Australian Government

Department of Sustainability, Environment,
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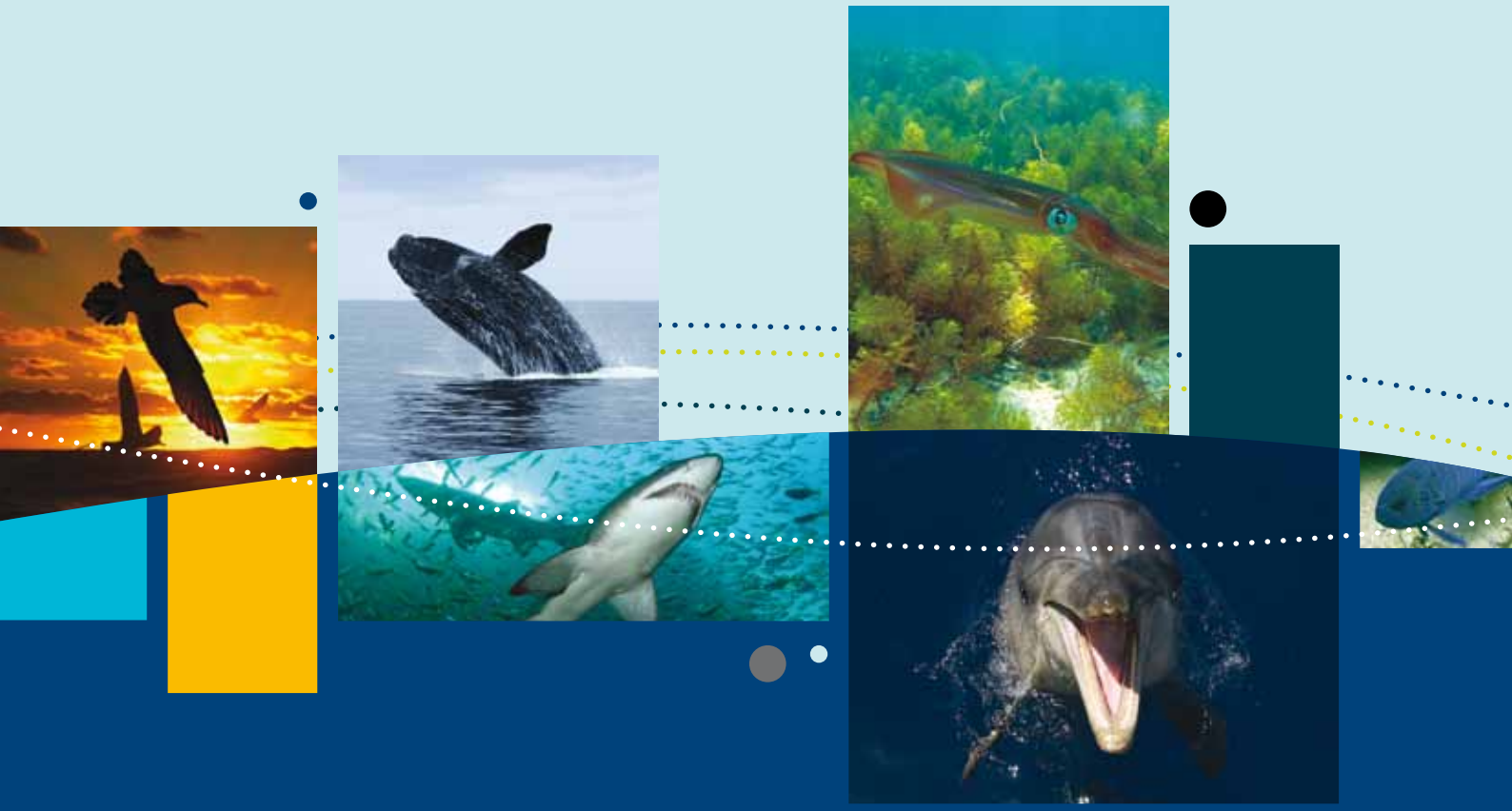

Marine bioregional plan for the South-west Marine Region

prepared under the *Environment Protection and Biodiversity Conservation Act 1999*

Draft for Consultation

THIS DRAFT PLAN DOES NOT INCLUDE THE PROPOSED COMMONWEALTH MARINE RESERVES FOR THE REGION. THESE ARE ADDRESSED IN A SEPARATE CONSULTATION DOCUMENT.

Images:
Flesh footed shearwater – Richard Freeman, Southern right whale – Dave Watts, Grey nurse shark – David Harasti, Southern calamari squid – Anthony King, Dolphin – Richard Freeman, Southern blue devil – MLSSA/Antony King, Marine life – CSIRO, Capes seagrass – Marine Futures WA, Blue whale – DSEWPAC, Australian Sea Lion – Glen Cowan, Tern common – Richard Freeman

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MINISTERIAL FOREWORD

Draft South-west Marine Bioregional Plan

For generations Australians have understood the need to preserve precious areas on land as national parks. Our oceans contain many iconic, precious and fragile sites which deserve protection too.

Australia has the third largest marine area of any nation in the world. Our marine region runs from the coral-rich tropical seas of the north to the sub-Antartic waters of the Southern Ocean.

Our oceans are twice the size of our continental land mass. They cover almost 16 million square kilometres, and in the unique area off the coast of south-west Western Australia, reach depths of almost six kilometres.

In parts of the south-west, almost 90 per cent of the marine species are not found anywhere else in the world. A third of the world's whale and dolphin species are found in the region.

The fact is our marine environment is under long-term pressure from climate change, marine industries and pollution.

We know that Australia's oceans are a direct link for trade with the world. Our commercial and recreational fishing and energy sectors help to drive economic and social prosperity in communities throughout the nation.

But we also know that Australians need their oceans to be healthy if they are going to provide us with fish to eat, a place to fish, sustainable tourism opportunities and a place for families enjoy for generations to come.

That's why the Gillard Government has committed to developing plans to manage our oceans better and is creating a national network of Commonwealth marine reserves.

These plans are being developed under the *Environmental Protection and Biodiversity Conservation Act 1999* and backed by the best available science.

In this draft plan for the South-west marine region, you will find information about the extraordinary array of marine life and ecosystems in this part of Australia.

This draft plan will be open for input from the community for the next three months and I encourage you to have your say. The feedback the Government receives during this time will help in finalising this plan and inform a decision on a final proposed network of marine reserves in the region.

We have a once in a generation opportunity to put in place the measures needed to protect our precious marine environment for future generations.

Tony Burke
Minister for the Environment

HAVE YOUR SAY

The release of the draft South-west Marine Bioregional Plan marks the start of the formal public consultation period on both the draft plan and the draft South-west Commonwealth Marine Reserve Network. Stakeholders will have 90 days in which to submit comments on both the draft plan and the proposed network.

The department invites public feedback on the draft South-west Marine Bioregional Plan and the proposed marine reserve network.

There are three ways to submit feedback:

- on the web—complete a submission form available on the Department of Sustainability, Environment, Water, Population and Communities website, **http://www.environment.gov.au/coasts/mbp/south-west/index.html**
- by email—save the submission form from the department's website to your computer, and email the completed form along with any additional information to **Submission.Southwest@environment.gov.au**
- by post—print the submission form from the department's website and post the completed form free of charge to:

  MBP Submissions – South-west
  Reply Paid 787
  Canberra, ACT 2601

Further details about the stakeholder consultation process and opportunities to be involved are available at **http://www.environment.gov.au/coasts/mbp/south-west/index.html**. The website also contains fact sheets on specific items of interest and answers to a number of frequently asked questions. If you have any questions about how to make a submission or on any other aspects of the marine bioregional planning process please email **Southwest.MarinePlan@environment.gov.au** or phone 1800 069 352.

CONTENTS

1 THE SOUTH-WEST MARINE BIOREGIONAL PLAN

1.1 Goal of the plan

The South-west Marine Bioregional Plan has been prepared under section 176 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The plan aims to strengthen the operation of the EPBC Act in the Commonwealth marine area of the South-west Marine Region to help ensure that the marine environment of the region remains healthy and resilient.

The bioregional plan describes the marine environment and conservation values (protected species, protected places and key ecological features) of the South-west Marine Region, sets out broad objectives for its biodiversity,[1] identifies regional priorities and outlines strategies and actions to achieve these.

1.2 Scope of the plan

This plan is for the South-west Marine Region, which covers the Commonwealth marine area extending from the eastern end of Kangaroo Island in South Australia to the waters off Shark Bay in Western Australia. The Commonwealth marine area starts at the outer edge of state waters, 3 nautical miles (5.5 kilometres) from the shore (territorial sea baseline), and extends to the outer boundary of Australia's exclusive economic zone, 200 nautical miles from the territorial sea baseline. Section 24 of the EPBC Act defines the Commonwealth marine area.

The plan does not cover state waters but, where relevant, does include information about inshore environments and the way they interact with species and habitats of the Commonwealth marine area.

Under section 176 of the EPBC Act, once a bioregional plan has been made, the minister responsible for the environment must have regard to it when making any decision under the Act to which this plan is relevant. However, the plan does not otherwise alter the scope of the minister's statutory responsibilities, nor does it narrow the matters the minister is required to take into account or may wish to take into account in making decisions. The EPBC Act provides that this plan is not a legislative instrument.

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1 Biodiversity is defined under the EPBC Act as the variability among living organisms from all sources *(including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part)* and includes:
(a) diversity within species and between species; and
(b) diversity of ecosystems.

1.3 Objectives of the plan

Consistent with the objectives of the EPBC Act, and in the context of the principles for ecologically sustainable development as defined in the Act, the South-west Marine Bioregional Plan sets the following objectives for the South-west Marine Region:

1. conserving biodiversity and maintaining ecosystem health
2. ensuring the recovery and protection of threatened species
3. improving understanding of the region's biodiversity and ecosystems and the pressures they face.

