the Inner Channels via a sand transfer system and two nearshore outfalls for beach nourishment.

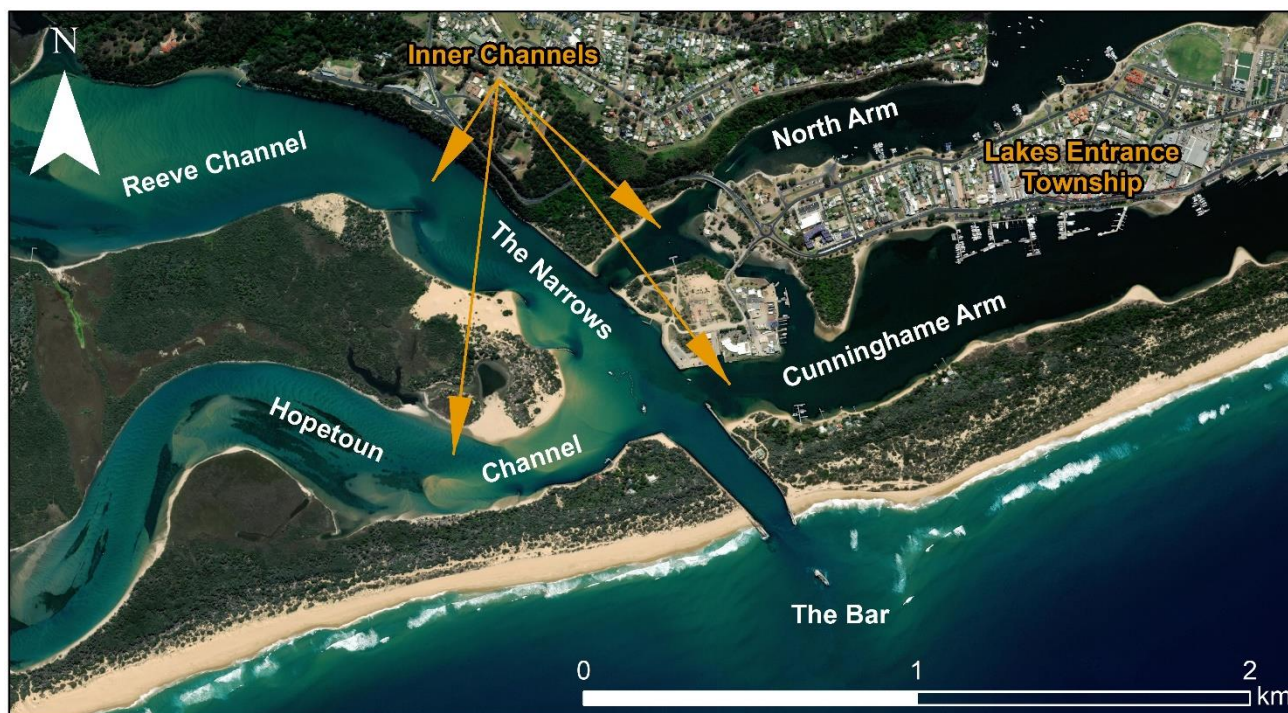


Figure 1. General locality of GLOA activities.

During 2008 – 2016, the TSHD Pelican operated on a 24/7 basis for the GLOA program. Since the delivery of the Gippsland Ports’ owned TSHD Tommy Norton, operations for the GLOA program are conducted during daylight hours on a 72-hour, 9-day fortnight except where constrained by operational issues (i.e. maintenance), weather conditions, or restrictions imposed by the GLOA Environmental Management Plan (EMP) and/or approvals/legislation.

During 2008-2019, the ‘Total Dredged Volume’ from the TSHD programs averaged almost 230,000m³ per annum (Swash, 2019). Bathymetric surveys indicate that sedimentation above design depths for GLOA dredge areas is in the order of (Gippsland Ports, draft 2022):

- Bar Channel: **20,000 to 80,000 m³ / year**
- Bar Wedge: **70,000 to 160,000 m³ / year**
- Entrance Channel: **3,000 to 7,000 m³ / year**
- Swing Basin: **20,000 to 30,000 m³ / year**
- Inner Channels: **140,000 to 170,000 m³/year**

Current seasonal restrictions apply to TSHD dredging operations, including the Rigby Island Buffer Zone which preclude dredging activities during shorebird breeding and migration periods (i.e. between October and March inclusive) and turbidity restrictions during the Australian Grayling migration (i.e. September to January). Cetacean proximity restrictions are permanently adhered to with an annual external audit of the GLOA EMP conducted to ensure compliance (Ethos NRM, 2020).

Since the original perpetual *Environment Protection and Biodiversity Act 1999* (EPBC) referral decision (ref:2011/5932) (**Appendix 1**), there have been a few changes to the species listed on the “Protected Matters Search” (**Appendix 2**) which have been covered in this assessment. It is also noted that the potential for significant impact by invasive species has been further reduced since the purchase of the TSHD Tommy Norton which has not left the Gippsland Lakes system since its arrival in 2017.

Information relevant to each EPBC listed species has been sourced primarily from Recovery Plans, and the Species Profile and Threat Database (SPRAT) (<http://www.environment.gov.au/cgibin/sprat/public/sprat.pl>).

Where this information has not been available, the following sources have been utilised:

- Syngnathid fish Bray, D.J. (2021) *Fishes of Australia*, accessed 31 Jan 2022, <https://fishesofaustralia.net.au/home/species/3130>
Edmunds, M., Judd, A., Stewart, K., Sheedy, E. & Ong, J. (2007) *Lakes Entrance Existing Conditions: Marine Habitats and Communities*. Report to Gippsland Ports. Australian Marine Ecology Report 382, Melbourne. (AME, 2007)
Kuitert, R. (1993) *Coastal Fishes of South-Eastern Australia*. Crawford House, Bathurst. (Kuitert, 1993)
- Seagrass EGCMA. (2021). *Gippsland Lakes Seagrass Mapping*. Bairnsdale: EGCMA. (EGCMA, 2021)
Kitchingman, A. (2016). *Gippsland Lakes Seagrass Mapping*. Heidelberg: Arthur Rylah Institute. (Kitchingman, 2016)
Flynn A, Edmunds M, & Brown H (2012) *Lakes Entrance: 2012 Seagrass Survey*. Report to Gippsland Ports. Australian Marine Ecology Report 506, Melbourne. (AME, 2012)
Edmunds, M., Judd, A., Stewart, K., Sheedy, E. & Ong, J. (2007) *Lakes Entrance Existing Conditions: Marine Habitats and Communities*. Report to Gippsland Ports. Australian Marine Ecology Report 382, Melbourne. (AME, 2007)
Roob, R. & Ball, D. (1997) *Victorian Marine Habitat Database: Gippsland Lakes Seagrass Mapping*. Report for Fisheries Victoria, Department of Natural Resources and Environment. Marine and Freshwater Resources Institute, Queenscliff. (Roob & Ball, 1997)

Although it is stated in the “Matters of National Environmental Significance: Significant Impact Guidelines” (DoE, 2013) that “dredging to maintain existing navigational channels would not normally be expected to have a significant impact on the environment where the activity is undertaken as part of normal operations and the disposal of spoil does not have a significant impact”, this report provides a more detailed evaluation of the EPBC “Significant Impact Criteria” for listed threatened species, migratory species, marine species, cetaceans and wetlands of international importance (Ramsar) (**Appendix 3**).

Since 2015, the GLOA program has achieved a 100% Full Compliance rating for the annual Independent Compliance Audit of the Environmental Management Plan along with a full compliance rating for the Compliance Audit for the Sea Dumping Permit issued to Gippsland Ports Committee of Management Incorporated (SD2013/2442) in 2017 (attached as **Appendix 4**).

2 EPBC SIGNIFICANT IMPACT CRITERIA

A ‘significant impact’ is an impact which is important, notable, or of consequence, having regard to its context or intensity (DoE, 2013). Variables that determine whether an action is likely to have a significant impact on ‘matters of national environmental significance’ (MNES) include:

- The sensitivity, value, and quality of the environment which is impacted.
- The intensity, duration, magnitude, and geographic extent of the impacts.

EPBC categories that may be affected by the GLOA program include threatened species, listed migratory species, and wetlands of international importance (i.e. Ramsar Wetlands).

2.1 EPBC criteria for ‘significant impact’ for threatened species

Criteria for the assessment of ‘significant impact’ for [threatened species](#) (DoE, 2013) include actions that have a real chance or possibility to result in:

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

2.2 EPBC criteria for ‘significant impact’ for migratory species

Criteria for the assessment of ‘significant impact’ for listed [migratory species](#) (DoE, 2013) include actions that have a real chance or possibility to result in:

1. 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
2. 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
3. seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

2.3 EPBC criteria for ‘significant impact’ for wetlands of international importance

Criteria for the assessment of ‘significant impact’ for a [declared Ramsar wetland](#) (DoE, 2013) include actions that have a real chance or possibility to result in:

1. areas of the wetland being destroyed or substantially modified
2. a substantial and measurable change in the hydrological regime of the wetland, for example, a substantial change to the volume, timing, duration and frequency of ground and surface water flows to and within the wetland
3. the habitat or lifecycle of native species, including invertebrate fauna and fish species, dependent upon the wetland being seriously affected
4. a substantial and measurable change in the water quality of the wetland – for example, a substantial change in the level of salinity, pollutants, or nutrients in the wetland, or water temperature which may adversely impact on biodiversity, ecological integrity, social amenity or human health, or
5. an invasive species that is harmful to the ecological character of the wetland being established (or an existing invasive species being spread) in the wetland.

The impact pathways with potential to caused significant impact to EPBC-listed threatened species, migratory species, and wetlands of international importance (i.e. Ramsar Wetlands) have been addressed in the GLOA Environmental Risk Register (GLOA ERR) attached as **Appendix 5**. The GLOA ERR is currently being updated to incorporate the results from research and monitoring conducted in the period since the last GLOA ERR version. Where appropriate, the GLOA ERR will be referred to for further detail regarding potential impact pathways.

Advice relevant to the GLOA program (DoE, 2013) suggest that “dredging of a new shipping channel through a World Heritage property, a National Heritage place, through or next to the Great Barrier Reef Marine Park, a Ramsar wetland, or an area containing nationally listed threatened species or ecological communities, or which involves modifying an area of important habitat for a nationally listed migratory species, is likely to have a significant impact on a matter of national environmental significance”. However, “dredging to maintain existing navigational channels would not normally be expected to have a significant impact on the environment where the activity is undertaken as part of normal operations and the disposal of spoil does not have a significant impact” (DoE, 2013).

3 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

An EPBC Act Protected Matters Report dated 27/01/22, from an area incorporating a 5km buffer around GLOA program actions is included as Appendix 2. The assessment of potential impacts on MNES is included as Appendix 3. The Protected Matters Report identified:

- 3 frogs – listed as EPBC threatened species;
- 57 birds – listed as EPBC threatened species, EPBC migratory species, and EPBC marine species;
- 30 marine, estuarine and syngnathid fish (i.e. pipefish, pipehorses, seahorses and sea dragons) – EPBC threatened species and EPBC marine species;
- 18 mammals (including marine mammals) – listed as EPBC threatened species, EPBC migratory species, EPBC marine species, and EPBC Cetaceans.
- 10 flora species – all terrestrial species that were considered nil residual risk from any potential impact. There was no marine flora listed.
- 3 reptiles – listed as EPBC threatened species, EPBC migratory species, and EPBC marine species; and
- 5 sharks – listed as EPBC threatened species and EPBC migratory species.

3.1 EPBC listed frogs

Each of the EPBC listed frog species Giant Burrowing Frog, Green and Golden Bell Frog and Growling Grass Frog may inhabit areas (especially wetlands) fringing the Gippsland Lakes. There is potential for these species to be affected by altered hydrodynamic processes resulting in increased tides and salinity despite no important habitat located immediately adjacent to GLOA activities.

Modelling of the Gippsland Lakes has indicated that small changes in tidal prism (such as those associated with a deeper entrance) have very little effect on the salinity or flushing in the Lakes (Walker & Andrewartha 2000; Webster *et al.* 2010 **cited in** (Water Technology, 2013)). Monitoring during the trial of the TSHD in 2008 recorded a small (in absolute terms, 0.05m at the entrance) increase in tidal prism and, hence, tidal exchange into the lakes (Water Technology, 2013).

The previous modelling concluded that tides are not the dominant flushing mechanism in the Gippsland Lakes (Walker & Andrewartha 2000; Webster *et al.* 2010 **cited in** (Water Technology, 2013)). For tidal flushing to have a significant effect in this system, it would require a much larger increase in tidal range (Water Technology, 2012). Salinity concentrations in the Lakes are affected more greatly by “longer period changes in ocean water levels (such as through atmospheric pressure changes, storm setup) which elevate the water level at the entrance over longer periods (>7 days) compared to tides” (Water Technology, 2013). Changes in the salinity concentration of the Gippsland Lakes can be predominantly attributed to variation in freshwater inflows through the catchments which are associated with the variation in rainfall conditions (Water Technology, 2013).

As GLOA dredging activities are unlikely to have a significant effect on tides or salinity throughout the Gippsland Lakes system, the residual risk of GLOA actions to have a “real chance or possibility” of significant impact (see **Section 2.1**) to the EPBC listed frog species or their required habitat is considered to be low.

3.2 EPBC listed birds

EPBC listed bird species can be split into 4 categories: Aerial, Terrestrial, Marine and Wetland/Shorebird species.

3.2.1 Aerial, Terrestrial and Marine species

Aerial and terrestrial species and their habitats are considered to be unaffected by GLOA actions.

Although marine species are unlikely to occur within the area affected by GLOA actions, they may be potentially affected by behavioural changes due to lighting at night. Whilst the TSHD Pelican (2008 – 2016) operated on a 24/7 basis, the Gippsland Ports' owned TSHD Tommy Norton only operates during daylight hours mitigating this potential impact and resulting in these species considered to be at low residual risk for the possibility of significant impact

3.2.2 Wetland/Shorebird species

Wetland species (including migratory species) are considered unlikely to be affected as there is no important habitat located adjacent to GLOA actions. As addressed in **Section 3.1** and the GLOA ERR (**Appendix 5**), GLOA dredging activities are unlikely to have a significant effect on the hydrodynamic or salinity regime, suggesting little to no impact on wetland species or their habitat throughout the Gippsland Lakes system. Therefore, these species are not likely to be at risk of significant impact based on the criteria listed in **Sections 2.1** and **2.2**.

Shorebird species such as terns and plovers that are known to utilize habitat adjacent to GLOA actions (i.e. Rigby Island) may be affected by altered hydrodynamic processes (addressed in **Section 3.1** and the GLOA ERR **Appendix 5**) and airborne noise.

To minimize disturbance from airborne noise, the Rigby Island buffer zone (**Figure 2**) has been established during the shorebird breeding season (i.e. October – March inclusive) within which GLOA actions are prohibited. Annual audits of the GLOA Environmental Management Plan between 2011 and 2021 (excluding 2017 when there was no audit conducted) confirm that the Rigby Island buffer zone has not been breached by GLOA actions during the breeding season. Therefore, these species are considered to be at low residual risk of significant impact to EPBC-listed shorebird species based on the criteria listed in **Section 2.1**.

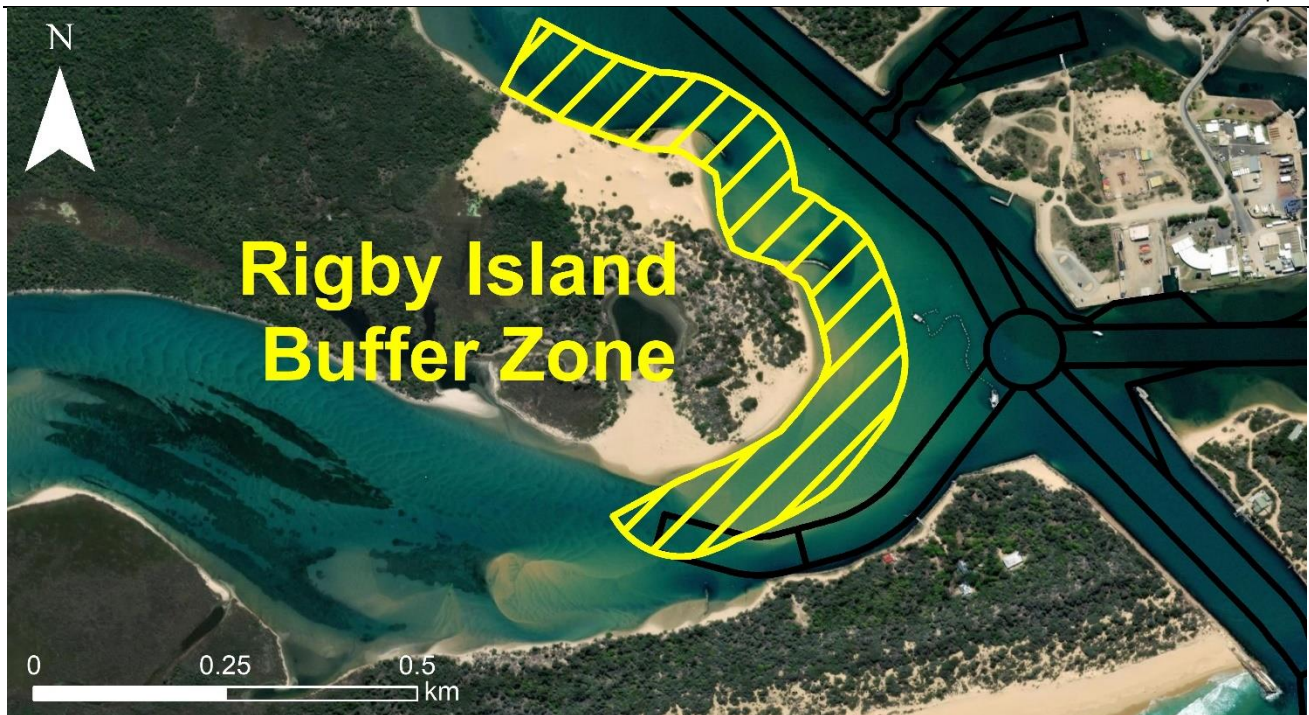


Figure 2. Rigby Island Buffer Zone.

3.3 EPBC listed fish

EPBC listed marine fish Blue Warehou and Southern Bluefin Tuna generally occur in offshore waters and are considered to be unaffected by GLOA actions.

EPBC listed estuarine fish Dwarf Galaxias (freshwater) is considered to be unaffected by GLOA actions as there is no known potential habitat in the vicinity of GLOA actions.

