

Appendix 10

Threatened Species (Commonwealth Assessment of Significance)

Marine Aquaculture Research Lease, Providence Bay, Port Stephens, NSW – EIS.

Birds

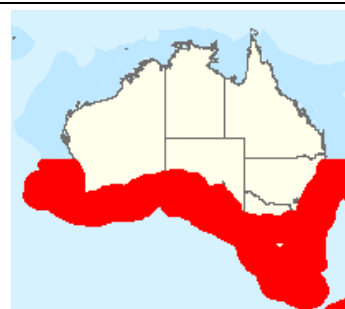
Common Name

Amsterdam albatross

Latin Name

Diomedea (exulans) amsterdamensis

EPBC Status	FM / TSC Listing
Endangered, Migratory	N/A



Distribution across Australia

The amsterdam albatross is not resident in Australia but visits Australian waters to the south and south-west.

Critical Habitat Resources in Australia

There are no critical habitat resources for the amsterdam albatross within the wider study area. No critical habitat for albatross or petrel species (other than Gould's petrel) listed in this report is found in the wider study area. Both albatross and petrel species have specific breeding localities and a broad range of foraging habitats that are considered to be critical habitat however critical foraging habitat is considered to be waters south of 25 degrees. Further, six breeding areas within Australian waters have been listed as critical habitat for albatrosses; Macquarie Island, Albatross Island, Pedra Branca, the Mewstone, Heard and McDonald Islands and the Australian Antarctic Territory (DSEWPC, 2011).

Important Habitat Values for the Species

The amsterdam albatross only breeds and cares for chicks on the upland plateau of Amsterdam Island in the southern Indian Ocean; otherwise they remain at sea for several years, soaring aloft on air currents and float on the water surface when wind subsides. The species feeding distribution has been related to sea surface temperatures and tuna distributions (Rivalan *et al.*, 2010).

Recognised Threats and Potential Impact(s) of the Proposal

Global threats to the amsterdam albatross include longline fishing, disease, habitat destruction, predation by introduced fauna, reduced food availability, ingestion/entanglement in marine debris and pollution (Web Reference 1). Potential threats associated with the proposal include entanglement in sea cage infrastructure, ingestion of marine debris, attraction of predators leading to competition for habitat, chemical bioaccumulation in tissues, non-targeted antibiotic administration due to predation on stock and change of food source.

Proposed Impact Management and Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and reporting incidents to relevant agencies.
2. Deceased stock will be removed according to industry best practice and a demand feeding regime will be adopted to minimise excess food in the water column. This will lessen the attraction of wild fish and therefore, potential predators. All waste products and feed bins will be securely covered and disposed of appropriately.
3. Sea cages will be designed to be unattractive to marine birds e.g. elimination of safe roosting and perching places.



Monitoring and Management

Entanglements and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impacts on the amsterdam albatross.

Birds

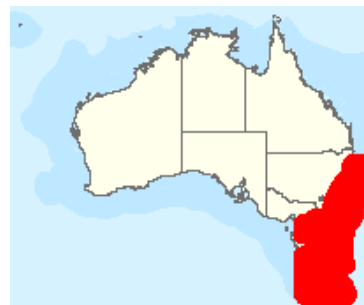
Common Name

Antipodean albatross

Latin Name

Diomedea antipodensis

EPBC Status	FM / TSC Listing
Vulnerable, Migratory	Vulnerable



Distribution across Australia

The antipodean albatross uses Australian waters to feed where it occurs in NSW waters during winter to feed on cuttlefish. The Australian distribution represents a small proportion of their entire range.

Critical Habitat Resources in Australia

There are no critical habitat resources for the antipodean albatross within the wider study area. No critical habitat for albatross or petrel species (other than Gould's petrel) listed in this report is found in the wider study area. Both albatross and petrel species have specific breeding localities and a broad range of foraging habitats that are considered to be critical habitat however critical foraging habitat is considered to be waters south of 25 degrees. Further, six breeding areas within Australian waters have been listed as critical habitat for albatrosses; Macquarie Island, Albatross Island, Pedra Branca, the Mewstone, Heard and McDonald Islands and the Australian Antarctic Territory (DSEWPC, 2011).

Important Habitat Values for the Species

The antipodean albatross breeds in New Zealand on the Antipodes Islands and Campbell Island and feeds across the south-west Pacific Ocean, Southern Ocean and the Tasman Sea, mainly from New Zealand to Chile.

Recognised Threats and Potential Impact(s) of the Proposal

Feral animal predation in breeding areas, long line fisheries as well as demersal and trawl fisheries all constitute threats to the antipodean albatross. Litter discards can lead to ingestion which also threatens the antipodean albatross. Potential threats associated with the proposal include entanglement in sea cage infrastructure, ingestion of marine debris, attraction of predators leading to competition for habitat, chemical bioaccumulation in tissues, non-targeted antibiotic administration due to predation on stock and change of food source.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and reporting incidents to relevant agencies.
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Monitoring and Management

Entanglements and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impacts on the antipodean albatross

Birds

Common Name

Tristan albatross

Latin Name

Diomedea dabbenena, Diomedea exulans exulans



EPBC Status	FM / TSC Listing
Endangered, Migratory	N/A

Distribution across Australia

Only one definitive record of the tristan albatross has been collected from Australian waters - a bird was tagged on Gough Island and recaptured off Wollongong, NSW.

Critical Habitat Resources in Australia

There are no critical habitat resources for the tristan albatross within the wider study area. No critical habitat for albatross or petrel species (other than Gould's petrel) listed in this report is found in the wider study area. Both albatross and petrel species have specific breeding localities and a broad range of foraging habitats that are considered to be critical habitat however critical foraging habitat is considered to be waters south of 25 degrees. Further, six breeding areas within Australian waters have been listed as critical habitat for albatrosses; Macquarie Island, Albatross Island, Pedra Branca, the Mewstone, Heard and McDonald Islands and the Australian Antarctic Territory (DSEWPC, 2011).

Important Habitat Values for the Species

The tristan albatross breeds nesting in grass tussocks, on subantarctic Inaccessible and Gough Islands in the Atlantic Ocean. The species forage in the Atlantic Ocean around South Africa and north almost as far as the equator. The birds sleep and rest on ocean waters when not breeding.

Recognised Threats and Potential Impact(s) of the Proposal

Recognised threats include predation on their breeding islands, drowning in longline fishing gear, ingestion of marine debris, pollution and collisions with gear from fishing trawlers. Potential threats associated with the proposal include entanglement in sea cage infrastructure, ingestion of marine debris, attraction of predators leading to competition for habitat, chemical bioaccumulation in tissues, non-targeted antibiotic administration due to predation on stock and change of food source.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and reporting incidents to relevant agencies.
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3. Sea cages will be designed to be unattractive to marine birds e.g. elimination of safe roosting and perching places.



Monitoring and Management

Entanglements and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impacts on the tristan albatross.

Birds

Common Name

Wandering albatross

Latin Name

Diomedea exulans (sensu lato)



EPBC Status	FM / TSC Listing
Vulnerable, Migratory	Endangered

Distribution across Australia

Wandering albatrosses breed on the Australian Macquarie Island in the southwest corner of the Pacific Ocean, about half-way between New Zealand and Antarctica. It occurs inshore, off shore and in pelagic waters around Australia, particularly around eastern NSW between July and November for short periods.

Critical Habitat Resources in Australia

There are no critical habitat resources for the wandering albatross within the wider study area. No critical habitat for albatross or petrel species (other than Gould's Petrel) listed in this report is found in the wider study area. Both albatross and petrel species have specific breeding localities and a broad range of foraging habitats that are considered to be critical habitat however critical foraging habitat is considered to be waters south of 25 degrees. Further, six breeding areas within Australian waters have been listed as critical habitat for albatrosses; Macquarie Island, Albatross Island, Pedra Branca, the Mewstone, Heard and McDonald Islands and the Australian Antarctic Territory (DSEWPC, 2011).

Important Habitat Values for the Species

The wandering albatross feeds on squid, fish and crustaceans from the surface, by shallow diving (2-5m) and on the surface aggressively on carrion. The species occurs inshore, offshore and in pelagic waters of high productivity to feed. .

Recognised Threats and Potential Impact(s) of the Proposal

The wandering albatross is susceptible to drowning or injury from encounters with longline fisheries, entanglement / ingestion of marine debris and acculturation of chemical contaminants. Trolling and trawling fisheries also pose a potential threat to the species. On Macquarie Island, an increase in Subantarctic skuas and human disturbance is likely to have negatively affected the breeding success of the wandering albatross. Potential threats associated with the proposal include entanglement in sea cage infrastructure, ingestion of marine debris, attraction of predators leading to competition for habitat, chemical bioaccumulation in tissues and non-targeted antibiotic administration due to predation on stock.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and reporting incidents to relevant agencies.
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Monitoring and Management

Entanglements and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impacts on the wandering albatross.

Birds

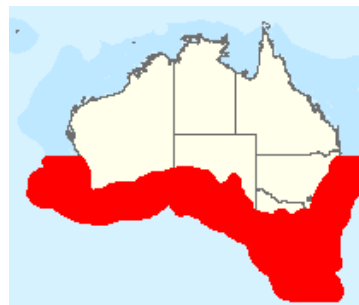
Common Name

Gibson's albatross

Latin Name

Diomedea exulans gibsoni

EPBC Status	FM / TSC Listing
Vulnerable, Migratory	Vulnerable



Distribution across Australia

Gibson's albatross use Australian waters, mostly the Tasman Sea, to forage while they breed in New Zealand.

Critical Habitat Resources in Australia

There are no critical habitat resources for the gibson's albatross within the wider study area. No critical habitat for albatross or petrel species (other than Gould's petrel) listed in this report is found in the wider study area. Both albatross and petrel species have specific breeding localities and a broad range of foraging habitats that are considered to be critical habitat however critical foraging habitat is considered to be waters south of 25 degrees. Further, six breeding areas within Australian waters have been listed as critical habitat for albatrosses; Macquarie Island, Albatross Island, Pedra Branca, the Mewstone, Heard and McDonald Islands and the Australian Antarctic Territory (DSEWPC, 2011).

Important Habitat Values for the Species

Gibson's albatross are pelagic feeders that use the wind to travel great distances, generally between 30° and 50°S. This species breeds on Adams and Auckland Islands in New Zealand on moss terraces in grass tussocks.

Recognised Threats and Potential Impact(s) of the Proposal

Key threats to gibson's albatross include incidental catch in longline fishing, trawling, trolling and intentional shooting. Potential threats associated with the proposal include entanglement in sea cage infrastructure, ingestion of marine debris, attraction of predators leading to competition for habitat, chemical bioaccumulation in tissues, non-targeted antibiotic administration due to predation on stock and change of food source.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and reporting incidents to relevant agencies.
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Monitoring and Management

Entanglements and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impacts on the gibson's albatross.

Birds

Common Name

Campbell albatross

Latin Name

Thalassarche (melanophris) impavida

EPBC Status	FM / TSC Listing
Vulnerable, Migratory	N/A



Distribution across Australia

Campbell albatrosses forage within Australian waters: Tasman Sea and south western Pacific Ocean.

Critical Habitat Resources in Australia

There are no critical habitat resources for the campbell albatross within the wider study area. No critical habitat for albatross or petrel species (other than Gould's petrel) listed in this report is found in the wider study area. Both albatross and petrel species have specific breeding localities and a broad range of foraging habitats that are considered to be critical habitat however critical foraging habitat is considered to be waters south of 25 degrees. Further, six breeding areas within Australian waters have been listed as critical habitat for albatrosses; Macquarie Island, Albatross Island, Pedra Branca, the Mewstone, Heard and McDonald Islands and the Australian Antarctic Territory (DSEWPC, 2011).

Important Habitat Values for the Species

The campbell albatross only breeds on the northern and western coastline of Campbell Island, off New Zealand, on steep slopes and ledges covered with tussocks and mud. Non-breeding adults and juveniles feed on squid, fish, crustaceans, carrion and gelatinous organisms from the surface or by making shallow dives within neretic and oceanic waters around south Australian waters, the Tasman Sea and the south western Pacific Ocean.

Recognised Threats and Potential Impact(s) of the Proposal

Key threats to the campbell albatross include incidental catch in longline fishing and trawling (Web Reference 2). Potential threats associated with the proposal include entanglement in sea cage infrastructure, ingestion of marine debris, attraction of predators leading to competition for habitat, chemical bioaccumulation in tissues, non-targeted antibiotic administration due to predation on stock and change of food source.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and reporting incidents to relevant agencies.
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Monitoring and Management

Entanglements and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impacts on the campbell albatross.

Birds

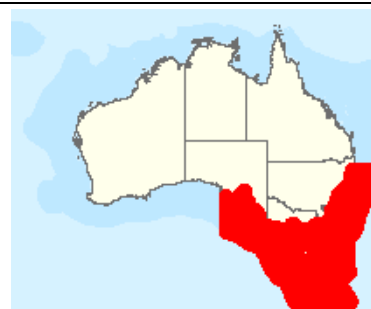
Common Name

Buller's albatross

Latin Name

Thalassarche bulleri

EPBC Status	FM / TSC Listing
Vulnerable, Migratory	N/A



Distribution across Australia

The buller's albatross regularly forages in the Tasman Sea and South Pacific Ocean. This species does not breed in Australia but is commonly sighted off the coast from Coffs Harbour to Tasmania and west to Eyre Peninsula (Web Reference 1).

Critical Habitat Resources in Australia

There are no critical habitat resources for the buller's albatross within the wider study area. No critical habitat for albatross or petrel species (other than Gould's petrel) listed in this report is found in the wider study area. Both albatross and petrel species have specific breeding localities and a broad range of foraging habitats that are considered to be critical habitat however critical foraging habitat is considered to be waters south of 25 degrees. Further, six breeding areas within Australian waters have been listed as critical habitat for albatrosses; Macquarie Island, Albatross Island, Pedra Branca, the Mewstone, Heard and McDonald Islands and the Australian Antarctic Territory (DSEWPC, 2011).

Important Habitat Values for the Species

The buller's albatross inhabits marine and pelagic waters in the subantarctic and subtropical waters of the southern Pacific Ocean and breeds on a number of Islands around New Zealand in a range of habitats including tussocks, meadows and forest cover. Specific habitat requirements are poorly known.

