

CHAPTER 3 CONSERVATION VALUES OF THE SOUTH-WEST MARINE REGION

Marine Bioregional Plans will identify those components of marine biodiversity and heritage that are recognised as **conservation values** by the Australian Government. Knowing what the conservation values are for each Region will help in making decisions about proposed developments and other ongoing activities.

For the purpose of marine bioregional planning, conservation values are defined as those elements of the Region that are either specifically **protected** under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or the *Historic Shipwrecks Act 1976*, or have been identified through the planning process as **key ecological features** in the Commonwealth marine environment. Key ecological features are not specifically protected under the EPBC Act, although the marine environment as a whole is a matter of National Environmental Significance under the EPBC Act. Key ecological features are being identified as conservation values within Commonwealth waters to help inform decisions about the marine environment in any given Marine Region.

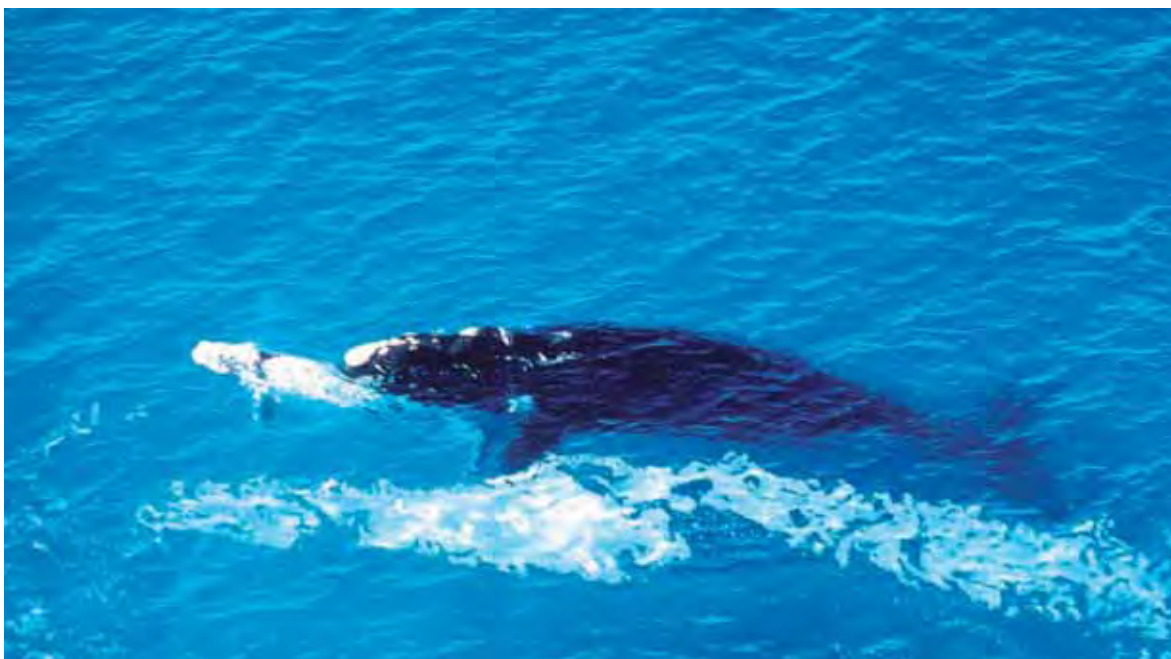
Matters specifically protected under Part 13 and Part 15 of the EPBC Act are recognised conservation values. In the South-west Marine Region these include listed threatened, migratory and marine species, cetaceans (whales, dolphins and porpoises) and Commonwealth

marine reserves. Historic shipwrecks are also identified as conservation values by virtue of their protection under the *Historic Shipwrecks Act 1976*.

The marine conservation values identified in this section will be the subject of assessment during the development of the Draft South-west Marine Bioregional Plan to:

- understand the threats posed by current and emerging activities;
- determine priorities for mitigating threats; and
- provide guidance for future decisions under the EPBC Act on the potential significant impacts on listed threatened and listed migratory species or the Commonwealth marine environment of the South-west Marine Region.

The nature and location of the conservation values will also be considered in the establishment of marine protected areas (MPAs) as part of the National Representative System of MPAs (see Chapter 1). However, conservation values will not automatically be included in Commonwealth marine reserves. In accordance with the Regional Specifications (Chapter 4.2), only those marine conservation values for which spatial protection is both desirable and appropriate will be considered in developing the MPA network for the Region.



Southern right whale and calf. Photo: Clive McMahon, Australian Government Antarctic Division, Department of the Environment, Water, Heritage and the Arts.

3.1 Key ecological features of the marine environment

Under the EPBC Act, the 'marine environment' of the Commonwealth marine area is a **matter of national environmental significance** (see Section 23 of the EPBC Act). This means that any action that will have or is likely to have a significant impact on the Commonwealth marine environment must be referred to the Minister for the Environment, Heritage and the Arts for assessment and approval. National guidelines have been developed to help in determining whether actions are likely to have a significant impact, and can be found at <www.environment.gov.au/epbc/policy>.

Marine Bioregional Plans will identify and describe key ecological features of a Region's marine environment. Once Plans are finalised, key ecological features will be considered in making decisions about whether an action is likely to have a significant impact on the Commonwealth marine environment.

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 a community with a regionally important ecological role (e.g. a predator, 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:
 - a) enhanced or high productivity (such as predictable upwellings),
 - b) aggregations of marine life (such as feeding, resting, breeding or nursery areas),
 - c) biodiversity and endemism; or
- a unique seafloor feature with known or presumed ecological properties of regional significance.

Key ecological features in the South-west Marine Region are identified by the Australian Government on the basis of advice from scientists about the ecological processes and characteristics of the Region. An important source of information used to identify key ecological features in the Region was the *South-west Marine Region Ecosystems and Key Species Groups Report* commissioned by the Department of the Environment, Water, Heritage and the

Arts. A scientific workshop was conducted in September 2006, bringing together marine scientists with specific experience and expertise in the Region. The workshop explored what is currently known about the ecosystems of the South-west Marine Region, and scientific understanding of likely interactions and ecosystem processes. The outcomes of the workshop and the *Ecosystems and Key Species Groups Report* are available at <www.environment.gov.au/coasts/mbp/south-west>.

