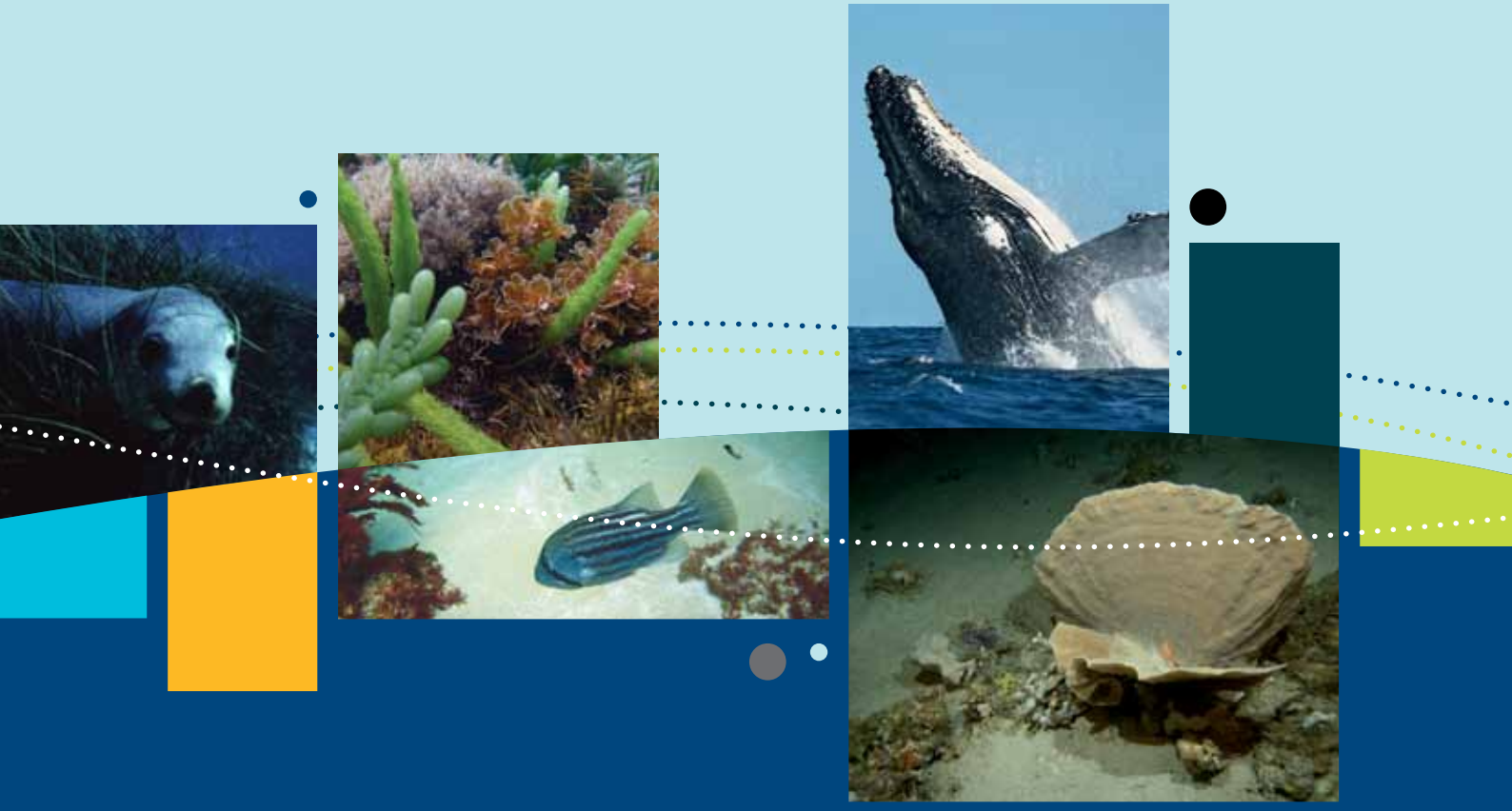
Australian Government

Department of Sustainability, Environment,
Water, Population and Communities



Detailed Analysis of the Proposed South-west Marine Region Network

Detailed Analysis of the Proposed

South-west Commonwealth Marine Reserve Network

Contents

1. Purpose of this document

This document supplements the document *Proposal for the South-west Commonwealth Marine Reserve Network* and provides further information to support public consultation on the proposal. The proposal for the South-west Marine Reserve Network has been released concurrently with the draft *South-west Marine Bioregional Plan*, which is also open for public comment.

This document describes how the proposed marine reserve network was designed; the information used to support it and provides a more detailed analysis against the *Goals and principles for the establishment of the National Representative System of Marine Protected Areas in Commonwealth waters.*

Online submission forms, documents and information resources about the South-west network proposal and the Draft South-west marine bioregional plan and are available at: **www.environment.gov.au/coasts/mbp/south-west/index.html.**

2 Policy context

2.1 The National Representative System of Marine Protected Areas

The Commonwealth, States and the Northern Territory first agreed to establish the National Representative System of Marine Protected Areas (NRSMPA) in 1998 when ministers meeting as the Australian and New Zealand Environment and Conservation Council approved guidelines for establishing the NRSMPA[1]. The primary goal of the NRSMPA is to establish and manage a comprehensive, adequate and representative system of marine protected areas to contribute to the long-term ecological viability of marine and estuarine systems, to maintain ecological processes and systems, and to protect Australia's biological diversity at all levels. As a signatory to the Convention on Biological Diversity, Australia shares an international commitment to establish a representative system of marine protected areas within its maritime jurisdiction.

The Australian Government is developing networks of marine reserves for each of the five large marine planning regions of the Commonwealth marine area (Figure 2.1)[2] as part of the NRSMPA. The first regional network of Commonwealth marine reserves was established in 2007 in the South-east marine region. Marine reserve networks are now being developed for the South-west, North-west, North and East marine regions.