1.4 Contents of the plan and supporting information resources

Part 2 of the plan describes the conservation values of the region (see Section 1.5 for the definition). Part 3 introduces the regional conservation priorities (see Section 1.5) and outlines strategies and actions to address them.

Schedule 1 presents a full description of the pressures on the conservation values of the South-west Marine Region that are assessed as being *of concern* or *of potential concern* (see Section 2.2 of the *Overview*). Schedule 2 provides specific advice on matters of national environmental significance in the region.

A series of information resources has been produced to support implementation of this plan. Conservation value report cards summarise the most up-to-date scientific information on the distribution, conservation status, vulnerabilities, pressures and management of the Commonwealth marine environment, cetaceans, pinnipeds, seabirds, reptiles, sharks, bony fish and protected places.

A conservation values atlas presents a series of maps detailing the location and spatial extent of conservation values (where sufficient information exists to do so). The atlas is available at **http://www.environment.gov.au/coasts/mbp/south-west/index.html**.

These resources will be updated as significant new information becomes available.

Additionally, the bioregional profile **http://www.environment.gov.au/coasts/mbp/south-west/index.html** for the South-west Marine Region is an important reference document. It provides a full description of the region with comprehensive scientific reference lists.

1.5 Definitions

Biologically important areas: These are areas where aggregations of individuals of a protected species display biologically important behaviour, such as breeding, foraging, resting or migration. Biologically important areas are those parts of a region that are particularly important for the protection and conservation of protected species. Regional advice (Schedule 2 of the plan) often relates to these areas because of their known relevance to a protected species. Regional advice focused on these areas should not be construed to mean that legislative obligations do not apply outside these areas. Biologically important areas should not be confused with 'critical habitat' as defined in the EPBC Act (see below).

Commonwealth marine environment: Section 24 of the EPBC Act defines a Commonwealth marine area. Under the EPBC Act, the environment in a Commonwealth marine area is a matter of national environmental significance (see below, and sections 23 and 24A of the EPBC Act). In this plan, the 'Commonwealth marine environment' refers to the environment in a Commonwealth marine area.

Conservation values: For the purpose of marine bioregional planning, conservation values are defined as those elements of the region that are either specifically protected under the EPBC Act, have heritage values for the purposes of the EPBC Act, or have been identified through the planning process as key ecological features in the Commonwealth marine environment. Although key ecological features are not specifically protected under the EPBC Act, the marine environment as a whole is a matter of national environmental significance under the Act. Key ecological features are identified as conservation values within the Commonwealth marine environment to help inform decisions about the marine environment.

Critical habitat: A register of critical habitat is maintained under the EPBC Act. The register lists habitats considered critical to the survival of a listed threatened species or listed threatened ecological community. Once a habitat is listed in the register, the habitat is protected when it is in or on a Commonwealth area, and the EPBC Act makes it an offence for a person to take an action that the person knows significantly damages or will significantly damage critical habitat.

Ecologically significant population: This definition applies to species listed as migratory. In accordance with the EPBC Act Policy Statement 1.1: Significant impact guidelines—matters of national environmental significance, for listed migratory species, consideration should be given to whether an ecologically significant proportion of a population is found in the area. Whether the species in the area represents an ecologically significant proportion of a population needs to be determined on a case-by-case basis, as different species have different life histories and populations. Some key factors that should be considered include the species' population status, genetic distinctiveness and species-specific behavioural patterns.

Environment minister/environment department: The minister and department administering the *Environment Protection and Biodiversity Conservation Act 1999*.

Important population: This definition relates to populations of species listed as vulnerable. An important population is a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or populations that are:

- key source populations either for breeding or dispersal
- necessary for maintaining genetic diversity
- near the limit of the species range.

This definition is consistent with that provided in the EPBC Act Policy Statement 1.1: Significant impact guidelines—matters of national environmental significance (2009). In accordance with these guidelines, in determining the significance of an impact on a vulnerable listed species, consideration should be given to whether an important population is found in the area.

Key ecological features: Key ecological features are elements of the Commonwealth marine environment that, based on current scientific understanding, are considered to be of regional importance for either the region's biodiversity or ecosystem function and integrity.

For the purpose of marine bioregional planning, key ecological features of the marine environment meet one or more of the following criteria:

- a species, group of species or community with a regionally important ecological role, where there is specific knowledge about why the species or species group is important to the ecology of the region, and the spatial and temporal occurrence of the species or species group is known
- a species, group of species or community that is nationally or regionally important for biodiversity, where there is specific knowledge about why the species or species group is regionally or nationally important for biodiversity, and the spatial and temporal occurrence of the species or species group is known
- an area or habitat that is nationally or regionally important for:
  - enhanced or high biological productivity[2]
  - aggregations of marine life
  - biodiversity and endemism
- a unique seafloor feature with ecological properties of regional significance.

2 productivity (or biological productivity) – the process through which algae and seagrasses transform inorganic nutrients into organic matter through photosynthesis. The process is at the basis of the ocean's food web, as phytoplankton and algae are consumed respectively by zooplankton and grazing organisms and these are in turn consumed by larger and larger predators. Nutrients rich waters promote and support productivity.

Matters of national environmental significance: The matters of national environmental significance protected under the EPBC Act are:

- world heritage properties
- national heritage places
- wetlands of international importance (listed under the Ramsar Convention[3])
- listed threatened species (except those listed as extinct or conservation dependent) and ecological communities (except those listed as vulnerable)
- migratory species protected under international agreements
- the Commonwealth marine environment
- the Great Barrier Reef Marine Park.

Additionally, nuclear actions, including uranium mines, are a matter of national environmental significance.

Population: A population of a species is defined under the EPBC Act as an occurrence of the species in a particular area. In relation to critically endangered, endangered or vulnerable threatened species, occurrences include but are not limited to:

- a geographically distinct regional population or collection of local populations
- a population or collection of local populations that occur within a particular bioregion.

Protected places: Protected places are those protected under the EPBC Act as matters of national environmental significance (places listed as world heritage properties, national heritage places or wetlands of international importance), Commonwealth marine reserves and places deemed to have heritage value in the Commonwealth marine environment (such as places on the Commonwealth Heritage List or shipwrecks under the *Historic Shipwrecks Act 1976*).

3 **www.environment.gov.au/water/topics/wetlands/ramsar-convention/index.html**

Protected species: Species protected under the EPBC Act are commonly referred to as protected species. Under the EPBC Act, protected species can be listed as threatened, migratory or marine species. All cetaceans (whales, dolphins and porpoises) are protected under the EPBC Act in the Australian Whale Sanctuary[4] (and, to some extent, beyond its outer limits). It is an offence to kill, injure, take, trade, keep or move a listed species without authorisation.

Those protected species that are threatened species listed as critically endangered, endangered, vulnerable or migratory are matters of national environmental significance.

Those species that do not fall in one of the two categories above and that are:

- listed as marine (s. 248 of the EPBC Act)
- cetaceans (whales, dolphins and porpoises)
- threatened species listed as extinct or conservation dependent

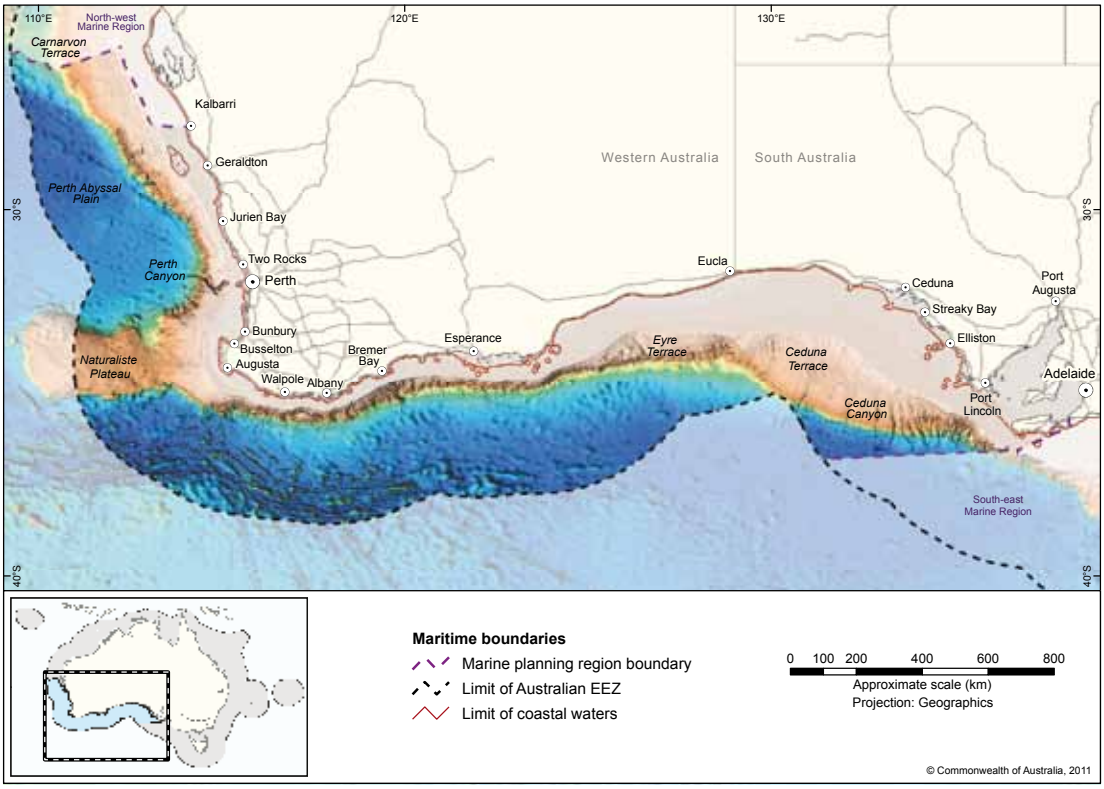
are protected under the EPBC Act but are not matters of national environmental significance.