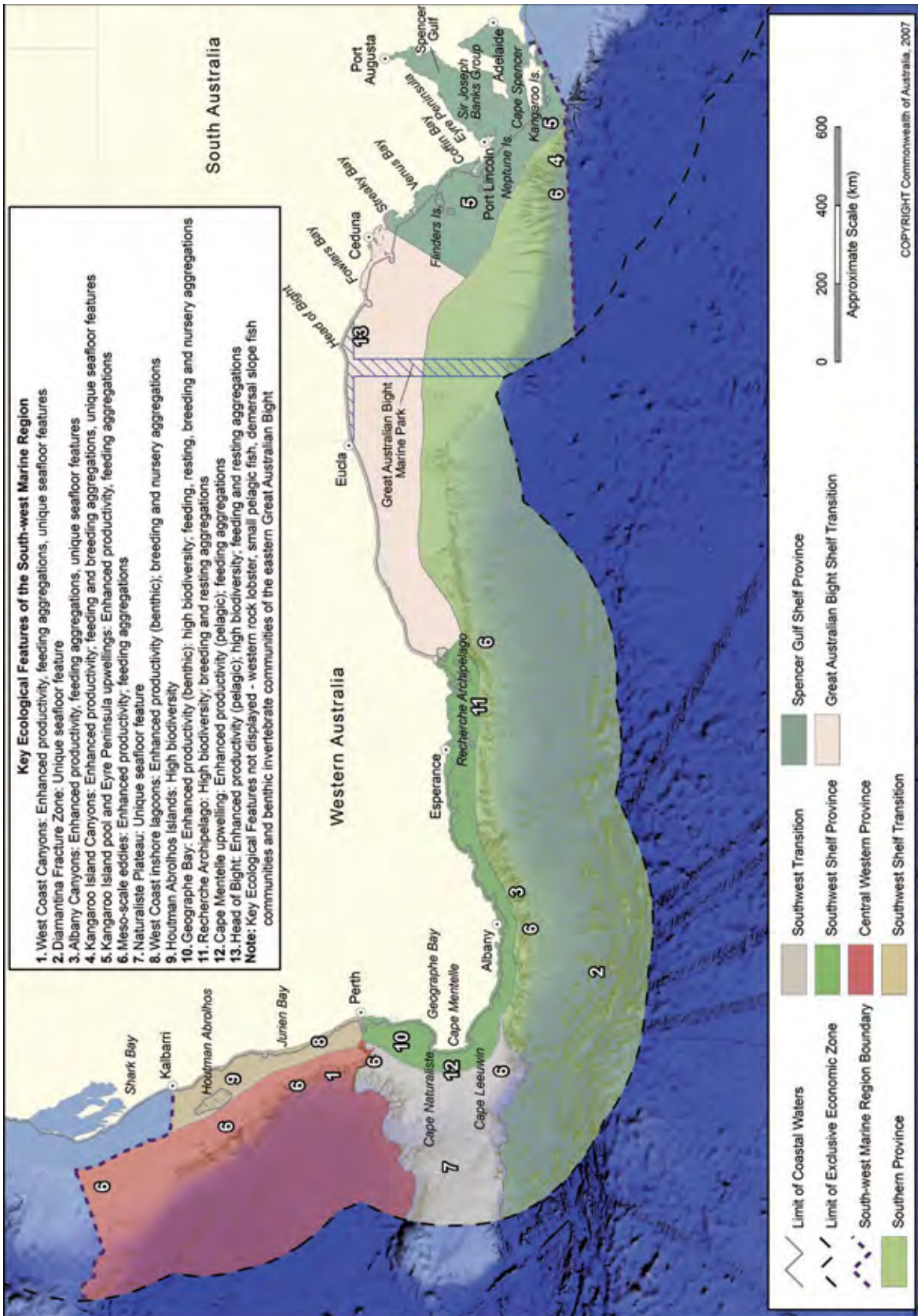
Table 3.1 identifies key ecological features in the South-west Marine Region determined during the development of this Bioregional Profile, and summarises the rationale used to identify a specific feature as a conservation value in the Region (Chapter 2 provides further context for understanding the role of different features in the ecosystem). The collection of further and finer-scale information during the next stage of the planning process will improve our understanding of key ecological features in the Region. This information will also be used to confirm and refine the key ecological features identified during the profiling stage of the process. This information will underpin the analysis of the threats that the marine environment may face over the next 10 to 20 years. The Draft South-west Marine Bioregional Plan will include a refined list of key ecological features.

Seventeen key ecological features have been identified so far within the South-west Marine Region. These occur across 20 areas, and include one species and three communities/species groups (Table 3.1). Figure 3.1 provides location details for areas identified in Table 3.1.



Sea pen. Photo: Marine Life Society of South Australia.

Figure 3.1 Key ecological features of the South-west Marine Region



This is also available as a separate map in the envelope in the back cover of this book.



Table 3.1 Key ecological features of the South-west Marine Region

Key Ecological Features	Bioregions (IMCRA v.4.0)	Rationale
1. West Coast Canyons and adjacent shelf break	Central Western Province, Southwest Transition	Enhanced productivity; feeding aggregations; unique seafloor feature The West Coast Canyons are believed to be associated with small periodic upwellings that locally enhance productivity and attract aggregations of marine life. The Perth Canyon is prominent among these canyons because of its magnitude and ecological importance. The Perth Canyon marks the southern boundary for numerous tropical species groups on the shelf, including sponges, corals, decapods and xanthid crabs. Deep ocean currents upwelling in the canyon create 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.
2. Diamantina Fracture Zone	Southern Province	Unique seafloor feature The Diamantina Fracture Zone is a rugged, deep-water environment composed of numerous closely spaced troughs and ridges covering more than 100 000 km ² . Marine experts point out that the size and physical complexity of the Diamantina Fracture Zone suggest that it is likely to support deep-water communities characterised by high species diversity and endemism.
3. Albany Canyons Group and adjacent shelf break	Southern Province	Enhanced productivity; feeding aggregations; unique seafloor feature The Albany Canyons, including 32 canyons along 700 km of continental slope, are believed to be associated with small periodic upwellings that enhance productivity and attract aggregations of marine life. Anecdotal evidence indicates that this area supports fish aggregations that attract large predatory fish, sharks and toothed, deep-diving whales such as the sperm whale.
4. Kangaroo Island Canyons and adjacent shelf break	Southern Province	Enhanced productivity; feeding and breeding aggregations; unique seafloor feature The Kangaroo Island canyons – a small group of steep-sided, narrow canyons – are associated with enhanced productivity that attracts aggregations of marine life. Seasonal upwellings are believed to be an important factor enhancing production. These upwellings support aggregations of krill, small pelagic fish and squid that 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. Anecdotal evidence indicates that orange roughy, blue grenadier and western gemfish aggregate and are thought to spawn in this area. Empirical evidence shows that orange roughy eggs occur in high densities. The canyons are also thought to be an important pupping area for school shark and the adjacent shelf break is known for high yields of giant crab and southern rock lobster.
5. Kangaroo Island Pool and Eyre Peninsula upwellings	Spencer Gulf Shelf Province	Enhanced productivity; feeding aggregations The Kangaroo Island Pool and Eyre Peninsula upwellings are known to be associated with seasonal aggregations of marine life. The nutrient-rich upwellings enhance the production of plankton communities supporting seasonal aggregations of krill, small pelagic fish and squid which in turn attract marine mammals (e.g. toothed whales, dolphins and New Zealand fur seals), sharks, large predatory fish and seabirds.