Recognised Threats and Potential Impact(s) of the Proposal

Buller's albatross is the most common bycatch from New Zealand's longline fisheries, and are considered to be threatened by longline fishing operations, competition with fisheries for marine resources and marine pollution in Australia (Web Reference 1). Potential threats associated with the proposal include entanglement in sea cage infrastructure, ingestion of marine debris, attraction of predators leading to competition for habitat, chemical bioaccumulation in tissues, non-targeted antibiotic administration due to predation on stock and change of food source.

Proposed Impact Mitigation Measures

Mitigation

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Monitoring and Management

Entanglements and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impacts on the buller's albatross.

Birds

Common Name

Shy albatross, tasmanian shy albatross

Latin Name

Thalassarche cauta (sensu stricto)

EPBC Status	FM / TSC Listing
Vulnerable, Migratory	Vulnerable



Distribution across Australia

Shy albatrosses are distributed below 25°S in shelf waters around Tasmania and south eastern Australia.

Critical Habitat Resources in Australia

There are no critical habitat resources for the shy albatross within the wider study area. No critical habitat for albatross or petrel species (other than Gould's petrel) listed in this report is found in the wider study area. Both albatross and petrel species have specific breeding localities and a broad range of foraging habitats that are considered to be critical habitat however critical foraging habitat is considered to be waters south of 25 degrees. Further, six breeding areas within Australian waters have been listed as critical habitat for albatrosses; Macquarie Island, Albatross Island, Pedra Branca, the Mewstone, Heard and McDonald Islands and the Australian Antarctic Territory (DSEWPC, 2011).

Important Habitat Values for the Species

Breeding occurs on Albatross Island, Bass Strait, and Mewstone and Pedra Branca, off southern Tasmania, on level sparsely vegetated ground. Dispersal after fledging is considered to be colony specific (Web Reference 1) but extends to waters off South Africa, South America and Australia. Waters over the continental shelf are considered key areas for foraging.

Recognised Threats and Potential Impact(s) of the Proposal

The shy albatross is the species of albatross most frequently killed by longlines in the Australian Fishing Zone. Trawl fisheries, shooting, disease and competition for food are also recognised threats for the species. Potential threats associated with the proposal include entanglement in sea cage infrastructure, ingestion of marine debris, attraction of predators leading to competition for habitat, chemical bioaccumulation in tissues, non-targeted antibiotic administration due to predation on stock and change of food source.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and reporting incidents to relevant agencies.
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Monitoring and Management

Entanglements and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impacts on the shy albatross.

Birds

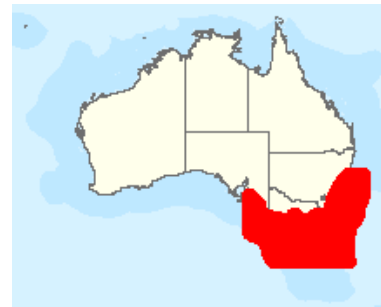
Common Name

Salvin's albatross

Latin Name

Thalassarche salvini

EPBC Status	FM / TSC Listing
Vulnerable	N/A



Distribution across Australia

The salvin's albatross is an infrequent visitor which forages in Australian waters south east of Tasmania.

Critical Habitat Resources in Australia

There are no critical habitat resources for the salvin's albatross within the wider study area. No critical habitat for albatross or petrel species (other than Gould's petrel) listed in this report is found in the wider study area. Both albatross and petrel species have specific breeding localities and a broad range of foraging habitats that are considered to be critical habitat however critical foraging habitat is considered to be waters south of 25 degrees. Further, six breeding areas within Australian waters have been listed as critical habitat for albatrosses; Macquarie Island, Albatross Island, Pedra Branca, the Mewstone, Heard and McDonald Islands and the Australian Antarctic Territory (DSEWPC, 2011).

Important Habitat Values for the Species

Salvin's albatross breed on disparate island groups: the French Crozet Islands in the Indian Ocean, and the New Zealand Snares, Chatham and Bounty Islands in the South Pacific Ocean. This species is otherwise found on continental shelves and seamounts across the Southern, South Pacific and Indian Oceans.

Recognised Threats and Potential Impact(s) of the Proposal

Key threats to the salvin's albatross include incidental catch in longline fishing and trawling (Web Reference 1). Potential threats associated with the proposal include entanglement in sea cage infrastructure, ingestion of marine debris, attraction of predators leading to competition for habitat, chemical bioaccumulation in tissues, non-targeted antibiotic administration due to predation on stock and change of food source.

Proposed Impact Mitigation Measures

Mitigation

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Monitoring and Management

Entanglements and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impacts on the salvin's albatross.

Birds

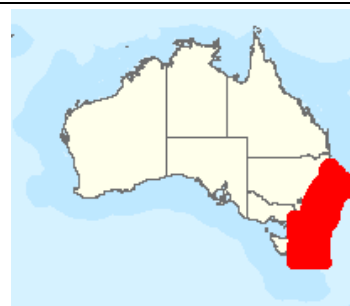
Common Name

White-capped albatross

Latin Name

Thalassarche steadi

EPBC Status	FM / TSC Listing
Vulnerable	N/A



Distribution across Australia

The white-capped albatross is common off the south-east coast of Australia, particularly Bass Strait.

Critical Habitat Resources in Australia

There are no critical habitat resources for the white-capped albatross within the wider study area. No critical habitat for albatross or petrel species (other than Gould's petrel) listed in this report is found in the wider study area. Both albatross and petrel species have specific breeding localities and a broad range of foraging habitats that are considered to be critical habitat however critical foraging habitat is considered to be waters south of 25 degrees. Further, six breeding areas within Australian waters have been listed as critical habitat for albatrosses; Macquarie Island, Albatross Island, Pedra Branca, the Mewstone, Heard and McDonald Islands and the Australian Antarctic Territory (DSEWPC, 2011).

Important Habitat Values for the Species

The white-capped albatross breeds in the New Zealand subantarctic on a number of separate islands: Disappointment, Auckland, Adams, Bollon's and Forty-four Islands. The birds are common off south-east Australia and South Africa and are also abundant in most New Zealand shelf waters.

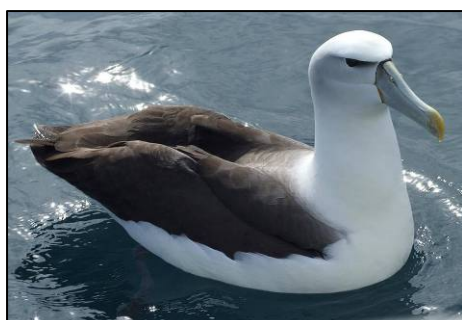
Recognised Threats and Potential Impact(s) of the Proposal

Predation on Auckland Island by pigs, drowning in longline fishing gear, collision with trawl warps are recognised threats for the species. More longline drowning are associated with South African, Namibian and New Zealand than Australian fisheries. Ingestion or capture in marine debris, oil spills, pollution and competition with commercial fisheries are also threats (Web Reference 1). Potential threats associated with the proposal include entanglement in sea cage infrastructure, ingestion of marine debris, attraction of predators leading to competition for habitat, chemical bioaccumulation in tissues, non-targeted antibiotic administration due to predation on stock and change of food source.

Proposed Impact Mitigation Measures

Mitigation

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Monitoring and Management

Entanglements and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impacts on the white-capped albatross.

Birds

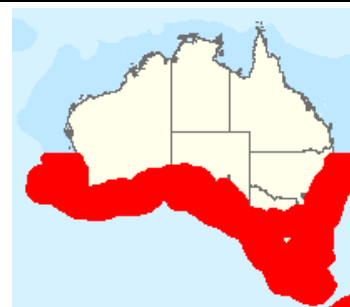
Common Name

Black-browed albatross

Latin Name

Thalassarche melanophris

EPBC Status	FM / TSC Listing
Vulnerable, Migratory	Vulnerable



Distribution across Australia

The black-browed albatross breeds on Australian subantarctic islands: Heard, McDonald, Macquarie, Bishop and Clerk. The species remains around this region during the breeding season then in winter it migrates north to the continental shelf and shelf-break of South Australia, Tasmania, Victoria and NSW. Some animals are observed at the continental shelf break of Western Australia and Queensland (Web Reference 1).

Critical Habitat Resources in Australia

There are no critical habitat resources for the black-browed albatross within the wider study area. No critical habitat for albatross or petrel species (other than Gould's petrel) listed in this report is found in the wider study area. Both albatross and petrel species have specific breeding localities and a broad range of foraging habitats that are considered to be critical habitat however critical foraging habitat is considered to be waters south of 25 degrees. Further, six breeding areas within Australian waters have been listed as critical habitat for albatrosses; Macquarie Island, Albatross Island, Pedra Branca, the Mewstone, Heard and McDonald Islands and the Australian Antarctic Territory (DSEWPC, 2011).

Important Habitat Values for the Species

The black-browed albatross breeds on a number of sub and peri-Antarctic Islands and Islets: within Chilean, British, French, Australian and New Zealand territories. The species migrates north in non breeding periods and reaches 35°S within open waters of the Pacific, Atlantic and Indian Oceans. More northerly sightings occur closer to continents. The species tolerates a large range of sea surface temperatures (0-24°C) (Web Reference 1).

Recognised Threats and Potential Impact(s) of the Proposal

The main threat to the species is drowning within longline fisheries, with secondary threats including interactions with trawling fisheries, marine debris and pollutants and competition with fisheries for food (Web Reference 1). Potential threats associated with the proposal include entanglement in sea cage infrastructure, ingestion of marine debris, attraction of predators leading to competition for habitat, chemical bioaccumulation in tissues, non-targeted antibiotic administration due to predation on stock and change of food source.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to follow and training/equipment required.
2. Deceased stock will be removed according to industry best practice and a demand feeding regime will be adopted to minimise excess food in the water column. This will lessen the attraction of wild fish and therefore, potential predators. All waste products and feed bins will be securely covered and disposed of appropriately.
3. Sea cages will be designed to be unattractive to marine birds e.g. elimination of safe roosting/perching places.



Monitoring and Management

Entanglements and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impacts on the black-browed albatross.

Birds

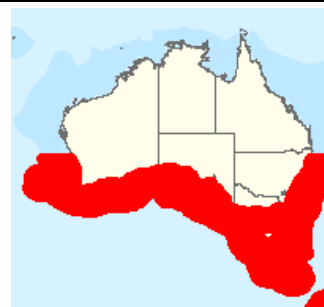
Common Name

Streaked shearwater

Latin Name

Calonectris leucomelas, *Puffinus leucomelas*

EPBC Status	FM / TSC Listing
Migratory	N/A



Distribution across Australia

The streaked shearwater is common a pelagic seabird occurring in both pelagic and inshore waters in southern Australia during the summer, after breeding in the northern hemisphere.

Critical Habitat Resources in Australia

There are no critical habitat resources for the streaked shearwater within the direct or wider study area.

Important Habitat Values for the Species

The streaked shearwater breeds on offshore islands of Japan, Russia, China, North and South Korea, and along the coasts of Japan and Russia and migrates south when not breeding. It forages by surface seizing and shallow dives in pelagic and inshore waters feeding on fish and squid (Web Reference 2).

Recognised Threats and Potential Impact(s) of the Proposal

Streaked shearwaters are susceptible to capture in fishing nets and longlines. Potential threats associated with the proposal include entanglement in sea cage infrastructure, ingestion of marine debris, attraction of predators leading to competition for habitat, chemical bioaccumulation in tissues, non-targeted antibiotic administration due to predation on stock and change of food source.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and the reporting of incidents.
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3. Sea cages will be designed to be unattractive to marine birds e.g. elimination of safe roosting/perching places.

Monitoring and Management

Entanglements and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impacts on the streaked shearwater.



Birds

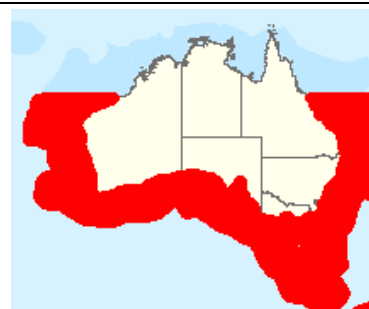
Common Name

Southern giant petrel

Latin Name

Macronectes giganteus

EPBC Status	FM / TSC Listing
Endangered, Migratory	Endangered



Distribution across Australia

The southern giant petrel breeds on six islands within Australian territory in the Southern Ocean and Australian Antarctic Territory. The birds remain within the same ocean sector as their breeding island in non breeding seasons. Most records in southeastern Australia occur between June and December.

Critical Habitat Resources in Australia

There are no critical habitat resources for the southern giant petrel within the wider study area. No critical habitat for albatross or petrel species (other than Gould's petrel) listed in this report is found in the wider study area. Both albatross and petrel species have specific breeding localities and a broad range of foraging habitats that are considered to be critical habitat however critical foraging habitat is considered to be waters south of 25 degrees. Further, six breeding areas within Australian waters have been listed as critical habitat for giant petrels; Macquarie Island, Albatross Island, Pedra Branca, the Mewstone, Heard and McDonald Islands and the Australian Antarctic Territory (DSEWPC, 2011).

Important Habitat Values for the Species

The southern giant petrel nests in mounds of moss, grass and stone on bare or grassy ground. This species eats krill, squid, offal and carrion, and is wide ranging from Antarctica to the Chilean, African and Australian subtropics. It breeds throughout the southern oceans and is widespread throughout the Southern Ocean. Birds have been found to remain in the same ocean sector as their breeding island, in non-breeding season.

Recognised Threats and Potential Impact(s) of the Proposal

Recognised threats include longline fishing, predation by black rats and feral cats breeding on islands, oil spills, declines in cuttlefish populations, climate change and habitat degradation (Web Reference 3). Potential threats associated with the proposal include entanglement in sea cage infrastructure, ingestion of marine debris, attraction of predators leading to competition for habitat, chemical bioaccumulation in tissues, non-targeted antibiotic administration due to predation on stock and change of food source.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglements, including procedures to follow, training required and reporting incidents.
2. Deceased stock will be removed according to industry best practice and a demand feeding regime will be adopted to minimise excess food in the water column. This will lessen the attraction of wild fish and therefore, potential predators. All waste products and feed bins will be securely covered and disposed of appropriately.
3. Sea cages will be designed to be unattractive to marine birds e.g. elimination of safe roosting/perching places.