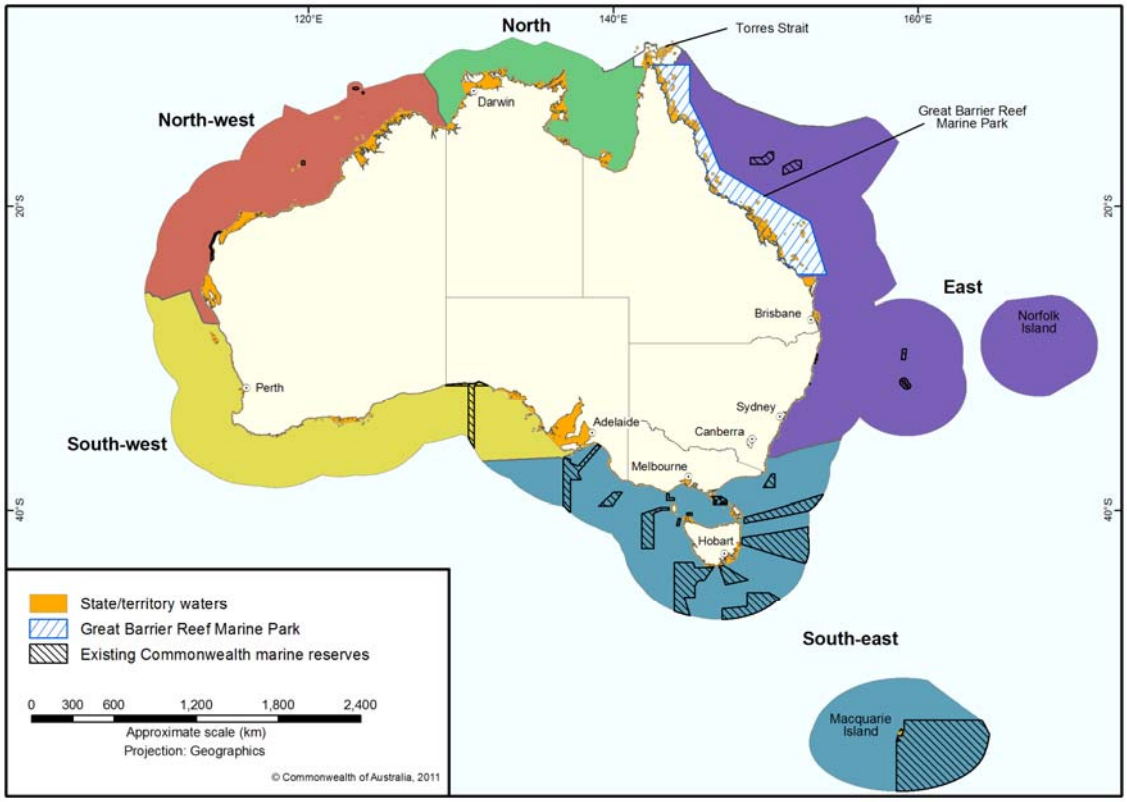


Figure 2.1 Australia's marine planning regions and existing Commonwealth marine reserves

The NRSMPA Guidelines identified the Interim Marine and Coastal Regionalisation of Australia (IMCRA v3.3) as providing the national and regional planning framework for developing the NRSMPA, with ecosystems used as the basis for determining representativeness. The IMCRA v3.3 focused on inshore waters and as such was not sufficient to support development of the

[1] For more information see http://www.environment.gov.au/coasts/mpa/nrsmpa/index.html
[2] The Commonwealth marine area includes waters from 3 nautical miles (or the territorial sea baseline) to the edge of Australia's Exclusive Economic Zone (200 nautical miles).

NRSMPA in Commonwealth waters. It was updated in 2006 and became the Integrated Marine and Coastal Regionalisation of Australia (IMCRA v4.0), covering both inshore waters and waters off the continental shelf of Australia. The provincial bioregions identified in IMCRA v4.0 are the key ecosystem planning units that are being used by the Australian Government in identifying the Commonwealth waters component of the NRSMPA.

The NRSMPA Guidelines describe principles to be followed in developing the NRSMPA. They include the CAR principles – those of Comprehensiveness, Adequacy and Representativeness.

> **Comprehensiveness**: the NRSMPA will include the full range of ecosystems recognised at an appropriate scale within and across each bioregion.
>
> **Adequacy**: the NRSMPA will have the required level of reservation to ensure the ecological viability and integrity of populations, species and communities.
>
> **Representativeness**: those marine areas that are selected for inclusion in MPAs should reasonably reflect the biotic diversity of the marine ecosystems from which they derive.

2.2 The Goals and Principles for the establishment of the National Representative System of Marine Protected Areas in Commonwealth waters

The NRSMPA guidelines set out high level criteria for the identification and selection of marine protected areas, but include only limited guidance as to how the guidelines are to be applied to achieve a CAR system. This limitation led the Australian Government to develop, in 2007, the *Goals and principles for the establishment of the National Representative System of Marine Protected Areas in Commonwealth waters*. The purpose of the Goals and Principles is to provide guidance about how to identify regional networks of marine reserves that meet the CAR principles. They seek to do this in circumstances where the complex nature of marine ecosystems, together with the absence of fine scale data, particularly for off-shore waters, make it difficult to confidently assess the extent to which the CAR principles have been satisfied. The use of an adaptive approach to management based on monitoring, research and performance review linked to biodiversity conservation objectives can be expected over time to increase confidence that the CAR principles are being met.

In the South-west marine region, as in other regions, there is a lack of detailed and comprehensive information on the distribution of biodiversity, mainly due to the vastness, remoteness and often inaccessibility of Australia's deep ocean environment. For this reason, surrogates for biodiversity (such as water depth, substrate and seafloor features) have been used extensively to design the proposed reserve network. This approach has been taken because science indicates that different habitats and species are associated with different physical features in the ocean. The use of surrogates is a key component of the four Goals that are guiding the development of Commonwealth marine reserves.

- **Goal 1** states that each **provincial bioregion** occurring in a marine region should be represented in the marine reserve network. The 41 provincial bioregions identified in IMCRA v4.0 have been determined largely on the basis of research on different assemblages of fish species and sponges that live at the seafloor as well as different types of deep water habitats and seafloor sediments.
- **Goal 2** states that all **oceans depths** should be represented in the marine reserve network. Scientific assessment has demonstrated that different biological communities live at different depths. Therefore, by including different ocean depths within Commonwealth

marine reserve networks, we can ensure that examples of all types of marine biodiversity will be represented.

- **Goal 3** states that examples of all types of marine **biological features** should be represented in the marine reserve network including those features found in the water column and at the seafloor. Marine biological features have been determined through scientific analysis of fine-scale information on distribution patterns of fish and invertebrate species as well as physical features such as sediment grain size and composition, seabed temperatures, and bathymetry. Scientists have also analysed marine biological features to identify large scale ecological features (or Key Ecological Features) that support distinct or important ecological communities at a regional scale.
- **Goal 4** states that examples of all different types of physical **seafloor features** should be represented in the marine reserve network. Seafloor features include underwater seamounts, canyons, and plains. By including samples of all different seafloor features in marine reserves, we ensure that the different ecological communities associated with these features are included in the reserves network.

Box 1.1 Goals and Principles for the establishment of the NRSMPA in Commonwealth waters

Goal 1 Each bioregion occurring in the Region should be represented at least once in the MPA network. Priority will be given to bioregions not already represented in the National Representative System.

Goal 2 The MPA network should cover all depth ranges occurring in the Region or other gradients in light penetration in waters over the continental shelf.

Goal 3 The MPA network should seek to include examples of benthic/demersal biological features (e.g. habitats, communities, sub-regional ecosystems, particularly those with high biodiversity value, species richness and endemism) known to occur in the Region at a broad sub-provincial (> 100s of kilometres) scale.

Goal 4 The MPA network should include all types of seafloor features. There are 21 seafloor types across the entire Exclusive Economic Zone. Some bioregions will be characterised by the presence of a certain subset of features, such as continental slope or seamounts.

