



Description of the Environment CAPL Planning Area

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CAPL Planning Area**

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	Name	Signature	Date
Author:	Ashley Fertch Environmental Specialist		
Checked:	Duanne Salins Regulatory Approvals Advisor		
Approved:	Joe Sanderson HES Supervisor - Environment		

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1 Introduction

1.1 Purpose

This document describes the environment within Chevron Australia Pty Ltd.'s (CAPL's) Planning Area (PA) (Figure 1-1), which is the total area in which CAPL's activities may interact with the environment. This document applies to all CAPL operations and is to be used for each Environment Plan (EP) submitted to the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) after this document's initial acceptance.

Each EP will define an environment that may be affected (EMBA) by its specific petroleum activity. The EMBA for each activity will most likely be based on conservative stochastic spill modelling thresholds; based on the knowledge gained from previous stochastic modelling from CAPL's activities, all EMBA's are expected to fall within this PA. If an EMBA from an individual EP extends outside the PA, this document will be revised, and the PA extended to incorporate the EMBA.

1.2 Regulatory Context

The Commonwealth Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 detail the information that must be included in an EP. Specifically:

Regulation 13(2) states that the environment plan must:

- (a) describe the existing environment that may be affected by the activity; and*
- (b) include details of the particular relevant values and sensitivities (if any) of that environment.*

Regulation 4 defines the environment as:

- (a) ecosystems and their constituent parts, including people and communities; and*
 - (b) natural and physical resources; and*
 - (c) the qualities and characteristics of locations, places and areas; and*
 - (d) the heritage value of places;*
- and includes*
- (e) the social, economic and cultural features of the matters mentioned in paragraphs (a), (b), (c) and (d).*

Regulation 13(3) further provides that, without limiting paragraph (2)(b) of Regulation 13(2), particular relevant values and sensitivities may include any of these:

- (a) the world heritage values of a declared World Heritage property within the meaning of the EPBC Act;*
- (b) the national heritage values of a National Heritage place within the meaning of that Act;*
- (c) the ecological character of a declared Ramsar wetland within the meaning of that Act;*

(d) the presence of a listed threatened species or listed threatened ecological community within the meaning of that Act;

(e) the presence of a listed migratory species within the meaning of that Act;

(f) any values and sensitivities that exist in, or in relation to, part or all of:

(i) a Commonwealth marine area within the meaning of that Act; or

(ii) Commonwealth land within the meaning of that Act.

Specific to the Description of the Environment section, NOPSEMA's Environment Plan Content Requirements document (Ref. 99) states:

The level of detail within the plan should be appropriately scaled to the nature of the impacts and risks to the particular values and sensitivities. For example, the environment that may be affected by planned operations will need to be described in a greater level of detail than areas exposed to low levels of hydrocarbon in the unlikely event of a worst-case hydrocarbon release.

Consequently, CAPL has taken the approach that this document provides information suitable for summarising the particular values and sensitivities in order to inform the impact and risk evaluation for CAPL operations. However, if additional information is available for specific locations (typically an operational area for a specific activity) and if this information can be used to further influence or inform the impact and risk assessment, this additional information will be included in the Description of the Environment section of the individual EP.

1.3 Review and Revision

The information provided in this document is derived from various referenced desktop sources. As a minimum, this document will be reviewed annually to include any relevant changes to source documents, which may include State (Western Australian [WA])/Commonwealth Management Plans, Recovery Plans, Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) status, or new published research.

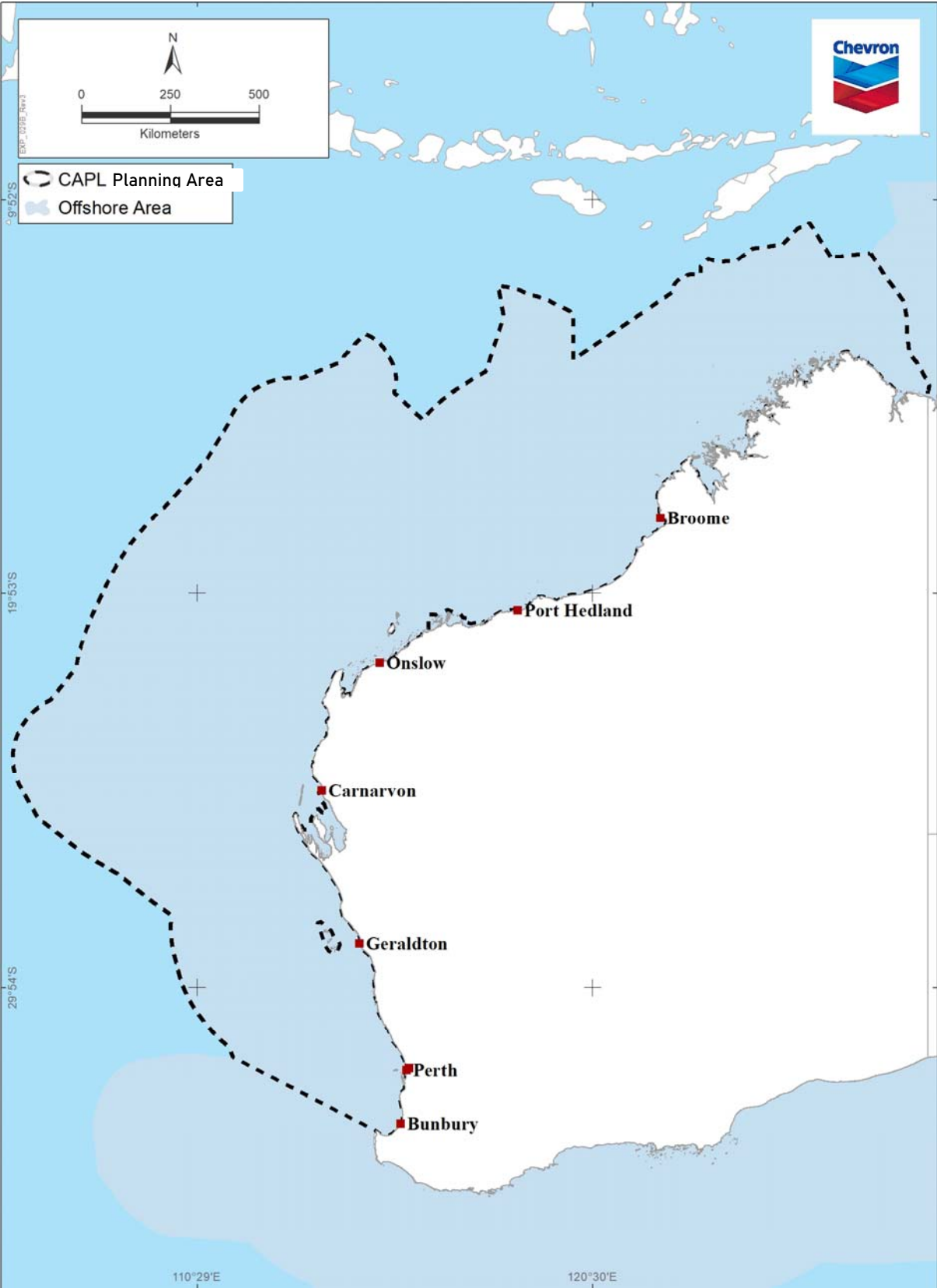


Figure 1-1: CAPL's Planning Area

2 Matters of National Environmental Significance (NES)

2.1 World Heritage Properties

Properties nominated for World Heritage listing are inscribed on the list only after they have been carefully assessed as representing the best examples of the world's cultural and natural heritage. At the time of writing this document, Australia has 19 properties on the World Heritage List.

The list of Australia's World Heritage areas (Ref. 1) and a Protected Matters Search Report (Appendix A; Ref. 2) show that two World Heritage properties are within the PA. Table 2-1 summarises these World Heritage Properties (Ref. 3).

Table 2-1: World Heritage Properties

World Heritage Properties	Brief Overview of Values (Source: Ref. 3)
Shark Bay	On the Indian Ocean coast at the most westerly point of Australia, Shark Bay's waters, islands, and peninsulas covering a large area of ~2.2 million hectares (of which about 70% are marine waters) have a number of exceptional natural features, including one of the largest and most diverse seagrass beds in the world. However, it is for its stromatolites (colonies of microbial mats that form hard, dome-shaped deposits, which are said to be the oldest life forms on earth), that the property is most renowned. The property is also famous for its rich marine life including a large population of dugongs and provides a refuge for a number of other globally threatened species.
The Ningaloo Coast	<p>The Ningaloo Coast is located on Western Australia's remote coast along the East Indian Ocean. The property holds a high level of terrestrial species endemism and high marine species diversity and abundance. An estimated 300 to 500 Whale Sharks aggregate annually coinciding with mass coral spawning events and seasonal localised increases in productivity. The marine portion of the nomination contains a high diversity of habitats that includes lagoon, reef, open ocean, the continental slope, and the continental shelf. Intertidal systems such as rocky shores, sandy beaches, estuaries, and mangroves are also found within the property. The most dominant marine habitat is the Ningaloo reef, which sustains both tropical and temperate marine fauna and flora, including marine reptiles and mammals.</p> <p>The main terrestrial feature of the Ningaloo Coast is the extensive karst system and network of underground caves and water courses of the Cape Range. The karst system includes hundreds of separate features such as caves, dolines, and subterranean water bodies and supports a rich diversity of highly specialised subterranean species. Above ground, the Cape Range Peninsula belongs to an arid ecoregion recognised for its high levels of species richness and endemism, particularly for birds and reptiles.</p>

2.2 National Heritage Places

The National Heritage List is Australia's list of natural, historic, and Indigenous places of outstanding significance to the nation. The National Heritage List Spatial Database (Ref. 4) describes the place name, class (Indigenous, natural, historic), and status.

A search of the National Heritage List Spatial Database (Ref. 4) and the Protected Matters Search Report (Appendix A; Ref. 2) revealed that several National Heritage Places occur in the PA. Table 2-2 summarises these National Heritage Places. The information presented in this table outlines the Nominator's Summary Statement of Significance sourced from the Australian National Heritage List (Ref. 5).

Table 2-2: National Heritage Places

National Heritage Place	Class	Summary of Significance (Source: Ref. 5)
<i>Batavia</i> Shipwreck Site and Survivor Camps Area 1629 – Houtman Abrolhos	Historic	Wrecked on 4 June 1629, the <i>Batavia</i> is the oldest of the known Verenigde Oost-Indische Compagnie wrecks on the Western Australian (WA) coast. Because of its relatively undisturbed nature, the archaeological investigation of the wreck itself has revealed a range of objects of considerable historical value. The recovered sections of the hull of the <i>Batavia</i> have been reconstructed in the Western Australian Maritime Museum and provides information on 17th century Dutch ship building techniques, while the remains of the cargo carried by the vessel have provided economic, and social evidence of the operation of the Dutch port at Batavia (now Jakarta) in the early 17th century.
Dirk Hartog Landing Site 1616 – Cape Inscription Area	Historic	Cape Inscription is the site of the oldest known landings of Europeans on the Western Australian coastline, and is associated with a series of landings and surveys by notable explorers over a 250-year period. The first known European landing on the west coast of Australia was by Dirk Hartog of the Dutch East India Company's ship the <i>Eendracht</i> at Cape Inscription on 25 October 1616. Hartog left a pewter plate, inscribed with a record of his visit and nailed to a post left standing upright in a rock cleft on top of the cliff. This plate is the oldest extant record of a European landing in Australia. Hartog's discovery had a major impact on world cartography. After leaving the island, he sailed northwards charting the coastline of Western Australia to 22 degrees south. As a result, a known part of the coastline of Western Australia appeared on world maps for the first time, replacing the mythical southern continent of 'Terra Australis Incognita'.
<i>HMAS Sydney II</i> and <i>HSK Kormoran</i> Shipwreck Sites	Historic	The naval battle fought between the Australian warship <i>HMAS Sydney II</i> and the German commerce raider <i>HSK Kormoran</i> off the WA coast during World War II (November 1941) was a defining event in Australia's cultural history. <i>HMAS Sydney II</i> was Australia's most famous warship of the time and this battle has forever linked the stories of these warships to each other. The tragic loss of <i>HMAS Sydney II</i> and its entire crew of 645 following the battle with <i>HSK Kormoran</i> remains Australia's worst naval disaster.
Dampier Archipelago (including Burrup Peninsula)	Indigenous	The Dampier Archipelago located about 1550 kilometres north of Perth. On the magnificent Dampier Archipelago in Western Australia, where the striking red earth of the Burrup Peninsula meets the blue Indian Ocean, rock engravings thought to number in the millions and other significant sites are helping us learn more about our Indigenous heritage. Made up of islands, reefs, shoals, channels and straits, and covering a land area of around 400 square kilometers, the Burrup Peninsula is 27 kilometres long and four kilometres wide. Many important native plants, animals and habitats are found in the area. The Archipelago was formed 6-8000 years ago when rising sea levels flooded what were once coastal plains. The underlying rocks are amongst the oldest on earth, formed in the Archaean period more than 2400 million years ago. The Dampier Archipelago was included in the National Heritage List on 3 July 2007.
Lesueur National Park*	Natural	The Lesueur National Park (inland from Green Head, WA) contains an exceptional concentration of plant species richness and endemism. It is estimated to contain >900 plant species, including nine plant taxa that are endemic to the national park and 111 taxa that are endemic to the surrounding region. A further 81 plant taxa are at the northern or southern limit of their distribution, which is significant for the evolution of new species (Ref. 7). The Lesueur National Park is one of the most important places in Australia for demonstrating species richness and endemism within the Proteaceae plant

National Heritage Place	Class	Summary of Significance (Source: Ref. 5)
		<p>family, including the genera of Banksia, Hakea, Dryandra, Grevillea, and Isopogon (Ref. 8).</p> <p>The Lesueur National Park contains outstanding species richness and endemism in several other plant families such as: the Fabaceae family, including the genera of Gastrolobium (poison pea), Daviesia (bitter pea) and Jacksonia (dogwood); the Myrtaceae family, including the genera of Verticordia (feather flower) and Melaleuca (paper bark); the Haemodoraceae family (bloodroots, conostyles and kangaroo paws); the Stylidiaceae family (triggerplants); and the Droseraceae family (sundews) (Ref. 8).</p>
Shark Bay, Western Australia	Natural	<p>Shark Bay is on the most western point of the Australian coast. The region is one of the few properties inscribed on the World Heritage List (see Table 2-1) for all four outstanding natural universal values:</p> <ul style="list-style-type: none"> • as an outstanding example representing the major stages in the Earth's evolutionary history • as an outstanding example representing significant ongoing ecological and biological processes • as an example of superlative natural phenomena • containing important and significant habitats for in situ conservation of biological diversity. <p>25% of vascular plants (283 species) are at the limits of their range in Shark Bay. Many vegetation formations and plant species are found only in the interzone area. The area south of Freycinet Estuary contains the unique type of vegetation known as tree heath. There are also at least 51 species endemic to the region and others that are considered new to science.</p> <p>The Shark Bay region is an area of major zoological importance, primarily due to habitats on peninsulas and islands being isolated from the disturbance that has occurred elsewhere. Of the 26 species of endangered Australian mammals, five are found on Bernier and Dorre Islands. These are the Boodie or Burrowing Bettong, Rufous Hare Wallaby, Banded Hare Wallaby, the Shark Bay Mouse, and the Western Barred Bandicoot.</p> <p>The Shark Bay region has a rich avifauna with over 230 species, or 35%, of Australia's bird species having been recorded. A number of birds attain their northern limit here, such as the Regent Parrot, Western Yellow Robin, Blue-breasted Fairy-wren, and Striated Pardalote.</p> <p>The region is also noted for the diversity of its amphibians and reptiles, supporting nearly 100 species. Again, many species are at the northern or southern limit of their range. The area is also significant for the variety of burrowing species, such as the Sandhill Frog, which, apparently, needs no surface water. Shark Bay contains three endemic sand-swimming skinks, and 10 of the 30 dragon lizard species found in Australia.</p> <p>The 12 species of seagrass in Shark Bay make it one of the most diverse seagrass assemblages in the world. Seagrass covers >4000 km² of the bay, with the 1030 km² Wooramel Seagrass Bank being the largest structure of its type in the world.</p> <p>Seagrass has contributed significantly to the evolution of Shark Bay as it has modified the physical, chemical, and biological environment as well as the geology and has led to the development of major marine features, such as Faure Sill.</p> <p>The barrier banks associated with the growth of seagrass over the last 5000 years has, with low rainfall, high evaporation, and low tidal flushing, produced the hypersaline Hamelin Pool and L'Haridon Bight. This hypersaline condition is conducive to the growth of cyanobacteria, which trap and bind sediment to produce various mats and structures including stromatolites.</p> <p>Stromatolites represent the oldest form of life on Earth. They are representative of life forms from ~3500 million years ago. Hamelin Pool contains the most diverse and abundant examples of stromatolite forms in the world.</p>

National Heritage Place	Class	Summary of Significance (Source: Ref. 5)
		<p>Shark Bay is renowned for its marine fauna. For example, the Shark Bay population of about 10 000 Dugong is one of the largest in the world, and dolphins abound, particularly at Monkey Mia.</p> <p>Humpback Whales use Shark Bay as a staging post in their migration along the WA coast. This species was reduced by past exploitation from an estimated population of 20 000 on the west coast to 500–800 whales in 1962; the population is now estimated at 2000–3000.</p> <p>Green and Loggerhead Turtles are found in Shark Bay near their southern limits; they nest on Dirk Hartog Island and Peron Peninsula beaches. Dirk Hartog Island is the most important nesting site for Loggerhead Turtles in WA.</p> <p>Shark Bay is also an important nursery ground for larval stages of crustaceans, fishes, and medusae (jellyfish).</p>
The Ningaloo Coast	Natural	<p>The integration of the Ningaloo Reef and Exmouth Peninsula karst system as a cohesive limestone structure is at the heart of the natural heritage significance of the Ningaloo Coast. The modern Ningaloo Reef, Exmouth Peninsula karst, and the wave-cut terraces, limestone plains, Pleistocene reef sediments of Exmouth Peninsula, and associated marine, terrestrial, and subterranean ecosystems, including the Muiron Islands, demonstrate a geological, hydrological, and ecological unity, which harmonises the region's present ecosystem functions with its evolutionary history as a time-series of coral reefs and an evolving karst system.</p> <p>The history of coral reefs during the last 26 million years is chronicled in the limestone parapets and wave-cut terraces of Cape Range, which record previous high water levels. Demonstrating late Quaternary deformation at a passive continental margin, the uplifted Neogene wave-cut terraces and fossil reefs that fringe Exmouth Peninsula, and the submerged fossil reef terraces that form the substrate of the modern reef, in immediate juxtaposition with the undeformed modern Ningaloo Reef, contribute to an understanding of the mechanisms that led to the modern character of the west coast of Australia.</p> <p>Archaeological deposits in the rock shelters on Cape Range show Aboriginal people had a comprehensive and sophisticated knowledge of edible and non-edible marine resources between 35 000 and 17 000 years ago. The rock shelters of Exmouth Peninsula are outstanding because they provide the best evidence in Australia for the use of marine resources during the Pleistocene, including their uses as food and for personal adornment.</p> <p>The evidence for standardisation in size and manufacture of the shell beads found at Mandu Creek rock shelter, coupled with the fact they provide the earliest unequivocal evidence for the creation of personal ornaments in Australia, demonstrates a high degree of creative and technical achievement.</p>
The West Kimberley	Natural	<p>The National Heritage listing of the West Kimberley recognises the natural, historic, and Indigenous stories of the region that are of outstanding heritage value to the nation. These and other fascinating stories about the west Kimberley are woven together in the following description of the region and its history, including a remarkable account of Aboriginal occupation and custodianship over the course of more than 40 000 years.</p> <p>The Kimberley occupies more than 420 000 km² on the north-western margin of the Australian continent. Its rocky coastline edges the Indian Ocean, and off the coast lie thousands of islands, many fringed with coral. The Mitchell Plateau (Ngauwudu) rises to nearly 800 m above sea level at its centre, in places dropping into steep escarpments, and losing altitude as it approaches the sea. Further south, Yampi Peninsula lies in a transitional area between the high rainfall of tropical north Kimberley and the drier conditions characteristic of central WA. These different environments meet in a complex landscape of plains, dissected sandstone plateaus, and rugged mountains.</p> <p>The central Kimberley, which includes the periphery of north Kimberley plateau country and the King Leopold Ranges, is very rugged; the physical structures here were formed by significant geological events, which folded rocks intensely, many thousands of millions of years ago. That such evidence</p>

National Heritage Place	Class	Summary of Significance (Source: Ref. 5)
		<p>of a distant past can today be seen so clearly in the landscape is due to the region's remarkable geological stability. This stability has also allowed the much more recent appearance of extensive limestone ranges, built from the remains of an extraordinary reef complex which, more than 300 million years ago, rivalled the Great Barrier Reef in size. The ranges have since eroded to form complex networks of caves and tunnels.</p> <p>Dinosaur footprints and tracks are another remarkable remnant of past life in the Kimberley; they are exposed in many places in the Broome sandstone, along the western length of Dampier Peninsula. This coastline is subject to one of the highest tidal ranges in the world, and many of the fossil footprints can only be seen for short periods during very low tides. Inland of Dampier Peninsula, south of the broad floodplains of the Fitzroy River, the distinctive red of the pindan country opens onto a vast expanse of desert.</p> <p>Throughout the Kimberley, where water meets land—in estuaries, mangroves and mudflats, in moist vine thickets, along the banks of rivers and creeks, around waterholes or soaks—there is an abundance of plants and animals, some of which live only in the Kimberley, while others may have travelled from the far side of the world to nest or breed here.</p>
<p>* Identified in the Protected Matters Search Report (Appendix A; Ref. 2) but located inland and thus not expected to be exposed to CAPL's activities.</p>		

2.3 Commonwealth Heritage Places

The Commonwealth Heritage List is a list of Indigenous, historic, and natural heritage places owned or controlled by the Australian Government. The Commonwealth Heritage List (Ref. 6) describes the place name, class (Indigenous, natural, historic), and status.

A search of the Commonwealth Heritage List and the Protected Matters Search Report (Appendix A; Ref. 2) revealed that Commonwealth Heritage Places occur in the PA. Table 2-3 summarises these Commonwealth Heritage Places. The information presented in this table outlines the Nominator's Summary Statement of Significance sourced from the Australian Heritage Database (Ref. 6).

Table 2-3: Commonwealth Heritage Places

Commonwealth Heritage Place	Class	Summary of Significance (Source: Ref. 6)
<p>Ashmore Reef National Nature Reserve (External territories list)</p>	<p>Natural</p>	<p>Ashmore Reef (which is an atoll that includes four low-lying uninhabited sand islands) has major significance as a staging point for wading birds migrating between Australia and the northern hemisphere, including 43 species listed on the China–Australia Migratory Bird Agreement (CAMBA) and/or the Japan–Australia Migratory Bird Agreement (JAMBA). The place provides habitat for three species of sea snake; <i>Aipysurus apraefrontalis</i>, <i>A. foliosquama</i>, and <i>A. fuscus</i> with very restricted distributions. <i>Aipysurus fuscus</i> is endemic to Ashmore Reef.</p> <p>Ashmore Reef supports extremely high concentrations of breeding seabirds, many of which are nomadic and typically breed on small isolated islands. Breeding colonies of 17 species of seabirds have been recorded. The islands are regarded as supporting some of the most important seabird rookeries on the Sahul Shelf, including large (1000 to 50 000 breeding pairs) breeding colonies of Sooty Tern (<i>Sterna fuscata</i>), Crested Tern (<i>S. bergii</i>), Bridled Tern (<i>S. anaethetus</i>) and Common Noddy (<i>Anous stolidus</i>), and smaller breeding colonies of Little Egret (<i>Egretta alba</i>), Eastern Reef Egret (<i>E. sacra</i>), Black Noddy (<i>Anous minutus</i>), White-tailed Tropic Bird (<i>Phaethon lepturus</i>), and Red-tailed Tropic Bird (<i>P. rubricauda</i>). The place is also important for providing breeding habitat for Green (<i>Chelonia mydas</i>) and Hawksbill Turtles (<i>Eretmochelys imbricata</i>).</p>

Commonwealth Heritage Place	Class	Summary of Significance (Source: Ref. 6)
		<p>Ashmore Reef exhibits a higher diversity of marine habitats compared with other North West Shelf reefs. The place supports an exceptionally diverse marine fauna, particularly corals (255 species in 56 genera) and molluscs (433 species), and is regarded as having the highest diversity of sea snakes (12 species) in the world. Other highly diverse fauna include birds (78 species), decapod crustaceans (99 species), echinoderms (178 species), and fish (569 species).</p> <p>Species of conservation significance recorded at Ashmore Reef include: the nationally endangered Little Tern (<i>Sterna albifrons</i>) and Loggerhead Turtle (<i>Caretta caretta</i>), and the nationally vulnerable Green Turtle (<i>Chelonia mydas</i>) and Hawksbill Turtle (<i>Eretmochelys imbricata</i>). The place also includes species not previously recorded or only rarely recorded in Australia including: three bird species (Brown Hawk Owl [<i>Ninox scutulata</i>], White-tailed Tropic Bird [<i>Phaethon lepturus</i>], and Black Noddy [<i>Anous minutus</i>]); five hermatypic coral species; and 13 fish species.</p> <p>Ashmore Reef is an important scientific reference area for migratory seabirds, sea snakes, and marine invertebrates. It has been the site of several major scientific expeditions and is the subject of ongoing scientific monitoring of biological diversity, fauna populations, and breeding activity.</p> <p>Ashmore Reef is the type locality for two species of sea snake—<i>Aipysurus apraefrontalis</i> and <i>A. foliosquama</i>.</p> <p>Ashmore Reef is significant for its history of human occupation and use. Although the reef may have been known to the Rottinese people (Rote is an island in modern-day Indonesia) for many centuries, the first description is probably that contained in Eredia (1600) if accepted, this may be the first description of Ashmore Reef, which is now part of Australia. Ashmore Reef is believed to have been visited by fisherman from Rote Island since the early 18th century, as well as by Makassans and Bajau ('Sea Gypsies') and people from the island of Seram. The Ashmore Reef islands were used both for fishing and as a staging point for voyages to the southern reefs off Australia's coast. Occupation by these seafarers, particularly from the area east of Madura (Indonesia), on the islands occurred intermittently during the 1930s. Visits recommenced in 1947 following World War II and have continued.</p> <p>The islands are also significant for phosphate mining, which led to their annexation by Great Britain and ultimate transfer to the Australian Government in 1934. Physical evidence of these former occupations exists and would be particularly significant in archaeological terms. Such evidence may include original wells and grave sites and would include evidence of disturbance from early phosphate mining.</p>
Garden Island (WA list)	Natural	<p>Garden Island was the first site occupied by Governor Stirling's party in 1829 when founding the colony of Western Australia; it was also the site of the first official non-convict settlement in WA. The Cliff Point Historic Site on Garden Island, also known as Sulphur Town, was initially occupied by Captain Charles Fremantle before the arrival of Captain Stirling, and is listed separately in the Register (Reg. No. 10657). The party occupied the site for two months before they moved to the Swan River settlement on the mainland.</p> <p>Garden Island, and in particular the Cliff Point Historic Site, is highly valued for its cultural associations as the site of first settlement in WA and is important for its association with Governor Stirling and Captain Charles Fremantle.</p> <p>In 1911, the Commonwealth resumed Garden Island from WA for use as a naval base. The strategic role of Garden Island and Cockburn Sound, which was secured for coastal defence in World War II, is illustrated by defence installations including Challenger or J Gun Battery, and the Scriven, Beacon, and Collie Battery complexes, supported by a range of service structures. Challenger Battery is listed separately in the Register at Reg. No. 18968.</p> <p>The absence of feral predators means that Garden Island provides a significant refuge for animals vulnerable to predation on the mainland. Due to its isolation from the WA mainland, the island is relatively free of disturbance from humans or introduced animals. Species of particular interest include the</p>

Commonwealth Heritage Place	Class	Summary of Significance (Source: Ref. 6)
		<p>Tammar Wallaby (<i>Macropus eugenii</i>), Carpet Python (<i>Morelia spilota</i>), and the Lined Skink (<i>Lerista lineata</i>). Populations of the 14 species of reptile and the Tammar Wallaby have been isolated from mainland populations for 6000–7000 years. In particular, the population of the Tammar Wallaby on Garden Island is morphologically distinct from all other populations.</p> <p>The vegetation on Garden Island differs in structure and composition from vegetation on nearby Rottnest Island and the adjacent mainland (e.g. eucalypts and banksia, which are common on the mainland, are absent from the island). Due to a low fire frequency, the vegetation on Garden Island is older and denser than that on the mainland. The northern end of the island supports some of the oldest stands of the rare Rottnest Island Pine (<i>Callitris preissii</i>), with most trees dating from the 1920s. Other species that are now rare in the region include the Cheesewood (<i>Pittosporum phylliraeoides</i> var. <i>phylliraeoides</i>) and Rottnest Teatree (<i>Melaleuca lanceolata</i>).</p> <p>The parabolic sand dunes on the western side of Garden Island are among the best-preserved dunes of the Quindalup soil unit, which is widespread in coastal WA.</p> <p>It is likely that Indigenous values exist at this place. The Australian Heritage Commission (AHC) has not yet identified, documented, or assessed these values for National Estate significance.</p>

Commonwealth Heritage Place	Class	Summary of Significance (Source: Ref. 6)
<p>Lancelin Defence Training Area (WA list)</p>	<p>Natural</p>	<p>The Lancelin Defence Training Area (DTA) is at the northern end of the Swan Coastal Plain, an area of exceptionally diverse flora and fauna. Much of Lancelin is dominated by species-rich <i>Banksia</i> woodlands and Myrtaceous/Proteaceous heaths. The floristic mosaic of <i>Banksia attenuata</i> – <i>B. menziesii</i> low woodlands, wet heaths, and low-heath communities represent significant vegetation remnants that are poorly conserved and under-represented in the conservation reserve system.</p> <p>The Lancelin DTA contains wetlands that are important in the hydrogeological system of the region. The Namming freshwater wetland suite contains a high diversity of habitats, is an important breeding site for waterfowl, and acts as a drought refuge for both waterfowl and other fauna.</p> <p>The Lancelin DTA is close to the boundary of two major zoogeographic regions, the semi-arid Eyrean zone, and the Bassean, or south-western zone of WA. This accounts in part for the high vertebrate fauna richness, particularly for reptiles and frogs, with eight frog species recorded in the large, seasonal Walyengarra Lake.</p> <p>Several species occur at the edge of their distribution range within the place. Reptile species that are at, or near, the southern limit of their distribution in the Lancelin DTA include the skink <i>Lerista planiventralis</i> and the snake <i>Simoselaps littoralis</i>. Many bird species are at or near their northern limit of distribution here, including the Southern Emu Wren (<i>Stipiturus malachurus</i>), and the Spotted Pardalote (<i>Pardalotus punctata</i>), while several are at their southern limits, including the Pied Butcherbird (<i>Cracticus nigrogularis</i>), and the Pied Honeyeater (<i>Certhionyx variegatus</i>).</p> <p>The vegetation community known as Tall Heath—comprising <i>Calothamnus quadrifidus</i>, <i>Dryandra sessilis</i>, and <i>Hakea trifurcata</i>—is near the southern limit of its distribution within the Lancelin DTA. Stands of Tuart (<i>Eucalyptus gomphocephala</i>) are significant as this area is close to this restricted species' northern limit.</p> <p>Several flora species found in the place are listed as poorly known or rare (Priority species) in WA, including species that are known from only a few populations that are under threat.</p> <p>The Lancelin DTA occurs within a narrow strip along the central and south WA coast where a number of reptile species have restricted distributions. Species with restricted distributions that occur here include the legless lizards <i>Aclys concinna</i>, <i>Pletholax gracilis</i>, and <i>Delma grayii</i> and the skinks <i>Ctenotus australis</i> and <i>Lerista praepecta</i>.</p>
<p>Learmonth Air Weapons Range Facility (WA list)</p>	<p>Natural</p>	<p>The geomorphology of Cape Range, of which the Learmonth Air Weapons Range (AWR) Facility is a part, is of considerable importance in documenting sea level and landform changes since the late Cenozoic Era (~1.8 million years ago). A series of emergent reef complexes, which represent several periods of coral reef development, are striking elements of the geomorphology of the western side of the Learmonth AWR Facility and Cape Range. The ages of these reef terraces are key to understanding of the timing of uplift events.</p> <p>The coastal plain of Cape Range contains a network of subterranean waterways, comprising caverns and fissures in the limestone beneath the coastal plain. Of these, Bundera Sinkhole, found within the Learmonth AWR Facility, is the only deep anchialine system known in Australia, and is the only continental anchialine system known in the southern hemisphere. Anchialine systems are cave systems with restricted exposure to open air, with subterranean connections to the sea, and showing marine and terrestrial influences. Anchialine systems are noted both for their relict fauna and their high species richness. The physicochemical environment in Bundera Sinkhole is very complex, and is associated with biogeochemical processes that are likely to be important for maintaining the unique community contained in this system.</p> <p>The cave fauna of Cape Range, including that within the Learmonth AWR Facility at Bundera Sinkhole, is of exceptional biogeographical importance.</p>

Commonwealth Heritage Place	Class	Summary of Significance (Source: Ref. 6)
		<p>Much of the fauna developed a long time ago, with a number of species of the aquatic cave fauna (stygo fauna) originating in the Tethys Sea ~170 million years ago.</p> <p>Bundera Sinkhole supports several species of aquatic stygo fauna, many of which are endemic to the sinkhole or to Cape Range. Many of the stygo fauna species have their closest known affinities with the fauna of anchialine caves on either side of the North Atlantic. This narrow cave is also the only known southern hemisphere site for a crustacean from the class Remipedia (<i>Lasionectes exleyi</i>). <i>L. exleyi</i> is listed as endangered at both State and Commonwealth levels. This species is widely separated from related species found in the North Atlantic. Bundera Sinkhole is also the only known locality in the southern hemisphere for another crustacean species: <i>Danielopolina</i> sp. Nov.</p> <p>Several other crustacean species found in Bundera Sinkhole are likely to have originated from the Tethys Sea, including: <i>Stygiocaris lancifera</i> (the Lance-beaked Cave Shrimp); two copepods from the Calanoida order (<i>Bunderia</i> sp. and <i>Stygocyclopia</i> sp.); and another copepod, <i>Halicyclops spinifer</i>. Many of these species also have widely separated distributions (e.g. <i>Halicyclops</i> is confined in Australia to Cape Range, but is also found in Iran, Brazil, and India). The Lance-beaked Cave Shrimp is listed as rare or likely to become extinct at the State level.</p> <p>The gastropod <i>Iravadia</i> sp. is found in brackish water in Bundera Sinkhole, and represents the first marine/estuarine stygophile recorded from the region. A fish species, the Blind or Cave Gudgeon <i>Milyeringa veritas</i>, also occurs here—it is one of only two vertebrate species known in Australasia that is confined to caves. This species is listed as vulnerable at the national level.</p> <p><i>Prionospio thalarji</i> sp. nov., a worm from the Spionidae family, has been described from Bundera Sinkhole. Other species from this genus are predominantly marine, and this is the first global record of a spionid occurring in a cave environment.</p> <p>The ecosystems represented in the caves of the Cape Range and subterranean waterways under the coastal plains of the peninsula, including in the Learmonth AWR Facility at Bundera Sinkhole, are rare in WA. Only a small number of cave ecosystems exist in WA, and Bundera Sinkhole, along with other caves at Cape Range, are the only example in Australia of an orogenic (formed during a mountain building phase) limestone from the Tertiary Period (between 65 million and 1.8 million years ago).</p> <p>Stygo fauna throughout the world is of considerable scientific interest, yielding important information concerning the evolution of life on earth. The stygo fauna at Cape Range, including species found within the Learmonth AWR Facility at Bundera Sinkhole, give insights into the origin of Australian fauna, changes in climate since the Miocene Epoch, and the biogeographical history of the continent</p> <p>Several species of vertebrate terrestrial fauna at Cape Range, including within the Learmonth AWR Facility, are of biogeographical importance because they form isolated populations, or populations at the limit of their range. The reptile fauna is of particular biogeographical significance, with a number of species or subspecies occurring here with highly restricted distributions.</p> <p>The Learmonth AWR Facility supports six southern reptile species that are at, or close to, their northern geographic limit: <i>Diplodactylus ornatus</i>, <i>Ctenotus fallens</i>, <i>Lerista lineopunctulata</i>, <i>L. praepedita</i>, <i>Morethia lineocellata</i>, and <i>Vermicella littoralis</i>. All these species are found on the western coastal dunes, and are largely restricted to the coastal corridor. All are endemic to southern WA and restricted to sandy coastal habitats along the western coast.</p> <p>The Learmonth AWR Facility supports several plant species that are either endemic, or mainly limited to the Cape Range peninsula, with at least ten endemic flora species occurring here.</p>