Monitoring and Management

Entanglements and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impacts on the southern giant petrel.



Birds

Common Name

Northern giant petrel

Latin Name

Macronectes halli

EPBC Status	FM / TSC Listing
Vulnerable, Migratory	Vulnerable



Distribution across Australia

The northern giant petrel visits waters off the southern Australian mainland during winter and breed on Australian Macquarie Island.

Critical Habitat Resources in Australia

There are no critical habitat resources for the northern giant petrel within the wider study area. No critical habitat for albatross or petrel species (other than Gould's petrel) listed in this report is found in the wider study area. Both albatross and petrel species have specific breeding localities and a broad range of foraging habitats that are considered to be critical habitat however critical foraging habitat is considered to be waters south of 25 degrees. Further, six breeding areas within Australian waters have been listed as critical habitat for giant petrels; Macquarie Island, Albatross Island, Pedra Branca, the Mewstone, Heard and McDonald Islands and the Australian Antarctic Territory (DSEWPC, 2011).

Important Habitat Values for the Species

The northern giant petrel is found in the Antarctic Polar Front. Its distribution varies seasonally from sub-Antarctic Ocean waters to subtropical waters in winter. The species has many islands upon which it breeds.

Recognised Threats and Potential Impact(s) of the Proposal

Recognised threats include longline fishing, trawling, human disturbance, ingestion of hooks, entanglement and ingestion of marine debris, oil spills and other forms of marine pollution (Web Reference 1). Potential threats associated with the proposal include entanglement in sea cage infrastructure, ingestion of marine debris, attraction of predators leading to competition for habitat, chemical bioaccumulation in tissues, non-targeted antibiotic administration due to predation on stock and change of food source.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and the reporting of incidents.
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3. Sea cages will be designed to be unattractive to marine birds e.g. elimination of safe roosting/perching places.



Monitoring and Management

Entanglements and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impacts on the northern giant petrel.

Birds

Common Name

Gould's petrel

Latin Name

Pterodroma leucoptera leucoptera



EPBC Status	FM / TSC Listing
Endangered, Migratory	Vulnerable

Distribution across Australia

The Gould's petrel feeds within the Tasman Sea and breeds on two small islands off Port Stephens in NSW during winter.

Critical Habitat Resources in Australia

Cabbage Tree Island is a significant breeding locality for the species, which is located more than 1.5 km from the proposed Research Lease. Boondelbah Island has a few nesting birds which is also nearby. Non-breeding and feeding ranges are unknown but assumed to be the Tasman Sea.

Important Habitat Values for the Species

The species is only found in this region so the critical habitat resources listed for Australia above are universal.

Recognised Threats and Potential Impact(s) of the Proposal

Threats to the species while on land include entanglement in sticky Bird-Lime Tree fruits, predation by other birds and introduced rabbits which degrade Gould's petrel breeding habitat. With their feeding distribution largely unknown further threats can be assumed to be entanglement and ingestion of marine debris, pollution and potentially by-catch in fisheries. Potential threats associated with the proposal include entanglement in sea cage infrastructure, ingestion of marine debris, attraction of predators leading to competition for habitat, chemical bioaccumulation in tissues, non-targeted antibiotic administration due to predation on stock and change of food source.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and the reporting of incidents.
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3. Sea cages will be designed to be unattractive to marine birds e.g. elimination of safe roosting/perching places.

Monitoring and Management

Entanglements and water quality will be monitored and reviewed on a regular basis.



Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impacts on the Gould's petrel.

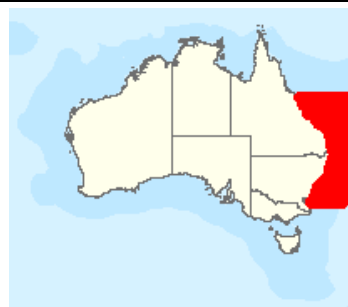
Birds

Common Name

Kermadec petrel (Western)

Latin Name

Pterodroma neglecta neglecta



EPBC Status	FM / TSC Listing
Vulnerable	Vulnerable

Distribution across Australia

The kermadec petrel is a marine, pelagic seabird which disperses over the southern Pacific Ocean and breeds on many islands including the Australian islands of Lord Howe, Phillip and Norfolk.

Critical Habitat Resources in Australia

There are no critical habitat resources for the kermadec petrel within the wider study area. However, Balls Pyramid near Lord Howe Island and Phillip Island near Norfolk Island, are the only known breeding sites in Australian waters (Web Reference 3).

Important Habitat Values for the Species

The species breeds across islands in the southern Pacific Ocean including Australian, New Zealand and Chilean territories. The species forages via surface seizing and dipping in tropical and subtropical areas of the Pacific Ocean but its diet is largely unknown.

Recognised Threats and Potential Impact(s) of the Proposal

Threats to kermadec petrel breeding colonies have been attributed to predation by black rats on Lord Howe Island and Kestrels on Phillip Island. The effect of fisheries, including as longline, on the species is unknown. Potential threats associated with the proposal include entanglement in sea cage infrastructure, ingestion of marine debris, attraction of predators leading to competition for habitat, chemical bioaccumulation in tissues, non-targeted antibiotic administration due to predation on stock and change of food source.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and the reporting of incidents.
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3. Sea cages will be designed to be unattractive to marine birds e.g. elimination of safe roosting/perching places.

Monitoring and Management

Entanglements and water quality will be monitored and reviewed on a regular basis.



Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impacts on the kermadec petrel.

Birds

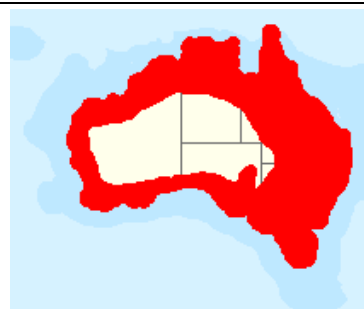
Common Name

White-bellied sea eagle

Latin Name

Haliaeetus leucogaster

EPBC Status	FM / TSC Listing
Migratory, Marine	Vulnerable



Distribution across Australia

The white-bellied sea eagle is distributed along the coastline of Australia and extends inland along waterways of eastern Australia dependent on climatic conditions. Breeding sites are patchy along this distribution.

Critical Habitat Resources in Australia

There are no critical habitat resources for the white-bellied sea eagle within the wider study area.

Important Habitat Values for the Species

The white-bellied sea eagle is found in Australia, the Malay Archipelago, South East Asia, India and China. It is a terrestrial species found along the coast but it can range inland depending on climatic conditions. The coastal and inland habitats are varied while breeding habitats are generally close to water in tall open forest or woodland. The carnivorous birds forage opportunistically in inshore waters over large expanses eating aquatic and terrestrial animals.

Recognised Threats and Potential Impact(s) of the Proposal

Recognised threats to the white-bellied sea eagle include habitat destruction through human disturbance and urbanisation of coastal areas, poisoning, shooting, inland water resource deterioration and competition with wedge-tailed eagles (Web Reference 1). Potential threats associated with the proposal include entanglement in sea cage infrastructure, ingestion of marine debris, attraction of predators leading to competition for habitat, chemical bioaccumulation in tissues, non-targeted antibiotic administration due to predation on stock and change of food source.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and the reporting of incidents.
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3. Sea cages will be designed to be unattractive to marine birds e.g. elimination of safe roosting/perching places.



Monitoring and Management

Entanglements and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impacts on the white-bellied sea eagle.

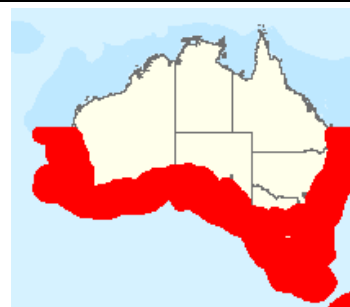
Birds

Common Name

Great skua

Latin Name

Catharacta skua



EPBC Status	FM / TSC Listing
Listed Marine Species	N/A

Distribution across Australia

The Australian distribution is not known. This species was listed under the EPBC Act as a Marine Species for the coordinates chosen, yet no information is held in the DSEWPaC website on the bird. It is assumed to visit our oceans to feed, while similar species with a southern hemisphere distribution include subantarctic skua (southern) (*Catharacta lonnbergi lonnbergi*), south polar skua (*Catharacta maccormicki*), and pomarine skua (*Stercorarius pomarinus*). These birds also have no distribution in mainland Australia and are limited to the polar regions.

Critical Habitat Resources in Australia

N/A

Important Habitat Values for the Species

The British Isles and Atlantic Ocean are important habitat for the great skua.

Recognised Threats and Potential Impact(s) of the Proposal

Potential threats associated with the proposal include entanglement in sea cage infrastructure, ingestion of marine debris, attraction of predators leading to competition for habitat, chemical bioaccumulation in tissues, non-targeted antibiotic administration due to predation on stock and change of food source.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the the Marine Fauna Interaction Management Plan, use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and the reporting of incidents.
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3. Sea cages will be designed to be unattractive to marine birds e.g. elimination of safe roosting/perching places.

Monitoring and Management

Entanglements and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impacts on the great skua.



Birds

Common Name

Providence petrel

Latin Name

Pterodroma solandri

EPBC Status	FM / TSC Listing
Listed Marine, Migratory	Vulnerable



Distribution across Australia

The providence petrel is a pelagic seabird which disperses over the southern western Pacific Ocean and throughout the breeding season is highly concentrated off the east coast of Australia on the offshore islands of Lord Howe, Phillip and historically Norfolk. This species can be found in eastern Australian waters in the non-breeding season however in December to February they are mostly absent (Web Reference 1).

Critical Habitat Resources in Australia

There are no critical habitat resources for the providence petrel within the wider study area. However, with the exception of the small breeding colony on Philip Island, the Australian offshore island, Lord Howe, is the last remaining stronghold breeding location for providence petrel. On Lord Howe Island, there are two primary sites which are used for breeding including Mount Lidgbird and Mount Gower (Web Reference 1). These two sites are essential for the survival of the population.

Important Habitat Values for the Species

Providence petrel is a marine pelagic seabird that inhabits both subtropical and tropical waters of the South west Pacific Ocean migrating in the non-breeding season to the North Pacific and Bering Sea. During the breeding season, they nest on the tops of two summits on Lord Howe Island in grass lined chambers at the end of burrows or rock crevices on the slope of the mountains (Web Reference 1). The providence petrel typically forages in warmer waters off Australia in large mixed flocks capturing a range of prey from fish, squid, crustaceans and offal.

Recognised Threats and Potential Impact(s) of the Proposal

Potential threats associated with the proposal include entanglement in sea cage infrastructure, ingestion of marine debris, attraction of predators leading to competition for habitat, chemical bioaccumulation in tissues, non-targeted antibiotic administration due to predation on stock and change of food source.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and the reporting of incidents.
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3. Sea cages will be designed to be unattractive to marine birds e.g. elimination of safe roosting/perching places.



Monitoring and Management

Entanglements and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impacts on the providence petrel.

Birds

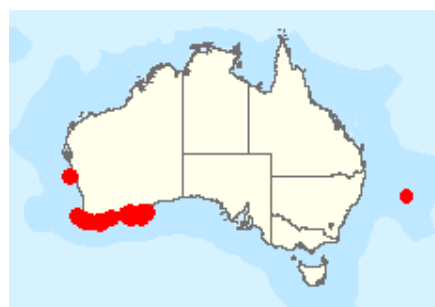
Common Name

Flesh-footed shearwater

Latin Name

Puffinus carneipes

EPBC Status	FM / TSC Listing
Listed Marine, Migratory	Vulnerable



Distribution across Australia

The flesh-footed shearwater is a marine trans-equatorial migrant species, ranging throughout the south-west Pacific and southern Indian Oceans. Two of the low numbers of breeding areas left in the world are located in Western Australia and Lord Howe Island. The flesh-footed shearwater is a locally common visitor to waters of the continental shelf and continental slope off southern Australia (south-western Western Australia to south-eastern Queensland) and around Lord Howe Island (Web Reference 1).

Critical Habitat Resources in Australia

There are no critical habitat resources for the flesh-footed shearwater within the wider study area. The flesh-footed shearwater has limited breeding localities (France, New Zealand and Australia) with the main breeding areas being one in the south west Pacific including Lord Howe Island and New Zealand; the other being many islands along the coast of Western Australia (Web Reference 1).

Important Habitat Values for the Species

The flesh-footed shearwater predominately occurs in the subtropics over continental shelves and slopes and occasionally inshore waters. On the offshore islands in which it breeds, pairs nest in burrows on sloping ground in coastal forest, scrubland, shrubland or grassland with these same burrows being used for roosting during the breeding season. Burrows are situated in areas that provide a clear flight-path for birds to enter and exit their colonies (Web Reference 1).

Recognised Threats and Potential Impact(s) of the Proposal

Potential threats associated with the proposal include entanglement in sea cage infrastructure, ingestion of marine debris, attraction of predators leading to competition for habitat, chemical bioaccumulation in tissues, non-targeted antibiotic administration due to predation on stock and change of food source.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and the reporting of incidents.
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3. Sea cages will be designed to be unattractive to marine birds e.g. elimination of safe roosting/perching places.



Monitoring and Management

Entanglements and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impacts on the flesh-footed shearwater.

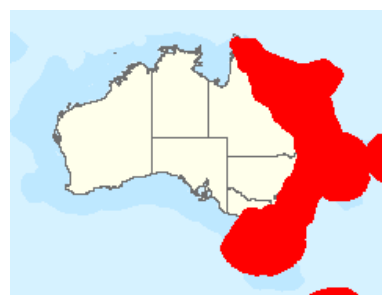
Birds

Common Name

White-bellied storm petrel

Latin Name

Fregetta grallaria grallaria



EPBC Status	FM / TSC Listing
Listed Marine Species	Vulnerable

Distribution across Australia

The white-bellied storm petrel has a wide-spread oceanic distribution in the south Pacific, Indian and Atlantic Oceans. In the non-breeding season, majority of individuals migrate to warmer water and are frequently found near the continental edge (10-25 km offshore) of Australia. Vagrant birds also often visit NSW coastal waters, especially during/after a storm. During the breeding season, December to February, they are found at various rocky or vegetated islands including islands in the Lord Howe Island group (NSW) (NSW NWPS, 1999b).

Critical Habitat Resources in Australia

There are no critical habitat resources for the white-bellied storm petrel within the wider study area.