Key Ecological Features	Bioregions (IMCRA v.4.0)	Rationale
6. Meso-scale eddies (several locations)	Central Western Province, Southwest Transition, Southern Province	Enhanced productivity; feeding aggregations Eddies and eddy fields form at predictable locations off the western and south-western shelf break (south-west of Shark Bay, offshore of the Houtman Abrolhos Islands, south-west of Jurien Bay, Perth Canyon, south-west of Cape Leeuwin and south of Albany, Esperance and the Eyre Peninsula). The meso-scale eddies of this Region are important transporters of nutrients and plankton communities, taking them far offshore into the Indian Ocean where they are consumed by oceanic communities. Clockwise eddies are considered to play an important role in lifting deep water, which can be relatively cooler and richer in nutrients, toward the surface where it can enhance production of plankton communities that attract aggregations of marine life.
7. Naturaliste Plateau	Southwest Transition	Unique seafloor feature The Naturaliste Plateau is a complex and isolated seafloor feature that occurs in an area where numerous water bodies and currents converge. It is also the only seafloor feature in the Region that interacts with the sub-tropical convergence front. Although there is very little known about the marine life of this part of the Region, experts point out that the combination of its structural complexity, mixed water dynamics and relative isolation is highly likely to support deep-water communities characterised by high species diversity and endemism.
8. Commonwealth waters within and adjacent to the west coast inshore lagoons	Southwest Shelf Transition, Southwest Shelf Province	Enhanced productivity (benthic); breeding and nursery aggregations An extended chain of inshore lagoons, extending from south of Mandurah to Kalbarri, is considered to be important for benthic productivity and recruitment for a range of marine species. Although macro-algae and seagrass appear to be the primary source of production, scientists suggest that ground water enrichment may supplement the supply of nutrients to the inshore lagoon. 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, and many other reef species.
9. Commonwealth waters surrounding the Houtman Abrolhos Islands	Southwest Shelf Transition, Central Western Province	High biodiversity The Houtman Abrolhos Islands and surrounding reefs have been relatively well studied and are noted for their high species diversity. The reefs are composed of 184 known species of corals that support about 400 known species of demersal fish, 492 known species of molluscs, 110 known species of sponges, 172 known species of echinoderms and 234 known species of benthic algae. The high biodiversity of the islands is attributed to the mix of temperate and tropical species resulting from the southward transport of species by the Leeuwin Current over thousands of years.
10. Commonwealth waters within and adjacent to Geographe Bay	Southwest Shelf Province	Enhanced productivity (benthic); high biodiversity; feeding, resting, breeding and nursery aggregations Geographe Bay is a large sheltered embayment with extensive beds of tropical and temperate seagrass that account for about 80 per cent of benthic primary production in the area. The seagrass beds are noted for their high species biodiversity and endemism. Similar to the lagoons to the north, Geographe Bay provides important nursery habitat for many shelf species (e.g. dusky whaler sharks use the shallow seagrass habitat as nursery grounds for several years before ranging out over the shelf to adult feeding grounds along the shelf break). Geographe Bay is also an important resting area for migrating humpback whales.



Key Ecological Features	Bioregions (IMCRA v.4.o)	Rationale
11. Commonwealth waters surrounding the Recherche Archipelago	Southwest Shelf Province, Southern Province	High biodiversity; breeding and resting aggregations The Recherche Archipelago is the most extensive area of reef in the South-west Marine Region (35 203 km ² of reef habitat). 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 macro-algae. The islands also provide haul-out (resting areas) and breeding sites for Australian sea lions and New Zealand fur seals.
12. Cape Mentelle upwelling	Southwest Shelf Province	Enhanced productivity (pelagic); feeding aggregations The Cape Mentelle upwelling draws relatively nutrient-rich water from the base of the Leeuwin Current, where nutrient levels are higher, up the continental slope and on to the continental shelf, where it results in blooms of phytoplankton at the surface. Higher densities of phytoplankton provide the basis of an extended food chain characterised by aggregations of small pelagic fish, larger predatory fish, seabirds, dolphins and sharks.
13. Commonwealth waters adjacent to the Head of Bight	Great Australian Bight Shelf Transition	Enhanced productivity (pelagic); high biodiversity; feeding and resting aggregations An ecologically important hotspot of higher productivity occurs on the inner shelf at the Head of Bight. Satellite images show higher concentrations of chlorophyll (an indicator for phytoplankton) in this area. This is supported by anecdotal observations of higher concentrations of a number of species that appear to use relatively sheltered areas of mixed seagrass, sand and limestone reef as nurseries and feeding grounds. These include juvenile Australian salmon, mulloway, school shark, sea lions, dolphins and southern right whales. Studies of benthic epifauna also found high biomass and species diversity at the Head of Bight.
14. Western rock lobster	Southwest Shelf Transition	Species with important ecological role This species is the dominant large benthic invertebrate in this bioregion. Western rock lobsters are an important part of the food web on the inner shelf, particularly when they are juveniles as they are preyed upon by octopus, cuttlefish, baldchin groper, blue groper, dhufish, pink snapper wirrah cod and breaksea cod. Western rock lobster are also particularly vulnerable to predation during seasonal moults in November-December and to a lesser extent during April-May. The high biomass of western rock lobsters and their vulnerability to predation suggest that they are an important trophic pathway for a range of inshore species that prey upon juvenile lobsters. Western rock lobster is the basis of one of Australia's most valuable commercial fisheries. The Western Rock Lobster Fishery was the first Australian fishery to be accredited with Marine Stewardship Council certification.
15. Small pelagic fish	Southwest Shelf Transition, Southwest Shelf Province, Great Australian Bight Shelf Transition, Spencer Gulf Shelf Province	Species group with important ecological role Small pelagic fish are an extremely important component of pelagic ecosystems, providing a link between primary production and higher predators, such as other fish, sharks, seabirds, seals and cetaceans. Fluctuations in abundance of small pelagic fish have serious implications for the functioning of pelagic ecosystems. In the South-west Marine Region, the small pelagic fish include ten species: sardine, scaly mackerel, Australian anchovy, round herring, sandy sprat, blue sprat, jack mackerel, blue or slimy mackerel, red bait and saury. There is a Small Pelagics Fishery which is managed by the Australian Fisheries Management Authority and is a Wildlife Trade Operation under the EPBC Act.

Key Ecological Features	Bioregions (IMCRA v.4.o)	Rationale
16. Demersal slope fish communities	Central Western Province	Communities with high species biodiversity Demersal slope fish assemblages in this bioregion are characterised by high species diversity. Scientists have described 480 species of demersal fish that inhabit the slope of this bioregion and 31 of these are considered endemic to the bioregion. Demersal fish on the slope in this bioregion in particular have high species diversity compared with other more intensively sampled oceanic regions of the world. Below 400 m water depth demersal fish communities are characterised by a diverse assemblage where relatively small, benthic species (grenadiers, dogfish and cucumber fish) dominate.
17. Benthic invertebrate communities of the eastern Great Australian Bight	Great Australian Bight Shelf Transition	Communities with high species biodiversity Soft-sediment benthic invertebrate communities of the eastern Great Australian Bight shelf form some of the world's most diverse soft sediment ecosystems. A 2002 survey of benthic marine life sampled 798 species, including 360 species of sponge, 138 ascidians and 93 bryozoans, many of which were new to science. The shelf in this area of the Region is part of the world's largest cool-water carbonate province. Invertebrate skeletons and shells make up over 80 per cent of the shelf sediments.



Large erect sponges with a mixture of small sponges, cnidarians and bryozoans. Southern Province, 193 m deep. Photo: CSIRO.