In developing options that meet the four goals, the following location principles will be applied:

1. MPAs will be located taking into account the occurrence and location of existing spatial management arrangements (e.g. existing protected areas and sectoral measures) that contribute to the goals.
2. The goals should be met with the least number of separate MPAs (i.e. a smaller number of larger MPAs rather than many small MPAs) to maximise conservation outcomes.

Where different options that meet the goals exist, the following selection principles should be considered in selecting areas suitable for inclusion in the National Representative System of MPAs:

3. The capacity of an MPA to mitigate identified risks to conservation values.
4. The occurrence of spatially defined habitats for and/or aggregations of threatened and/or migratory species.
5. The occurrence of ecologically important pelagic features which have a consistent and definable spatial distribution.
6. The occurrence of known small-scale (tens of kilometres) ecosystems associated with the benthic/demersal environment.
7. Relevant available information about small-scale distribution of sediment types and sizes and other geo-oceanographic variables.
8. Occurrence of listed heritage sites (where inclusion in the MPA network would improve administration of protection regimes).
9. Socio-economic costs should be minimised.

Once the broad location of MPAs has been determined, the following design principles should be applied to further refine the size and shape of individual MPAs:

10. Individual areas should, as far as practicable, include continuous depth transects, (e.g. from the shelf to the abyss).
11. Whole seafloor (geomorphic) features should be included.
12. Features should be replicated wherever possible within the system of MPAs, (i.e. included more than once).
13. Size and shape should be orientated to account for inclusion of connectivity corridors and biological dispersal patterns within and across MPAs.
14. Boundary lines should be simple, as much as possible following straight latitudinal/longitudinal lines.
15. Boundary lines should be easily identifiable, where possible coinciding with existing regulatory boundaries.
16. The size and shape of each area should be set to minimise socio-economic costs.

The following zoning principles will be applied in developing the regional systems of MPAs:

17. Zoning will be based on the EPBC Act/The World Conservation Union (IUCN) categories of protection.
18. The regional MPA network will aim to include some highly protected areas (IUCN Categories I and II) in each bioregion.
19. Zoning will be based on the consideration of the risk that specific activities pose to the conservation objectives of each MPA.
20. Zoning of MPAs will seek to ensure that the conservation objectives of the area are protected, taking into account a precautionary approach to threats as well as the relative costs and benefits (economic, social and environmental) of different zoning arrangements.

2.3 Minimising socio-economic impacts

A key element of the Australian Government's approach to developing the regional marine reserve networks is the objective, embedded in the Goals and Principles, of establishing the reserve network in a way that minimises social and economic costs. Therefore, the design of the regional networks seeks wherever possible to avoid restrictions on access to areas of significance to a range of recreational and commercial interests. These include: recreational, charter and commercial fishing; aquaculture operations; existing petroleum and greenhouse gas storage titles, areas prospective for petroleum resources; tourism activities; non-commercial Indigenous uses and the exercise of non-commercial native title rights; defence and border protection activities; port-related activities, pipelines and submarine cables; and shipping lanes. Shipping rights of innocent passage under the United Nations Convention on the Law of the Sea are not affected.

The development of the proposed marine reserves network was also informed by consultation undertaken by the department on the Areas for Further Assessment for the South-west region. The identification of Areas for Further Assessment (AFAs) was an important step in refining information on human uses and socio-economic values in the marine environment. The Areas for Further Assessment were large areas that encompassed examples of the range of biodiversity and ecosystems within each marine region. The reason they were identified was to aid further analysis of information at a more detailed scale and assist in the design of new marine reserves. Consultations on the AFAs assisted in identifying potential social and economic impacts that may occur with the establishment of marine reserves in these areas and how those impacts could be minimised.

Section 3.2 outlines the social and economic data and information that have been used in the design of the network proposal with the objective of minimising impacts. Section 4.4 reports on the preliminary assessment of the impacts arising from the proposed network.

An accurate assessment of the extent of impact and the flow-on effects into regional communities requires input from potentially affected users and industries. A socioeconomic impact assessment will take place during the public consultation period. The outcomes of the assessment, together with the submissions received about the proposed marine reserve network, will inform government decisions on the final network.

Industries, communities and stakeholders potentially affected by the proposed reserves will be consulted as part of the socio-economic assessment.

The government has committed to considering adjustment assistance for affected commercial fishing businesses and fishing-dependent regional communities based on impacts evaluated as part of the socio-economic assessment and on other relevant inputs received through the public consultation process. Decisions on the scope, type and level of adjustment assessment will be based on the government's Fisheries Adjustment Policy released on 3 May 2011 and available at http://www.environment.gov.au/coasts/mbp/about/policy.html

3 The approach to designing the network

3.1 Systematic conservation planning

The proposal for the South-west Commonwealth marine reserve network has been designed to meet the Goals and Principles outlined above. The process of reserve identification has been supported by a systematic conservation planning approach and has implemented the software Marxan (see Box 3.1). This approach is recognised as best practice and is widely used for designing terrestrial and marine protected areas, both in Australia and overseas.

Systematic conservation planning involves the following steps:

- setting out the objectives that the network seeks to achieve, including conservation features that should be included and areas and values that should be avoided (in order to minimise economic and social impacts)
- selecting and using spatial data that best represents those objectives
- generating and evaluating configurations of areas that, taken together, meet those objectives

The objectives that the network seeks to achieve are derived directly from the *Goals and Principles:*

- Include examples of each of the seven provincial bioregions (Goal 1; Figure 3.1)
- Include examples of each of the seven meso-scale bioregions (Goal 1; Figure 3.2)
- Include examples of each of the nineteen depth ranges within provincial bioregions (Goal 2; Figure 3.3; Table 3.3)
- Include examples of benthic/demersal key ecological features (Goal 3; Figure 3.4)
- Include examples of all biological seascapes (Goal 3; Figure 3.5; Table 3.4)
- Include examples of all seafloor types (Goal 4; Figure 3.6)
- Incorporate permanent fisheries closures (Principle 1; Figure 3.7)
- Incorporate the existing Great Australian Bight Marine Park (Principle 1)
- Preferentially incorporate areas in proximity to existing state marine parks (Principle 1)
- Preferentially select areas including biologically important areas for species listed as threatened and migratory (Principle 4)
- Preferentially select spatially predictable pelagic key ecological features (Principle 5)
- Avoid areas of value to current users and existing interests (Principles 9 and 16)

Box 3.1 What is Marxan?

Marxan is a computer software decision support tool that can be applied to a range of conservation planning problems, including designing new reserve networks and reporting on the performance of proposed or existing networks. Its use is recognised internationally as a best practice approach to reserve design. Marxan is the most widely used conservation planning software in the world.