Commonwealth Heritage Place	Class	Summary of Significance (Source: Ref. 6)
Mermaid Reef – Rowley Shoals (WA list)	Natural	<p>Mermaid Reef is characterised by environmental conditions that are rare for shelf-edge reefs and are known only in the Rowley Shoals in WA; these conditions include clear, deep oceanic water and large tidal ranges. Species of conservation significance recorded at the place include the nationally vulnerable Green Turtle (<i>Chelonia mydas</i>). The Rowley Shoals provide habitat for species not previously been recorded in WA, including 216 fish species, 39 mollusc species, and seven echinoderm species. The Rowley Shoals are regionally important for their fauna diversity, which includes: corals (184 species in 52 genera); molluscs (260 species); echinoderms (90 species); and fish (485 species). Mermaid Reef, together with Clerke and Imperieuse Reefs, has biogeographical significance due to the presence of species that are at, or close to, the limits of their geographic ranges, including fish known previously only from Indonesian waters (e.g. the apogonid <i>Cheilodipterus singapurensis</i>, the pomacentrid <i>Chrysiptera hemicyanea</i>, the blenniid <i>Escenius schroederi</i>, and several gobiids). The monotypic labrid <i>Conniella apterygia</i> is endemic to the region of Rowley Shoals and Seringapatam and Scott Reefs. Mermaid Reef is particularly significant as a stepping-stone in the spread of genetic material from the Indonesian archipelago to the reefs to the south. The Rowley Shoals are important for benchmark studies as they are one of the few places off the north-west coast of WA that have been the site of major biological collection trips by the WA Museum. The Rowley Shoals includes the type locality of several fish, including the genus and species of the wrasse <i>Conniella apterygia</i> and the serranid species <i>Pseudanthias sheni</i>. The place is one of the best morphological examples of shelf-edge reefs in Australian waters and is important for demonstrating their principal structural and developmental characteristics. A shipwreck off the western edge of Mermaid Reef is believed to be that of the British whaling vessel <i>Lively</i>, which was lost in the early 1800s.</p>
Ningaloo Marine Area – Commonwealth Waters (WA list)	Natural	<p>Whale Sharks (<i>Rhincodon typus</i>) congregate in the Ningaloo Marine Area after the mass coral spawning each autumn in the adjacent Ningaloo Reef (State waters). The place is an important feeding area for the Whale Shark and one of the few places in the world where they are known to congregate regularly in significant numbers.</p> <p>The place is part of the annual migration route for the endangered (Commonwealth) Humpback Whale. They migrate north to Kimberley (WA) breeding grounds in winter (June–August) and south to Antarctic feeding grounds in summer (August–November). Other Commonwealth listed threatened species found in the place are the endangered Blue Whale, Southern Right Whale (<i>Eubalaena australis</i>), Loggerhead Turtle, and Southern Giant Petrel (<i>Macronectes giganteus</i>); the vulnerable Fin Whale (<i>Balaenoptera physalis</i>), Sei Whale (<i>B. borealis</i>), Green Turtle, Hawksbill Turtle, Flatback Turtle, Soft-plumaged Petrel (<i>Pterodroma mollis</i>), Great White Shark (<i>Carcharodon carcharias</i>), and Grey Nurse Shark (<i>Carcharias taurus</i>). Other significant species include the Dugong, Spinner Dolphin (<i>Stenella longirostris</i>), Yellow-nosed Albatross (<i>Diomedea chlororhynchos</i>) and Osprey (<i>Pandion haliaetus</i>).</p> <p>Marine turtle density is exceptionally high in the place; Green Turtles are the most abundant, exceeding the highest densities recorded in the Great Barrier Reef Marine Park (Queensland).</p> <p>The place is on the migratory route of many trans-equatorial wader bird species, and provides valuable feeding grounds for many migratory seabirds, including 11 species protected under JAMBA and/or CAMBA including the Wedge-tailed Shearwater (<i>Puffinus pacificus</i>), Wilson’s Storm Petrel (<i>Oceanites oceanicus</i>), Lesser Frigatebird (<i>Fregata ariel</i>), Crested Tern (<i>Sterna bergii</i>), and White-winged Tern (<i>Chlidonias leucoptera</i>).</p> <p>The place is an important breeding area for billfish, and is one of the few areas in the world where aggregations of several species (Black Marlin, Blue Marlin, Striped Marlin, and sailfish) occur. The place is an important feeding area for manta rays in autumn and winter and significant for tuna migration</p>

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		<p>and potentially important for juvenile Southern Bluefin Tuna (<i>Thunnus maccoyii</i>).</p> <p>The Ningaloo Marine Area provides opportunities for scientific research in many different fields related to aspects of the place's unique and interesting features. Past, current, and ongoing research is being undertaken by academic and research institutions, including: the Department of Biodiversity, Conservation and Attractions (WA), Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australian Institute of Marine Science (AIMS), Murdoch University (WA), University of WA, Edith Cowan University (WA), and James Cook University (Queensland). Areas of research include tourism, marine ecology, whales, marine turtles, Whale Sharks, fish, and oceanography.</p> <p>The Ningaloo Marine Area has many historic associations for European exploration and development of the North West Cape and northern WA, including pearling and whaling activities. To date eight shipwrecks dating from 1811 to 1923 have been discovered in the area.</p> <p>Other Indigenous and non-Indigenous cultural values of National Estate significance may exist in this place, but the AHC has not yet identified, documented, or assessed these values.</p>
<p>Scott Reef and Surrounds – Commonwealth Area (External territories list)</p>	<p>Natural</p>	<p>Scott Reef is a significant component of a disjointed chain of shelf-edge reefs separated from Indonesia by the Timor Trough. It is regionally significant both because of its high representation of species not found in coastal waters off WA and for the unusual nature of its fauna, which has affinities with the oceanic reef habitats of the Indo-West Pacific as well as the reefs of the Indonesian region. Scott Reef is important for its contribution to understanding long-term geomorphological and reef formation processes and past environments—its sedimentary sequence extends back to include sediments from the Triassic Period.</p> <p>The place has biogeographical significance due to the presence of species that are at, or close to, the limits of their geographic ranges, including fish known previously only from Indonesian waters (e.g. <i>Cheilodipterus singapurensis</i>, <i>Chrysoptera hemicyanea</i>, <i>Ecsenius schroederi</i>, and several gobiids). In addition, some coral species may be endemic to Scott Reef. The reef's isolation and large size may predispose it for the evolution of genetically distinct subspecies or endemic species. Several species are currently only known from Scott Reef, including 51 fish species, 14 mollusc species, six echinoderm species, and the seagrass <i>Thalassia hemprichii</i>. Scott Reef is of biogeographical significance due to its connectivity in terms of gene flow and coral spore movement to surrounding reefs such as Ashmore Reef and Rowley Shoals. Scott Reef has enormous habitat diversity and is considered a hot spot of fish diversity.</p> <p>Scott Reef is characterised by environmental conditions that are rare for shelf atolls; these conditions include clear, deep oceanic water and large tidal ranges. Scott Reef has nationally vulnerable Green Turtles (<i>Chelonia mydas</i>), which are genetically distinct from those on near-coastal sites in WA, from the Lacepede Islands to North West Cape. The sand cays of the place are important habitat for migrating animals in the largely landless expanse of the Timor Sea. They are an important staging area for birds, particularly migrants to and from Australia. Seventeen of the 25 bird species identified on Scott Reef are on CAMBA and/or JAMBA lists.</p> <p>Scott and Seringapatam Reefs together are regionally important for the diversity of their fauna, which includes corals (224 species in 56 genera); molluscs (279 species); decapod crustacea (56 species); echinoderms (117 species); and fish (558 species).</p> <p>Scott Reef is important for scientific research and benchmark studies due to its great age, the exceptional documentation of its geophysical and physical environmental characteristics, and its use as a site of major biological collection trips and surveys by the WA Museum and AIMS.</p>

Commonwealth Heritage Place	Class	Summary of Significance (Source: Ref. 6)
<p>Yampi Defence Area (WA list)</p>	<p>Natural</p>	<p>The Yampi Defence Area displays a complex mosaic of landforms in the transition from the sandstone plateaus of the north-west Kimberley, to the broad plains and pindan scrub of the south-west Kimberley. The occurrence of such diverse landscapes within a relatively limited area is unusual.</p> <p>The strong relationship that exists between past orogenic events and the diverse landscape pattern of ridges and valleys is emphasised in the shape of the Yampi Fold Belt, and distinguished by the pronounced ria embayments that characterise the coastline.</p> <p>Landforms originating from rocks within the Yampi Fold Belt and the terrain associated with the Late Devonian Lillybooraroo Conglomerate are of considerable scientific importance. The erosion of the Lillybooraroo Conglomerate, which covers the Yampi Fold Belt, has partially exposed a pre-Devonian land surface, the attributes of which have enormous potential to aid our understanding of long-term geomorphological processes and evolution. Suggestions that the Lillybooraroo Conglomerate remains an original valley fill deposit would attest to very low rates of erosion and long-term landscape stability, reinforcing the scientific importance of the place.</p> <p>The Yampi Defence Area, which is at the crossroads of the Dampierland, Central, and Northern Kimberley biogeographical regions, has a diverse range of ecosystems, displaying an unusual richness of faunal associations and vegetation communities, with >800 plant species (approximately one-third of the described Kimberley flora) being recorded. Previous surveys of the Dampier Peninsula and Walcott Inlet, and the Kimberley Rainforest Survey enable the changing floristic composition to be compared between adjacent areas. On the basis of species richness, indications are that the Yampi Defence Area supports >1000 species, including undescribed, rare, and fire-sensitive species that are declining elsewhere in the Kimberley. Similarly, the known distributions of vertebrates from the Yampi Peninsula, and locations to the north and south, indicate that a far richer fauna is likely to occur in the place.</p> <p>Fire-protected sandstone communities, typified by healthy mixed-age stands of cypress pine (<i>Callitris intratropica</i>) once common throughout the Kimberley are now very rare in northern Australia, and the occurrence of such stands around Secure Bay are important reference sites for similar Kimberley plant communities that are subject to more frequent fire regimes. The extensive sandstone landforms support small isolated patches of rainforest (the south-west limit in the Kimberley of the distribution of rainforest over sandstone), creating important nodes of diversity and refugia that contain many regionally endemic plants, animals, and invertebrates.</p> <p>Granite landforms are of restricted distribution in the Kimberley and mostly occur in drier areas. The high concentration of granite outcrop sequences at Yampi occurs in a higher rainfall zone resulting in formation of diverse and specialised vegetation communities. Aquatic plants inhabit the ephemeral pools that form in granite depressions, while rock-colonisers populate the granite fissures and scree slopes where run-off water is high.</p> <p>Six plant taxa occur within the place that are endemic to the Yampi Peninsula. Yampi Defence Area is the type locality for the insectivorous plant <i>Byblis filifolia</i>, first collected in 1838 during the voyage of <i>HMS Beagle</i>.</p> <p>The close juxtaposition of three botanical regions within the place is highlighted by the presence of numerous tropical plant species and several animal taxa that are at the southern edge of their distribution. Merging with these are many arid zone plants at the northern and western edge of their distribution, recognisable as the pindan grades into the taller woodland structure of the north-western Kimberley. The sandstone mesa south of Kimbolton is the southernmost locality for several plant taxa restricted to the fire-protected sandstone ranges of the Kimberley.</p> <p>The diversity of landforms in the place and the resultant high concentration of small refugial habitats support a regionally rich vertebrate fauna and represent the most southerly known extant population of the nationally vulnerable Golden-backed Tree-rat (<i>Mesembriomys macrurus</i>) and the most southerly</p>

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		<p>record in the Kimberley of the Sugar Glider (<i>Petaurus breviceps</i>). The bird fauna is significant as it represents a suite of species that are at, or near, the southern edge of their range in the semi-humid zone of the Kimberley including the Green-winged Pigeon (<i>Chalcophaps indica</i>); the Torres Strait Pigeon (<i>Ducula bicolor</i>); and the Little Shrike-thrush (<i>Colluricincla megarhyncha parvula</i>). The place is also an important zone of overlap between many northern and southern species and subspecies. The vertebrate fauna shows its closest similarity to those recorded from the wetter areas of the west Kimberley that lie further to the north.</p> <p>The place supports several fauna and flora species that are listed as specially protected, threatened, or having priority status in WA, as well as four fauna species that are nationally vulnerable and one species that is nationally endangered.</p> <p>Other Indigenous and non-Indigenous cultural values of National Estate significance may exist in this place, but the AHC has not yet identified, documented, or assessed these values.</p>
<p>Cliff Point Historic Site (WA list)</p>	<p>Historic</p>	<p>The Cliff Point Historic Site, individually significant within the area of Garden Island, is important as it was the first site inhabited by Governor Stirling's party in 1829 when founding the colony of Western Australia, and as WA's first official non-convict settlement. The site was initially occupied by Captain Charles Fremantle before the arrival of Captain Stirling. The party occupied the site for two months before a move was made to the Swan River settlement on the mainland.</p> <p>The Cliff Point Historic Site is important as the site of first settlement in WA and is highly valued by the community for its cultural associations.</p> <p>The Cliff Point Historic Site, also known as Sulphur Town, after <i>HMS Sulphur</i> was chosen in 1828 by Governor Stirling to transport settlers to the new colony and is important for its association with Governor Stirling and Captain Charles Fremantle.</p>
<p>Geraldton Drill Hall Complex (WA list)</p>	<p>Historic</p>	<p>The Geraldton Drill Hall Complex, comprising the Drill Hall, Q-Store, and former Parade Ground, is important for its association with the establishment of colonial militia forces in the Geraldton district in the 1870s, after the Imperial British troops departed from the Australian colonies in 1870. The Geraldton Volunteer Rifle Corps (established in 1877) is the oldest to have served in WA and the oldest country unit. The present Drill Hall was erected in the mid-1890s to replace an earlier masonry structure, part of which survives at the rear of the building. The Corps served in the Boer War in 1899, as 'A' Company 16th Battalion, and was one of the most active in the State.</p> <p>The Geraldton Drill Hall Complex is an important example of a colonial drill hall, erected in response to the development of colonial militia forces in WA before the Boer War. The drill hall is one of five remaining colonial period drill halls in WA, of which two are still used by the Department of Defence. Evidence of the original drill hall building (c. 1880) is provided by the remnant masonry section at the rear covered by a hipped roof section of the main roof.</p> <p>The complex is highly valued by the community and the Army Reserve for its symbolic, cultural, and social associations.</p>
<p><i>HMAS Sydney II</i> and <i>HSK Kormoran</i> Shipwreck Sites (External territories list)</p>	<p>Historic</p>	<p>The naval battle fought between the Australian warship <i>HMAS Sydney II</i> and the German commerce raider <i>HSK Kormoran</i> off the WA coast during World War II was a defining event in Australia's cultural history. <i>HMAS Sydney II</i> was Australia's most famous warship of the time and this battle has forever linked the stories of these warships to each other. The tragic loss of <i>HMAS Sydney II</i> and its entire crew of 645 following the battle with <i>HSK Kormoran</i>, remains Australia's worst naval disaster and sent shockwaves throughout the Australian community in November 1941.</p> <p>The battle between <i>HMAS Sydney II</i> and <i>HSK Kormoran</i> had far-reaching consequences for developing Australia's defences. The loss of <i>HMAS Sydney II</i> was the first and most significant in a succession of Australian naval losses that directly threatened the security of Australia and its surrounding seas, having occurred only 17 days before the Japanese launched their</p>

Commonwealth Heritage Place	Class	Summary of Significance (Source: Ref. 6)
		<p>attacks in Southeast Asia and the Northern Pacific. The aftermath of the sinking of <i>HMAS Sydney II</i> and subsequent warship losses saw a major shift in Australian military and political doctrine away from defending Australia by defending the British Empire to that of direct defence of the Australian mainland and the development of a defence alliance with the United States.</p> <p>The discovery and inspection of <i>HMAS Sydney II</i> and <i>HSK Kormoran</i> in 2008 has enabled reconciliation of theory and known historical fact concerning the battle with the archaeological evidence present in the remains. This physical evidence was pivotal to the findings of the 2009 <i>HMAS Sydney II</i> Commission of Inquiry (Cole Inquiry), and allowed some circumstances of the loss of <i>HMAS Sydney II</i> to be better understood. It has also enabled the study of unique technological features that allowed <i>HSK Kormoran</i> to avoid identification as a warship when approaching <i>HMAS Sydney II</i> until reaching point blank range for the weapons of the time. The surprise achieved by using these technologies was a major factor in the destruction of <i>HMAS Sydney II</i>.</p> <p>During the relatively short but conspicuous career of <i>HMAS Sydney II</i>, it was commanded by two of the most highly regarded and respected officers serving in the Royal Australian Navy at that time (Captain J.A. Collins and Captain J. Burnett). Their association with <i>HMAS Sydney II</i> is significant in both their naval careers and of the ship itself.</p> <p>The 2008 discovery of <i>HMAS Sydney II</i> and <i>HSK Kormoran</i> has highlighted the ongoing importance of these shipwrecks and their stories to the wider Australian community. The stories of these two ships are not only valued by the family and friends of the servicemen who died but also by veterans, defence personnel, and the Australian community in general. The location, interpretation, and memorialisation of these shipwrecks also provides some closure for the families.</p>
J Gun Battery (WA list)	Historic	<p>Garden Island is important as the first site occupied by Governor Stirling's party in 1829 when founding the colony of Western Australia and as the first official non-convict settlement in WA. The Cliff Point Historic Site, also known as Sulphur Town, was occupied in the first instance by Captain Charles Fremantle before the arrival of Captain Stirling, and is listed separately in the Register (Reg. No. 10657). The party occupied the site for two months before a move was made to the Swan River settlement on the mainland.</p> <p>Garden Island, and in particular the Cliff Point Historic Site, is highly valued by the community for its cultural associations as the site of first settlement in WA and is important for its association with Governor Stirling and Captain Charles Fremantle.</p> <p>Garden Island was selected as the base for a naval base in 1911 and resumed by the Commonwealth. The strategic role of the island and Cockburn Sound, secured for coastal defence in the Second World War 1939–1945, is illustrated by defences including Challenger or J Battery and the Scriven, Beacon, and Collie Battery complexes, supported by a range of service structures. Challenger battery is listed separately in the Register at Reg. No. 18968.</p> <p>The absence of feral predators means that Garden Island provides a significant refuge for animals vulnerable to predation on the mainland. Due to its isolation from the WA mainland, the island is relatively free of disturbance from humans or introduced animals. Species of particular interest include the Tamar Wallaby (<i>Macropus eugenii</i>), Carpet Python (<i>Morelia spilota</i>), and the Lined Skink (<i>Lerista lineata</i>). Populations of the 14 species of reptile and the Tamar Wallaby have been isolated from mainland populations for 6000–7000 years. In particular, the population of the Tamar Wallaby on Garden Island is morphologically distinct from all other populations.</p> <p>The vegetation on Garden Island differs in structure and composition from vegetation on nearby Rottnest Island and the adjacent mainland. For example, eucalypts and banksia, which are common on the mainland, are absent from the island. Due to a low fire frequency, the vegetation on Garden Island is older and denser than that on the mainland. The northern end of the island has some of the oldest stands of the rare Rottnest Island pine (<i>Callitris</i></p>

Commonwealth Heritage Place	Class	Summary of Significance (Source: Ref. 6)
		<p><i>preissii</i>), with most trees dating from the 1920s. Other species that are now rare in the region include the Cheesewood (<i>Pittosporum phylliraeoides</i> var. <i>phylliraeoides</i>) and Rottnest Teatree (<i>Melaleuca lanceolata</i>).</p> <p>The parabolic sand dunes on the western side of the island are among the best-preserved dunes of the Quindalup soil unit, which is widespread in coastal WA.</p> <p>It is likely that Indigenous values exist at this place. The AHC has not yet identified, documented, or assessed these values for National Estate significance.</p>

2.4 Wetlands of International Importance (listed under the Ramsar Convention)

At the time of writing this document, Australia has 65 Ramsar wetlands that cover >8.3 million ha. Ramsar wetlands are those that are representative, rare, or unique wetlands, or that are important for conserving biological diversity. These are included on the List of Wetlands of International Importance held under the Ramsar Convention (Ref. 9).

The Ramsar Wetlands of Australia dataset (Ref. 10) shows the Ramsar wetlands within the PA, as summarised in Table 2-4. The key features of these wetlands are sourced from the Australian Ramsar Wetlands Database (Ref. 11).

Table 2-4: Ramsar Wetlands

Wetland Name	Summary of Significance (Ref 11)
Eighty-mile Beach	<p>The Eighty-mile Beach Ramsar site, between Port Hedland and Broome in north-western WA, is made up of Eighty Mile Beach and Mandora Salt Marsh (40 km east of Eighty-mile Beach). Eighty Mile Beach is a 220 km section of coastline and adjacent intertidal mudflats. Mandora Salt Marsh includes two large seasonal wetlands and a series of small permanent mound springs.</p> <p>A small number of tidal creeks dissect the beach, including Salt Creek, which is fed partly from groundwater and has permanent surface water. The Mandora Salt Marsh lakes mainly fill from rainfall and run-off in the wet season, then dry to clay beds in the dry season.</p> <p>The mound springs likely come from water deep within the Broome sandstone aquifer rising through fractures in the rock, and resulting in permanent, mostly freshwater, surface water. The permanence of these freshwater wetlands makes them extremely important to biodiversity in the arid area, providing habitat and drinking water in an otherwise dry environment. Mandora Soak contains peat deposits estimated to be ~7000 years old. Salt Creek, in Mandora Salt Marsh, contains one of only two inland mangrove communities in Australia. Other vegetation includes paperbark, samphire, and freshwater aquatic plants.</p> <p>Eighty Mile Beach is characterised by extensive mudflats supporting an abundance of macroinvertebrates, which provide food for large numbers of shorebirds. More than 472 000 migratory waders have been counted on the mudflats during the September to November period.</p> <p>The site is considered one of the major arrival and departure areas for migratory shorebirds visiting Australia, particularly on their southward migration. It is one of the most important sites in the world for the migration of Great Knot (<i>Calidris tenuirostris</i>). Flatback Turtles (<i>Natator depressus</i>) regularly nest at scattered locations along Eighty Mile Beach.</p> <p>Eighty Mile Beach is used for beach-based recreation, including four-wheel driving, motorcycling, fishing, and shell collecting. Mandora Salt Marsh is mainly used for cattle grazing. The site is traditionally part of Karajarri Country in the north, Nyangumarta Country in the south, and Ngarla Country at the southern end of Eighty Mile Beach. The site has artefacts such as middens, pinka (large baler shells used to scoop and carry</p>

Wetland Name	Summary of Significance (Ref 11)
Peel-Yalgorup System*	<p>water for drinking), wilura (used for sharpening spear heads), axes, and flakes, and kurtanyanu and jungari (grinding stones).</p> <p>The Peel-Yalgorup System, located adjacent to the City of Mandurah in WA, is a large and diverse system of shallow estuaries, coastal saline lakes, and freshwater marshes. The site includes the Peel Inlet, Harvey Estuary, Lake McLarty, Lake Mealup, and ten Yalgorup National Park wetlands.</p> <p>The Peel Inlet and Harvey Estuary are large shallow estuarine waters fed from the Serpentine, Murray, and Harvey Rivers, and are connected to the Indian Ocean through various channels. Lake McLarty and Lake Mealup are seasonal freshwater to brackish wetlands. The Yalgorup National Park wetlands are brackish to hypersaline. The wetlands are shallow and fed mainly from groundwater and rainfall. The site is fringed mainly by samphire, rushes, sedges, and paperbark communities.</p> <p>The Peel-Yalgorup System Ramsar site is the most important area for waterbirds in south-western WA. It supports a large number of waterbirds and a wide variety of waterbird species. It also supports a wide variety of invertebrates and estuarine and marine fish.</p> <p>The Yalgorup Lakes wetlands include Lake Clifton, which is one of the few places in the world where living thrombolites occur in inland water. Thrombolites are underwater rock-like structures that are formed by the activities of microbial communities. They are actively growing and rely on an inflow of fresh groundwater rich in calcium and bicarbonate. The thrombolites in Lake Clifton are estimated to be >2000 years old.</p> <p>The Peel Inlet and Harvey Estuary are mainly used for recreational and commercial fishing and other aquatic activities. The estuary system supports the largest professional and amateur estuarine fishery in WA, with a high catch of Blue Swimmer Crabs and Western King Prawns.</p> <p>The Peel-Yalgorup Ramsar site lies within Pinjarup country, a dialect group of the Nyoongar; it contains hundreds of sites with significance to the Indigenous community, including artefact scatter sites, camp sites, ceremonial sites, fish traps, and skeletal remains.</p>
Ashmore Reef Commonwealth Marine Reserve	<p>Ashmore Reef Commonwealth Marine Reserve (formerly Ashmore Reef National Nature Reserve) is in the north-eastern Indian Ocean on the edge of Australia's North West Shelf.</p> <p>It is the largest of only three emergent oceanic reefs present within the north-eastern Indian Ocean, and is the only oceanic reef in the region with vegetated islands. The Reserve is comprised of numerous marine habitats and supports a regionally important and diverse range of species.</p> <p>The Reserve has been recognised internationally for its high diversity and density of sea snakes. The Ramsar site is also home to Dugongs, highly diverse reef-building corals, and numerous endemic species of fish and other marine invertebrate fauna.</p> <p>The three vegetated islands and several sand cays of the Reserve include important seabird and turtle nesting sites and support large populations of migratory shorebirds and breeding seabirds.</p> <p>Ashmore has been regularly visited and fished by Indonesians since the early eighteenth century. Indonesian artefacts identified in the Reserve include ceramics, graves, ballast rocks, and what could be a trepang (sea cucumber) cooking site.</p> <p>Tourism and recreation as well as access to shelter and water for traditional fishers from Indonesia in the Reserves is mainly limited to West Island Lagoon and part of West Island. Research relevant to the Reserve and nearby reefs has included surveys, monitoring, and/or research on terrestrial and marine non-indigenous species, sea birds, migratory shorebirds, sea snakes, fish, corals, sea cucumbers, trochus, clams, cephalopods, and other marine invertebrates.</p>
Becher Point Wetlands	<p>The Becher Point Wetlands Ramsar site is a system of about 60 small wetlands located near Rockingham in south-west Western Australia.</p> <p>Over the past 5000 years Becher Point advanced seaward, or westwards, in response to falling sea levels, with the new terrestrial land forming a stable beachridge plain.</p> <p>As the beachridge plain grew westwards, new wetlands formed to the west of the older wetlands. The older wetlands evolved from simple groundwater systems to more complex wetland systems with different hydrological and ecological character. The</p>

Wetland Name	Summary of Significance (Ref 11)
	<p>Becher Point Wetlands Ramsar site covers the younger wetlands in this progression, with the newest wetlands being <1000 years old and the oldest ~3000 years old.</p> <p>The wetlands support sedgelands, herblands, grasslands, open-shrublands, and low open-forests. The sedgelands that occur within the linear wetland depressions of the Ramsar site are a nationally listed threatened ecological community (TEC).</p> <p>At least four species of amphibians and 21 species of reptiles have been recorded on the site. The site also supports the Southern Brown Bandicoot.</p> <p>The site is gazetted as a reserve for conservation of flora and fauna. The site, which includes the Port Kennedy Scientific Park, is used for research, education, and recreation.</p>
Forrestdale and Thomsons Lakes*	<p>Forrestdale Lake is in the City of Armadale and Thomsons Lake is in the City of Cockburn (both in the Perth metropolitan area, WA).</p> <p>Forrestdale and Thomsons Lakes are fresh/brackish, seasonal wetlands, predominantly fed by groundwater. Forrestdale Lake usually dries out by midsummer, whereas Thomsons Lake retains water longer and in some years does not dry completely. These lakes are the best remaining examples of brackish, seasonal lakes with extensive fringing sedgeland, typical of the Swan Coastal Plain.</p> <p>The lakes provide important habitat for waterbirds on the Swan Coastal Plain with 72 species of waterbird occurring at the two lakes and 21 of them breeding. Twenty-one species of migratory birds protected by international migratory bird conservation agreements have been recorded at the lakes.</p> <p>Thomsons Lake is one of the last remaining Swan Coastal Plain refuges for the Australasian Bittern, and the only remaining wetland within the Perth metropolitan area where the Marsh Harrier still breeds.</p>
Ord River Floodplain	<p>The Ord River Floodplain Ramsar site, in north-east Western Australia, is a floodplain and estuarine wetland system. Mangroves are the most common vegetation in the site, extending from the False Mouths of the Ord to the upstream sections of the estuary. The mangroves form narrow fringes along the intertidal areas, with saltmarsh on higher ground. The intertidal mangroves support many species of birds and bats, and are a breeding area for Banana Prawns.</p> <p>The Parry Lagoon floodplains are dominated by grassland, the lower Ord River and Parry Creek by riparian woodland, and the permanent waterholes by aquatic vegetation. More than 200 species of birds have been recorded within the site including waterfowl, migratory shorebirds, mangrove birds, and terrestrial species. The site supports the nationally threatened Australian Painted Snipe.</p> <p>The wetlands are habitat for many diadromous fish species (those that migrate between marine and more freshwater environments some time during their life), including the nationally threatened species Freshwater Sawfish, Green Sawfish, and Northern River Shark. Reptiles that use the site include the Freshwater Crocodile and Salt-water Crocodile.</p> <p>The Lower Ord River and the False Mouths of the Ord River are popular destinations for recreational fishing, crabbing, and boating. The Parry Lagoons Nature Reserve is also important for passive recreational activities such as bird watching and bush walking. Nature-based commercial tourism is an important source of income for the region.</p>

Wetland Name	Summary of Significance (Ref 11)
Roebuck Bay	<p>The Roebuck Bay Ramsar site is near Broome in northern WA. Roebuck Bay has a very large tidal range, which exposes ~160 km² of mudflat, covering most of the Ramsar site. The site receives tidal sea water as well as fresh surface and groundwater, and the balance between the two influences the residual groundwater salinity and the distribution of plants and animals. Mangrove swamps line the eastern and southern edges of the site, and extend up into the linear tidal creeks. They are important nursery areas for marine fishes and crustacea, particularly prawns. Extensive seagrass beds occur in the bay, providing an important feeding ground for Dugong and Green Turtles. Dolphins and nationally threatened turtles also regularly use the site.</p> <p>The intertidal mud and sand flats support a high abundance of bottom-dwelling invertebrates, which are a key food source for waterbirds. The site is one of the most important migration stopover areas for shorebirds in Australia and globally. For many shorebirds, Roebuck Bay is the first Australian landfall they reach on the East Asian–Australasian Flyway. The total numbers of waders using the site each year is estimated at >300 000. The northern beaches and Bush Point provide important high tide roost sites.</p> <p>The site is used for recreational or tourism activities such as fishing, crabbing, sightseeing, and bird watching. Broome Bird Observatory, a small reserve at the northern end of the site, engages in shorebird research and public education.</p> <p>Roebuck Bay lies in the traditional estate of Indigenous people belonging to both Jukun and Yawuru groups. The site was an important area for seasonal meetings, exchanging gifts, arranging marriages, and settling disputes. Numerous shellfish middens, marking former camping places, can still be seen along coastal cliffs and dunes. Indigenous people continue to make extensive use of Roebuck Bay's natural resources for activities such as gathering shellfish, fishing, and hunting.</p>
<p><i>* Identified in the Protected Matters Search Report (Appendix A; Ref. 2) but located inland and thus not expected to be exposed to CAPL's activities.</i></p>	

2.5 Listed Threatened and Migratory Species

The Species of National Environmental Significance database (Ref. 12) stores maps and point distribution information about NES species as listed in the EPBC Act.

The Biologically Important Areas (BIAs) of Regionally Significant Marine Species database (Ref. 13) uses the marine bioregional planning program to identify, describe, and map BIAs for protected species under the EPBC Act. BIAs spatially and temporally define areas where protected species display biologically important behaviours (including breeding, foraging, resting, or migration).

The following information was generated from the Biologically Important Areas of Regionally Significant Marine Species database (Ref. 13), the Species of National Environmental Significance (Public Grids) database (Ref. 12), and the Protected Matters Search Report (Appendix A; Ref. 2).

2.5.1 Marine Mammals

Table 2-5 lists the Threatened and Migratory marine mammals that may be present within the PA (Ref. 12; Ref. 2 [Appendix A]).

Table 2-6 lists the individual BIAs for marine mammals and their known seasonal presence within the PA (Ref. 13) ; these are shown in Figure 2-1.

A review of the Conservation Advices and Recovery Plans identified key threats associated with Threatened and Migratory marine mammals that may be present within the PA. These threats and relevant management advice are listed in Table 2-7.