3.2 Nationally protected species

Species listed under the EPBC Act are commonly referred to as ‘protected species’ because it is an offence to kill, injure, take, trade, keep or move a listed species without authorisation. Under the EPBC Act, species can be listed as threatened, migratory, cetaceans or as marine:

- *Threatened species* – are those species that have been identified as being in danger of becoming extinct;
- *Listed Migratory species* – are those species that are listed under:
 - the *Convention on the Conservation of Migratory Species of Wild Animals* (also known as the 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), or
 - any other international agreement, or instrument made under other international agreements approved by the Minister for the Environment, Heritage and the Arts.

Further information on the CMS, JAMBA and CAMBA is provided in Appendix A;

- *Cetaceans* – all species of cetacean (including whales, dolphins and porpoises) are protected under the EPBC Act to ensure their future survival; and
- *Listed marine species* – species belonging to taxa that the Australian Government recognises as requiring protection to ensure their long-term conservation (in accordance with Section 248 of the EPBC Act). Listed marine species occurring in the South-west include:
 - sea snakes (Families Hydrophiidae and Laticaudidae),
 - pinnipeds, including fur seals and sea lions and true seals (Families Otariidae and Phocidae),
 - marine turtles (Families Cheloniidae and Dermochelyidae),

- seahorses, sea-dragons, pipefish and ghost pipefish (Families Syngnathidae and Solenostomidae), and
- seabirds (i.e. defined in the EPBC Act as bird species that occur naturally in the Commonwealth marine area).

Species can also be listed under more than one category; for instance marine turtles are listed as threatened species, migratory species and as marine species.

Under the EPBC Act, species listed as ‘threatened’ or ‘migratory’ are matters of national environmental significance¹. Proposals for activities likely to have a significant impact on matters of national environmental significance must be referred to the Australian Government Minister for the Environment, Heritage and the Arts for approval. The requirement to refer proposals for actions likely to have a significant impact on matters of national environmental significance applies to activities proposed not only in areas managed by the Commonwealth but also in areas managed by the States and Territories.

Significant Impact Guidelines – Matters of National Environmental Significance have been produced to provide advice to proponents on when referrals should be submitted for approval. These guidelines provide specific advice about the kinds of actions likely to have a significant impact on threatened and migratory species. The guidelines also provide specific advice about the kinds of actions likely to have a significant impact on the Commonwealth marine environment. Under these guidelines for the Commonwealth marine environment, any actions that will, or are likely to, “have a substantial adverse effect on a population of a marine species or cetacean including its life cycle (e.g. breeding, feeding, migratory behaviour, life expectancy) and spatial distribution” are identified as actions that should be referred for approval. These guidelines are available at <www.environment.gov.au/epbc/policy>.

Species listed under the EPBC Act are also protected from adverse interactions with commercial fishing operations. Under the EPBC Act all fisheries managed under Commonwealth legislation, and State-managed fisheries that have an export component, must be assessed to ensure that, over time, fisheries are managed in an ecologically sustainable way. These fishery

¹ Species listed as extinct or conservation dependent are not matters of national environmental significance under the EPBC Act.

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 by-catch 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>.

The EPBC Act includes other forms of protection for listed species to ensure that human activities do not threaten their survival in the wild (see Appendix B for further information and relevant links).

3.2.1 Protected species in the South-west Marine Region

The South-west Marine Region is an important area for many species that are protected under the EPBC Act. Many of the species listed under the EPBC Act are also protected under State legislation. For instance the white shark is protected under the EPBC Act and under South Australian and Western Australian legislation.

In the South-west Marine Region there are 105 species protected under the EPBC Act that are *known to occur* in the Region: 26 species listed as threatened, 49 as migratory, 31 cetaceans and 70 listed as marine (Table 3.2)². In addition, there are another 77 species that *may infrequently occur* in the Region. Species that *may infrequently occur* in the South-west Marine Region are defined as those:

- that are accidental visitors to the Region; or
- that on the basis of available information about their range are considered as species that may occur in the Region.

Appendix C lists all species protected under the EPBC Act that are *known to occur* and all that *may infrequently occur* in the South-west Marine Region.

Note that, at the time of finalisation of this Bioregional Profile (2007), there are no species listed as ‘critically endangered’. There are also no species known to have become extinct in the Region.

Protected Species Group Report Cards have been prepared for each of the broad taxonomic groups listed under the EPBC Act that are known to occur in the Region (Appendix D). The report cards identify the threatened and migratory listed species that are known to occur in the South-west Marine Region, describe their ecology, identify the important areas for them within the Region, explain what processes and activities pose a threat to their continued survival and identify how these threats are being mitigated. The report cards also point to relevant references and research for further reading. The report cards are available on the internet at <www.environment.gov.au/coasts/mbp/south-west> and will be updated as new information becomes available. Protected Species Group Report Cards are available for sharks, fish, reptiles (marine turtles and sea-snakes), birds, pinnipeds (seals, fur seals and sea lions), and cetaceans (whales, dolphins and porpoises) occurring in the South-west Marine Region.



Shy albatross. Photo: Mike Double.

² Species can be listed under more than one category under the EPBC Act. For instance, marine turtles are listed as threatened species, migratory species and as marine species.

Table 3.2 Number of protected species known to occur in the Region by broad taxonomic group (as at April 2007)

	Listed Threatened Species			Listed Migratory Species	Cetaceans (whales, dolphins and porpoises)	Listed Marine Species
	Endangered	Vulnerable	Conservation Dependent			
Sharks	-	3	-	2	-	-
Bony fish	-	-	1	-	-	1
Reptiles	1	2	-	3	-	4
Seabirds	2	11	-	35	-	62
Pinnipeds	-	1	-	-	-	3
Cetaceans	2	3	-	9	3 ¹	-
Totals		26		49	3¹	7⁰

Important areas for species listed as ‘threatened’ or ‘migratory’ under the EPBC Act have been identified in the South-west Marine Region and in adjacent State waters. These important areas have been identified for species listed as ‘threatened’ or ‘migratory’ under the EPBC Act as they are matters of national environmental significance (see Chapter 3.2 for further information on requirements under the EPBC Act for matters of national environmental significance).

Table 3.3 identifies breeding areas, nursery and calving areas, feeding areas and resting areas for protected sharks, fish, reptiles, seabirds (foraging areas only), pinnipeds and cetaceans within the South-west Marine Region. Table 3.4 identifies sea bird rookeries adjacent to the Region on islands and coastal areas. These areas were identified on the basis of available information, expert advice and the criteria below:

- **Sharks:** nursery grounds and feeding areas;
- **Fish (orange roughy):** aggregations;

- **Reptiles (marine turtles):** foraging areas;
- **Seabirds:** rookeries and known feeding areas;
- **Pinnipeds (seals, fur seals and sea lions):** breeding colonies and surrounding waters; and
- **Cetaceans (whales, dolphins and porpoises):** feeding areas, calving areas and resting areas on migratory routes in the Region.

Additional important areas for species protected under the EPBC Act may be identified during the next stage of the planning process, as further and finer-scale information about the Region is collected to underpin the analysis of the threats protected species may face over the next 10-20 years. The Draft South-west Marine Bioregional Plan will include any additional important areas identified for protected species.



Australian sea lion. Photo: David Muirhead, Marine Life Society of South Australia.