Marxan is used to inform decision-making in relation to the location of new reserve networks, with user-defined levels of biodiversity representation, for the least possible cost (Ball *et al.* 2009). It uses data layers of conservation features (such as bioregions and depth ranges), and socio-economic values (such as the value of fisheries and other industries) that represent the potential cost of the reserves, and produces potential network solutions that optimise the conservation outcomes against the potential cost of achieving them. More information about Marxan is available at the University of Queensland website: www.ecology.uq.edu.au/marxan.

The network proposal presented in this document is the result of iterative development and assessment of multiple configurations of marine reserves that meet the set of objectives outlined above. The identification process was guided by the twenty principles, facilitated by the initial application of Marxan and informed by input obtained from stakeholders during consultation on the areas for further assessment.

3.2 The information base

A broad range of datasets was used to inform the development of the network proposal. Tables 3.1 and 3.2 explain the relationship between the network objectives and the relevant datasets used in the design process.

Key inputs to the reserve design process included information about:

1. Biodiversity values
2. Existing spatial management measures
3. Socio-economic values

3.2.1 Biodiversity values

Unlike most terrestrial environments, information about the full range of habitats and species in marine environments is generally poor. This is especially the case in the offshore parts of the South-west region where waters are very deep and there has been little detailed study or data gathering. In these circumstances, the detailed and peer-reviewed data that does exist is supplemented with information on known or predicted linkages between the physical environment and biodiversity. This concept is commonly referred to as surrogacy. Surrogates that are commonly used to represent biodiversity include depth, substrate, geomorphology (seafloor features), latitude, light and currents. Each of these factors will have an influence on where particular species, habitats or ecological communities occur.

The following information about the biodiversity values of the region has been incorporated into the design of the proposed network:

- bioregions
- depth
- benthic and demersal biological features
- seafloor features
- species

<u>Bioregions (Goal 1)</u>

The bioregions in Australia's marine jurisdiction have been identified based on the patterns of bottom-dwelling species through the Integrated Marine and Coastal Regionalisation of Australia (IMCRA v4.0). The Commonwealth Environmental Research Fund (CERF) Marine Biodiversity Hub has analysed an additional six animal species groups which further support the validity of these bioregions (Dunstan and Foster 2009).

Marine bioregions have been identified at two scales: provincial bioregions, which encompass the entire area of Australia's marine jurisdiction (Figure 3.1); and smaller meso-scale bioregions, which are confined to the continental shelf waters (Figure 3.2). Information on IMCRA is available at: http://www.environment.gov.au/coasts/mbp/publications/imcra/imcra-4.html