Important Habitat Values for the Species

The white-bellied storm petrel occurs in highly saline sub-tropical and tropical waters. However, this species has been recorded in sub Antarctic waters (NSW NWPS, 1999b). Foraging in nearshore waters along the continental shelf of Australia and breeding only on small offshore islets in the Lord Howe Island Group (Web Reference 1). Nests are built in the crevices between large volcanic rocks and burrows excavated banks with breeding colonies frequently being located near dykes (Web Reference 1).

Recognised Threats and Potential Impact(s) of the Proposal

Potential threats associated with the proposal include entanglement in sea cage infrastructure, ingestion of marine debris, attraction of predators leading to competition for habitat, chemical bioaccumulation in tissues, non-targeted antibiotic administration due to predation on stock and change of food source.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and the reporting of incidents.
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Monitoring and Management

Entanglements and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impacts on the white-bellied storm petrel.

Birds

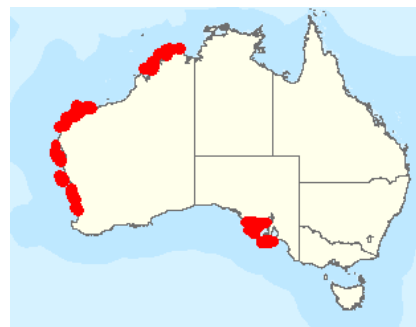
Common Name

Osprey

Latin Name

Pandion haliaetus (cristatus)

EPBC Status	FM / TSC Listing
Listed Marine, Migratory	Vulnerable



Distribution across Australia

The osprey occurs in Indonesia, Philippines, Palau Islands, New Guinea, Solomon Islands, New Caledonia and Australia (Web Reference 1). In Australia, the osprey is found continuously around the coastline being reasonably common on the north coast, patchy on eastern coast and rare or absent in Victoria and Tasmania (Web Reference 1). The breeding range in Australia extends around the northern coast of Australia (including many offshore islands) from Albany in Western Australia to Lake Macquarie in NSW; with a second isolated breeding population on the coast of South Australia (Web Reference 1).

Critical Habitat Resources in Australia

There are a few sites in the Port Stephens region that have had reports of osprey nests including Karuah, Lemon Tree Passage and Tahlee. However, the proposed Research Lease is not expected to directly or indirectly impact on these breeding localities.

Important Habitat Values for the Species

The osprey is a coastal species preferring open fresh, brackish or saline water to foraging primarily for fish in mouths of large rivers, lagoons and lakes (Web Reference 1). The osprey constructs large nests out of sticks in high dead or partly dead trees or artificial platforms including jetties and telegraph poles (Web Reference 1).

Recognised Threats and Potential Impact(s) of the Proposal

Potential threats associated with the proposal include entanglement in sea cage infrastructure, ingestion of marine debris, attraction of predators leading to competition for habitat, chemical bioaccumulation in tissues, non-targeted antibiotic administration due to predation on stock and change of food source.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and the reporting of incidents.
2. Deceased stock will be removed according to industry best practice and a demand feeding regime will be adopted to minimise excess food in the water column. This will lessen the attraction of wild fish and therefore, potential predators. All waste products and feed bins will be securely covered and disposed of appropriately.
3. Sea cages will be designed to be unattractive to marine birds e.g. elimination of safe roosting/perching places.



Monitoring and Management

Entanglements and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impacts on the osprey.

Birds

Common Name

Little tern

Latin Name

Sterna albifrons

EPBC Status	FM / TSC Listing
Listed Marine, Migratory	Endangered



Distribution across Australia

In Australia, the little tern has a widespread and almost continuous distribution from north-western Australia, around the northern and eastern coasts to south-eastern Australia, including Tasmania (Web Reference 1).

Critical Habitat Resources in Australia

There is no known critical breeding habitat in Providence Bay for the little tern. However, there are a few records of little terns breeding within the Myall Lakes National Park but this area is not expected to be directly or indirectly impacted by the proposed Research Lease.

Important Habitat Values for the Species

The little tern is predominantly a coastal species; nesting in estuaries, lagoons, river mouths and coastal beaches with preferred sheltered environments, however can occasionally be found offshore (Web Reference 1). Nests are typically in small depressions in sand, driftwood and other debris. The little tern forages in near by waters, plunging in shallow water to capture small fish, crustaceans, insects and even molluscs (Web Reference 1).

Recognised Threats and Potential Impact(s) of the Proposal

Potential threats associated with the proposal include entanglement in sea cage infrastructure, ingestion of marine debris, attraction of predators leading to competition for habitat, chemical bioaccumulation in tissues, non-targeted antibiotic administration due to predation on stock and change of food source.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and the reporting of incidents.
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3. Sea cages will be designed to be unattractive to marine birds e.g. elimination of safe roosting/perching places.



Monitoring and Management

Entanglements and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impacts on the little tern.

Birds

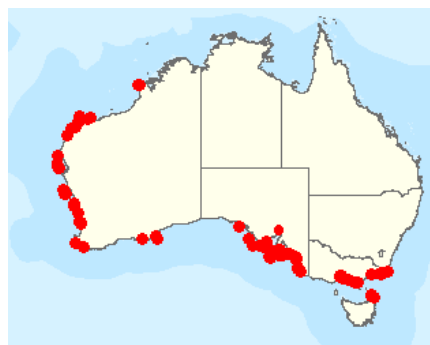
Common Name

Sooty tern

Latin Name

Sterna fuscata (Onychoprion fuscata)

EPBC Status	FM / TSC Listing
Listed Marine Species	Vulnerable



Distribution across Australia

In Australia, this species is mostly found in the tropics on the north coast and associated islands with occasional sightings on the west and east coasts. It is found in NSW usually after storms.

Critical Habitat Resources in Australia

There are no critical habitat resources for the sooty tern within the wider study area.

Important Habitat Values for the Species

Compared with most other terns, the sooty tern inhabits more pelagic habitats, foraging offshore and only occupying inshore areas for breeding or during stormy weather (NSW NWPS, 1999a). This species can be found nesting on coral cays, atolls, sandbanks, rock stacks and cliffs on offshore islands including Lord Howe Island and Norfolk Island (NSW NWPS, 1999a).

Recognised Threats and Potential Impact(s) of the Proposal

Potential threats associated with the proposal include entanglement in sea cage infrastructure, ingestion of marine debris, attraction of predators leading to competition for habitat, chemical bioaccumulation in tissues, non-targeted antibiotic administration due to predation on stock and change of food source.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and the reporting of incidents.
2. Deceased stock will be removed according to industry best practice and a demand feeding regime will be adopted to minimise excess food in the water column. This will lessen the attraction of wild fish and therefore, potential predators. All waste products and feed bins will be securely covered and disposed of appropriately.
3. Sea cages will be designed to be unattractive to marine birds e.g. elimination of safe roosting/perching places.

Monitoring and Management

Entanglements and water quality will be monitored and reviewed on a regular basis.



Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impacts on the sooty tern.

Sharks

Common Name

Grey Nurse Shark (east coast population)

Latin Name

Carcharias taurus

EPBC Status	FM / TSC Listing
Critically Endangered	Critically Endangered



Distribution across Australia

The Grey Nurse Shark (east coast population) is sighted from southern Queensland down the east coast into NSW but infrequently in northern Queensland, Victorian, South Australian and Tasmanian waters. The species is known to have specific aggregation sites yet it is suggested to migrate seasonally along the NSW coast (Pollard *et al.* 1996).

Critical Habitat Resources in Australia

Many of the known aggregation sites for Grey Nurse Sharks (eastern Australian population) have been declared critical habitat for the species and are protected by both state and federal legislation. Ten areas in NSW have been declared as critical habitat for the Grey Nurse Shark; these include Little Broughton Island and The Pinnacle, both within Port Stephens-Great Lakes Marine Park (approximately 10 km and 60 km, respectively, away from the proposed Research Lease).

Important Habitat Values for the Species

Grey Nurse Sharks utilise shallow rocky reefs with small sandy gutters. Many aggregation locations for this species have been protected as critical habitat; however their entire range and movement patterns (especially with respect to nocturnal activities and feeding) have not yet been quantified. It has also been suggested the movement and aggregation of the species differs by genders and age (Otway and Parker 2000).

Recognised Threats and Potential Impact(s) of the Proposal

The Grey Nurse Shark has been the subject of targeted fishing in Australia with catches recorded since the late 1800's. Grey Nurse Sharks are now protected from all forms of fishing however accidental bycatch by commercial or recreational fishers continues further, discarded gear has resulted in injury via entanglement or ingestion, sometimes without recovery. Potential threats which marine finfish aquaculture may pose to sharks include entanglement in infrastructure, change of distribution through attraction to stock or removal of foraging habitat.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and the reporting of incidents.
2. Deceased stock will be removed according to industry best practice and a demand feeding regime will be adopted to minimise excess food in the water column. This will lessen the attraction of wild fish and therefore, potential predators. All waste products and feed bins will be securely covered and disposed of appropriately.
3. The proposed lease represents a relatively small proportion of the total foraging habitat available in the wider area and will not isolate any area of this habitat.



Monitoring and Management

Entanglements and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impacts on the Grey Nurse Shark.

Sharks

Common Name

Great White Shark

Latin Name

Carcharodon carcharias

EPBC Status	FM / TSC Listing
Vulnerable, Migratory	Vulnerable



Distribution across Australia

The white shark is widely distributed across temperate and subtropical Australia from Moreton Bay in southern Queensland around the southern coastline to the North West Cape (WA) (Bruce & Bradford, 2008). This species distribution is not uniform along the coastline with more frequent observations being made near pinniped (seal) colonies. Aggregations of juveniles have also been suggested (Bruce & Bradford, 2008). The animals visit inshore areas such as bays and estuaries as well as the open ocean (Bruce, 2008).

Critical Habitat Resources in Australia

No critical habitat has been declared for the species in Australia, however three primary residency regions have been identified in eastern Australia: Corner Inlet/Lakes Entrance (Victoria), Fraser Island (Queensland) and Stockton Beach/Hawks Nest (NSW). Stockton Beach starts 20 km from the proposed marine research lease and extends 32 km south, while Hawks Nest begins 3 km west of the site and extends 12 km north.

Important Habitat Values for the Species

The Great White Shark can be found in diverse habitats from open oceans, continental shelf and slope areas, inshore to rocky reefs, surf beaches and bays and estuaries (Web Reference 1). This species life cycle and thus habitat requirements are poorly understood (Bruce & Bradford, 2008). Great White Sharks are known to range widely: an example is a shark tagged in Neptunes (SA) which swam across the Tasman Sea to New Zealand and also to a depth of 1000m (Web Reference 1).

Recognised Threats and Potential Impact(s) of the Proposal

Recognised threats to the Great White Shark include incidental capture by commercial and recreational fishers, historic game fishing, beach meshing and baiting for human protection, entanglement or ingestion of discarded gear, illegal trade (both within Australia and overseas) and tourism activities (Web Reference 1). Potential threats which marine finfish aquaculture may pose to sharks include entanglement in infrastructure, change of distribution through attraction to stock or removal of foraging habitat.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglements, including procedures to be followed, training and equipment required, and reporting incidents.
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3. The proposed lease represents a relatively small proportion of the total foraging habitat available in the wider area and will not isolate any area of this habitat.



Monitoring and Management

Entanglements and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impacts on the Great White Shark.

Sharks

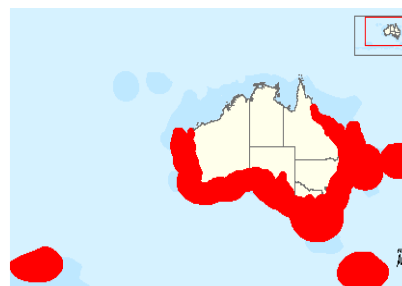
Common Name

Mackerel Shark, Porbeagle

Latin Name

Lamna nasus

EPBC Status	FM / TSC Listing
Migratory	



Distribution across Australia

The Mackerel Shark is widely distributed in the cold and temperate marine waters of the Southern Hemisphere and the North Atlantic. It inhabits Australian waters ranging from southern Western Australia to southern Queensland.

Critical Habitat Resources in Australia

No critical habitat has been declared for the species in Australia.

Important Habitat Values for the Species

The Mackerel Shark can be found in diverse habitats from deep open ocean to very shallow inshore areas but is most commonly found over food-rich banks on the outer continental shelf. This species conducts long distance seasonal migrations and in the South Pacific the population shifts north past 30°S into subtropical waters during winter and spring while in summer the Mackerel Shark retreats south past 35°S. The Mackerel Shark is an opportunistic hunter that predominately preys on bony fishes and cephalopods.

Recognised Threats and Potential Impact(s) of the Proposal

Recognised threats to the Mackerel Shark include capture by commercial and recreational fishers, sport fishing, by-catch, beach meshing for human protection and entanglement or ingestion of discarded gear (Web Reference 1). Potential threats which marine finfish aquaculture may pose to sharks include entanglement in infrastructure, change of distribution through attraction to stock or removal of foraging habitat.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. A Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and the reporting of incidents.
2. Deceased stock will be removed according to industry best practice and a demand feeding regime will be adopted to minimise excess food in the water column. This will lessen the attraction of wild fish and therefore, potential predators. All waste products and feed bins will be securely covered and disposed of appropriately.
3. The proposed lease represents a relatively small proportion of the total foraging habitat available in the wider area and will not isolate any area of this habitat.

Monitoring and Management

Entanglements and water quality will be monitored and reviewed on a regular basis.



Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impacts on the Mackerel Shark.

Sharks

Common Name

Green Sawfish, Dindagubba, Narrowsnout Sawfish

Latin Name

Pristis zijsron

EPBC Status	FM / TSC Listing
Vulnerable	Extinct



Distribution across Australia

The Green Sawfish has been found from southern NSW waters north around to Broome in WA. Records of the last 40 years have not seen the species south of northern Queensland and it is now presumed extinct in NSW (Web Reference 4).

Critical Habitat Resources in Australia

There are no critical habitat resources for the Green Sawfish within the wider study area.

Important Habitat Values for the Species

This species has been recorded in inshore, estuarine and offshore waters with sandy and buddy benthic habitats (Web Reference 4). Their diet consists of mullet, molluscs and small crustaceans which they capture using a combination of a shoaling and a sweeping method (Web Reference 4).