4 The Australian Whale Sanctuary includes all Commonwealth waters from the 3-nautical-mile state waters limit out to the boundary of the exclusive economic zone (i.e. out to 200 nautical miles, and further in some places).

2 THE SOUTH-WEST MARINE REGION AND ITS CONSERVATION VALUES

The South-west Marine Region comprises Commonwealth waters from the eastern end of Kangaroo Island in South Australia to Shark Bay in Western Australia (Figure 2.1). The region spans approximately 1.3 million square km of temperate and subtropical waters and abuts the coastal waters of South Australia and Western Australia. It extends from shallow waters on the continental shelf, 3 nautical miles (5.5 km) from shore, to the deep ocean environments at the edge of Australia's exclusive economic zone, 200 nautical miles from shore.

Figure 2.1: The South-west Marine Region



The main physical features of the region are:

- a narrow continental shelf on the west coast from the subtropics to temperate waters off south-west Western Australia
- a wide continental shelf dominated by sandy carbonate sediments of marine origin (i.e. crushed shells from snails and other small animals and calcareous algae) in the Great Australian Bight
- high wave energy on the continental shelf around the whole region
- a steep, muddy continental slope which include many canyons, the most significant being the Perth Canyon, the Albany canyon group and the canyons in the vicinity of Kangaroo Island
- large tracts of poorly understood abyssal plains at depths greater than 4000 m
- the Diamantina Fracture Zone, a rugged area of steep mountains and troughs off south-west Australia at depths greater than 4000 m
- the Naturaliste Plateau, an extension of Australia's continental mass that provides deep-water habitat at depths of 2000–5000 m
- islands and reefs in both subtropical (Houtman Abrolhos Islands) and temperate waters (e.g. Recherche Archipelago)
- complex and unusual oceanographic patterns, driven largely by the Leeuwin Current and its associated currents, that have a significant influence on biodiversity distribution and abundance.

The remainder of this chapter describes the conservation values of the South-west Marine Region, including the Commonwealth marine environment, protected species and protected places.

2.1 Conservation values—the Commonwealth marine environment

Biodiversity

By global standards, the marine environment of the South-west Marine Region has high biodiversity and large numbers of species native to the region (known as endemism). Particular hotspots for biodiversity are the Houtman Abrolhos Islands, the overlap between tropical and temperate fauna along the west coast, the Recherche Archipelago and the soft sediment ecosystems in the Great Australian Bight.

Several factors combine to contribute to the high level of biodiversity and endemism in the region. These include a long and stable period of geological isolation, a persistent high-energy environment, warm-water intrusion via the Leeuwin Current and areas where cold, nutrient-rich, deep ocean waters rise to the surface in the east of the region. The low-nutrient environment of

the South-west Marine Region results in clear waters and high levels of light penetration, giving rise to a continental shelf characterised by high diversity of seagrass and algal species and benthic communities. These, in turn, provide habitats for a large variety of species and function as nurseries for a range of fish and invertebrates, which move further offshore in their adult stages.

The region is increasingly recognised as an area of global conservation significance for species of rare and endangered marine mammals and seabirds. It provides important calving regions for the endangered southern right whale and colonies (including pupping areas) of Australia's only endemic pinniped: Australian sea lion. The south-west corner of the region is an important area for beaked whales. Other protected species known to occur in the region include white shark, humpback whale and several species of albatross.

Despite its high biodiversity, the biological productivity of the South-west Marine Region is low compared with other Australian marine regions because of the effect of the Leeuwin Current in suppressing upwelling of nutrients from deeper cold waters and the absence of significant rivers contributing nutrients into the marine environment through run-off. Small seasonal upwellings occur regularly at known locations and, because of the overall nutrient-poor nature of the region's waters, these small hotspots of productivity have a disproportionate influence on the region's biodiversity. The main areas of higher seasonal productivity in the region are the Perth Canyon, Albany canyon group, Kangaroo Island canyons and pool, Cape Mentelle and eddy fields that spin off the Leeuwin Current along the west and south coasts of Western Australia.

The most significant known influence on ecosystem structure and function in the South-west Marine Region is the Leeuwin Current. The current originates in the warm, low-saline waters of the Indonesian archipelago, and brings warm waters south along the west coast of Australia before rounding capes Leeuwin and Mentelle and flowing east across the south coast. The current is stronger in winter than in summer and has three main influences on the south-west region:

- suppressing upwelling and therefore contributing to the low productivity of the region, and consequently the relatively small fisheries on the west coast
- maintaining warm-water communities much further south than they would normally occur—for example, corals and coral reef fish as far south as Rottnest Island
- driving inter-annual variability in settlement of western rock lobster, which is a significant component of benthic communities on the west coast and a valuable fishery species.

Associated with the Leeuwin Current are fields of eddies that form at predictable locations in the region. These eddies can be either upwelling or downwelling; upwelling eddies enhance local biological productivity where they form, and downwelling eddies concentrate and transport communities away from the coast.

Key ecological features

Key ecological features are elements of the Commonwealth marine environment in the South-west Marine Region that, based on current scientific understanding, are considered to be of regional importance for either the region's biodiversity or ecosystem function and integrity. They may be physical features or species (see Table 2.1 and Figure 2.2).

Table 2.1: Key ecological features of the South-west Marine Region

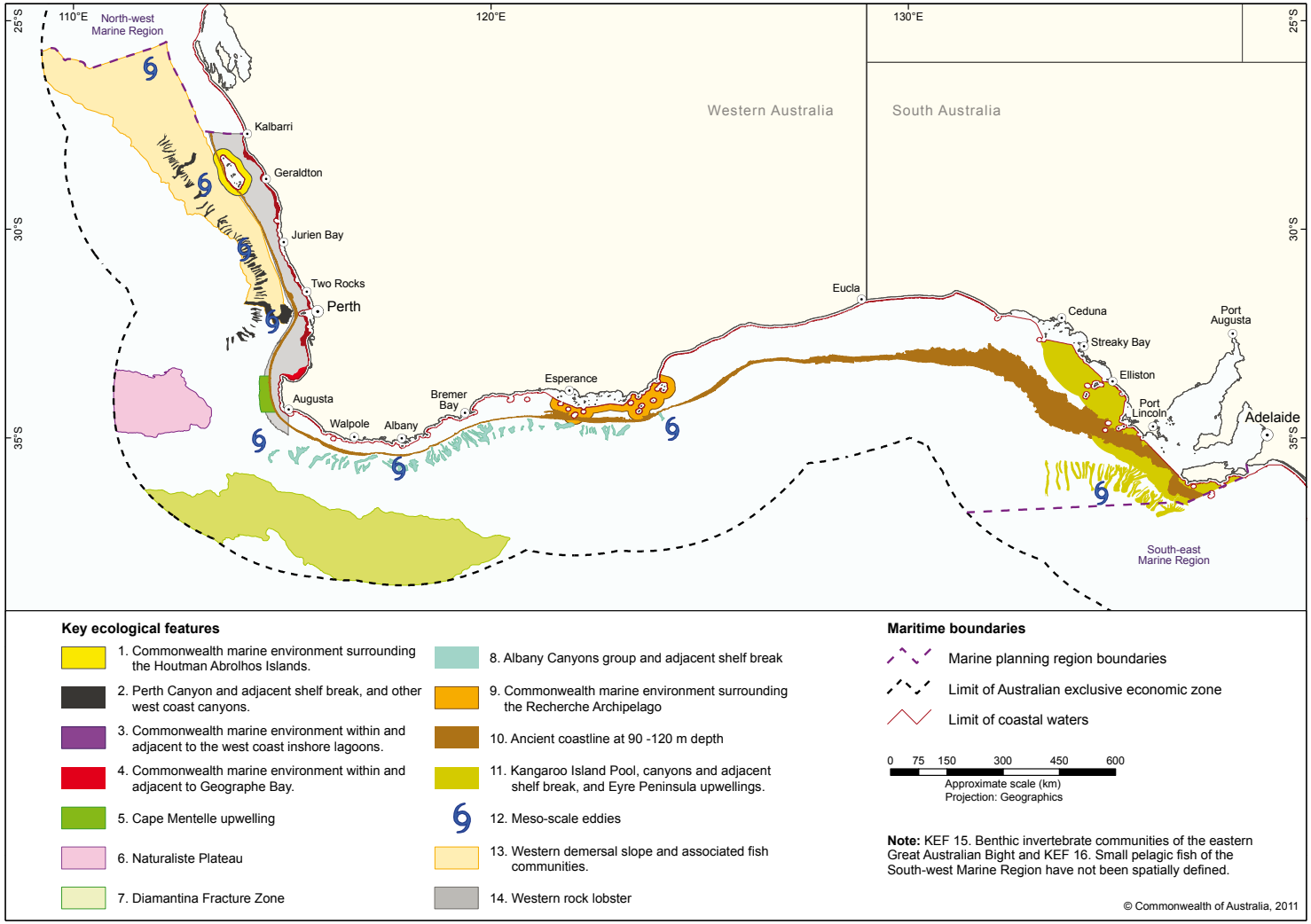
Feature	Description
Commonwealth marine environment surrounding the Houtman Abrolhos Islands (and adjacent shelf break)	Values: High levels of biodiversity and endemism The Houtman Abrolhos Islands and surrounding reefs support a unique mix of temperate and tropical species, resulting from the southward 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.
Perth Canyon and adjacent shelf break, and other west-coast canyons	Values: High biological productivity and aggregations of marine life, and unique seafloor 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.
Commonwealth marine environment within and adjacent to the west-coast inshore lagoons	Values: 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.
Commonwealth marine environment within and adjacent to Geographe Bay	Values: 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 also an important resting area for migrating humpback whales.