Table 3.3 Important breeding, feeding and resting areas for species listed as threatened or migratory under the EPBC Act

Where available, further information and references for important areas for threatened and migratory species are provided in Appendix D of this Bioregional Profile.

Important Areas	Rationale
Inshore waters of the Great Australian Bight, including the Head of Bight	<p>Nursery area – white shark Small juvenile white sharks (less than 2 m in length) are commonly encountered in this area. It is presumed that the apparent abundance of small white sharks in this area is the result of pupping in or near this area.</p> <p>Feeding area – white shark Movements of white sharks are known to increase seasonally at the Head of Bight and may be linked to the seasonal availability and movements of prey including snapper, gummy sharks, Australian salmon and to the calving of southern right whales.</p> <p>Calving area – southern right whale The Head of Bight is one of the main southern right whale calving areas in SA.</p>
Pinniped (seal and sea lion) colonies	<p>Breeding area – Australian sea lion Five of the known breeding sites for Australian sea lions produce more than 100 pups each year, representing more than 50 per cent of all pups born. These five sites are all off SA: Dangerous Reef (Southern Eyre Peninsula); the Pages Islands (outside the South-west Marine Region); West Waldegrave Island (Western Eyre Peninsula); Seal Bay (Kangaroo Island); and Olive Island (Western Eyre Peninsula). However, because of the closed breeding patterns of Australian sea lions and their threatened conservation status it is considered that all breeding sites for Australian sea lions are significant.</p> <p>Feeding area – white shark Evidence indicates that pinniped colonies are areas where white sharks can aggregate or frequently revisit to feed. In addition to the Australian sea lion colonies, most of the known breeding sites for the New Zealand fur seal are found in the Region (30 in SA and 17 in WA). Large breeding populations in the Region are at North and South Neptune Islands, Kangaroo Island and Liguanea Island, which account for more than 80 per cent of the national pup production for the species.</p>
Spencer Gulf and Gulf St Vincent	<p>Feeding area – white shark These gulfs are considered important feeding grounds for sub-adult white sharks, although juvenile and large adult sharks have also been observed in these areas. Dolphins, finfish and other elasmobranchs which are abundant here are thought to be targeted by white sharks occurring in these gulfs.</p>
Waters in the east of the Great Australian Bight	<p>Aggregation – orange roughy Aggregations have been targeted by commercial fishers in the Great Australian Bight Trawl Fishery sector of the Southern and Eastern Scalefish and Shark Fishery, particularly during the late 1980s and early 1990s, when large catches were taken in some years.</p>
Albany Canyons Group and adjacent shelf break	<p>Aggregation – orange roughy Aggregations are known to occur, and have been targeted by commercial fishers. With the decline of the fished aggregation in the eastern Great Australian Bight, virtually all recent (mid 1990s – early 2000s) orange roughy catches in the Region have been taken from two areas off WA, described as the ‘Albany Hills’ and ‘Esperance’ stocks.</p> <p>Feeding area – sperm whale Sperm whales have been recorded as being concentrated in a narrow area only a few kilometres wide at the shelf edge off Albany, WA.</p>
Kangaroo Island canyons and adjacent shelf break	<p>Aggregation – orange roughy Aggregations are known to occur in the area, including in the vicinity of the Murray Canyons, which is near the eastern boundary of the Region.</p> <p>Feeding area – pygmy blue whale, fin whale and sperm whale This area is a feeding area for pygmy blue whales, fin whales, sperm whales and possibly sei whales.</p>



continued overleaf

Important Areas	Rationale
Houtman Abrolhos Islands and surrounding waters	<p>Feeding area – Australian lesser noddy The sub-species is only known to forage between the islands and the continental shelf edge.</p> <p>Foraging area – green turtle Although the importance of this area to the species is not well understood, resident adult green turtles are observed at the reefs of the Houtman Abrolhos Islands.</p> <p>Resting area – humpback whale Humpback whales are known to rest in this area on migration. Sightings of Bryde’s whales also suggest this area may be important for this rarely sighted species.</p>
Doubtful Islands Bay	<p>Calving area – southern right whale This area is one of the main calving areas for southern right whales in WA.</p>
Israelite Bay	<p>Calving area – southern right whale This area is one of the main calving areas for southern right whales in WA.</p>
Fowlers Bay	<p>Calving area – southern right whale This area is one of the main calving areas for southern right whales in SA.</p>
Albany/ Cape Riche area	<p>Calving area – southern right whale This area is one of the main calving areas for southern right whales in WA.</p>
Yokinup Bay/Cape Arid area	<p>Calving area – southern right whale This is one of the main calving areas for southern right whales in WA.</p>
Perth Canyon	<p>Feeding area – pygmy blue whale The Perth Canyon is a seasonally important aggregation area for krill at depths of 200-300 m and attracts many species of krill feeders, in particular pygmy blue whales. Fin whales have also been observed in the area and it is thought that sei whales may also feed there.</p>
Waters from Rottneest Island to Geographe Bay	<p>Resting area – humpback whale The bay and surrounding waters are an important resting area for humpback whales, particularly cow-calf pairs, as they migrate south at the end of the breeding season. Recent surveys have also detected southern right whales in the area and have shown an increasing number of pygmy blue whales using the bay in spring. They have been further observed passing through the shelf area between Cape Naturaliste and Rottneest Island, however the ecological or functional significance of the area to the species is unclear.</p> <p>Foraging area – loggerhead turtle Although the importance of this area to the species is not well understood, resident adult loggerhead turtles and sub-adult turtles are known to forage in this area.</p>
Waters off the mid-west to south-west coast of WA	<p>Foraging area – leatherback turtle Although the importance of this area to the species is not well understood, leatherback turtles are known to feed in pelagic waters along the mid-west and south-west coast of WA. Adult leatherback turtles have also been observed feeding in inshore waters, including in the Swan River estuary. The southern extent of leatherback turtles in WA is not well understood. They have been found stranded and caught as by-catch in fisheries along the southern coast of WA.</p>
Coastal reefs around Kalbarri	<p>Foraging area – green turtle Although the importance of this area to the species is not well understood, resident adult green turtles are observed in this area.</p>
Jurien Bay south to Rottneest Island	<p>Foraging area – juvenile green turtle Although the importance of this area to the species is not well understood, large juvenile green turtles are observed in this area.</p>
Waters surrounding Cape Leeuwin/Flinders Bay	<p>Resting area – humpback whale Humpback whales are known to rest in this area on migration.</p>
Twilight Cove	<p>Calving area – southern right whale This area is one of the main calving areas for southern right whales in WA.</p>

Table 3.4 Seabird rookeries on islands and coastal areas adjacent to the South-west Marine Region