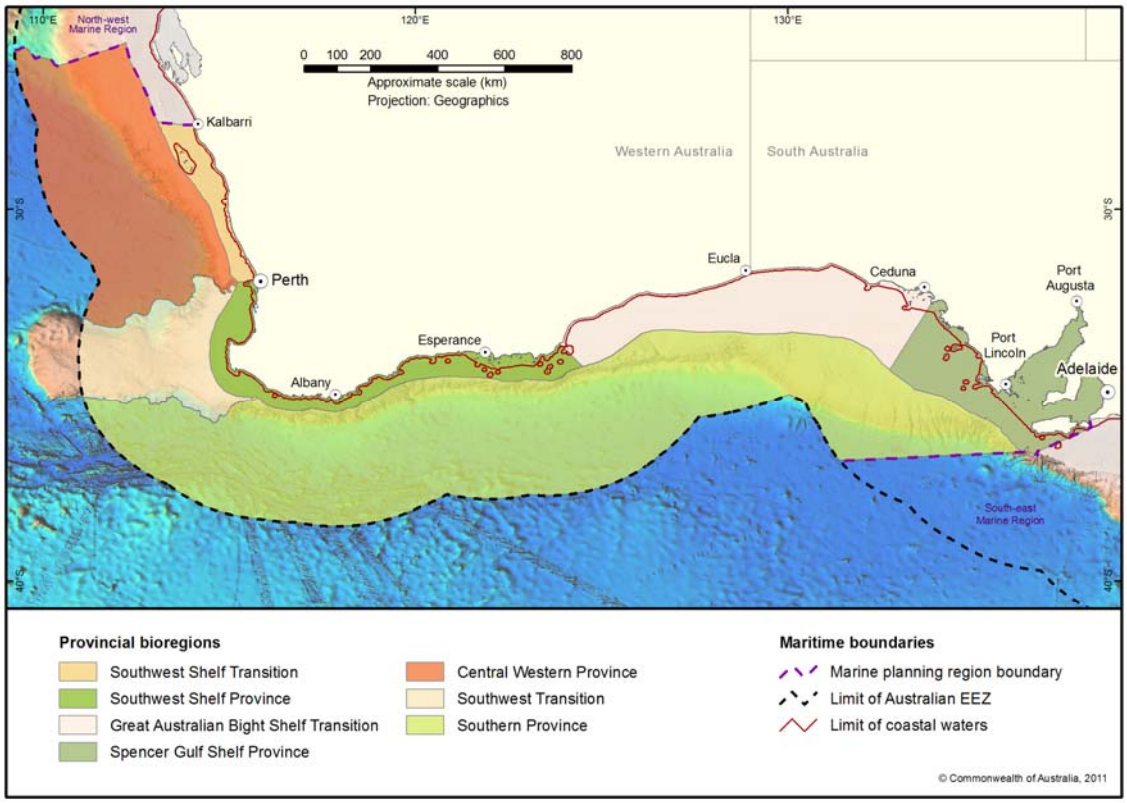


Figure 3.1 Provincial bioregions of the South-west marine region

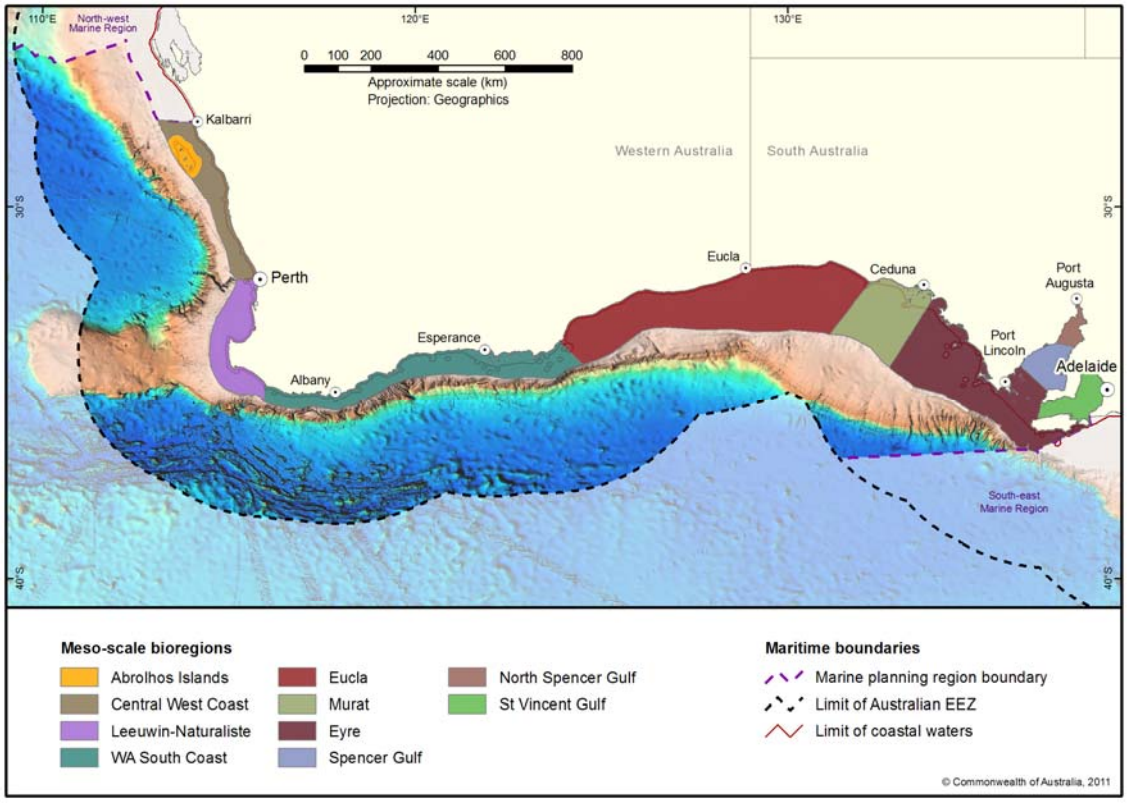


Figure 3.2 Meso-scale bioregions of the South-west marine region

Table 3.1. Biophysical datasets used in the design of the draft proposal for the South-west network

Network design objecitves	Relevant Goals and Principles	Dataset	Description	Source
Include examples of all provincial bioregions	Goal 1	Provincial bioregions	• large planning units based on ecological patterns (bottom-dwelling invertebrates and fish that live close to the seafloor) • 7 occur in the region	IMCRA v4.0
Include examples of all meso-scale bioregions	Goal 1	Meso-scale bioregions	• smaller planning units confined to continental shelf waters based on ecological patterns • 7 occur in the region	IMCRA v4.0
Include examples of all depth ranges within provincial bioregions	Goal 2	Depth within bioregions	• depth ranges selected based on species distribution	CERF Marine Biodiversity Hub CSIRO
Include examples of all key ecological features	Goal 3	Key ecological features	• areas, species or communities regionally or nationally important for ecological functioning • 16 occur in the region	DSEWPaC
Include examples of all biological seascapes	Goal 3	Biological seascapes	• areas with similar seabed assemblages of marine fauna • based on predictive modelling using physical and biological data on demersal fish and benthic invertebrates	CERF Marine Biodiversity Hub
Include examples of all seafloor types	Goal 4	Seafloor features	• landscape-scale physical structures of the seafloor (geomorphology), e.g., canyons and reefs • 16 different types in the South-west region	IMCRA v4.0
Include examples of biologically important areas for species listed as threatened and migratory	Principle 4	Biologically important areas	• areas where aggregations of individuals of a protected species display behaviours such as breeding, foraging, resting and migration	DSEWPaC

Table 3.2. Socio-economic datasets used in the design of the draft proposal for the South-west network

Name	Relevant Goals and Principles	Description	Network Design Objectives	Source
Commercial fishing	Principles 9, 16	• State data was available as 60 minute reporting grids (generally for 2000-2006), while Commonwealth data was available as 6 minute reporting grids (2003-2008)	Seek to avoid areas of value to commercial fisheries	AFMA; BRS; WA DoF; PIRSA
Charter fishing	Principles 9, 16	• Data on broad distribution of catch and effort from state and national surveys.	Seek to avoid areas of value to charter fishing operations	Henry and Lyle 2003; Sumner et. al 2008; Knight 2009; WA DoF; PIRSA
Recreational fishing	Principles 9, 16	• Data on broad distribution of catch and effort from state and national surveys. Additional information on important recreational fishing ports and iconic areas from state based recreational fishing organisations	Seek to avoid areas of value to recreational fishers and boating	Henry and Lyle 2003, Sumner et. al 2008 and Recfish Australia
Offshore aquaculture	Principles 9, 16	• 3 sites occur in the region, all for scallop production; offshore from Geraldton, Mandurah and Bunbury.	No objective set in Marxan; data used for contextual purposes	WA DoF
Native Title	Principles 9, 16	• 9 claims currently extend into the region (current as of March 2011)	No objective set in Marxan; data used for contextual purposes	National Native Title Tribunal
Defence	Principles 9, 16	• a large training area exists off the coast from Perth, the Western Australian Exercise Area (WAXA).	No objective set in Marxan; data used for contextual purposes	Department of Defence
Petroleum	Principles 9, 16	• 10 petroleum exploration titles, 1 petroleum production title, 4 petroleum acreage releases and 2 geosequestration releases currenlty occur in the region.	Seek to avoid petroleum leases and acreages	DRET
Petroleum prospectivity	Principles 9, 16	• relative petroleum prospectivity based on sedimentary basins; some areas of high prosecitity occur in the region.	Seek to avoid basins with medium to high prospectivity	Geosciences Austalia
Shipping and ports	Principles 9, 16	• distribution of shipping routes, volume of traffic, existing & proposed ports	No objective set in Marxan; data used for contextual purposes	BRS
Fisheries closures	Principles 1, 9 and 16	• permanent fisheries closures and habitat protection areas	Always select permanent fisheries closures	AFMA; WA DoF
Marine reserves	Principle 1	• existing and proposed state and commonwealth marine reserves within and adjacent to the region	Always select the existing GAB MP Preferentially select areas in proximity of existing state marine parks	WA DEC; SA DENR; DSEWPaC
Submarine cables	Principle 1	• 1 telecommunication cable links Australia, via Perth, with South-East Asia; has a protection zone 2 nm wide to 2000m	No objective set in Marxan; data used for contextual purposes	ACMA
Historic shipwrecks	Principle 8	• 5 occur in the region, includling the HMAS *Sydney* II and HSK *Kormoran*, recently added to the National Heritage List.	No objective set in Marxan; data used for contextual purposes	DSEWPaC

Depth (Goal 2)

The South-west marine region ranges from shallow coastal waters of less than 15 metres depth to the deep ocean at around 6000 metres depth. Many marine assemblages are stratified by depth and similar depth ranges in different bioregions support different suites of species, so depth ranges within bioregions should be represented.

The CERF Marine Biodiversity Hub has analysed the available data on the distribution of over 1500 bottom dwelling fish species and used this to develop a species-based depth stratification of the continental shelf waters (0–200m) (Lyne *et. al.* 2009). These depth ranges have been expanded, based on advice from the CSIRO, to include the deeper waters of the continental slope, continental rise and deep ocean floor (Figure 3.3; Table 3.3). Further information on depth ranges is available at: **www.marinehub.org**. This depth classification has been used in addressing Goal 2.