Feature	Description
Cape Mentelle upwelling	Values: 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. 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
Naturaliste Plateau	Values: Unique seafloor 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.
Diamantina Fracture Zone	Values: Unique seafloor feature with ecological properties of regional significance The Diamantina Fracture Zone is a rugged, deep-water environment of seamounts and numerous closely spaced troughs and ridges. Very little is known about the ecology of this remote, deep-water feature, but marine experts suggest that its size and physical complexity mean that it is likely to support deep-water communities characterised by high species diversity, with many species found nowhere else.
Albany canyon group and adjacent shelf break	Values: High productivity and aggregations of marine life, and unique seafloor feature with ecological properties of regional significance The Albany canyon group is thought to be associated with small, periodic subsurface upwelling events, which may drive localised regions of high productivity. The canyons are known to be a feeding area for sperm whale and sites of orange roughy aggregations. Anecdotal evidence also indicates that this area supports fish aggregations that attract large predatory fish and sharks.

Feature	Description
The Commonwealth marine environment surrounding the Recherche Archipelago	Values: Aggregations of marine life and high levels of biodiversity and endemism The Recherche Archipelago is the most extensive area of reef in the South-west Marine Region. Its reef and seagrass habitat supports a high species diversity of warm temperate species, including 263 known species of fish, 347 known species of molluscs, 300 known species of sponges, and 242 known species of macroalgae. The islands also provide haul-out (resting areas) and breeding sites for Australian sea lions and New Zealand fur seals.
Ancient coastline between 90 and 120 m depth	Values: 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.
Kangaroo Island Pool, canyons and adjacent shelf break, and Eyre Peninsula upwellings	Values: High productivity and aggregations of marine life, and the canyons and adjacent shelf break are unique seafloor features with ecological properties of regional significance The Kangaroo Island canyons are known for their seasonal upwellings of deep ocean waters that support aggregations of krill, small pelagic fish and squid, which, in turn, attract marine mammals (e.g. pygmy blue whales, fin whales, sperm whales, dolphins and New Zealand fur seals), sharks, large predatory fish and seabirds.
Meso-scale eddies (several locations)	Values: High productivity and aggregations of marine life Driven by interactions between currents and bathymetry, persistent meso-scale eddies form in predictable locations within the meanders of the Leeuwin Current. They are important transporters of nutrients and plankton communities and are likely to attract a range of organisms from the higher trophic levels, such as marine mammals, seabirds, tuna and billfish. The eddies play a critical role in determining species distribution, as they influence the southerly range boundaries of tropical and subtropical species, the transport of coastal phytoplankton communities offshore and recruitment to fisheries.

Feature	Description
Demersal slope and associated fish communities of the Central Western Province	Values: 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	Values: 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.
Benthic invertebrate communities of the eastern Great Australian Bight	Values: A species group or community that is nationally or regionally important to biodiversity The benthic invertebrate communities found on the shelf of the Great Australian Bight, particularly sponges, ascidians and bryozoans, have been described as among the world's most diverse soft-sediment ecosystems.
Small pelagic fish	Values: A species group that has a regionally important ecological role This species group is considered important for ecological functioning and integrity, providing critical links between primary production and higher predators. Collectively, they are an important prey item for a diverse range of species, including tuna, whales, dolphins, seals, sea lions and numerous seabirds.

Figure 2.2: Key ecological features in the South-west Marine Region



Further information on the South-west Marine Region's key ecological features is available in the Commonwealth marine environment report card **http://www.environment.gov.au/coasts/mbp/south-west/index.html**.

2.2 Conservation values—protected species

The South-west Marine Region is an important area for protected species (see Section 1.5). Under the EPBC Act, species can be listed as threatened, migratory, cetaceans or marine.

Threatened species are, in broad terms, those species that have been identified as being in danger of becoming extinct. Species may be listed in the following categories:

a) conservation dependent

b) vulnerable

c) endangered

d) critically endangered

e) extinct

f) extinct in the wild

Migratory species are those species that are listed under:

- the Convention on the Conservation of Migratory Species of Wild Animals (CMS or Bonn Convention)
- the Agreement between the Government of Australia and the Government of Japan for the Protection of Migratory Birds in Danger of Extinction and their Environment 1974 (JAMBA)
- the Agreement between the Government of Australia and the Government of the People's Republic of China for the Protection of Migratory Birds and their Environment 1986 (CAMBA)
- the Agreement between the Government of Australia and the Government of the Republic Of Korea on the Protection of Migratory Birds 2007 (ROKAMBA)
- any other international agreement, or instrument made under other international agreements approved by the Environment Minister.

Further information on the CMS, JAMBA, CAMBA and ROKAMBA is provided at **www.environment.gov.au/biodiversity/migratory/index.html**

Cetaceans—all cetaceans (whales, dolphins and porpoises) are protected under the EPBC Act in the Australian Whale Sanctuary (and, to some extent, beyond its outer limits).

Marine species belong to taxa that the Australian Government has recognised as requiring protection to ensure their long-term conservation (in accordance with ss. 248–250 of the EPBC Act). Listed marine species occurring in the South-west Marine Region include species of:

- sea snakes (families Hydrophiidae and Laticaudidae)
- seals, both eared and true seals (families Otariidae and Phocidae)
- marine turtles (families Cheloniidae and Dermochelyidae)
- seahorses, sea dragons, pipefish and ghost pipefish (families Syngnathidae and Solenostomidae)
- seabirds (i.e. bird species that occur naturally in Commonwealth marine areas).

Protected species can be listed under more than one category.

Under the EPBC Act, species listed as threatened or migratory are matters of national environmental significance (although species listed as extinct or conservation dependent are not matters of national environmental significance—see Section 1.5). Information specific to species that occur in the region and are matters of national environmental significance is provided in Schedule 2.

Many of the species listed under the EPBC Act are also protected under state legislation. For example, white shark is protected under the EPBC Act and under South Australian and Western Australian legislation.

Species listed under the EPBC Act are also protected from adverse interactions with commercial fishing operations. All fisheries managed under Commonwealth legislation, and state-managed fisheries that have an export component, are assessed under the EPBC Act. These fishery assessments are conducted using the *Guidelines for the Ecologically Sustainable Management of Fisheries*. These guidelines specify that fisheries must be conducted in a manner that does not threaten bycatch species and that 'avoids mortality of, or injuries to, endangered, threatened or protected species'. Further information about fisheries assessments carried out under the EPBC Act is available at **www.environment.gov.au/coasts/fisheries/publications/guidelines.html**

The lists of protected species established under the EPBC Act are updated periodically. This plan refers to the current lists of protected species in the region included in the conservation values report cards **http://www.environment.gov.au/coasts/mbp/south-west/index.html**. The report cards include detailed information about species groups and species distribution and ecology in the South-west Marine Region.

Based on current data and expert advice, biologically important areas (see Section 1.5) are defined for some protected species. Biologically important areas and the data underpinning them are available in the South-west conservation values atlas **http://www.environment.gov.au/coasts/mbp/south-west/index.html**.

2.3 Conservation values—protected places

Protected places are those areas protected under the EPBC Act as matters of national environmental significance (places listed as world heritage properties, national heritage places or wetlands of international importance), Commonwealth marine reserves or places deemed to have heritage value in the Commonwealth marine environment (such as places on the Commonwealth Heritage List or shipwrecks under the *Historic Shipwrecks Act 1976*).

There are five historic shipwrecks in the region (Figure 2.3):

- *HMAS Sydney II* and *HSK Kormoran*: sunk in 1941 following a battle engagement approximately 250 km off the central coast of Western Australia
- *SS Cambewarra*: a steam-powered transport vessel that was wrecked in 1914 near Fisherman's Island, 80 km south of Dongara, Western Australia
- *Lord Roberts*: a cutter wrecked in 1902 in the Gulf St Vincent, South Australia
- *Red Rover*: a fishing boat wrecked near Coffin Bay, South Australia, in 1887.

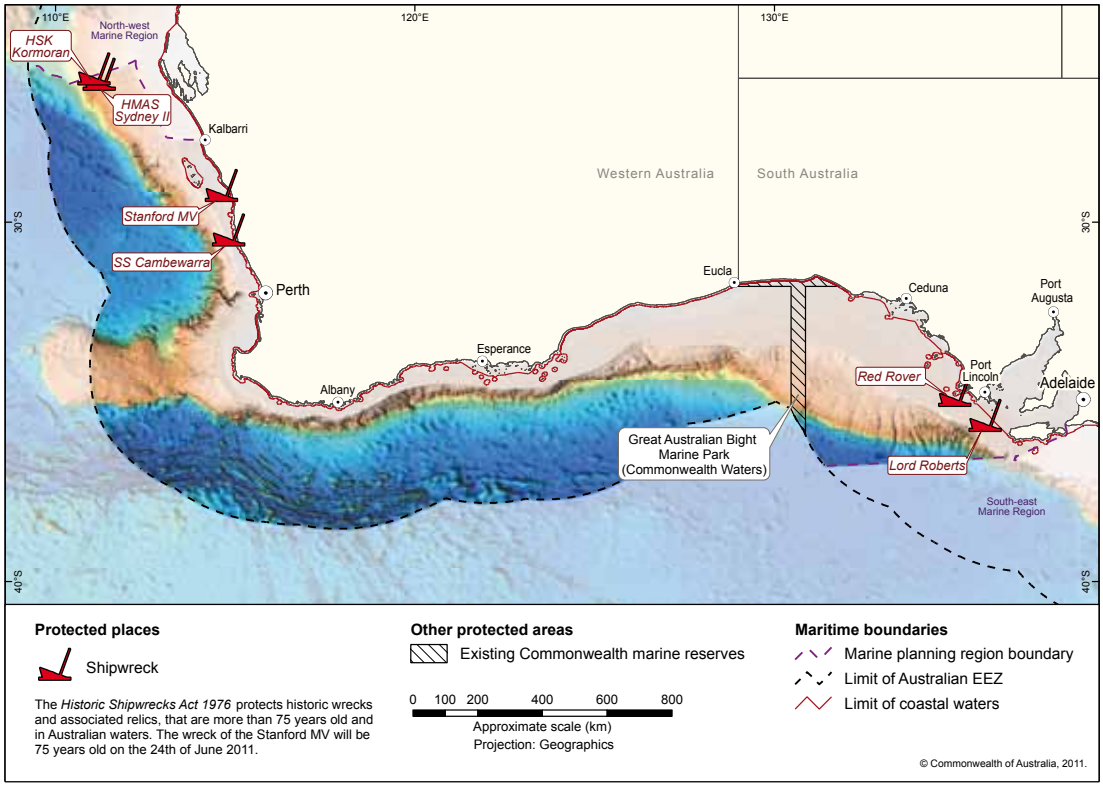
The *HMAS Sydney II* and *HSK Kormoran* wrecks are also listed on the National Heritage List and Commonwealth Heritage List for their historic heritage values. By virtue of their listing on the National Heritage List, these two shipwrecks are also matters of national environmental significance.