Nesting areas	Nesting species
Houtman Abrolhos Islands	Australian lesser noddy (Morley Island, Wooded Island and Pelsaert Island) Common noddy (Pelsaert Island) Bridled tern (Leo Island, Pelsaert Island, Little North Island) Caspian tern (Leo Island, West Wallabi Island and Pelsaert Island) Osprey (Pelsaert Island) White-bellied sea eagle (West Wallabi Island) Wedge-tailed shearwater
Rottneest Island	Wedge-tailed shearwater Bridled tern
Recherche Archipelago	Flesh-footed shearwater Short-tailed shearwater Caspian Tern White-bellied sea eagle
Penguin Island	Bridled tern
Eyre Peninsula	Osprey White-bellied sea eagle
Kangaroo Island	Osprey
Lancelin Island	Wedge-tailed shearwater Bridled tern
Safety Bay	Wedge-tailed shearwater Bridled tern
Great Althorpe Island	Short-tailed shearwater
Cape Hamelin	Flesh-footed shearwater
Yorke Peninsula	White-bellied sea eagle
Nuyts Archipelago	Caspian tern Flesh-footed shearwater Short-tailed shearwater
Neptune Islands (including North and South Neptune)	Short-tailed shearwater Caspian tern
Gambier Island	Short-tailed shearwater
Lewis, Hopkins and Williams Islands (near Cape Catastrophe)	Short-tailed shearwater
Greenly Island	Short-tailed shearwater
Investigator Group	Short-tailed shearwater
West Troubridge Shoal	Caspian tern
Sir Joseph Banks Group	Caspian tern
Eyre Island and Little Eyre Island	Caspian tern
Fisherman Islands	Bridled tern
Beagle Islands	Bridled tern



3.2.2 Flagship species of the South-west Marine Region

'Flagship' species have been identified in the South-west Marine Region on the basis of their unique association with the Region and its habitats. The concept of flagship species is not legislative and it does not change the conservation status or associated provisions under the EPBC Act. Identifying species that are uniquely associated with a Region – that is, flagship species – is useful for education purposes and to raise awareness about marine conservation matters among the public. Flagship species of the South-west Marine Region are the white shark, the Australian lesser noddy, the great-winged petrel, the Australian sea lion, the southern right whale and the beaked whales (which include at least five separate species). Further information on these species can be found in Appendix D.

White shark – The white shark (*Carcharodon carcharias*) is listed both as a threatened and a migratory species under the EPBC Act. It is classified as a vulnerable species for a number of reasons, including evidence of a declining population, its life history characteristics (long-lived with low levels of reproduction), limited local distribution and abundance and, at the time of listing, pressure from commercial fishing.



White shark. Photo: Rachel Robbins, Fox Shark Research Station.

Although the white shark is a wide-ranging species that is found in all seas, the South-west Marine Region appears to be an important area for the species. Available records of incidental catches of white sharks in Australian waters are higher in the South-west Marine Region than in any other region, and are not well correlated with fishing effort. Fishing activities along the west coast of Western Australia (Shark Bay to Bunbury) and in the Great Australian Bight appear to have significantly higher interactions with white sharks than in other areas, which indicates that these areas may be particularly important for the species. Because of the internationally threatened status of this species the Region may also be significant for the conservation

and management of white sharks not only in Australian terms, but possibly also in a global context.

Australian lesser noddy – The Australian lesser noddy (*Anous tenuirostris melanops*) is listed as a marine and a threatened species under the EPBC Act. It is classified as a vulnerable species under the EPBC Act for a number of reasons including past population decline, possibly associated with guano mining in the Houtman Abrolhos Islands and the species' limited distribution.



Australian lesser noddy. Photo: WA Department of Environment and Conservation, Bert and Bab Wells.

The most significant breeding rookeries for the Australian lesser noddy are found in the Houtman Abrolhos Islands on Morley, Wooded and Pelsaert Islands. These islands are adjacent to the South-west Marine Region, and the species is known to forage both around breeding colonies and well out to sea.

Great-winged petrel – The great-winged petrel (*Pterodroma macroptera*) is listed as a marine species under the EPBC Act. The great-winged petrel is not listed as a threatened species under the EPBC Act as it has not been determined as a species threatened by extinction.



Great-winged petrel. Photo: Andrew Burbridge, WA Department of Environment and Conservation.

The great-winged petrel is the only petrel species that breeds adjacent to the Region. In addition, in Australia the great-winged petrel is only known to breed on islands of the Recherche Archipelago and islands offshore of Albany that are adjacent to the South-west Marine Region, with some 33 000 breeding pairs estimated to breed on the islands of the Recherche Archipelago.

Australian sea lion – The Australian sea lion (*Neophoca cinerea*) is listed as a marine and threatened species under the EPBC Act. It is classified as a vulnerable species under the EPBC Act for a number of reasons including lack of population recovery since the end of commercial sealing.



Australian sea lion. Photo: Glen Cowans.

The Australian sea lion is the only endemic species of pinniped in Australia and is currently found only on the west and south coasts of Western Australia, and on the coast of South Australia, although its historic range was far more extensive. It has 66 breeding colonies on islands from the Houtman Abrolhos Islands near Geraldton in Western Australia, to the Pages Islands near Kangaroo Island in South Australia. All of these colonies of Australian sea lions except the Pages Islands colony are on islands adjacent to the South-west Marine Region. All breeding colonies of the Australian sea lion are considered significant for the conservation of the species as it is known to have a low reproductive rate and a restricted capacity to form new colonies. Their limited capacity to form new breeding colonies is because females tend to return to the colony where they were born to reproduce.

Southern right whale – The southern right whale (*Eubalaena australis*) is listed as a cetacean and as a threatened and migratory species under the EPBC Act. It is classified as an endangered species under the EPBC Act. Southern right whales were heavily exploited for their oil and baleen in the early 1800s. Low level catches continued until at least the 1930s when worldwide protection for right whales was introduced in 1935. However, illegal catches continued until the late 1970s. Since the introduction of a moratorium on all commercial whaling in 1985/6 the Australian population of southern right whales has shown signs of a slow, steady recovery.

Southern right whales migrate each year from cold sub-Antarctic waters to breed and calve. They breed while fasting during winter-spring in shallow waters across



Southern right whale and calf. Photo: Clive McMahon, Australian Government Antarctic Division.

the south of the continent, with the majority of the Australian population of southern right whales breeding in the South-west Marine Region. The main calving areas (based on observations of mothers with very young calves in multiple years) currently known for southern right whales within and adjacent to the South-west Marine Region include: Doubtful Islands Bay (including Point Ann/Point Charles area), Israelite Bay area, Twilight Cove, Flinders Bay, Albany/Cape Riche area, and Yokinup Bay/Cape Arid area, Head of the Bight, Fowlers Bay, and Encounter Bay.

Beaked whales – Beaked whales are the least well studied of all marine mammals. This is primarily because of their oceanic distribution and their preferences for deep waters beyond the shelf edge, where few research vessels visit. However, a recent study by MacLeod and Mitchell (2006) indicates that waters south-west of Australia are probably important areas for beaked whales. Despite the limited number of recorded sightings (19) reported in this study in waters off south-west Australia, five species of beaked whales have been recorded. These include the poorly known Hector's beaked whale (*Mesoplodon hectori*) and Andrews' beaked whale (*Mesoplodon bowdoini*). Both of these species are also known from recorded strandings in Western Australia and South Australia. Cuvier's beaked whale (*Ziphius cavirostris*) has also been recorded at sea in this area and from a number of recorded strandings in Western Australia and South Australia.



Hector's beaked whale. Photo: Nick Gales, Australian Government Antarctic Division.