EPBC listed estuarine fish Australian Grayling is known to migrate between freshwater and estuarine habitats. Although it is unknown how far this species migrates, for precautionary purposes it is assumed that they inhabit the area of GLOA actions. To minimize disturbance during the grayling migration period (September to January), the dredge is prohibited from operating in overflow mode between the Entrance's training walls on a flood tide.

Furthermore, during the grayling migration period, turbidity monitoring has been conducted annually since 2011 to ensure that sediment plumes caused by dredging does not exceed 25NTU above natural conditions at a distance of 50m from the vessel. Long-term monitoring undertaken by Gippsland Ports (2011 – 2021) has clearly demonstrated that dredging activities have a very minor, localised and transient impact on turbidity which is well within the compliance 'dredge effect' limit of 25 NTU. From 2011 – 2018, the 'dredge effect' was less than 6 NTUs for 86% of the time with only one false positive reading greater than 25 NTUs during this period. It is also noted that natural river discharges cause comparatively greater turbidity and visual impact (Swash, 2019).

Annual audits of the GLOA EMP between 2011 and 2021 (excluding 2017 when there was no audit conducted) confirm that these protocols have been adhered to. As dredging will continue to operate in non-overflow

mode between the training walls on a flood tide between September and January inclusive, the Australian Grayling is considered to be at low residual risk of significant impact based on the criteria listed in **Section 2.1**.

Twenty-six (26) EPBC listed syngnathid fish were identified as potentially inhabiting the area affected by GLOA actions. Of these, only nine are likely to be associated with the areas potentially affected by GLOA actions (Kuitert, 1993; AME, 2007). There are a further five species where potential habitat may exist, although they are not known from the area. Potential impacts from GLOA actions include the removal of seabed/seagrass, increased suspended sediments (seagrass) and increased suspended sediments (clogging of gills).

Seagrass is known to provide particularly important habitat for syngnathids. Although the distribution of seagrass displays high annual variability, mapping of seagrass beds in the Narrows, Hopetoun Channel, North and Cunningham Arms, adjacent to GLOA actions, have shown little long-term change between mapping periods 2007 – 2012 (AME, 2007) and 2017 – 2021 (EGCMA, 2021). Long-term monitoring of turbidity levels (**Figure 1**) demonstrate that dredging activities have remained well within the turbidity compliance limit of 25 NTU suggesting minimal, localised increases in suspended sediments. Therefore, the potential impacts to these species are considered to be at low residual risk of significant impact based on the criteria listed in **Section 2.1**.

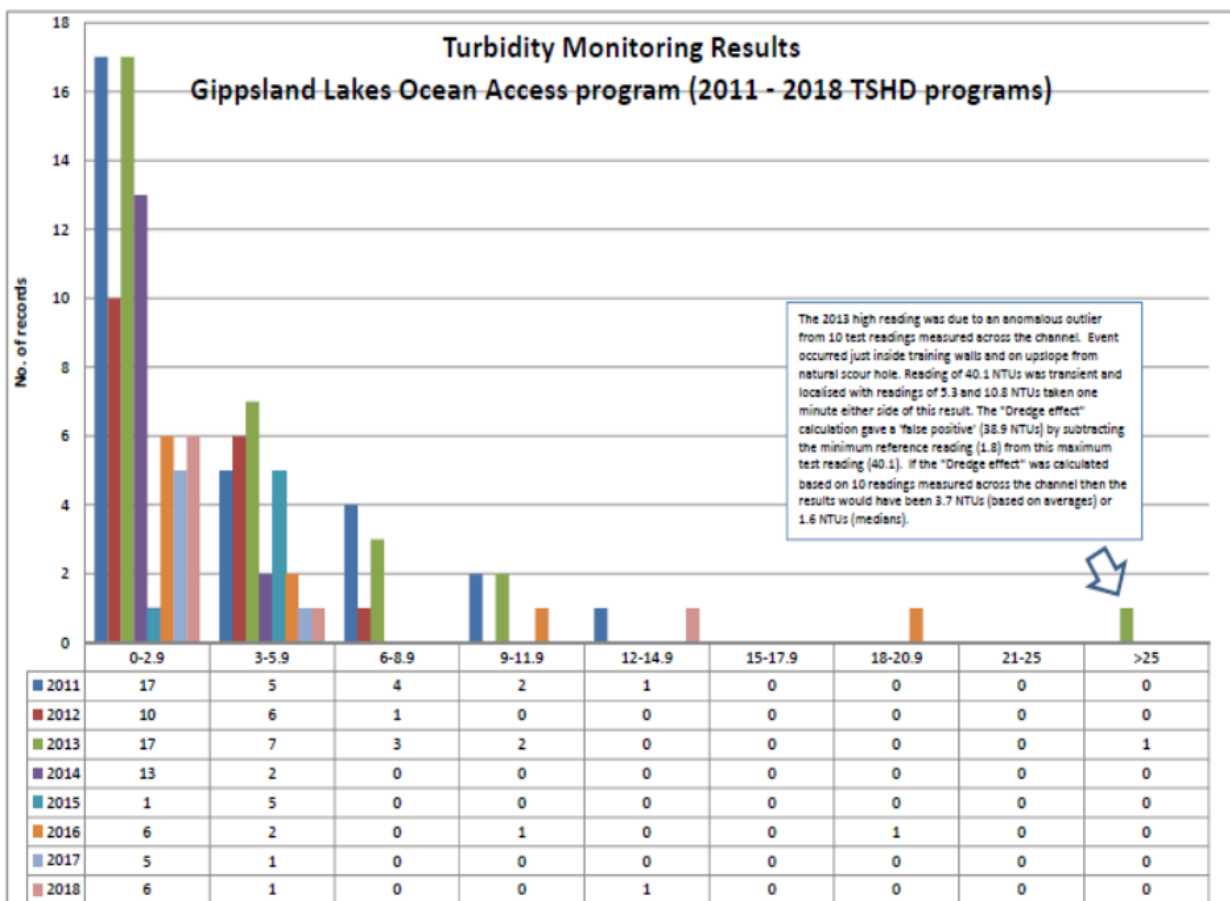


Figure 3: GLOA turbidity monitoring results (2011 – 2018)

3.4 EPBC listed mammals

Terrestrial species and their habitat are considered to be unaffected by GLOA actions.

Only a few species of the identified whales are likely to frequent the area and potentially be affected by the placement of dredged material at the DMGs. The Humpback Whale and the Southern Right Whale are likely to occur seasonally near this coast and the Blue Whale may occasionally occur. To minimize the impact on these species, cetacean monitoring protocols are in place including the cessation of some GLOA TSHD actions when sighted within monitoring zones. Annual audits of the GLOA EMP between 2011 and 2021 (excluding 2017 when there was no audit conducted) confirm that these protocols have been adhered to. Therefore, these species are considered to be at low residual risk of significant impact based on the criteria listed in **Section 2.1** and **2.2**.

Dolphins inhabit all waters of the study area, particularly Bottle-nosed Dolphin, Common Dolphin, Risso's Dolphin and Burrunan Dolphin (this species is not currently EPBC-listed). Similar to the whales, to minimize the impact on these species, cetacean monitoring protocols are in place including the cessation of some GLOA TSHD actions when sighted within monitoring zones. Therefore, these species are considered to be at low residual risk of significant impact based on the criteria listed in **Section 2.1**. The cutter suction dredge, Kalimna, is a non-propelled, stationary dredge and is considered a low risk even when operating.

During 2013 – 2019, there were a total of 196 dolphin sightings with an average of 5.7 individuals per sighting and a total of 17 whale sightings with an average of 2.1 individuals per sighting. During this period, there were no known incidents of injury or death to cetaceans associated with dredging activities (Swash, 2019). In fact, dredging has been undertaken at Lakes Entrance since 1889 with no reported collisions with cetaceans (Swash, 2019).

The Australian Fur-seal has also been recorded infrequently within areas adjacent to GLOA actions. This species is considered to be potentially affected by underwater noise but at low residual risk of significant impact, based on the criteria listed in **Section 2.1**, due to their continued records despite noise from GLOA activities and commercial and recreational vessels.

3.5 EPBC listed reptiles

The identified EPBC listed turtles are all tropical species and their presence would be as vagrants only. There are no records on the Victorian Biodiversity Atlas (VBA) of these species occurring within 5km of GLOA actions in the past 25 years. These species are considered to be unaffected by GLOA actions.

3.6 EPBC Listed Sharks

The EPBC listed Great White Shark and the School Shark are likely to frequent the coast in this area. However, as these species are highly mobile and not known to be overly sensitive to lower frequency noise, turbidity or vessel presence, they are considered very unlikely to be impacted by GLOA actions and considered at nil residual risk based on the criteria listed in **Section 2.1**. The other identified EPBC listed sharks are either tropical species or unlikely to inhabit the coastline.

3.7 Wetlands of International Importance (Ramsar)

Prior to the opening of the permanent artificial entrance in 1889, the Gippsland Lakes was naturally an intermittently closed and open lagoon system, separated from the ocean by a series of low sand dunes. Fresh water would accumulate in the lagoons and wetlands until they breached the dune system, resulting in saline intrusion into the lakes system. Sand transport down the Ninety Mile Beach would eventually close the breach and freshwater conditions slowly re-established. The permanent entrance has allowed for continuous saline intrusion into the system, now showing a salinity gradient from east to west, and replacing the freshwater system with marine, estuarine and brackish habitats regularly influenced by coastal tides, currents and storm surges (BMT WBM, 2011).

The permanent entrance was established in 1889, some 92 years prior to the Gippsland Lakes being declared a Ramsar wetland in 1981. Dredging has occurred at Lakes Entrance since 1889, and before, as summarised in Gippsland Ports' ['History of Dredging the Entrance to Gippsland Lakes'](#) (extract in Table 1 below).

Table 1: Summary of historic dredging activities at Lakes Entrance

DREDGE NAME	PERIOD OF USE	TYPE OF DREDGE
<i>Wombat</i>	1879 to 1928	Bucket Dredge
<i>Pioneer</i>	1906 to unknown	Suction Dredge
<i>Priestman</i>	Pre 1908 to 1963	Grab Dredge
<i>W.H. Edgar</i>	1922 to 1936	Side Suction Dredge
<i>Paynesville</i>	1936 to 1963	Suction Dredge
<i>Sandpiper</i>	1963 to 2005	Cutter Suction Dredge
<i>Mathew Flinders</i>	Circa 1970	Trailing Suction Hopper Dredge
<i>April Hamer</i>	1979 to 2011	Side-casting Dredge
<i>Melbourne</i>	2006 to 2007	Cutter Suction Dredge
<i>Kalimna</i>	2007 to present	Cutter Suction Dredge
<i>Pelican</i>	2008 to 2016	Trailing Suction Hopper Dredge
<i>Tommy Norton</i>	2017 to present	Trailing Suction Hopper Dredge

Maintaining the existing entrance channel is unlikely to have a significant impact on the ecological character of the Gippsland Lakes Ramsar site as the GLOA actions will not alter existing environmental conditions and do not breach the relevant "significant impact criteria" (**Section 2.3**). In fact, by procuring the State-funded, TSHD Tommy Norton, Gippsland Ports has minimised the possibility of introducing invasive species to the Ramsar site as this vessel has not left the Gippsland Lakes system since its arrival in 2017.

3.8 Seagrass species and ecological communities

There were no EPBC listed MNES marine flora species or ecological communities (i.e. *Posidonia* seagrass meadows) identified by the “Protected Matters Search”, nor records within the VBA.

Although *Posidonia australis* (from the Nationally Endangered Ecological Community “*Posidonia Australia* Seagrass Meadows of the Manning-Hawkesbury Ecoregion”) exists in Victoria, it is largely restricted to Corner Inlet/Nooramunga (O'Hara, 2002). Seagrass surveys within the Gippsland Lakes system (Roob & Ball, 1997; AME, 2007; AME, 2012; Kitchingman, 2016) have not recorded *Posidonia*.

4 CONCLUSION

The Commonwealth’s EPBC (2011/5932) referral decision (8 September 2011) determined that the proposed GLOA program activities were ‘*Not a controlled action if undertaken in a particular manner*’ (**Appendix 1**), listing three conditions:

1. Cetacean monitoring and protocols.
2. Water quality during the Australian Grayling migration period (September to January).
3. Rigby Island Buffer Zone to mitigate shorebird disturbance mitigation between October and March

Existing management measures implemented by Gippsland Ports are considered appropriate to adhere to the above conditions and mitigate any potential disturbance of EPBC listed species. These conditions are captured as “Project Deliver Standards” (PDS) within the GLOA EMP, and compliance is assessed annually during an independent audit. Since 2015, the GLOA program has achieved a 100% Full Compliance rating for the annual Independent Compliance Audit of the Environmental Management Plan (including these PDS) along with a full compliance rating for the Compliance Audit for the Sea Dumping Permit issued to Gippsland Ports Committee of Management Incorporated (SD2013/2442) in 2017 (attached as **Appendix 4**).

Furthermore, long-term monitoring of turbidity levels has demonstrated that GLOA dredging activities have remained well within the turbidity compliance limit of 25 NTU suggesting minimal, localised increases in suspended sediments unlikely to impact the listed species or their habitat.

The Commonwealth’s original perpetual EPBC referral decision for Gippsland Ports’ GLOA program remains valid and despite additional species identified on the MNES list (i.e. Protected Matters Search report (**Appendix 2**), there has been no change to the original findings.

This EPBC self-assessment report has determined that the Gippsland Ports’ GLOA program will not have a significant impact on any EPBC listed species, vegetation community or wetland of international importance based on the significant impact criteria provided by the “Matters of National Environmental Significance: Significant Impact Guidelines 1.1” (DoE, 2013) and listed in **Sections 2.1 – 2.3**. As such, an EPBC referral is not required.

5 REFERENCES

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6 APPENDICES

Appendix 1. Decision on EPBC referral (2011)



SCAN 90 27 695
PERMITS.

Mr Nick Murray
CEO
Gippsland Ports
PO Box 388
Bairnsdale
Vic 3875

Date: 8 September 2011
EPBC Ref: 2011/5932
EPBC contact: Daryl Venables
02 6274 2217
daryl.venables@environment.gov.au

Received by
Gippsland Ports
15 SEP 2011
Bairnsdale

Dear Mr Murray

**Decision on referral
Gippsland Lakes Ocean Access Project, Lakes Entrance Vic**

This is to advise you of my decision, under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) about the proposed action to conduct maintenance dredging of oceanic sand at Lakes Entrance (Vic) in the inner channels and bar to provide ocean access between the Gippsland Lakes and Bass Strait.

As a delegate of the Minister for Sustainability, Environment, Water, Population and Communities, I have decided that the proposed action is not a controlled action, provided it is taken in accordance with the manner described in the enclosed decision document. This means that, provided that the action is undertaken in that way, it does not require further assessment and approval under the EPBC Act before it can proceed.

A copy of the document recording this decision is enclosed. This document will be notified publicly on the department's website.

Please note that this decision relates only to the specific matters protected under Chapter 2 of the EPBC Act.

This decision does not affect any requirement for separate state or local government environment assessment and approvals of the proposed action.

Please notify this department immediately if you are unable to undertake the proposed action in accordance with the measures described. Penalty provisions may apply if the referred action is undertaken in a different way to the manner specified.

Otherwise we would appreciate receiving your written advice:

- within two weeks of the date of this letter - confirming that the action will be undertaken in the manner set out in the enclosed decision, and
- within three months of the date of this letter - reporting on your progress in implementing the measures.

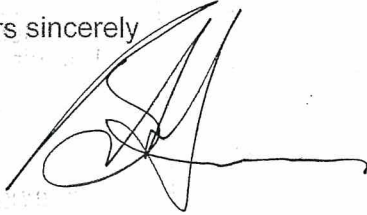
The department has an active audit program for proposals that have been referred under the EPBC Act. The audit program aims to ensure that there is a high degree of compliance with decisions made in relation to those proposals. You should be aware that your project may be selected for audit by the department at any time and all related records and documents may be subject to scrutiny. Information about the department's audit strategy is enclosed.

Gippsland Ports
Action Officer **C80**
Copy to **MARIA SUPPINIT**
IAN McDOUGALL

File: 27-965-Permit
↳ EPB

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

Yours sincerely

A handwritten signature in black ink, appearing to be 'Barbara Jones', with a long horizontal stroke extending to the right.

Barbara Jones
Assistant Secretary
Environment Assessment Branch



**Notification of
REFERRAL DECISION – not controlled action if undertaken in a particular
manner**

Gippsland Lakes Ocean Access Project Lakes Entrance Vic, (EPBC 2011/5932)

This decision is made under sections 75 and 77A of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Proposed action

person named in the referral	Gippsland Ports Committee of Management Incorporated (Gippsland Ports) ABN: 089 229 649
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proposed action	To conduct maintenance dredging of oceanic sand at Lakes Entrance (Vic) in the inner channels and bar to provide ocean access between the Gippsland Lakes and Bass Strait using a trailer suction hopper dredge and disposing of the spoil in two dredge material grounds along the coast outside the Entrance.[See EPBC Act referral 2011/5932].
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Referral decision: Not a controlled action if undertaken in a particular manner

status of proposed action	The proposed action is not a controlled action provided it is undertaken in the manner set out in this decision.
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Person authorised to make decision

Name and position	Barbara Jones Assistant Secretary Environment Assessment Branch
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signature

date of decision	8 September 2011
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manner in which proposed action must be taken	The following measures must be taken to avoid significant impacts on <ul style="list-style-type: none">• Listed threatened species and communities (sections 18 & 18A)• Listed migratory species (sections 20 & 20A)
--	---

-
1. The following measures must be implemented for all dredging and dumping activities:
 - Prior to dredging activities, vessel operators must check for cetaceans within the **designated monitoring zone**.
 - Dredging activities can only commence if no cetaceans have been observed within the **designated monitoring zone**.
 - If a cetacean is sighted within the **designated monitoring zone**, dredging or dredge disposal must not commence until all individuals are observed to move outside the monitoring zone or have not been sighted for 20 minutes.
 2. During the period of September to January, the plume caused by dredging activities must not exceed 25 NTU, at a distance of 50 metres from the vessel, when measured across the channel.
 3. Dredging cannot occur within the Rigby Island Buffer zone (as shown in Figure 19 and described on page 35 of the supporting report of EPBC referral 2011/5932) between October and March.

Designated monitoring zone means the area within a 300 metre radius of any point of the dredging/dumping vessel.

Appendix 2. EPBC Act Protected Matters Report



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. Please see the caveat for interpretation of information provided here.