There is one Commonwealth marine reserve in the South-west Marine Region: the Great Australian Bight Marine Park, which stretches from 200 km west of Ceduna in South Australia and follows the coast to the Western Australian border (Figure 2.3). The park includes a strip 20 nautical miles wide extending 200 nautical miles offshore.

The park comprises adjoining South Australian and Commonwealth protected areas. The Great Australian Bight Marine Park (Commonwealth Waters) is a Commonwealth reserve under the EPBC Act.

The Australian and South Australian governments manage the park cooperatively to protect conservation values (specifically, southern right whale, Australian sea lion, other species of conservation significance, and a transect representative of the seabed on the continental shelf and slope of the Great Australian Bight). Management of the park allows ecologically sustainable uses that are consistent with protecting these values and that contribute to regional and national development. Management plans regulate recreational, scientific and commercial uses of the park within four distinct management areas or zones: a sanctuary zone and a conservation zone (state waters); and a marine mammal protection zone and benthic protection zone (Commonwealth waters).

Figure 2.3: Protected places in the South-west Marine Region



3 REGIONAL PRIORITIES, STRATEGIES AND ACTIONS

Section 176 of the EPBC Act provides for a bioregional plan to identify objectives for the biodiversity and other values of a region and to include priorities to achieve these objectives. The objectives for this plan are set out in Section 1.3. They are:

1. conserving biodiversity and maintaining ecosystem health
2. ensuring the recovery and protection of threatened species
3. improving understanding of the region's biodiversity and ecosystems and the pressures they face.

In the context of these objectives, Part 3:

- details the regional priorities and the rationale underpinning the determination of each priority (Section 3.1)
- outlines the strategies and actions developed to address the regional priorities (Section 3.2).

3.1 Regional priorities

Regional priorities are key areas of focus that have been identified to inform decision-making about marine conservation and planning, as well as industry development and other human activities. The regional priorities provide context for implementing the government's statutory responsibilities, such as recovery planning for threatened species and the development and implementation of threat abatement measures. They also point to where future government initiatives and future investments in marine conservation, including in research and monitoring, would be best directed.

The outcomes of the pressure analyses have guided the identification of the regional priorities. These analyses reflect aspects such as the conservation status of conservation values, the location and extent of pressures and the expected impacts arising from conservation value/pressure interactions. To further aid the identification of the regional priorities for the region, consideration has been given to the following criteria:

- a conservation value that is subject to
  - a pressure considered *of concern* for the conservation value, and
  - pressures that together are likely to result in cumulative impacts on the value, and/or
  - pressure(s) that are likely to increase substantially in intensity and extent over the next 5–10 years
- a pressure that is considered *of concern* for multiple conservation values
- an area where better knowledge would improve the Government's capacity to meet conservation and ecologically sustainable use objectives
- an Australian Government policy priority for the marine region.

Pressures

For the purpose of this plan, pressures are defined broadly as human-driven processes and events that do or can detrimentally affect the region's conservation values. These pressures were assessed during the development of this plan. In the assessment process, pressures were classified as *of concern, of potential concern, of less concern* and *not of concern*. The assessment process is described in Section 2.2 of the *Overview of marine bioregional plans*, and details of the outcomes are included in Schedule 1 to this plan.

There are two main sources of pressures in the South-west Marine Region: those associated directly with anthropogenic (human) activities and those related to climate change.

Anthropogenic pressures on marine ecosystems and biodiversity in the South-west Marine Region are, by global standards, low. This is partly due to the relatively low levels of marine resource use and coastal population pressure across the region (exceptions being in proximity to the large urban centres), and partly due to Australia's generally sound management of the marine environment.

A number of sources of pressures nevertheless exist in the region, which is next to one of the fastest growing economies in Australia. The main drivers and sources of pressure on conservation values in the South-west Marine Region are:

- climate change and associated large-scale effects, including shifts in major currents, rising sea levels, ocean acidification, and changes in the variability and extremes of climatic features (e.g. sea temperature, winds, and storm frequency and intensity)
- harvesting of living resources

- fast urban and industrial development in areas adjacent to the region
- increases in shipping and port activities
- growth in marine industries and infrastructure
- defence training activities within the Western Australian training exercise area off Perth
- emergence of offshore renewable energy industries.

Only a subset of conservation values and pressures assessed as being *of concern* or *of potential concern* have been identified as regional priorities. Generally, when a pressure affects multiple values and its effects are *of concern* for at least some of these values, then the pressure is identified as a regional priority. Similarly, if a conservation value is, or is likely to be, affected detrimentally by multiple pressures, it is considered to be a regional priority if at least one of the pressures has been assessed as *of concern*. Other key considerations in determining pressure-based regional priorities included issues of scale, legislative responsibility, conservation status, effectiveness of existing management, and level of uncertainty about distribution, abundance and status of conservation values and the pressures acting on them.

South-west Marine Region priorities

This plan identifies 23 regional priorities: 18 conservation values and 5 pressures.

- Conservation values of regional priority are (Table 3.1):
  - blue whale
  - southern right whale
  - humpback whale
  - Australian lesser noddy
  - a group of five migratory birds (flesh-footed shearwater, short-tailed shearwater, roseate tern, common noddy and bridled tern)
  - little penguin
  - sooty tern and little shearwater
  - white shark
  - school shark
  - Australian sea lion
  - Commonwealth marine environment surrounding the Houtman Abrolhos Islands
  - Perth Canyon and adjacent shelf break, and other west coast canyons
  - Commonwealth marine environment within and adjacent to the west coast inshore lagoons
  - Commonwealth marine environment within and adjacent to Geographe Bay

  - Commonwealth marine environment surrounding the Recherche Archipelago
  - Kangaroo Island Pool, canyons and adjacent shelf break, and Eyre Peninsula upwellings
  - western rock lobster
  - small pelagic fish.
- Pressures of regional priority are (Table 3.2):
  - climate change
  - marine debris
  - noise pollution
  - extraction of living resources
  - bycatch.

Building on the regional priority assessments, available information and existing administrative guidelines, this plan provides advice to assist decision-makers, marine industries and other users to understand and meet the obligations that exist with respect to these priorities under the EPBC Act (see Schedule 2).

Table 3.1: Conservation values of regional priority for the South-west Marine Region

	Conservation value	Regional context	Pressure rating	Focus for conservation effort
1	**Blue whale** Endangered	Two important feeding aggregation areas for the species occur in the region (Perth Canyon and Eastern Great Australian Bight Upwelling/ Kangaroo Island canyons) High degree of uncertainty about population levels, structure and recovery rates	*Of potential concern* Changes in sea temperature Changes in oceanography Ocean acidification Marine debris Noise pollution Oil pollution Collisions with vessels Many pressures expected to increase (Table S1.2 of Schedule 1)	Ongoing: Mitigating the effects of increasing pressures in the region Medium term: Increasing the understanding of this species, its population structure and dynamics, its ecology in the region and its recovery status
2	**Southern right whale** Endangered	Uses sites in the region for calving It is thought that the species is recovering due to observed recolonisation of historic calving sites; however, uncertainty about population levels, population structure and recovery rates remains high	*Of potential concern* Changes in oceanography Ocean acidification Marine debris Noise pollution Physical habitat modification Bycatch Oil pollution Collisions with vessels Collision/entanglement with infrastructure Many pressures expected to increase (Table S1.2 of Schedule 1)	Ongoing: Mitigating the effects of pressures and, in particular, preventing habitat degradation and disturbance at established calving sites and historic calving sites that might be recolonised by the recovering species Medium term: Improving compliance and coordination of reporting of collisions with vessels

	Conservation value	Regional context	Pressure rating	Focus for conservation effort
3	**Humpback whale** Vulnerable	Migrates through the region and rests in known locations in the region	*Of potential concern* Changes in oceanography Ocean acidification Marine debris Noise pollution Bycatch Oil pollution Some pressures, such as interaction with fishing gear and associated bycatch mortality, are expected to increase as the species recovers (Table S1.2 of Schedule 1)	Ongoing: Mitigating the effects of increasing pressures Short term: Supporting robust monitoring and reporting of interactions with relevant fisheries Medium to long term: Proactively addressing the increase in likelihood of bycatch mortality and improving compliance with reporting requirements for collisions with vessels
4	**Australian sea lion** Vulnerable	Distribution is almost exclusively confined to the region Species has biological characteristics that are unique among pinnipeds and marine mammals There is documented lack of recovery and population decline for some breeding colonies	*Of concern* Changes in sea temperature Marine debris Bycatch *Of potential concern* Sea level rise Changes in oceanography Ocean acidification Noise pollution Human presence at sensitive sites Extraction of living resources Oil pollution Collision/entanglement with infrastructure (Tables S1.3 and S1.4 of Schedule 1)	Immediate: Ensuring that mitigation measures and appropriate monitoring are in place to address the key pressures (in particular, fisheries-related pressures) and to assess their effectiveness in reducing mortality Ongoing: Mitigating the effects of non-fisheries pressures Medium to long term: Implementing an integrated research and monitoring strategy to assess and monitor population and recovery rates and increase the ability to support the species' recovery through better knowledge of ecology, genetics and population dynamics