3.3 Protected Places

Protected places include marine protected areas (MPAs) and historic shipwrecks. Within the South-west Marine Region there is one Commonwealth marine reserve – the Great Australian Bight Marine Park – and five shipwrecks protected under the *Historic Shipwrecks Act 1976*. Any as yet undiscovered historic shipwrecks older than 75 years are also protected under the *Historic Shipwrecks Act 1976*. No heritage places occur within the Region, but the presence of the Shark Bay World Heritage Area just north of the northern boundary of the Region should be noted. The values of this World Heritage Area will be considered and described in the Bioregional Profile for the North-west Marine Region. In addition there are a number of marine reserves in State waters adjacent to the South-west Marine Region. For instance, in waters surrounding the Houtman Abrolhos Islands, the Western Australian Government has protected four areas for the conservation and study of resident reef fish species and their habitats.

3.3.1 The Great Australian Bight Marine Park

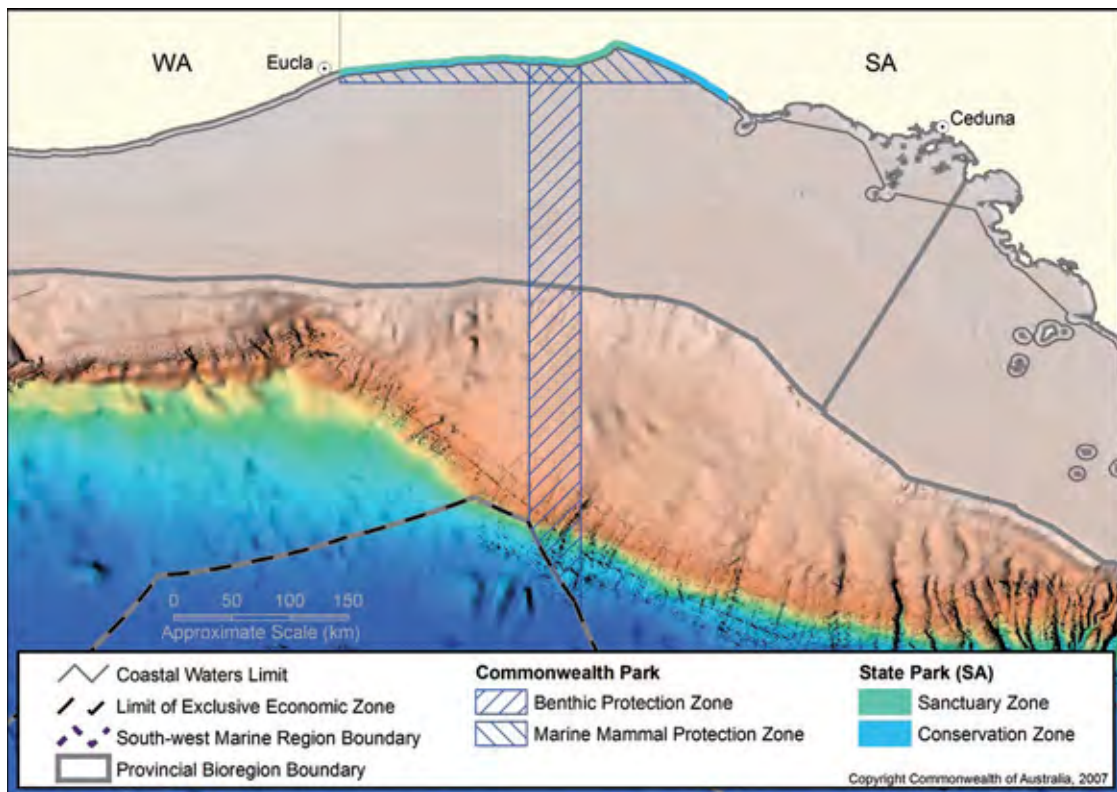
The Great Australian Bight Marine Park (Commonwealth Waters), declared in 1998, is currently the only

Commonwealth marine reserve within the Region. At around 19 700 km², the park is one of the Australian Government’s largest MPAs. The park, including its South Australia State waters components, stretches from 200 km west of Ceduna in South Australia along the coast to the Western Australian border (Figure 3.2). The park is managed cooperatively by the Australian Government and the South Australian Government. It was also the first MPA to include an area especially designed to be representative of the Region.

The combined Commonwealth and State waters of the Park are split into four management zones. Within South Australian waters there are Sanctuary and Conservation Zones, and in Commonwealth waters there is a Marine Mammal Protection Zone and a Benthic Protection Zone. These zones are designed to protect the particular conservation values of the Park which are:

- globally significant habitat for the southern right whale – breeding and calving aggregations of this species, which is listed as endangered, are found in western South Australia and Western Australia along the shores of the Great Australian Bight to Cape Leeuwin;

Figure 3.2 The Great Australian Bight Marine Park



- haul-out, breeding and foraging grounds for the Australian sea lion, a species that occurs only in Australia's southern waters on offshore islands from the Houtman Abrolhos Islands off Western Australia to Kangaroo Island, and on some mainland South Australian sites; and
- habitat for other species of conservation significance, such as the humpback whale, the white shark and several species of albatross.

The Great Australian Bight Marine Park contributes to the National Representative System of MPAs by protecting a representative transect of the seabed on the continental shelf and slope of the Great Australian Bight.

Several unique factors combine to contribute to the high level of biodiversity and endemism in the area of the park. These include a long period of geological isolation, a persistent high wind and wave energy environment, warm-water intrusion via the Leeuwin current from Western Australia, and cold-water, nutrient-rich upwellings in the east. Taxonomic groups with exceptional diversity in this area include red algae (sea weed), ascidians (sea squirts), bryozoans (lace corals), molluscs (shellfish) and echinoderms (sea urchins and sea stars).

The EPBC Act (Section 354) prohibits actions affecting native species inside the park unless authorised under the *Great Australian Bight Marine Park (Commonwealth Waters) Management Plan 2005-2012*. The plan currently allows a range of activities, including fishing and scientific research, to be carried out under permit from the Director of National Parks. Other provisions of the EPBC Act prevent activities that affect species of particular conservation interest (in the park or other Commonwealth waters), and control actions that could have a 'significant' impact on the Commonwealth marine environment, including the park's seabed. The park's management plan supplements this protection by minimising disturbances to areas of habitat important to these species, and prohibiting disturbances to the seabed by benthic trawling, while allowing for other ecologically sustainable activities in the park.

Further information on the Great Australian Bight Marine Park is available at <www.environment.gov.au/coasts/mpa>.