Table 2-5: Threatened and Migratory Marine Mammals

Common Name	Scientific Name	Status	Migratory
Southern Right Whale	<i>Eubalaena australis</i>	Endangered	Migratory
Antarctic Minke Whale, Dark-shoulder Minke Whale	<i>Balaenoptera bonaerensis</i>		Migratory
Sei Whale	<i>Balaenoptera borealis</i>	Vulnerable	Migratory
Bryde's Whale	<i>Balaenoptera edeni</i>		Migratory
Blue Whale	<i>Balaenoptera musculus</i>	Endangered	Migratory
Fin Whale	<i>Balaenoptera physalus</i>	Vulnerable	Migratory
Pygmy Right Whale	<i>Caperea marginata</i>		Migratory
Dugong	<i>Dugong dugon</i>		Migratory
Dusky Dolphin	<i>Lagenorhynchus obscurus</i>		Migratory
Humpback Whale	<i>Megaptera novaeangliae</i>	Vulnerable	Migratory
Australian Sea-lion, Australian Sea Lion	<i>Neophoca cinerea</i>	Vulnerable	
Australian Snubfin Dolphin	<i>Orcaella heinsohni</i>		Migratory
Killer Whale, Orca	<i>Orcinus orca</i>		Migratory
Sperm Whale	<i>Physeter macrocephalus</i>		Migratory
Indo-Pacific Humpback Dolphin	<i>Sousa chinensis</i>		Migratory
Spotted Bottlenose Dolphin (Arafura/Timor Sea populations)	<i>Tursiops aduncus</i> (Arafura/Timor Sea populations)		Migratory

Table 2-6: BIAs for Threatened and Migratory Marine Mammals

Common Name	Behaviour	Seasonal Presence	Occurrence Descriptor
Australian Snubfin Dolphin	Breeding	Year-round	Known to occur
	Calving	Year-round	Known to occur
	Foraging	Year-round	Known to occur
	Foraging (high density prey)	Year-round	Known to occur
	Foraging likely	Year-round	Known to occur
	Resting	Year-round	Known to occur
Indo-Pacific Humpback Dolphin	Breeding	Year-round	Known to occur
	Breeding	Year-round	Likely to occur
	Calving	Year-round	Known to occur

Common Name	Behaviour	Seasonal Presence	Occurrence Descriptor
	Calving	Year-round	Likely to occur
	Foraging	Year-round	Known to occur
	Foraging	Year-round	Likely to occur
	Foraging (high density prey)	Year-round	Known to occur
	Foraging (high density prey)	Year-round	Likely to occur
	Significant habitat	Year-round	Known to occur
	Significant habitat – unknown behaviour	Year-round	Likely to occur
Indo-Pacific/Spotted Bottlenose Dolphin	Breeding	Not possible to determine yet	Known to occur
	Calving	Not possible to determine yet	Known to occur
	Foraging	Not possible to determine yet	Known to occur
	Foraging likely	Not possible to determine yet	Known to occur
	Migration likely	Not possible to determine yet	Known to occur
Dugong	Breeding	April/May	Known to occur
	Breeding	Year-round	Known to occur
	Calving	April/May	Known to occur
	Calving	Year-round	Known to occur
	Foraging	April/May	Known to occur
	Foraging	May–September	Known to occur
	Foraging	Year-round	Likely to occur
	Foraging (high density seagrass beds)	April/May	Known to occur
	Foraging (high density seagrass beds)	Year-round	Known to occur
	Migration likely	Year-round	Known to occur
	Nursing	April/May	Known to occur
	Nursing	Year-round	Known to occur

Common Name	Behaviour	Seasonal Presence	Occurrence Descriptor
Australian Sea Lion	Foraging (male)	Year-round	Likely to occur
	Foraging (male and female)	Year-round	Known to occur
Blue and Pygmy Blue Whale	Foraging (abundant food source)	Arrive as early as November, with number of animals steadily increasing to peak in March–May. After May the number of whales drops, by late June most animals have left, although a few acoustic detections are made into July (Ref. 98)	Known to occur
	Foraging (high-density)	Arrive early as Nov with number of animals increasing to peak in March–May. After May the number of whales drops, late June most animals left, a few acoustic detections are made into July (Ref. 98). Satellite tracking data indicates use mid-March-late April,	Known to occur
	Foraging (on migration)	Arrive early as Nov with number of animals increasing to peak in March–May. After May the number of whales drops, late June most animals left, a few acoustic detections are made into July (Ref. 98). Satellite tracking data indicates use mid-March-late April.	Known to occur
Humpback Whale	Calving	Winter	Known to occur
	Migration	Northern migration, late July to September	Known to occur
	Migration	Winter	Known to occur
	Migration (north)	Northern migration, late July to September	Known to occur
	Migration (north and south)	Northern migration, late July to September	Known to occur
	Migration (north and south)	Northern peak July and southward peak October – November (Ref. 98)	Known to occur
	Migration (north and south)	Southbound peak late Sept to mid-Oct. Northward peak mid-June to mid-July	Known to occur
	Migration (south)	Southbound peak late Sept to mid-Oct	Known to occur
	Nursing	Winter	Known to occur
Resting	Winter	Known to occur	
Pygmy Blue Whale	Distribution		Known to occur

Common Name	Behaviour	Seasonal Presence	Occurrence Descriptor
	Foraging		Known to occur
	Foraging area (annual high use area)		Known to occur
	Known foraging area		Known to occur
	Migration	Northern migration (enter Perth canyon January to May; pass Exmouth April to August; continue north to Indonesia). Southern migration (follow WA coastline from October to late December)	Known to occur
		Most use between October and December, peaking in November	Known to occur
Southern Right Whale	Calving buffer	Late autumn, winter, and spring	Known to occur
	Seasonal calving habitat	Late autumn, winter, and spring	Known to occur
Sperm Whale	Foraging (abundant food source)	Summer	Known to occur

Table 2-7: Summary of Relevant Conservation Plans – Marine Mammals

Species	Relevant Plan / Advice	Key Threats / Relevant Management Advice
Humpback Whale	Conservation Advice for the Humpback Whale 2015–2020 (Ref. 14)	<p>Assessing and addressing anthropogenic noise; shipping, industrial, and seismic surveys</p> <ul style="list-style-type: none"> All seismic surveys must be undertaken consistently with the EPBC Act Policy Statement 2.1 – Interaction between offshore seismic exploration and whales. Should a survey be undertaken in or near a calving, resting, foraging area, or a confined migratory pathway then Part B. Additional Management Procedures must also be applied. For actions involving acoustic impacts (example pile driving, explosives) on Humpback Whale calving, resting, feeding areas, or confined migratory pathways site-specific acoustic modelling should be undertaken (including cumulative noise impacts). Should acoustic impacts on humpback calving, resting, foraging areas, or confined migratory pathways be identified a noise management plan should be developed. This can include: <ul style="list-style-type: none"> the use of shutdown and caution zones pre- and post-activity observations the use of marine mammal observers and/or Passive Acoustic Monitoring Implementation of an adaptive management program following verification of the noise levels produced from the action (i.e. if the noise levels created exceed original expectations). <p>Minimising vessel collisions</p> <ul style="list-style-type: none"> Maximise the likelihood that all vessel strike incidents are reported in the national ship strike database. All cetaceans are protected in Commonwealth waters and, the EPBC Act requires that all collisions with whales in Commonwealth waters are reported.

Species	Relevant Plan / Advice	Key Threats / Relevant Management Advice
		<p>Vessel collisions can be submitted to the National Ship Strike Database at https://data.marinemammals.gov.au/report/shipstrike</p> <ul style="list-style-type: none"> • Ensure the risk of vessel strike on Humpback Whales is considered when assessing actions that increase vessel traffic in areas where Humpback Whales occur and, if required appropriate mitigation measures are implemented to reduce the risk of vessel strike. • Enhance education programs to inform vessel operators of best practice behaviours and regulations for interacting with Humpback Whales.
Blue Whale	Conservation Management Plan for the Blue Whale 2015–2025 (Ref. 15)	<p>Key threats include:</p> <ul style="list-style-type: none"> • whaling • climate variability and change • noise interference • habitat modification • vessel disturbance • overharvesting of prey. <p>No relevant management advice has been identified.</p>
Sei Whale	Conservation Advice <i>Balaenoptera borealis</i> Sei Whale (Ref. 16)	<p>Assessing and addressing anthropogenic noise:</p> <ul style="list-style-type: none"> • Once the spatial and temporal distribution (including biologically important areas) of Sei Whales is further defined an assessment of the impacts of increasing anthropogenic noise (including from seismic surveys, port expansion, and coastal development) should be undertaken on this species. <p>Minimising vessel collisions:</p> <ul style="list-style-type: none"> • Ensure all vessel strike incidents are reported in the national vessel strike database (https://data.marinemammals.gov.au/report/shipstrike).
Fin Whale	Conservation Advice <i>Balaenoptera physalus</i> Fin Whale (Ref. 17)	<p>Assessing and addressing anthropogenic noise:</p> <ul style="list-style-type: none"> • Once the spatial and temporal distribution (including biologically important areas) of Fin Whales is further defined an assessment of the impacts of increasing anthropogenic noise (including from seismic surveys, port expansion, and coastal development) should be undertaken on this species. <p>Minimising vessel collisions:</p> <ul style="list-style-type: none"> • Ensure all vessel strike incidents are reported in the national vessel strike database
Southern Right Whale	Conservation Management Plan for the Southern Right Whale: A Recovery Plan under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> 2011–2021 (Ref. 18)	<p>Key threats include:</p> <ul style="list-style-type: none"> • entanglement • vessel disturbance • whaling • climate variability and change • noise interference • habitat modification. <p>No relevant management advice has been identified.</p>
Australian Sea Lion	Recovery Plan for the Australian Sea Lion (<i>Neophoca cinerea</i>) (Ref. 19)	<p>Key threats include:</p> <ul style="list-style-type: none"> • interactions with the commercial gillnet fishing sector • mortality due to interactions with the rock lobster industry • deaths caused by fisheries-related marine debris.

Species	Relevant Plan / Advice	Key Threats / Relevant Management Advice
		<p>Other factors that may be contributing to the lack of recovery include:</p> <ul style="list-style-type: none">• habitat degradation and interactions with aquaculture operations• human disturbance to colonies• deliberate killings• disease• pollution and oil spills• prey depletion• climate change. <p>No relevant management advice has been identified.</p>

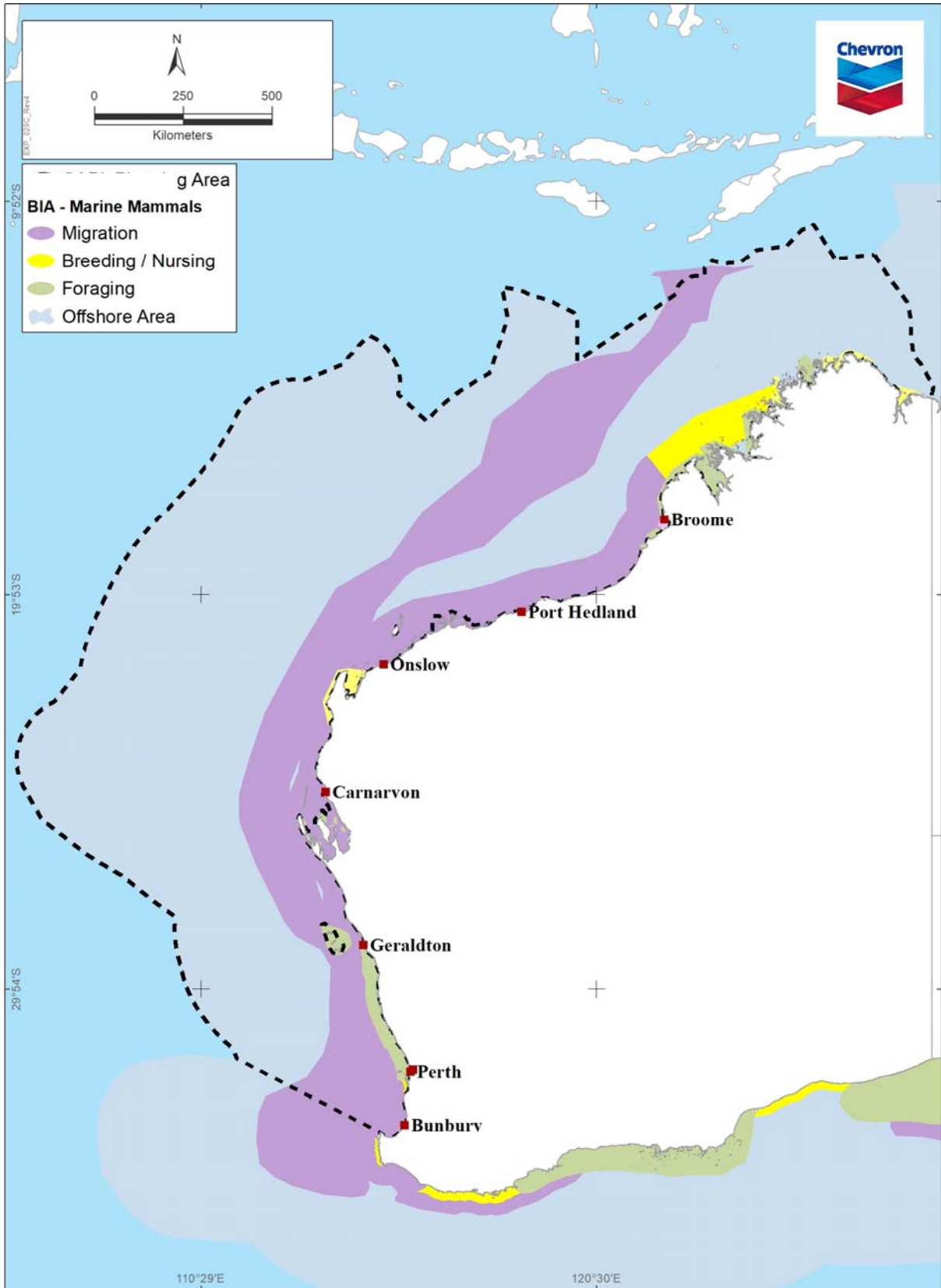


Figure 2-1: BIAs Associated with Marine Mammals

2.5.2 Reptiles

Table 2-8 lists the Threatened and Migratory marine reptile species that may be present within the PA (Ref. 12; Ref. 2 [Appendix A]).

Table 2-9 lists critical nesting habitats within the PA; these are shown on Figure 2-2 (Ref. 20).

Table 2-10 lists the BIAs for marine reptiles and their known seasonal presence within the PA; these are also shown on Figure 2-2 (Ref. 13).

A review of the Conservation Advices and Recovery Plans identified key threats associated with Threatened and Migratory marine reptiles that may be present within the PA. These threats and relevant management advice are listed in

Table 2-11.

In addition to the Threatened and Migratory marine reptile species identified in the tables below, an additional 26 listed marine reptile species (all sea snakes except the Freshwater Crocodile [*Crocodylus johnstoni*]) were identified as having the potential to occur within the PA (Ref. 2). Cogger (Ref. 21; Ref. 22) notes that most sea snakes have shallow benthic feeding patterns and are rarely observed in water >30 m deep, indicating that these species are likely to be present in shallow waters.

Table 2-8: Threatened and Migratory Marine Reptiles

Common Name	Scientific Name	Status	Migratory
Short-nosed Seasnake	<i>Aipysurus apraefrontalis</i>	Critically Endangered	
Leaf-scaled Seasnake	<i>Aipysurus foliosquama</i>	Critically Endangered	
Loggerhead Turtle	<i>Caretta caretta</i>	Endangered	Migratory
Green Turtle	<i>Chelonia mydas</i>	Vulnerable	Migratory
Salt-water Crocodile, Estuarine Crocodile	<i>Crocodylus porosus</i>		Migratory
Leatherback Turtle, Leathery Turtle, Luth	<i>Dermochelys coriacea</i>	Endangered	Migratory
Hawksbill Turtle	<i>Eretmochelys imbricata</i>	Vulnerable	Migratory
Olive Ridley Turtle, Pacific Ridley Turtle	<i>Lepidochelys olivacea</i>	Endangered	Migratory
Flatback Turtle	<i>Natator depressus</i>	Vulnerable	Migratory

Table 2-9: Critical Habitat for Marine Turtles

Common Name	Location	Seasonal Presence	Occurrence Descriptor
Loggerhead Turtle	Exmouth Gulf and Ningaloo Coast. 20 km internesting buffer	Nov–May	Known to occur
	Gnaraloo Bay and beaches. 20 km internesting buffer	Nov–May	Known to occur
	Shark Bay, all coastal and island beaches out to the northern tip of Dirk Hartog Island. 20 km internesting buffer	Nov–May	Known to occur

Common Name	Location	Seasonal Presence	Occurrence Descriptor
Green Turtle	Mainland east of Mary Island to mainland adjacent to Murrara Island including all offshore islands. 20 km interesting buffer	Nov–Mar	Known to occur
	Ashmore Reef and Cartier Reef. 20 km interesting buffer	Dec–Jan	Known to occur
	Browse Island. 20 km interesting buffer	Nov–Mar	Known to occur
	Scott Reef. 20 km interesting buffer	Nov–Mar	Known to occur
	Adele Island, Lacepede Islands	Nov–Mar	Known to occur
	Dampier Archipelago. 20 km interesting buffer	Nov–Mar	Known to occur
	Barrow Island, Montebello Islands, Serrier Island, and Thevenard Island. 20 km interesting buffer	Nov–Mar	Known to occur
	Exmouth Gulf and Ningaloo Coast. 20 km interesting buffer	Nov–Mar	Known to occur
Hawksbill Turtle	Dampier Archipelago, including Delambre Island and Rosemary Island. 20 km interesting buffer	Oct–Feb	Known to occur
	Cape Preston to mouth of Exmouth Gulf including Montebello Islands and Lowendal Islands. 20 km interesting buffer	Oct–Feb	Known to occur
Olive Ridley Turtle	Cape Leveque. 20 km interesting buffer	May–Jul	Known to occur
	Prior Point and Llanggi. 20 km interesting buffer	May–Jul	Known to occur
	Darcy Island. 20 km interesting buffer	May–Jul	Known to occur
	Vulcan Island. 20 km interesting buffer	May–Jul	Known to occur
Flatback Turtle	Cape Domett and Lacrosse Island in the Cambridge Gulf. 60 km interesting buffer	Aug–Sep	Known to occur
	Lacepede Islands. 60 km interesting buffer	Oct–Mar	Known to occur
	Eco Beach – coastal beach near Broome. 60 km interesting buffer	July	Known to occur
	Eighty Mile Beach – coastal beach. 60 km interesting buffer	July	Known to occur
	Cemetery Beach, Port Hedland. 60 km interesting buffer	Oct–Mar	Known to occur
	Mundabullangana Beach. 60 km interesting buffer	Oct–Mar	Known to occur
	Dampier Archipelago, including Delambre Island and Hauy Island. 60 km interesting buffer	Oct–Mar	Known to occur
	Barrow Island, Montebello Islands, coastal islands from Cape Preston to Locker Island. 60 km interesting buffer	Oct–Mar	Known to occur

Table 2-10: BIAs for Threatened and Migratory Marine Reptiles

Common Name	BIA – Legend	Seasonal Presence	Occurrence Descriptor
Flatback Turtle	Aggregation		Known to occur
	Foraging	Green Turtle aggregation inside of NW Is. Early in summer	Known to occur
	Foraging	January – Flatbacks, Greens	Known to occur

Common Name	BIA – Legend	Seasonal Presence	Occurrence Descriptor
	Foraging	Observations during July, no evidence of turtle activity Oct–Nov for Solitary, Steamboat, Carey, Preston Islands, and Cape Preston	Known to occur
	Foraging	Year-round	Known to occur
	Internesting		Known to occur
	Internesting buffer	Green Turtle aggregation inside of NW Is. Early in summer	Known to occur
	Internesting buffer	January – Flatbacks, Greens	Known to occur
	Internesting buffer	Summer	Known to occur
	Internesting buffer	Summer (nesting /internesting), year-round	Known to occur
	Mating	Green Turtle aggregation inside of NW Is. Early in summer	Known to occur
	Migrating Corridor	Summer (nesting/interesting) year-round	Known to occur
	Nesting	Green Turtle aggregation inside of NW Is. Early in summer	Known to occur
	Nesting	January – Flatbacks, Greens	Known to occur
	Nesting	Short summer nesting season, predominantly Nov–Mar with peak in January	Known to occur
	Nesting	Summer	Known to occur
Green Turtle	Aggregation	Early summer	Known to occur
	Aggregation		Known to occur
	Basking	Summer	Known to occur
	Foraging	Green Turtle aggregation inside of NW Is. Early in summer	Known to occur
	Foraging	January – Flatbacks, Greens	Known to occur
	Foraging	March–May	Likely to occur
	Foraging	Observations during July, no evidence of turtle activity Oct–Nov for Solitary, Steamboat, Carey, Preston Islands, and Cape Preston	Known to occur
	Foraging	Summer	Known to occur
	Foraging	Summer / possibly year-round	Known to occur
	Foraging	Year-round	Known to occur
	Foraging	Year-round	Likely to occur
	Foraging		Known to occur
	Internesting	Dec–Feb	Known to occur
	Internesting	Peak season Dec–Jan	Known to occur
	Internesting	Summer	Known to occur
Internesting	Year-round	Likely to occur	

Common Name	BIA – Legend	Seasonal Presence	Occurrence Descriptor
	Interesting		Known to occur
	Interesting buffer	Green Turtle aggregation inside of NW Is. Early in summer	Known to occur
	Interesting buffer	January – Flatbacks, Greens	Known to occur
	Interesting buffer	Peak season Dec–Jan	Known to occur
	Interesting buffer	Summer	Known to occur
	Interesting buffer	Summer (nesting /interesting) year-round	Known to occur
	Interesting buffer	Year-round	Known to occur
	Interesting buffer	Year-round	Likely to occur
	Interesting buffer		Known to occur
	Mating	Green Turtle aggregation inside of NW Is. Early in summer	Known to occur
	Mating	Summer	Known to occur
	Mating	Year-round	Likely to occur
	Mating		Known to occur
	Migrating Corridor	Summer (nesting/interesting) year-round	Known to occur
	Nesting	Green Turtle aggregation inside of NW Is. Early in summer	Known to occur
	Nesting	January – Flatbacks, Greens	Known to occur
	Nesting	Peak season Dec–Jan	Known to occur
	Nesting	Summer	Known to occur
	Nesting	Year-round	Known to occur
	Nesting	Year-round	Likely to occur
	Nesting		Known to occur
Hawksbill Turtle	Foraging	Aggregation inside of NW Is. Early in summer	Known to occur
	Foraging	Observations during July no evidence of turtle activity Oct–Nov for Solitary, Steamboat, Carey, Preston Islands, and Cape Preston	Known to occur
	Foraging	Year-round	Known to occur
	Foraging	Year-round	Likely to occur
	Interesting	Spring and early summer, peak nesting October	Known to occur
	Interesting buffer	Spring and early summer, peak nesting October	Known to occur
	Interesting buffer	Peak nesting in spring and early summer	Known to occur
	Interesting buffer		Known to occur
	Interesting buffer	Green Turtle aggregation inside of NW Is. Early in summer	Known to occur

Common Name	BIA – Legend	Seasonal Presence	Occurrence Descriptor
	Internesting buffer	Year-round	Known to occur
	Internesting buffer	Year-round	Likely to occur
	Internesting buffer	Peak season Dec–Jan	Likely to occur
	Internesting buffer	Peak nesting in spring and early summer	Likely to occur
	Mating	Green Turtle aggregation inside of NW Is. Early in summer	Known to occur
	Mating	Spring and early summer, peak nesting October	Known to occur
	Mating	Year-round	Known to occur
	Nesting	Green Turtle aggregation inside of NW Is. Early in summer	Known to occur
	Nesting	Peak nesting in spring and early summer	Known to occur
	Nesting	Peak season Dec–Jan	Known to occur
	Nesting	Spring and early summer, peak nesting October	Known to occur
	Nesting	Year-round	Known to occur
	Nesting	Year-round	Likely to occur
	Nesting		Known to occur
Loggerhead Turtle	Foraging	Year-round	Known to occur
	Foraging		Known to occur
	Internesting	Dec–Mar	Known to occur
	Internesting buffer	Dec–Mar	Known to occur
	Internesting buffer	Peak season monitored	Known to occur
	Internesting buffer		Known to occur
	Nesting	Dec–Mar	Known to occur
	Nesting	Peak season monitored	Known to occur
	Nesting		Known to occur
Olive Ridley Turtle	Foraging		Known to occur

Table 2-11: Summary of Relevant Conservation Plans – Marine Reptiles

Species	Relevant Plan / Advice	Key Threats / Relevant Management Advice
<i>Caretta caretta</i> (Loggerhead Turtle) <i>Chelonia mydas</i> (Green Turtle) <i>Dermochelys coriacea</i> (Leatherback Turtle, Leathery Turtle, Luth) <i>Eretmochelys imbricata</i> (Hawksbill Turtle)	Recovery Plan for Marine Turtles in Australia (Ref. 23)	Key threats include: <ul style="list-style-type: none"> • climate change and variability • marine debris • chemical and terrestrial discharge • international take • terrestrial predation • fisheries bycatch • light pollution

Species	Relevant Plan / Advice	Key Threats / Relevant Management Advice
<i>Natator depressus</i> (Flatback Turtle)		<ul style="list-style-type: none"> • habitat modification • Indigenous take • vessel disturbance • noise interference • recreational activities • diseases and pathogens. <p>Details regarding relevant threats:</p> <ul style="list-style-type: none"> • A3: Reduce the impacts from marine debris • A4: Minimise chemical and terrestrial discharge: <ul style="list-style-type: none"> – Ensure spill risk strategies and response programs adequately include management for marine turtles and their habitats, particularly in reference to ‘slow to recover habitats’, e.g. nesting habitat, seagrass meadows, or coral reefs – Quantify the impacts of decreased water quality on stock viability – Quantify the accumulation and effects of anthropogenic toxins in marine turtles, their foraging habitats, and subsequent stock viability. • A8: Minimise light pollution: <ul style="list-style-type: none"> – Artificial light within or adjacent to habitat critical to the survival of marine turtles will be managed such that marine turtles are not displaced from these habitats – Develop and implement best practice light management guidelines for existing and future developments adjacent to marine turtle nesting beaches – Identify the cumulative impact on turtles from multiple sources of onshore and offshore light pollution.
<i>Dermochelys coriacea</i> (Leatherback Turtle, Leathery Turtle, Luth)	Approved Conservation Advice for <i>Dermochelys coriacea</i> (Leatherback Turtle) (Ref. 24)	<p>Key threats include:</p> <ul style="list-style-type: none"> • incidental capture in commercial fisheries • harvest of eggs and meat • ingestion of marine debris • vessel disturbance / boat strike • predation on eggs by wild dogs (<i>Canis familiaris</i>), pigs (<i>Sus scrofa</i>) and monitor lizards (<i>Varanus salvator</i>) • degradation of foraging areas • changes to breeding sites. <p>No relevant management advice has been identified.</p>
<i>Aipysurus apraefrontalis</i> (Short-nosed Sea Snake)	Approved Conservation Advice for <i>Aipysurus apraefrontalis</i> (Short-nosed Sea Snake) (Ref. 25)	<p>Key threats include:</p> <ul style="list-style-type: none"> • changes to the inner region of Ashmore Reef (sand encroachment) that has caused coral outcrops that previously supported high densities of sea snakes to be filled in with sand • increases in water temperatures observed in Ashmore and surrounding reefs associated with El Niño events, which may have impacted the

Species	Relevant Plan / Advice	Key Threats / Relevant Management Advice
		<p>species directly or indirectly by contributing to further habitat degradation</p> <ul style="list-style-type: none"> oil and gas exploration, including seismic surveys and exploration drilling incidental catch and death in commercial prawn trawling fisheries. Unsustainable and illegal fishing practices are recognised as the most significant direct and indirect threat to natural processes and biological diversity in the Ashmore Reef region. <p>No relevant management advice has been identified.</p>
<p><i>Aipysurus foliosquama</i> (Leaf-scaled Sea Snake)</p>	<p>Approved Conservation Advice for <i>Aipysurus foliosquama</i> (Leaf-scaled Sea Snake) (Ref. 26)</p>	<p>Key threats include:</p> <ul style="list-style-type: none"> changes to the inner region of Ashmore Reef (sand encroachment) – coral outcrops that previously supported high densities of sea snakes are now filled with sand increases in water temperatures observed in Ashmore and surrounding reefs associated with El Niño events, which may have impacted the species directly or indirectly by contributing to further habitat degradation oil and gas exploration, including seismic surveys and exploration drilling incidental catch and death in commercial prawn trawling fisheries. Unsustainable and illegal fishing practices are recognised as the most significant direct and indirect threat to natural processes and biological diversity in the Ashmore Reef region. <p>No relevant management advice has been identified.</p>

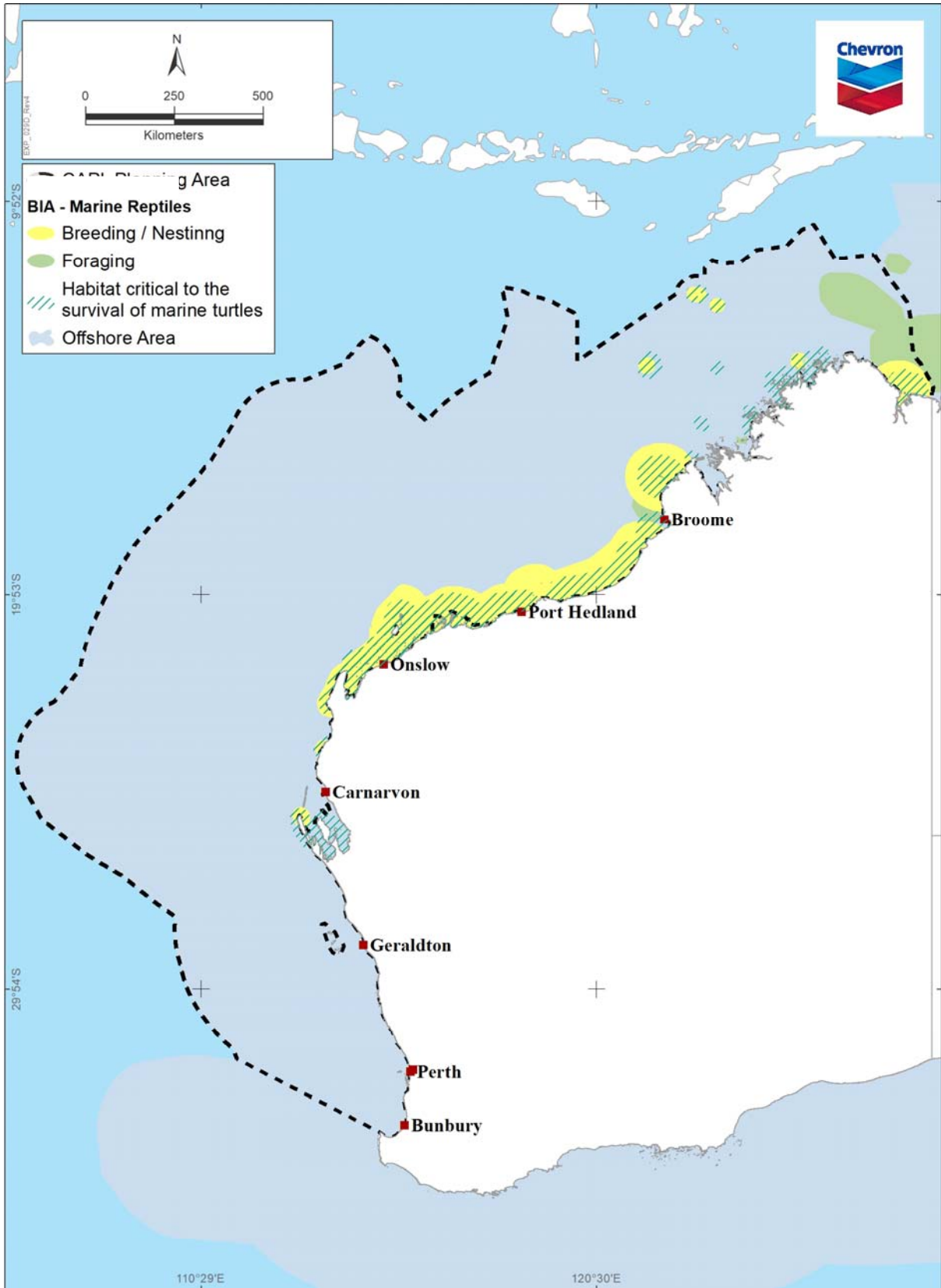


Figure 2-2: BIAs Associated with Marine Reptiles

2.5.3 Fishes, including Sharks and Rays

Table 2-12 lists the Threatened and Migratory fishes (including sharks and rays) that may be present within the PA (Ref. 12; Ref. 2 [Appendix A]).

Table 2-13 lists the BIAs for fishes (including sharks and rays) and their known seasonal presence within the PA (Ref. 13) ; these are shown in Figure 2-3.

Within the PA, 61 solenostomid and syngnathid species that are listed marine species have been identified as having the potential to occur (Appendix A; Ref. 2).

Almost all syngnathids live in nearshore and inner shelf habitats, usually in shallow coastal waters, among seagrasses, mangroves, coral reefs, macroalgae-dominated reefs, and sand or rubble habitats (Ref. 27; Ref. 28; Ref. 29; Ref. 30). Although two species have been identified in the North-west Marine Region in deeper waters (Winged Seahorse [*Hippocampus alatus*] and Western Pipehorse [*Solegnathus* sp. 2]; Ref. 31), these species were not identified by the NES search of the PA (Ref. 12).

A review of the Conservation Advices and Recovery Plans identified key threats associated with Threatened and Migratory fishes (including sharks and rays) that may be present within the PA. These threats and relevant management advice are included in Table 2-14.