Recognised Threats and Potential Impact(s) of the Proposal

Recognised threats to the Green Sawfish include incidental catch by commercial and recreational fishers, change in their soft sediment habitats, shark fining, habitat degradation, Australian Indigenous harvesting and reproduction constraints (Web Reference 1). Potential threats which marine finfish aquaculture may pose to sharks include entanglement in infrastructure, change of distribution through attraction to stock or removal of foraging habitat.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and the reporting of incidents.
2. Deceased stock will be removed according to industry best practice and a demand feeding regime will be adopted to minimise excess food in the water column. This will lessen the attraction of wild fish and therefore, potential predators. All waste products and feed bins will be securely covered and disposed of appropriately.
3. The proposed lease area does not constitute any part of the current range of the sawfish - it is unlikely that the Research Lease would remove or fragment sawfish habitat.

Monitoring and Management

Entanglements, water quality and the benthic environment will be monitored and reviewed on a regular basis.



Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impacts on the Green Sawfish.

Sharks

Common Name

Whale Shark

Latin Name

Rhincodon typus

EPBC Status	FM / TSC Listing
Critically Endangered	N/A



Distribution across Australia

Whale Sharks are known to occur in New South Wales, Queensland, Northern Territory, Western Australia, Christmas Island, Indian Ocean and occasionally South Australia and Victoria. The species is thought to be primarily pelagic and highly migratory (Web Reference 1).

Critical Habitat Resources in Australia

Important habitats for the Whale Shark within the Australian jurisdiction are known seasonal aggregation areas off Ningaloo Reef in Western Australia (between March and July), Christmas Island (between December and January) and in the Coral Sea (between November and December). Seasonal aggregations off Ningaloo Reef are associated with climatic and oceanographic processes in the region (DEH, 2005).

Important Habitat Values for the Species

The Whale Shark is a slow moving filter feeding shark which is the largest species of fish, growing up to 20 m (DEH 2005). The Whale Shark inhabits tropical to warm-temperate oceans worldwide. Seasonal aggregations are also known to occur outside Australian jurisdiction in a number of range states such as the Philippines, Belize and the Maldives.

Recognised Threats and Potential Impact(s) of the Proposal

Commercial harvest is the main threat to the species outside of Australian waters, whereas competition with fisheries, habitat damage, pollution, disease and direct disturbance from tourism are considered potential threats within Australian jurisdiction. At present none of these potential threats are thought to have an impact on the number of Whale Sharks visiting Australian waters (DEH 2005). Potential threats to the species from the proposed Research Lease include entanglement with or injury from marine debris and removal of foraging habitat.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and the reporting of incidents.
2. All waste products and feed bins will be securely covered and disposed of appropriately.
3. The proposed Research Lease represents a relatively small proportion of the total foraging habitat available in the wider area and will not isolate any area of this habitat.

Monitoring and Management

Entanglements and water quality will be monitored and reviewed on a regular basis.



Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impacts on the Whale Shark.

Marine Mammals

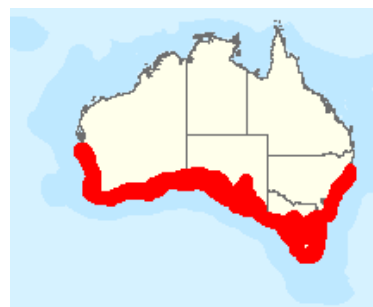
Common Name

New Zealand fur seal

Latin Name

Arctocephalus forsteri

EPBC Status	FM / TSC Listing
Listed Marine Species	Vulnerable



Distribution across Australia

In Australian waters, the New Zealand fur seal has been reported from Western Australia, South Australia, Victoria, Tasmania (including Macquarie Island), New South Wales and Queensland (south of Fraser Island).

Critical Habitat Resources in Australia

Important breeding habitats for the New Zealand fur seal within the Australian jurisdiction include islands off Western Australia, South Australia and Tasmania (including Macquarie Island). There are numerous locations around the coast of Australia that represent important habitat for non-breeding colonies, including Montague Island near Narooma in NSW (Shaughnesy et al. 2001).

Important Habitat Values for the Species

The preferred habitat of this species for breeding and haul-out sites is rocky platforms and islands but it appears to avoid exposed rock platforms and sandy and pebbly beaches. New Zealand fur seals congregate at specific sites between October and mid-January to breed. New Zealand fur seal foraging habitat includes both shallow inshore waters and the margins of the continental shelf where it feeds on cephalopods, bony fish and seabirds.

Recognised Threats and Potential Impact(s) of the Proposal

Recognised threats to this species include commercial and recreational fishing operations, particularly bycatch mortality, reduced food availability and entanglement or ingestion of plastic debris. Increased risk of boat strikes, increased acoustic pollution due to increased boating activity, reduced foraging habitat availability and entanglements in sea cage infrastructure are some of the potential threats associated with the proposed Research Lease to New Zealand fur seals.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and reporting incidents to relevant agencies. Deceased stock will be removed according to industry best practice and a demand feeding regime will be adopted to minimise excess food in the water column. This will lessen the attraction of wild fish and therefore, potential predators.
2. Boating traffic and noise associated with the proposed Research Lease will be kept to a minimum and safe boating practices in relation to marine fauna will form a component of the mandatory training for all Research Lease field staff.
3. The proposed lease represents a relatively small proportion of the total foraging habitat available in the wider area and will not isolate any area of this habitat.



Monitoring and Management

Entanglements, as well as the impact of boat traffic and noise will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impact on the New Zealand fur seal.

Marine Mammals

Common Name

Australo-african fur seal

Latin Name

Arctocephalus pusillus



EPBC Status	FM / TSC Listing
Listed Marine Species	Vulnerable

Distribution across Australia

The australo-african fur seal is found around Bass Strait, Tasmania, southern Victoria, on islands off South Australia and along the coast of NSW up to the Mid North Coast (Shaughnessy, 1999).

Critical Habitat Resources in Australia

There are ten locations along the Victorian coast and Tasmanian islands in Bass Strait where the australo-african fur seal breeds. There are also a number of non-breeding colonies between Jervis Bay in NSW and Kangaroo Island in South Australia (Web Reference 4). Montague Island near Narooma is the main haul-out site in NSW but Green Cape (far south coast) and Steamers Beach (south of Jervis Bay) are also regular haul-out sites within NSW waters.

Important Habitat Values for the Species

The preferred habitat of this species for breeding and haul-out sites is rocky islands, and includes pebble and boulder beaches and gentle sloping rock ledges (Shaughnessy, 1999). Breeding colonies form between October and January with males coming ashore first to establish territories. Foraging habitat includes inshore waters of a depth up to 200 m with its diet consisting of cephalopods, bony fish and crustaceans.

Recognised Threats and Potential Impact(s) of the Proposal

Recognised threats to this species include commercial and recreational fishing operations, particularly bycatch mortality, reduced food availability and entanglement or ingestion of plastic debris. Increased risk of boat strikes, increased acoustic pollution due to increased boating activity, reduced foraging habitat availability and entanglements in sea cage infrastructure are some of the potential threats associated with the proposal to australo-african fur seals.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and reporting incidents to relevant agencies. Deceased stock will be removed according to industry best practice and a demand feeding regime will be adopted to minimise excess food in the water column. This will lessen the attraction of wild fish and therefore, potential predators.
2. Boating traffic and noise associated with the proposal will be kept to a minimum and safe boating practices in relation to marine fauna will form a component of the mandatory training for all Research Lease field staff.
3. The proposed lease represents a relatively small proportion of the total foraging habitat available in the wider area and will not isolate any area of this habitat.



Monitoring and Management

Entanglements, as well as the impact of boat traffic and noise will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impact on the australo-african fur seal.

Marine Mammals

Common Name

Minke whale

Latin Name

Balaenoptera acutorostrata

EPBC Status	FM / TSC Listing
Cetacean	N/A



Distribution across Australia

In Australia, the minke whale is recorded off the coast of Queensland, New South Wales, Victoria, Tasmania, South Australia and Western Australia (Web Reference 1).

Critical Habitat Resources in Australia

No habitat critical to the survival of the minke whale occurs in the wider study area.

Important Habitat Values for the Species

Minke whales migrate seasonally and inhabit polar, temperate and tropical areas but are considered to prefer cooler waters. This species is found within coastal and offshore areas and is a seasonal feeder with a diet consisting of krill, copepods and small schooling fish, such as sardines, herring and anchovies (Web Reference 1).

Recognised Threats and Potential Impact(s) of the Proposal

Global threats to the minke whale include pollution, direct disturbance from seismic and defence operations, collision with large vessels, entanglement in fishing gear, overfishing of krill and climate change (Web Reference 1). Some of the potential threats associated with the proposed Research Lease include increased risk of boat strikes, increased acoustic pollution due to increased boating activity, reduced foraging habitat availability, entanglement in sea cage infrastructure and declining water quality.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and reporting incidents.
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3. Boating traffic and noise associated with the proposal will be kept to a minimum and safe boating practices in relation to marine fauna will form a component of the mandatory training for all Research Lease field staff.
4. The proposed lease represents a relatively small proportion of the total foraging habitat available in the wider area and will not isolate any area of this habitat.



Monitoring and Management

Entanglements, the impact of boat traffic and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impact on the minke whale.

Marine Mammals

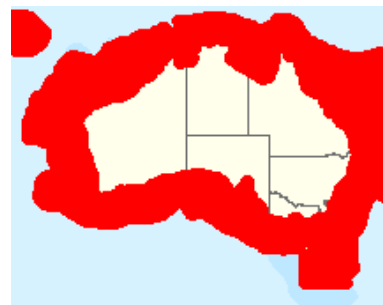
Common Name

Common dolphin, short-beaked common dolphin

Latin Name

Delphinus delphis

EPBC Status	FM / TSC Listing
Cetacean	N/A



Distribution across Australia

In Australia, the common dolphin is recorded in all states and territories but is predominately found in southern Australian waters (Web Reference 1).

Critical Habitat Resources in Australia

The common dolphin inhabits offshore waters and there appears to be two main locations within Australian jurisdiction which this species inhabits - the southern south-eastern Indian Ocean and the Tasman Sea (Web Reference 1). However, no habitat critical to the survival of the common dolphin occurs in the wider study area.

Important Habitat Values for the Species

The common dolphin occurs in temperate, subtropical and tropical areas inhabiting neritic, pelagic and oceanic waters. This species is an opportunistic feeder preying upon shoaling and mesopelagic fish and cephalopods (Web Reference 1).

Recognised Threats and Potential Impact(s) of the Proposal

Global threats to the common dolphin include incidental catch, pollution, habitat degradation, environmental changes, competition with fisheries and direct catch (Web Reference 1). Potential threats associated with the proposal include increased risk of boat strikes, increased acoustic pollution due to increased boating activity, reduced foraging habitat availability, entanglement in sea cage infrastructure and ingestion of marine debris.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and reporting incidents to relevant agencies. Deceased stock will be removed according to industry best practice and a demand feeding regime will be adopted to minimise excess food in the water column. This will lessen the attraction of wild fish and therefore, potential predators.
2. Boating traffic and noise associated with the proposal will be kept to a minimum and safe boating practices in relation to marine fauna will form a component of the mandatory training for all Research Lease field staff.
3. The proposed lease represents a relatively small proportion of the total foraging habitat available in the wider area and will not isolate any area of this habitat.



Monitoring and Management

Entanglements and the impact of boat traffic will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impact on the common dolphin.

Marine Mammals

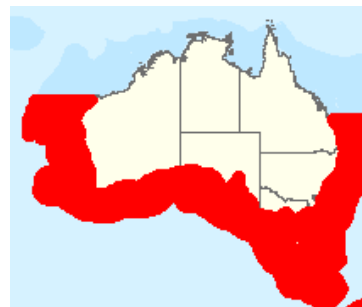
Common Name

Southern right whale

Latin Name

Eubalaena australis

EPBC Status	FM / TSC Listing
Endangered, Migratory	Vulnerable



Distribution across Australia

Southern right whales are seasonally recorded in the coastal waters of all Australian states ranging from Hervey Bay and Stradbroke Island in Queensland and around the southern coastline, including Tasmania, to Exmouth in Western Australia.

Critical Habitat Resources in Australia

Habitat important to the survival of the species are those areas known to seasonally support significant aggregations of whales and those ecosystem processes upon which southern right whales rely. Significant calving areas are located in Victoria, South Australia and Western Australia, generally consisting of shallow (5-10 m) gradually sloping protected bays. It is thought likely that foraging habitat is related to oceanographic parameters and ecological processes affecting concentration and distribution across Australia of prey which consists predominantly of zooplankton. Southern right whales are known to be present along the east coast of Australia between May and November. No habitat considered important for southern right whales occurs in the direct area of the proposed Research Lease.

Important Habitat Values for the Species

There is limited information on the southern right whale's feeding and migratory habitat but it is thought to be related to bathymetric and oceanographic parameters and ecological processes affecting prey concentration (Web Reference 1). The diet of the southern right whale consists of euphausiids, copepod and amphipod crustaceans.

Recognised Threats and Potential Impact(s) of the Proposal

Global threats to the southern right whale include expansion of scientific whaling, habitat degradation, pollution, climate and oceanographic change and prey depletion due to over harvesting (Web Reference 1). Potential threats associated with the proposal include increased risk of boat strikes, increased acoustic pollution due to increased boating activity, reduced foraging habitat availability, entanglement in sea cage infrastructure and ingestion of marine debris.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and reporting incidents to relevant agencies. Deceased stock will be removed according to industry best practice and a demand feeding regime will be adopted to minimise excess food in the water column. This will lessen the attraction of wild fish and therefore, potential predators.
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3. The proposed lease represents a relatively small proportion of the total foraging habitat available in the wider area and will not isolate any area of this habitat.



Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impact on the southern right whale.

Marine Mammals

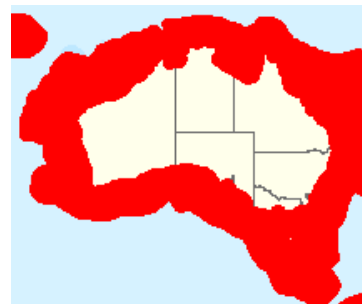
Common Name

Risso's dolphin, Grampus

Latin Name

Grampus griseus

EPBC Status	FM / TSC Listing
Cetacean	N/A



Distribution across Australia

In Australia, there are records of the risso's dolphin off the coast of all Australian states except Tasmania and the Northern Territory (Web Reference 1).