Report created: 27-Jan-2022

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment 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 (Ramsar)	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	1
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	67
Listed Migratory Species:	48

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

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 Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	84
Whales and Other Cetaceans:	11
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	7
Regional Forest Agreements:	2
Nationally Important Wetlands:	1
EPBC Act Referrals:	10
Key Ecological Features (Marine):	1
Biologically Important Areas:	13
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [\[Resource Information \]](#)

Ramsar Site Name	Proximity	Buffer Status
Gippsland lakes	Within Ramsar site	In feature area

Commonwealth Marine Area [\[Resource Information \]](#)

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside a Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area.

Feature Name	Buffer Status
EEZ and Territorial Sea	In buffer area only

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.

Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Gippsland Red Gum (Eucalyptus tereticornis subsp. mediana) Grassy Woodland and Associated Native Grassland	Critically Endangered	Community likely to occur within area	In feature area
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically Endangered	Community likely to occur within area	In feature area
Natural Damp Grassland of the Victorian Coastal Plains	Critically Endangered	Community may occur within area	In feature area
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	Critically Endangered	Community likely to occur within area	In buffer area only
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area	In feature area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area	In buffer area only

Listed Threatened Species [\[Resource Information \]](#)

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.

Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
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Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area	In feature area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat may occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In feature area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thinornis cucullatus cucullatus Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area	In feature area
FISH			
Galaxiella pusilla Eastern Dwarf Galaxias, Dwarf Galaxias [56790]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat known to occur within area	In feature area
Serirolella brama Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area	In feature area
Thunnus maccoyii Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
FROG			
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Litoria raniformis Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat likely to occur within area	In feature area
MAMMAL			
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In feature area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area	In feature area
Isoodon obesulus obesulus Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat may occur within area	In buffer area only
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area	In feature area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat known to occur within area	In feature area
Potorous tridactylus tridactylus Long-nosed Potoroo (SE Mainland) [66645]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
PLANT			
Acacia caerulescens Limestone Blue Wattle, Buchan Blue, Buchan Blue Wattle [21883]	Vulnerable	Species or species habitat known to occur within area	In feature area
Amphibromus fluitans River Swamp Wallaby-grass, Floating Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat known to occur within area	In feature area
Commersonia prostrata Dwarf Kerrawang [87152]	Endangered	Species or species habitat likely to occur within area	In feature area
Dianella amoena Matted Flax-lily [64886]	Endangered	Species or species habitat may occur within area	In feature area
Glycine latrobeana Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Pterostylis chlorogramma Green-striped Greenhood [56510]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thelymitra epipactoides Metallic Sun-orchid [11896]	Endangered	Species or species habitat likely to occur within area	In feature area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area	In feature area
Xerochrysum palustre Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat likely to occur within area	In feature area
REPTILE			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area
SHARK			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Breeding known to occur within area	In feature area
Galeorhinus galeus School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In feature area

Listed Migratory Species [[Resource Information](#)]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardenna grisea Sooty Shearwater [82651]		Species or species habitat may occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In feature area
Sternula albifrons Little Tern [82849]		Species or species habitat may occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Migratory Marine Species			
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area	In feature area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Breeding known to occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area	In feature area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In feature area
Migratory Terrestrial Species			
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area	In feature area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardena carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardena grisea as Puffinus griseus Sooty Shearwater [82651]		Species or species habitat may occur within area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area overfly marine area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Charadrius ruficapillus Red-capped Plover [881]		Species or species habitat known to occur within area overfly marine area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea antipodensis gibsoni as Diomedea gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Breeding known to occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In feature area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Species or species habitat known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]		Species or species habitat known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Onychoprion fuscatus as Sterna fuscata Sooty Tern [90682]		Breeding known to occur within area	In feature area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area	In feature area
Phoebastria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Stercorarius skua as Catharacta skua Great Skua [823]		Species or species habitat may occur within area	In feature area
Sternula albifrons as Sterna albifrons Little Tern [82849]		Species or species habitat may occur within area	In feature area
Sternula nereis as Sterna nereis Fairy Tern [82949]		Breeding known to occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thinornis cucullatus as Thinornis rubricollis Hooded Dotterel, Hooded Plover [87735]		Species or species habitat known to occur within area overfly marine area	In feature area
Thinornis cucullatus cucullatus as Thinornis rubricollis rubricollis Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area overfly marine area	In feature area
Fish			
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In feature area
Hippocampus abdominalis Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area	In feature area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In feature area
Hippocampus minotaur Bullneck Seahorse [66705]		Species or species habitat may occur within area	In feature area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area	In feature area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In feature area
Hypselognathus rostratus Knifesnout Pipefish, Knife-snouted Pipefish [66245]		Species or species habitat may occur within area	In feature area
Kaupus costatus Deepbody Pipefish, Deep-bodied Pipefish [66246]		Species or species habitat may occur within area	In feature area
Kimblaeus bassensis Trawl Pipefish, Bass Strait Pipefish [66247]		Species or species habitat may occur within area	In feature area
Leptoichthys fistularius Brushtail Pipefish [66248]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
Mitotichthys semistriatus Halfbanded Pipefish [66261]		Species or species habitat may occur within area	In feature area
Mitotichthys tuckeri Tucker's Pipefish [66262]		Species or species habitat may occur within area	In feature area
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area	In feature area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area
Solegnathus robustus Robust Pipehorse, Robust Spiny Pipehorse [66274]		Species or species habitat may occur within area	In feature area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area	In feature area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area
Stipecampus cristatus Ringback Pipefish, Ring-backed Pipefish [66278]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area	In feature area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In feature area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Longsnout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In feature area

Mammal

Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In feature area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat may occur within area	In feature area

Reptile

Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area	In feature area

Whales and Other Cetaceans

[[Resource Information](#)]

Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			

Current Scientific Name	Status	Type of Presence	Buffer Status
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area	In feature area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area	In feature area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat likely to occur within area	In feature area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area

Extra Information

State and Territory Reserves [\[Resource Information \]](#)

Protected Area Name	Reserve Type	State	Buffer Status
Bancroft Bay - Kalimna G.L.R.	Natural Features Reserve	VIC	In feature area
Flannagan Island G.L.R.	Natural Features Reserve	VIC	In buffer area only
Fraser Island G.L.R.	Natural Features Reserve	VIC	In buffer area only
Gippsland Lakes Coastal Park	Conservation Park	VIC	In feature area
Nungurner B.R.	Natural Features Reserve	VIC	In buffer area only
Nyerimilang Park G.L.R.	Natural Features Reserve	VIC	In feature area
Rigby Island G.L.R.	Natural Features Reserve	VIC	In feature area

Regional Forest Agreements [\[Resource Information \]](#)

Note that all areas with completed RFAs have been included.

RFA Name	State	Buffer Status
East Gippsland RFA	Victoria	In buffer area only
Gippsland RFA	Victoria	In feature area

Nationally Important Wetlands [\[Resource Information \]](#)

Wetland Name	State	Buffer Status
Lake King Wetlands	VIC	In feature area

EPBC Act Referrals [\[Resource Information \]](#)

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action Biodiversity Impacts Audit	2011/6191	Not Controlled Action	Completed	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Cunninghame Arm Redevelopment (Stage 3)	2002/618	Not Controlled Action	Completed	In buffer area only
Gippsland Lakes Composting Toilet Program	2000/66	Not Controlled Action	Completed	In feature area
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Pump station upgrades and rising main construction, Lakes Entrance, Victoria	2016/7646	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Lakes Entrance Sand Management Program Trial Dredging	2007/3852	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Lakes Entrance Sand Management Program Trial Dredging	2007/3694	Not Controlled Action (Particular Manner)	Completed	In feature area
Maintenance Dredging of Oceanic Sand	2011/5932	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Key Ecological Features

[[Resource Information](#)]

Key Ecological Features are the parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area.

Name	Region	Buffer Status
Upwelling East of Eden	South-east	In feature area

Biologically Important Areas

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			
Diomedea exulans (sensu lato)			
Wandering Albatross [1073]	Foraging	Known to occur	In buffer area only

Scientific Name	Behaviour	Presence	Buffer Status
Pelecanoides urinatrix Common Diving-petrel [1018]	Foraging	Known to occur	In feature area
Thalassarche cauta cauta Shy Albatross [82345]	Foraging likely	Likely to occur	In feature area
Thalassarche chlororhynchos bassi Indian Yellow-nosed Albatross [85249]	Foraging	Known to occur	In buffer area only
Thalassarche melanophris Black-browed Albatross [66472]	Foraging	Known to occur	In buffer area only
Thalassarche melanophris impavida Campbell Albatross [82449]	Foraging	Known to occur	In buffer area only

Sharks

Carcharodon carcharias White Shark [64470]	Breeding (nursery area)	Known to occur	In feature area
Carcharodon carcharias White Shark [64470]	Distribution (low density)	Likely to occur	In buffer area only
Carcharodon carcharias White Shark [64470]	Known distribution	Known to occur	In feature area

Whales

Balaenoptera musculus brevipinna Pygmy Blue Whale [81317]	Distribution	Known to occur	In feature area
Balaenoptera musculus brevipinna Pygmy Blue Whale [81317]	Foraging	Likely to be present	In feature area
Eubalaena australis Southern Right Whale [40]	Known core range	Known to occur	In feature area
Eubalaena australis Southern Right Whale [40]	Migration and resting on migration	Known to occur	In feature area

Bioregional Assessments

SubRegion	BioRegion	Website	Buffer Status
Gippsland	Gippsland Basin	BA website	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and 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

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

Where little information is available for a 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 detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

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

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

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

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

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.

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Appendix 3. Assessment of EPBC Listed Species (PMST) for the GLOA program.

Species ID	Scientific Name	Common Name	Threat Category	Migratory Status	Migratory Category	Marine Status	Cetacean Status	PMST Simple Presence	Residual Risk	Potential Impacts	Comments
BIRDS											
59309	<i>Actitis hypoleucos</i>	Common Sandpiper		Migratory	Migratory Wetlands Species	Listed		Known	Nil	No plausible impact pathway	The Common Sandpiper is a migratory shorebird found along shorelines, mangrove-lined creeks, and wetlands. It generally forages in shallow water and on bare soft mud at edge of wetlands.
82338	<i>Anthochaera phrygia</i>	Regent Honeyeater	Critically Endangered					Likely	Nil	No plausible impact pathway	Terrestrial species - habitat does not exist in the GLOA study area.
678	<i>Apus pacificus</i>	Fork-tailed Swift		Migratory	Migratory Marine Birds	Listed - overfly marine area		Likely	Nil	No plausible impact pathway	The Fork-tailed Swift is almost exclusively aerial. It mostly occur over dry or open habitats including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh.
82404	<i>Ardenna carneipes</i>	Flesh-footed Shearwater, Fleshy-footed Shearwater		Migratory	Migratory Marine Birds	Listed (as <i>Puffinus carneipes</i>)		Likely	Low	Lighting at night.	Pelagic seabird. Unlikely to occur in the study area. Since the arrival of the Gippsland Ports' owned TSHD Tommy Norton, all GLOA dredging activities have been conducted during daylight hours.
82651	<i>Ardenna grisea</i>	Sooty Shearwater		Migratory	Migratory Marine Birds	Listed (as <i>Puffinus griseus</i>)		May	Low	Lighting at night.	Pelagic seabird. Unlikely to occur in the study area. Since the arrival of the Gippsland Ports' owned TSHD Tommy Norton, all GLOA dredging activities have been conducted during daylight hours.
1001	<i>Botaurus poiciloptilus</i>	Australasian Bittern	Endangered					Known	Nil	No plausible impact pathway	The Australasian Bittern occurs mainly in freshwater wetlands and, rarely, in estuaries or tidal wetlands. It prefers permanent and seasonal freshwater habitats, especially with tall dense vegetation dominated by sedges, rushes and reeds. Habitat does not exist in the GLOA study area.
66521	<i>Bubulcus ibis</i>	Cattle Egret				Listed - overfly marine area (as <i>Ardea ibis</i>)		May	Nil	No plausible impact pathway	The Cattle Egret occurs in terrestrial grasslands, including poorly drained pastures with tall grasses, and wetlands, including meadows and swamps with low emergent vegetation.
874	<i>Calidris acuminata</i>	Sharp-tailed Sandpiper		Migratory	Migratory Wetlands Species	Listed		Known	Nil	No plausible impact pathway	The Sharp-tailed Sandpiper is a migratory shorebird preferring muddy edges of shallow fresh or brackish wetlands with inundated or emergent sedges, grass, saltmarsh or other low vegetation. It also uses intertidal mudflats in sheltered bays, inlets, and estuaries, and occupies coastal mudflats mainly when ephemeral terrestrial wetlands have dried out.
855	<i>Calidris canutus</i>	Red Knot, Knot	Endangered	Migratory	Migratory Wetlands Species	Listed - overfly marine area		Known	Nil	No plausible impact pathway	Migratory shorebird mainly inhabiting intertidal mudflats, sandflats and sandy beaches of sheltered coasts, estuaries bays, inlets, lagoons. Sometimes found on sandy ocean beaches, exposed rock platforms or coral reefs. Rarely use freshwater swamps.
856	<i>Calidris ferruginea</i>	Curlew Sandpiper	Critically Endangered	Migratory	Migratory Wetlands Species	Listed - overfly marine area		Known	Nil	No plausible impact pathway	Migratory shorebird mainly occurring on intertidal mudflats in sheltered coastal areas such as estuaries, bays, inlets and lagoons.
858	<i>Calidris melanotos</i>	Pectoral Sandpiper		Migratory	Migratory Wetlands Species	Listed - overfly marine area		May	Nil	No plausible impact pathway	Migratory shorebird generally occupies shallow fresh to saline wetlands, including coastal lagoons, estuaries, bays, swamps, inundated grasslands, etc. Prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation.
860	<i>Calidris ruficollis</i>	Red-necked Stint		Migratory	Migratory Wetlands Species	Listed - overfly marine area		Known	Nil	No plausible impact pathway	Mostly found in coastal areas including sheltered inlets, bays, lagoons and estuaries with intertidal mudflats.

Species ID	Scientific Name	Common Name	Threat Category	Migratory Status	Migratory Category	Marine Status	Cetacean Status	PMST Simple Presence	Residual Risk	Potential Impacts	Comments
877	<i>Charadrius leschenaultii</i>	Greater Sand Plover, Large Sand Plover	Vulnerable	Migratory	Migratory Wetlands Species	Listed		May	Nil	No plausible impact pathway	Mainly occur on sheltered sandy, or muddy beaches with large intertidal mudflats or sandbanks, as well as estuarine lagoons.
881	<i>Charadrius ruficapillus</i>	Red-capped Plover				Listed - overfly marine area		Known	Nil	No plausible impact pathway	Usually inhabits wide, bare sandflats or mudflats at the margins of saline, brackish or freshwater wetlands.
64458	<i>Diomedea antipodensis</i>	Antipodean Albatross	Vulnerable	Migratory	Migratory Marine Birds	Listed		Likely	Low	Lighting at night.	Pelagic seabird. Unlikely to occur in the study area. Since the arrival of the Gippsland Ports' owned TSHD Tommy Norton, all GLOA dredging activities have been conducted during daylight hours.
82270	<i>Diomedea antipodensis gibsoni</i>	Gibson's Albatross	Vulnerable			Listed (as <i>Diomedea gibsoni</i>)		Likely	Low	Lighting at night.	Pelagic seabird. Unlikely to occur in the study area. Since the arrival of the Gippsland Ports' owned TSHD Tommy Norton, all GLOA dredging activities have been conducted during daylight hours.
89221	<i>Diomedea epomophora</i>	Southern Royal Albatross	Vulnerable	Migratory	Migratory Marine Birds	Listed		Likely	Low	Lighting at night.	Pelagic seabird. Unlikely to occur in the study area. Since the arrival of the Gippsland Ports' owned TSHD Tommy Norton, all GLOA dredging activities have been conducted during daylight hours.
89223	<i>Diomedea exulans</i>	Wandering Albatross	Vulnerable	Migratory	Migratory Marine Birds	Listed		Likely	Low	Lighting at night.	Pelagic seabird. Unlikely to occur in the study area. Since the arrival of the Gippsland Ports' owned TSHD Tommy Norton, all GLOA dredging activities have been conducted during daylight hours.
64456	<i>Diomedea sanfordi</i>	Northern Royal Albatross	Endangered	Migratory	Migratory Marine Birds	Listed		Likely	Low	Lighting at night.	Pelagic seabird. Unlikely to occur in the study area. Since the arrival of the Gippsland Ports' owned TSHD Tommy Norton, all GLOA dredging activities have been conducted during daylight hours.
929	<i>Falco hypoleucos</i>	Grey Falcon	Vulnerable					Likely	Nil	No plausible impact pathway	Terrestrial species - habitat does not exist in the GLOA study area.
64438	<i>Fregetta grallaria grallaria</i>	White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian)	Vulnerable					Likely	Low	Lighting at night.	Pelagic seabird. Unlikely to occur in the study area. Since the arrival of the Gippsland Ports' owned TSHD Tommy Norton, all GLOA dredging activities have been conducted during daylight hours.
863	<i>Gallinago hardwickii</i>	Latham's Snipe, Japanese Snipe		Migratory	Migratory Wetlands Species	Listed - overfly marine area		Known	Nil	No plausible impact pathway	Migratory shorebird usually inhabiting open, freshwater wetlands with low, dense vegetation.
470	<i>Grantiella picta</i>	Painted Honeyeater	Vulnerable					Likely	Nil	No plausible impact pathway	Terrestrial species - habitat does not exist in the GLOA study area.
1059	<i>Halobaena caerulea</i>	Blue Petrel	Vulnerable			Listed		May	Low	Lighting at night.	Pelagic seabird. Unlikely to occur in the study area. Since the arrival of the Gippsland Ports' owned TSHD Tommy Norton, all GLOA dredging activities have been conducted during daylight hours.
870	<i>Himantopus himantopus</i>	Pied Stilt, Black-winged Stilt				Listed - overfly marine area			Nil	No plausible impact pathway	Prefer freshwater and saltwater marshes, mudflats and the shallow edges of lakes and rivers.
682	<i>Hirundapus caudacutus</i>	White-throated Needletail	Vulnerable	Migratory	Migratory Terrestrial Species	Listed - overfly marine area		Known	Nil	No plausible impact pathway	Primarily an aerial species., occurring over most types of habitat.
744	<i>Lathamus discolor</i>	Swift Parrot	Critically Endangered			Listed - overfly marine area		Likely	Nil	No plausible impact pathway	Terrestrial species - habitat does not exist in the GLOA study area.
86380	<i>Limosa lapponica baueri</i>	Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit	Vulnerable					Known	Nil	No plausible impact pathway	Migratory shorebird found mainly in coastal habitats including intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. Often found around beds of seagrass and, sometimes, in nearby saltmarsh.