Table 2-12: Threatened and Migratory Fishes, including Sharks and Rays

Common Name	Scientific Name	Status	Migratory
Narrow Sawfish, Knifetooth Sawfish	<i>Anoxypristis cuspidata</i>		Migratory
Grey Nurse Shark (west coast population)	<i>Carcharias taurus</i> (west coast population)	Vulnerable	
White Shark, Great White Shark	<i>Carcharodon carcharias</i>	Vulnerable	Migratory
Northern River Shark, New Guinea River Shark [#]	<i>Glyphis garricki</i>	Endangered	
Speartooth Shark [#]	<i>Glyphis glyphis</i>	Critically Endangered	
Shortfin Mako, Mako Shark	<i>Isurus oxyrinchus</i>		Migratory
Longfin Mako	<i>Isurus paucus</i>		Migratory
Porbeagle, Mackerel Shark	<i>Lamna nasus</i>		Migratory
Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray	<i>Manta alfredi</i>		Migratory
Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray	<i>Manta birostris</i>		Migratory
Blind Gudgeon [*]	<i>Milyeringa veritas</i>	Vulnerable	
Balston's Pygmy Perch [^]	<i>Nannatherina balstoni</i>	Vulnerable	
Blind Cave Eel [*]	<i>Ophisternon candidum</i>	Vulnerable	
Dwarf Sawfish, Queensland Sawfish	<i>Pristis clavata</i>	Vulnerable	Migratory
Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [#]	<i>Pristis pristis</i>	Vulnerable	Migratory

Common Name	Scientific Name	Status	Migratory
Green Sawfish, Dindagubba, Narrowsnout Sawfish	<i>Pristis zijsron</i>	Vulnerable	Migratory
Whale Shark	<i>Rhincodon typus</i>	Vulnerable	Migratory
<p>* Subterranean fauna species identified in the Protected Matters Search Report (Appendix A; Ref. 2) but not expected to be exposed to CAPL's activities.</p> <p># Species mainly located inland (freshwater and estuarine habitats) identified in the Protected Matters Search Report but with the potential to be present offshore (neritic and intertidal zones) and exposed to CAPL's activities.</p> <p>^ Freshwater species located inland identified in the Protected Matters Search Report but not expected to be exposed to CAPL's activities.</p>			

Table 2-13: BIAs for Threatened and Migratory Fishes, including Sharks and Rays

Common Name	BIA – Legend	Seasonal Presence	Occurrence Descriptor
Dwarf Sawfish	Foraging	All seasons	Known to occur
	Foraging	Use in dry season to early wet (Dec)	Known to occur
	Foraging		Known to occur
	Juvenile	All seasons	Known to occur
	Nursing	All seasons	Known to occur
	Nursing	Use in dry season to early wet (Dec)	Known to occur
	Nursing		Known to occur
	Pupping	All seasons	Known to occur
	Pupping		Known to occur
Freshwater Sawfish	Foraging	All seasons	Known to occur
	Foraging	Pupping occurs from Jan–May	Known to occur
	Foraging	Pupping occurs from Jan–May, more prevalent during the late wet season when mature animals have more water to manoeuvre in	Known to occur
	Juvenile	Pupping occurs from Jan–May	Known to occur
	Nursing	All seasons	Known to occur
	Nursing	All seasons	Likely to occur
	Pupping	Pupping occurs from Jan–May	Known to occur
	Pupping	Pupping occurs from Jan–May	Likely to occur
	Pupping	Pupping occurs from Jan–May, more prevalent during the late wet season when mature animals have more water to manoeuvre in	Known to occur
Green Sawfish	Foraging		Known to occur
	Nursing		Known to occur
	Pupping		Known to occur
White Shark	Foraging	Spring	Known to occur
	Foraging (high density prey)	Apr–Jun, autumn	Known to occur

Common Name	BIA – Legend	Seasonal Presence	Occurrence Descriptor
	Foraging		Known to occur

Table 2-14: Summary of Relevant Conservation Plans – Fishes, including Sharks and Rays

Species	Relevant Plan / Advice	Key Threats / Relevant Management Advice
<i>Pristis zijsron</i> (Green Sawfish, Dindagubba, Narrowsnout Sawfish) <i>Pristis clavata</i> (Dwarf Sawfish) <i>Glyphis garricki</i> (Northern River Shark) <i>Glyphis glyphis</i> (Speartooth Shark)	Sawfish and River Sharks Multispecies Recovery Plan (Ref. 32)	Key threats include: <ul style="list-style-type: none"> fishing activities including: being caught as bycatch in the commercial and recreational sectors; through Indigenous fishing; and illegal, unreported, and unregulated fishing habitat degradation and modification. Other potential threats to the species include the collection of animals for display in public aquaria and marine debris. No relevant management advice has been identified.
	Approved Conservation Advice for Green Sawfish (Ref. 33)	The main potential threats to Green Sawfish include: <ul style="list-style-type: none"> incidental capture as bycatch and by-product in gillnet and trawl fisheries illegal capture for fins and rostra habitat degradation through coastal development. No relevant management advice has been identified.
	Approved Conservation Advice for <i>Pristis clavata</i> (Dwarf Sawfish) (Ref. 34)	The main identified threats to Dwarf Sawfish include: <ul style="list-style-type: none"> incidental capture as bycatch in commercial and recreational net fishing illegal, unreported, and unregulated fishing. No relevant management advice has been identified.
	Approved Conservation Advice for <i>Glyphis garricki</i> (Northern River Shark) (Ref. 35)	The main identified threats to Northern River Sharks include: <ul style="list-style-type: none"> commercial, recreational, and Indigenous fishing activities IUU fishing habitat degradation and modification. No relevant management advice has been identified.
	Approved Conservation Advice for <i>Glyphis glyphis</i> (Speartooth Shark) (Ref. 36)	The main identified threats to Speartooth Sharks include: <ul style="list-style-type: none"> commercial, recreational, and Indigenous fishing activities IUU fishing habitat degradation and modification. No relevant management advice has been identified.
Rhincodon typus (Whale Shark)	Conservation Advice for the Whale Shark 2015–2020 (Ref. 37)	The most significant threat to Whale Sharks is intentional and unintentional mortality from fishing outside Australian waters. In Australian waters,

Species	Relevant Plan / Advice	Key Threats / Relevant Management Advice
		<p>threats to the recovery of the species include boat strike from large vessels and habitat disruption from mineral exploration, production, and transportation. Other less-important threats include disturbance from domestic tourism operations, marine debris, and climate change. Limited subsistence hunting of Whale Sharks still occurs in some parts of the world. Ecotourism in these regions could provide an alternative income, which would give these communities the means to stop hunting and a reason to conserve the species.</p> <p>No relevant management advice has been identified.</p>
<p><i>Carcharias taurus</i> (west coast population) (Grey Nurse Shark [west coast population])</p>	<p>Recovery Plan for the Grey Nurse Shark (<i>Carcharias taurus</i>) (Ref. 38)</p>	<p>Key threats include:</p> <ul style="list-style-type: none"> • commercial fishing • recreational fishing • shark finning • shark control activities • ecotourism • aquarium trade.
<p><i>Carcharodon Carcharias</i> (Great White Shark)</p>	<p>Recovery Plan for the White Shark (<i>Carcharodon Carcharias</i>) (Ref. 39)</p>	<p>Key threats include:</p> <ul style="list-style-type: none"> • mortality related to being caught accidentally (bycatch) or illegally (targeted) by commercial and recreational fisheries, including issues of post release mortality • mortality related to shark control activities such as beach meshing or drum lining (east coast population). <p>Other potential threats to the species include the impacts of illegal trade in White Shark products; ecosystem effects as a result of habitat modification and climate change (including changes in sea temperature, ocean currents, and acidification); and ecotourism, including cage diving.</p> <p>No relevant management advice has been identified.</p>
<p><i>Milyeringa veritas</i> (Blind Gudgeon)</p>	<p>Approved Conservation Advice for <i>Milyeringa veritas</i> (Blind Gudgeon) (Ref. 40)</p>	<p>The main identified threats to the Blind Gudgeon include:</p> <ul style="list-style-type: none"> • sedimentation from mining and construction • canal development • water abstraction • point source pollution from sewage • landfill • dumping and mining • diffuse pollution from urban development and petroleum infrastructure. <p>No relevant management advice has been identified.</p>
<p><i>Nannatherina balstoni</i> (Balston's Pygmy Perch)</p>	<p>Approved Conservation Advice for <i>Nannatherina balstoni</i> (Balston's Pygmy Perch) (Ref. 41)</p>	<p>The main identified threat to the Balston's Pygmy Perch is habitat alteration and the introduction of exotic fish species.</p> <p>Habitat alteration is likely to occur through any alterations to inflow and increased salinisation, siltation, and eutrophication that occur through</p>

Species	Relevant Plan / Advice	Key Threats / Relevant Management Advice
		<p>changes to flow regimes (regulation and abstraction), road maintenance, mineral sand exploration and mining, groundwater extraction, and agricultural and forestry practices in the uppermost catchment.</p> <p>No relevant management advice has been identified.</p>

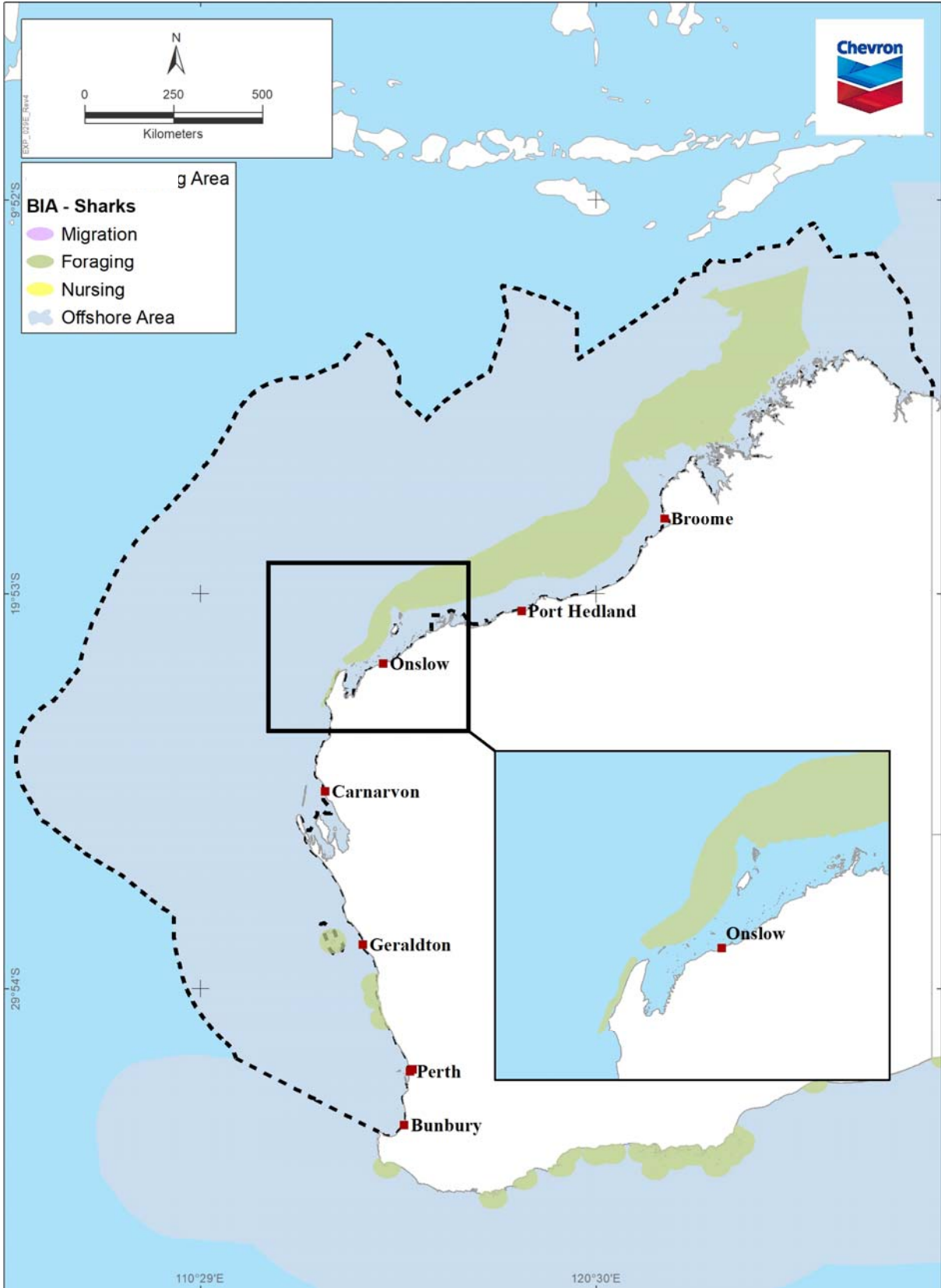


Figure 2-3: BIAs Associated with Fishes, including Sharks and Rays

2.5.4 Seabirds and Shorebirds

Table 2-15 lists the Threatened and Migratory seabirds and shorebirds that may be present within the PA Ref. 12; Ref. 2 [Appendix A]).

Table 2-16 lists the BIAs for seabirds and shorebirds and their known seasonal presence within the PA (Ref. 13); these are shown in Figure 2-4.

A review of Conservation Advices and Recovery Plans identified key threats associated with Threatened and Migratory seabirds and shorebirds that may be present within the PA. These threats and relevant management advice are included in Table 2-17.

Table 2-15: Threatened and Migratory Seabirds and Shorebirds

Common Name	Scientific Name	Status	Migratory
Oriental Reed-warbler*	<i>Acrocephalus orientalis</i>		Migratory
Common Sandpiper*	<i>Actitis hypoleucos</i>		Migratory
Common Noddy	<i>Anous stolidus</i>		Migratory
Australian Lesser Noddy	<i>Anous tenuirostris melanops</i>	Vulnerable	
Fork-tailed Swift	<i>Apus pacificus</i>		Migratory
Flesh-footed Shearwater, Fleshy-footed Shearwater	<i>Ardenna carneipes</i>		Migratory
Wedge-tailed Shearwater	<i>Ardenna pacifica</i>		Migratory
Ruddy Turnstone*	<i>Arenaria interpres</i>		Migratory
Australasian Bittern	<i>Botaurus poiciloptilus</i>	Endangered	
Sharp-tailed Sandpiper*	<i>Calidris acuminata</i>		Migratory
Sanderling*	<i>Calidris alba</i>		Migratory
Red Knot, Knot*	<i>Calidris canutus</i>	Endangered	Migratory
Curlew Sandpiper*	<i>Calidris ferruginea</i>	Critically Endangered	Migratory
Pectoral Sandpiper*	<i>Calidris melanotos</i>		Migratory
Red-necked Stint*	<i>Calidris ruficollis</i>		Migratory
Long-toed Stint*	<i>Calidris subminuta</i>		Migratory
Great Knot*	<i>Calidris tenuirostris</i>	Critically Endangered	Migratory
Streaked Shearwater	<i>Calonectris leucomelas</i>		Migratory
Forest Red-tailed Black-Cockatoo, Karrak	<i>Calyptorhynchus banksii naso</i>	Vulnerable	
Baudin's Cockatoo, Long-billed Black-Cockatoo	<i>Calyptorhynchus baudinii</i>	Vulnerable	
Carnaby's Cockatoo, Short-billed Black-Cockatoo	<i>Calyptorhynchus latirostris</i>	Endangered	
Red-rumped Swallow#	<i>Cecropis daurica</i>		Migratory
Double-banded Plover*	<i>Charadrius bicinctus</i>		Migratory
Greater Sand Plover, Large Sand Plover	<i>Charadrius leschenaultii</i>	Vulnerable	Migratory

Common Name	Scientific Name	Status	Migratory
Lesser Sand Plover, Mongolian Plover	<i>Charadrius mongolus</i>	Endangered	Migratory
Oriental Plover, Oriental Dotterel*	<i>Charadrius veredus</i>		Migratory
Oriental Cuckoo, Horsfield's Cuckoo	<i>Cuculus optatus</i>		Migratory
Amsterdam Albatross	<i>Diomedea amsterdamensis</i>	Endangered	Migratory
Tristan Albatross	<i>Diomedea dabbenena</i>	Endangered	
Southern Royal Albatross	<i>Diomedea epomophora</i>	Vulnerable	Migratory
Wandering Albatross	<i>Diomedea exulans</i>	Vulnerable	Migratory
Northern Royal Albatross	<i>Diomedea sanfordi</i>	Endangered	
Red Goshawk	<i>Erythrotriorchis radiatus</i>	Vulnerable	
Gouldian Finch	<i>Erythrura gouldiae</i>	Endangered	
Crested Shrike-tit (northern), Northern Shrike-tit	<i>Falcunculus frontatus whitei</i>	Vulnerable	
Lesser Frigatebird, Least Frigatebird	<i>Fregata ariel</i>		Migratory
Great Frigatebird, Greater Frigatebird	<i>Fregata minor</i>		Migratory
Swinhoe's Snipe*	<i>Gallinago megala</i>		Migratory
Pin-tailed Snipe*	<i>Gallinago stenura</i>		Migratory
Partridge Pigeon (western)	<i>Geophaps smithii blaauwi</i>	Vulnerable	
Oriental Pratincole*	<i>Glareola maldivarum</i>		Migratory
Blue Petrel	<i>Halobaena caerulea</i>	Vulnerable	
Barn Swallow#	<i>Hirundo rustica</i>		Migratory
Caspian Tern	<i>Hydroprogne caspia</i>		Migratory
Malleefowl	<i>Leipoa ocellata</i>	Vulnerable	
Broad-billed Sandpiper*	<i>Limicola falcinellus</i>		Migratory
Asian Dowitcher*	<i>Limnodromus semipalmatus</i>		Migratory
Bar-tailed Godwit*	<i>Limosa lapponica</i>		Migratory
Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit*	<i>Limosa lapponica baueri</i>	Vulnerable	Migratory
Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri)	<i>Limosa lapponica menzbieri</i>	Critically Endangered	Migratory
Black-tailed Godwit*	<i>Limosa limosa</i>		
Southern Giant-Petrel, Southern Giant Petrel	<i>Macronectes giganteus</i>	Endangered	Migratory
Northern Giant Petrel	<i>Macronectes halli</i>	Vulnerable	Migratory

Common Name	Scientific Name	Status	Migratory
White-winged Fairy-wren (Barrow Island), Barrow Island Black-and-white Fairy-wren	<i>Malurus leucopterus edouardi</i>	Vulnerable	
White-winged Fairy-wren (Dirk Hartog Island), Dirk Hartog Black-and-White Fairy-wren	<i>Malurus leucopterus leucopterus</i>	Vulnerable	
Grey Wagtail#	<i>Motacilla cinerea</i>		Migratory
Yellow Wagtail#	<i>Motacilla flava</i>		Migratory
Eastern Curlew, Far Eastern Curlew*	<i>Numenius madagascariensis</i>	Critically Endangered	Migratory
Little Curlew, Little Whimbrel*	<i>Numenius minutus</i>		Migratory
Whimbrel*	<i>Numenius phaeopus</i>		Migratory
Bridled Tern	<i>Onychoprion anaethetus</i>		Migratory
Fairy Prion (southern)	<i>Pachyptila turtur subantarctica</i>	Vulnerable	
Osprey*	<i>Pandion haliaetus</i>		Migratory
Abbott's Booby	<i>Papasula abbotti</i>	Endangered	
Night Parrot	<i>Pezoporus occidentalis</i>	Endangered	
White-tailed Tropicbird	<i>Phaethon lepturus</i>		Migratory
Red-tailed Tropicbird	<i>Phaethon rubricauda</i>		Migratory
Red-necked Phalarope*	<i>Phalaropus lobatus</i>		Migratory
Ruff (Reeve) *	<i>Philomachus pugnax</i>		Migratory
Sooty Albatross	<i>Phoebastria fusca</i>	Vulnerable	Migratory
Pacific Golden Plover*	<i>Pluvialis fulva</i>		Migratory
Grey Plover*	<i>Pluvialis squatarola</i>		Migratory
Princess Parrot, Alexandra's Parrot	<i>Polytelis alexandrae</i>	Vulnerable	
Soft-plumaged Petrel	<i>Pterodroma mollis</i>	Vulnerable	
Rufous Fantail#	<i>Rhipidura rufifrons</i>		Migratory
Australian Painted Snipe	<i>Rostratula australis</i>	Endangered	
Roseate Tern	<i>Sterna dougallii</i>		Migratory
Little Tern	<i>Sternula albifrons</i>		Migratory
Australian Fairy Tern	<i>Sternula nereis nereis</i>	Vulnerable	
Masked Booby	<i>Sula dactylatra</i>		Migratory
Brown Booby	<i>Sula leucogaster</i>		Migratory
Red-footed Booby	<i>Sula sula</i>		Migratory
Indian Yellow-nosed Albatross	<i>Thalassarche carteri</i>	Vulnerable	
Tasmanian Shy Albatross	<i>Thalassarche cauta</i>		Migratory

Common Name	Scientific Name	Status	Migratory
Shy Albatross, Tasmanian Shy Albatross	<i>Thalassarche cauta cauta</i>	Vulnerable	
White-capped Albatross	<i>Thalassarche cauta steadi</i>	Vulnerable	
Campbell Albatross, Campbell Black-browed Albatross	<i>Thalassarche impavida</i>	Vulnerable	
Black-browed Albatross	<i>Thalassarche melanophris</i>	Vulnerable	Migratory
Crested Tern*	<i>Thalasseus bergii</i>		Migratory
Grey-tailed Tattler*	<i>Tringa brevipes</i>		Migratory
Wood Sandpiper*	<i>Tringa glareola</i>		Migratory
Common Greenshank, Greenshank*	<i>Tringa nebularia</i>		Migratory
Marsh Sandpiper, Little Greenshank*	<i>Tringa stagnatilis</i>		Migratory
Common Redshank, Redshank*	<i>Tringa totanus</i>		Migratory
Painted Button-quail (Houtman Abrolhos)	<i>Turnix varius scintillans</i>	Vulnerable	
Masked Owl (northern)	<i>Tyto novaehollandiae kimberli</i>	Vulnerable	
Terek Sandpiper*	<i>Xenus cinereus</i>		Migratory
* Migratory Wetland Species			
# Migratory Terrestrial Species (unlikely to be encountered in the PA)			

Table 2-16: BIAs for Threatened and Migratory Seabirds and Shorebirds

Common Name	BIA – Legend	Seasonal Presence	Occurrence Descriptor
Australian Lesser Noddy	Foraging (provisioning young)	Year-round	Known to occur
Bridled Tern	Foraging (in high numbers)	Almost entirely a breeding visitor, arriving late September or October and leaving between late February and early May	Known to occur
Brown Booby	Breeding	Breeding Feb–Oct (but mainly in autumn)	Known to occur
Caspian Tern	Foraging (provisioning young)		Known to occur
Common Noddy	Foraging	Breeding visitor in Abrolhos (mid-August to late April) and further north (May to at least November)	Known to occur
	Foraging (provisioning young)	Breeding visitor in Abrolhos (mid-August to late April) and further north (May to at least November)	Known to occur

Common Name	BIA – Legend	Seasonal Presence	Occurrence Descriptor
Fairy Tern	Breeding	Breeding from July to late September; birds from South-West Marine Region (SWMR) dispersing northwards in winter	Known to occur
	Foraging (in high numbers)	Year-round, but southern birds disperse north in winter	Known to occur
Flesh-footed Shearwater	Aggregation	Late April to late June and late August to early November	Known to occur
Greater Frigatebird	Breeding	Breeding in May–June and August	Known to occur
Great-winged Petrel (macroptera race)	Foraging (provisioning young)	Late January to early December	Known to occur
Lesser Crested Tern	Breeding	Breeding Mar–Jun	Known to occur
Lesser Frigatebird	Breeding	Breeding Mar–Sep	Known to occur
Little Penguin	Foraging (provisioning young)		Known to occur
Little Shearwater	Foraging (in high numbers)	Early January to early December, mainly April to November	Known to occur
Little Tern	Breeding	Breeding recorded in June, July, and October	Known to occur
	Resting	Breeding recorded in June, July, and October	Known to occur
Pacific Gull	Foraging (in high numbers)		Former Range
	Foraging (in high numbers)		Known to occur
Red-footed Booby	Breeding	Breeding in May-June	Known to occur
Roseate Tern	Breeding	Breeding from mid-March to July; Also birds from SWMR dispersing north in winter	Known to occur
	Foraging	Winter	Known to occur
	Foraging (provisioning young)	Winter	Known to occur
	Resting	Breeding from mid-March to July; birds from SWMR dispersing north in winter	Known to occur
Soft-plumaged Petrel	Foraging (in high numbers)	Mainly March to late September	Known to occur
Sooty Tern	Foraging	Late Aug to early May	Known to occur
Wedge-tailed Shearwater	Breeding	Breeding visitor arriving in mid-August and leaving in April in Pilbara and mid-May in Shark Bay	Known to occur

Common Name	BIA – Legend	Seasonal Presence	Occurrence Descriptor
	Foraging (in high numbers)	Mid-August–May	Known to occur
White-faced Storm Petrel	Foraging (in high numbers)		Known to occur
White-tailed Tropicbird	Breeding	Breeding recorded in May and October	Known to occur

Table 2-17: Summary of Relevant Conservation Plans – Seabirds and Shorebirds

Species	Relevant Plan / Advice	Key Threats / Relevant Management Advice
<i>Anous tenuirostris melanops</i> (Australian Lesser Noddy)	Conservation Advice for <i>Anous tenuirostris melanops</i> Australian Lesser Noddy (Ref. 42)	The main potential threat to breeding colonies is catastrophic destruction of habitat by cyclones. Other threats include: <ul style="list-style-type: none"> • pollution • oil spills • over-fishing.
<i>Calyptorhynchus banksii naso</i> (Forest Red-tailed Black-Cockatoo) <i>Calyptorhynchus baudinii</i> (Baudin’s Cockatoo, Long-billed Black-Cockatoo)	Forest Black-Cockatoo (Baudin’s Cockatoo <i>Calyptorhynchus baudinii</i>) and Forest Red-tailed Black-Cockatoo (<i>Calyptorhynchus banksii naso</i>) Recovery Plan (Ref. 43)	Key threats are: <ul style="list-style-type: none"> • killing by illegal shooting • feral honeybees • habitat loss • nest hollow shortage • nest hollow competition.
	Approved Conservation Advice for <i>Calyptorhynchus banksii naso</i> (Forest Red-tailed Black-Cockatoo) (Ref. 44)	The main identified threats to the Forest Red-tailed Black-Cockatoo are: <ul style="list-style-type: none"> • illegal shooting • habitat loss • nest hollow shortage and competition from other species • injury or death from <i>Apis mellifera</i> (European Honey Bees).
	Conservation Advice <i>Calyptorhynchus baudinii</i> Baudin’s Cockatoo (Ref. 45)	Key threats include: <ul style="list-style-type: none"> • habitat loss, disturbance, and modifications • fire • invasive species • competition with native species • illegal killing • phytopathogens and pests • climate change.
<i>Calyptorhynchus latirostris</i> (Carnaby’s Cockatoo)	Carnaby’s Cockatoo (<i>Calyptorhynchus latirostris</i>) Recovery Plan (Ref. 46)	Key threats include: <ul style="list-style-type: none"> • loss of breeding habitat • loss of non-breeding foraging and night roosting habitat • tree health • mining and extraction activities • illegal shooting

Species	Relevant Plan / Advice	Key Threats / Relevant Management Advice
		<ul style="list-style-type: none"> • illegal taking • climate change • collisions with motor vehicles • disease.
<p><i>Leipoa ocellate</i> (Malleefowl)</p>	<p>National Recovery Plan for Malleefowl <i>Leipoa ocellate</i> (Ref. 47)</p>	<p>Key threats include:</p> <ul style="list-style-type: none"> • clearing • habitat fragmentation and isolation • grazing • predation • fire (wildfire and intentional burns) • disease, inbreeding, and chemical exposure • climate change.
<p><i>Macronectes giganteus</i> (Southern Giant Petrel) <i>Macronectes halli</i> (Northern Giant Petrel) <i>Thalassarche carteri</i> (Indian Yellow-nosed Albatross) <i>Thalassarche cauta</i> (Tasmanian Shy Albatross) <i>Thalassarche cauta cauta</i> (Shy Albatross) <i>Thalassarche cauta steadi</i> (White-capped Albatross) <i>Thalassarche impavida</i> (Campbell Albatross, Campbell Black-browed Albatross) <i>Thalassarche melanophris</i> (Black-browed Albatross)</p>	<p>National Recovery Plan for Threatened Albatrosses and Giant Petrels 2011–2016 (Ref. 48)</p>	<p>Key threats include:</p> <ul style="list-style-type: none"> • incidental catch resulting from fishing operations • competition with fisheries for marine resources • dependence on discards • marine pollution • climate change • intentional shooting/killing • feral pest species • human disturbance at the nest • parasites and diseases • loss of nesting habitat • competition for nest space • climate change.
<p><i>Malurus leucopterus edouardi</i> (White-winged Fairy-wren (Barrow Island))</p>	<p>Approved Conservation Advice for <i>Malurus leucopterus edouardi</i> (White-winged Fairy-wren [Barrow Island]) (Ref. 49)</p>	<p>The main potential threats to the White-winged Fairy-wren (Barrow Island) include:</p> <ul style="list-style-type: none"> • introduction of non-endemic fauna, flora, or pathogens • inappropriate fire regime • vegetation clearing • destruction of birds • degradation of habitat by fire and development.
<p><i>Malurus leucopterus leucopterus</i> (White-winged Fairy-wren (Dirk Hartog Island))</p>	<p>Approved Conservation Advice for <i>Malurus leucopterus leucopterus</i> (White-winged Fairy-wren (Dirk Hartog Island)) (Ref. 50)</p>	<p>The main identified threats to the White-winged Fairy-wren (Dirk Hartog Island) are:</p> <ul style="list-style-type: none"> • fire, which can kill birds and/or destroy habitat • degradation through grazing and trampling of habitat by feral goats (<i>Capra hircus</i>)

Species	Relevant Plan / Advice	Key Threats / Relevant Management Advice
		<ul style="list-style-type: none"> predation by feral cats (<i>Felis catus</i>) and house mice (<i>Mus</i> sp.)
<i>Pachyptila turtur subantarctica</i> (Fairy Prion (southern))	Conservation Advice <i>Pachyptila turtur subantarctica</i> Fairy Prion (southern) (Ref. 51)	Key threats include: <ul style="list-style-type: none"> habitat loss, disturbance, and modification predation.
<i>Papasula abbotti</i> (Abbott's Booby)	Conservation Advice <i>Papasula abbotti</i> Abbott's Booby (Ref. 52)	The Abbott's booby breeds only on Christmas Island. The principal reason for the decline of Abbott's Booby is thought to be the clearance of about a third of the former nesting rainforest habitat.
<i>Pezoporus occidentalis</i> (Night Parrot)	Conservation Advice <i>Pezoporus occidentalis</i> Night Parrot (Ref. 53)	There are no known threats to this species.
<i>Polytelis alexandrae</i> (Princess Parrot)	Conservation Advice <i>Polytelis alexandrae</i> Princess Parrot (Ref. 54)	Potential threats include: <ul style="list-style-type: none"> increased intensity of bushfires habitat degradation from introduced weeds and herbivores predation by introduced predators competition with other bird species disease illegal collection.
<i>Pterodroma mollis</i> (Soft-plumaged Petrel)	Conservation Advice <i>Pterodroma Mollis</i> Soft-plumaged Petrel (Ref. 55)	Key threats include: <ul style="list-style-type: none"> accidental introduction of predators to island populations.
<i>Rostratula australis</i> (Australian Painted Snipe)	Approved Conservation Advice for <i>Rostratula australis</i> (Australian Painted Snipe) (Ref. 56)	Key threats include: <ul style="list-style-type: none"> habitat loss, disturbance, and modification invasive weeds trampling, browsing, or grazing animal predation or competition fire.
<i>Sternula nereis nereis</i> (Australian Fairy Tern)	Approved Conservation Advice for <i>Sternula nereis nereis</i> (Fairy Tern) (Ref. 57)	Key threats include: <ul style="list-style-type: none"> predation by introduced animals disturbance by humans and direct destruction of nests increasing salinity in waters adjacent to colonies irregular water management (flooding nests etc.) weed encroachment oil spills.
<i>Turnix varius scintillans</i> (Painted Button-quail (Houtman Abrolhos))	Approved Conservation Advice for <i>Turnix varia scintillans</i> (Painted Button-quail (Houtman Abrolhos)) (Ref. 58)	Key threats include: <ul style="list-style-type: none"> inappropriate fire regimes competition for food with, or predation of eggs by, the introduced House Mouse (<i>Mus musculus</i>) introduction of non-endemic fauna, flora or pathogens

Species	Relevant Plan / Advice	Key Threats / Relevant Management Advice
<p><i>Tyto novaehollandiae kimberli</i> (Masked Owl (northern))</p>	<p>Conservation Advice <i>Tyto novaehollandiae kimberli</i> Masked Owl (northern) (Ref. 59)</p>	<ul style="list-style-type: none"> • grazing and trampling of habitat. <p>Potential threats include:</p> <ul style="list-style-type: none"> • decline in food availability • more intense, frequent, and extensive fires, which may also reduce the availability of large trees and hollows • competition for tree hollows • reduction in suitable habitat.

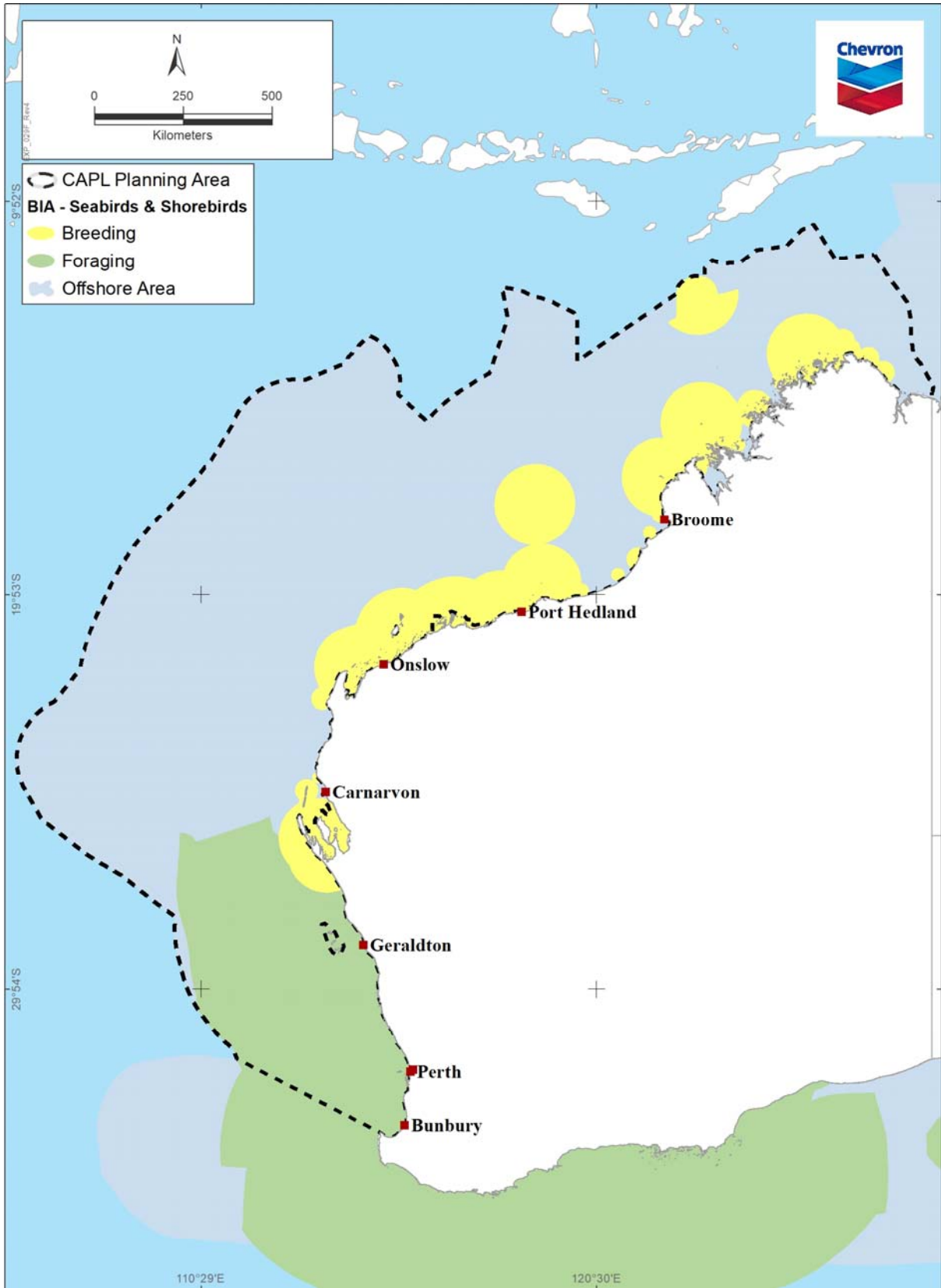


Figure 2-4: BIAs Associated with Seabirds and Shorebirds

2.6 Listed Threatened Ecological Communities

In Australia, three categories exist for listing threatened ecological communities (TECs) under the EPBC Act: critically endangered, endangered, and vulnerable.

In WA, TECs are present in the south-west and in the north around Broome. Table 2-18 summarises these communities (Ref. 60; Ref. 2 [Appendix A]).