Critical Habitat Resources in Australia

The only suspected 'resident' population of risso's dolphins in Australia is located around Fraser Island in Queensland (Web Reference 1). No habitat critical to the survival of the risso's dolphin occurs in the wider study area.

Important Habitat Values for the Species

The risso's dolphin inhabits inshore and offshore waters in subantarctic, temperate, subtropical and tropical regions. However, this species is predominately oceanic and pelagic and appears to have a preference for warm temperate to tropical waters. The risso's dolphin is frequently sighted over the continental slope in waters deeper than 1000 m and has a diet consisting of squid, octopus and fish (Web Reference 1).

Recognised Threats and Potential Impact(s) of the Proposal

Global threats to the risso's dolphin include direct and incidental catch, pollution, acoustic pollution, habitat degradation, tourism, overfishing, intentional killing, live capture and shark nets (Web Reference 1). Some of the potential threats associated with the proposal include increased risk of boat strikes, increased acoustic pollution from boating activity, reduced foraging habitat availability, entanglement in sea cage infrastructure and ingestion of plastic debris.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and reporting incidents to relevant agencies.
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4. The proposed lease represents a relatively small proportion of the total foraging habitat available in the wider area and will not isolate any area of this habitat.



Monitoring and Management

Entanglements, the impact of boat traffic and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impact on the risso's dolphin.

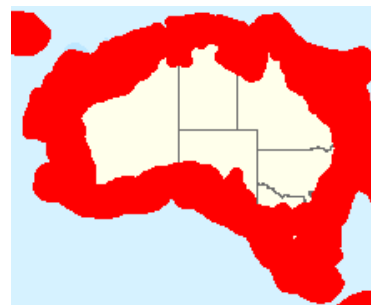
Marine Mammals

Common Name

Humpback whale

Latin Name

Megaptera novaeangliae



EPBC Status	FM / TSC Listing
Vulnerable, Migratory	Vulnerable

Distribution across Australia

In Australia, humpback whales are distributed throughout the Australian Antarctic, Commonwealth offshore, State and Territory waters. Humpback whales travel northward to breeding areas between May and July and return southward to their sub-Antarctic feeding grounds between September and November. Calving grounds are found along the mid and northern parts of the east and west coasts and feeding grounds in the Southern Ocean. Northern and southern hemisphere populations are thought to be genetically distinct due to their temporal migration separation (Web Reference 1).

Critical Habitat Resources in Australia

Habitat important and potentially critical to the survival of humpback whales is defined as those areas known to seasonally support significant aggregations of whales and those ecosystem processes upon which they rely. Calving, resting and feeding areas and also certain sections of migratory pathways are considered of particular importance. Feeding usually takes place in productive Antarctic waters where Antarctic krill (a primary food source for hump back whales) is concentrated, although some feeding behaviour has been reported near mainland Australia. Important calving areas within Australian waters include the Great Barrier Reef complex and southern Kimberley between Broome and the northern end of Camden Sound. Important migratory pathways include Abrolhos and Geraldton Islands, Point Cloats to North West Cape in Western Australia, Cape Byron in NSW and east of Moreton and Stradbroke Island in Queensland. Twofold Bay in NSW, the Whitsundays, Moreton Bay, Hervey Bay, Bell Cay, the Palm Island Group and the Swain Reefs in Queensland, as well as Geographe Bay, Exmouth Gulf and around Houtman Abrolhos Islands in Western Australia are some important resting areas for the humpback whales (Web Reference 1).

Important Habitat Values for the Species

Humpback whales inhabit the ice-edge in their Antarctic feeding grounds (south of 55° S) during summer. Their diet consists of krill, predominately *Euphausia superba*, which are consumed using a variety of feeding methods such as 'lunge feeding' and 'bubble feeding'. In winter, this species migrates to warmer waters to mate and pregnant females give birth to calves near islands and atolls (Web Reference 1).

Recognised Threats and Potential Impact(s) of the Proposal

Global threats to the humpback whale include expansion of scientific whaling, pollution, direct disturbance from seismic and defence operations, collision with large vessels, entanglement in fishing gear, climate change, habitat degradation and prey depletion due to over harvesting (Web Reference 1). Some of the potential threats associated with the proposed Research Lease include increased risk of boat strikes, increased acoustic pollution due to increased boating activity, reduced foraging habitat availability, entanglement in sea cage infrastructure and ingestion of marine debris.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and reporting incidents to relevant agencies.
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3. Boating traffic and noise associated with the proposal will be kept to a minimum and safe boating practices in relation to marine fauna will form a component of the mandatory training for all Research Lease field staff.

4. The proposed lease represents a relatively small proportion of the total foraging habitat available in the wider area and will not isolate any area of this habitat.



Monitoring and Management

Entanglements, the impact of boat traffic and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impact on the humpback whale.

Marine Mammals

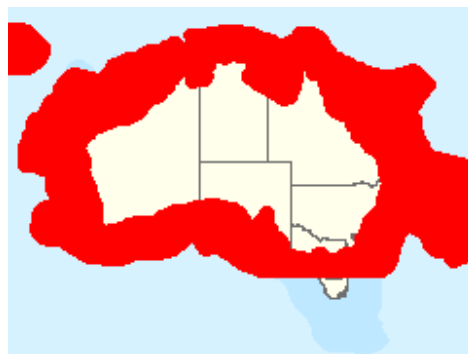
Common Name

Bryde's whale

Latin Name

Balaenoptera edeni

EPBC Status	FM / TSC Listing
Migratory,	N/A



Distribution across Australia

Bryde's whale is present in temperate to tropical waters being restricted to latitudes of 40°N and 40°S inhabiting inshore and offshore environments. In Australia, bryde's whale has been recorded in every state except Northern Territory with a sighting in NSW and Victoria, and multiple strandings of the species in the other states (Web Reference 1).

Critical Habitat Resources in Australia

No habitat critical to the survival of bryde's whale occurs in the wider study area.

Important Habitat Values for the Species

There are two forms of bryde's whale that inhabit and utilise different habitats. The coastal form of bryde's whale occupy the 200 m depth isobar travelling up the coast for available prey, where the offshore form is found in deeper waters of 500-1000 m (Web Reference 1). Both forms of bryde's whale use the upper layers of the ocean and are therefore are recognised as pelagic species (Web Reference 1).

Recognised Threats and Potential Impact(s) of the Proposal

Global threats to bryde's whale include pollution, scientific whaling, direct disturbance possibly from seismic and/or defence operations, collision with large vessels, entanglement in fishing gear, and interactions with fisheries (Web Reference 1). Some of the potential threats associated with the proposed Research Lease include increased risk of boat strikes, increased acoustic pollution due to increased boating activity, reduced foraging habitat availability, entanglement in sea cage infrastructure and declining water quality.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and reporting incidents to relevant agencies.
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4. The proposed lease represents a relatively small proportion of the total foraging habitat available in the wider area and will not isolate any area of this habitat.



Monitoring and Management

Entanglements, the impact of boat traffic and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impact on the bryde's whale.

Marine Mammals

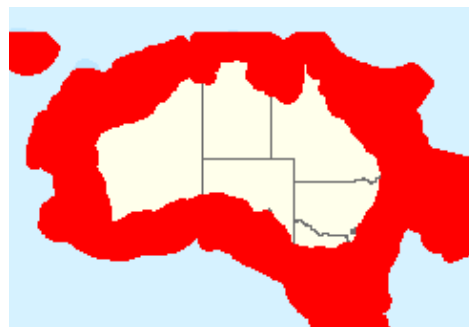
Common Name

Blue whale

Latin Name

Balaenoptera musculus

EPBC Status	FM / TSC Listing
Migratory, Endangered	Endangered



Distribution across Australia

The blue whale has a cosmopolitan distribution in tropical to Antarctic waters. In Australia, the blue whale is widespread occurring around the entire coastline at various times of the year. These waters are used predominantly for opportunistic feeding or as part of a migration route. However, there are three known significant feeding areas around the southern continental shelf - Perth Canyon, the Bonney Upwelling and adjacent upwelling areas of South Australia and Victoria.

Critical Habitat Resources in Australia

While there are three significant feeding areas for the blue whale on the southern coast of Australia, there is no habitat critical to the survival of this species occurring in the direct or wider study area.

Important Habitat Values for the Species

The blue whale has highly variable habitat requirements, from migrating to polar regions in summer, upwelling areas for feeding and deep water adjacent to tropical island groups for breeding (Web Reference 1). In these polar regions, blue whales feed on krill but are also known to feed on fish and squid (Web Reference 1).

Recognised Threats and Potential Impact(s) of the Proposal

Global threats to the blue whale include scientific whaling, habitat degradation, climate change, prey depletion from over harvesting, direct disturbance possibly from seismic and/or defence operations, collision with large vessels, entanglement in fishing gear and low reproduction rates (Web Reference 1). Some of the potential threats associated with the proposed Research Lease include increased risk of boat strikes, increased acoustic pollution due to increased boating activity, reduced foraging habitat availability, entanglement in sea cage infrastructure and declining water quality.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and reporting incidents to relevant agencies.
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4. The proposed Research Lease represents a relatively small proportion of the total foraging habitat available in the wider area and will not isolate any area of this habitat.



Monitoring and Management

Entanglements, the impact of boat traffic and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impact on the blue whale.

Marine Mammals

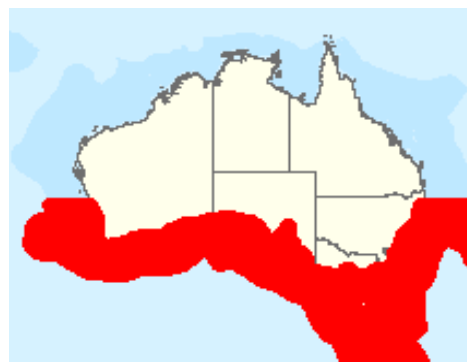
Common Name

Pygmy right whale

Latin Name

Caperea marginata

EPBC Status	FM / TSC Listing
Migratory	N/A



Distribution across Australia

The pygmy right whale has been recorded intermittently on the Australian coastline between 32° N and 47° S. The northern distribution of the pygmy right whale may be limited to the east and west coasts due to the south flowing East Australian Current (EAC) and the Leeuwin Current (Web Reference 1).

Critical Habitat Resources in Australia

No habitat critical to the survival of pygmy right whale occurs in the direct or wider study area.

Important Habitat Values for the Species

Pygmy right whales have been reported to inhabit significant feeding areas associated with upwellings and with high zooplankton abundance, particularly copepods and small euphausiids, which comprise their main prey (Web Reference 1). These coastal upwelling events appear to be an essential factor in regulating pygmy right whale distribution. Pygmy right whales do not appear to be deep divers implying that they principally inhabit the pelagic zone of oceanic waters.

Recognised Threats and Potential Impact(s) of the Proposal

Global threats to the pygmy right whale include scientific whaling, habitat degradation, climate change, collision with large vessels and entanglement in fishing gear (Web Reference 1). Some of the potential threats associated with the proposed Research Lease include increased risk of boat strikes, increased acoustic pollution due to increased boating activity, reduced foraging habitat availability, entanglement in sea cage infrastructure and declining water quality.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and reporting incidents to relevant agencies.
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4. The proposed lease represents a relatively small proportion of the total foraging habitat available in the wider area and will not isolate any area of this habitat.



Monitoring and Management

Entanglements, the impact of boat traffic and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impact on the pygmy right whale.

Marine Mammals

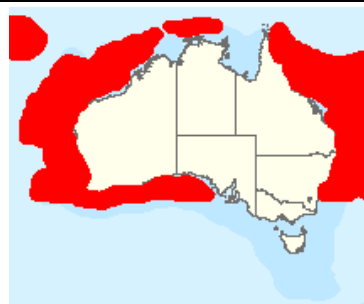
Common Name

Killer whale, orca

Latin Name

Orcinus orca

EPBC Status	FM / TSC Listing
Migratory	N/A



Distribution across Australia

The killer whale is found in all seas and oceans of the world usually in family groups. Concentrations have been reported around Tasmania but this species has been recorded from all States of Australia.

Critical Habitat Resources in Australia

No habitat critical to the survival of the killer whale occurs in the direct or wider study area.

Important Habitat Values for the Species

The species occurs in most habitat types from coastal areas to the deep ocean waters, from the tropics to polar regions although sightings near the coast of NSW are rare. These animals are carnivores and one of the most efficient large predators of the ocean. They often work in packs, and will take a broad range of vertebrates including other whales, seals, penguins, fish, sea otters, and turtles. Killer whales have marked territorial behaviour and home ranges. Their prey is determined by what is available in their home range but they also seek out areas of seasonal abundance such as seal pupping sites.

Recognised Threats and Potential Impact(s) of the Proposal

Global threats to the killer whale include pollution, incidental capture, interactions with fisheries, targeted hunting (Web Reference 1). Some of the potential threats associated with the proposed Research Lease include acoustic pollution, reduced foraging habitat availability, entanglement in sea cage infrastructure and ingestion of marine debris.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and reporting incidents to relevant agencies.
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4. The proposed lease represents a relatively small proportion of the total foraging habitat available in the wider area and will not isolate any area of this habitat.



Monitoring and Management

Entanglements and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impact on the killer whale.

Marine Mammals

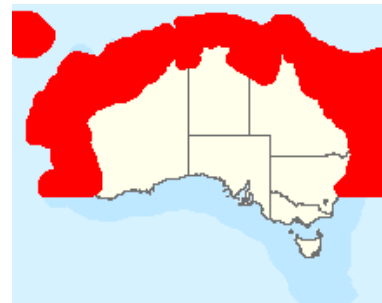
Common Name

Spotted dolphin, pantropical spotted dolphin

Latin Name

Stenella attenuate

EPBC Status	FM / TSC Listing
Cetacean	N/A



Distribution across Australia

In Australia, there are records of the spotted dolphin off the coast of New South Wales, Queensland, Northern Territory and Western Australia (down south to Augusta).

Critical Habitat Resources in Australia

No habitat critical to the survival of the spotted dolphin occurs in the direct or wider study area.

Important Habitat Values for the Species

The spotted dolphin predominately inhabits near shore and oceanic habitats in tropical and warm temperate waters but it has also been sighted on the shelf and along the continental slope. The diet of the spotted dolphin consists of squids, epipelagic and mesopelagic fish, nemertean worms and crab larvae (Web Reference 1).