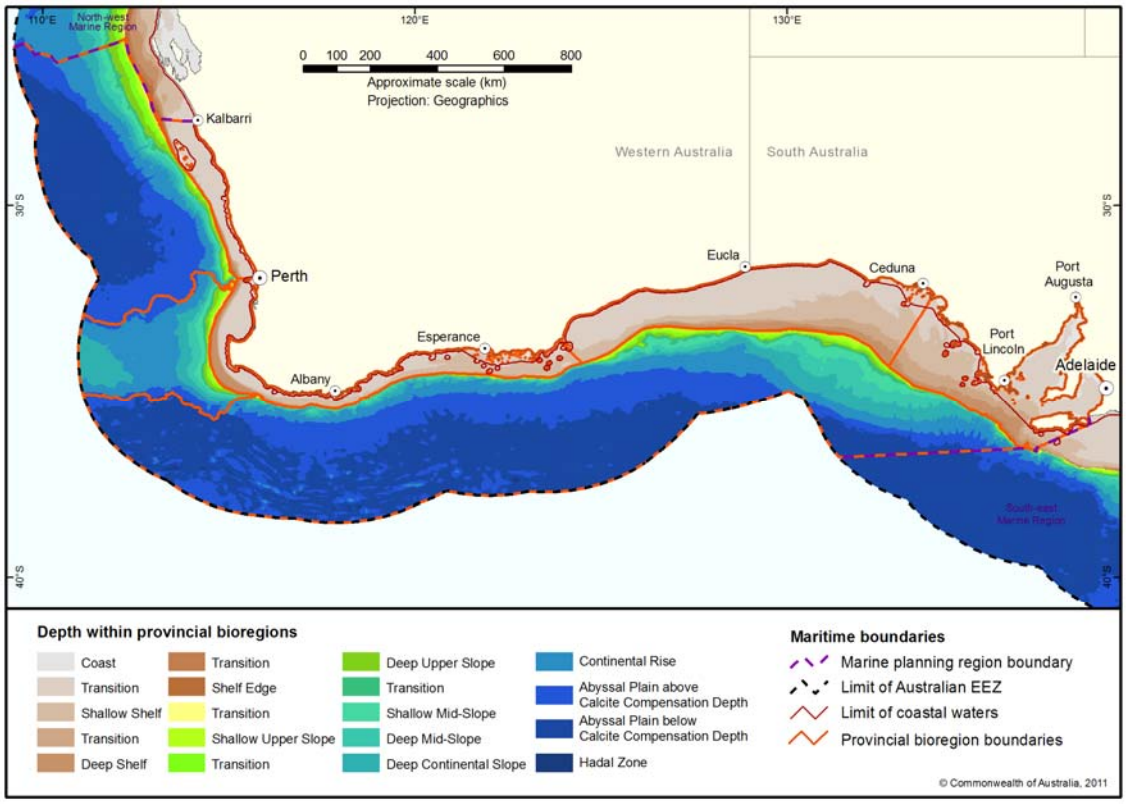


Figure 3.3 Depth ranges within bioregions in the South-west marine region

Table 3.3. Depth ranges within the provincial bioregions used in the reserve design process for the South-west marine region. These depth ranges are based on the work by the CERF Marine Hub and advice from CSIRO.

	Shelf Provincial Bioregions	Off shelf Provincial Bioregions		
Depth range	Southwest Shelf Transition Southwest Shelf Province Great Australian Bight Shelf Transition Spencer Gulf Shelf Province	Central Western Province	Southwest Transition	Southern Province
Shallow Water	**0 - 15**	**-**		
Shallow Water to Shallow Shelf Transition	**15 - 70**	**-**		
Shallow Shelf	**70 - 100**	**-**		
Shallow Shelf to Deep Shelf Transition	**100 - 120**	**-**		
Deep Shelf	**120 - 150**	**-**		
Deep Shelf to Shelf Edge Transition	**150 - 165**	**-**		
Shelf Edge	**165 - variable**	**-**		
Shelf Edge to Shallow Upper Slope Transition	**-**	**230 - 300**	**225 - 305**	**220 - 310**
Shallow Upper Slope	**-**	**300 - 510**	**305 515**	**310 - 520**
Shallow Upper Slope to Deep Upper Slope Transition	**-**	**510 - 650**	**515 - 650**	**520 - 650**
Deep Upper Slope	**-**	**650 - 800**	**650 - 775**	**650 - 750**
Deep Upper Slope to Shallow Mid-Slope Transition	**-**	**800 - 890**	**775 - 875**	**750 - 860**
Shallow Mid-Slope	**-**	**890 – 1075**	**875 -1105**	**860 - 1140**
Deep Mid-Slope	**-**	**1075 - 1500**	**1105 - 1500**	**1140 - 1500**
Deep Continental Slope	**-**	**1500 - 2500**		
Continental Rise	**-**	**2500 - 4000**		
Abyssal Plain above Calcite Compensation Depth	**-**	**4000 - 5000**		
Abyssal Plain below Calcite Compensation Depth	**-**	**5000 - 6000**		
Hadal Zone	**-**	**>6000**		

Benthic and demersal biological features (Goal 3)

The physical composition of the seabed strongly affects the distribution of many benthic organisms. Information about key ecological features and biological seascapes has been used to represent the benthic and demersal biological features of the region in addressing Goal 3.

Key ecological features are elements of the Commonwealth marine environment that are of particular importance for ecological functioning, ecological integrity and biodiversity. The south-west marine region has 16 key ecological features (Figure 3.4). All but three of these have been mapped; while the remaining three are defined by indicative locations only. These are the meso-scale eddies of the Leeuwin Current, small pelagic fish and the benthic invertebrate communities of the eastern Great Australian Bight.