Table 2-18: Threatened Ecological Communities

TEC Name	Summary of Significance
Banksia Woodlands of the Swan Coastal Plain ecological community*	The ecological community is a woodland associated with the Swan Coastal Plain of southwest Western Australia. A key diagnostic feature is a prominent tree layer of banksia, with scattered eucalypts and other tree species often present among or emerging above the banksia canopy. The understorey is a species-rich mix of sclerophyllous shrubs, graminoids, and forbs. The ecological community is characterised by a high endemism and considerable localised variation in species composition across its range. (Ref. 61)
Clay Pans of the Swan Coastal Plain*	The Clay Pans of the Swan Coastal Plain ecological community occurs in Western Australia where clay soils form an impermeable layer close to the landscape surface, and wetlands form that rely solely on rainfall to fill and then dry to impervious pans in summer. The ecological community generally occurs as a shrubland (less commonly as a low, open woodland) over a ground layer of geophytes, herbs, and sedges, which are characteristic of the wetter parts of the sites. There are no dominant species that characterise the entire ecological community. The ecological community, however, shows similar landform and vegetation structural features across its range. A distinctive feature of these clay pan wetlands is the suite of geophytes and annual flora that germinates, grows and flowers sequentially as these areas dry over summer, producing a floral display for over three months. The clay pans have very high species richness, a number of local endemics and are the most floristically diverse of the Swan Coastal Plain wetlands. (Ref. 62)
Monsoon Vine Thickets on the coastal sand dunes of Dampier Peninsula	The Monsoon Vine Thickets on the coastal sand dunes of Dampier Peninsula ecological community represents certain occurrences of Monsoon Vine thickets in the south-west Kimberley region of Western Australia (within the Dampierland bioregion). The ecological community is predominantly restricted to the coastlines of the Dampier Peninsula from Broome in the south to One Arm Point in the north and on the north-eastern coast of the Peninsula from One Arm Point to Goodenough Bay. The coastal dune environment, being largely of sand, has minimal soil development and is susceptible to erosion from various sources including rising tides, strong winds, and cyclonic activity. Tides of the Dampier Peninsula range up to 11 m and are a major factor affecting the coastal environment where the ecological community occurs. (Ref. 63)
Sedgeland in Holocene dune swales of the southern Swan Coastal Plain	The Rockingham-Becher Plain has been formed through the accumulation of Holocene sediments and contains a continuous depositional history from 7000 BP to present. Wetlands occur within the swales where the watertable is close to or at the ground surface in the wetter months of the year. The most typical form is that of the Becher Suite, which is made up of over 250 very small to small sumplands and damplands, many of which contain occurrences of this community. The present known distribution of the sedgelands in Holocene dune swale community as is ~193 ha and is almost entirely located within linear wetland depressions (swales) occurring between parallel sand ridges of the Rockingham-Becher Plain. Additional occurrences include a small area at Yanchep and a small area at Dalyellup. Holocene dunes with wetlands around Preston Beach, south of Lancelin, and at Cheynes Beach may also contain occurrences of this community. (Ref. 64)
Subtropical and Temperate Coastal Saltmarsh	The Subtropical and Temperate Coastal Saltmarsh ecological community occurs within a relatively narrow margin of the Australian coastline, within the subtropical and temperate climatic zones south of the South-east Queensland IBRA bioregion boundary at 23° 37' latitude along the east coast and south of (and including) Shark Bay at 26° on the west coast.

TEC Name	Summary of Significance
	<p>Coastal saltmarsh occurring on islands within the geographic range is also included within the ecological community.</p> <p>The Coastal Saltmarsh ecological community consists mainly of salt-tolerant vegetation (halophytes) including: grasses, herbs, sedges, rushes, and shrubs. Succulent herbs, shrubs, and grasses generally dominate, and vegetation is generally <0.5 m high (with the exception of some reeds and sedges). (Ref. 65)</p>
<p>Thrombolite (microbial) community of coastal freshwater lakes of the Swan Coastal Plain (Lake Richmond)*</p>	<p>The 'Thrombolite (microbial) community of coastal freshwater lakes of the Swan Coastal Plain (Lake Richmond)' is a complex association of microorganisms that aggregate in rock-like formations in the littoral zone of Lake Richmond. Thrombolite communities are dominated by cyanobacteria ('blue-green algae') and other photosynthetic prokaryotes.</p> <p>Lake Richmond is a perennial freshwater lake with a maximum depth of 15 m. The water body covers ~40 ha and is elevated ~1 m above sea level. It was isolated from the sea during the last 4000 years when part of the marine portion of Cockburn Sound filled in. The thrombolitic zone is up to 15 m wide and has a lithified carbonate crust. The best developed thrombolite formations occur on the eastern side of the lake. The lake margin consists of bare flats up to 70 m wide, bordered by several metres of sedgeland dominated by <i>Baumea juncea</i>, <i>Scirpus validus</i>, and <i>Typha orientalis</i>. (Ref. 66)</p>
<p>Thrombolite (microbialite) Community of a Coastal Brackish Lake (Lake Clifton)*</p>	<p>The Lake Clifton thrombolite community is restricted to Lake Clifton, which occurs within the South West Natural Resource Management Region. This ecological community is situated in the Swan Coastal Plain IBRA Bioregion of Western Australia. Lake Clifton is situated within the Yalgorup National Park and is the northernmost lake in the Peel-Yalgorup Lakes System.</p> <p>The main known occurrence of the ecological community is a stretch, ~15 km long and up to 15 m wide, along the north-eastern shoreline of Lake Clifton. There are other small clusters of thrombolites within the lake, also at the northern end. This structure is the largest known example of a living, non-marine microbialite reef in the southern hemisphere. (Ref. 67)</p>
<p>Tuart (<i>Eucalyptus gomphocephala</i>) Woodlands and Forests of the Swan Coastal Plain ecological community*</p>	<p>The ecological community occurs as woodlands or forests or other structural forms where the primary defining feature is the presence of <i>Eucalyptus gomphocephala</i> (Tuart) trees in the uppermost canopy layer. The ecological community includes the assemblage of plants, animals, and other organisms that occur in association with Tuart. The ecological community has a discontinuous distribution in the west of the Swan Coastal Plain, of southwest Western Australia.</p> <p>The Tuart woodlands and forests occur on the Swan Coastal Plain in Western Australia, from Jurien, ~200 km north of Perth, to the Sabina River, near Busselton, 225 km south of Perth.</p> <p>The ecological community occurs mainly on the Spearwood and Quindalup dune systems, which are underlain by Tamala Limestone. (Ref. 68)</p>
<p>* Identified in the Protected Matters Search Report (Appendix A; Ref. 2) but located inland and thus not expected to be exposed to CAPL's activities.</p>	

2.7 Commonwealth Marine Areas

The Commonwealth marine area is any part of the sea, including the waters, seabed, and airspace, within Australia's exclusive economic zone (EEZ) and/or over the continental shelf of Australia, which is not state or territory waters.

The Commonwealth marine area stretches from three to 200 nautical miles from the coast. Marine protected areas are marine areas that are recognised to have high conservation value (Ref. 69).

2.7.1 Australian Marine Parks

Australian Marine Parks (AMPs), proclaimed under the EPBC Act in 2007 and 2013, are located in Commonwealth waters that start at the outer edge of state and territory waters, generally three nautical miles (~5.5 km) from the shore, and

extend to the outer boundary of Australia's EEZ, 200 nautical miles (~370 km) from the shore (Ref. 70).

Table 2-19,

Table 2-20 and Table 2-21 summarise the north-west and south-west AMPs present within the PA, including their zones, areas, and International Union for Conservation of Nature (IUCN) categories (Ref. 71; Ref. 2 [Appendix A]).

Table 2-19: Summary of AMPs (North-west Marine Parks)

AMP Name	Zones, IUCN categories, and zone area	Description	Natural Values (Ref. 72)
Argo–Rowley Terrace	National Park Zone (II) 36 050 km ² Multiple Use Zone (VI) 108 812 km ² Special Purpose Zone (Trawl) (VI) 1141 km ²	The Argo–Rowley Terrace Marine Park is ~270 km north-west of Broome, WA, and extends to the limit of Australia’s EEZ. The Marine Park is adjacent to the Mermaid Reef Marine Park and the WA Rowley Shoals Marine Park. The Marine Park covers an area of 146 003 km ² and has water depths between 220 m and 6000 m. The Marine Park was proclaimed under the EPBC Act on 14 December 2013 and renamed Argo–Rowley Terrace Marine Park on 9 October 2017.	<p>The Marine Park includes examples of ecosystems representative of:</p> <ul style="list-style-type: none"> Northwest Transition—an area of shelf break, continental slope, and the majority of the Argo Abyssal Plain. Key topographic features include Mermaid, Clerke, and Imperieuse reefs, which collectively are a biodiversity hotspot Timor Province—an area dominated by warm, nutrient-poor waters. Canyons are an important feature in this area of the Marine Park and are generally associated with high productivity and aggregations of marine life. <p>Key ecological features of the Marine Park are:</p> <ul style="list-style-type: none"> Canyons linking the Argo Abyssal Plain with the Scott Plateau—an area likely to result in upwelling of nutrient-rich water and aggregations of marine life Mermaid Reef and Commonwealth waters surrounding Rowley Shoals—an area of enhanced productivity and high species richness, thought to be facilitated by internal wave action generated by internal tides. <p>The Marine Park supports a range of species including species listed as threatened, migratory, marine, or cetacean under the EPBC Act. Biologically important areas within the Marine Park include resting and breeding habitat for seabirds and a migratory pathway for the Pygmy Blue Whale.</p>
Ashmore Reef	Sanctuary Zone (Ia) 550 km ² Recreational Use Zone (IV) 34 km ²	The Ashmore Reef Marine Park is ~630 km north of Broome and 110 km south of the Indonesian island of Roti. The Marine Park is in Australia’s External Territory of Ashmore and Cartier Islands and is within an area subject to a Memorandum of Understanding (MoU) between Indonesia and Australia, known as the MoU Box. The Marine Park covers an area of 583 km ² and water depths from <15 m to 500 m. The Marine Park has three vegetated sand cays that are permanently above water: West, Middle, and East islands. The Marine Park was originally proclaimed under the Commonwealth <i>National</i>	<p>The Marine Park includes examples of ecosystems representative of the Timor Province—a bioregion with a depth range from ~200 m near the shelf break to 5920 m over the Argo Abyssal Plain. The reefs and islands of the bioregion are regarded as biodiversity hotspots. Ashmore Reef is an important feature of the bioregion. Endemism in demersal fish communities of the continental slope is high with two distinct communities identified: one on the upper slope, the other mid slope. Key ecological features of the Marine Park are:</p> <ul style="list-style-type: none"> Ashmore Reef and Cartier Island and surrounding Commonwealth waters—areas of enhanced productivity in an otherwise low-nutrient environment, of regional importance for feeding and breeding aggregations of birds and marine life continental slope demersal fish communities—an area of high-diversity demersal fish assemblages. <p>The marine environment of the Marine Park includes habitats associated with two extensive lagoons, sand flats, shifting sand cays, extensive reef flat, and large areas of seagrass. The reef ecosystems are comprised of hard and soft corals,</p>

AMP Name	Zones, IUCN categories, and zone area	Description	Natural Values (Ref. 72)
		<p><i>Parks and Wildlife Conservation Act 1975</i> on 16 August 1983 as the Ashmore Reef National Nature Reserve, and proclaimed under the EPBC Act on 14 December 2013; it was renamed Ashmore Reef Marine Park on 9 October 2017.</p>	<p>gorgonians, sponges, and a range of encrusting organisms, with the highest number of coral species of any reef off the Western Australian coast. The Marine Park supports a range of species, including species listed as threatened, migratory, marine, or cetacean under the EPBC Act. Biologically important areas within the Marine Park include breeding, foraging, and resting habitat for seabirds; resting and foraging habitat for migratory shorebirds; foraging, mating, nesting, and interesting habitat for marine turtles; foraging habitat for Dugong; and a migratory pathway for Pygmy Blue Whales.</p> <p>Ashmore Reef Ramsar site</p> <p>The Ashmore Reef Ramsar site includes the largest of the atolls in the region. West Island, Middle Island, and East Island represent the only vegetated islands in the region. Ashmore Reef Ramsar site supports internationally significant populations of seabirds and shorebirds, is important for turtles (Green, Hawksbill and Loggerhead) and Dugong, and has the highest diversity of hermatypic (reef-building) corals on the West Australian coast. It is known for its abundance and diversity of sea snakes. However, since 1998 populations of sea snakes at Ashmore Reef have been in decline.</p>
Carnarvon Canyon	Habitat Protection Zone (IV) 6177 km ²	<p>The Carnarvon Canyon Marine Park is ~300 km north-west of Carnarvon. It covers an area of 6177 km² with a water depth range of 1500–6000 m. The Marine Park was proclaimed under the EPBC Act on 14 December 2013 and renamed Carnarvon Canyon Marine Park on 9 October 2017.</p>	<p>The Marine Park includes examples of ecosystems representative of the Central Western Transition — a bioregion characterised by large areas of continental slope; a range of topographic features such as terraces, rises, and canyons; seasonal and sporadic upwelling; and benthic slope communities comprising tropical and temperate species. It includes the Carnarvon Canyon, a single-channel canyon covering the entire depth range of the Marine Park. Ecosystems of the Marine Park are influenced by tropical and temperate currents, deep-water environments, and proximity to the continental slope and shelf. The soft-bottom environment at the base of the Carnarvon Canyon is likely to support species that are typical of the deep sea floor (e.g. holothurians, polychaetes, sea pens). The Marine Park supports a range of species, including species listed as threatened, migratory, marine, or cetacean under the EPBC Act. There is limited information about species' use of this Marine Park.</p>
Cartier Island	Sanctuary Zone (Ia) 172 km ²	<p>The Cartier Island Marine Park is ~45 km south-east of Ashmore Reef Marine Park and 610 km north of Broome, WA. Both Marine Parks are located in Australia's External Territory of Ashmore and Cartier Islands and are also within an area subject to a Memorandum</p>	<p>The Marine Park includes examples of ecosystems representative of the Timor Province—a bioregion with a depth range from ~200 m near the shelf break to 5920 m over the Argo Abyssal Plain. The reefs and islands of the bioregion are regarded as biodiversity hotspots. Endemism of demersal fish communities of the continental slope is high with two distinct communities identified, one on the upper slope, the other mid slope. Key ecological features represented in the Marine Park are:</p>

AMP Name	Zones, IUCN categories, and zone area	Description	Natural Values (Ref. 72)
		<p>of Understanding (MoU) between Indonesia and Australia, known as the MoU Box. The Marine Park covers an area of 172 km² with water depths from <15 m to 500 m. The Marine Park was originally proclaimed under the Commonwealth <i>National Parks and Wildlife Conservation Act 1975</i> on 21 June 2000 as the Cartier Island Marine Reserve, and proclaimed under the EPBC Act on 14 December 2013; it was renamed Cartier Island Marine Park on 9 October 2017.</p>	<ul style="list-style-type: none"> Ashmore Reef and Cartier Island and surrounding Commonwealth waters—areas of enhanced productivity in an otherwise low-nutrient environment, of regional importance for feeding and breeding aggregations of birds and marine life Continental slope demersal fish communities—an area of high diversity in demersal fish assemblages. <p>The Marine Park includes an unvegetated sand island (Cartier Island); mature reef flat; a small, submerged pinnacle (Wave Governor Bank); and two shallow pools to the north-east of the island. It is also an area of high diversity and abundance of hard and soft corals, gorgonians (sea fans), sponges, and a range of encrusting organisms. The reef crests are generally algal dominated, while the reef flats feature ridges of coral rubble and large areas of seagrass. The Marine Park supports a range of species, including species listed as threatened, migratory, marine, or cetacean under the EPBC Act. Biologically important areas within the Marine Park include breeding and foraging habitat for seabirds; internesting, nesting, and foraging habitat for marine turtles; and foraging habitat for Whale Sharks. The Marine Park is important for a range of other species and internationally significant for its abundance and diversity of sea snakes, some of which are listed species under the EPBC Act.</p>
Dampier	<p>National Park Zone (II) 73 km² Habitat Protection Zone (IV) 104 km² Multiple Use Zone (VI) 1074 km²</p>	<p>The Dampier Marine Park is ~10 km north-east of Cape Lambert and 40 km from Dampier extending westwards from the WA state water boundary. The Marine Park covers an area of 1252 km² and a water depth range between <15 m and 70 m. The Marine Park was proclaimed under the EPBC Act on 14 December 2013 and renamed Dampier Marine Park on 9 October 2017.</p>	<p>The Marine Park includes examples of ecosystems representative of the Northwest Shelf Province—a dynamic environment influenced by strong tides, cyclonic storms, long-period swells, and internal tides. The bioregion includes diverse benthic and pelagic fish communities, and ancient coastline thought to be an important sea floor feature and migratory pathway for Humpback Whales. The Marine Park supports a range of species including those listed as threatened, migratory, marine, or cetacean under the EPBC Act. Biologically important areas within the Marine Park include breeding and foraging habitat for seabirds, interesting habitat for marine turtles, and a migratory pathway for Humpback Whales.</p>
Eighty Mile Beach	<p>Multiple Use Zone (VI) 10 785 km²</p>	<p>The Eighty Mile Beach Marine Park is located ~74 km north-east of Port Hedland, adjacent to the Western Australian Eighty Mile Beach Marine Park. The Marine Park covers an area of 10 785 km² and a water depth ranges between less than 15 m and 70 m. The Marine Park was proclaimed</p>	<p>The Marine Park includes examples of ecosystems representative of the Northwest Shelf Province—a dynamic environment influenced by strong tides, cyclonic storms, long-period swells, and internal tides. The bioregion includes diverse benthic and pelagic fish communities, and ancient coastline thought to be an important sea floor feature and migratory pathway for Humpback Whales. The Marine Park supports a range of species including species listed as threatened, migratory, marine, or cetacean under the EPBC Act. Biologically important areas within the Marine Park include</p>

AMP Name	Zones, IUCN categories, and zone area	Description	Natural Values (Ref. 72)
		under the EPBC Act on 14 December 2013 and renamed Eighty Mile Beach Marine Park on 9 October 2017.	breeding, foraging, and resting habitat for seabirds; interesting and nesting habitat for marine turtles; foraging, nursing, and pupping habitat for sawfish; and a migratory pathway for Humpback Whales.
Gascoyne	National Park Zone (II) 9132 km ² Habitat Protection Zone (IV) 38 982 km ² Multiple Use Zone (VI) 33 652 km ²	The Gascoyne Marine Park is located ~20 km off the west coast of the Cape Range Peninsula, adjacent to the Ningaloo Reef Marine Park and the Western Australian Ningaloo Marine Park, and extends to the limit of Australia's EEZ. The Marine Park covers an area of 81 766 km ² and water depths between 15 m and 6000 m. The Marine Park was proclaimed under the EPBC Act on 14 December 2013 and renamed Gascoyne Marine Park on 9 October 2017.	<p>The Marine Park includes examples of ecosystems representative of:</p> <ul style="list-style-type: none"> • Central Western Shelf Transition—continental shelf with water depths up to 100 m, and a significant transition zone between tropical and temperate species • Central Western Transition—characterised by large areas of continental slope; a range of topographic features such as terraces, rises, and canyons; seasonal and sporadic upwelling; and benthic slope communities comprising tropical and temperate species • Northwest Province—an area of continental slope comprising diverse and endemic fish communities. <p>Key ecological features of the Marine Park are:</p> <ul style="list-style-type: none"> • Canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula—an area resulting in upwelling of nutrient-rich water and aggregations of marine life • Commonwealth waters adjacent to Ningaloo Reef—an area where the Leeuwin and Ningaloo currents interact resulting in enhanced productivity and aggregations of marine life • Continental slope demersal fish communities—an area of high diversity of demersal fish assemblages on the continental slope • Exmouth Plateau—a regionally and nationally unique deep-sea plateau in tropical waters. Ecosystems represented in the Marine Park are influenced by the interaction of the Leeuwin Current, Leeuwin Undercurrent, and the Ningaloo Current. <p>The Marine Park supports a range of species including species listed as threatened, migratory, marine, or cetacean under the EPBC Act. Biologically important areas within the Marine Park include breeding habitat for seabirds; interesting habitat for marine turtles; a migratory pathway for Humpback Whales; and foraging habitat and migratory pathway for Pygmy Blue Whales.</p>
Kimberley	National Park Zone (II) 6392 km ² Habitat Protection Zone (IV) 5665 km ²	The Kimberley Marine Park is located ~100 km north of Broome, extending from the Western Australian state water boundary north from the Lacepede Islands to the Holothuria	<p>The Marine Park includes examples of ecosystems representative of:</p> <ul style="list-style-type: none"> • Northwest Shelf Province—a dynamic environment influenced by strong tides, cyclonic storms, long-period swells, and internal tides. The bioregion includes diverse benthic and pelagic fish communities, and an ancient coastline thought to be an important

AMP Name	Zones, IUCN categories, and zone area	Description	Natural Values (Ref. 72)
	Multiple Use Zone (VI) 62 411 km ²	Banks offshore from Cape Bougainville. The Marine Park is adjacent to the Western Australian Lalang-garram/Camden Sound Marine Park and the North Kimberley Marine Park. The Marine Park covers an area of 74 469 km ² and water depths from less than 15 m to 800 m. The Marine Park was proclaimed under the EPBC Act on 14 December 2013 and renamed Kimberley Marine Park on 9 October 2017.	<p>sea floor feature and migratory pathway for Humpback Whales.</p> <ul style="list-style-type: none"> Northwest Shelf Transition—straddles the North-west and North Marine Regions and in the Northwest includes shelf break, continental slope, and the majority of the Argo Abyssal Plain and is subject to a high incidence of cyclones. Benthic biological communities in the deeper parts of the bioregion have not been extensively studied, although high levels of species diversity and endemism occur among demersal fish communities on the continental slope. Timor Province—water depths (of the bioregion) ranging from ~200 m near the shelf break to 5920 m over the Argo Abyssal Plain. The reefs and islands of the bioregion are regarded as biodiversity hotspots. Endemism in demersal fish communities of the continental slope is high; two distinct communities have been identified on the upper and mid slopes. <p>Key ecological features of the Marine Park are:</p> <ul style="list-style-type: none"> the ancient coastline at the 125 m depth contour—where rocky escarpments are thought to provide biologically important habitats in areas otherwise dominated by soft sediments the continental slope demersal fish communities—characterised by high diversity of demersal fish assemblages. <p>The Marine Park supports a range of species, including protected species listed as threatened, migratory, marine, or cetacean under the EPBC Act. Biologically important areas within the Marine Park include breeding and foraging habitat for seabirds; internesting and nesting habitat for marine turtles; breeding, calving, and foraging habitat for inshore dolphins; calving, migratory pathway, and nursing habitat for Humpback Whales; migratory pathway for Pygmy Blue Whales; foraging habitat for dugong; and foraging habitat for Whale Sharks.</p>
Mermaid Reef	National Park Zone (II) 540 km ²	The Mermaid Reef Marine Park is located ~280 km north-west of Broome, adjacent to the Argo–Rowley Terrace Marine Park and ~13 km from the Western Australian Rowley Shoals Marine Park. The Marine Park covers an area of 540 km ² and water depths from less than 15 m to 500 m. The Marine Park was originally proclaimed under the Commonwealth <i>National Parks and</i>	The Marine Park includes examples of ecosystems representative of the Northwest Transition—an area of shelf break, continental slope, and the majority of the Argo Abyssal Plain. Together with Clerke Reef and Imperieuse Reef, Mermaid Reef is a biodiversity hotspot and key topographic feature of the Argo Abyssal Plain. A key ecological feature of the Marine Park is the Mermaid Reef and Commonwealth waters surrounding Rowley Shoals—an area of enhanced productivity and high species richness thought to be facilitated by internal wave action generated by internal tides in the lagoon. Ecosystems of the Marine Park are associated with emergent reef flat, deep reef flat, lagoon, and submerged sand habitats. The Marine Park supports a range of species, including species

AMP Name	Zones, IUCN categories, and zone area	Description	Natural Values (Ref. 72)
		<p><i>Wildlife Conservation Act 1975</i> on 10 April 1991 as the Mermaid Reef Marine National Nature Reserve, and proclaimed under the EPBC Act on 14 December 2013 and renamed Mermaid Reef Marine Park on 9 October 2017.</p>	<p>listed as threatened, migratory, marine, or cetacean under the EPBC Act. Biologically important areas within the Marine Park include breeding habitat for seabirds and a migratory pathway for the Pygmy Blue Whale.</p>
Montebello	Multiple Use Zone (VI) 3413 km ²	<p>The Montebello Marine Park is located offshore of Barrow Island and 80 km west of Dampier extending from the Western Australian state water boundary, and is adjacent to the Western Australian Barrow Island and Montebello Islands Marine Parks. The Marine Park covers an area of 3413 km² and water depths from <15 m to 150 m. The Marine Park was proclaimed under the EPBC Act on 14 December 2013 and renamed Montebello Marine Park on 9 October 2017.</p>	<p>The Marine Park includes examples of ecosystems representative of the Northwest Shelf Province—a dynamic environment influenced by strong tides, cyclonic storms, long-period swells, and internal tides. The bioregion includes diverse benthic and pelagic fish communities, and ancient coastline thought to be an important sea floor feature and migratory pathway for Humpback Whales. A key ecological feature of the Marine Park is the ancient coastline at the 125 m depth contour where rocky escarpments are thought to provide biologically important habitat in areas otherwise dominated by soft sediments. The Marine Park supports a range of species including species listed as threatened, migratory, marine, or cetacean under the EPBC Act. Biologically important areas within the Marine Park include breeding habitat for seabirds; internesting, foraging, mating, and nesting habitat for marine turtles; a migratory pathway for Humpback Whales; and foraging habitat for Whale Sharks.</p>
Ningaloo	National Park Zone (II) 116 km ² Recreational Use Zone (IV) 2319 km ²	<p>The Ningaloo Marine Park stretches ~300 km along the west coast of the Cape Range Peninsula, and is adjacent to the Western Australian Ningaloo Marine Park and Gascoyne Marine Park. The Marine Park covers an area of 2435 km² and a water depth range of 30 m to more than 500 m. The Marine Park was originally proclaimed under the <i>National Parks and Wildlife Conservation Act 1975</i> on 20 May 1987 as the Ningaloo Marine Park (Commonwealth Waters), and proclaimed under the EPBC Act on 14 December 2013 and renamed Ningaloo Marine Park on 9 October 2017.</p>	<p>The Marine Park includes examples of ecosystems representative of:</p> <ul style="list-style-type: none"> • Central Western Shelf Transition—continental shelf of water depths up to 100 m, and a significant transition zone between tropical and temperate species • Central Western Transition—characterised by large areas of continental slope; a range of topographic features such as terraces, rises, and canyons; seasonal and sporadic upwelling; and benthic slope communities comprising tropical and temperate species • Northwest Province—an area of continental slope comprising diverse and endemic fish communities • Northwest Shelf Province—a dynamic environment, influenced by strong tides, cyclonic storms, long-period swells, and internal tides. The bioregion includes diverse benthic and pelagic fish communities, and ancient coastline thought to be an important sea floor feature and migratory pathway for Humpback Whales. <p>Key ecological features of the Marine Park are:</p>

AMP Name	Zones, IUCN categories, and zone area	Description	Natural Values (Ref. 72)
			<ul style="list-style-type: none"> • Canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula—an area resulting in upwelling of nutrient-rich water and aggregations of marine life • Commonwealth waters adjacent to Ningaloo Reef—an area where the Leeuwin and Ningaloo currents interact, resulting in enhanced productivity and aggregations of marine life • Continental slope demersal fish communities—an area of high diversity among demersal fish assemblages on the continental slope. <p>Ecosystems represented in the Marine Park are influenced by interaction of the Leeuwin Current, Leeuwin Undercurrent, and the Ningaloo Current. The Marine Park supports a range of species including species listed as threatened, migratory, marine, or cetacean under the EPBC Act. Biologically important areas within the Marine Park include breeding and or foraging habitat for seabirds; internesting habitat for marine turtles; a migratory pathway for Humpback Whales; foraging habitat and migratory pathway for Pygmy Blue Whales; breeding, calving, foraging, and nursing habitat for dugong; and foraging habitat for Whale Sharks.</p>
Roebuck	Multiple Use Zone (VI) 304 km ²	The Roebuck Marine Park is located ~12 km offshore of Broome, and is adjacent to the Western Australian Yawuru Nagulagun/Roebuck Bay Marine Park. The Marine Park covers an area of 304 km ² and a water depth range of less than 15 m to 70 m. The Marine Park was proclaimed under the EPBC Act on 14 December 2013 and renamed Roebuck Marine Park on 9 October 2017.	The Marine Park includes examples of ecosystems representative of the Northwest Shelf Province—a dynamic environment influenced by strong tides, cyclonic storms, long-period swells, and internal tides. The bioregion includes diverse benthic and pelagic fish communities, and ancient coastline thought to be an important sea floor feature and migratory pathway for Humpback Whales. The Marine Park supports a range of species including species listed as threatened, migratory, marine, or cetacean under the EPBC Act. Biologically important areas within the Marine Park include breeding and resting habitat for seabirds; foraging and internesting habitat for marine turtles; a migratory pathway for Humpback Whales; and foraging habitat for dugong.
Shark Bay	Multiple Use Zone (VI) 7443 km ²	The Shark Bay Marine Park is located ~60 km offshore of Carnarvon, adjacent to the Shark Bay World Heritage Property and National Heritage place. The Marine Park covers an area of 7443 km ² , extending from the Western Australian state water boundary, and a water depth range between 15 m and 220 m. The Marine Park was proclaimed under the	<p>The Marine Park includes examples of ecosystems representative of:</p> <ul style="list-style-type: none"> • Central Western Shelf—a predominantly flat, sandy, and low-nutrient area, in water depths 50–100 m. The bioregion is a transitional zone between tropical and temperate species • Central Western Transition—characterised by large areas of continental slope; a range of topographic features such as terraces, rises, and canyons; seasonal and sporadic upwelling; and benthic slope communities comprising tropical and temperate species. <p>Ecosystems represented in the Marine Park are influenced by the Leeuwin, Ningaloo, and Capes</p>

AMP Name	Zones, IUCN categories, and zone area	Description	Natural Values (Ref. 72)
		EPBC Act on 14 December 2013 and renamed Shark Bay Marine Park on 9 October 2017.	currents. The Marine Park supports a range of species including species listed as threatened, migratory, marine, or cetacean under the EPBC Act. Biologically important areas within the Marine Park include breeding habitat for seabirds, interesting habitat for marine turtles, and a migratory pathway for Humpback Whales. The Marine Park and adjacent coastal areas are also important for Shallow-water Snapper.

Table 2-20: Summary of AMPs (South-west Marine Parks)

AMP Name	Zones, IUCN categories and zone area	Description	Natural Values (Ref. 73)
Abrolhos	Habitat Protection Zone (IV) 23,239 km ² Multiple Use Zone (VI) 56,545 km ² National Park Zone (II) 2548 km ² Special Purpose Zone (VI) 5729 km ²	Abrolhos Marine Park is located adjacent to the Western Australian Houtman Abrolhos Islands, covering a large offshore area extending from the Western Australian state water boundary to the edge of Australia's exclusive economic zone. It is located ~27 km south-west of Geraldton and extends north to ~330 km west of Carnarvon. The northernmost part of the shelf component of the Marine Park, north of Kalbarri, is adjacent to the Shark Bay World Heritage Area. The Marine Park covers an area of 88,060 km ² and a water depth range between less than 15 m and 6000 m. The Marine Park was proclaimed under the EPBC Act on 14 December 2013 and renamed Abrolhos Marine Park on 9 October 2017.	The Marine Park includes examples of ecosystems representative of: <ul style="list-style-type: none"> Central Western Province—characterised by a narrow continental slope incised by many submarine canyons and the most extensive area of continental rise in any of Australia's marine regions. A significant feature within the area are several eddies that form off the Leeuwin Current at predictable locations, including west of the Houtman Abrolhos Islands Central Western Shelf Province—a predominantly flat, sandy, and low-nutrient area, in water depths between 50 and 100 m. Significant sea floor features of this area include a deep hole and associated area of banks and shoals offshore of Kalbarri. The area is a transitional zone between tropical and temperate species Central Western Transition—a deep ocean area characterised by large areas of continental slope, a range of significant sea floor features including the Wallaby Saddle, seasonal and sporadic upwelling, and benthic slope communities comprising tropical and temperate species South-west Shelf Transition—a narrow continental shelf that is noted for its physical complexity. The Leeuwin Current has a significant influence on the biodiversity of this nearshore area as it pushes subtropical water southward along the area's western edge. The area contains a diversity of tropical and temperate marine life including a large number of endemic fauna species.
Geographe	National Park Zone (II) 15 km ²	The Geographe Marine Park is located in Geographe Bay, ~8 km	The Marine Park includes examples of ecosystems representative of the South-west Shelf Province—an area of diverse marine life, influenced by the

AMP Name	Zones, IUCN categories and zone area	Description	Natural Values (Ref. 73)
	<p>Habitat Protection Zone (IV) 21 km²</p> <p>Multiple Use Zone (VI) 291 km²</p> <p>Special Purpose Zone (Mining Exclusion) (VI) 650 km²</p>	<p>west of Bunbury and 8 km north of Busselton, adjacent to the Western Australian Ngari Capes Marine Park. The Marine Park covers an area of 977 km², extending from the Western Australian state water boundary, and a water depth range between 15 m and 70 m. The Marine Park was proclaimed under the EPBC Act on 14 December 2013 and renamed Geographe Marine Park on 9 October 2017.</p>	<p>warm waters of the Leeuwin Current. The bioregion includes globally important biodiversity hotspots, such as the waters off Geographe Bay. Key ecological features of the Marine Park are:</p> <ul style="list-style-type: none"> • Commonwealth marine environment within and adjacent to Geographe Bay—the sheltered waters of Geographe Bay support extensive seagrass beds that in turn provide important nursery habitat for a range of marine species • Western Rock Lobster—plays an important trophic role in many of the inshore ecosystems of the South-west Marine Region. Western Rock Lobsters are an important part of the food web on the inner shelf, particularly as juveniles. <p>The Marine Park supports a range of species including species listed as threatened, migratory, marine, or cetacean under the EPBC Act. Biologically important areas within the Marine Park include foraging habitat for seabirds, a migratory pathway for Humpback and Pygmy Blue Whales, and a calving buffer area for Southern Right Whales.</p>
Jurien	<p>National Park Zone (II) 31 km²</p> <p>Special Purpose Zone (VI) 1820 km²</p>	<p>The Jurien Marine Park is located ~148 km north of Perth and 155 km south of Geraldton, adjacent to the Western Australian Jurien Bay Marine Park. The Marine Park covers an area of 1851 km² of continental shelf, extending from the Western Australian state water boundary, and a water depth range between 15 m and 220 m. The Marine Park was proclaimed under the EPBC Act on 14 December 2013 and renamed Jurien Marine Park on 9 October 2017.</p>	<p>The Marine Park includes examples of ecosystems representative of:</p> <ul style="list-style-type: none"> • South-west Shelf Transition—consists of a narrow continental shelf that is noted for its physical complexity. The Leeuwin Current has a significant influence on the biodiversity of this nearshore area as it pushes subtropical water southward along the bioregion's western edge. The area contains a diversity of tropical and temperate marine life including a large number of endemic fauna species. <p>Key ecological features of the Marine Park are:</p> <ul style="list-style-type: none"> • Ancient coastline between 90 m and 120 m depth—high benthic biodiversity and productivity occur where the ancient coastline forms a prominent escarpment • Demersal slope and associated fish communities of the Central Western Province—an area that provides important habitat for demersal fish communities and is characterised by high species diversity and endemism • Western Rock Lobster—plays an important trophic role in many of the inshore ecosystems of the South-west Marine Region. Western Rock Lobsters are an important part of the food web on the inner shelf, particularly as juveniles. <p>The Marine Park supports a range of species including species listed as threatened, migratory, marine, or cetacean under the EPBC Act. Biologically important areas within the Marine Park</p>

AMP Name	Zones, IUCN categories and zone area	Description	Natural Values (Ref. 73)
			include foraging habitat for seabirds, Australian Sea Lions, and White Sharks; and a migratory pathway for Humpback and Pygmy Blue Whales.
Perth Canyon	National Park Zone (II) 1241 km ² Habitat Protection Zone (IV) 4352 km ² Multiple Use Zone (VI) 1816 km ²	The Perth Canyon Marine Park is located ~52 km west of Perth and ~19 km west of Rottnest Island. The Marine Park covers an area of 7409 km ² and water depths range between 120 m and 5000 m. The Marine Park was proclaimed under the EPBC Act on 14 December 2013 and renamed Perth Canyon Marine Park on 9 October 2017.	<p>The Marine Park includes examples of ecosystems representative of:</p> <ul style="list-style-type: none"> • Central Western Province—characterised by a narrow continental slope incised by many submarine canyons, including Perth Canyon, and the most extensive area of continental rise in any of Australia’s marine regions. A significant feature within the area are the several eddies that form off the Leeuwin Current at predictable locations, including the Perth Canyon • South-west Shelf Province—marine life in this area is diverse and influenced by the warm waters of the Leeuwin Current • South-west Transition—significant features of this area include the submarine canyons that incise the northern parts of the slope and the deep-water mixing that results from the dynamics of major ocean currents when these meet the sea floor, particularly in the Perth Canyon • South-west Shelf Transition—consists of a narrow continental shelf that is noted for its physical complexity. The Leeuwin Current has a significant influence on the biodiversity of this nearshore area as it pushes subtropical water southward along the area’s western edge. The area contains a diversity of tropical and temperate marine life including a large number of endemic fauna species. <p>Key ecological features of the Marine Park are:</p> <ul style="list-style-type: none"> • Perth Canyon and adjacent shelf break, and other west coast canyons—unique sea floor features give rise to ecologically important events of localised productivity and aggregations of marine life. The Perth Canyon is prominent among these canyons because of its large size and ecological importance. The upwelling of deep ocean currents in the canyon creates a nutrient-rich cold-water habitat that attracts feeding aggregations of deep-diving mammals, such as Pygmy Blue Whales and large predatory fish that feed on aggregations of small fish, krill, and squid • Demersal slope and associated fish communities of the Central Western Province—an area that provides important habitat for demersal fish communities and is characterised by high species diversity and endemism • Western Rock Lobster—plays an important trophic role in many of the inshore ecosystems of the South-west Marine Region.