Species ID	Scientific Name	Common Name	Threat Category	Migratory Status	Migratory Category	Marine Status	Cetacean Status	PMST Simple Presence	Residual Risk	Potential Impacts	Comments
1060	<i>Macronectes giganteus</i>	Southern Giant-Petrel, Southern Giant Petrel	Endangered	Migratory	Migratory Marine Birds	Listed		May	Low	Lighting at night.	Pelagic seabird. Unlikely to occur in the study area. Since the arrival of the Gippsland Ports' owned TSHD Tommy Norton, all GLOA dredging activities have been conducted during daylight hours.
1061	<i>Macronectes halli</i>	Northern Giant Petrel	Vulnerable	Migratory	Migratory Marine Birds	Listed		May	Low	Lighting at night.	Pelagic seabird. Unlikely to occur in the study area. Since the arrival of the Gippsland Ports' owned TSHD Tommy Norton, all GLOA dredging activities have been conducted during daylight hours.
670	<i>Merops ornatus</i>	Rainbow Bee-eater				Listed - overfly marine area		May	Nil	No plausible impact pathway	Occurs mainly in open forests and woodlands, shrublands and in various cleared or semi-cleared habitats.
C	<i>Monarcha melanopsis</i>	Black-faced Monarch		Migratory	Migratory Terrestrial Species	Listed - overfly marine area		Known	Nil	No plausible impact pathway	Occurs mainly in rainforest ecosystems.
612	<i>Myiagra cyanoleuca</i>	Satin Flycatcher		Migratory	Migratory Terrestrial Species	Listed - overfly marine area		Known	Nil	No plausible impact pathway	Inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands. Mostly occur at higher elevations (i.e. above 800m in ACT)
747	<i>Neophema chrysogaster</i>	Orange-bellied Parrot	Critically Endangered			Listed - overfly marine area		May	Nil	No plausible impact pathway	Terrestrial species - habitat does not exist in the GLOA study area.
847	<i>Numenius madagascariensis</i>	Eastern Curlew, Far Eastern Curlew	Critically Endangered	Migratory	Migratory Wetlands Species	Listed		Known	Nil	No plausible impact pathway	Migratory shorebird found mainly along sheltered coasts including estuaries, bays, harbours and coastal lagoons with large intertidal mudflats or sandflats, often with beds of seagrass (Zosteraceae).
90682	<i>Onychoprion fuscatus</i>	Sooty Tern				Listed (as <i>Sterna fuscata</i>)		Known	Low	Altered hydrodynamic processes result in increased scour and erosion	The PMST search states that "breeding is known to occur within area" with the map on the SPRAT sheet suggesting that the only site within the Gippsland Lakes that "species or species habitat may occur" is at Rigby Island, adjacent to the entrance. There are no records of this species listed on the Victorian Biodiversity Atlas (VBA) within 5km of this site and, hence, the species is considered to unlikely be affected by the GLOA program. Despite ongoing dredging extending several channel areas and potentially increasing total volume, change in volume is very small in the context of the overall channel and is much smaller than the natural change in channel volumes experienced by scouring or deposition of sediments in response to changes in catchment flows (Water Technology, 2022).
64445	<i>Pachyptila turtur subantarctica</i>	Fairy Prion (southern)	Vulnerable					Known	Low	Lighting at night.	Pelagic seabird. Unlikely to occur in the study area. Since the arrival of the Gippsland Ports' owned TSHD Tommy Norton, all GLOA dredging activities have been conducted during daylight hours.
952	<i>Pandion haliaetus</i>	Osprey		Migratory	Migratory Wetlands Species	Listed		Likely	Nil	No plausible impact pathway	Occur mostly in littoral and coastal habitats and terrestrial wetlands and require extensive areas of open fresh, brackish or saline water for foraging.
1075	<i>Phoebastria fusca</i>	Sooty Albatross	Vulnerable	Migratory	Migratory Marine Birds	Listed		May	Low	Lighting at night.	Pelagic seabird. Unlikely to occur in the study area. Since the arrival of the Gippsland Ports' owned TSHD Tommy Norton, all GLOA dredging activities have been conducted during daylight hours.
26033	<i>Pterodroma leucoptera leucoptera</i>	Gould's Petrel, Australian Gould's Petrel	Endangered					May	Low	Lighting at night.	Pelagic seabird. Unlikely to occur in the study area. Since the arrival of the Gippsland Ports' owned TSHD Tommy Norton, all GLOA dredging activities have been conducted during daylight hours.
592	<i>Rhipidura rufifrons</i>	Rufous Fantail		Migratory	Migratory Terrestrial Species	Listed - overfly marine area		Known	Nil	No plausible impact pathway	The Rufous Fantail mainly inhabits wet sclerophyll forests, often in gullies, usually with a dense understorey. Occasionally occur in drier sclerophyll forests and woodlands, often with a shrubby or heath understorey.
77037	<i>Rostratula australis</i>	Australian Painted Snipe	Endangered			Listed - overfly marine area (as <i>Rostratula</i>)		Likely	Nil	No plausible impact pathway	The Australian Painted Snipe occurs in shallow freshwater (occasionally brackish) wetlands, both ephemeral and permanent, such as lakes, swamps,

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						<i>benghalensis</i> (sensu lato))					claypans, and inundated grasslands/saltmarsh, usually with a good cover of vegetation.
823	<i>Stercorarius skua</i>	Great Skua				Listed (as <i>Catharacta skua</i>)		May	Low	Lighting at night.	Migratory seabird. Unlikely to occur in the study area. Since the arrival of the Gippsland Ports' owned TSHD Tommy Norton, all GLOA dredging activities have been conducted during daylight hours.
82849	<i>Sternula albifrons</i>	Little Tern		Migratory	Migratory Marine Birds	Listed (as <i>Sterna albifrons</i>)		May	Low	Altered hydrodynamic processes result in increased scour and erosion	The Little Tern inhabits sheltered coastal environments, including lagoons, estuaries, river mouths and deltas, lakes, bays, harbours and inlets, especially those with exposed sandbanks or sand-spits, and also on exposed ocean beaches. Despite ongoing dredging extending several channel areas and potentially increasing total volume, change in volume is very small in the context of the overall channel and is much smaller than the natural change in channel volumes experienced by scouring or deposition of sediments in response to changes in catchment flows (Water Technology, 2022). Airborne noise has the potential to impact on nesting and migratory shorebirds and studies have shown that an average "flight" response occurs in shorebirds exposed to 85 decibels (Brown, 1990). A study by Burger et al. (1998) indicated that a 100m buffer from operating vessels would protect shorebird values. At 100m, measurements from commensurate port areas are typically 45-55 decibels and fishing boats 55 decibels. The Rigby Island Buffer Zone provides a 100m buffer from the tern nesting area at the south-eastern corner of Rigby Island.
									Low	Airborne noise	
82950	<i>Sternula nereis nereis</i>	Australian Fairy Tern	Vulnerable Vulnerable	Migratory	Migratory Marine Birds	Listed		Known	Low	Altered hydrodynamic processes result in increased scour and erosion	The Australian Fairy Tern utilises a variety of habitats including offshore, estuarine or lake islands, wetlands, beaches and spits. Nests in small colonies on sandy islands and beaches inside estuaries and on open sandy beaches. Known to nest on Rigby Island, adjacent to the Entrance. This area is subject to a buffer during breeding season Despite ongoing dredging extending several channel areas and potentially increasing total volume, change in volume is very small in the context of the overall channel and is much smaller than the natural change in channel volumes experienced by scouring or deposition of sediments in response to changes in catchment flows (Water Technology, 2022). Airborne noise has the potential to impact on nesting and migratory shorebirds and studies have shown that an average "flight" response occurs in shorebirds exposed to 85 decibels (Brown, 1990). A study by Burger et al. (1998) indicated that a 100m buffer from operating vessels would protect shorebird values. At 100m, measurements from commensurate port areas are typically 45-55 decibels and fishing boats 55 decibels. The Rigby Island Buffer Zone provides a 100m buffer from the tern nesting area at the south-eastern corner of Rigby Island.
									Low	Airborne noise	
64460	<i>Thalassarche bulleri</i>	Buller's Albatross, Pacific Albatross	Vulnerable			Listed (as <i>Thalassarche sp. nov.</i>)		May	Low	Lighting at night.	Pelagic seabird. Unlikely to occur in the study area. Since the arrival of the Gippsland Ports' owned TSHD Tommy Norton, all GLOA dredging activities have been conducted during daylight hours.
82273	<i>Thalassarche bulleri platei</i>	Northern Buller's Albatross, Pacific Albatross	Vulnerable	Migratory	Migratory Marine Birds	Listed		May	Low	Lighting at night.	Pelagic seabird. Unlikely to occur in the study area. Since the arrival of the Gippsland Ports' owned TSHD Tommy Norton, all GLOA dredging activities have been conducted during daylight hours.
64464	<i>Thalassarche carteri</i>	Indian Yellow-nosed Albatross	Endangered	Migratory	Migratory Marine Birds	Listed		Likely	Low	Lighting at night.	Pelagic seabird. Unlikely to occur in the study area. Since the arrival of the Gippsland Ports' owned TSHD Tommy Norton, all GLOA dredging activities have been conducted during daylight hours.

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89224	<i>Thalassarche cauta</i>	Shy Albatross	Endangered	Migratory	Migratory Marine Birds	Listed		Likely	Low	Lighting at night.	Pelagic seabird. Unlikely to occur in the study area. Since the arrival of the Gippsland Ports' owned TSHD Tommy Norton, all GLOA dredging activities have been conducted during daylight hours.
64457	<i>Thalassarche eremita</i>	Chatham Albatross	Vulnerable	Migratory	Migratory Marine Birds	Listed		Likely	Low	Lighting at night.	Pelagic seabird. Unlikely to occur in the study area. Since the arrival of the Gippsland Ports' owned TSHD Tommy Norton, all GLOA dredging activities have been conducted during daylight hours.
64459	<i>Thalassarche impavida</i>	Campbell Albatross, Campbell Black-browed Albatross	Vulnerable	Migratory	Migratory Marine Birds	Listed		May	Low	Lighting at night.	Pelagic seabird. Unlikely to occur in the study area. Since the arrival of the Gippsland Ports' owned TSHD Tommy Norton, all GLOA dredging activities have been conducted during daylight hours.
66472	<i>Thalassarche melanophris</i>	Black-browed Albatross	Vulnerable	Migratory	Migratory Marine Birds	Listed		May	Low	Lighting at night.	Pelagic seabird. Unlikely to occur in the study area. Since the arrival of the Gippsland Ports' owned TSHD Tommy Norton, all GLOA dredging activities have been conducted during daylight hours.
64463	<i>Thalassarche salvini</i>	Salvin's Albatross	Vulnerable	Migratory	Migratory Marine Birds	Listed		Likely	Low	Lighting at night.	Pelagic seabird. Unlikely to occur in the study area. Since the arrival of the Gippsland Ports' owned TSHD Tommy Norton, all GLOA dredging activities have been conducted during daylight hours.
64462	<i>Thalassarche steadi</i>	White-capped Albatross	Vulnerable			Listed		Likely	Low	Lighting at night.	Pelagic seabird. Unlikely to occur in the study area. Since the arrival of the Gippsland Ports' owned TSHD Tommy Norton, all GLOA dredging activities have been conducted during daylight hours.
87735	<i>Thinornis cucullatus</i>	Hooded Dotterel, Hooded Plover				Listed - overfly marine area (as <i>Thinornis rubricollis rubricollis</i>)		Known	Low	Altered hydrodynamic processes result in increased tides and salinity	The Hooded Plover generally inhabits wide ocean beaches. It may also occur on near-coastal saline and freshwater lakes and lagoons, tidal bays and estuaries, rock platforms, or on rocky or sandy reefs close to shore. The change in the volume capacity due to dredging is very small in the context of the overall channel and is much smaller than the natural change experienced in response to changes in catchment flows. Hence, dredging has little effect on the tidal volume passing through the channels. Furthermore, the mixing and salinity regime is mostly influenced by "longer ocean level changes, such as due to storm effects over several days" and "catchment flows, which during floods can push the salt water out of the system, or during droughts can experience salt-water intrusion far deeper into the lakes and estuaries" (Water Technology, 2022).
90381	<i>Thinornis cucullatus cucullatus</i>	Eastern Hooded Plover, Eastern Hooded Plover	Critically Endangered			Listed - overfly marine area (as <i>Thinornis rubricollis</i>)		Known	Low	Airborne Noise	The Eastern Hooded Plover generally inhabits wide ocean beaches. It may also occur on near-coastal saline and freshwater lakes and lagoons, tidal bays and estuaries, rock platforms, or on rocky or sandy reefs close to shore. Known to occur in the vicinity of the Entrance and historical records of nesting on the coast of the Ninety Mile Beach. The change in the volume capacity due to dredging is very small in the context of the overall channel and is much smaller than the natural change experienced in response to changes in catchment flows. Hence, dredging has little effect on the tidal volume passing through the channels. Furthermore, the mixing and salinity regime is mostly influenced by "longer ocean level changes, such as due to storm effects over several days" and "catchment flows, which during floods can push the salt water out of the system, or during droughts can experience salt-water intrusion far deeper into the lakes and estuaries" (Water Technology, 2022). Airborne noise has the potential to impact on nesting and migratory shorebirds and studies have shown that an average "flight" response occurs in shorebirds exposed to 85 decibels (Brown, 1990). A study by Burger et al. (1998) indicated that a 100m buffer from operating vessels would protect shorebird values. At 100m, measurements from commensurate port areas are

Species ID	Scientific Name	Common Name	Threat Category	Migratory Status	Migratory Category	Marine Status	Cetacean Status	PMST Simple Presence	Residual Risk	Potential Impacts	Comments
											typically 45-55 decibels and fishing boats 55 decibels. The Rigby Island Buffer Zone provides a 100m buffer from the tern nesting area at the south-eastern corner of Rigby Island.
832	<i>Tringa nebularia</i>	Common Greenshank, Greenshank	Critically Endangered	Migratory	Migratory Wetlands Species	Listed - overfly marine area		Known	Nil	No plausible impact pathway	Migratory shorebird found in a wide variety of inland wetlands and sheltered coastal habitats or varying salinity. Occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass.
FISH											
56790	<i>Galaxiella pusilla</i>	Eastern Dwarf Galaxias, Dwarf Galaxias	Vulnerable					Likely	Low	Altered hydrodynamic processes resulting in increased tides and salinity.	The Eastern Dwarf Galaxias is a tiny fish occurring in slow flowing and still, shallow, permanent and temporary freshwater habitats. There is no known potential habitat in the vicinity of the Entrance. The change in the volume capacity due to dredging is very small in the context of the overall channel and is much smaller than the natural change experienced in response to changes in catchment flows. Hence, dredging has little effect on the tidal volume passing through the channels. Furthermore, the mixing and salinity regime is mostly influenced by “longer ocean level changes, such as due to storm effects over several days” and “catchment flows, which during floods can push the salt water out of the system, or during droughts can experience salt-water intrusion far deeper into the lakes and estuaries” (Water Technology, 2022).
66227	<i>Heraldia nocturna</i>	Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish				Listed		May	Nil	No plausible impact pathway	Inhabit sheltered inshore reefs in harbours, bays and coves where they are usually seen beneath ledges, in holes, crevices and small caves at depths of 2-30 m. Not associated with Gippsland Lakes.
66233	<i>Hippocampus abdominalis</i>	Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse				Listed		May	Low	Removal of seabed - seagrass	Inhabits a range of habitats from intertidal rockpools, low rocky reefs in shallow estuaries, to deep tidal channels, clinging to seagrasses, sponges, macroalgae, rocky outcrops and man-made features. Seagrass beds in the Gippsland Lakes are likely to provide habitat for this species. Seagrass mapping during 2007-12 and 2017-21 indicate that there is no seagrass within the channel areas. Long-term monitoring (2011-18) of turbidity levels demonstrate that dredging activities have remained well within the turbidity compliance limit of 25 NTU suggesting minimal, localised increases in suspended sediments (Swash, 2019). In any event, the impact of any plume is likely to be minimal as studies have indicated that there are few benthic organisms in the area and no threatened species (AME, 2007; AME, 2008; AME, 2009; AME, 2012).
									Low	Increased suspended sediments – clogging of gills	
									Low	Increased suspended sediments – seagrass	
66235	<i>Hippocampus breviceps</i>	Short-head Seahorse, Short-snouted Seahorse				Listed		May	Low	Removal of seabed - seagrass	Usually inhabits shallow seagrass beds in bays, estuaries and on sheltered coasts. Seagrass beds in the Gippsland Lakes are likely to provide habitat for this species. Seagrass mapping during 2007-12 (AME) and 2017-21 (EGCMA) indicate that there is no seagrass within the dredged channel areas. Long-term monitoring (2011-18) of turbidity levels demonstrate that dredging activities have remained well within the turbidity compliance limit of 25 NTU suggesting minimal, localised increases in suspended sediments (Swash, 2019). In any event, the impact of any plume is likely to be minimal as studies have indicated that there are few benthic organisms in the area and no threatened species (AME, 2007; AME, 2008; AME, 2009; AME, 2012).
									Low	Increased suspended sediments – clogging of gills	
									Low	Increased suspended sediments – seagrass	