3.3.2 Historic shipwrecks

Within the South-west Marine Region there are currently five known historic shipwrecks protected under the *Historic Shipwrecks Act 1976* (note however that many more shipwrecks are located in State waters). These are the:

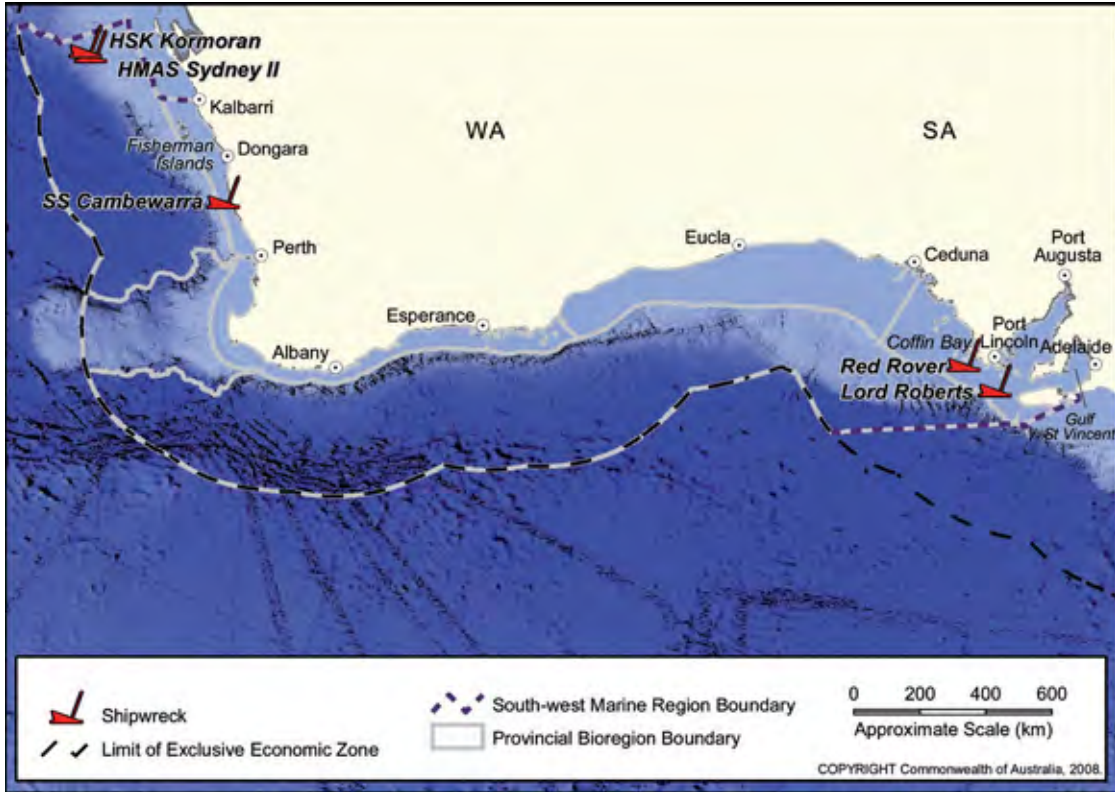
- **SS Cambewarra**, a steam powered transport vessel that was wrecked in 1914 near Fisherman's Island, 80 km south of Dongara, Western Australia;
- **Red Rover**, a fishing boat wrecked in September 1887 near Coffin Bay, South Australia;
- **Lord Roberts**, wrecked in 1902 in the Gulf St Vincent Region, South Australia;
- **HMAS Sydney II**, wrecked in 1941 while engaged in battle with the *HSK Kormoran*, approximately 250 km off the mid-west coast of Western Australia; and
- **HSK Kormoran**, wrecked in 1941 while engaged in battle with the *HMAS Sydney II*, approximately 250 km off the mid-west coast of Western Australia.

The *HMAS Sydney II* and German raider *HSK Kormoran* were found in March 2008, some 66 years after they were lost. The Minister for the Environment, Heritage and the Arts has placed a provisional declaration over the *HMAS Sydney II* and German raider *HSK Kormoran* under the *Historic Shipwrecks Act 1976*. The declaration gives legal protection to these historically significant vessels and relics, from damage, disturbance or removal. Under the provisional declaration, unauthorised damage, disturbance or removal of the sites is prohibited. This action will ensure respect for all those that died in the battle but will not prevent further documentation of the site.

It should be noted that information about the location of shipwrecks is often approximate and that other historic shipwrecks may be located within the Region. Figure 3.3 shows the locations of known historic shipwrecks within the South-west Marine Region.



Figure 3.3 Historic shipwrecks with known locations in the South-west Marine Region



Historic shipwrecks are recognised and protected under the *Historic Shipwrecks Act 1976*, which protects historic wrecks and associated relics found in waters from the low water mark to the edge of the continental shelf. Under the *Historic Shipwrecks Act*, all wrecks more than 75 years old are protected, together with their associated relics. The Minister for the Environment, Heritage and the Arts can also make a declaration to protect any historically significant wrecks or articles and relics that are less than 75 years old.

The *Historic Shipwrecks Act* aims to ensure that historic shipwrecks are protected for their heritage values and maintained for recreational and educational purposes. It also regulates activities that may result in the damage, interference, removal or destruction of an historic shipwreck or associated relic. Under the *Historic Shipwrecks Act*:

- anyone who finds the remains of a ship or articles associated with a ship is required to give notification of the location as soon as practicable to the Minister for the Environment, Heritage and the Arts; and
- historic relics must not be removed, or the physical fabric of a wreck disturbed, unless a permit has been obtained.

The *Historic Shipwrecks Act* also provides for protected zones to be declared around wrecks that are at particular threat from interference. Permits are required to enter protected zones, which can cover an area up to a radius of 800 m. There are currently no declared protected zones under the *Historic Shipwrecks Act* in the South-west Marine Region.

Further information about historic shipwrecks and the *Historic Shipwrecks Act* can be found at <www.environment.gov.au/heritage/shipwrecks>.



Bryozoans. Photo: Marine Life Society of South Australia.

3.4 Consideration of pressures on regional conservation values

There are a range of pressures impacting, or potentially impacting upon conservation values in the Region. Many of these are outlined in Appendix D (i.e. those of relevance to threatened and migratory species) and in the Coasts and Oceans chapter of the 2006 *State of the Environment Report*.

Of additional concern are the potential impacts of climate change on the marine environment. Valuable information on climate change impacts and adaptation in the marine environment can be found in the 2006 CSIRO Report *Impacts of Climate Change on Australian Marine Life* <www.greenhouse.gov.au/impacts/publications/marinelife.html>. The report provides a detailed overview of the potential impacts climate change

could have on marine biodiversity and ecosystems. It also proposes research and adaptation strategies to ameliorate climate change impacts.

The information collected during the profiling stage will inform how pressures on the regional conservation values described in this chapter, will be addressed in the South-west Marine Bioregional Plan.

Chapter 6 of this Bioregional Profile contains more information about how and when in the process, stakeholders' input will be sought to inform the development of the Draft Plan.



Long-snouted boarfish. Photo: Marine Life Society of South Australia.

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Map data

Figure 3.1 Key Ecological Features of the South-west Marine Region

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 Geoscience Australia (2006): Australian Maritime Boundaries (AMB) v2.0
 Projection: Geographics, Datum: GDA94
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Figure 3.2 Great Australian Bight Marine Park

Department of the Environment, Water, Heritage and the Arts (2004): Collaborative Australian Protected Areas Database - CAPAD
 Department of the Environment, Water, Heritage and the Arts (2006): Integrated Marine and Coastal Regionalisation of Australia v4.0 - Provincial Bioregions
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Figure 3.3 Historic shipwrecks with known locations occurring in the South-west Marine Region

Department of the Environment, Water, Heritage and the Arts (2003): Historic Shipwrecks Register
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Trevally. Photo: David Muirhead, Marine Life Society of South Australia.