	Conservation value	Regional context	Pressure rating	Focus for conservation effort
5	**Australian lesser noddy** Vulnerable	Species has a restricted distributional range and is dependent on one type of habitat (mangrove forests) for nesting, and the Australian breeding population at the Houtman Abrolhos Islands is of global significance	*Of concern* Sea level rise Changes in sea temperature Changes in oceanography *Of potential concern* Ocean acidification Chemical pollution/contaminants Light pollution Physical habitat modification Nuisance species Extraction of living resources Oil pollution (Tables S1.5 and S1.6 of Schedule 1)	Short term: Assessing the vulnerability of habitat to sea level rise and other pressures, and understanding the ability of the species to adapt to climate change Medium to long term: Identifying and protecting important habitats outside the species' immediate area of occupancy, and understanding effects on the species of changes in fisheries management

	Conservation value	Regional context	Pressure rating	Focus for conservation effort
6	**Flesh-footed shearwater, short-tailed shearwater, roseate tern, common (brown) noddy, bridled tern** Migratory	Region is significant to their conservation at a species or Australian population level because a significant proportion of their Australian population nests adjacent to the region	*Of concern* (for some species) Sea level rise Changes in sea temperature Changes in oceanography For some of these species, changes in distribution and/or prey availability have been recorded from the region and have been attributed to climate change *Of potential concern* (for some species) Ocean acidification Chemical pollution/contaminants Marine debris Light pollution Nuisance species Extraction of living resources Bycatch Oil pollution Disease (Tables S1.5 and S1.6 of Schedule 1)	Ongoing: Mitigating the effects of non climate-related pressures Medium term: Gaining a better understanding of the implications of the predicted climate-related changes for these species and their ability to adapt to climate change Long term: Assessing the availability and status of frontier habitats for populations expected to shift in their distribution, and any impact on temperate species potentially displaced by subtropical or tropical species

	Conservation value	Regional context	Pressure rating	Focus for conservation effort
7	**Little penguin** Marine	The region covers about half the species range in Australian waters. The population breeding in the Perth region is the largest in Western Australia (around 700 pairs) and geographically isolated from the south coast populations Highly dependent on small pelagic fish as a food source	*Of concern* Sea level rise Changes in sea temperature Changes in oceanography *Of potential concern* Ocean acidification Chemical pollution/contaminants Marine debris Physical habitat modification Extraction of living resources Oil pollution Collisions with vessels Disease (Tables S1.5 and S1.6 of Schedule 1)	Ongoing: Mitigating the effects of non climate-related pressures Medium term: Gaining a better understanding of the implications of the predicted climate-related changes for this species and its ability to adapt to climate change
8	**Sooty tern, little shearwater** Marine	The region provides biologically important feeding areas for important nesting populations of sooty tern (72% of the Australian population) and little shearwater (58% of the Australian population) With the exception of colonies at Norfolk and Lord Howe Islands, little shearwater occur only in the South-west Marine Region, and this population is considered a subspecies (tunneyi)	*Of concern* Sea level rise Changes in sea temperature Changes in oceanography *Of potential concern* Ocean acidification Light pollution (little shearwater) Extraction of living resources (sooty tern) Oil pollution (Tables S1.5 and S1.6 of Schedule 1)	Ongoing: Mitigating the effects of non climate-related pressures Medium term: Gaining a better understanding of the implications of the predicted climate-related changes for these species and their ability to adapt to climate change

	Conservation value	Regional context	Pressure rating	Focus for conservation effort
9	**White shark** Vulnerable	Region includes important foraging areas and areas in which white shark appears to occur with high frequency There is a high level of uncertainty about the species' population numbers, structure and recovery	*Of concern* Bycatch *Of potential concern* Changes in sea temperature Change in oceanography Ocean acidification Marine debris Collision/entanglement with infrastructure Any wholesale shift in the productivity and trophic regimes of the region's ecosystem in response to climate change has the potential to significantly affect large top predators, such as sharks (Tables S1.10 and S1.11 of Schedule 1)	Short term: Further reducing bycatch mortality in fisheries across the region Longer term: Reducing uncertainty about its population, recovery, ecology and habitat requirements, including, in the medium term, further investigating the location and significance of biologically important areas in the south-west

	Conservation value	Regional context	Pressure rating	Focus for conservation effort
10	**School shark** Conservation dependent	There is uncertainty about the location and extent of biologically important areas for this species in the south-west	*Of concern* Bycatch *Of potential concern* Sea level rise Changes in sea temperature Changes in oceanography Ocean acidification Marine debris Physical habitat modification As for other shark species, any wholesale shift in the productivity and trophic regimes of the region's ecosystem in response to climate change has the potential to significantly affect large top predators (Tables S1.10 and S1.11 of Schedule 1)	Immediate: Reducing the level of bycatch mortality in the region Medium term: Identifying, mapping and protecting habitat critical to the recovery of the species, including inshore habitat used for breeding and as nursery areas

	Conservation value	Regional context	Pressure rating	Focus for conservation effort
11	**Commonwealth marine environment surrounding the Houtman Abrolhos Islands** Key ecological feature	Supports high and unique biodiversity Provides important habitat for a range of species, including threatened species	*Of concern* Sea level rise Changes in sea temperature Changes in oceanography In particular, climate-related effects on species distribution and reproductive success and the region's productivity and trophic processes are *of concern* *Of potential concern* Ocean acidification Chemical pollution/contaminants Nutrient pollution Physical habitat modification Extraction of living resources Bycatch Oil pollution Pressures are either not well understood or expected to increase (Tables S1.12 and S1.13 of Schedule 1)	Short term: Including examples of its ecosystems and biodiversity in the south-west Commonwealth marine reserve network Medium term: Developing feasible indicators to monitor the nature and extent of ecological change in the area Long term: Gaining a better understanding of the processes driving biodiversity and ecosystem functioning

	Conservation value	Regional context	Pressure rating	Focus for conservation effort
12	**Perth Canyon and adjacent shelf break, and other west coast canyons** Key ecological feature	Supports the largest known feeding aggregation of endangered blue whales Unique geomorphology gives rise to ecologically important events of localised productivity	*Of concern* Changes in sea temperature Changes in oceanography Climate-related effects on species distribution and reproductive success and on the region's productivity and trophic processes are *of concern* *Of potential concern* Ocean acidification Chemical pollution/contaminants Noise pollution Extraction of living resources Bycatch Oil pollution Collisions with vessels Pressures are either not well understood or expected to increase The Perth Canyon is located offshore from the largest urban centre in Western Australia, and a number of human activities take place in this area, with multiple pressures potentially resulting in cumulative effects on its biodiversity (Tables S1.12 and S1.13 of Schedule 1)	Short term: Including examples of its ecosystems and biodiversity in the south-west Commonwealth marine reserve network Medium term: Developing feasible indicators to monitor the nature and extent of ecological change, and understanding better the potential for cumulative impacts on this feature's values arising from multiple pressures Long term: Gaining a better understanding of the processes driving biodiversity and ecosystem functioning

	Conservation value	Regional context	Pressure rating	Focus for conservation effort
13	**Commonwealth marine environment within and adjacent to the west coast inshore lagoons** Key ecological feature	Regionally important for enhanced benthic productivity and for aggregations of marine life Includes ecosystems important for benthic productivity, including macroalgae and seagrass communities, and breeding and nursery aggregations for many temperate and tropical marine species The inshore lagoons are important areas for the recruitment of the commercially and recreationally important western rock lobster, dhufish, pink snapper, breaksea cod, baldchin and blue gropers, abalone and many other reef species Extensive schools of migratory fish visit the area annually, including herring, garfish, tailor and Australian salmon	*Of concern* Changes in sea temperature Changes in oceanography *Of potential concern* Sea level rise Ocean acidification Chemical pollution/contaminants Nutrient pollution Changes in turbidity Physical habitat modification Extraction of living resources Bycatch Oil pollution Invasive species (Tables S1.12 and S1.13 of Schedule 1)	Short term: Including examples of its ecosystems and biodiversity in the south-west Commonwealth marine reserve network Medium term: Developing feasible indicators to monitor the nature and extent of ecological change and understanding better the potential for cumulative impacts on this feature's values arising from multiple pressures Long term: Gaining a better understanding of the processes driving biodiversity and ecosystem functioning

	Conservation value	Regional context	Pressure rating	Focus for conservation effort
14	**Commonwealth marine environment within and adjacent to Geographe Bay** Key ecological feature	Includes extensive seagrass beds, extending into relatively deep waters (up to 40–50 m in depth) Provides important habitat for a range of species, including nursery habitat for a number of commercially and economically valuable fish species	*Of concern* Changes in sea temperature Changes in oceanography Climate-related effects on species distribution and reproductive success and on the region's productivity and trophic processes are *of concern*, with flow-on effects for the surrounding marine ecosystem *Of potential concern* Sea level rise Ocean acidification Chemical pollution/contaminants Nutrient pollution Changes in turbidity Noise pollution Physical habitat modification Extraction of living resources Oil pollution Invasive species Pressures are expected to increase In particular, pressures that might affect seagrass communities are *of potential concern* One of the few areas in the south-west where agricultural run-off has the potential to affect the marine environment because of the intensity of land use and the presence of watercourses that discharge into the bay (Tables S1.12 and S1.13 of Schedule 1)	Short term: Including examples of its ecosystems and biodiversity in the South-west Commonwealth marine reserve network Medium term: Developing feasible indicators to monitor the nature and extent of ecological change, including developing robust and efficient monitoring of the extent of seagrass beds in this area Longer term: Gaining a better understanding of the processes driving biodiversity and ecosystem functioning of this feature