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66705	<i>Hippocampus minotaur</i>	Bullneck Seahorse				Listed		May	Nil	No plausible impact pathway	Inhabits hard bottom substrates with fine sand on the continental shelf at 64-110 m. Not associated with Gippsland Lakes.
66242	<i>Histiogamphelus briggsii</i>	Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish				Listed		May	Low	Removal of seabed - seagrass	Inhabit inshore sandy areas, singly or in small aggregations, often amongst detached seaweed or along the margins of <i>Posidonia</i> and <i>Zostera</i> seagrass beds. Not known from Gippsland Lakes, although potential habitat may exist. Seagrass mapping during 2007-12 (AME) and 2017-21 (EGCMA) indicate that there is no seagrass within the dredged channel areas. Long-term monitoring (2011-18) of turbidity levels demonstrate that dredging activities have remained well within the turbidity compliance limit of 25 NTU suggesting minimal, localised increases in suspended sediments (Swash, 2019). In any event, the impact of any plume is likely to be minimal as studies have indicated that there are few benthic organisms in the area and no threatened species (AME, 2007; AME, 2008; AME, 2009; AME, 2012).
									Low	Increased suspended sediments – clogging of gills	
									Low	Increased suspended sediments – seagrass	
66243	<i>Histiogamphelus cristatus</i>	Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish				Listed		May	Nil	No plausible impact pathway	Inhabits seagrass beds and adjacent open sandy and rubble areas with patches of seagrass and detritus in estuaries and shallow protected waters. Species is not associated with the Gippsland Lakes.
66245	<i>Hypselognathus rostratus</i>	Knifesnout Pipefish, Knife-snouted Pipefish				Listed		May	Low	Removal of seabed - seagrass	Endemic to southern Australia from the Gippsland Lakes, Victoria, to Venus Bay, South Australia, and northern Tasmania. Inhabits seagrass beds and adjacent sand flats in coastal bays and estuaries. Seagrass mapping during 2007-12 (AME) and 2017-21 (EGCMA) indicate that there is no seagrass within the dredged channel areas. Long-term monitoring (2011-18) of turbidity levels demonstrate that dredging activities have remained well within the turbidity compliance limit of 25 NTU suggesting minimal, localised increases in suspended sediments (Swash, 2019). In any event, the impact of any plume is likely to be minimal as studies have indicated that there are few benthic organisms in the area and no threatened species (AME, 2007; AME, 2008; AME, 2009; AME, 2012).
									Low	Increased suspended sediments – clogging of gills	
									Low	Increased suspended sediments – seagrass	
66246	<i>Kaupus costatus</i>	Deepbody Pipefish, Deep-bodied Pipefish				Listed		May	Low	Removal of seabed - seagrass	Inhabits sheltered intertidal and shallow areas with algal and seagrass beds, and mangroves, at depths to 10 m. The species is most common among the seagrass <i>Zostera</i> . Not known from Gippsland Lakes, although potential habitat may exist. Seagrass mapping during 2007-12 (AME) and 2017-21 (EGCMA) indicate that there is no seagrass within the dredged channel areas. Long-term monitoring (2011-18) of turbidity levels demonstrate that dredging activities have remained well within the turbidity compliance limit of 25 NTU suggesting minimal, localised increases in suspended sediments (Swash, 2019). In any event, the impact of any plume is likely to be minimal as studies have indicated that there are few benthic organisms in the area and no threatened species (AME, 2007; AME, 2008; AME, 2009; AME, 2012).
									Low	Increased suspended sediments – clogging of gills	
									Low	Increased suspended sediments – seagrass	
66247	<i>Kimblaeus bassensis</i>	Trawl Pipefish, Bass Strait Pipefish				Listed		May	Nil	No plausible impact pathway	Inhabits rubble and shelly substrates on the continental shelf at 10-204 m. Species is not associated with the Gippsland Lakes.
66248	<i>Leptoichthys fistularius</i>	Brushtail Pipefish				Listed		May	Low	Removal of seabed - seagrass	Inhabits inshore sheltered seagrass beds, mainly <i>Zostera</i> , but also <i>Posidonia</i> beds. Seagrass beds in the Gippsland Lakes are likely to provide habitat for this species. Seagrass mapping during 2007-12 (AME) and 2017-21 (EGCMA) indicate that there is no seagrass within the dredged channel areas.
									Low	Increased suspended sediments – clogging of gills	

Species ID	Scientific Name	Common Name	Threat Category	Migratory Status	Migratory Category	Marine Status	Cetacean Status	PMST Simple Presence	Residual Risk	Potential Impacts	Comments
									Low	Increased suspended sediments – seagrass	Long-term monitoring (2011-18) of turbidity levels demonstrate that dredging activities have remained well within the turbidity compliance limit of 25 NTU suggesting minimal, localised increases in suspended sediments (Swash, 2019). In any event, the impact of any plume is likely to be minimal as studies have indicated that there are few benthic organisms in the area and no threatened species (AME, 2007; AME, 2008; AME, 2009; AME, 2012).
66251	<i>Lissocampus runa</i>	Javelin Pipefish				Listed		May	Low	Removal of seabed - seagrass	Inhabits bay and estuaries, including tidepools, often sheltering amongst seagrass (usually <i>Zostera</i> spp.). Not known from Gippsland Lakes, although potential habitat may exist. Seagrass mapping during 2007-12 (AME) and 2017-21 (EGCMA) indicate that there is no seagrass within the dredged channel areas. Long-term monitoring (2011-18) of turbidity levels demonstrate that dredging activities have remained well within the turbidity compliance limit of 25 NTU suggesting minimal, localised increases in suspended sediments (Swash, 2019). In any event, the impact of any plume is likely to be minimal as studies have indicated that there are few benthic organisms in the area and no threatened species (AME, 2007; AME, 2008; AME, 2009; AME, 2012).
									Low	Increased suspended sediments – clogging of gills	
									Low	Increased suspended sediments – seagrass	
66252	<i>Maroubra perserrata</i>	Sawtooth Pipefish				Listed		May	Nil	No plausible impact pathway	Inhabits coastal reefs at depths of 3-25m, sheltering beneath ledges and in caves during day. Species is not associated with the Gippsland Lakes.
66261	<i>Mitotichthys semistriatus</i>	Halfbanded Pipefish				Listed		May	Low	Removal of seabed - seagrass	Often aggregate in small groups in shallow seagrass and eelgrass beds in less than 10 m, preferring tall seagrasses in very protected areas, usually just below the intertidal zone. Seagrass beds in the Gippsland Lakes are likely to provide habitat for this species. Seagrass mapping during 2007-12 (AME) and 2017-21 (EGCMA) indicate that there is no seagrass within the dredged channel areas. Long-term monitoring (2011-18) of turbidity levels demonstrate that dredging activities have remained well within the turbidity compliance limit of 25 NTU suggesting minimal, localised increases in suspended sediments (Swash, 2019). In any event, the impact of any plume is likely to be minimal as studies have indicated that there are few benthic organisms in the area and no threatened species (AME, 2007; AME, 2008; AME, 2009; AME, 2012).
									Low	Increased suspended sediments – clogging of gills	
									Low	Increased suspended sediments – seagrass	
66262	<i>Mitotichthys tuckeri</i>	Tucker's Pipefish				Listed		May	Nil	No plausible impact pathway	Inhabits kelp beds and floating Sargassum along the open coast at 9–18 m. Species is not associated with the Gippsland Lakes.
66265	<i>Notiocampus ruber</i>	Red Pipefish				Listed		May	Nil	No plausible impact pathway	Usually inhabits rocky reefs, often in crevices, in association with sponges and encrusting and filamentous red algae. Species is not associated with the Gippsland Lakes.
66268	<i>Phyllopteryx taeniolatus</i>	Common Seadragon, Weedy Seadragon				Listed		May	Nil	No plausible impact pathway	Inhabit shallow estuaries to deeper offshore reefs, living seagrass beds and on rocky reefs covered in macroalgae, especially kelp beds. Species is not associated with the Gippsland Lakes.
26179	<i>Prototroctes maraena</i>	Australian Grayling	Vulnerable Conservation Dependent					Known	Low	Altered hydrodynamic processes resulting in increased tides and salinity.	Spends part of its lifecycle in cool, clear, freshwater streams and at least part of the larval and/or juvenile stages in coastal seas. Dredging protocols and annual turbidity monitoring are in place to minimise impact during the migration period. The change in the volume capacity due to dredging is very small in the context of the overall channel and is much smaller than the natural change experienced in response to changes in catchment flows. Hence, dredging has little effect on the tidal volume passing through the channels. Furthermore, the mixing and salinity regime is mostly influenced by “longer ocean level changes, such as due to storm effects over several days” and “catchment flows, which during floods can push the salt water out of the system, or during
									Low	Increased suspended sediments	

Species ID	Scientific Name	Common Name	Threat Category	Migratory Status	Migratory Category	Marine Status	Cetacean Status	PMST Simple Presence	Residual Risk	Potential Impacts	Comments
											droughts can experience salt-water intrusion far deeper into the lakes and estuaries” (Water Technology, 2022). Long-term monitoring (2011-18) of turbidity levels demonstrate that dredging activities have remained well within the turbidity compliance limit of 25 NTU suggesting minimal, localised increases in suspended sediments (Swash, 2019). In any event, the impact of any plume is likely to be minimal as studies have indicated that there are few benthic organisms in the area and no threatened species (AME, 2007; AME, 2008; AME, 2009; AME, 2012).
69374	<i>Seriolella brama</i>	Blue Warehou	Conservation Dependent					Known	Nil	No plausible impact pathway	Mostly occur in offshore waters, although juveniles may be found in bays, estuaries and coastal waters. Species is not associated with the Gippsland Lakes.
66274	<i>Solegnathus robustus</i>	Robust Pipehorse, Robust Spiny Pipehorse				Listed		May	Nil	No plausible impact pathway	Endemic to temperate waters of South Australia, with a limited distribution from Port Weyland, Spencer Gulf westwards to Flinders Island, in 30-68m. Species is not associated with the Gippsland Lakes.
66275	<i>Solegnathus spinosissimus</i>	Spiny Pipehorse, Australian Spiny Pipehorse				Listed		May	Nil	No plausible impact pathway	Inhabit relatively shallow waters with specimens collected from muddy, silty, shelly and rubble substrates, and rocky reefs, and may be washed ashore after storms. Species is not associated with the Gippsland Lakes.
66276	<i>Stigmatopora argus</i>	Spotted Pipefish, Gulf Pipefish, Peacock Pipefish				Listed		May	Low	Removal of seabed - seagrass	Commonly inhabits seagrass beds in inshore bays and estuaries. Seagrass beds in the Gippsland Lakes are likely to provide habitat for this species. Seagrass mapping during 2007-12 (AME) and 2017-21 (EGCMA) indicate that there is no seagrass within the dredged channel areas. Long-term monitoring (2011-18) of turbidity levels demonstrate that dredging activities have remained well within the turbidity compliance limit of 25 NTU suggesting minimal, localised increases in suspended sediments (Swash, 2019). In any event, the impact of any plume is likely to be minimal as studies have indicated that there are few benthic organisms in the area and no threatened species (AME, 2007; AME, 2008; AME, 2009; AME, 2012).
									Low	Increased suspended sediments – clogging of gills	
									Low	Increased suspended sediments – seagrass	
66277	<i>Stigmatopora nigra</i>	Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish				Listed		May	Low	Removal of seabed - seagrass	Commonly inhabits sheltered seagrass and algal beds from the intertidal to depths of 35 m. Seagrass beds in the Gippsland Lakes are likely to provide habitat for this species. Seagrass mapping during 2007-12 (AME) and 2017-21 (EGCMA) indicate that there is no seagrass within the dredged channel areas. Long-term monitoring (2011-18) of turbidity levels demonstrate that dredging activities have remained well within the turbidity compliance limit of 25 NTU suggesting minimal, localised increases in suspended sediments (Swash, 2019). In any event, the impact of any plume is likely to be minimal as studies have indicated that there are few benthic organisms in the area and no threatened species (AME, 2007; AME, 2008; AME, 2009; AME, 2012).
									Low	Increased suspended sediments – clogging of gills	
									Low	Increased suspended sediments – seagrass	
66278	<i>Stipecampus cristatus</i>	Ringback Pipefish, Ring-backed Pipefish				Listed		May	Nil	No plausible impact pathway	Prefers sheltered reef and rubble areas, living in sparse algal and seagrass habitats (<i>Amphibolis</i> and <i>Posidonia</i>), Species is not associated with the Gippsland Lakes.
66279	<i>Syngnathoides biaculeatus</i>	Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish				Listed		May	Nil	No plausible impact pathway	Inhabits shallow, protected waters of bays, lagoons and estuaries including mangrove areas, in association with seagrass beds and macroalgae. In Australian waters, known from Geraldton to Shark Bay, and north to Ashmore and Cartier Reefs, Western Australia, and from the Timor Sea, the Northern Territory, eastwards to Queensland and south to Batemans Bay (New South Wales). Species is not associated with the Gippsland Lakes.
69402	<i>Thunnus maccoyii</i>	Southern Bluefin Tuna	Vulnerable					Likely	Nil	No plausible impact pathway	Oceanic species, not associated with the Gippsland Lakes.

Species ID	Scientific Name	Common Name	Threat Category	Migratory Status	Migratory Category	Marine Status	Cetacean Status	PMST Simple Presence	Residual Risk	Potential Impacts	Comments
66282	<i>Urocampus carinirostris</i>	Hairy Pipefish				Listed		May	Low	Removal of seabed - seagrass	One of the most common estuarine pipefishes in south-eastern Australia. Inhabits the lower reaches of rivers, sheltered estuaries and shallow reefs in seagrass and algal beds. Seagrass beds in the Gippsland Lakes are likely to provide habitat for this species. Seagrass mapping during 2007-12 (AME) and 2017-21 (EGCMA) indicate that there is no seagrass within the dredged channel areas. Long-term monitoring (2011-18) of turbidity levels demonstrate that dredging activities have remained well within the turbidity compliance limit of 25 NTU suggesting minimal, localised increases in suspended sediments (Swash, 2019). In any event, the impact of any plume is likely to be minimal as studies have indicated that there are few benthic organisms in the area and no threatened species (AME, 2007; AME, 2008; AME, 2009; AME, 2012).
									Low	Increased suspended sediments – clogging of gills	
									Low	Increased suspended sediments – seagrass	
66283	<i>Vanacampus margaritifer</i>	Mother-of-pearl Pipefish				Listed		May	Low	Removal of seabed - seagrass	Inhabits shallow estuarine and coastal waters where it occurs in seagrass beds including <i>Heterozostera</i> , <i>Zostera</i> , <i>Posidonia</i> and <i>Halophila</i>), macroalgae (<i>Ecklonia</i> and other brown algae), rocky reef, boulder, rubble, sandy and muddy habitats. Not known from Gippsland Lakes, although potential habitat may exist. Seagrass mapping during 2007-12 (AME) and 2017-21 (EGCMA) indicate that there is no seagrass within the dredged channel areas. Long-term monitoring (2011-18) of turbidity levels demonstrate that dredging activities have remained well within the turbidity compliance limit of 25 NTU suggesting minimal, localised increases in suspended sediments (Swash, 2019). In any event, the impact of any plume is likely to be minimal as studies have indicated that there are few benthic organisms in the area and no threatened species (AME, 2007; AME, 2008; AME, 2009; AME, 2012).
									Low	Increased suspended sediments – clogging of gills	
									Low	Increased suspended sediments – seagrass	
66284	<i>Vanacampus phillipi</i>	Port Phillip Pipefish				Listed		May	Low	Removal of seabed - seagrass	Inhabits shallow seagrass and macroalgal beds in estuaries and other quiet, silty, clear-water areas. Seagrass beds in the Gippsland Lakes are likely to provide habitat for this species. Seagrass mapping during 2007-12 (AME) and 2017-21 (EGCMA) indicate that there is no seagrass within the dredged channel areas. Long-term monitoring (2011-18) of turbidity levels demonstrate that dredging activities have remained well within the turbidity compliance limit of 25 NTU suggesting minimal, localised increases in suspended sediments (Swash, 2019). In any event, the impact of any plume is likely to be minimal as studies have indicated that there are few benthic organisms in the area and no threatened species (AME, 2007; AME, 2008; AME, 2009; AME, 2012).
									Low	Increased suspended sediments – clogging of gills	
									Low	Increased suspended sediments – seagrass	
66285	<i>Vanacampus poecilolaemus</i>	Longsnout Pipefish, Australian Longsnout Pipefish, Long-snouted Pipefish				Listed		May	Low	Removal of seabed - seagrass	Inhabits shallow seagrass and macroalgal beds in estuaries and other quiet, silty, clear-water areas. Seagrass beds in the Gippsland Lakes are likely to provide habitat for this species. Seagrass mapping during 2007-12 (AME) and 2017-21 (EGCMA) indicate that there is no seagrass within the dredged channel areas. Long-term monitoring (2011-18) of turbidity levels demonstrate that dredging activities have remained well within the turbidity compliance limit of 25 NTU suggesting minimal, localised increases in suspended sediments (Swash, 2019). In any event, the impact of any plume is likely to be minimal as studies have indicated that there are few benthic organisms in the area and no threatened species (AME, 2007; AME, 2008; AME, 2009; AME, 2012).
									Low	Increased suspended sediments – clogging of gills	
									Low	Increased suspended sediments – seagrass	

FROGS

Species ID	Scientific Name	Common Name	Threat Category	Migratory Status	Migratory Category	Marine Status	Cetacean Status	PMST Simple Presence	Residual Risk	Potential Impacts	Comments
1973	<i>Heleioporus australiacus</i>	Giant Burrowing Frog	Vulnerable					Likely	Low	Altered hydrodynamic processes resulting in increased tides and salinity.	Occurs in areas of native vegetation and can be found in heath, woodland and open dry sclerophyll forest. Species may inhabit areas fringing the Gippsland Lakes. The change in the volume capacity due to dredging is very small in the context of the overall channel and is much smaller than the natural change experienced in response to changes in catchment flows. Hence, dredging has little effect on the tidal volume passing through the channels. Furthermore, the mixing and salinity regime is mostly influenced by “longer ocean level changes, such as due to storm effects over several days” and “catchment flows, which during floods can push the salt water out of the system, or during droughts can experience salt-water intrusion far deeper into the lakes and estuaries” (Water Technology, 2022).
1870	<i>Litoria aurea</i>	Green and Golden Bell Frog	Vulnerable					Likely	Low	Altered hydrodynamic processes resulting in increased tides and salinity.	Prefers permanent or ephemeral waterbodies. Utilises coastal swamps, marshes, dune swales, lagoons, lakes and other estuary wetlands and also riverine floodplain wetland and billabongs. Species may inhabit fringing wetlands of the Gippsland Lakes. The change in the volume capacity due to dredging is very small in the context of the overall channel and is much smaller than the natural change experienced in response to changes in catchment flows. Hence, dredging has little effect on the tidal volume passing through the channels. Furthermore, the mixing and salinity regime is mostly influenced by “longer ocean level changes, such as due to storm effects over several days” and “catchment flows, which during floods can push the salt water out of the system, or during droughts can experience salt-water intrusion far deeper into the lakes and estuaries” (Water Technology, 2022).
1828	<i>Litoria raniformis</i>	Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog	Vulnerable					Likely	Low	Altered hydrodynamic processes resulting in increased tides and salinity.	Found mostly amongst emergent vegetation in or at the edges of still or slow-flowing waterbodies such as lagoons, swamps, lakes, ponds and farm dams. Species may inhabit fringing wetlands of the Gippsland Lakes. The change in the volume capacity due to dredging is very small in the context of the overall channel and is much smaller than the natural change experienced in response to changes in catchment flows. Hence, dredging has little effect on the tidal volume passing through the channels. Furthermore, the mixing and salinity regime is mostly influenced by “longer ocean level changes, such as due to storm effects over several days” and “catchment flows, which during floods can push the salt water out of the system, or during droughts can experience salt-water intrusion far deeper into the lakes and estuaries” (Water Technology, 2022).
MAMMALS											
20	<i>Arctocephalus forsteri</i>	Long-nosed Fur-seal, New Zealand Fur-seal				Listed		May	Nil	No plausible impact pathway	No records on the VBA from past 25 years within 5km of the Entrance. Rarely occur in the vicinity of the Gippsland Lakes.
21	<i>Arctocephalus pusillus</i>	Australian Fur-seal, Australo-African Fur-seal				Listed		May	Low	Underwater noise.	Seven records on the VBA from past 25 years within 5km of the Entrance. Noise monitoring and modelling conducted for the Port of Melbourne Channel Deepening Project for a much larger TSHD (i.e. 35,000m ³ compared to TSHD Tommy Norton 650m ³) indicated that underwater noise from dredging operations would have no impact on marine fauna in Port Phillip Bay (PoMC 2008). Although not tested, it is expected that underwater noise levels of the smaller TSHD will be less and potentially not detectable above background noise levels.