Recognised Threats and Potential Impact(s) of the Proposal

Global threats to the spotted dolphin include direct and incidental catch, pollution, acoustic pollution, habitat degradation, tourism, overfishing, intentional killing, live capture and shark nets (Web Reference 1). Some of the potential threats associated with the proposal include increased risk of boat strikes, increased acoustic pollution from boating activity, reduced foraging habitat availability, entanglement in sea cage infrastructure and ingestion of plastic debris.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and reporting incidents.
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4. The proposed lease represents a relatively small proportion of the total foraging habitat available in the wider area and will not isolate any area of this habitat.

Monitoring and Management



Entanglements, the impact of boat traffic and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impact on the spotted dolphin.

Marine Mammals

Common Name

Indo-Pacific, Indian ocean, spotted bottlenose dolphin

Latin Name

Tursiops aduncus

EPBC Status	FM / TSC Listing
Cetacean	N/A



Distribution across Australia

There are records of the Indo-Pacific bottlenose dolphin in northern, eastern and western Australia.

Critical Habitat Resources in Australia

There are four main regions around Australia in which Indo-Pacific bottlenose dolphins are known to inhabit - the Coral Sea, the Tasman Sea, the eastern Indian Ocean and the Arafura/Timor Seas (Web Reference 1). However, no habitat critical to the survival of this species occurs in the wider study area.

Important Habitat Values for the Species

The Indo-Pacific bottlenose dolphin occurs in inshore areas including estuaries, nearshore waters and bays, as well as shallow offshore waters and open coast environments where they feed on a variety of fish and cephalopods.

Recognised Threats and Potential Impact(s) of the Proposal

Global threats to the Indo-Pacific bottlenose dolphin include direct and incidental catch, pollution, acoustic pollution, habitat degradation, tourism, overfishing, intentional killing, live capture and shark nets (Web Reference 1). Some of the potential threats associated with the proposal include increased risk of boat strikes, increased acoustic pollution from boating activity, reduced foraging habitat availability and entanglement in sea cage infrastructure.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and reporting incidents to relevant agencies.
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4. The proposed lease represents a relatively small proportion of the total foraging habitat available in the wider area and will not isolate any area of this habitat.



Monitoring and Management

Entanglements, the impact of boat traffic and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impact on the Indo-Pacific bottlenose dolphin.

Marine Mammals

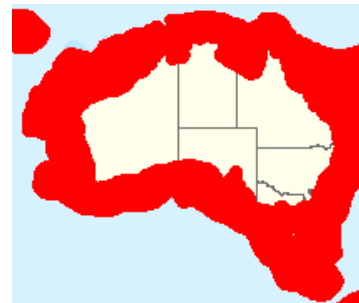
Common Name

Bottlenose dolphin

Latin Name

Tursiops truncatus s str.

EPBC Status	FM / TSC Listing
Cetacean	N/A



Distribution across Australia

In Australia, there are records of the bottlenose dolphin in south-western Western Australia, South Australia, Tasmania, New South Wales and Queensland.

Critical Habitat Resources in Australia

The bottlenose dolphin generally inhabits offshore waters deeper than 30 m but is also found in shallow coastal waters. There appears to be two main locations within Australian jurisdiction which this species inhabits - the South Pacific Ocean and the southern Indian Ocean.

Important Habitat Values for the Species

The bottlenose dolphin occurs in all temperate and tropical waters inhabiting inshore areas, such as lagoons, estuaries, bays and open coast, as well as offshore areas such as oceanic island coasts. Consequently, this species is associated with many types of substrate and habitats, including mud, sand, reefs, mangroves and seagrass beds. Bottlenose dolphins are opportunistic feeders preying upon mesopelagic fish and squid.

Recognised Threats and Potential Impact(s) of the Proposal

Global threats to the bottlenose dolphin include direct and incidental catch, pollution, acoustic pollution, habitat degradation, tourism, overfishing, intentional killing, live capture and shark nets (Web Reference 1). Some of the potential threats associated with the proposal include increased risk of boat strikes, increased acoustic pollution from boating activity, reduced foraging habitat availability, entanglement in sea cage infrastructure and ingestion of plastic debris.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and reporting incidents.
2. Deceased stock will be removed according to industry best practice and a demand feeding regime will be adopted to minimise excess food in the water column. This will lessen the attraction of wild fish and therefore, potential predators.
3. Boating traffic and noise associated with the proposal will be kept to a minimum and safe boating practices in relation to marine fauna will form a component of the mandatory training for all Research Lease field staff.
4. The proposed lease represents a relatively small proportion of the total foraging habitat available in the wider area and will not isolate any area of this habitat.

Monitoring and Management

Entanglements, the impact of boat traffic and water quality will be monitored and reviewed on a regular basis.



Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impact on the bottlenose dolphin.

Marine Mammals

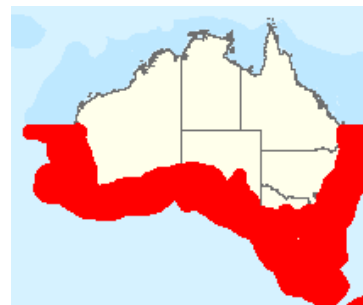
Common Name

Dusky dolphin

Latin Name

Lagenorhynchus obscurus

EPBC Status	FM / TSC Listing
Migratory	N/A



Distribution across Australia

Dusky dolphins are southern hemisphere dolphins usually found in temperate waters and often seen in large groups of hundreds. They can be seen inshore in the warmer months and may frequent bays. Low rates of observations or strandings suggest that the dusky dolphin is rare along the south-east Australian coast and are unlikely to be resident.

Critical Habitat Resources in Australia

No habitat critical to the survival of the dusky dolphin occurs in the wider study area.

Important Habitat Values for the Species

The dusky dolphin predominately inhabits inshore waters in sub-Antarctic and temperate areas but is also considered to be pelagic (Web Reference 1). This species is often found over the continental shelf and slope preferring waters with surface temperatures between 10 °C and 18 °C. The dusky dolphins diet consists of a range of schooling fish, particularly anchovies, as well as squid and lantern fishes (Web Reference 1).

Recognised Threats and Potential Impact(s) of the Proposal

Global threats to the dusky dolphin include direct and incidental catch, pollution, acoustic pollution, habitat degradation, tourism, overfishing, intentional killing, live capture and shark nets (Web Reference 1). Some of the potential threats associated with the proposal include increased risk of boat strikes, increased acoustic pollution from boating activity, reduced foraging habitat availability, entanglement in sea cage infrastructure and ingestion of plastic debris.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and reporting incidents.
2. Deceased stock will be removed according to industry best practice and a demand feeding regime will be adopted to minimise excess food in the water column. This will lessen the attraction of wild fish and therefore, potential predators.
3. Boating traffic and noise associated with the proposal will be kept to a minimum and safe boating practices in relation to marine fauna will form a component of the mandatory training for all Research Lease field staff.
4. The proposed lease represents a relatively small proportion of the total foraging habitat available in the wider area and will not isolate any area of this habitat.



Monitoring and Management

Entanglements, the impact of boat traffic and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impact on the dusky dolphin.

Marine Mammals

Common Name

Dugong

Latin Name

Dugong dugon

EPBC Status	FM / TSC Listing
Cetacean	Endangered



Distribution across Australia

Dugongs are recorded in north Australian waters including Moreton Bay, the Gulf of Carpentaria, the Great Barrier Reef in Queensland, as well as Shark Bay and the northern coast of Western Australia. The Dugong occasionally visits the coastal and estuarine waters of NSW (Web Reference 1) where it is suggested that warm currents, low rainfall and availability of seagrass in this locality draws some individuals south of their accepted range.

Critical Habitat Resources in Australia

No critical habitat for the dugong has been declared in NSW. However, dugongs have been sighted in coastal and estuarine waters around Brisbane Water, Lake Macquarie, Port Stephens, and Wallis Lake in 2002/03 but these individuals are thought to be non-breeding vagrants. These areas are associated with some of the largest seagrass beds in NSW and the presence of the dugong in these areas usually coincides with warm water temperatures (>18°C).

Important Habitat Values for the Species

Dugongs are herbivores that eat seagrass and frequent coastal waters, estuarine creeks and streams, wide, shallow protected bays and mangrove channels, the leeward side of inshore islands and offshore areas where the continental shelf is shallow, wide and protected. They like to live in large herds but due to declining numbers are often now found in smaller groups and although they only live where there is seagrass, they may migrate between these areas.

Recognised Threats and Potential Impact(s) of the Proposal

Recognised threats to the dugong include habitat degradation and loss, boat strikes, entanglements and ingestion of marine debris, disease and parasites, tourism and harassment, acoustic disturbance, chemical pollution, incidental catch, indigenous harvest, aquaculture activities and tidal surges (Web Reference 1). Potential threats associated with the proposal include boat strikes, acoustic pollution, reduced foraging habitat availability, water pollution, entanglement in sea cage infrastructure and ingestion of plastic debris.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and reporting incidents.
2. All waste products and feed bins will be securely covered and disposed of appropriately.
3. Boating traffic and noise associated with the proposal will be kept to a minimum and safe boating practices in relation to marine fauna will form a component of the mandatory training for all Research Lease field staff.
4. There is no seagrass in the area of the proposed lease so total foraging habitat available in the area will not be reduced or isolated due to the Research Lease.



Monitoring and Management

Entanglements, the impact of boat traffic and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impact on the dugong.

Marine Mammals

Common Name

Sperm whale

Latin Name

Physeter macrocephalus

EPBC Status	FM / TSC Listing
Cetacean	Vulnerable



Distribution across Australia

Sperm whales have been sighted off the coast of all the Australian states (Web Reference 1). Their distribution is patchy but wide ranging extending from the tropics to the polar pack-ice including the subantarctic islands: Macquarie and Heard. Sperm whales tend to concentrate where the seabed rises steeply from a greater depth beyond the continental shelf.

Critical Habitat Resources in Australia

No habitat critical to the survival of the sperm whale occurs in the wider study area.

Important Habitat Values for the Species

The habitat of the sperm whale is difficult to categorise due to its cosmopolitan nature and its ability to inhabit all oceans. Sperm whales tend to inhabit offshore areas with a water depth of 600 m or more and are uncommon in waters with a depth of less than 300 m. However, there are occasional records of sperm whales occurring inshore in the wider study area. The sperm whales diet consists of cephalopods such as squid and octopus, as well as large demersal fishes such as rays, teleosts and sharks (Web Reference 1).

Recognised Threats and Potential Impact(s) of the Proposal

Recognised threats to the sperm whale include entrapment in fishing gear (including 'ghost nets'), a resumption of legal commercial whaling, collision with large vessels on shipping lanes beyond the edge of the continental shelf and seismic operations in similar areas causing evasive responses. Sperm whales are also threatened by pollution including increasing amounts of plastic debris at sea, oil spills and dumping of industrial wastes into waterways and the sea, leading to bio-accumulation of toxic substances in body tissues. Potential threats associated with the proposal include boat strikes, acoustic pollution, water pollution, entanglement in sea cage infrastructure and ingestion of plastic debris.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and reporting incidents.
2. All waste products and feed bins will be securely covered and disposed of appropriately.
3. Boating traffic and noise associated with the proposal will be kept to a minimum and safe boating practices in relation to marine fauna will form a component of the mandatory training for all Research Lease field staff.



Monitoring and Management

Entanglements, the impact of boat traffic and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Given the rarity of the sperm whales in coastal waters it is unlikely this species would be impacted as a result of the proposal and the Research Lease is therefore not considered to represent a significant threat.

Reptiles

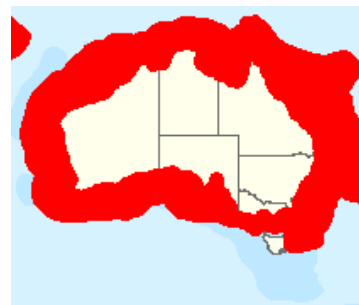
Common Name

Loggerhead turtle

Latin Name

Caretta caretta

EPBC Status	FM / TSC Listing
Endangered, Migratory	Endangered



Distribution across Australia

In Australia, loggerhead turtles have been recorded in tropical and temperate waters off the coasts of New South Wales, Queensland, Northern Territory and Western Australia (Web Reference 1).

Critical Habitat Resources in Australia

There are a number of important nesting sites for the loggerhead turtle along the east coast of Australia, particularly around the southern Great Barrier Reef and along the west coast, notably Shark Bay, North-West Cape, the Muiron Islands region and the northern Dirk Hartog Island Turtle Bay-Cape Levillain coast (Web Reference 5). However, there are no critical habitat resources for the loggerhead turtle in the wider study area of the proposal.

Important Habitat Values for the Species

Hatchlings to sub-adult loggerhead turtles occur in the open ocean foraging on planktonic organisms. Loggerheads turtles enter benthic foraging habitat including coral reefs, estuaries and bays, at a larger size than other hard-shelled sea turtles. Adults and large juveniles feed on jellyfish, sea urchins, shellfish, sponges, crustaceans and algae. The occurrence of the loggerhead turtle in the study area is rare where there is one record of this species occurring in the wider Newcastle study region in 2003 (Web Reference 1).

Recognised Threats and Potential Impact(s) of the Proposal

Recognised threats to the loggerhead turtle include direct harvesting, predation by native fauna, feral animals and pets, fisheries bycatch, entanglement and/or ingestion of marine debris, boat strikes, climate change, coastal development, habitat loss and water quality deterioration. Some of the potential impacts associated with the proposal include entanglement in sea cage infrastructure, water quality deterioration, boat strikes and reduced foraging habitat availability.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglements, including procedures to be followed, training and equipment required, and reporting incidents.
2. Deceased stock will be removed according to industry best practice and a demand feeding regime will be adopted to minimise excess food in the water column. This will lessen the attraction of wild fish and therefore, potential predators.
3. Boating traffic associated with the proposal will be kept to a minimum and safe boating practices in relation to marine fauna will form a component of the mandatory training for all Research Lease field staff.
4. The proposed lease represents a relatively small proportion of the total foraging habitat available in the wider area and will not isolate any area of this habitat.



Monitoring and Management

Entanglements, the impact of boat traffic and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome / Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impact on the loggerhead turtle.