	Conservation value	Regional context	Pressure rating	Focus for conservation effort
15	**Commonwealth marine environment surrounding the Recherche Archipelago** Key ecological feature	Supports a high level of biodiversity, including high numbers of endemic species Provides important habitat for a range of species, including threatened species	*Of concern* Changes in sea temperature Changes in oceanography In particular, climate-related effects on species distribution and reproductive success and on the region's productivity and trophic processes are *of concern* *Of potential concern* Sea level rise Ocean acidification Chemical pollution/contaminants Nutrient pollution Extraction of living resources Bycatch Oil pollution Invasive species Pressures are either not well understood or expected to increase (Tables S1.12 and S1.13 of Schedule 1)	Short term: Including examples of its ecosystems and biodiversity in the south-west Commonwealth marine reserve network Medium to long term: Developing feasible indicators to monitor the nature and extent of ecological change, and gaining a better understanding of the processes driving biodiversity and ecosystem functioning

	Conservation value	Regional context	Pressure rating	Focus for conservation effort
16	**Kangaroo Island Pool, canyons and adjacent shelf break, and Eyre Peninsula upwellings** Key ecological feature	Supports regionally important processes of biological productivity and is inhabited by benthic communities that are species rich by national and global standards Provides important habitat for a range of species, including threatened species	*Of concern* Changes in sea temperature Changes in oceanography Climate-related effects on species distribution and reproductive success and on the region's productivity and trophic processes are *of concern* *Of potential concern* Ocean acidification Noise pollution Extraction of living resources Bycatch Oil pollution Pressures are either not well understood or expected to increase (Tables S1.12 and S1.13 of Schedule 1)	Short term: Including examples of its ecosystems and biodiversity in the south-west Commonwealth marine reserve network Medium term: Developing feasible indicators to monitor the nature and extent of ecological change Long term: Gaining a better understanding of the processes driving biodiversity and ecosystem functioning

	Conservation value	Regional context	Pressure rating	Focus for conservation effort
17	**Western rock lobster** Key ecological feature	In its adult stage, western rock lobster is a top benthic predator, likely to play an important role in community structure The species has experienced significant decline in larval settlement in recent years Its ecological role in unexploited conditions is not fully understood, as there are no areas in the region where the species is not fished	*Of concern* Changes in sea temperature Changes in oceanography *Of potential concern* Sea level rise Ocean acidification Changes in turbidity Physical habitat modification Extraction of living resources Oil pollution (Tables S1.12 and S1.13 of Schedule 1)	Immediate: Supporting efforts to understand the causes of the recent population decline Short term: Including examples of western rock lobster habitat and associated ecological communities in the south-west Commonwealth marine reserve network Medium to long term: Gaining a better understanding of the species' ecological role, particularly in the deeper waters of the Commonwealth marine environment
18	**Small pelagic fish** Key ecological feature	Thought to play an important role in the region's ecosystems. While small pelagic fish are currently underexploited in the region, the volume harvested has increased in recent years and these species are inherently vulnerable to overfishing because they occur in aggregations. In the past, small pelagic fish have experienced severe declines in the region in response to introduced pathogens.	*Of concern* Changes in sea temperature Changes in oceanography *Of potential concern* Ocean acidification Disease (Tables S1.12 and S1.13 of Schedule 1)	Ongoing: Ensuring that the ecosystem role of this group of species at a subregional and regional level is carefully considered in assessing any change in the management and intensity of relevant fisheries Long term: Gaining a better understanding of the potential response of this species group to climate-related shifts in productivity

Table 3.2: Environmental pressures of regional priority for the South-west Marine Region

	Environmental pressure	Regional context	Pressure rating	Focus for conservation effort
19	**Climate change**	Loss of climatic habitat caused by anthropogenic emissions of greenhouse gases is listed as a key threatening process under the EPBC Act Potential for significant and large-scale changes to marine ecosystems Potential detrimental effects on a number of protected species through the loss and modification (e.g. increased turbidity) of coastal and inshore habitats by sea level rise Changes in sea temperature likely to affect the distributional range of species, resulting in changes to species composition of ecosystems Changes in the oceanography of the region may affect ecosystem productivity, larval dispersal, species distribution and breeding patterns Predicted that, if concentration of atmospheric CO2 continues to increase at the current rate, the ocean will become corrosive to the shells of many marine organisms by 2100. The response of marine organisms to increased ocean acidity is poorly understood (Schedule 1)	*Of concern* 13 species 10 KEFs *Of potential concern* All other conservation values	Short term: Improving estimates of sea level rise at the regional level, and predictions of the effects of sea level rise on the region's species Short to medium term: Reducing uncertainty about the direction and intensity of changes in sea temperature and oceanography and the effects on marine ecosystems Short to medium term: Assessing the potential effects of ocean acidification on the region's biodiversity, and identifying species and processes with high vulnerability

KEF = key ecological feature

	Environmental pressure	Regional context	Pressure rating	Focus for conservation effort
20	**Marine debris**	Injury and fatality to vertebrate marine life caused by ingestion of, or entanglement in, harmful marine debris is a listed key threatening process under the EPBC Act Evidence from the region indicates that mortality through entanglement in marine debris is often associated with discarded or lost fishing gear. This is the case particularly for Australia sea lion The effects of other sources of marine debris are not well understood (Schedule 1)	*Of concern* 1 species *Of potential concern* 13 species	Short term: Address the effects of marine debris in the region by reducing loss and disposal of fishing gear at sea Long term: Improving understanding of the sources and impacts of marine debris on the region's marine life and ecosystems, including through monitoring of marine debris loads at selected locations
21	**Noise pollution**	Three key ecological features have been identified, as they are located in areas of high prospectivity for oil and gas resources and the use of seismic surveys is expected to increase. One of these features, the Perth Canyon, is also located in a Royal Australian Navy training area, where active sonar is used, and in front of the ports of Fremantle and Kwinana, where shipping traffic is expected to increase (Schedule 1)	*Of potential concern* 9 species 5 KEFs	Ongoing: Mitigating the effects of noise pollution Short to medium term: Improving understanding of the effects of increased noise on the species of the region, and in particular on protected species

KEF = key ecological feature

	Environmental pressure	Regional context	Pressure rating	Focus for conservation effort
22	**Extraction of living resources**	Future increase in fishing pressure on small pelagic fishes is assessed as being *of potential concern*. The effect of this pressure on the functioning of species and ecosystems reliant on overfished species has been assessed as *of concern* or *of potential concern* due to its interactions with a number of protected species, including in relation to prey depletion. Recreational fishing in the region is believed to have increased substantially and contributed to overfishing of important demersal finfish off the west coast (Schedule 1)	*Of concern* 1 species *Of potential concern* 8 species 9 KEFs	Short term: Ensuring that the ecosystem effects of overexploitation by commercial and recreational fishing are addressed by fisheries management, with particular consideration of those key ecological features that are important to the biological production of the region Medium term: Developing feasible indicators to monitor the nature and extent of ecological change, including monitoring the effects of this pressure on key ecological features that interact with it Short to medium term: Addressing the effects of depletion of prey and/or associated species (e.g. large pelagic fish that herd prey into swarms that are more accessible to feeding seabirds) by ensuring that the effects of commercial and recreational fishing on species that are dependent on targeted species (e.g. protected seabird species and Australian sea lion) are better understood and addressed in fisheries management

KEF = key ecological feature

	Environmental pressure	Regional context	Pressure rating	Focus for conservation effort
23	**Bycatch**	Data on bycatch mortality is poor for many species. Some species are subject to bycatch mortality from multiple fisheries. The Threat Abatement Plan for the Incidental Catch (or Bycatch) of Seabirds during Oceanic Longline Fishing Operations (2006) appears to be effective in mitigating impacts on seabirds. The effectiveness of bycatch mitigation measures for other species is less clear. Further details are in Schedule 1	*Of concern* 3 species *Of potential concern* 13 species 8 KEFs	Immediate: Further reducing bycatch mortality for Australian sea lion and white and school sharks Short term: Gaining a comprehensive and integrated understanding of bycatch mortality—including of protected and non-protected species—across the region arising from multiple fisheries. In the longer term, this information should be used to target bycatch monitoring programs

KEF = key ecological feature

3.2 Strategies and actions

The plan includes seven strategies to address the regional priorities:

Strategy A: Increase collaboration with relevant research organisations to inform and influence research priorities and to increase the uptake of research findings to inform management and administrative decision-making

Strategy B: Establish and manage a south-west Commonwealth marine reserve network as part of a National Representative System of Marine Protected Areas

Strategy C: Provide relevant, accessible and evidence-based information to support decision-making with respect to development proposals that come under the jurisdiction of the EPBC Act

Strategy D: Increase collaboration with fisheries management agencies and the fishing industry to improve understanding of fisheries impacts and address the cumulative effects of fisheries on the region's key ecological features and protected species

Strategy E: Develop partnerships with relevant marine industries to increase understanding of the impacts of anthropogenic disturbance on the region's key ecological features and protected species

Strategy F: Develop targeted collaborative programs to coordinate species recovery and environmental protection efforts across Australian Government and state agencies with responsibilities for the marine environment

Strategy G: Improve monitoring, evaluation and reporting on ecosystem health in the marine environment

Within each strategy, actions have been designed to address one or more of the regional priorities. A few actions are not linked directly to regional priorities but have been included as enabling actions—that is, they provide the necessary foundation and/or mechanisms for addressing the regional priorities in a coordinated, effective and efficient way.

Actions under the strategies are classified in terms of their implementation timeframe:

- **Immediate actions** are those expected to be implemented within 6–12 months (these usually relate to priorities where the level of concern is high and management responses are either under way or expected to begin in the near future).
- **Short-term actions** are expected to be implemented within 2 years.
- **Medium-term actions** are expected to be implemented within 3–5 years.

- **Long-term actions** are expected to be implemented within 8–10 years, and usually relate to research into ecological effects that involves observational studies requiring long timeframes.
- **Ongoing actions** commonly cover routine administrative decision-making under the EPBC Act (e.g. administration of the fisheries assessment provisions).