Species ID	Scientific Name	Common Name	Threat Category	Migratory Status	Migratory Category	Marine Status	Cetacean Status	PMST Simple Presence	Residual Risk	Potential Impacts	Comments
33	<i>Balaenoptera acutorostrata</i>	Minke Whale					Cetacean	May	Nil	No plausible impact pathway	Species may occur along the coast of the Ninety Mile Beach. Cetacean monitoring and protocols are in place to minimise impact to all cetaceans, including cessation of works when sighted.
36	<i>Balaenoptera musculus</i>	Blue Whale	Endangered	Migratory	Migratory Marine Species		Cetacean	Likely	Nil	No plausible impact pathway	Species may occur along the coast of the Ninety Mile Beach. Cetacean monitoring and protocols are in place to minimise impact to all cetaceans, including cessation of works when sighted.
39	<i>Caperea marginata</i>	Pygmy Right Whale		Migratory	Migratory Marine Species		Cetacean	Likely	Nil	No plausible impact pathway	Species unlikely to occur along the coast of the Ninety Mile Beach. Cetacean monitoring and protocols are in place to minimise impact to all cetaceans, including cessation of works when sighted.
75184	<i>Dasyurus maculatus maculatus (SE mainland population)</i>	Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population)	Endangered					Likely	Nil	No plausible impact pathway	Terrestrial species - habitat does not exist in the GLOA study area.
60	<i>Delphinus delphis</i>	Common Dolphin, Short-beaked Common Dolphin					Cetacean	May	Low	Underwater noise.	Species known to occur along the coast and within the Gippsland Lakes. Noise monitoring and modelling conducted for the Port of Melbourne Channel Deepening Project for a much larger TSHD (i.e. 35,000m ³ compared to TSHD Tommy Norton 650m ³) indicated that underwater noise from dredging operations would have no impact on marine fauna in Port Phillip Bay (PoMC 2008). Although not tested, it is expected that underwater noise levels of the smaller TSHD will be less and potentially not detectable above background noise levels.
40	<i>Eubalaena australis</i>	Southern Right Whale	Endangered	Migratory (as <i>Balaena glacialis australis</i>)	Migratory Marine Species		Cetacean	Known	Nil	No plausible impact pathway	Species may occur along the coast of the Ninety Mile Beach. Cetacean monitoring and protocols are in place to minimise impact to all cetaceans, including cessation of works when sighted.
68050	<i>Isodon obesulus obesulus</i>	Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern)	Endangered					May	Nil	No plausible impact pathway	Terrestrial species - habitat does not exist in the GLOA study area.
64	<i>Grampus griseus</i>	Risso's Dolphin, Grampus					Cetacean	May	Low	Underwater noise.	Species has been recorded once on the VBA from past 25 years within 5km of the Entrance. Noise monitoring and modelling conducted for the Port of Melbourne Channel Deepening Project for a much larger TSHD (i.e. 35,000m ³ compared to TSHD Tommy Norton 650m ³) indicated that underwater noise from dredging operations would have no impact on marine fauna in Port Phillip Bay (PoMC 2008). Although not tested, it is expected that underwater noise levels of the smaller TSHD will be less and potentially not detectable above background noise levels.
43	<i>Lagenorhynchus obscurus</i>	Dusky Dolphin		Migratory	Migratory Marine Species		Cetacean	May	Nil	No plausible impact pathway	Species may occur along the coast of the Ninety Mile Beach. Cetacean monitoring and protocols are in place to minimise impact to all cetaceans, including cessation of works when sighted.
38	<i>Megaptera novaeangliae</i>	Humpback Whale	Vulnerable	Migratory	Migratory Marine Species		Cetacean	Known	Nil	No plausible impact pathway	Species may occur along the coast of the Ninety Mile Beach. Cetacean monitoring and protocols are in place to minimise impact to this species, including cessation of works when sighted.
46	<i>Orcinus orca</i>	Killer Whale, Orca		Migratory	Migratory Marine Species		Cetacean	Likely	Nil	No plausible impact pathway	Species may occur along the coast of the Ninety Mile Beach. Cetacean monitoring and protocols are in place to minimise impact to all cetaceans, including cessation of works when sighted.

Species ID	Scientific Name	Common Name	Threat Category	Migratory Status	Migratory Category	Marine Status	Cetacean Status	PMST Simple Presence	Residual Risk	Potential Impacts	Comments
254	<i>Petauroides volans</i>	Greater Glider	Vulnerable					Known	Nil	No plausible impact pathway	Terrestrial species - habitat does not exist in the GLOA study area.
66645	<i>Potorous tridactylus tridactylus</i>	Long-nosed Potoroo (SE Mainland)	Vulnerable					Known	Nil	No plausible impact pathway	Terrestrial species - habitat does not exist in the GLOA study area.
186	<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	Vulnerable					Known	Nil	No plausible impact pathway	Terrestrial species - habitat does not exist in the GLOA study area.
68418	<i>Tursiops aduncus</i>	Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin					Cetacean	Likely	Low	Underwater noise.	Species known to occur along the coast and within the Gippsland Lakes. Noise monitoring and modelling conducted for the Port of Melbourne Channel Deepening Project for a much larger TSHD (i.e. 35,000m ³ compared to TSHD Tommy Norton 650m ³) indicated that underwater noise from dredging operations would have no impact on marine fauna in Port Phillip Bay (PoMC 2008). Although not tested, it is expected that underwater noise levels of the smaller TSHD will be less and potentially not detectable above background noise levels.
68417	<i>Tursiops truncatus s. str.</i>	Bottlenose Dolphin					Cetacean	May	Low	Underwater noise.	Species known to occur along the coast and within the Gippsland Lakes. Noise monitoring and modelling conducted for the Port of Melbourne Channel Deepening Project for a much larger TSHD (i.e. 35,000m ³ compared to TSHD Tommy Norton 650m ³) indicated that underwater noise from dredging operations would have no impact on marine fauna in Port Phillip Bay (PoMC 2008). Although not tested, it is expected that underwater noise levels of the smaller TSHD will be less and potentially not detectable above background noise levels.
PLANTS											
21883	<i>Acacia caerulescens</i>	Limestone Blue Wattle, Buchan Blue, Buchan Blue Wattle	Vulnerable					Known	Nil	No plausible impact pathway	Terrestrial species - habitat does not exist in the GLOA study area.
19215	<i>Amphibromus fluitans</i>	River Swamp Wallaby-grass, Floating Swamp Wallaby-grass	Vulnerable					May	Nil	No plausible impact pathway	Terrestrial species - habitat does not exist in the GLOA study area.
2119	<i>Caladenia tessellata</i>	Thick-lipped Spider-orchid, Daddy Long-legs	Vulnerable					Known	Nil	No plausible impact pathway	Terrestrial species - habitat does not exist in the GLOA study area.
87152	<i>Commersonia prostrata</i>	Dwarf Kerrawang	Endangered					Likely	Nil	No plausible impact pathway	Terrestrial species - habitat does not exist in the GLOA study area.
64886	<i>Dianella amoena</i>	Matted Flax-lily	Endangered					May	Nil	No plausible impact pathway	Terrestrial species - habitat does not exist in the GLOA study area.
13910	<i>Glycine latrobeana</i>	Clover Glycine, Purple Clover	Vulnerable					Known	Nil	No plausible impact pathway	Terrestrial species - habitat does not exist in the GLOA study area.
56510	<i>Pterostylis chlorogramma</i>	Green-striped Greenhood	Vulnerable					Likely	Nil	No plausible impact pathway	Terrestrial species - habitat does not exist in the GLOA study area.
11896	<i>Thelymitra epipactoides</i>	Metallic Sun-orchid	Endangered					Likely	Nil	No plausible impact pathway	Terrestrial species - habitat does not exist in the GLOA study area.
15202	<i>Thesium australe</i>	Austral Toadflax, Toadflax	Vulnerable					May	Nil	No plausible impact pathway	Terrestrial species - habitat does not exist in the GLOA study area.
76215	<i>Xerochrysum palustre</i>	Swamp Everlasting,	Vulnerable					Likely	Nil	No plausible impact pathway	Terrestrial species - habitat does not exist in the GLOA study area.

Species ID	Scientific Name	Common Name	Threat Category	Migratory Status	Migratory Category	Marine Status	Cetacean Status	PMST Simple Presence	Residual Risk	Potential Impacts	Comments
		Swamp Paper Daisy									
REPTILES											
1763	<i>Caretta caretta</i>	Loggerhead Turtle	Endangered	Migratory	Migratory Marine Species	Listed		Likely	Nil	No plausible impact pathway	Tropical marine species unlikely to occur in the Gippsland Lakes region
1765	<i>Chelonia mydas</i>	Green Turtle	Vulnerable	Migratory	Migratory Marine Species	Listed		May	Nil	No plausible impact pathway	Tropical marine species unlikely to occur in the Gippsland Lakes region
1768	<i>Dermochelys coriacea</i>	Leatherback Turtle, Leathery Turtle, Luth	Endangered	Migratory	Migratory Marine Species	Listed		Likely	Nil	No plausible impact pathway	Tropical marine species unlikely to occur in the Gippsland Lakes region
SHARKS											
84108	<i>Carcharhinus longimanus</i>	Oceanic Whitetip Shark		Migratory	Migratory Marine Species			May	Nil	No plausible impact pathway	Marine species that rarely comes close to land. Very unlikely to occur along the coast.
64470	<i>Carcharodon carcharias</i>	White Shark, Great White Shark	Vulnerable	Migratory	Migratory Marine Species			Known	Nil	No plausible impact pathway	Marine species, may occur along the coast.
68453	<i>Galeorhinus galeus</i>	School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark	Conservation Dependent					Likely	Nil	No plausible impact pathway	Marine species, may occur along the coast.
83288	<i>Lamna nasus</i>	Porbeagle, Mackerel Shark		Migratory	Migratory Marine Species			Likely	Nil	No plausible impact pathway	Marine species that rarely comes close to land. Very unlikely to occur along the coast.
66680	<i>Rhincodon typus</i>	Whale Shark	Vulnerable	Migratory	Migratory Marine Species			May	Nil	No plausible impact pathway	Tropical marine species unlikely to occur in the Gippsland Lakes region

Appendix 4. Final audit report – 2017 DoEE (DAWE) Sea Dumping Permit



**Compliance Audit Report
Gippsland Ports Committee of Management Inc
Audited November 2017**

Sea Dumping Permit 2013/2442

Ref. SD2013/2442

Decision Date: 15 December 2009

Final report: 28 November 2017

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1 AUDIT DETAILS

Report Title:	Compliance Audit Report Sea Dumping Permit 2013/2442
Auditee Name:	Gippsland Ports Committee of Management
Sea Dumping Permit	2013/2442
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Date Audit Conducted:	November 2017

2 BACKGROUND

The The Sea Dumping Permit 2013/2442 for Gippsland Ports Committee of Management was issued on 15 October 2013 and included 21 approval conditions. The conditions specified a disposal site for dumping activities, mitigation measures for the protection of marine species, as well as requirements in the instance of environmental risks and incidents.

This is the first compliance audit undertaken of the project under Condition 12 of the approval.

The Sea Dumping Permit is valid until 15 October 2023.

3 AUDIT OBJECTIVE

The audit objective was to assess compliance with 16 of the 21 conditions of Sea Dumping Permit 2013/2442 issued to Gippsland Ports Committee of Management in October 2013.

The scope of the audit included:

- Compliance with mitigation measures for the protection of marine species
- Management of environmental risks and incidents
- Compliance with monitoring and reporting requirements; and
- Record keeping

4 AUDIT FINDINGS

The audit criteria covered 16 conditions of the Sea Dumping Permit, incorporating 31 criteria. The audit determined that Gippsland Ports have demonstrated compliance with all requirements of the examined criteria.

Of the 31 criteria

- 24 criteria were compliant, with one improvement opportunity recommended
- 7 criteria were deemed Not Applicable as they have not been triggered under the approval conditions.

The audit did not identify any instances of Non-Compliance.

Details of the above criteria and audit process are set out in Appendix A.

4.1 Findings

There were no non-compliances identified during the course of the audit.

Conditions six (6) and seven (7) refer to the development and implementation of an approved Long Term Monitoring and Management Plan (LTMMP). At the time the audit was undertaken, Gippsland Ports are undertaking a review of the LTMMP as an update is required due the arrival of a new dredge vessel in September 2017. As the reviewed LTMMP is yet to be submitted and approved by the Department, all LTMMP criteria were assessed for compliance against the 2013 approved LTMMP.

One observation was made, as set out below with regards to the Trailing Suction Hopper Dredging Statistics spreadsheet used to record daily and cumulative dredge totals for each calendar year.

4.2 Observations

01 Data is collected and recorded daily in the TSHD Dredging Spreadsheet. It is noted that the copy of the Spreadsheet provided with the audit documents, has 2013 dates listed under the 2014 tab. This does not compromise the data as each entry corresponds correctly with the 2014 daily running sheets and IMO reports, but it should be corrected to ensure easy comprehension in future.

Gippsland Ports Committee of Management Comment:

The Gippsland Ports management team have reviewed the audit report and note the audit findings. The observation regarding the dates in the TSHD spreadsheet have been corrected.

5 AUDIT PROCESS

The audit commenced in October 2017 and was conducted by a compliance auditor of the Department of the Environment and Energy. The compliance audit was primarily undertaken as a 'desktop review' of documentation and evidence provided by Gippsland Ports, and a review of DoEE files.

A site inspection was not considered necessary to determine compliance with the conditions.

This document provides Gippsland Ports with formal notification of the outcomes of the compliance audit.

The Department acknowledges and appreciates the cooperation and assistance of Mr David Holding and Gippsland Ports Committee of Management during the audit.

6 TERMINOLOGY

The following designations are used to record findings during audits.

Compliance (C)

A rating of 'compliance' is given when the auditee has complied with a condition or element of a condition.

Non-compliance (NC)

A rating of 'non-compliance' is given when the auditee has not met a condition or an element of a condition.

Not applicable (NA)

A rating of 'not applicable' at the time of the audit is given when the condition or element of a condition falls outside the scope of the audit e.g. if an activity has not yet commenced or a requirement has not been triggered.

Undetermined (U)

A rating of 'undetermined' is given when the condition or element of a condition falls inside the scope of the audit but there is insufficient evidence to make a judgment on compliance or non-compliance

Observation (O)

An 'observation' may be made about issues relevant to the protection of a matter of national environmental significance when the issue is not strictly related to compliance or non-compliance with a condition or element of a condition.

7 ATTACHMENTS

Attachment A

- Approval decision Sea Dumping Permit 2013/2442

Attachment B

- Table detailing findings against the audit criteria

8 FINAL REPORT DISTRIBUTION

- Gippsland Ports Committee of Management Inc
- Commonwealth Department of the Environment and Energy

Appendix 5. GLOA Environmental Risk Register v2.3 (review draft 2017)

GLOA Environmental Risk Register (Review draft May2017)

Activity	Stressor	Effect	Supporting evidence	Inherent Risk			Risk treatment (mitigation)	Residual risk		
				Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
Dredging of Wedge Channel Sand Traps	Hydrodynamic processes causing changes in salinity in the Lakes	Changes to ecological character of the Gippsland Lakes Ramsar site	<p>A hydrodynamic modelling assessment (Water Technology, Dec 2012) of the potential impacts of proposed revisions (ie. Sand traps) to the current entrance channel dredge design has been undertaken. The following relative impacts of the different dredge design scenarios were identified from the assessment:</p> <ul style="list-style-type: none"> □ Negligible impacts to the tidal hydrodynamics in terms of water levels, current speeds and directions were identified within the entrance to the Gippsland Lakes between the different dredge design scenarios. Minor changes, including lower currents at deeper dredge locations were observed outside of the entrance. □ The relative impact on the physical rate of exchange of water between Bass Strait and the Gippsland Lakes was determined as negligible between the different dredge design scenarios (with sand traps). 	Rare	Minor	Low	Monitoring of tides and waves at the Entrance.	Rare	Minor	Low
Dredging of the existing channel footprint	Hydrodynamic processes causing scour and erosion	Loss of terrestrial vegetation in areas subject to erosion	Areas that could potentially suffer from erosion do not contain any significant vegetation communities and are considered to be in poor condition with a high proportion of weeds (Ecology Australia 2007).	Unlikely	Minor	Low	Monitoring of foreshore areas and the Ninety Mile Beach to identify any erosion. Ensure dredging is within channel design specifications. Hydrodynamic surveys.	Unlikely	Minor	Low
		Loss of shorebird nesting habitat	The major nesting locations for Fairy Terns (<i>Sterna neris</i>) and Little Terns (<i>Sternula albifrons</i>) within the Gippsland Lakes Ramsar site are at Lake Tyers and Crescent Island (Ecos 2008), which are quite a distance away from the dredging channel and therefore not expected to be impacted by scour or erosion caused by dredging. However, they are also known to nest on Rigby Island (Parks Victoria).	Unlikely	Moderate	Medium	Monitoring of nesting habitat at Rigby Island. Habitat restoration if required in conjunction with DSE and Parks Victoria	Rare	Moderate	Low
Dredging of the existing channel footprint	Hydrodynamic processes causing changes in salinity in the Lakes	Changes to ecological character of the Gippsland Lakes Ramsar site	<p>Dredging has not had any significant effects on hydrodynamic processes at the Entrance. Expert professional opinion sought by Gippsland Ports from consultants GHD and Coastal Engineering Solutions advised that 'the Entrance is the primary "choke" to flow rates in and out of the lakes and conditions in the Entrance have not materially changed. Dredging of the bar and creation of the wedge has certainly opened up the ocean channel, but the Entrance remains as the primary limitation on tidal flows, and additionally, the tidal prism within the Lakes has not changed (GHD 31 January 2011).'</p> <p>The above has been reconfirmed in a more recent report prepared by Water Technology entitled "Review of Hydrodynamic and Salinity Effects Associated with TSHD on the Gippsland Lakes" (August 2011 and updated in December 2012)</p> <p>'The dredging by the <i>April Hamer</i> and the more recent dredging with the TSHD, <i>Pelican</i>, does not have any significant impact on the water exchange between the Gippsland Lakes and the ocean. This is because the control for water flow into and out of the lakes is not the channel through the bar but the trained entrance itself. That is, creating a deeper channel through the bar will not increase the total flow of water into the lakes, because the restriction of the cross-sectional shape at the entrance controls this flow (CES 2010).'</p> <p>Even if hydrodynamic processes were to change, they would be unlikely to significantly increase the salinity of the Lakes or to alter their ecological character. The large attenuation of tide through the Entrance severely restricts tidal exchange between Bass Strait and the Lakes. Modelling by Webster et al. (2001) indicates that even an increase of 150% or decrease of 60% in the channel capacity outside the Entrance would cause a negligible change in salinity in the main basins of the Lakes and a moderate</p>	Rare	Minor	Low	Monitoring of tides and waves at the Entrance.	Rare	Minor	Low