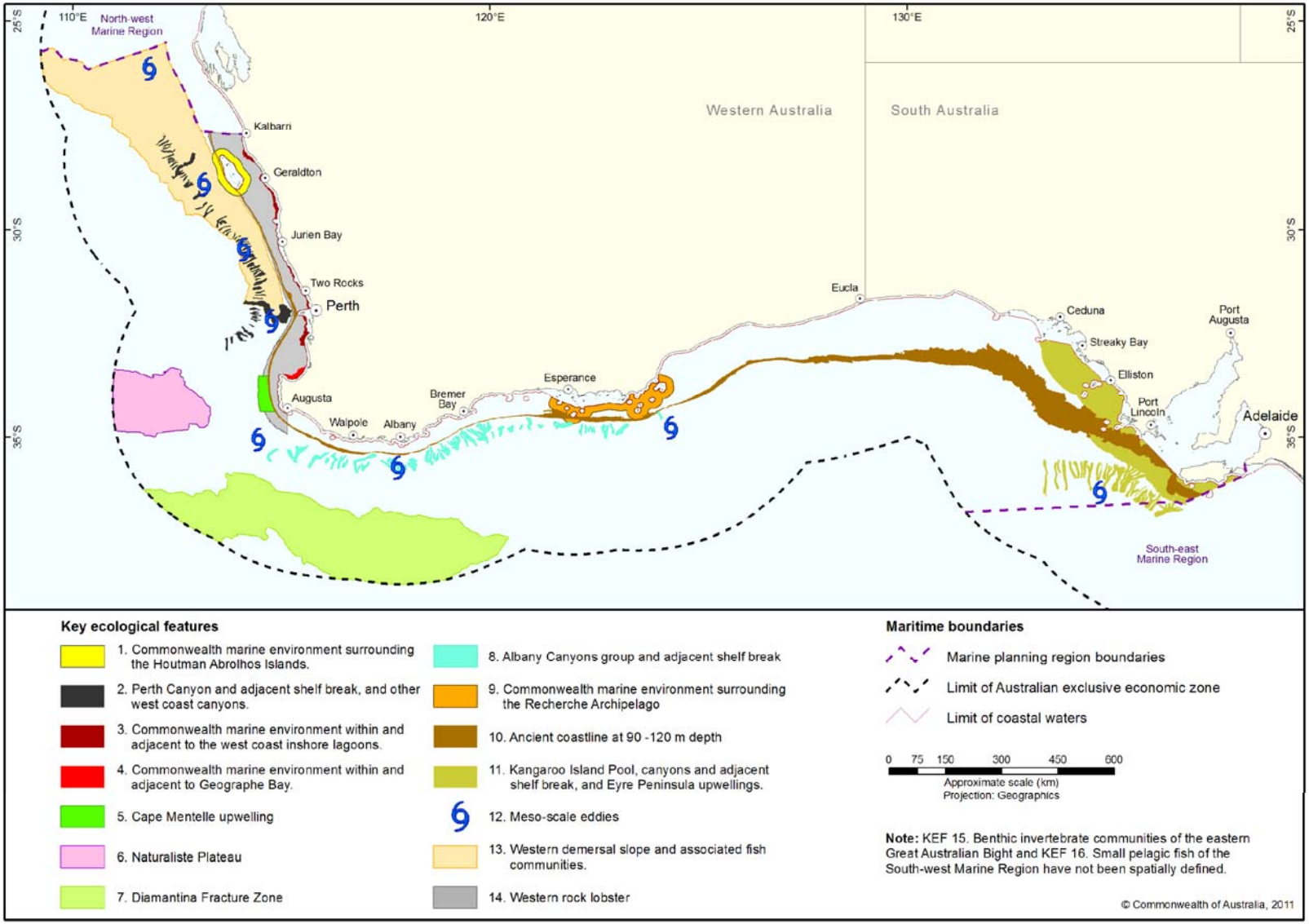


Figure 3.4 Key ecological features of the South-west marine region

Biological seascapes represent a combination of physical and biological information that predicts where species are likely to occur using scientific modelling of ecosystems (Figure 3.5; Table 3.4). The inclusion of these as a surrogate for biodiversity allows the variety of biodiversity associated with different substrates to be captured within the proposed network. The CERF Marine Biodiversity Hub has developed the biological seascapes based on the original seascapes developed by Geosciences Australia. Further information is available at: **www.marinehub.org.**

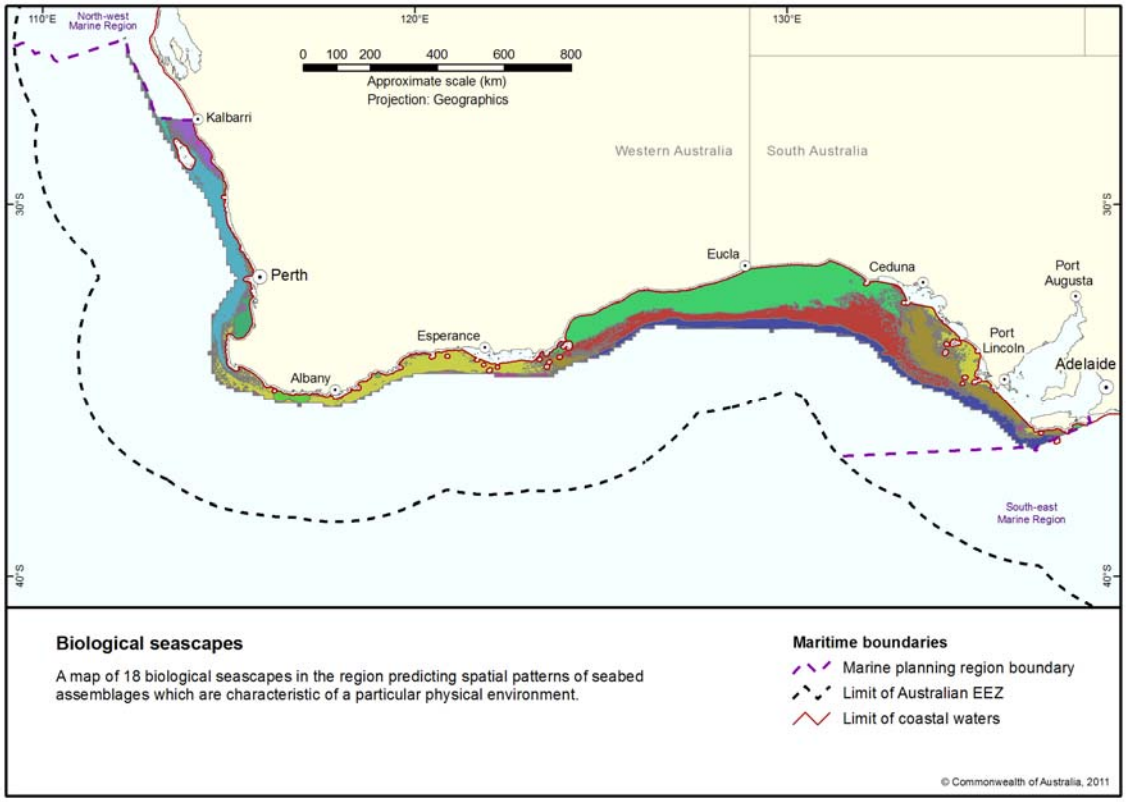


Figure 3.5 Biological seascapes of the South-west marine region

Table 3.4. Description of the CERF Marine Hub biological seascapes clusters used in the reserve design.