Reptiles

Common Name

Green turtle

Latin Name

Chelonia mydas

EPBC Status	FM / TSC Listing
Vulnerable, Migratory	Vulnerable



Distribution across Australia

Green turtles forage, migrate and nest across tropical northern Australia. This species usually occurs between the 20°C isotherms but occasionally individuals will enter temperate waters (Web Reference 1).

Critical Habitat Resources in Australia

There are a number of important nesting and inter-nesting sites for the green turtle along the Australian coastline including Elizabeth-Middleton Reefs National Marine Reserve off NSW, the Capricorn and Bunker Island Groups, Raine Island, Mon Repos and Western Cape York Peninsula in Queensland, Coburg Peninsula and Rocky Island in Northern Territory and Exmouth Gulf, Muiron Islands, Lacepede Islands and Ningaloo coast in Western Australia (Web Reference 1). However, there are no critical habitat resources for the green turtle in the wider study area of the proposed Research Lease.

Important Habitat Values for the Species

The first five to ten years of the green turtles life is spent drifting in ocean currents. During this pelagic phase this species is often found in association with rafts and driftlines of the macroalgae - *Sargassum*. Green turtles settle in shallow benthic foraging habitats, such as rocky reefs or coral reefs, when they reach a curved carapace length of 30 to 40 cm. The diet of juvenile green turtles consists of plankton while adults predominately feed on seagrass and algae but occasionally will eat mangroves, sponges, jellyfish and fish-egg cases (Web Reference 1).

Recognised Threats and Potential Impact(s) of the Proposal

Recognised threats to the green turtle include direct harvesting, predation by native fauna, feral animals and pets, fisheries bycatch, entanglement and/or ingestion of marine debris, boat strikes, climate change, coastal development, habitat loss and water quality deterioration. Some of the potential impacts associated with the proposal include entanglement in sea cage infrastructure, water quality deterioration, boat strikes and reduced foraging habitat availability.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglements, including procedures to be followed, training and equipment required, and reporting incidents.
2. Deceased stock will be removed according to industry best practice and a demand feeding regime will be adopted to minimise excess food in the water column. This will lessen the attraction of wild fish and therefore, potential predators, as well as assist with avoiding water quality deterioration.
3. Boating traffic associated with the proposal will be kept to a minimum and safe boating practices in relation to marine fauna will form a component of the mandatory training for all Research Lease field staff.
4. There are no seagrass beds or algal mats in the area of the proposed lease so total foraging habitat available in the area will not be reduced or isolated due to the Research Lease.



Monitoring and Management

Entanglements, the impact of boat traffic and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impact on the green turtle.

Reptiles

Common Name

Leatherback turtle, leathery turtle

Latin Name

Dermochelys coriacea

EPBC Status	FM / TSC Listing
Endangered, Migratory	Vulnerable



Distribution across Australia

In Australia, the leatherback turtle has been recorded feeding in coastal waters offshore of all Australian States. This species occurs in temperate, subtropical and tropical areas but is most commonly sighted in the coastal waters of southern Australia, south-western Western Australia, south-east Australia (i.e. Tasmania, Victoria and eastern South Australia) and central eastern Australia (i.e. Sunshine Coast to central New South Wales) (Web Reference 1).

Critical Habitat Resources in Australia

There are no major nesting sites for the leatherback turtle in Australia but there is some scattered nesting along the coast in southern Queensland and Northern Territory. Nesting has been recorded in northern New South Wales near Ballina and south of Forster in Bootie National Park. However, there are no critical habitat resources for the leatherback turtle in the wider study area of the proposed Research Lease.

Important Habitat Values for the Species

The leatherback turtle is a highly pelagic species but ventures close to shore during the nesting season. Adults forage over Australian continental shelf waters feeding on gelatinous organisms such as jellyfish, salps, squid and siphonophores. Little is known about the diet of post-hatchlings and small juveniles which tend to disappear in the open ocean for several years. Leatherback turtles require sandy beaches to nest with sand temperatures between 24 to 34°C are needed for successful incubation (Web Reference 1).

Recognised Threats and Potential Impact(s) of the Proposal

Recognised threats to the leatherback turtle include direct harvesting, boat strikes, predation by native fauna, feral animals and pets, fisheries bycatch, entanglement and/or ingestion of marine debris, climate change and extreme weather events, coastal development, seismic surveys, habitat loss and water quality deterioration. Potential impacts associated with the proposal include entanglement, water quality deterioration, boat strikes and reduced foraging habitat availability.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglements, including procedures to be followed, training and equipment required, and reporting incidents.
2. Deceased stock will be removed according to industry best practice and a demand feeding regime will be adopted to minimise excess food in the water column. This will lessen the attraction of wild fish and therefore, potential predators, as well as assist with avoiding water quality deterioration.
3. Boating traffic associated with the proposal will be kept to a minimum and safe boating practices in relation to marine fauna will form a component of the mandatory training for all Research Lease field staff.
4. The proposed lease represents a relatively small proportion of the total foraging habitat available in the wider area and will not isolate any area of this habitat.



Monitoring and Management

Entanglements, the impact of boat traffic and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impact on the leatherback turtle.

Reptiles

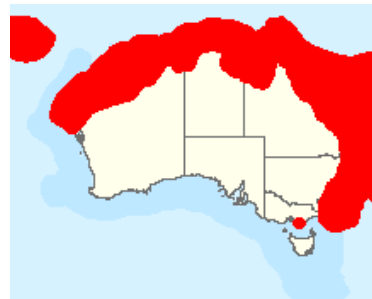
Common Name

Hawksbill turtle

Latin Name

Eretmochelys imbricate

EPBC Status	FM / TSC Listing
Vulnerable, Migratory	N/A



Distribution across Australia

Hawksbill turtles are recorded in temperate, subtropical and tropical waters across all of the world's oceans while nesting is predominately confined to tropical areas.

Critical Habitat Resources in Australia

Australia has the largest breeding population of hawksbill turtles in the world and the largest rookeries. Some of the important nesting sites for this species includes Rosemary Island and Varanus Island in Western Australia, around Torres Strait and the northern Great Barrier Reef in Queensland (Web Reference 1). Some important foraging and juvenile habitat for the hawksbill turtle includes the inner Great Barrier Reef Cays (north from Grenville) and Milman Island in Queensland, the reefs west of Cape Preston and south to Onslow in Western Australia and the Groote Eylandt in Northern Territory. However, there are no critical habitat resources for the hawksbill turtle in the wider study area of the proposal.

Important Habitat Values for the Species

The first five to ten years of the hawksbill turtles life is spent drifting in ocean currents. During this pelagic phase this species is often found in association with rafts and driftlines of the macroalgae - *Sargassum*. Hawksbill turtles settle in shallow benthic foraging habitats, such as rocky reefs or coral reefs, when they reach a curved carapace length of 30 to 40 cm. Adult hawksbill turtles are omnivores and feed on octopus, squid, gastropods, sponges, hydroids, jellyfish, seagrass and algae, while juveniles eat plankton (Web Reference 1).

Recognised Threats and Potential Impact(s) of the Proposal

Global threats to the hawksbill turtle include direct harvesting, predation by native fauna, feral animals and pets, fisheries bycatch, entanglement and/or ingestion of marine debris, coastal development, climate change, habitat loss and water quality deterioration. Some of the potential impacts associated with the proposal include entanglement in sea cage infrastructure, water quality deterioration, boat strikes and reduced foraging habitat availability.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglements, including procedures to be followed, training and equipment required, and reporting incidents.
2. Deceased stock will be removed according to industry best practice and a demand feeding regime will be adopted to minimise excess food in the water column. This will lessen the attraction of wild fish and therefore, potential predators, as well as assist with avoiding water quality deterioration.
3. Boating traffic associated with the proposal will be kept to a minimum and safe boating practices in relation to marine fauna will form a component of the mandatory training for all Research Lease field staff.
4. The proposed lease represents a relatively small proportion of the total foraging habitat available in the wider area and will not isolate any area of this habitat.



Monitoring and Management

Entanglements, the impact of boat traffic and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome / Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposed Research Lease is considered unlikely to have any detrimental impact on the hawksbill turtle.

Reptiles

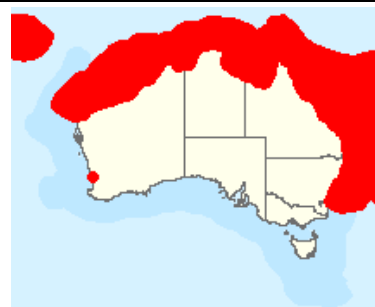
Common Name

Flatback turtle

Latin Name

Natator depressus

EPBC Status	FM / TSC Listing
Vulnerable, Migratory	N/A



Distribution across Australia

The flatback turtle is generally restricted to the tropical waters of northern Australia (Web Reference 1).

Critical Habitat Resources in Australia

There are no critical habitat resources for this species in the direct or wider study area. There are no areas of significant habitat such as nesting sites known to occur within New South Wales and there is one record of a flatback turtle occurring in the wider study region (Lake Macquarie) in 2003.

Important Habitat Values for the Species

Adults, subadults and hatchlings inhabit soft bottom habitat over the continental shelf of northern Australia. Nesting habitat includes sandy beaches in the subtropics and tropics with sand temperatures between 25°C and 33°C at nest depth. Nesting of the flatback turtles is confined to Australian beaches where four genetic stocks have been recognised. These important nesting sites occur in eastern Australia (between Bundaberg and Torres Strait), Torres Strait and the Gulf of Carpentaria, the Northern Territory (e.g. Fog Island, Tiwi Islands and Turtle Point), and Western Australia (e.g. Kimberley Region and Lacrosse Island). Little is known about the diet of this species but juveniles have been found feeding on squid, gastropod molluscs and siphonophores e.g. hydroids, jellyfish and soft corals (Web Reference 1).

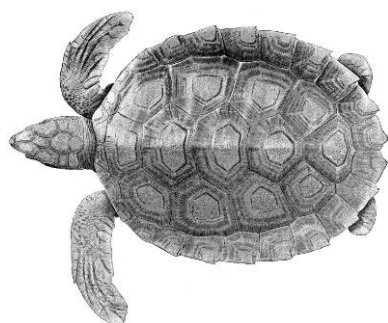
Recognised Threats and Potential Impact(s) of the Proposal

Recognised threats to the flatback turtle include direct harvesting, boat strikes, predation by native fauna, feral animals and pets, fisheries bycatch, entanglement and/or ingestion of marine debris, climate change and extreme weather events, coastal development, seismic surveys, habitat loss and water quality deterioration. Some of the potential impacts associated with the proposal include entanglement in sea cage infrastructure, water quality deterioration, boat strikes and reduced foraging habitat availability.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglements, including procedures to be followed, training and equipment required, and reporting incidents.
2. Deceased stock will be removed according to industry best practice and a demand feeding regime will be adopted to minimise excess food in the water column. This will lessen the attraction of wild fish and therefore, potential predators, as well as assist with avoiding water quality deterioration.
3. Boating traffic associated with the proposal will be kept to a minimum and safe boating practices in relation to marine fauna will form a component of the mandatory training for all Research Lease field staff.
4. It is rare for this species to frequent NSW waters which are outside its range of known nesting, breeding, mating and feeding areas.



Monitoring and Management

Entanglements, the impact of boat traffic and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome/ Effectiveness

It is considered highly unlikely the proposal would have any detrimental impact on the flatback turtle if it did visit the area provided that the Research Lease is properly managed, monitored and the mitigation measures are implemented.

Reptiles

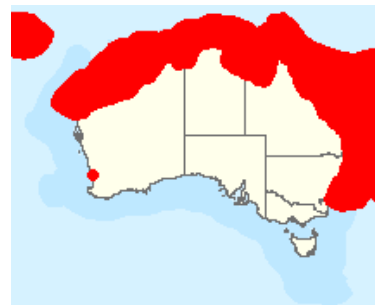
Common Name

Yellow-bellied sea snake

Latin Name

Pelamis platurus

EPBC Status	FM / TSC Listing
Listed Marine Species	N/A



Distribution across Australia

In Australia, there are records of the yellow-bellied sea snake in most Australian waters except along the southern coastline. Populations have been found in the Gulf of Carpentaria, the central coast of New South Wales and Scott Reef in northern Western Australia (Web Reference 1).

Critical Habitat Resources in Australia

There are no critical habitat resources for this species in the direct or wider study area.

Important Habitat Values for the Species

The yellow-bellied sea snake usually inhabits shallow coastal waters but also occurs in open pelagic waters with a temperature ranging from 11.7°C to 36 °C. This species feeds on fish associated with the slicks or drift lines in which it lives such as mullet, anchovies, jacks and juvenile dolphin fish (Web Reference 1).

Recognised Threats and Potential Impact(s) of the Proposal

Global threats to the yellow-bellied sea snake include incidental bycatch in commercial and research trawling operations, ghost fishing nets, entanglement and ingestion of plastic debris, boat strikes and pollution. Some of the potential impacts associated with the proposal include entanglement in sea cage infrastructure, water quality deterioration, boat strikes and reduced foraging habitat availability.

Proposed Impact Mitigation Measures

Mitigation

1. The risk of entanglement will be mitigated by implementing a range of measures as described in the EIS and EMP. These include the Marine Fauna Interaction Management Plan, the use of thick taut ropes, highly visible lines, absence of loose ropes, anti-predator nets, as well as regular inspections and maintenance of the sea cage infrastructure. An Marine Fauna Entanglement Avoidance Protocol will also be established which will detail a response plan for entanglement incidences, including procedures to be followed, training and equipment required, and reporting incidents to relevant agencies.
2. Deceased stock will be removed according to industry best practice and a demand feeding regime will be adopted to minimise excess food in the water column. This will lessen the attraction of wild fish and therefore, potential predators, as well as assist with avoiding water quality deterioration.
3. Boating traffic associated with the proposal will be kept to a minimum and safe boating practices in relation to marine fauna will form a component of the mandatory training for all Research Lease field staff.
4. The proposed lease represents a relatively small proportion of the total foraging habitat available in the wider area and will not isolate any area of this habitat.



Monitoring and Management

Entanglements, the impact of boat traffic and water quality will be monitored and reviewed on a regular basis.

Predicted Outcome / Effectiveness

Provided that the Research Lease is properly managed, monitored and the mitigation measures implemented, the proposal is considered unlikely to have any detrimental impact on the yellow-bellied sea snake.

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