Activity	Stressor	Effect	Supporting evidence	Inherent Risk			Risk treatment (mitigation)	Residual risk		
				Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
			change in salinity in Reeve Channel. By the date of designation as a Ramsar site in 1982, the Gippsland Lakes had been operating as an estuarine system for decades. Salinity is a determinant of the ecological character of the Ramsar site (Ecos 2008) and there is a high degree of natural variation with seasonally variable inflows from the catchment. Any change to salinity that could possibly occur due to the continued dredging of the existing footprint would be within natural variation. 'Changes observed in the salinity concentration of the Gippsland Lakes over recent years can be predominantly attributed to the reduction in freshwater inflows through the inflowing river systems which is associated with lower rainfall conditions and water abstraction. (Water Technology, August 2011)'							
		Changes to fauna (e.g presence of sharks and rays in the upper lakes)	Current salinity in the Lakes during summer reaches 30 ppt (EPA unpublished data). This is within the tolerances of most marine sharks and rays, which are known to be vagrant in fresh and brackish waters (Last 2008).	Rare	Minor	Low	None required	Rare	Minor	Low
Introduction of a new vessel	Translocation of marine pests	Displacement of native species and impacts to commercial and recreational fisheries	The TSHD (and any substitute vessel for the SCD <i>April Hamer</i>) may come from overseas or an Australian environment (such as Port Phillip Bay) which has a high number of introduced marine pests. The consequences of introducing a marine pest to the Gippsland Lakes is dependent on the species that is transported and if it becomes established. However, in this risk assessment a worse case scenario is proposed whereby a pest that has a rapid growth rate and an aggressive / highly competitive nature has been introduced. Should such an invasion occur, there could be near permanent effects to the entire Gippsland Lakes ecosystem.	Unlikely	Major	High	Implementation of Australian Quarantine Inspection Service (AQIS) procedures prior to arrival at Gippsland Lakes including hull inspections prior to the arrival of the vessel. Monitoring of marine environments for presence of introduced marine pests.	Rare	Major	High
Dredge operation (TSHD)	Removal of seabed	Removal of seagrass	AME (2007, 2008, 2009 and 2012) indicates that there is <u>no</u> seagrass within the channel areas to be dredged. The area with the closest seagrass to the existing dredging footprint is Hopetoun Channel where seagrass is some 20 – 30 metres outside the dredging channel boundary. Given that the tolerance (inaccuracy) of the dredge guidance system is less than 30 cm in extreme conditions, this seagrass is not considered to be at risk of being accidentally removed.	Rare	Minor	Low	Periodic monitoring of seagrass communities.	Rare	Minor	Low
		Removal of benthic marine organisms	The material to be dredged is sand recently deposited from marine origins and very low in organic matter (URS 2007 and Geochemical Assessments 2012). Recently settled sand is not likely to contain benthic invertebrate communities in high densities. The benthic fauna in areas within and adjacent to the channels was described by AME (2007) as depauperate in terms of abundance and species diversity.	Unlikely	Insignificant	Low	Ensure dredging is within the channel footprint specifications.	Unlikely	Insignificant	Low
		Disturbs heritage site.	Williams and Dudley (2007) and Helms (2007) did not identify any heritage sites in the channel area (channel has been dredged since 1977 making it almost impossible for heritage items to remain). Material discovered during the 2009 TSHD campaign on the Bar was confirmed to be the shipwreck "The Shark". Heritage Victoria was notified in September 2009. Gippsland Ports was advised there were no significant heritage issues surrounding this shipwreck.	Rare	Moderate	Medium	The long-term channel design highlights the wreck of "The Shark" which is a no-go zone.	Rare	Moderate	Medium
	Suspended sediments	Clogging of gills and effects on filter feeding organisms	The plume created by the TSHD is localised and not likely to persist for longer than 10 minutes after dredging ceases (Evans Consulting in URS 2007). The dredge will operate in overflow mode (where a turbidity plume will occur) for up to 40 minutes in each 3 hour cycle. Therefore a small (<100 metre) plume is expected to occur in the area immediately surrounding the vessel for a period of 50 minutes each 3 hour cycle. Jenkins and McKinnon (2006) indicated that 100 mg/L was a conservative estimate of turbidity likely to affect fish and marine invertebrates (considering effects to more vulnerable juvenile stages). In 2011 and 2012 a total of 46 separate turbidity monitoring events occurred. The maximum	Unlikely	Insignificant	Low	Based on two years of turbidity monitoring results and independent advice it is unlikely turbidity represents a risk to marine life	Unlikely	Insignificant	Low

Activity	Stressor	Effect	Supporting evidence	Inherent Risk			Risk treatment (mitigation)	Residual risk		
				Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
			<p>'dredge effect' in these two years was 14 NTUs with all but three recordings (or 93%) less than 9 NTUs which is well below the 25 NTU limit set under the conditions of Gippsland Ports' Sea Dumping Permit. It is noted that the expected plume from TSHD operations will be smaller, less dense and less persistent than that created by SCD activity. The SCD <i>April Hamer</i> dredged in this area between 1977 and 2011, but is no longer used by Gippsland Ports.</p> <p>In any event, the impact of any plume is likely to be minimal as AME (2007, 2008, 2009 and 2012) indicates that there are few benthic organisms in the area and no threatened species. Furthermore, most species of fish can actively move from the dredge area during dredge operations.</p>							
	Settled sediment	Reduced underwater light resulting in decreased seagrass	AME (2007, 2008, 2009 and 2012) indicates that there is no seagrass in the existing channel footprint, no seagrass in any surrounding area outside the Entrance and little seagrass in the area surrounding the Inner Channels dredging footprint.	Unlikely	Insignificant	Low	Periodic surveys of seagrass extent in areas adjacent to the dredging channel inside the Entrance.	Unlikely	Insignificant	Low
		Reduced visibility impacting on visual feeders and affecting fish migration through the channel	<p>The Australian Grayling migrates from fresh to marine waters as part of its lifecycle, with the return of juveniles to the river in spring (November) the most vulnerable phase (Koehn and O'Connor 1990). Juveniles of similar species have been known to avoid areas with > 25 NTU (AME 2006). In 2011 and 2012 a total of 46 separate turbidity monitoring events occurred. The maximum 'dredge effect' in these two years was 14 NTUs with all but three recordings (or 93%) less than 9 NTUs which is well below the 25 NTU limit set under the conditions of Gippsland Ports' Sea Dumping Permit. It is not known whether the Australian Grayling migrates through the Entrance to Bass Strait, or completes the marine phase of its lifecycle in the estuarine waters of the Lakes (Ecos 2008). However, it is thought that most individuals only spawn once before dying and loss of a cohort would be significant (Backhouse et al. 2008).</p> <p>As above, TSHD is expected to cause a small (<100 metre) plume in the area immediately surrounding the vessel for a period of 50 minutes during each 3 hours of operation; smaller, less dense and less persistent than the plume created by SCD activity. Given that the plume material is almost exclusively sand, it is likely to settle rapidly and residual turbidity should be low.</p> <p>In addition, winter (and early spring) river discharges cause comparatively greater turbidity and visual impact (see imagery from 2007).</p>	Unlikely	Major	High	Based on two years of turbidity monitoring results and independent advice it is unlikely turbidity represents a risk to marine life	Rare	Minor	Low
		Smothers benthic organisms and seagrass	<p>The plume created by the TSHD is localised and expected to occur only in the area immediately surrounding the vessel. As such, settled sediment from the plume will also be localised in distribution. It is not expected to reach areas of seagrass inside the Entrance (which AME (2007, 2008 and 2009) indicates are 20-30 metres away from the dredging channel footprint) in sufficient volumes to cause a measureable impact.</p> <p>AME (2007, 2008, 2009 and 2012) also indicates that benthic organism density is low, and that there are no threatened species in the area to be dredged.</p>	Unlikely	Insignificant	Low	Ensure dredging is within the channel footprint.	Unlikely	Insignificant	Low
	Release of nutrients	Increased primary productivity and algal blooms	The material to be dredged is almost 100% medium to medium-coarse sand of oceanic origin and low in organic material (URS 2007). The sand of the Bar is being re-worked continually by wave and current forces and has negligible organic content other than occasional kelp washed off the seabed (Coastal Engineering Solutions, 2005). As such, a significant increase in nutrient concentrations from sediment disturbance by dredging is not expected to occur.	Unlikely	Insignificant	Low	Monitor water quality periodically.	Unlikely	Insignificant	Low
	Release of toxicants	Impacts on fauna health	Toxicants could be released from the material disturbed during dredging. However, the material to be dredged contains very low levels (mostly below detection limits) of contaminants and all samples were within NODG guidelines (URS 2007). It is therefore unlikely that any fauna will be affected by contaminants.	Rare	Minor	Low	None required	Rare	Minor	Low

Activity	Stressor	Effect	Supporting evidence	Inherent Risk			Risk treatment (mitigation)	Residual risk		
				Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
			A single sample contained TBT at NODG screening levels and so the assessment of consequence was made on the basis of the effects of TBT to organisms in the immediate vicinity of dredging. TBT is known to cause imposex (masculinity of females) in marine molluscs and toxicity in other organisms (Terlizzi et al 2001). However, there are few benthic organisms in the vicinity of the dredge and no habitat for snails in the zone of influence. It is possible that some individuals, however, could be affected if TBT were to be released from the sediment.							
	Underwater noise	Affects marine organisms including marine mammals	Although there are no specific measurements of underwater noise for the 750 - 1250 m ³ hopper capacity TSHD, noise monitoring and modelling conducted for the Port of Melbourne Channel Deepening Project for a much larger TSHD indicated underwater noise from the operation of the dredge would have no impact on marine fauna in Port Phillip Bay (PoMC 2008). It is expected that noise levels from the smaller TSHD included in this proposal will be less than that of the 35,000m ³ hopper capacity TSHD used in Port Phillip Bay and potentially not detectable above background noise levels.	Rare	Minor	Low	None required	Rare	Minor	Low
	Airborne noise	Airborne noise affects terrestrial fauna (including nesting birds and migratory shorebirds)	Although there are no specific measurements of airborne noise for the 750 - 1250 m ³ TSHD, noise monitoring and modelling conducted for the Port of Melbourne Channel Deepening Project for a much larger 35,000 m ³ TSHD (Queen of the Netherlands) indicated airborne noise from the operation of the dredge was approximately 100 decibels at 100 m from the vessel (Bassett 2006). The airborne noise from the significantly smaller vessel is expected to be much less. Although there are no background noise levels for Gippsland Ports, measurements from commensurate port areas are typically 45 – 50 decibels during the day and fishing vessels are in the order of 55 decibels at 100m distance (SVT Engineering 2004). Airborne noise has the potential to impact on nesting and migratory shorebirds and studies have shown that an average “flight” response occurs in shorebirds exposed to 85 decibels (Brown 1990). A study by Burger et al. (1998) indicated that a 100m buffer from operating vessels would protect shorebird values. Fairy Tern (<i>Sterna neris</i>) and Little Tern (<i>Sternula albifrons</i>) are known to nest on Rigby Island (Parks Victoria) although the major nesting locations within the Gippsland Lakes Ramsar site are at Lake Tyers and Bunga Arm (Ecos 2008). Migratory shorebird key habitats are over 30 km away from the dredging footprint (Ecos 2008).	Unlikely	Moderate	Medium	Gippsland Ports has defined a 100 m wide buffer zone around the traditional and potential future small tern (Little Terns and Fairy Terns) nesting area at the south-eastern corner of Rigby Island (Rigby Island Buffer Zone). Gippsland Ports will restrict dredging within this zone to the period outside the nesting season of small terns, (i.e. only allow dredging within the period of April through to September inclusive).	Rare	Minor	Low
		Affects people (residents)	Lakes Entrance is a working regional port and measures from commensurate port areas are typically 40-50 decibels during the day and fishing vessels in the order of 55 decibels at 100m distance (SVT Engineering 2004). .No complaints were received from residents during the 2008 - 2012 dredging campaigns using the TSHD Pelican (Gippsland Ports pers. comm.)	Unlikely	Minor	Low	Ensure dredging is within channel design specifications.	Unlikely	Minor	Low
	Lighting at night	Affects birds	Marine and wading bird species are attracted to artificial light, which has the potential to disrupt migratory shorebirds (Gauthreaux and Belser 2006) and affect feeding patterns of night foragers (Montevecchi 2006). However, there is also evidence to suggest that artificial lighting in coastal and estuarine areas increases feeding success of night foragers (Santos et al. 2010). When dredging at night, there are lights on the vessel that can be seen from the shoreline. However, the dredge operates in areas with other light sources and is unlikely to result in increased ambient light levels.	Unlikely	Minor	Low	None required.	Unlikely	Minor	Low
	Visual amenity	Impacts recreational users and residents	It is possible that some members of the community will consider the operating dredge an “eye-sore”. Therefore there is the capacity for visual amenity to be impaired. However, there were no such complaints during previous dredge campaigns from 2008 to 2012, and Gippsland Ports has been operating dredges continuously since 1977.	Unlikely	Minor	Low	None required.	Unlikely	Minor	Low

Activity	Stressor	Effect	Supporting evidence	Inherent Risk			Risk treatment (mitigation)	Residual risk		
				Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
	Exhaust	Impacts on the health of people and / or fauna	Exhaust from the operating dredge is not dissimilar to other operating vessels and given the prevailing winds, will not result in a significant impact on air quality. There are strict International noxious gas emission controls with which vessels must comply.	Rare	Minor	Low	Ensure vessel complies with legislative specifications.	Rare	Minor	Low
	Dredge collides with whales	Impacts whale ability to continue on migration route	Whales are sighted periodically off-shore from Lakes Entrance during the known migration period. Dredging has been undertaken at this location over many years with no reported collisions.	Unlikely	Minor	Low	Ensure vessel complies with management requirements including surveillance and reporting outlined in the GLOA EMP, and legislative requirements.	Unlikely	Minor	Low
Dredge operation (cutter suction dredge)	Removal of seabed	Removal of seagrass	AME (2007, 2008, 2009 and 2012) indicate that there is <u>no</u> seagrass within the channel areas to be dredged. The area with the closest seagrass to the existing dredging footprint is Hopetoun Channel where seagrass is some 20 – 30 metres outside the channel boundary. Given that the tolerances (inaccuracy) of the dredge guidance system is less than 30 cm in extreme conditions, this seagrass is not considered to be at risk of being accidentally removed.	Rare	Minor	Low	Ensure dredging is within dredging channel footprint. Hydrographical surveys.	Rare	Minor	Low
		Removal of benthic marine organisms	The material to be dredged is sand recently deposited from marine origins and very low in organic matter (URS 2007). Recently settled sand is not likely to contain benthic invertebrate communities in high densities. The benthic fauna in areas within and adjacent to the channels was described by AME (2007) as depauperate in terms of abundance and species diversity.	Unlikely	Insignificant	Low	Ensure dredging is within the channel footprint specifications.	Unlikely	Insignificant	Low
		Disturbs heritage site	Williams and Dudley (2007) and Helms (2007) did not identify any heritage sites in the channel area (channel has been dredged since 1977 making it almost impossible for heritage items to remain).	Rare	Moderate	Medium	Ensure dredging is within dredging channel footprint. Hydrographical surveys.	Rare	Moderate	Medium
	Suspended sediments	Clogging of gills and effects on filter feeding organisms	The plume created by the cutter suction dredge is smaller than that of the TSHD and not visible on the surface of the water. Jenkins and McKinnon (2006) indicated that 100 mg/L was a conservative estimate of turbidity likely to affect fish and marine invertebrates (considering effects to more vulnerable juvenile stages). It is unlikely that the cutter suction dredge will result in suspended solids in this concentration. In any event, the impact of any plume is likely to be minimal as AME (2007, 2008, 2009 and 2012) indicates that there are few benthic organisms in the area and no threatened species. Furthermore, most species of fish can actively move from the dredge area during dredge operations. The CSD <i>Kalimna</i> has been operating at Lakes Entrance since July 2007 and there is no evidence to date of environmental impacts from suspended sediments.	Rare	Insignificant	Low	None required. Based on two years of TSHD turbidity monitoring results and independent advice it is unlikely turbidity represents a risk to marine life	Rare	Insignificant	Low
		Reduced underwater light resulting in decreased seagrass	The plume created by the cutter suction dredge is smaller than that of the TSHD and not visible on the surface of the water. AME (2007, 2008, 2009 and 2012) indicates that there is little seagrass in the area surrounding the dredge operations. The CSD <i>Kalimna</i> has been operating at Lakes Entrance since July 2007 and there is no evidence to date of environmental impacts from suspended sediments.	Rare	Insignificant	Low	None required. Based on two years of TSHD turbidity monitoring results and independent advice it is unlikely turbidity represents a risk to marine life Periodic surveys of seagrass extent in areas adjacent to channel.	Rare	Insignificant	Low
		Reduced visibility impacting on visual feeders and affecting fish migration	The plume created by the cutter suction dredge is smaller than that of the TSHD and not visible on the surface of the water. It is not possible that the operation of this dredge will affect visual feeders or fish migration.				Not applicable			
Settled sediment	Smothers benthic organisms and seagrass	The cutter suction dredge operates by removing the sediment by suction – there is no disposal or release of material in the process.				Not applicable				