AMP Name	Zones, IUCN categories and zone area	Description	Natural Values (Ref. 73)
			<p>Western Rock Lobsters are an important part of the food web on the inner shelf, particularly as juveniles</p> <ul style="list-style-type: none"> Mesoscale eddies—important transporters of nutrients and plankton communities that form at predictable locations off the western and south-western shelf break. <p>The Marine Park supports a range of species including species listed as threatened, migratory, marine, or cetacean under the EPBC Act. Biologically important areas within the Marine Park include foraging habitat for seabirds, Antarctic Blue, Pygmy Blue, and Sperm Whales; a migratory pathway for Humpback, Antarctic Blue, and Pygmy Blue Whales; and a calving buffer area for Southern Right Whales.</p>
South-west Corner	<p>National Park Zone (II) 54 841 km²</p> <p>Habitat Protection Zone (IV) 95 088 km²</p> <p>Multiple Use Zone (VI) 106 602 km²</p> <p>Special Purpose Zone (Mining Exclusion) (VI) 9550 km²</p> <p>Special Purpose Zone (VI) 5753 km²</p>	<p>The South-west Corner Marine Park is located adjacent to the Western Australian Ngari Capes Marine Park, covering an extensive offshore area that is closest to Western Australia state waters ~48 km west of Esperance, 73 km west of Albany, and 68 km west of Bunbury, and extends to the edge of Australia's exclusive economic zone. The Marine Park covers an area of 271 833 km² and a water depth range from <15 m to 6400 m. The Marine Park was proclaimed under the EPBC Act on 14 December 2013 and renamed South-west Corner Marine Park on 9 October 2017.</p>	<p>The Marine Park includes examples of ecosystems representative of:</p> <ul style="list-style-type: none"> Southern Province—includes the deepest ocean areas of the Australian EEZ, reaching depths of ~5900 m, and is characterised by a long continental slope incised by numerous, well-developed submarine canyons, and the Diamantina Fracture Zone, a rugged area of deep sea floor comprising seamounts and many ridges and troughs South-west Transition—the main features of this area are the Naturaliste Plateau, the deepest submarine plateau along Australia's continental margins. The Plateau supports rich and diverse biological communities. Deep-water mixing results from the dynamics of major ocean currents when these meet the sea floor <p>South-west Shelf Province—marine life in this area is diverse and influenced by the warm waters of the Leeuwin Current. A small upwelling of nutrient-rich water off Cape Mentelle during summer increases productivity locally, attracting aggregations of marine life. Key ecological features of the Marine Park are:</p> <ul style="list-style-type: none"> Albany Canyon group and adjacent shelf break—a feature consisting of 32 canyons cut deeply into the steep continental slope. The canyons are believed to be associated with small periodic upwellings that enhance productivity and attract aggregations of marine life Cape Mentelle upwelling—draws relatively nutrient-rich water from the base of the Leeuwin Current, up the continental slope, and onto the inner continental shelf, where it results in phytoplankton blooms at the surface Diamantina Fracture Zone—a unique sea floor feature consisting of a rugged, deep-water environment of seamounts and many closely

AMP Name	Zones, IUCN categories and zone area	Description	Natural Values (Ref. 73)
			<p>spaced troughs and ridges. The ridges and seamounts can affect water dynamics and flow, enhancing productivity, and may act as 'stepping stones' for species dispersal and migration across the region and the wider abyssal plain</p> <ul style="list-style-type: none"> • Naturaliste Plateau—the combination of this unique sea floor feature's structural complexity, mixed water dynamics, and relative isolation indicate that it supports deep-water communities with high species diversity and endemism • Western Rock Lobster—plays an important trophic role in many of the inshore ecosystems of the South-west Marine Region. Western Rock Lobsters are an important part of the food web on the inner shelf, particularly as juveniles • Ancient coastline between 90 m and 120 m depth—high benthic biodiversity and productivity occur where the ancient coastline forms a prominent escarpment. <p>The Marine Park supports a range of species including species listed as threatened, migratory, marine, or cetacean under the EPBC Act. Biologically important areas within the Marine Park include foraging habitat for seabirds, Australian Sea Lions, White Sharks, and Sperm Whales; a migratory pathway for Antarctic Blue, Pygmy Blue, and Humpback Whales; and a calving buffer area for Southern Right Whales.</p>
Two Rocks	National Park Zone (II) 15 km ² Multiple Use Zone (VI) 867 km ²	The Two Rocks Marine Park is located 25 km north-west of Perth, to the north-west of the Western Australian Marmion Marine Park. The Marine Park covers an area of 882 km ² , extending from the Western Australian state water boundary, and a water depth range from 15 m to 120 m. The Marine Park was proclaimed under the EPBC Act on 14 December 2013 and renamed Two Rocks Marine Park on 9 October 2017.	<p>The Marine Park includes examples of ecosystems representative of the South-west Shelf Transition—an area of narrow continental shelf that is noted for its physical complexity. The Leeuwin Current has a significant influence on the biodiversity of this nearshore area as it pushes subtropical water southward along the area's western edge. The area contains a diversity of tropical and temperate marine life including a large number of endemic fauna species. The inshore lagoons are thought to be important areas for benthic productivity and recruitment for a range of marine species.</p> <p>Key ecological features of the Marine Park are:</p> <ul style="list-style-type: none"> • Commonwealth marine environment within and adjacent to the west coast inshore lagoons—an area that is regionally important for enhanced benthic productivity, including macroalgae and seagrass communities, and breeding and nursery aggregations for many temperate and tropical marine species • Western Rock Lobster—plays an important trophic role in many of the inshore ecosystems of the South-west Marine Region. Western Rock Lobsters are an important part

AMP Name	Zones, IUCN categories and zone area	Description	Natural Values (Ref. 73)
			<p>of the food web on the inner shelf, particularly as juveniles</p> <ul style="list-style-type: none"> • Ancient coastline between 90 m and 120 m depth—high benthic biodiversity and productivity occur where the ancient coastline forms a prominent escarpment. <p>The Marine Park supports a range of species including species listed as threatened, migratory, marine, or cetacean under the EPBC Act. Biologically important areas within the Marine Park include foraging habitat for seabirds and Australian Sea Lions, a migratory pathway for Humpback and Pygmy Blue Whales, and a calving buffer area for Southern Right Whales.</p>

Table 2-21 Summary of AMPs (North Marine Parks)

AMP Name	Zones, IUCN categories and zone area	Description	Natural Values (Ref. 74)
Oceanic Shoals	<p>National Park Zone (II) 406 km²</p> <p>Habitat Protection Zone (IV) 6929 km²</p> <p>Multiple Use Zone (VI) 39 964 km²</p> <p>Special Purpose Zone (Trawl) (VI) 24 444 km²</p>	<p>The Oceanic Shoals Marine Park is located west of the Tiwi Islands, ~155 km north-west of Darwin, Northern Territory and 305 km north of Wyndham, Western Australia. It extends to the limit of Australia's exclusive economic zone. The Marine Park covers an area of 71 743 km² and water depths from <15 m to 500 m. The Marine Park was proclaimed under the EPBC Act on 14 December 2013 and renamed Oceanic Shoals Marine Park on 9 October 2017.</p>	<p>The Marine Park includes examples of ecosystems representative of the Northwest Shelf Transition—a dynamic environment influenced by strong tidal currents, upwellings of nutrient-rich waters, and a range of prominent sea floor features. The pinnacles, carbonate banks, and shoals are sites of enhanced biological productivity. Key ecological features of the Marine Park are:</p> <ul style="list-style-type: none"> • Carbonate bank and terrace systems of the Van Diemen Rise—an area characterised by terraces, banks, channels, and valleys supporting sponges, soft coral, polychaetes, ascidians, turtles, snakes, and sharks • Carbonate bank and terrace system of the Sahul Shelf—an area characterised by terraces, banks, channels, and valleys, supporting sponges, soft corals, sessile filter feeders, polychaetes, and ascidians • Pinnacles of the Bonaparte Basin—an area that contains the largest concentration of pinnacles along the Australian margin, where local upwellings of nutrient-rich water attract aggregations of fish, seabirds, and turtles • Shelf break and slope of the Arafura Shelf—an area characterised by continental slope, patch reefs, and hard substrate pinnacles that support >280 demersal fish species. • The Marine Park supports a range of species, including species listed as threatened, migratory, marine, or cetacean under the EPBC Act. Biologically important areas within the Marine Park include foraging and interesting habitat for marine turtles.
Joseph Bonaparte Gulf	<p>Multiple Use Zone (VI) 6346 km²</p> <p>Special Purpose Zone (VI) 2251 km²</p>	<p>The Joseph Bonaparte Gulf Marine Park is located ~15 km west of Wadeye, Northern Territory, and ~90 km north of Wyndham, Western Australia, in the Joseph Bonaparte Gulf. It is adjacent to the Western Australian North Kimberley Marine Park. The Marine Park covers an area of 8597 km² and water depth ranges between <15 m and 100 m. The Marine Park was proclaimed under the EPBC Act on 14 December 2013 and renamed Joseph Bonaparte Gulf Marine Park on 9 October 2017.</p>	<p>The Marine Park includes examples of ecosystems representative of the Northwest Shelf Transition—a dynamic environment influenced by strong tidal currents, monsoonal winds, cyclones, and wind-generated waves. The large tidal ranges and wide intertidal zones near the Marine Park create a physically dynamic and turbid marine environment. The key ecological feature in the Marine Park is the carbonate bank and terrace system of the Sahul Shelf—characterised by terraces, banks, channels, and valleys supporting sponges, soft corals, sessile filter feeders, polychaetes, and ascidians. The Marine Park supports a range of species, including species listed as threatened, migratory, marine, or cetacean under the EPBC Act. Biologically important areas within the Marine Park include foraging habitat for marine turtles and the Australian Snubfin Dolphin.</p>

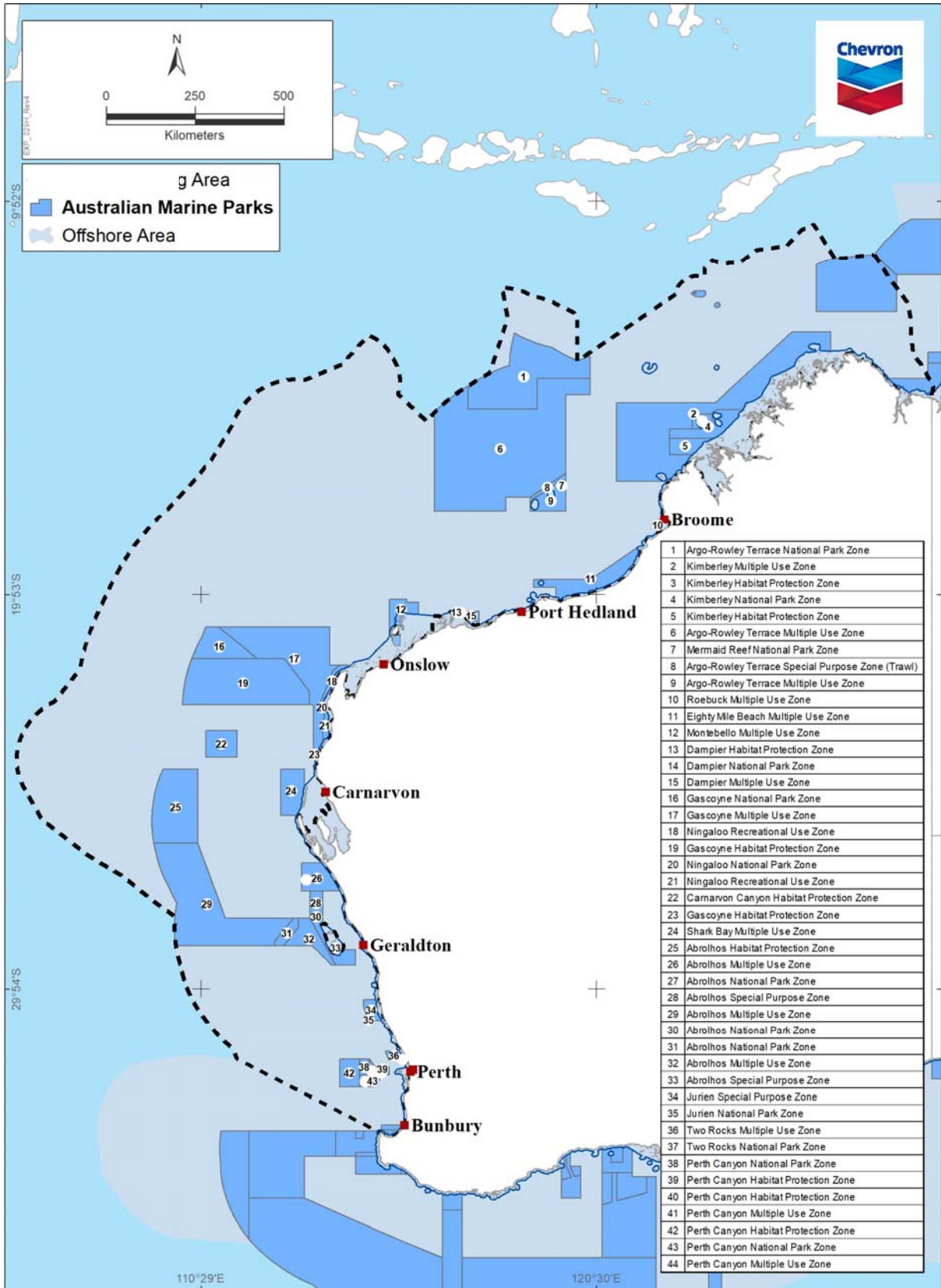


Figure 2-5: Australian Marine Parks

2.7.2 Key Ecological Features

KEFs are elements of the Commonwealth marine environment that are considered to be of regional importance for a region's biodiversity or its ecosystem function and integrity. KEFs meet one or more of these criteria (Ref. 75):

- a species, group of species, or a community with a regionally important ecological role (e.g. a predator, or prey that affects a large biomass or number of other marine species)
- a species, group of species, or a community that is nationally or regionally important for biodiversity
- an area or habitat that is nationally or regionally important for:
 - enhanced or high productivity (such as predictable upwellings—an upwelling occurs when cold nutrient-rich waters from the bottom of the ocean rise to the surface)
 - aggregations of marine life (such as feeding, resting, breeding or nursery areas)
 - biodiversity and endemism (species that only occur in a specific area)
- a unique sea floor feature, with known or presumed ecological properties of regional significance.

KEFs have been identified by the Australian Government on the basis of advice from scientists about the ecological processes and characteristics of the area (Ref. 75).

Table 2-22, Table 2-23, and Table 2-24 list the KEFs located within the PA (Ref. 75; Ref. 2 [Appendix A]).

Table 2-22: Key Ecological Features of the North-west Marine Bioregion

KEF Name	Value	Description (Ref. 76)
Ancient coastline at 125 m depth contour	Unique sea floor feature with ecological properties of regional significance	Parts of the ancient coastline, particularly where it exists as a rocky escarpment, are thought to provide biologically important habitats in areas otherwise dominated by soft sediments. The topographic complexity of these escarpments may also facilitate vertical mixing of the water column, providing relatively nutrient-rich local environments.
Ashmore Reef and Cartier Island and surrounding Commonwealth waters	High productivity and aggregations of marine life	Ashmore Reef is the largest of only three emergent oceanic reefs present in the north-eastern Indian Ocean and is the only oceanic reef in the region with vegetated islands. Ashmore Reef and Cartier Island and the surrounding Commonwealth waters are regionally important for feeding and breeding aggregations of birds and other marine life; they are areas of enhanced primary productivity in an otherwise low-nutrient environment. Ashmore Reef supports the highest number of coral species of any reef off the west Australian coast.
Canyons linking the Argo Abyssal Plain with the Scott Plateau	High productivity and aggregations of marine life	The canyons linking the Argo Abyssal Plain and Scott Plateau are important features likely to be associated with aggregations of marine life.
Canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula	Unique sea floor features with ecological	The canyons are associated with upwelling as they channel deep water from the Cuvier Abyssal Plain up onto the slope. This nutrient-rich water interacts with the Leeuwin Current at the canyon heads. Aggregations of

KEF Name	Value	Description (Ref. 76)
	properties of regional significance	Whale Sharks, manta rays, sea snakes, sharks, large predatory fish, and seabirds are known to occur in this area.
Carbonate bank and terrace system of the Sahul Shelf	Unique sea floor feature with ecological properties of regional significance	Little is known about the bank and terrace system of the Sahul Shelf, but it is regionally important because of its likely ecological role in enhancing biodiversity and local productivity relative to its surrounds. The banks are thought to support a high diversity of organisms (including reef fish, sponges, soft and hard corals, gorgonians, bryozoans, ascidians, and other sessile filter feeders). The banks are known to be foraging areas for Loggerhead, Olive Ridley, and Flatback Turtles. Cetaceans and Green and Freshwater Sawfish are likely to occur in the area.
Commonwealth waters adjacent to Ningaloo Reef	High productivity and aggregations of marine life	The Leeuwin and Ningaloo currents interact, leading to areas of enhanced productivity in the Commonwealth waters adjacent to Ningaloo Reef. Aggregations of Whale Sharks, manta rays, Humpback Whales, sea snakes, sharks, large predatory fish, and seabirds are known to occur in this area.
Continental Slope Demersal Fish Communities	High levels of endemism	The diversity of demersal fish assemblages on the continental slope in the Timor Province, the Northwest Transition, and the Northwest Province is high compared to elsewhere along the continental slope.
Exmouth Plateau	Unique sea floor feature with ecological properties of regional significance	The Exmouth Plateau is a regionally and nationally unique deep-sea plateau in tropical waters. The plateau is a very large topographic obstacle that may modify the flow of deep waters, generating internal tides and may contribute to upwelling of deeper water nutrients closer to the surface, thus serving an important ecological role.
Glomar Shoals	High productivity and aggregations of marine life	The Glomar Shoals are regionally important for their high biological diversity and high localised productivity. Biological data specific to Glomar Shoals is limited; however, the fish of Glomar Shoals are probably a subset of reef-dependent species and anecdotal and fishing industry evidence suggests they are particularly abundant.
Mermaid Reef and Commonwealth waters surrounding Rowley Shoals	High productivity and aggregations of marine life	The reefs of the Rowley Shoals (including Mermaid Reef) are areas of enhanced productivity and high species richness. Enhanced productivity that contributes to this species richness is thought to be facilitated by the breaking of internal waves in the waters surrounding the reefs, causing mixing and resuspension of nutrients from water depths of 500–700 m into the photic zone. The steep changes in slope around the reef also attract a range of migratory pelagic species such as dolphins, tuna, billfish, and sharks.
Pinnacles of the Bonaparte Basin	Unique sea floor feature with ecological properties of regional significance	As they provide areas of hard substrate in an otherwise relatively featureless environment, the pinnacles are likely to support a high number of species, although a better understanding of the species richness and diversity associated with these structures is required. Covering >520 km ² within the Bonaparte Basin, this feature contains the largest concentration of pinnacles along the Australian margin. The pinnacles of the Bonaparte Basin are thought to be the eroded remnants of underlying strata; it is likely that the vertical walls generate local upwelling of nutrient-rich water, leading to phytoplankton productivity that attracts aggregations of

KEF Name	Value	Description (Ref. 76)
		planktivorous and predatory fish, seabirds, and foraging turtles.
Seringapatam Reef and Commonwealth waters in the Scott Reef Complex	High productivity and aggregations of marine life	Seringapatam Reef and the Commonwealth waters in the Scott Reef complex are regionally important in supporting the diverse aggregations of marine life, high primary productivity, and high species richness associated with the reefs themselves. As two of the few offshore reefs in the north-west, they provide an important biophysical environment in the region.
Wallaby Saddle	High productivity and aggregations of marine life	The Wallaby Saddle may be an area of enhanced productivity. Historical whaling records provide evidence of Sperm Whale aggregations in the area of the Wallaby Saddle, possibly due to the enhanced productivity of the area and aggregations of baitfish.

Table 2-23: Key Ecological Features of the North Marine Bioregion

KEF Name	Value	Description (Ref. 77)
Carbonate bank and terrace system of the Van Diemen Rise	Unique sea floor feature with ecological properties of regional significance	The bank and terrace system of the Van Diemen Rise is part of the larger system associated with the Sahul Banks to the north and Londonderry Rise to the east; it is characterised by terrace, banks, channels, and valleys. The variability in water depth and substrate composition may contribute to the presence of unique ecosystems in the channels. Species present include sponges, soft corals, and other sessile filter feeders associated with hard substrate sediments of the deep channels; epifauna and infauna include polychaetes and ascidians. Olive Ridley Turtles, sea snakes, and sharks are also found associated with this feature.
Pinnacles of the Bonaparte Basin	Unique sea floor feature with ecological properties of regional significance	As they provide areas of hard substrate in an otherwise relatively featureless environment, the pinnacles are likely to support a high number of species, although a better understanding of the species richness and diversity associated with these structures is required. Covering >520 km ² within the Bonaparte Basin, this feature contains the largest concentration of pinnacles along the Australian margin. The pinnacles of the Bonaparte Basin are thought to be the eroded remnants of underlying strata; it is likely that the vertical walls generate local upwelling of nutrient-rich water, leading to phytoplankton productivity that attracts aggregations of planktivorous and predatory fish, seabirds, and foraging turtles.

Table 2-24: Key Ecological Features of the South-west Marine Bioregion

KEF Name	Value	Description (Ref. 78)
Ancient coastline at 90–120 m depth	Relatively high productivity and aggregations of marine life, and high levels of biodiversity and endemism	Benthic biodiversity and productivity occur where the ancient coastline forms a prominent escarpment, such as in the western Great Australian Bight, where the sea floor is dominated by sponge communities of significant biodiversity and structural complexity.
Cape Mentelle upwelling	High productivity and aggregations of marine life	The Cape Mentelle upwelling draws relatively nutrient-rich water from the base of the Leeuwin Current, up the continental slope, and onto the inner continental shelf, where it results in phytoplankton blooms at the surface.

KEF Name	Value	Description (Ref. 78)
		The phytoplankton blooms provide the basis for an extended food chain characterised by feeding aggregations of small pelagic fish, larger predatory fish, seabirds, dolphins, and sharks.
Commonwealth marine environment surrounding the Houtman Abrolhos Islands	High levels of biodiversity and endemism	The Houtman Abrolhos Islands and surrounding reefs support a unique mix of temperate and tropical species, resulting from the southward transport of species by the Leeuwin Current over thousands of years. The Houtman Abrolhos Islands are the largest seabird breeding station in the eastern Indian Ocean. They support more than one million pairs of breeding seabirds.
Commonwealth marine environment within and adjacent to Geographe Bay	High productivity and aggregations of marine life, and high levels of biodiversity and endemism	Geographe Bay is known for its extensive beds of tropical and temperate seagrass that support a diversity of species, many of them not found anywhere else. The bay provides important nursery habitat for many species. It is also an important migratory area for Humpback Whales.
Commonwealth marine environment within and adjacent to the west coast inshore lagoons	High productivity and aggregations of marine life	These lagoons are important for benthic productivity, including macroalgae and seagrass communities, and breeding and nursery aggregations for many temperate and tropical marine species. They are important areas for the recruitment of commercially and recreationally important fishery species. Extensive schools of migratory fish visit the area annually, including herring, garfish, tailor, and Australian Salmon.
Naturaliste Plateau	Unique sea floor feature with ecological properties of regional significance	The Naturaliste Plateau is Australia's deepest temperate marginal plateau. The combination of its structural complexity, mixed water dynamics, and relative isolation indicate that it supports deep-water communities with high species diversity and endemism.
Perth Canyon and adjacent shelf break, and other west coast canyons	High biological productivity and aggregations of marine life, and unique sea floor features with ecological properties of regional significance	The Perth Canyon is the largest known undersea canyon in Australian waters. Deep ocean currents rise to the surface, creating a nutrient-rich cold-water habitat attracting feeding aggregations of deep-diving mammals, such as Pygmy Blue Whales and large predatory fish that feed on aggregations of small fish, krill, and squid.
Western demersal slope and associated fish communities	Species groups that are nationally or regionally important to biodiversity	The western demersal slope provides important habitat for demersal fish communities, with a high level of diversity and endemism. A diverse assemblage of demersal fish species below a depth of 400 m is dominated by relatively small benthic species such as grenadiers, dogfish, and cucumber fish. Unlike other slope fish communities in Australia, many of these species display unique physical adaptations to feed on the sea floor (such as a mouth position adapted to bottom feeding), and many do not appear to migrate vertically in their daily feeding habits.
Western Rock Lobster	A species that plays a regionally important ecological role	This species is the dominant large benthic invertebrate in the region. The lobster plays an important trophic role in many of the inshore ecosystems of the South-west Marine Region. Western rock lobsters are an important part of the food web on the inner shelf, particularly as juveniles.

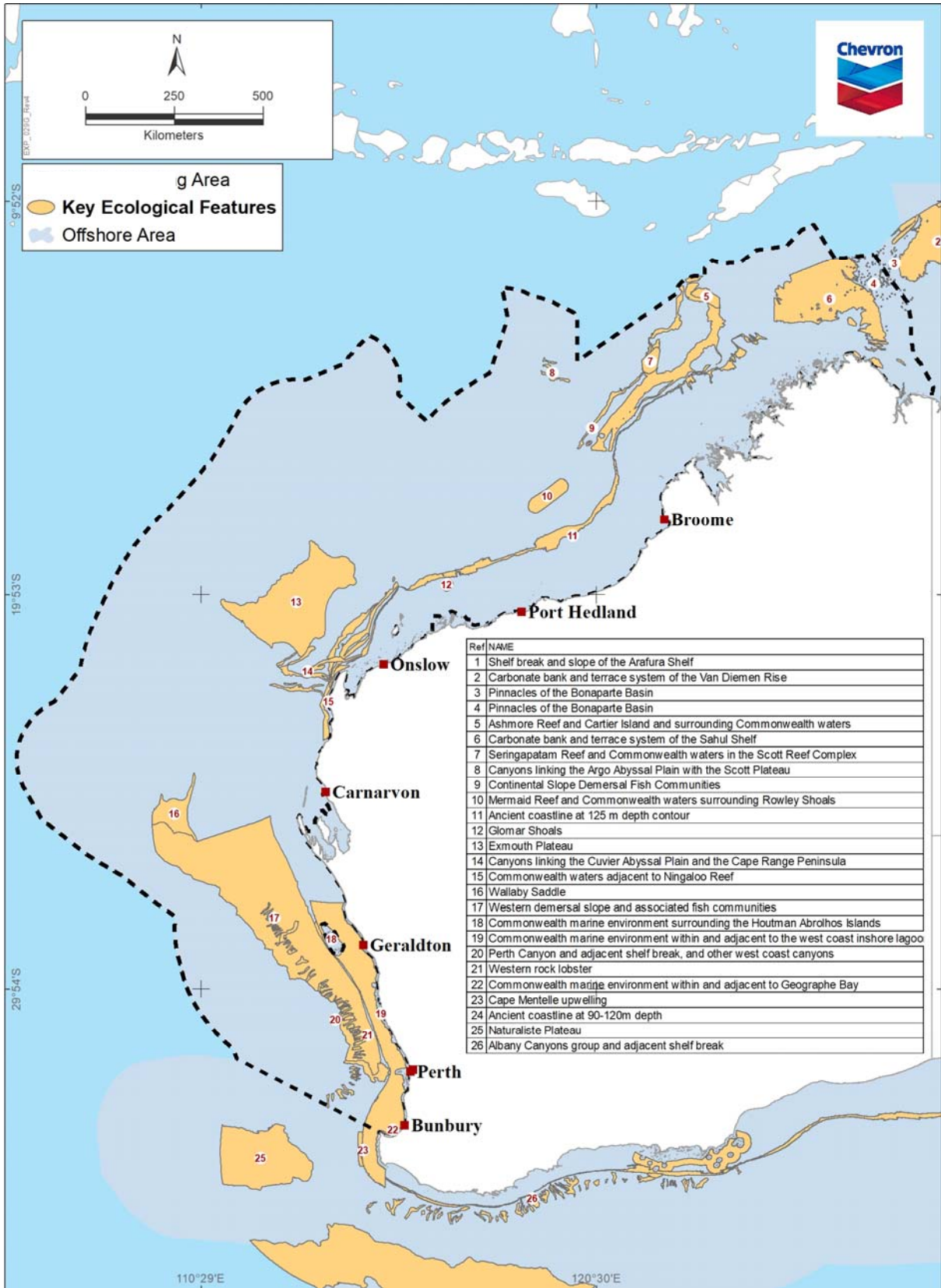


Figure 2-6: Key Ecological Features

3 Physical Environment

3.1 Meteorology

North-west WA is characterised by an arid, subtropical climate. In summer (between September and March), average daily temperatures range from 21 °C to 36 °C. During winter (May to July), mean daily temperatures range from 14 °C to 29 °C (Ref. 79; Ref. 80). April and August are considered transitional months during which either the summer or winter weather regime may dominate, or conditions may vary between the two (Ref. 80). The area receives relatively low rainfall, although heavy downpours can occur during tropical cyclones and depressions.

Wind patterns in north-west WA are dictated by the seasonal movement of atmospheric pressure systems. During summer, high-pressure cells produce prevailing winds from the north-west and south-west, which vary between 10 and 13 ms⁻¹. During winter, high-pressure cells over central Australia produce north-easterly to south-easterly winds with average speeds of between 6 and 8 ms⁻¹.

The cyclone season in north-west WA runs from November to April, with an average of five tropical cyclones per year (Ref. 81). Summer thunderstorms can have associated winds with gusts exceeding 20 ms⁻¹, but these winds are usually of short duration.

The air quality in the North-west Marine Region is largely unpolluted due to the Region's relative remoteness.

3.2 Oceanography

3.2.1 Water Temperature

Waters in north-west WA are tropical year-round, with sea surface temperature in open shelf waters reaching ~26 °C in summer, and dropping to ~22 °C in winter. Nearshore temperatures of north-west WA fluctuate through a higher temperature range from ~17 °C in winter to ~31 °C in summer (Ref. 82).

3.2.2 Circulation and Currents

The major surface currents influencing north-west WA flow towards the poles and include the Indonesian Throughflow, the Leeuwin Current, the South Equatorial Current, and the Eastern Gyral Current. The Ningaloo Current, the Holloway Current, the Shark Bay Outflow, and the Capes Current are seasonal surface currents in the region. Below these surface currents are several subsurface currents, the most important of which are the Leeuwin Undercurrent and the West Australian Current. These subsurface currents flow towards the equator in the opposite direction to surface currents (Ref. 76). Figure 3-1 and Figure 3-2 show the main surface and subsurface currents in north-west WA.

Water circulation in north-west WA is strongly influenced by the southward-flowing Indonesian Throughflow. The strength of the Throughflow, and its influence in north-west WA, varies seasonally in association with the north-west monsoon (Ref. 76).