Strategy A: Increase collaboration with relevant research organisations to inform and influence research priorities and to increase the uptake of research findings to inform management and administrative decision-making

- Improve existing mechanisms and establish new mechanisms to facilitate the uptake of marine research findings so that they can inform administrative and management decisions (short term).
- Support research undertaken through relevant recovery plans for Australian sea lion, blue whale, white shark and Australian lesser noddy (regional priority 4—short term; regional priorities 1, 5, 9—medium to long term).
- Support research to understand the expected impacts of climate change on protected species and key ecological features; in particular, their vulnerability and adaptive capacity to predicted changes (regional priorities 1–19—medium to long term).
- Improve knowledge of the processes driving biodiversity and ecosystem functioning of priority key ecological features of the South-west Marine Region (regional priorities 11, 12, 13, 14, 15, 16, 17, 18—medium to long term).
- Support further research investigating the ecological role of western rock lobster, particularly in the deeper waters of the Commonwealth marine environment, through establishing suitable sites for ongoing environmental monitoring (regional priority 17—medium to long term).

Strategy B: Establish and manage a south-west Commonwealth marine reserve network as part of the National Representative System of Marine Protected Areas

- Ensure that management arrangements for the marine reserves contribute to the protection and conservation of the region's biodiversity and ecosystem function and integrity (regional priorities 11, 12, 13, 14, 15, 16, 17, 18—medium to long term).
- Ensure that management arrangements for the reserves minimise, where appropriate, the risk and impacts of pressures rated as being *of concern* or *of potential concern* in the South-west Marine Region (medium to long term).

Strategy C: Provide relevant, accessible and evidence-based information to support decision-making with respect to development proposals that come under the jurisdiction of the EPBC Act

- Improve data and knowledge about biologically important areas for the region's protected species and species considered under pressure, with priority given to:
  - white shark (regional priority 9—short to medium term)
  - school shark (regional priority 10—short to medium term).
- Seek to improve access to information, particularly spatial data, on the region's key ecological features and protected species and the pressures on them (short to medium term).
- Assess the need for—and, if appropriate, undertake in partnership with relevant agencies—strategic assessments under the EPBC Act of areas adjacent to the region that are expected to experience rapid change affecting coastal and inshore marine environments with the potential to increase pressure on the Commonwealth marine environment (regional priorities 2, 4, 5, 7, 11, 14—short to medium term).
- Provide regional advice to assist in assessing and determining the significance of potential impacts on the region's conservation values to the extent that they are matters of national environmental significance or components of such a matter in the case of the key ecological features of the South-west Marine Region. This advice is provided as Schedule 2 of this plan (immediate).
- Ensure that the information provided through this plan and the supporting information resources continue to reflect the most relevant and up-to-date scientific data and knowledge (ongoing).
- Evaluate the role of the plan and its components in improving the effectiveness of decision-making under the EPBC Act at all levels (i.e. the environment minister, the environment department, or persons proposing to take actions likely to impact on matters of national environmental significance in the South-west Marine Region) (short to medium term).

Strategy D: Increase collaboration with fisheries management agencies and the fishing industry to improve the understanding of fisheries impacts and address the cumulative effects of fisheries on the region's key ecological features and protected species

- Collaborate with relevant fisheries management organisations to support research and the development of improved management initiatives for the bycatch of protected species—particularly school shark, white shark and Australian sea lion—focusing on improving understanding of the cumulative effects of bycatch across multiple fisheries and the establishment of ongoing monitoring indicators (regional priorities 4, 9, 10, 23—immediate).

- Collaborate with relevant fisheries management organisations to support research into the impacts of the extraction of living marine resources on key ecological features and protected species, and develop improved management initiatives where appropriate (regional priorities 22, 23—ongoing).
- Collaborate with relevant fisheries management organisations to improve current fisheries interaction data sets for cetaceans in the region (regional priorities 1, 2, 3, 22, 23—short term).
- Collaborate with relevant fisheries management organisations to improve understanding of interactions between protected species—particularly white shark and Australian sea lion—and aquaculture infrastructure, focusing on obtaining mortality rates and establishing ongoing monitoring indicators (regional priorities 4, 9, 22—medium to long term).

Strategy E: Develop partnerships with relevant marine industries to increase understanding of the impacts of anthropogenic disturbance on the region's key ecological features and protected species

- Collaborate with industry and research organisations to improve mechanisms for data collection, management and reporting of interactions between marine industries and biodiversity (short to medium term).
- Pursue, where feasible, collaborative agreements authorising the shared use of industry-gathered marine information, particularly spatial data (short to medium term).
- Collaborate with industry to improve understanding of the effects of increased noise on Australian sea lion (regional priority 4—short to medium term).
- Collaborate with relevant agencies to improve compliance in the reporting of vessel collisions with large whales and other marine fauna and seek to use the improved data sets in the development of improved mitigation measures, particularly in biologically important areas (regional priorities 1, 2, 3, 4, 7—short to long term).

Strategy F: Develop targeted collaborative programs to coordinate species recovery and environmental protection efforts across Commonwealth and state agencies with responsibilities for the marine environment

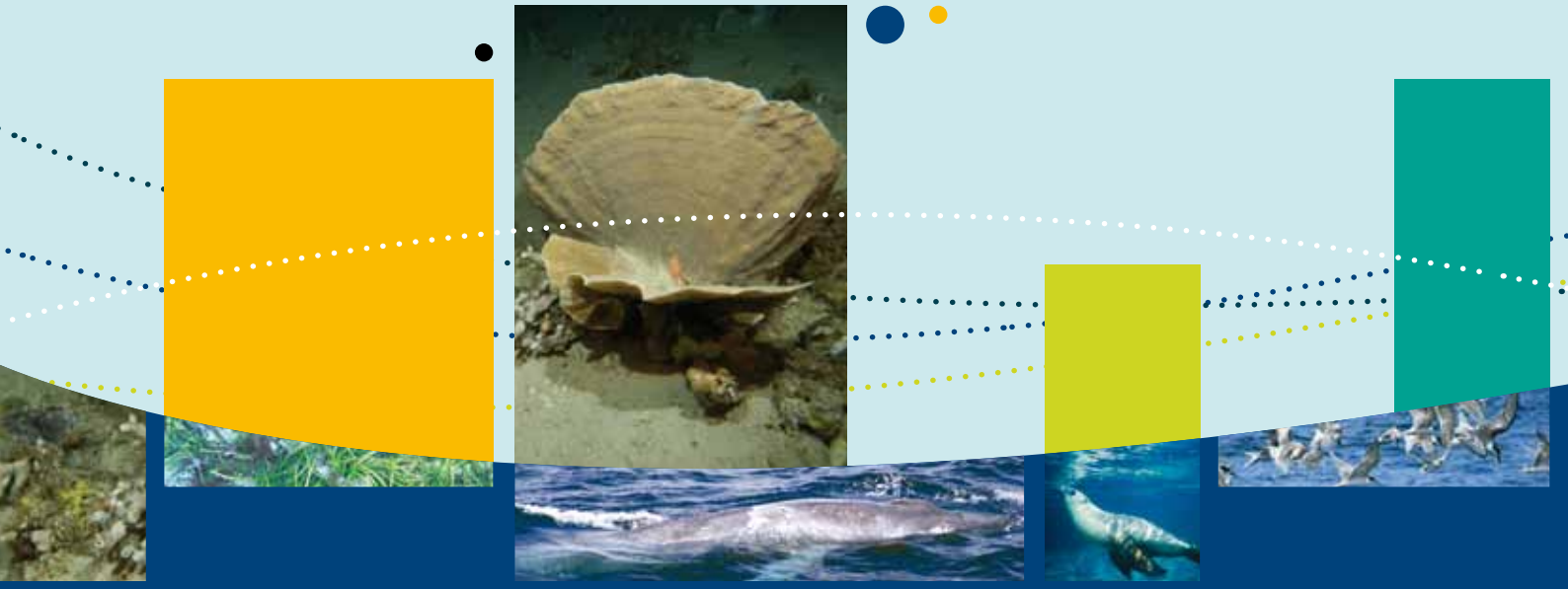
- Collaborate with relevant government agencies to implement mitigation measures to address the key pressures on Australian sea lion and assess their effectiveness in reducing the risk to the species' recovery (regional priority 4—immediate)
- Foster research and monitoring in relation to Australian sea lion to assess and monitor population and recovery rates and increase the ability to support the species' recovery through better knowledge of ecology, genetics and population dynamics (regional priority 4—short term).

- Collaborate with the South Australian and Western Australian governments to develop protection measures to limit disturbances during the southern right whale calving season, focusing on areas located in proximity to inhabited areas or areas where sources of disturbance exist or are emerging (regional priority 2—short term).
- Increase data on, and knowledge of, the sources and impacts of marine debris on the region's marine life and ecosystems, including by supporting regular monitoring of marine debris loads at selected locations in Western and South Australia (regional priority 20 —short to medium term).

Strategy G: Improve monitoring, evaluation and reporting on ecosystem health in the marine environment

- Collate information on the ecosystem components, functioning, pressures and potential cumulative impacts on priority key ecological features in the region and develop effective ecological indicators that will facilitate future monitoring, evaluation and reporting of marine ecosystem health (medium to long term).

  Priority key ecological features to be investigated are:
  - the Commonwealth marine environment surrounding the Houtman Abrolhos Islands (regional priority 11)
  - the Perth Canyon, focusing on better understanding the potential for cumulative impacts arising from multiple and concurrent pressures (regional priority 12)
  - the Commonwealth marine environment within and adjacent to the west coast inshore lagoons (regional priority 13)
  - the Commonwealth marine environment of Geographe Bay, focusing on understanding changes in the extent of seagrass beds in this area (regional priority 14)
  - the Commonwealth marine environment surrounding the Recherche Archipelago (regional priority 15)
  - the Kangaroo Island Pool, canyons and adjacent shelf break ecosystems, including the upwelling systems off the Eyre Peninsula (regional priority 16).
- Assess potential for bioaccumulation of contaminants in key species and evaluate their potential to indicate trends in environmental health.



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