Activity	Stressor	Effect	Supporting evidence	Inherent Risk			Risk treatment (mitigation)	Residual risk		
				Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
	Release of nutrients	Increased primary productivity and algal blooms	The material to be dredged is almost 100% medium to medium-coarse sand of oceanic origin and low in organic material (URS 2007). The CSD creates minimal disturbance and little or no plume. As such, a detectable increase in nutrient concentrations from sediment disturbance is not expected to occur.	Rare	Insignificant	Low	Periodically monitor water quality	Rare	Insignificant	Low
	Release of toxicants	Impacts on fauna health	The material to be dredged contains very low levels (mostly below detection limits) of contaminants and all samples were within NODG guidelines (URS 2007 and Geochemical Assessments 2012). The CSD creates minimal disturbance and little or no plume. As such, a detectable increase in contaminants is not expected to occur.	Rare	Minor	Low	None required	Rare	Minor	Low
	Underwater noise	Affects marine organisms including marine mammals	There are no measures of the noise levels from the operating cutter suction dredge. However, they are likely to be similar to other forms of shipping and would not be expected to have a measurable impact.	Rare	Minor	Low		Rare	Minor	Low
	Airborne noise	Affects terrestrial fauna (including nesting birds and migratory shorebirds)	There are no measures of the noise levels from the operating cutter suction dredge. However, they are likely to be similar to other forms of shipping and would not be expected to have a measurable impact. As per above for TSHD operations, airborne noise from CSD operations has the potential to impact on nesting and migratory shorebirds, including the known Fairy Tern and Little Tern nesting site on Rigby Island.	Rare	Minor	Low	Maintain 100 m buffer from Rigby Island during nesting season.	Rare	Minor	Low
	Dredge translocates introduced marine pests	Displacing native species; impacting on commercial and recreational fisheries.	Dredge is resident at the site and as such this is not a plausible pathway.	Not applicable						
Dredge operation (side casting dredge)	Removal of seabed	Removal of seagrass	AME (2007, 2008, 2009 and 2012) indicates that there is <u>no</u> seagrass within the channel areas to be dredged. The area with the closest seagrass to the existing dredging footprint is Hopetoun Channel where seagrass is some 20 – 30 metres outside the dredging channel boundary. Given that the tolerance (inaccuracy) of the dredge guidance system is less than 30 cm in extreme conditions, this seagrass is not considered to be at risk of being accidentally removed.	Rare	Minor	Low	None required	Rare	Minor	Low
		Removal of benthic marine organisms	The material to be dredged is sand recently deposited from marine origins and very low in organic matter (URS 2007). The benthic fauna in areas within and adjacent to the dredging channels was described by AME (2007) as depauperate in terms of abundance and species diversity.	Unlikely	Negligible	Low	Ensure dredging is within the dredging channel footprint.	Unlikely	Negligible	Low
	Disturbs heritage site	Williams and Dudley (2007) and Helms (2007) indicate no heritage sites in the channel area (channel has been dredged since 1880s making it almost impossible for heritage items to remain). Material discovered during the 2009 TSHD campaign on the Bar was confirmed to be the shipwreck "The Shark". Heritage Victoria was notified in September 2009. Gippsland Ports was advised there were no significant heritage issues surrounding this shipwreck.	Rare	Moderate	Medium	The long-term channel design highlights the wreck of "The Shark" which is a no-go zone.	Rare	Moderate	Medium	
	Suspended sediments	Clogging of gills and effects on filter feeding organisms	The plume created by the SCD is larger and more persistent than that of the TSHD. The SCD operates by constantly discharging material to the sides of the channel and so a plume is present during all times of operation. Jenkins and McKinnon (2006) indicated that 100 mg/L was a conservative estimate of turbidity likely to affect fish and marine invertebrates (considering effects to more vulnerable juvenile stages). It is not known if the plume from the SCD will result in suspended solids above this level, but it is more likely than for the TSHD. In addition the area covered and the length of time the plume is within the channel is greater. Despite this uncertainty and resultant risk, the impact of the plume is likely to be minimal as AME (2007, 2008, 2009 and 2012) indicates that there are few benthic organisms in the area and no threatened species. Furthermore, most species of fish can actively move from the dredge area during dredge operations.	Possible	Negligible	Low	Monitoring of turbidity around the SCD to determine extent and intensity of the plume.	Moderate	Negligible	Low

Activity	Stressor	Effect	Supporting evidence	Inherent Risk			Risk treatment (mitigation)	Residual risk		
				Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
		Reduces underwater light resulting in decreased seagrass	AME (2007, 2008, 2009 and 2012) indicates that there is <u>no</u> seagrass in the existing dredging channel footprint outside the Entrance, or in the areas surrounding that dredging footprint.	Possible	Negligible	Low	None required.	Moderate	Negligible	Low
		Reduced visibility impacting on visual feeders and affecting fish migration through the channel	The plume created by the side casting dredge is larger and more persistent than that of the TSHD. The side casting dredge operates by constantly discharging material to the sides of the channel and so a plume is present during all times of operation. The Australian Grayling migrates from fresh to marine waters as part of its lifecycle, with the return of juveniles to the river in spring (November) the most vulnerable phase (Koehn and O'Connor 1990). Juveniles of similar species have been known to avoid areas with > 25 NTU (AME 2006). It is not known whether the Australian Grayling migrates through the channel to Bass Strait, or completes the marine phase of its lifecycle in the estuarine waters of the Lakes (Ecos 2007). However, it is thought that most individuals only spawn once before dying and loss of a cohort would be significant (Backhouse et al. 2008). The extent and intensity of the plume that will be produced by the SCD is unknown, but given that the material is almost exclusively sand, it is likely to settle rapidly and residual turbidity should be low. In addition, winter (and early spring) river discharges cause comparatively greater turbidity and visual impact (see imagery from 2007).	Possible	Major	Extreme	Alternative dredging technology (TSHD) with a reduced plume to be used when possible, with side-casting dredging use limited to circumstances when a TSHD is not available or cannot be used. Monitoring of turbidity around the dredge to determine extent and intensity of the plume. For, Australian Grayling, which may rely on the Entrance as juveniles for return migration in Spring and turbidity monitoring to ensure migratory routes remain open should dredging occur at that time.	Rare	Minor	Low
	Settled sediment	Smothers benthic organisms and seagrass	The plume created by the SCD is significantly larger than that of the TSHD and material pushed sideways by the SCD deposits in the areas adjacent to the dredging channel footprint. However, the settled sediment is likely to have minimal impact given there is no seagrass in the dredging channel footprint outside the Entrance or the area surrounding the footprint, few benthic organisms in the area and no threatened species (AME 2007, 2008, 2009 and 2012)	Possible	Negligible	Low	Monitoring of turbidity around the SCD to determine extent and intensity of the plume. Ensure dredging occurs within the dredging channel footprint. Hydrodynamic surveys.	Moderate	Negligible	Low
	Release of nutrients	Increased primary productivity and algal blooms	The material to be dredged is almost 100% medium to medium-coarse sand of oceanic origin and low in organic material (URS 2007). The sand of the Bar is being re-worked continually by wave and current forces and has negligible organic content other than occasional kelp washed off the seabed (Coastal Engineering Solutions, 2005). As such, a significant increase in nutrient concentrations from sediment disturbance by dredging is not expected to occur.	Unlikely	Negligible	Low	Measure water quality periodically.	Unlikely	Negligible	Low
	Release of toxicants	Impacts on fauna health	Toxicants could be released from the material disturbed during dredging. However, the material to be dredged contains very low levels (mostly below detection limits) of contaminants and all samples were within NODG guidelines (URS 2007). It is therefore unlikely that any fauna will be affected by contaminants.	Rare	Minor	Low	None required	Rare	Minor	Low
	Underwater noise	Affects marine organisms including marine mammals	There are no measures of the noise levels from the operating SCD. However, they are likely to be similar to other forms of shipping and not expected to have a measureable impact.	Rare	Minor	Low	None required.	Rare	Minor	Low
	Airborne noise	Affects terrestrial fauna (including nesting birds and migratory shorebirds)	There are no measures of the noise levels from the operating SCD. However, they are likely to be similar to other forms of shipping and not expected to have a measureable impact. Airborne noise has the potential to impact on nesting and migratory shorebirds. However, none of the major nesting locations are in the immediate vicinity of SCD operations outside Lakes Entrance and impact on nesting and migratory shorebirds by airborne noise is considered unlikely. Furthermore, a SCD has been operating in the area for more than 30 years and no impact from airborne noise has been recorded during that time.	Unlikely	Moderate	Medium	Gippsland Ports has defined a 100 m wide buffer zone around the historical and potential future small tern (Little Terns and Fairy Terns) nesting area at the south-eastern corner of Rigby Island (Rigby Island Buffer Zone Figure 23). Gippsland Ports will restrict dredging within this zone to the period outside the nesting season of small terns, that is, to only allow dredging within the period April through to September inclusive.	Rare	Minor	Low

Activity	Stressor	Effect	Supporting evidence	Inherent Risk			Risk treatment (mitigation)	Residual risk		
				Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
	Dredge collides with whales	Impacts whale ability to continue on migration route	Whales are sighted periodically off-shore from Lakes Entrance during the known migration period. Dredging has been undertaken at this location over many years with no reported collisions.	Unlikely	Minor	Low	Ensure vessel complies with management requirements including surveillance and reporting outlined in the GLOA EMP, and legislative requirements.	Unlikely	Minor	Low
	Dredge translocates introduced marine pests	Displacing native species and impacting on commercial and recreational fisheries.	Dredge is resident at the site and as such this is not a plausible pathway. Refer to risk 'Introduction of a new vessel' if non-resident SCD to be used.	Not applicable						
Disposal of dredged material in the DMG footprint (TSHD)	Dredge collides with whales	Impacts whale ability to continue on migration route		Unlikely	Minor	Low	Ensure vessel complies with management requirements including surveillance and reporting outlined in the GLOA EMP, and legislative requirements.	Unlikely	Minor	Low
	Placement of material	Beach profile changes affecting native vegetation and nesting shorebirds	Coastal Engineering Solutions (2005) predicted that there would be no impact to hydrodynamic processes from the use of DMGs along the coast. Monitoring during the trial dredging campaigns in 2009 - 2010 (GHD) indicated that the Ninety Mile Beach is highly dynamic and experiences a high degree of natural variability. Changes observed during the trial TSHD period were within the scope of natural variation. In any event, there are no significant vegetation communities or threatened flora within the beach areas (Ecology Australia 2007). Hooded Plover nest along the ocean side of the beach of Boole Poole Peninsula but are not known to nest in the areas that could be impacted by the disposal of dredged material in the DMG footprint.	Unlikely	Minor	Low	Visual assessment of beaches and shorelines to ensure no changes to shoreline in excess of natural variation.	Unlikely	Minor	Low
	Build-up of DMG profile		Periodic bathymetric surveys are undertaken on both DMGs. Dispersion of disposed dredged material is monitored on an ongoing basis.	Unlikely	Minor	Low	DMG profile to be monitored annually	Unlikely	Minor	Low
	Smothers benthic organisms		AME (2007) indicates there are few benthic organisms in the area of the DMG footprint and no threatened species. Smothering of the few benthic organisms in the DMG area is likely to cause only insignificant impacts to the ecosystem.	Likely	Insignificant	Medium	Ensure disposal of dredge material is placed within the DMG footprint. Monitoring of dispersal.	Likely	Insignificant	Medium
	Impacts heritage site		As the actions at the DMGs only serve to place sediment (rather than disturb the seabed) – this was not considered a plausible pathway for impact to a heritage site.	Not applicable						
	Release of nutrients and increased phytoplankton production (algal bloom)		The material to be dredged is almost 100% medium to medium-coarse sand of oceanic origin and low in organic material (URS 2007). In addition, the DMG is located in the open coast where dilution is high and conditions are turbulent. No detectable increase in nutrient concentrations is expected. As such this was not considered a plausible impact pathway.	Not applicable						
	Release of toxicants impacting the health of marine fauna		As per the above (the material to be placed at the DMGs is the same as that dredged from the channel footprint). Toxicants could be released from the material disturbed during dredging. However, the material to be dredged contains very low levels (mostly below detection limits) of contaminants and all samples were within NODG guidelines (URS 2007 and Geochemical Assessments 2012). It is therefore unlikely that any fauna will be affected by contaminants.	Rare	Minor	Low	Measure water quality periodically.	Rare	Minor	Low
	Creates habitat for marine pests		The material to be placed at the DMGs is of marine origin and almost 100 % sand (URS 2007). It is similar in composition to the existing seabed and new habitat is not expected to be formed.	Rare	Major	High	Periodic monitoring for early detection of marine pests and implementation of management protocols if necessary.	Rare	Moderate	Medium

Activity	Stressor	Effect	Supporting evidence	Inherent Risk			Risk treatment (mitigation)	Residual risk		
				Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
	Suspended sediment	Clogging of gills and effects on filter feeding organisms	It is expected that any plume created by the placement of dredged material in the DMG footprint will be relatively small and localised. AME (2007, 2008, 2009 and 2012) indicates there are few benthic organisms in the area and no threatened species. Most species of fish can actively move from the DMG during disposal operations. The impact of suspended sediment is expected to be minimal.	Unlikely	Insignificant	Low	Periodic visual monitoring of dredge disposal to determine extent and duration of plume.	Unlikely	Insignificant	Low
		Reduced underwater light resulting in decreased primary productivity	AME (2007) indicates there is no seagrass in the footprint of the DMGs and no significant benthic communities. Decreased light may result in a decline in primary production of microphytobenthos but the effects will be localised and not significant to ecosystem function.	Unlikely	Insignificant	Low	Periodic visual monitoring of dredge disposal to determine extent and duration of plume.	Unlikely	Insignificant	Low
		Reduces visibility impacting on visual feeders and affecting fish migration	The plume from material placement at the DMG is expected to be relatively small and as the material is almost exclusively sand, it is not expected to persist. There are no significant species in the area of influence (AME 2007) and fish species can move to avoid area during dumping.	Rare	Minor	Low	Periodic visual monitoring of dredge disposal to determine extent and duration of plume.	Rare	Minor	Low
Disposal of dredged material onshore	Placement of material	Beach profile changes affecting native vegetation and nesting shorebirds	May be required by Gippsland Ports or external agencies such as Parks Victoria or DSE. Subsequently this is seen more as a potential benefit than a risk. There is considerable vegetation being lost due to erosion of banks on Boole Poole and Rigby Island. The major nesting locations for Fairy Terns (<i>Sterna neris</i>) and Little Terns (<i>Sternula albifrons</i>) within the Gippsland Lakes Ramsar site are at Lake Tyers and Crescent Island (Ecos 2008), however, they are also known to nest on Rigby Island (Parks Victoria).	Unlikely	Minor	Low	Consultation and approval required from relevant land manager. Material placement to occur outside of known nesting periods.	Unlikely	Minor	Low
		Impacts heritage site	As this action only serves to place sediment (rather than remove) – this was not considered a plausible pathway for impact to a heritage site.	Not applicable						
Vessel management	Waste disposal from vessel	Results in negative impacts to marine fauna (e.g. solid waste such as plastics, liquid wastes such as sewage)	Not expected to be significantly different from current operation of vessels in the Port area. Gippsland Ports' assessment of the risk associated with other vessel operations (2007, within the endorsed management plan) has been adopted here.	Unlikely	Minor	Low	Implementation of standard waste control measures. Regular auditing for compliance.	Unlikely	Minor	Low
	Oil spill	Impacts marine organisms	Gippsland Ports has an oil spill response plan developed in conjunction with TSV and AMSA. There have been no oil spill incidents emanating from any of Gippsland Ports dredging activities since oil pollution records have been kept. Further, any dredges operated by Gippsland Ports (including contracted dredges) are subject to extremely strict International rules and regulation covering the bunkering, storing and transfer of oils and fuels from ashore and within the vessels.	Rare	Major	High	Implementation of oil spill response plan and auditing of vessels to ensure compliance with regulations.	Rare	Minor	Medium
Sand transfer station	Increase in suspended solids	Impacts marine fauna	The sand transfer process discharges to the surf zone, where ambient suspended sediments from wave action is high. The discharge does not cause suspended sediments to increase beyond natural background levels.	Unlikely	Insignificant	Low	Ensure that discharge occurs into surf zone.	Unlikely	Insignificant	Low
	Airborne noise	Affects terrestrial fauna (including nesting birds and migratory shorebirds)	There are no measures of the noise levels from the operating Sand Transfer Station. However, it operates at some distance from known roosting and nesting sites for shorebirds and it is highly unlikely that noise could be detected above background levels.	Rare	Minor	Low	Ensure that Sand Transfer Station operates within compliance.	Rare	Minor	Low
	Lighting at night	Affects birds	Marine and wading bird species are attracted to artificial light, which has the potential to disrupt migratory shorebirds (Gauthreaux and Belser 2006) and affect feeding patterns of night foragers (Montevecchi 2006). However, there is also evidence to suggest that artificial lighting in coastal and estuary areas increases feeding success of night foragers (Santos et al. 2010). When operating at night, there are lights at the transfer station that are visible. However, the lights are not significantly different from those from	Unlikely	Minor	Low	Compliance with standard operation procedures.	Unlikely	Minor	Low

Activity	Stressor	Effect	Supporting evidence	Inherent Risk			Risk treatment (mitigation)	Residual risk		
				Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
			other sources in the nearby town of Lakes Entrance and are unlikely to result in increased ambient light levels.							
	Pipeline maintenance	Disturbs nesting shorebirds	The Hooded Plover population for Victoria is considered to be about 600 individuals and approximately 50% of the population breeds along the coast between Warrnambool and the South Australian border (DSE 2003). They are considered to occur along the Ninety-Mile Beach in a density of 1 bird per kilometre, and two pairs have been recorded nesting along the Bunga Arm in the Gippsland Lakes (Ecos 2008). It is considered that they may breed in the dunes along the Boole Poole Peninsula, although confirmed records are not available. Hooded Plover nest in the narrow fringe between vegetated dunes and the high water mark. This narrow habitat makes them vulnerable to habitat alterations and morphological changes to the beach (Birds Australia 2010). The breeding season extends from August to March and during this time, adults and young are vulnerable to disturbance by people and noise (Birds Australia 2010).	Possible	Moderate	High	Birds Australia has developed a protocol to detect and protect Hooded Plover beach nesting sites for Gippsland Ports (Birds Australia 2011). Implementation of this program includes surveys for nests during the breeding season and implementation of a 300 m buffer around nesting sites.	Unlikely	Minor	Low
		Disturbs native vegetation	Access for pipeline maintenance may include the use of vehicles along the vegetated foreshore area. Areas that could potentially be affected do not contain any significant vegetation communities and were considered to be in poor condition with a high proportion of weeds (Ecology Australia 2007).	Possible	Minor	Medium	Ensure all vehicles remain on designated tracks.	Unlikely	Minor	Low