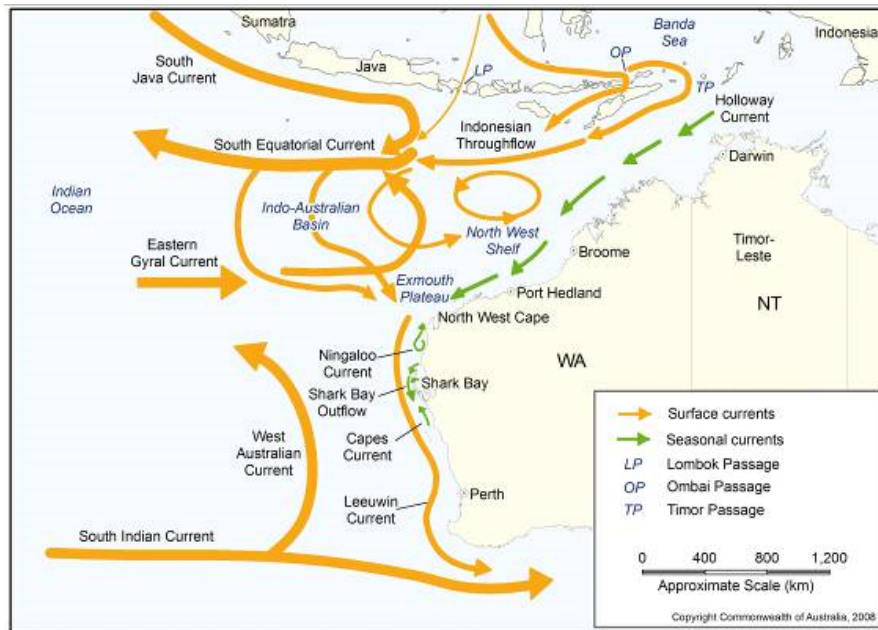


Figure 3-1: Surface and Seasonal Currents in the Region

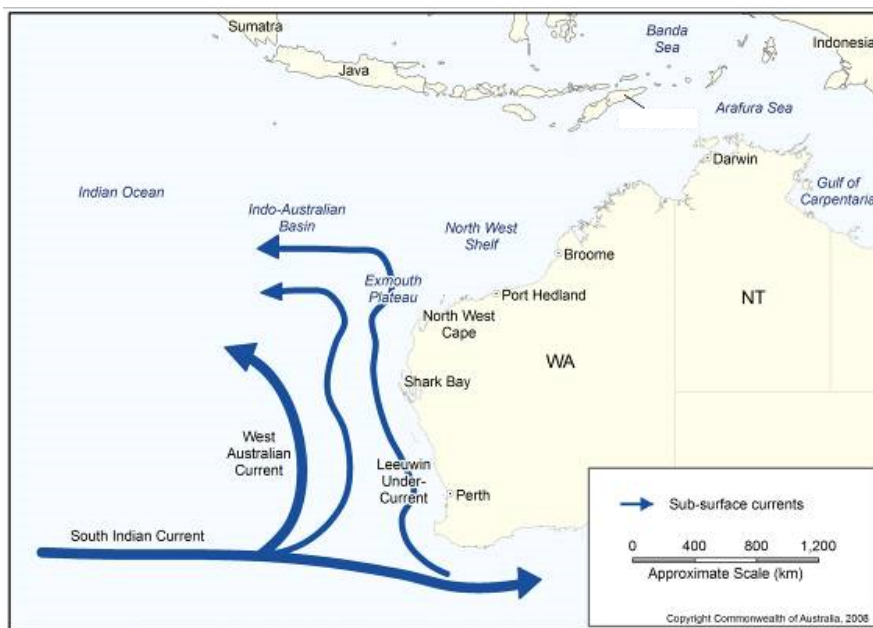


Figure 3-2: Subsurface Currents in the Region

Source: Ref. 76

3.2.3 Waves

The prevailing oceanic conditions in north-west WA are governed by a combination of sea and swell waves. Local wind-generated seas have variable wave heights, typically ranging from 0 to 4 m under non-tropical cyclone conditions. North-west WA typically experiences a persistent winter swell of ~2 m, generated by low-pressure systems in southern latitudes.

3.2.4 Tides

North-west WA has some of the largest tides along a coastline adjoining an open ocean in the world. Tides increase in amplitude from south to north, corresponding

with the increasing width of the continental shelf (Ref. 76). Tidal movements are larger and stronger in the nearshore waters compared to the offshore waters. Tides in the region are broadly categorised as semidiurnal (i.e. two high tides and two low tides per day) with a spring/neap cycle (Ref. 76).

3.3 Marine Water Quality

3.3.1 Nutrients

North-west WA's surface waters are nutrient-poor due to the Indonesian Throughflow dominating the surface waters of the entire region.

Sporadic and variable nutrient loadings may occur within coastal waters due to changes in river run-off (e.g. Ashburton River), blooms of nitrogen-fixing microbes, tidal mixing, low-frequency circulation, and habitat influences (i.e. mangroves) (Ref. 83).

3.3.2 Turbidity

Water clarity in north-west WA varies according to water movement, depth, and seabed sediment type. Nearshore waters in the region may be relatively turbid as a result of local current-induced resuspension of fine sediments and episodic run-off from adjacent rivers, although there is high spatial and temporal variation. However, some protected coastal areas, such as the lagoon system of the fringing Ningaloo Reef, can be characterised by relatively clear water with low turbidity.

3.3.3 Water Chemistry

Salinity varies spatially and temporally in the waters across north-west WA. Water salinity varies between 34.4 and 36.3 g/L in offshore waters around the North West Shelf (Ref. 84).

Wenziker *et al.* (Ref. 84) estimated natural background concentrations for a range of potential contaminants in the waters around the Dampier Archipelago, thus providing baseline information as to the water quality within nearshore waters of the North West Shelf. The contaminants investigated encompassed a range of heavy metals (e.g. cadmium, chromium, copper, lead, mercury, and zinc) and organic chemicals (e.g. polycyclic aromatic hydrocarbons, total petroleum hydrocarbons). The survey identified low background concentrations of metals and organic chemicals, with localised elevations of some contaminants (metals) near the coastal industrial centres and ports (e.g. Dampier). Except for a few select constituents, such as relatively high natural levels of cadmium, the concentrations of metals were low by world standards. Wenziker *et al.* (Ref. 84) recommended that guideline water quality trigger values from the Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand (Ref. 85) are suitable for use in the North West Shelf.

3.3.4 Marine Geomorphology

The sea floor of north-west WA comprises four general feature types: continental shelf, continental slope, continental rise, and abyssal plain. Most of the region is either continental slope or continental shelf.

3.4 Seabed Features

The geomorphology of Australia’s continental margin is varied, with several geomorphic features present, including basins, canyons, terraces, seamounts, and plateaus. The key geomorphic features (Ref. 86) that were mapped as potentially occurring within the PA, are:

- abyssal plain/deep ocean floor
- apron/fan
- bank/shoals
- basin
- canyon.

3.5 Marine Habitat

The Seamap Australia spatial data layer is a nationally synthesised data product of sea floor marine habitat data (Ref. 87). Australian continental shelf benthic habitat layers in GIS format were collected from various stakeholders around the country, compiled and reviewed by Australian National Data Service and external independent assessors, to produce a national classification of marine habitats.

Seamap Australia spatial data were used to indicate the types of marine habitat present within the PA. Table 3-1 summarises the areas of marine habitat associated with the matters of NES identified in this document.

Table 3-1: Marine Habitat and Key Sensitivities

Matter of NES	Key Sensitivities							Habitat Type				
	AMP	KEF	Ramsar Wetland	National Heritage Place	Commonwealth Heritage	World Heritage Property	TEC	Seagrass	Mangrove	Coral	Saltmarsh	Macroalgae
Ashmore Reef	☒							☒		☒		
Ashmore Reef and Cartier Island and surrounding Commonwealth waters		☒								☒		
Ashmore reef National Nature Reserve			☒							☒		
Ashmore Reef National Nature Reserve					☒					☒		
Carbonate bank and terrace system of the Sahul Shelf		☒								☒		
Carbonate bank and terrace system of the Van Diemen Rise		☒								☒		
Cartier Island	☒							☒		☒		
Commonwealth marine environment in and adjacent to Geographe Bay		☒						☒				

Matter of NES	Key Sensitivities							Habitat Type				
	AMP	KEF	Ramsar Wetland	National Heritage Place	Commonwealth Heritage	World Heritage Property	TEC	Seagrass	Mangrove	Coral	Saltmarsh	Macroalgae
Commonwealth marine environment in and adjacent to the west coast inshore lagoons		<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>
Eighty-mile Beach			<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
Geopraphe	<input checked="" type="checkbox"/>							<input checked="" type="checkbox"/>				
Joseph Bonaparte Gulf	<input checked="" type="checkbox"/>									<input checked="" type="checkbox"/>		
Mermaid Reef – Rowley Shoals					<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>		
Ningaloo Coast				<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>		
Ningaloo Coast						<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Ningaloo Marine Area – Commonwealth Waters					<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>		
Oceanic Shoals	<input checked="" type="checkbox"/>									<input checked="" type="checkbox"/>		
Ord River Floodplain			<input checked="" type="checkbox"/>						<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
Roebuck Bay			<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
Scott Reef and Surrounds – Commonwealth Area					<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		
Shark Bay						<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>				
Shark Bay (Wooramel Seagrass Bank)				<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>				
Subtropical and Temperate Coastal Saltmarsh							<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	
The West Kimberley				<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Thrombolite (microbial) community of coastal freshwater lakes of the Swan Coastal Plain (Lake Richmond)							<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>
Two Rocks	<input checked="" type="checkbox"/>							<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>

3.6 Shoreline Type

The Smartline Coastal Geomorphic Map of Australia (Ref. 88) is a detailed map of the coastal landform types—or geomorphology—of continental Australia and most of its adjacent islands. Using the intertidal classifications provided by the Smartline database, the types of shoreline that are present within the PA, their overall length, and percentage present in the PA is listed in Table 3-2.

Table 3-2: Shoreline Type and Length within PA

Shoreline Type	Length (100 kms)
Unclassified	4608.46
Muddy tidal flats	2162.74
Hard bedrock shore	2151.61
Tidal flats (sediment undifferentiated)	1811.23
Sandy beach undifferentiated	966.09
Fine-medium sand beach	400.78
Hard rock cliff (>5 m)	248.45
Tidal sediment flats (inferred from mangroves)	192.49
Beach (sediment type undifferentiated)	161.49
Fine-medium sandy tidal flats	137.94
Sandy shore undifferentiated	102.32
Sandy tidal flats	68.28
Mixed sandy shore undifferentiated	37.96
Hard rocky shore platform	21.59
Artificial shoreline undifferentiated	13.87
Rocky shore (undifferentiated)	8.84
Boulder revetment	6.98
Sandy tidal flats with coarse stony debris	3.87
Perched sandy beach (undifferentiated)	2.81
Soft 'bedrock' shore	0.39
Concrete dock structures	0.23
Coral shingle beach	0.21

4 Socioeconomic Environment

4.1 Commercial Shipping

The Australian Maritime Safety Authority uses a satellite automatic identification system (AIS) service that provides AIS data across the Indo-Pacific and Indonesian region. The AIS can send and receive ship information (such as identity, position, course, speed, ship particulars, and cargo information) to and from other ships, suitably equipped aircraft, and shore. It can handle >2000 reports per minute and updates information as often as every two seconds. Although the AIS is conventionally a line-of-sight radio broadcast system for communication between ships, and between ships and shore stations, recent technological developments have seen satellites adapted for receiving AIS messages from low Earth orbit.

Data provided by shipborne AISs were used to build a point density map from filtered satellite AIS data collected between 1 January 2016 and 31 December 2016 to indicate the level of shipping activity in Australian waters (Ref. 89).

Given the size of the PA, CAPL has reviewed this shipping density information to understand areas within the PA that comprise high activity and are important for the WA economy. Based on this data, the key shipping channels are those between:

- Fremantle, Dampier, and Port Hedland ports to Indonesia
- Fremantle, Dampier, and Port Hedland ports to Timor
- Port of Dampier to various offshore oil and gas developments.

The map also reflects the vessel density in and around known oil and gas facilities and developments within the PA (Figure 4-1).

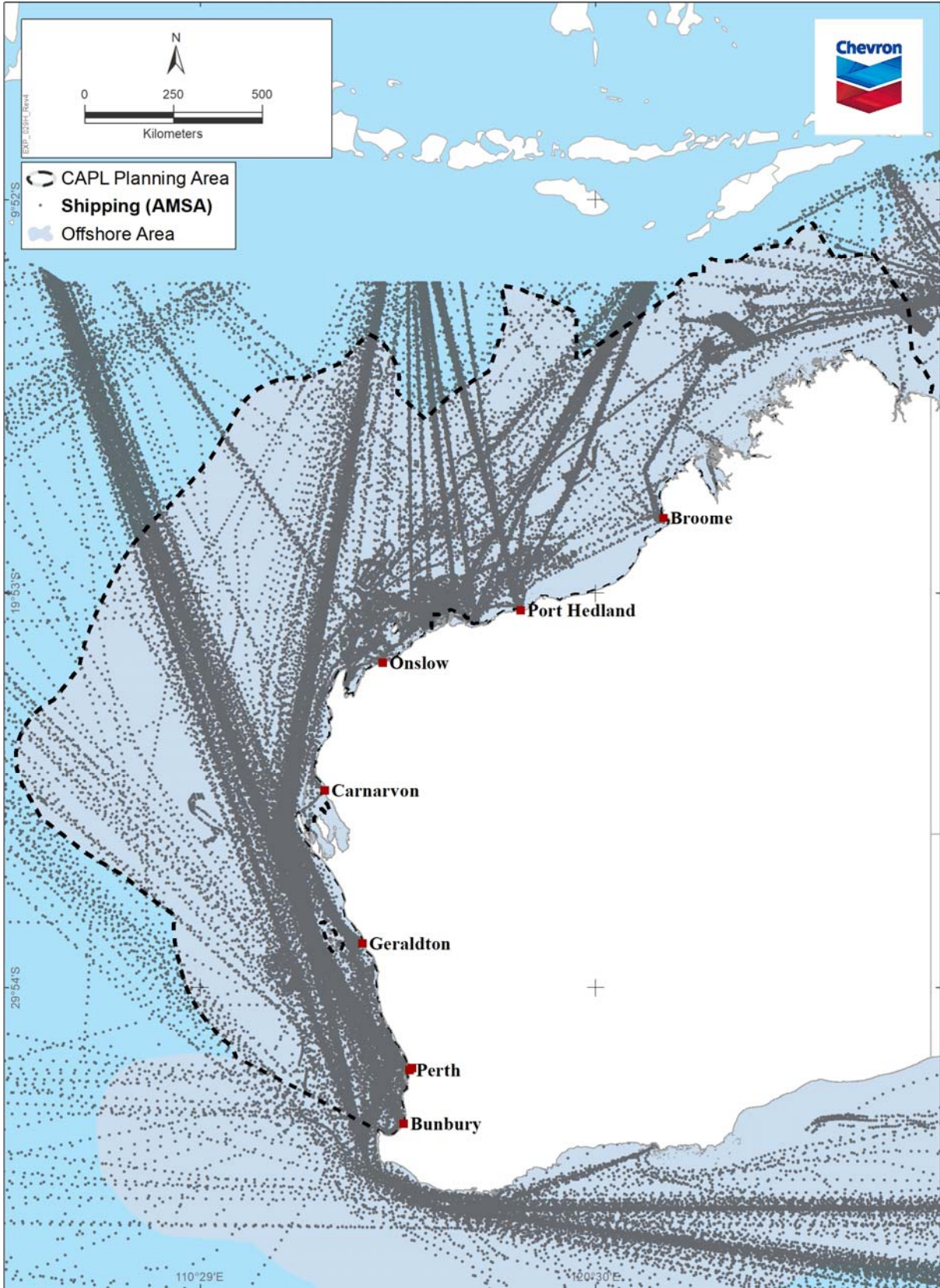


Figure 4-1: Commercial Shipping

Source: Ref. 89

4.2 Commercial Fishing and Aquaculture

Fishing and aquaculture activities are managed under various State and Commonwealth agencies. Table 4-1 and Table 4-2 list and summarise the State and Commonwealth managed fisheries that overlap the PA (Ref. 90; Ref. 91)

Table 4-1: State Managed Fisheries

State Managed Fishery	2017–2018 Season Summary (Ref. 92)
Abalone	The 2017–2018 fishing season reported a commercial catch of 49 t and recreational catch of 23–27 t. In 2017, 23 commercial vessels operated, employing 45 people. More than 17 441 recreational fishers held licences in 2017 that allowed participation in this fishery.
Abrolhos Islands and Mid-West Trawl	The 2017–2018 fishing season reported a commercial catch of 130.2 t of meat.
Broome Prawn	The 2017–2018 fishing season reported a negligible commercial catch. Extremely low fishing effort occurred—only one boat undertook trial fishing to investigate whether catch rates were sufficient for commercial fishing. This resulted in negligible landings of Western King Prawns with no by-product recorded.
Cockburn Sound (Crab)	The fishery has been closed since April 2014. In 2017, the juvenile recruitment improved but remained below the limit reference level and the egg production index declined below the threshold.
Cockburn Sound (Fish Net)	In 2017, the total commercial catch of nearshore and estuarine finfish in the West Coast Bioregion was 353 t, comprising 203 t from ocean waters and 150 t from estuaries (nearshore and estuarine finfish). The commercial catch was taken predominantly by six fisheries: West Coast Estuarine Managed Fishery, South West Coast Salmon Managed Fishery, South West Beach Seine Fishery, West Coast Demersal Scalefish Managed Fishery, Cockburn Sound (Fish Net) Managed Fishery, and the West Coast Beach Bait Managed Fishery. In the West Coast Bioregion, there were 64 commercial fishers employed (either part- or full-time) in nearshore and estuarine fisheries in 2017, largely supplying fresh fish to meet demand for locally caught product.
Cockburn Sound (Line and Pot)	The Cockburn Sound Line and Pot Managed Fishery, Southwest Trawl Managed Fishery, and West Coast Rock Lobster Managed Fishery combined to record a catch of 2 t of demersal species in 2017. Within the octopus-specific fisheries, four vessels fished in the Cockburn Sound Line and Pot Managed Fishery in 2017.
Exmouth Gulf Prawn	The 2017–2018 fishing season reported a commercial catch of 713 t. The estimated employment in the fishery in 2017 was 18 people including skippers and other crew.
Gascoyne Demersal Scalefish	The 2017–2018 fishing season reported a commercial catch of 133 t of Pink Snapper, 144 t of other demersal species, and a recreational catch of 95–110 t. In 2017, 16 vessels fished at some point during the season, 10 of which fished for >10 days during the peak Pink Snapper season, typically with a crew of two to three people. Shark Bay and Ningaloo are popular recreational fishing destinations especially during winter and school holidays.
Kimberley Crab	The 2017–2018 fishing season reported a commercial catch of 9 t of mud crab, which represents the entire commercial mud crab catch landed in 2017. Three commercial operators fished during 2017, with effort concentrated between May and September. The estimated gross value of product (GVP) for the crab fishery within the Northern Bioregion for 2017 was ~\$529 000.
Kimberley Gillnet and Barramundi	The 2017–2018 fishing season reported a commercial catch of 79.9 t and a recreational catch estimated to be 20–35 t. During the 2017 season (February to November), four vessels fished in this fishery with an average crew level of ~2.3 people, with an estimate of at least nine people directly employed in the fishery. A significant number of recreational and charter anglers also fished across the region. Recreational fishing attracts many visitors to the North Coast

State Managed Fishery	2017–2018 Season Summary (Ref. 92)
	Bioregion, particularly in nearshore areas over the winter dry season (April–October).
Kimberley Prawn	The 2017–2018 fishing season reported a commercial catch of 269 t. The fishery experienced low landings due to low effort and targeting on high catch rates of Banana Prawns. For the 2017–2018 season, bycatch included 258 sea snakes (most were returned to the sea alive, but 61 were returned dead, and five had an unknown status); 19 sawfish (10 were returned to the sea alive, four were dead, and five had an unknown status); four turtles were caught and returned to the sea alive; and one seahorse (status unknown).
Mackerel Fishery	The 2017–2018 fishing season reported a commercial catch of 283 t of Spanish Mackerel and 16 t of Grey Mackerel. The recreational catch is estimated to be ~46–73 t. Thirteen boats fished during the 2017 mackerel season, primarily from May–November, with ~30 people directly employed in the fishery.
Marine Aquarium	The 2017–2018 fishing season reported a commercial catch of 6113 fish. Eleven of the 12 licences in this fishery were active; three licences (of five) were active for the hermit crab fishery in 2017.
Nickol Bay Prawn	The 2017–2018 fishing season reported a commercial catch of 221.1 t. In 2017, 281 boat days were recorded for this fishery.
Northern Demersal Scalefish	The 2017–2018 fishing season reported a commercial catch of 1317 t. Six vessels fished in the 2017 fishing season, and at least 20 people (3–4 crew per vessel) were directly employed.
Octopus	The 2017–2018 fishing season reported a commercial catch of 267 t and recreational catch of 1 t. Each dedicated octopus fishing vessel employs between two and four people. In 2017, ~221 vessels caught octopus, although the vast majority of these landings were small (<100 kg), as they were by-product of the West Coast Rock Lobster Managed Fishery.
Onslow Prawn	The 2017–2018 fishing season reported a negligible commercial catch. Only five days of fishing effort was undertaken (by one boat) in 2017.
Pilbara Crab	The 2017–2018 fishing season reported a commercial catch of 51 t of Blue Swimmer Crab. During 2017, five people were employed as skippers and crew on vessels fishing for Blue Swimmer Crabs along the Pilbara coast. The estimated gross value of product (GVP) for the crab fishery within the Northern Bioregion for 2017 was ~\$529 000.
Pilbara Fish Trawl	The 2017–2018 fishing season reported a commercial catch of 1795 t. It is estimated that ~10 fishers on two vessels were directly employed during 2017 in the trawl sector. Overall, at least ~33 people (e.g. 3–4 crew per vessel) were directly employed in the Pilbara Demersal Scalefish Fisheries (PDSF).
Pilbara Trap	The 2017–2018 fishing season reported a commercial catch of 573 t. It is estimated that ~10 fishers on two vessels were directly employed during 2017 in the trawl sector. Overall, at least ~33 people (e.g. 3–4 crew per vessel) were directly employed in the PDSF.
Pilbara Line	The 2017–2018 fishing season reported a commercial catch of 573 t. It is estimated that 15 fishers on five vessels were directly employed during 2017 in the line sector. Overall, at least ~33 people (e.g. 3–4 crew per vessel) were directly employed in the PDSF.
Shark Bay Beach Seine and Mesh Net	In 2017, the total catch reported by the commercial fishery (Shark Bay Beach Seine and Mesh Net Managed Fishery [SBBSMNF]) was 156 t, comprising 95 t of whiting, 40 t of Sea Mullet, 12 t of Western Yellowfin Bream, 5 t of tailor, and 4 t of other mixed species including 3 t of Pink Snapper. In 2017, six vessels operated in the SBBSMNF, employing ~12 fishers.
Shark Bay Crab	The 2017–2018 fishing season reported a commercial catch of 443 t and a recreational catch of 1–2 t. The trap sector employs ~12 people as skippers and crew on vessels fishing for Blue Swimmer Crabs in the Gascoyne Coast Bioregion, as well as additional employment for 30–35 workers for the post-harvest processing of the crab catch.

State Managed Fishery	2017–2018 Season Summary (Ref. 92)
Shark Bay Prawn	The 2017–2018 fishing season reported a commercial catch of 1608 t. During 2017–2018, ~100 skippers and crew were employed in the fishery. One of the key operators with 10 licensed fishing boats is based in Carnarvon with administration, wharf, and engineering staff based at the small boat harbour and a processing factory at Babbage Island. Eight other boats travel to the region.
Shark Bay Scallop	The 2017–2018 fishing season reported a commercial catch of 326.4 t meat weight. In 2017, ~40 skippers and crew were employed in scallop fishing in WA, with support staff in Geraldton and Fremantle. In Shark Bay, an additional 90 crew are employed in the prawn fishery (Class B) that can also retain scallops.
Southern Demersal Gillnet & Demersal Longline	The Temperate Demersal Gillnet and Demersal Longline Fishery (TDGDLF) comprises the West Coast Demersal Gillnet and Demersal Longline (Interim) Managed Fishery (WCDGDLF), which operates between 26° and 33° S, and the Joint Authority Southern Demersal Gillnet and Demersal Longline Managed Fishery (JASDGDLF). The 2017–2018 fishing season reported a commercial catch of 936 t. 53 and 65 skippers and crew were employed in the JASDGDLF, and between 18 and 21 skippers and crew were employed in the WCDGDLF during 2016–2017.
South West Coast Salmon / South Coast Salmon	The 2017–2018 fishing season for the South West Coast Salmon and South Coast Salmon reported a commercial catch of 50 t and 93 t respectively. In 2017, there were ~12 commercial fishers employed in the South Coast Salmon Fishery.
South West Trawl	Only one boat fished in the SWTMF in 2017 for a total of 41 boat days.
Specimen Shell	The 2017–2018 fishing season reported a commercial catch of 7806 shells. Of the 31 licences in the fishery, 23 fished in 2017 and recorded a fishing effort of 674 days.
West Coast Deep Sea Crustacean	The 2017–2018 fishing season reported a commercial catch of 66.1 t and a recreational catch of 0 t. This fishery is based on vessels that employ a skipper and two or three crew and there is no recreational fishery. There were six vessels operating in 2017.
West Coast Demersal Gillnet & Demersal Longline	The Temperate Demersal Gillnet and Demersal Longline Fishery (TDGDLF) comprises the West Coast Demersal Gillnet and Demersal Longline (Interim) Managed Fishery (WCDGDLF), which operates between 26° and 33° S, and the Joint Authority Southern Demersal Gillnet and Demersal Longline Managed Fishery (JASDGDLF). The 2017–2018 fishing season reported a commercial catch of 936 t. 53 and 65 skippers and crew were employed in the JASDGDLF and between 18 and 21 skippers and crew were employed in the WCDGDLF during 2016–2017.
West Coast Demersal Scalefish	The 2017–2018 fishing season reported a commercial catch of 248 t and recreational catch of 248–285 t. Forty-one West Coast Demersal Scalefish (Interim) Managed Fishery (WCDSIMF) vessels operated in 2017 and employed between zero and five crew excluding the skipper. Sixty-seven licensed charter operators fished in the West Coast Bioregion (WCB) in 2015–2016. The number of people employed in the charter industry has not been estimated. The demersal resource in the WCB is highly accessible to boat fishers with 137 388 'recreational fishing from boat' licences held in WA from September 2015 to August 2016.
West Coast Estuarine	The 2017–2018 fishing season reported a commercial catch of 353 t and recreational catch of 58–77 t. 64 commercial fishers were employed (either part- or full-time) in nearshore and estuarine fisheries in 2017.
West Coast Purse Seine	The 2017–2018 fishing season reported a commercial catch of 1097 t. Seven vessels were active over this period.
West Coast Rock Lobster	The 2017–2018 fishing season reported a commercial catch of 6400 t and recreational catch of 272–400 t. 234 commercial vessels operated in 2017 with most of the catch handled by four main processing establishments. Over 60 000 recreational fishers held rock lobster licences in 2017.

Table 4-2: Commonwealth Managed Fisheries

Commonwealth Managed Fishery	2017–2018 Season Summary (Ref. 93)
North-West Slope Trawl Fishery	The 2017–2018 fishing season reported a commercial catch of 55.2 t with economic value withheld. The fishery recorded 219 active days comprising 3731 trawl-hours. Six permits were in place with four vessels active for the season.
Small Pelagic Fishery	The 2017–2018 fishing season reported a commercial catch of 9424 t. The fishery recorded 208 search-hours with 216 midwater trawl shots. In 2017–2018, 31 entities held quota statutory fishing right (SFRs), with three vessels actively using purse seine methods and one using trawl methods.
Southern Bluefin Tuna Fishery	The 2017–2018 fishing season reported a commercial catch of 6159 t worth an estimated AU\$39.17 million. The fishery recorded 1137 search-hours with 198 shots. In 2017–2018, 84 entities held quota SFRs, with seven vessels actively using purse seine methods and one using longline methods.
Western Deepwater Trawl Fishery	The 2017–2018 fishing season reported a commercial catch of 101.9 t with economic value withheld. The fishery recorded 100 active days comprising 1108.3 trawl-hours. Seven permits were in place with three vessels active for the season.
Western Skipjack Fishery	There has been no fishing effort in the Skipjack Tuna Fishery (STF) since the 2008–2009 fishing season. Variability in the availability of skipjack tuna in the Australian Fishing Zone and the prices received for product influence participation levels in the fishery. Fourteen permits were in place for the 2017–2018 season.
Western Tuna and Billfish Fishery	The 2017–2018 fishing season reported a commercial catch of 278 t with the economic value withheld. The fishery recorded 404 880 hooks for the season. 94 entities held quota SFRs in 2017–2018 with two vessels actively using pelagic longline and one vessel using minor line methods.

4.3 Recreational Fisheries

The WA Department of Primary Industries and Regional Development (DPIRD) conducts statewide recreational fishing surveys every two years, with the first survey completed in 2011. The survey collects information from more than 3000 recreational fishers who record their catches in logbooks over a 12-month period with DPIRD also conducting interviews throughout the State and monitoring the number of boat launches and retrievals using cameras at various boat ramps.

Key findings of the 2015–2016 survey report (Ref. 94) are included in Table 4-3.

Table 4-3: Recreational Fishing Survey Outcomes

Component	Number
Number of participants	6000
Number of recreational fishing boat licences issued	140 000
Most popular species	
Blue Swimmer Crab	Number caught ~680 000
School Whiting	Number caught ~230 000
Fishing effort by bioregion	
West Coast	74%

Component	Number
Gascoyne Coast	12%
North Coast	8%
South Coast	6%

Source: Ref. 94

4.4 Australian National Shipwrecks

The Australasian Underwater Cultural Heritage Database (Ref. 95) records all known Maritime Cultural Heritage (shipwrecks, aircraft, relics, and other underwater cultural heritage) in Australian waters. Historic shipwrecks and sunken aircraft (older than 75 years) are protected under the Commonwealth *Underwater Cultural Heritage Act 2018*. Shipwrecks and aircraft that have been underwater <75 years, and other types of underwater cultural heritage, can be protected through individual declaration based on an assessment of heritage significance.

667 shipwrecks are present within the PA. Given this number, no additional detail is provided in this document. If shipwrecks are present within an EMBA described in a project-specific EP, CAPL will identify and detail the significance of these shipwrecks in that EP.

4.5 Defence

Table 4-4 lists the Australian Department of Defence's prohibited and training areas that are within the PA (Ref. 96).

Table 4-4: Department of Defence Prohibited and Training Areas

Area Type	Area Name
Practice Areas	Darwin AWR Central
	Learmonth AWR
	North-West Australian Exercise Area
Training Areas	North Australian Exercise Area
	Yampi Field Training Area
	Learmonth AWR
	West Australian Exercise Area

4.6 Tourism

Tourism is an important industry for WA, directly employing 73 200 people and indirectly employing a further 35 600 (Ref. 97). The value of the WA tourism industry is AU\$12.9 billion by Gross State Product (Ref. 97). Table 4-5 lists the value of tourism to the state's economy.

Table 4-5: Western Australian Tourism Statistics

	WA Direct Tourism Gross Value Added (\$million)	% of WA Direct Tourism Gross Value Added (\$million)
Tourism characteristic industries		
Travel agency and tour operator services	\$1138	19.1%
Air, water, and other transport	\$823	13.8%

	WA Direct Tourism Gross Value Added (\$million)	% of WA Direct Tourism Gross Value Added (\$million)
Accommodation	\$654	11.0%
Cafes, restaurants, and takeaway food services	\$552	9.3%
Ownership of dwellings	\$370	6.2%
Clubs, pubs, taverns, and bars	\$339	5.7%
Motor vehicle hiring	\$157	2.6%
Other road transport	\$87	1.5%
Casinos and other gambling services	\$88	1.5%
Other sports and recreation services	\$85	1.4%
Cultural services	\$74	1.2%
Rail transport	\$64	1.1%
Taxi transport	\$56	0.9%
Tourism connected industries		
Automotive fuel retailing	\$51	0.9%
Other retail trade	\$631	10.6%
Education and training	\$384	6.4%
All other industries	\$413	6.9%
Total Gross Value Added	\$5966	100%

Source: Ref. 97

5 Terms, Acronyms, and Abbreviations

Table 5-1 defines the terms, acronyms, and abbreviations used in this document.

Table 5-1: Terms, Acronyms, and Abbreviations

Acronym / Abbreviation	Definition
~	Approximately
<	Less/fewer than
>	Greater/more than
AHC	Australian Heritage Commission
AIMS	Australian Institute of Marine Science
AIS	Automatic identification System
AMP	Australian Marine Park
AU\$	Australian dollar
AWR	Air Weapons Range
BIA	Biologically Important Area; a spatially defined area where aggregations of individuals of a species are known to display biologically important behaviours such as breeding, foraging, resting, or migration
BP	Before Present (present = 1950)
CAMBA	China–Australia Migratory Bird Agreement
CAPL	Chevron Australia Pty Ltd
CSIRO	Commonwealth Scientific and Industrial Research Organisation
Diadromous	Fish that spend portions of their life cycles partially in fresh water and partially in salt water
Doline	A shallow depression, either funnel- or saucer-shaped, with a floor covered by cultivated soil, formed by solution in limestone country
DPIRD	Western Australian Department of Primary Industries and Regional Development
DTA	Defence Training Area
EEZ	Exclusive Economic Zone
EMBA	Environment that May Be Affected
Endangered Species	A species that is not critically endangered, but is facing a very high risk of extinction in the wild in the near future.
EP	Environment Plan
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
g/L	Grams per litre
GIS	Geographic Information System
GVP	Gross Value of Product
ha	Hectare
HMAS	His Majesty's Australian Ship (during World War II)
HMS	His (or Her) Majesty's Ship (British)
HSK	Ship of the German Navy (during World War II)
IBRA	Interim Biogeographic Regionalisation for Australia

IUCN	International Union for Conservation of Nature
IUU	Illegal, unreported, and unregulated
JAMBA	Japan–Australia Migratory Bird Agreement
JASDGLF	Joint Authority Southern Demersal Gillnet and Demersal Longline Managed Fishery
Karst	An area of irregular limestone in which erosion has produced fissures, sinkholes, underground streams, and caverns.
KEF	Key Ecological Feature
km	Kilometre
km ²	Square kilometre
m	Metre
MoU	Memorandum of Understanding
ms ⁻¹	Metres per second
NES	[Matters of] National Environmental Significance, as defined in Part 3, Division 1 of the EPBC Act.
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
PA	Planning Area
PDSF	Pilbara Demersal Scalefish Fisheries
Photic zone	The depth of the water in a lake or ocean that is exposed to sufficient sunlight for photosynthesis to occur. The depth of the photic zone can be greatly affected by turbidity.
Priority Species	A species that does not meet the criteria for listing as Threatened Fauna or Declared Rare Flora, but which either may be suspected to be threatened; or is not threatened, but is rare and in need of ongoing monitoring; or is dependent on ongoing management intervention to prevent it from becoming threatened.
Prokaryote	A unicellular organism without a nucleus
Sessile	Permanently attached directly to the substratum by its base (i.e. immobile), without a stalk or stem
SFR	Statutory fishing right
Stochastic	Random
Swale	A low place in a tract of land, usually moister than the adjacent higher land
SWMR	South-West Marine Region
t	Tonne
TDGLF	Temperate Demersal Gillnet and Demersal Longline Fishery
TEC	Threatened Ecological Community
Trophic	Relating to food or nutrition / nutritive processes
Vulnerable Species	A species is listed as vulnerable under the EPBC Act if it is not critically endangered or endangered and it is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
WA	Western Australia
WCB	West Coast Bioregion
WCDGLF	West Coast Demersal Gillnet and Demersal Longline (Interim) Managed Fishery

6 References

Where references and citations have been copied from Government Database sources, the database has been referenced but the references as cited by the databases have not been specified here. For source material, please refer to the governmental databases for specific source references.

Table 6-1: References

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1.	Department of the Environment and Energy. 2018. <i>World Heritage Areas: Australia</i> . Department of the Environment and Energy, Canberra, Australian Capital Territory.	
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Ref. No.	Document Title	Document No.
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Ref. No.	Document Title	Document No.
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Appendix A Matter of NES Search Report



EPBC Act Protected Matters Report

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

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

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 17/08/20 14:29:42

[Summary](#)

[Details](#)

[Matters of NES](#)

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

[Extra Information](#)

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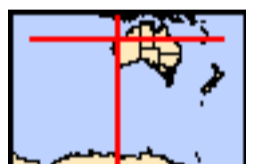
[Acknowledgements](#)



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

[Coordinates](#)

[Buffer: 1.0Km](#)



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	2
National Heritage Places:	5
Wetlands of International Importance:	6
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	2
Listed Threatened Ecological Communities:	8
Listed Threatened Species:	127
Listed Migratory Species:	103

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	4
Commonwealth Heritage Places:	3
Listed Marine Species:	192
Whales and Other Cetaceans:	41
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	15

Extra Information

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

State and Territory Reserves:	50
Regional Forest Agreements:	1
Invasive Species:	59
Nationally Important Wetlands:	13
Key Ecological Features (Marine)	11

Details

Matters of National Environmental Significance

World Heritage Properties		[Resource Information]
Name	State	Status
Shark Bay, Western Australia	WA	Declared property
The Ningaloo Coast	WA	Declared property

National Heritage Properties		[Resource Information]
Name	State	Status
Natural		
Lesueur National Park	WA	Listed place
Shark Bay, Western Australia	WA	Listed place
The Ningaloo Coast	WA	Listed place
The West Kimberley	WA	Listed place
Indigenous		
Dampier Archipelago (including Burrup Peninsula)	WA	Listed place

Wetlands of International Importance (Ramsar)		[Resource Information]
Name		Proximity
Becher point wetlands		Within 10km of Ramsar
Eighty-mile beach		Within Ramsar site
Forrestdale and thomsons lakes		Within 10km of Ramsar
Ord river floodplain		Within Ramsar site
Peel-yalgorup system		Within Ramsar site
Roebuck bay		Within 10km of Ramsar

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

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside the Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area. Generally the Commonwealth Marine Area stretches from three nautical miles to two hundred nautical miles from the coast.

Name
EEZ and Territorial Sea
Extended Continental Shelf

Marine Regions [\[Resource Information \]](#)

If you are planning to undertake action in an area in or close to the Commonwealth Marine Area, and a marine bioregional plan has been prepared for the Commonwealth Marine Area in that area, the marine bioregional plan may inform your decision as to whether to refer your proposed action under the EPBC Act.

Name
North
North-west
South-west

Listed Threatened Ecological Communities [\[Resource Information \]](#)

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

Name	Status	Type of Presence
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community likely to occur within area
Clay Pans of the Swan Coastal Plain	Critically Endangered	Community likely to occur within area
Monsoon vine thickets on the coastal sand dunes of Dampier Peninsula	Endangered	Community likely to occur within area
Sedgelands in Holocene dune swales of the southern Swan Coastal Plain	Endangered	Community known to occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area
Thrombolite (microbial) community of coastal	Endangered	Community known to

Name	Status	Type of Presence
freshwater lakes of the Swan Coastal Plain (Lake Richmond)		occur within area
Thrombolite (microbialite) Community of a Coastal Brackish Lake (Lake Clifton)	Critically Endangered	Community known to occur within area
Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain ecological community	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area
Calyptorhynchus baudinii Baudin's Cockatoo, Long-billed Black-Cockatoo [769]	Endangered	Breeding known to occur within area
Calyptorhynchus latirostris Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Breeding known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Roosting known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat likely to occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Erythrura gouldiae Gouldian Finch [413]	Endangered	Species or species habitat known to occur

Name	Status	Type of Presence within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Falcunculus frontatus whitei Crested Shrike-tit (northern), Northern Shrike-tit [26013]	Vulnerable	Species or species habitat likely to occur within area
Geophaps smithii blaauwi Partridge Pigeon (western) [66501]	Vulnerable	Species or species habitat likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Malurus leucopterus leucopterus White-winged Fairy-wren (Dirk Hartog Island), Dirk Hartog Black-and-White Fairy-wren [26004]	Vulnerable	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Papasula abbotti Abbott's Booby [59297]	Endangered	Species or species habitat may occur within area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Polytelis alexandrae Princess Parrot, Alexandra's Parrot [758]	Vulnerable	Species or species habitat known to occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area

Name	Status	Type of Presence
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Breeding known to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Tyto novaehollandiae kimberli Masked Owl (northern) [26048]	Vulnerable	Species or species habitat likely to occur within area
Fish		
Milyeringa veritas Blind Gudgeon [66676]	Vulnerable	Species or species habitat may occur within area
Nannatherina balstoni Balston's Pygmy Perch [66698]	Vulnerable	Species or species habitat likely to occur within area
Insects		
Hesperocolletes douglasi Douglas' Broad-headed Bee, Rottnest Bee [66734]	Critically Endangered	Species or species habitat may occur within area
Mammals		
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Bettongia lesueur lesueur Burrowing Bettong (Shark Bay), Boodie [66659]	Vulnerable	Species or species habitat may occur within area
Bettongia penicillata ogilbyi Woylie [66844]	Endangered	Species or species habitat known to occur within area
Conilurus penicillatus Brush-tailed Rabbit-rat, Brush-tailed Tree-rat, Pakooma [132]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat known to occur

Name	Status	Type of Presence within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Isoodon auratus auratus Golden Bandicoot (mainland) [66665]	Vulnerable	Species or species habitat likely to occur within area
Macroderma gigas Ghost Bat [174]	Vulnerable	Breeding likely to occur within area
Macrotis lagotis Greater Bilby [282]	Vulnerable	Species or species habitat known to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Breeding known to occur within area
Mesembriomys gouldii gouldii Black-footed Tree-rat (Kimberley and mainland Northern Territory), Djintamoonga, Manbul [87618]	Endangered	Species or species habitat may occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Vulnerable	Species or species habitat known to occur within area
Parantechinus apicalis Dibbler [313]	Endangered	Species or species habitat may occur within area
Petrogale concinna monastria Nabarlek (Kimberley) [87607]	Endangered	Species or species habitat known to occur within area
Petrogale lateralis lateralis Black-flanked Rock-wallaby, Moororong, Black-footed Rock Wallaby [66647]	Endangered	Species or species habitat known to occur within area
Phascogale tapoatafa kimberleyensis Kimberley brush-tailed phascogale, Brush-tailed Phascogale (Kimberley) [88453]	Vulnerable	Species or species habitat likely to occur within area
Pseudocheirus occidentalis Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Species or species habitat known to occur within area
Pseudomys fieldi Shark Bay Mouse, Djoongari, Alice Springs Mouse [113]	Vulnerable	Species or species habitat likely to occur within area
Rhinonictes aurantia (Pilbara form) Pilbara Leaf-nosed Bat [82790]	Vulnerable	Species or species habitat likely to occur within area
Saccolaimus saccolaimus nudicluniatus Bare-rumped Sheath-tailed Bat, Bare-rumped Sheath-tail Bat [66889]	Vulnerable	Species or species habitat likely to occur within area
Xeromys myoides Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat may occur within area
Other		
Idiosoma nigrum Shield-backed Trapdoor Spider, Black Rugose Trapdoor Spider [66798]	Vulnerable	Species or species habitat may occur within area
Westralunio carteri Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat likely to occur within area

Plants

Name	Status	Type of Presence
Andersonia gracilis Slender Andersonia [14470]	Endangered	Species or species habitat may occur within area
Androcalva bivillosa Stragglng Androcalva [87807]	Critically Endangered	Species or species habitat may occur within area
Banksia nivea subsp. uliginosa Swamp Honey-pot [82766]	Endangered	Species or species habitat may occur within area
Caladenia bryceana subsp. cracens Northern Dwarf Spider-orchid [64556]	Vulnerable	Species or species habitat may occur within area
Caladenia caesarea subsp. maritima Cape Spider-orchid [64856]	Endangered	Species or species habitat may occur within area
Caladenia elegans Elegant Spider-orchid [56775]	Endangered	Species or species habitat likely to occur within area
Caladenia hoffmanii Hoffman's Spider-orchid [56719]	Endangered	Species or species habitat likely to occur within area
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat likely to occur within area
Caladenia viridescens Dunsborough Spider-orchid [56776]	Endangered	Species or species habitat may occur within area
Chamelaucium sp. Gingin (N.G.Marchant 6) Gingin Wax [88881]	Endangered	Species or species habitat likely to occur within area
Chorizema varium Limestone Pea [16981]	Endangered	Species or species habitat may occur within area
Conostylis micrantha Small-flowered Conostylis [17635]	Endangered	Species or species habitat may occur within area
Diuris drummondii Tall Donkey Orchid [4365]	Vulnerable	Species or species habitat likely to occur within area
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat known to occur within area
Diuris purdiei Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat likely to occur within area
Drakaea elastica Glossy-leaved Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat known to occur within area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat likely to occur within area
Drummondita ericoides Morseby Range Drummondita [9193]	Endangered	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Eleocharis keigheryi Keighery's Eleocharis [64893]	Vulnerable	Species or species habitat may occur within area
Eucalyptus argutifolia Yanchep Mallee, Wabling Hill Mallee [24263]	Vulnerable	Species or species habitat known to occur within area
Eucalyptus beardiana Beard's Mallee [18933]	Vulnerable	Species or species habitat may occur within area
Eucalyptus cuprea Mallee Box [56773]	Endangered	Species or species habitat may occur within area
Eucalyptus x phylacis Meelup Mallee [87817]	Endangered	Species or species habitat likely to occur within area
Grevillea batrachioides Mt Lesueur Grevillea [21735]	Endangered	Species or species habitat may occur within area
Grevillea humifusa Spreading Grevillea [61182]	Endangered	Species or species habitat may occur within area
Hemiandra gardneri Red Snakebush [7945]	Endangered	Species or species habitat likely to occur within area
Leucopogon obtectus Hidden Beard-heath [19614]	Endangered	Species or species habitat may occur within area
Marianthus paralius [83925]	Endangered	Species or species habitat known to occur within area
Paracaleana dixonii Sandplain Duck Orchid [86882]	Endangered	Species or species habitat likely to occur within area
Pityrodia augustensis Mt Augustus Foxglove [4962]	Vulnerable	Species or species habitat likely to occur within area
Seringia exastia Fringed Fire-bush [88920]	Critically Endangered	Species or species habitat may occur within area
Sphenotoma drummondii Mountain Paper-heath [21160]	Endangered	Species or species habitat may occur within area
Synaphea sp. Fairbridge Farm (D. Papenfus 696) Selena's Synaphea [82881]	Critically Endangered	Species or species habitat may occur within area
Synaphea sp. Serpentine (G.R. Brand 103) [86879]	Critically Endangered	Species or species habitat may occur within area
Synaphea stenoloba Dwellingup Synaphea [66311]	Endangered	Species or species habitat may occur within area
Thelymitra stellata Star Sun-orchid [7060]	Endangered	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Wurmbea calcicola Naturaliste Nancy [64691]	Endangered	Species or species habitat known to occur within area
Reptiles		
Acanthophis hawkei Plains Death Adder [83821]	Vulnerable	Species or species habitat may occur within area
Aipysurus apraefrontalis Short-nosed Seasnake [1115]	Critically Endangered	Species or species habitat likely to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area
Ctenotus lancelini Lancelin Island Skink [1482]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Egernia stokesii badia Western Spiny-tailed Skink, Baudin Island Spiny-tailed Skink [64483]	Endangered	Species or species habitat likely to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Breeding known to occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Foraging, feeding or related behaviour known to occur within area
Liasis olivaceus barroni Olive Python (Pilbara subspecies) [66699]	Vulnerable	Species or species habitat likely to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area
Sharks		
Carcharias taurus (west coast population) Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat known to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Glyphis garricki Northern River Shark, New Guinea River Shark [82454]	Endangered	Breeding known to occur within area
Glyphis glyphis Speartooth Shark [82453]	Critically Endangered	Species or species habitat may occur within area
Pristis clavata Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Breeding known to occur within area
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat known to occur within area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding known to occur within area

Name	Status	Type of Presence
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna pacifica Wedge-tailed Shearwater [84292]		Breeding known to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat likely to occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Breeding known to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat known to occur within area
Hydroprogne caspia Caspian Tern [808]		Breeding known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Onychoprion anaethetus Bridled Tern [82845]		Breeding known to occur within area
Phaethon lepturus White-tailed Tropicbird [1014]		Foraging, feeding or related behaviour likely

Name	Threatened	Type of Presence
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	to occur within area Species or species habitat may occur within area
Sterna dougallii Roseate Tern [817]		Breeding known to occur within area
Sternula albifrons Little Tern [82849]		Breeding known to occur within area
Sula leucogaster Brown Booby [1022]		Breeding known to occur within area
Sula sula Red-footed Booby [1023]		Breeding known to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Anoxypristis cuspidata Narrow Sawfish, Knifetooth Sawfish [68448]		Species or species habitat likely to occur within area
Balaena glacialis australis Southern Right Whale [75529]	Endangered*	Breeding known to occur within area
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Name	Threatened	Type of Presence
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Dugong dugon Dugong [28]		Breeding known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Breeding known to occur within area
Isurus oxyrinchus Shortfin Mako, Mako Shark [79073]		Species or species habitat likely to occur within area
Isurus paucus Longfin Mako [82947]		Species or species habitat likely to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Foraging, feeding or related behaviour known to occur within area
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat known to occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat known to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Breeding known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area
Orcaella heinsohni Australian Snubfin Dolphin [81322]		Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Pristis clavata Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Breeding known to occur within area
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding known to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Breeding known to occur within area
Tursiops aduncus (Arafura/Timor Sea populations) Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900]		Species or species habitat known to occur within area
Migratory Terrestrial Species		
Cecropis daurica Red-rumped Swallow [80610]		Species or species habitat may occur within area
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat known to occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Acrocephalus orientalis Oriental Reed-Warbler [59570]		Species or species habitat may occur within area
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area

Name	Threatened	Type of Presence
Calidris subminuta Long-toed Stint [861]		Roosting known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Roosting known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Roosting known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Glareola maldivarum Oriental Pratincole [840]		Roosting known to occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		Roosting known to occur within area
Limnodromus semipalmatus Asian Dowitcher [843]		Roosting known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting known to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Phalaropus lobatus Red-necked Phalarope [838]		Species or species habitat known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Roosting known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area
Thalasseus bergii Crested Tern [83000]		Breeding known to occur within area
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area

Name	Threatened	Type of Presence within area
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Tringa totanus Common Redshank, Redshank [835]		Roosting known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Roosting known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [\[Resource Information \]](#)

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land - Defence - HMAS STIRLING-ROCKINGHAM ;HMAS STIRLING - GARDEN ISLAND Defence - LANCELIN TRAINING AREA Defence - YAMPI SOUND TRAINING AREA

Commonwealth Heritage Places [\[Resource Information \]](#)

Name	State	Status
Natural		
Lancelin Defence Training Area	WA	Listed place
Ningaloo Marine Area - Commonwealth Waters	WA	Listed place
Yampi Defence Area	WA	Listed place

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

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

Name	Threatened	Type of Presence
Birds		
Acrocephalus orientalis Oriental Reed-Warbler [59570]		Species or species habitat may occur within area
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Breeding known to occur

Name	Threatened	Type of Presence within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris subminuta Long-toed Stint [861]		Roosting known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Catharacta skua Great Skua [59472]		Species or species habitat may occur within area
Charadrius bicinctus Double-banded Plover [895]		Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Roosting known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Roosting known to occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat known to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat likely to occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Eudyptula minor Little Penguin [1085]		Breeding known to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Breeding known to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Glareola maldivarum Oriental Pratincole [840]		Roosting known to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Roosting known to occur within area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area
Hirundo daurica Red-rumped Swallow [59480]		Species or species habitat may occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat known to occur within area
Larus novaehollandiae Silver Gull [810]		Breeding known to occur within area
Larus pacificus Pacific Gull [811]		Breeding known to occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		Roosting known to occur within area
Limnodromus semipalmatus Asian Dowitcher [843]		Roosting known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area

Name	Threatened	Type of Presence
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting known to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Papasula abbotti Abbott's Booby [59297]	Endangered	Species or species habitat may occur within area
Pelagodroma marina White-faced Storm-Petrel [1016]		Breeding known to occur within area
Phaethon lepturus White-tailed Tropicbird [1014]		Foraging, feeding or related behaviour likely to occur within area
Phalaropus lobatus Red-necked Phalarope [838]		Species or species habitat known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Roosting known to occur within area
Phoebastria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area
Pterodroma macroptera Great-winged Petrel [1035]		Foraging, feeding or related behaviour known to occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Name	Threatened	Type of Presence
Puffinus assimilis Little Shearwater [59363]		Breeding known to occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Foraging, feeding or related behaviour likely to occur within area
Puffinus pacificus Wedge-tailed Shearwater [1027]		Breeding known to occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat known to occur within area
Sterna albifrons Little Tern [813]		Breeding known to occur within area
Sterna anaethetus Bridled Tern [814]		Breeding known to occur within area
Sterna bengalensis Lesser Crested Tern [815]		Breeding known to occur within area
Sterna bergii Crested Tern [816]		Breeding known to occur within area
Sterna caspia Caspian Tern [59467]		Breeding known to occur within area
Sterna dougallii Roseate Tern [817]		Breeding known to occur within area
Sterna fuscata Sooty Tern [794]		Breeding known to occur within area
Sterna nereis Fairy Tern [796]		Breeding known to occur within area
Stiltia isabella Australian Pratincole [818]		Roosting known to occur within area
Sula leucogaster Brown Booby [1022]		Breeding known to occur within area
Sula sula Red-footed Booby [1023]		Breeding known to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or

Name	Threatened	Type of Presence
Thinornis rubricollis Hooded Plover [59510]		related behaviour likely to occur within area Species or species habitat known to occur within area
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Tringa totanus Common Redshank, Redshank [835]		Roosting known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Roosting known to occur within area
Fish		
Acentronura australe Southern Pygmy Pipehorse [66185]		Species or species habitat may occur within area
Acentronura larsonae Helen's Pygmy Pipehorse [66186]		Species or species habitat may occur within area
Bhanotia fasciolata Corrugated Pipefish, Barbed Pipefish [66188]		Species or species habitat may occur within area
Bulbonaricus brauni Braun's Pughead Pipefish, Pug-headed Pipefish [66189]		Species or species habitat may occur within area
Campichthys galei Gale's Pipefish [66191]		Species or species habitat may occur within area
Campichthys tricarinatus Three-keel Pipefish [66192]		Species or species habitat may occur within area
Choeroichthys brachysoma Pacific Short-bodied Pipefish, Short-bodied Pipefish [66194]		Species or species habitat may occur within area
Choeroichthys latispinosus Muiron Island Pipefish [66196]		Species or species habitat may occur within area
Choeroichthys suillus Pig-snouted Pipefish [66198]		Species or species habitat may occur within area
Corythoichthys amplexus Fijian Banded Pipefish, Brown-banded Pipefish [66199]		Species or species habitat may occur within area
Corythoichthys flavofasciatus Reticulate Pipefish, Yellow-banded Pipefish, Network Pipefish [66200]		Species or species habitat may occur within area
Corythoichthys intestinalis Australian Messmate Pipefish, Banded Pipefish [66202]		Species or species habitat may occur within area
Corythoichthys schultzi Schultz's Pipefish [66205]		Species or species

Name	Threatened	Type of Presence
Cosmocampus banneri Roughridge Pipefish [66206]		habitat may occur within area Species or species habitat may occur within area
Doryrhamphus dactyliophorus Banded Pipefish, Ringed Pipefish [66210]		Species or species habitat may occur within area
Doryrhamphus excisus Bluestripe Pipefish, Indian Blue-stripe Pipefish, Pacific Blue-stripe Pipefish [66211]		Species or species habitat may occur within area
Doryrhamphus janssi Cleaner Pipefish, Janss' Pipefish [66212]		Species or species habitat may occur within area
Doryrhamphus multiannulatus Many-banded Pipefish [66717]		Species or species habitat may occur within area
Doryrhamphus negrosensis Flagtail Pipefish, Masthead Island Pipefish [66213]		Species or species habitat may occur within area
Festucalex scalaris Ladder Pipefish [66216]		Species or species habitat may occur within area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area
Halicampus brocki Brock's Pipefish [66219]		Species or species habitat may occur within area
Halicampus dunckeri Red-hair Pipefish, Duncker's Pipefish [66220]		Species or species habitat may occur within area
Halicampus grayi Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area
Halicampus nitidus Glittering Pipefish [66224]		Species or species habitat may occur within area
Halicampus spinirostris Spiny-snout Pipefish [66225]		Species or species habitat may occur within area
Haliichthys taeniophorus Ribbioned Pipehorse, Ribbioned Seadragon [66226]		Species or species habitat may occur within area
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area
Hippocampus angustus Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within

Name	Threatened	Type of Presence area
Hippocampus histrix Spiny Seahorse, Thorny Seahorse [66236]		Species or species habitat may occur within area
Hippocampus kuda Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area
Hippocampus planifrons Flat-face Seahorse [66238]		Species or species habitat may occur within area
Hippocampus spinosissimus Hedgehog Seahorse [66239]		Species or species habitat may occur within area
Hippocampus subelongatus West Australian Seahorse [66722]		Species or species habitat may occur within area
Hippocampus trimaculatus Three-spot Seahorse, Low-crowned Seahorse, Flat-faced Seahorse [66720]		Species or species habitat may occur within area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area
Lissocampus fatiloquus Prophet's Pipefish [66250]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Micrognathus micronotopterus Tidepool Pipefish [66255]		Species or species habitat may occur within area
Mitotichthys meraculus Western Crested Pipefish [66259]		Species or species habitat may occur within area
Nannocampus subosseus Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area
Phoxocampus belcheri Black Rock Pipefish [66719]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Solegnathus hardwickii Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area
Trachyrhamphus longirostris Straightstick Pipefish, Long-nosed Pipefish, Straight Stick Pipefish [66281]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Mammals		
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Dugong dugon Dugong [28]		Breeding known to occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Vulnerable	Species or species habitat known to occur within area
Reptiles		
Acalyptophis peronii Horned Seasnake [1114]		Species or species habitat may occur within area
Aipysurus apraefrontalis Short-nosed Seasnake [1115]	Critically Endangered	Species or species habitat likely to occur within area
Aipysurus duboisii Dubois' Seasnake [1116]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Aipysurus eydouxii Spine-tailed Seasnake [1117]		Species or species habitat may occur within area
Aipysurus laevis Olive Seasnake [1120]		Species or species habitat may occur within area
Aipysurus pooleorum Shark Bay Seasnake [66061]		Species or species habitat may occur within area
Aipysurus tenuis Brown-lined Seasnake [1121]		Species or species habitat may occur within area
Astrotia stokesii Stokes' Seasnake [1122]		Species or species habitat may occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area
Crocodylus johnstoni Freshwater Crocodile, Johnston's Crocodile, Johnston's River Crocodile [1773]		Species or species habitat may occur within area
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Disteira kingii Spectacled Seasnake [1123]		Species or species habitat may occur within area
Disteira major Olive-headed Seasnake [1124]		Species or species habitat may occur within area
Emydocephalus annulatus Turtle-headed Seasnake [1125]		Species or species habitat may occur within area
Enhydrina schistosa Beaked Seasnake [1126]		Species or species habitat may occur within area
Ephalophis greyi North-western Mangrove Seasnake [1127]		Species or species habitat may occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Breeding known to occur within area
Hydrelaps darwiniensis Black-ringed Seasnake [1100]		Species or species habitat may occur within area
Hydrophis atriceps Black-headed Seasnake [1101]		Species or species habitat may occur within area
Hydrophis coggeri Slender-necked Seasnake [25925]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Hydrophis czeblukovi Fine-spined Seasnake [59233]		Species or species habitat may occur within area
Hydrophis elegans Elegant Seasnake [1104]		Species or species habitat may occur within area
Hydrophis inornatus Plain Seasnake [1107]		Species or species habitat may occur within area
Hydrophis mcdowellii null [25926]		Species or species habitat may occur within area
Hydrophis ornatus Spotted Seasnake, Ornate Reef Seasnake [1111]		Species or species habitat may occur within area
Hydrophis pacificus Large-headed Seasnake, Pacific Seasnake [1112]		Species or species habitat may occur within area
Lapemis hardwickii Spine-bellied Seasnake [1113]		Species or species habitat may occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Foraging, feeding or related behaviour known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area
Pelamis platurus Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area

Whales and other Cetaceans

[Resource Information]

Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera bonaerensis Antarctic Minke Whale, Dark-shoulder Minke Whale [67812]		Species or species habitat likely to occur within area
Balaenoptera borealis Sei Whale [34]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat likely to occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Foraging, feeding or related behaviour known to occur within area
Balaenoptera physalus Fin Whale [37]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour likely to occur within area
Delphinus delphis Common Dolphin, Short-beaked Common		Species or species

Name	Status	Type of Presence
Dolphin [60]		habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Feresa attenuata Pygmy Killer Whale [61]		Species or species habitat may occur within area
Globicephala macrorhynchus Short-finned Pilot Whale [62]		Species or species habitat may occur within area
Globicephala melas Long-finned Pilot Whale [59282]		Species or species habitat may occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Hyperoodon planifrons Southern Bottlenose Whale [71]		Species or species habitat may occur within area
Indopacetus pacificus Longman's Beaked Whale [72]		Species or species habitat may occur within area
Kogia breviceps Pygmy Sperm Whale [57]		Species or species habitat may occur within area
Kogia simus Dwarf Sperm Whale [58]		Species or species habitat may occur within area
Lagenodelphis hosei Fraser's Dolphin, Sarawak Dolphin [41]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat likely to occur within area
Lissodelphis peronii Southern Right Whale Dolphin [44]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Breeding known to occur within area
Mesoplodon bowdoini Andrew's Beaked Whale [73]		Species or species habitat may occur within area
Mesoplodon densirostris Blainville's Beaked Whale, Dense-beaked Whale [74]		Species or species habitat may occur within area
Mesoplodon ginkgodens Ginkgo-toothed Beaked Whale, Ginkgo-toothed Whale, Ginkgo Beaked Whale [59564]		Species or species habitat may occur within area
Mesoplodon grayi Gray's Beaked Whale, Scamperdown Whale [75]		Species or species habitat may occur within area
Mesoplodon layardii Strap-toothed Beaked Whale, Strap-toothed Whale, Layard's Beaked Whale [25556]		Species or species habitat may occur within area

Name	Status	Type of Presence
Mesoplodon mirus True's Beaked Whale [54]		Species or species habitat may occur within area
Orcaella brevirostris Irrawaddy Dolphin [45]		Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Peponocephala electra Melon-headed Whale [47]		Species or species habitat may occur within area
Physeter macrocephalus Sperm Whale [59]		Species or species habitat may occur within area
Pseudorca crassidens False Killer Whale [48]		Species or species habitat likely to occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Breeding known to occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Stenella coeruleoalba Striped Dolphin, Euphrosyne Dolphin [52]		Species or species habitat may occur within area
Stenella longirostris Long-snouted Spinner Dolphin [29]		Species or species habitat may occur within area
Steno bredanensis Rough-toothed Dolphin [30]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops aduncus (Arafura/Timor Sea populations) Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900]		Species or species habitat known to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area
Ziphius cavirostris Cuvier's Beaked Whale, Goose-beaked Whale [56]		Species or species habitat may occur within area

Australian Marine Parks		[Resource Information]
Name	Label	
Abrolhos	Multiple Use Zone (IUCN VI)	
Argo-Rowley Terrace	Multiple Use Zone (IUCN VI)	
Argo-Rowley Terrace	National Park Zone (IUCN II)	
Dampier	Habitat Protection Zone (IUCN IV)	
Dampier	Multiple Use Zone (IUCN VI)	
Geographe	Multiple Use Zone (IUCN VI)	

Name	Label
Geographe	Special Purpose Zone (Mining)
Joseph Bonaparte Gulf	Multiple Use Zone (IUCN VI)
Joseph Bonaparte Gulf	Special Purpose Zone (IUCN VI)
Ningaloo	Recreational Use Zone (IUCN IV)
Oceanic Shoals	Special Purpose Zone (Trawl) (IUCN VI)
Roebuck	Multiple Use Zone (IUCN VI)
South-west Corner	Multiple Use Zone (IUCN VI)
South-west Corner	National Park Zone (IUCN II)
South-west Corner	Special Purpose Zone (Mining)

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Austin Bay	WA
Balanggarra	WA
Bardi Jawi	WA
Beekeepers	WA
Coulomb Point	WA
Dambimangari	WA
Dambimangari	WA
Dirk Hartog Island	WA
Drovers Cave	WA
Giralia	WA
Jarrkunpungu	WA
Jinmarnkur	WA
Jinmarnkur Kulja	WA
Karajarri	WA
Kooljerrenup	WA
Kujungurru Warrarn	WA
Lancelin And Edwards Islands	WA
Leeuwin-Naturaliste	WA
Len Howard	WA
Leschenault Peninsula	WA
Lesueur	WA
McLarty	WA
Mealup Point	WA
Mijing	WA
NTWA Bushland covenant (0070)	WA
Nambung	WA
Nilgen	WA
Nyangumarta Warrarn	WA
Ord River	WA
Southern Beekeepers	WA
Tamala Pastoral Lease (Part)	WA
Tent Island	WA
Unnamed WA34039	WA
Unnamed WA36913	WA
Unnamed WA36915	WA
Unnamed WA41160	WA
Unnamed WA43903	WA
Unnamed WA44977	WA
Unnamed WA46982	WA
Unnamed WA48205	WA
Unnamed WA48968	WA
Unnamed WA49994	WA
Unnamed WA51162	WA
Unnamed WA52366	WA
Unnamed WA53015	WA
Uunguu	WA
Wanagarren	WA

Name	State
Whitmore,Roberts,Doole Islands And Sandalwood Landing	WA
Yalgorup	WA
Yampi	WA

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

Note that all areas with completed RFAs have been included.

Name	State
South West WA RFA	Western Australia

Invasive Species [\[Resource Information \]](#)

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

Name	Status	Type of Presence
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Birds

Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area

Frogs

Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
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Mammals

Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Camelus dromedarius Dromedary, Camel [7]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Equus asinus Donkey, Ass [4]		Species or species habitat likely to occur within area
Equus caballus Horse [5]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Funambulus pennantii Northern Palm Squirrel, Five-striped Palm Squirrel [129]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Andropogon gayanus Gamba Grass [66895]		Species or species habitat likely to occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus declinatus Bridal Veil, Bridal Veil Creeper, Pale Berry Asparagus Fern, Asparagus Fern, South African Creeper [66908]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Brachiaria mutica Para Grass [5879]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Cylindropuntia spp. Prickly Pears [85131]		Species or species habitat likely to occur within area
Dolichandra unguis-cati Cat's Claw Vine, Yellow Trumpet Vine, Cat's Claw Creeper, Funnel Creeper [85119]		Species or species habitat likely to occur within area
Genista linifolia Flax-leaved Broom, Mediterranean Broom, Flax Broom [2800]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Hymenachne amplexicaulis Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		Species or species habitat likely to occur within area
Jatropha gossypifolia Cotton-leaved Physic-Nut, Bellyache Bush, Cotton-leaf Physic Nut, Cotton-leaf Jatropha, Black Physic Nut [7507]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Mimosa pigra Mimosa, Giant Mimosa, Giant Sensitive Plant, Thorny Sensitive Plant, Black Mimosa, Catclaw Mimosa, Bashful Plant [11223]		Species or species habitat likely to occur within area
Olea europaea Olive, Common Olive [9160]		Species or species habitat may occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Prosopis spp. Mesquite, Algaroba [68407]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Solanum elaeagnifolium Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle, Prairie-berry, Satansbos, Silver-leaf Bitter-apple, Silverleaf-nettle, Trompillo [12323]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area
Vachellia nilotica Prickly Acacia, Blackthorn, Prickly Mimosa, Black Piquant, Babul [84351]		Species or species habitat likely to occur within area

Reptiles

Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area
Ramphotyphlops braminus Flowerpot Blind Snake, Brahminy Blind Snake, Cacing Besi [1258]		Species or species habitat likely to occur within area

Nationally Important Wetlands

[Resource Information]

Name	State
De Grey River	WA
Eighty Mile Beach System	WA
Exmouth Gulf East	WA
Hutt Lagoon System	WA
Lake MacLeod	WA
Lake McLarty System	WA
Lake Thetis	WA
Leslie (Port Hedland) Saltfields System	WA
Ord Estuary System	WA
Peel-Harvey Estuary	WA
Shark Bay East	WA
Willie Creek Wetlands	WA
Yalgorup Lakes System	WA

Key Ecological Features (Marine)

[Resource Information]

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

Name	Region
Carbonate bank and terrace system of the Van Pinnacles of the Bonaparte Basin	North
Carbonate bank and terrace system of the Sahul	North-west
Commonwealth waters adjacent to Ningaloo Reef	North-west

Name	Region
Continental Slope Demersal Fish Communities	North-west
Ancient coastline at 90-120m depth	South-west
Cape Mentelle upwelling	South-west
Commonwealth marine environment within and	South-west
Commonwealth marine environment within and	South-west
Naturaliste Plateau	South-west
Western rock lobster	South-west

Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-31.685364 111.383806,-30.421416 110.383907,-28.709563 109.813289,-27.956348 109.779052,-27.031947 108.580754,-26.41568 107.473756,-25.63964 106.435232,-24.521229 105.853202,-23.733776 105.841789,-23.117509 106.127098,-22.569716 106.789015,-21.782264 107.382457,-20.024761 107.964487,-18.415619 108.877476,-16.441281 110.73769,-15.265809 111.399606,-14.432707 112.495192,-14.409882 113.145696,-14.033274 114.104334,-13.268647 114.697777,-13.668079 115.24557,-14.763665 115.485229,-15.436994 116.204208,-15.048974 116.512341,-14.261521 117.7677,-12.816086 118.223106,-12.116128 118.101374,-12.694354 120.049083,-13.942143 120.013023,-11.806775 122.895128,-11.355305 123.305408,-11.446603 124.005366,-11.111841 124.522726,-10.929243 125.374849,-10.533615 126.044374,-11.233573 126.592167,-11.20314 127.65732,-10.411883 128.144247,-10.077121 128.144247,-10.05473 128.903263,-15.066311 129.000573,-15.073541 128.086316,-14.70887 128.161695,-13.973081 127.444846,-13.746147 126.963691,-14.187104 126.642311,-14.589274 125.264576,-15.495683 124.45156,-16.421634 124.608948,-16.185996 123.568692,-17.183316 123.734194,-16.58754 122.967224,-17.359637 122.150112,-17.949292 122.203885,-19.206278 121.434701,-19.625031 120.97209,-20.076171 119.58726,-20.65478 117.409911,-20.301585 116.830031,-21.492458 115.462637,-21.848388 114.644029,-22.430209 114.376503,-22.628832 113.668027,-23.526107 113.755031,-24.089873 113.418707,-25.124337 113.593254,-25.91525 113.041098,-26.918878 113.774977,-28.09323 114.169623,-29.487715 114.996094,-30.578464 115.087467,-31.729596 115.71785,-33.275239 115.680823,-33.531575 115.003616,-33.430302 110.995361,-31.966038 111.508874,-31.685364 111.383806

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- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
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- [-Natural history museums of Australia](#)
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- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
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- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- [-Other groups and individuals](#)

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

Please feel free to provide feedback via the [Contact Us](#) page.