Cluster	Location	Description
Cluster 1*	upper Gulf St Vincent SA	Very high salinity average, very large variation in sea surface temperature, very low silicate average, relatively high turbidity, moderately high average water temperature at the seabed, moderately shallow depth
Cluster 2	Cervantes coast WA	Shallow depth, moderately high average water temperature at the seabed and surface , moderately high turbidity
Cluster 3	Shark Bay/Coral Coast WA	Very high average water temperature at the seabed and relatively high sea surface temperature, very shallow depth, relatively high turbidity, relatively low sediment carbonate, moderately low oxygen average at the seabed
Cluster 4	Carnarvon offshore WA	Very low oxygen average at the seabed, very high sea surface temperature, high average water temperature at the seabed, high silicate average, moderate outer-shelf depth range
Cluster 5	Carnarvon outer shelf WA	Low oxygen average at the seabed, very high surface temperature, high silicate average, shelf-break depth range, moderately high average water temperature at the seabed, relatively high sediment carbonate
Cluster 6	Great Australian Bight & SA gulf entrances	High sediment carbonate, moderately large variation in sea surface temperature, moderately high salinity average, intermediate average water temperature at the seabed, inner-shelf depth range
Cluster 7	SW and SA mid-shelf	Moderately small variation in sea surface temperature, relatively high sediment carbonate, moderate salinity average, mid-shelf depth range
Cluster 8*	Lower SA gulfs	High salinity average, large variation in sea surface temperature, low silicate average, moderately low average water temperature at the surface, moderately high turbidity, moderately shallow depth
Cluster 9	Great Australian Bight shelf-break	Low turbidity, high sediment carbonate, moderately low silicate average, high oxygen average at the seabed, shelf-break depth range, low moderate average water temperature at the seabed
Cluster 10	South Western shelf	Shelf depth range, moderately high average water temperature at the seabed and surface, moderate low variation in sea surface temperature, intermediate low oxygen average at the seabed, moderately high sediment carbonate
Cluster 11	Great Australian Bight outer shelf	High sediment carbonate, high intermediate salinity average, outer-shelf depth range
Cluster 12	Southern upper slope	Upper slope depth range, low salinity average, low average water temperature at the seabed, low turbidity, high nutrients, high oxygen average at the seabed, high sediment carbonate, steep slope
Cluster 13	Mid-shelf patches	Relatively low sediment carbonate, mid-shelf depth range, some areas of high sediment mud content
Cluster 14	East & west GAB fringes	Very high sediment carbonate, moderately high salinity average, shelf depth range, moderate average water temperature at the seabed
Cluster 15	SW and SE outer shelf and break	Very low surface water temperature average and variation, moderately low average seabed water temperature, high average seabed oxygen, relatively low silicate average and variation, outer shelf/break depth range
Cluster 16	Coastal patches	Shallow coastal depth range, moderate high turbidity, high sediment carbonate, moderate high salinity average
Cluster 17	large coastal embayment's	Low carbonate, low surface water temperature average and variation, inner shelf depth range
Cluster 18	SW & SE upper slope	Very low salinity average, very low average seabed water temperature, very high nutrients, high average seabed oxygen, high silicate average, upper slope depth range
Cluster 19	Western upper slope	Very high average seabed oxygen, upper slope depth range, very low salinity average, very low average seabed water temperature, very high nutrients, high silicate average, moderately high average surface water temperature
Cluster 20	Western shelf	Very high average seabed water temperature, moderately high sea surface temperature, moderately low oxygen average at the seabed, shelf depth range

* These two clusters do not appear in the South-west Marine Region.

Seafloor features (Goal 4)

The landscape-scale physical structure of the seafloor is important in determining where habitats or species occur. Large physical seafloor structures (10s to 100s of kilometres in scale) are referred to as geomorphic or seafloor features and include, for example, seafloor pinnacles, canyons and reefs. There are 16 types of seafloor features in the South-west marine region (Figure 3.6). Information on the IMCRA v4.0 seafloor features data layer is available at: **http://www.environment.gov.au/coasts/mbp/publications/imcra/imcra-4.html**

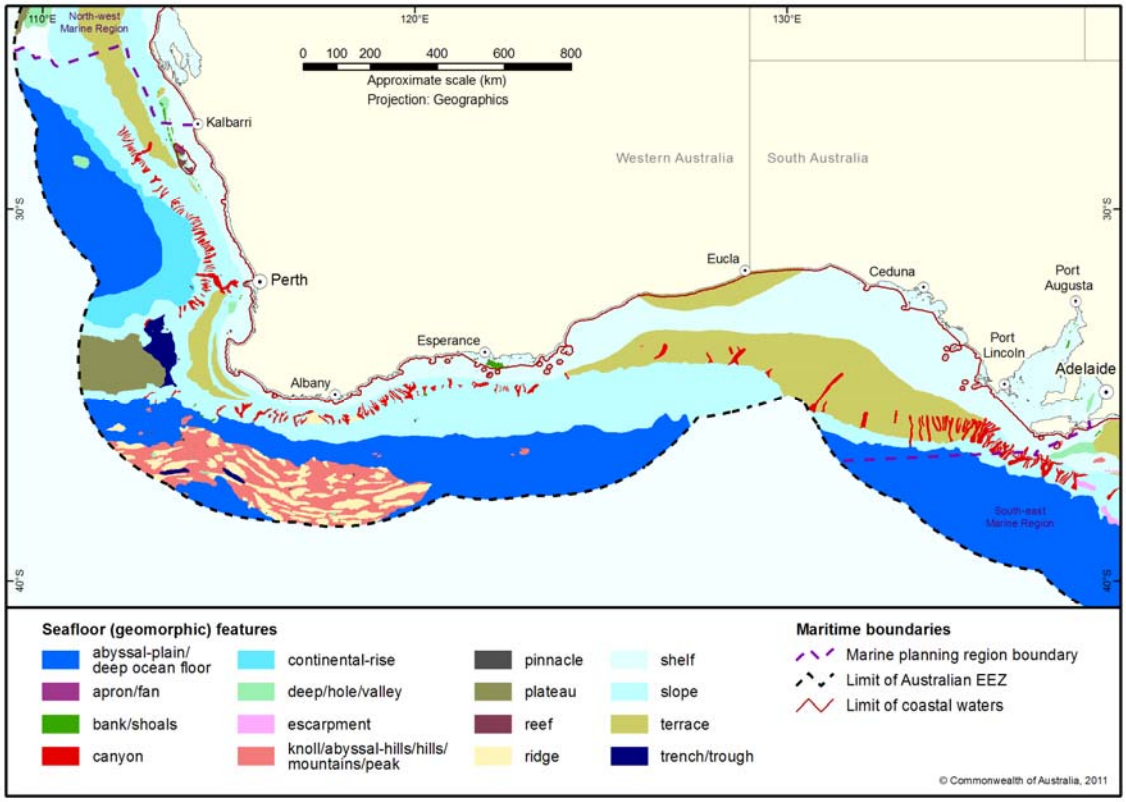


Figure 3.6 Seafloor features of the South-west marine region

Species

Biologically important areas are areas where aggregations of individuals of a protected species display behaviours such as breeding, foraging, resting and migration. Biologically important areas highlight those parts of the region that are particularly important for the protection and conservation of protected species. They have been identified based on published literature and advice from scientific experts. Information on the distribution, relative abundance and types of activities, such as foraging, breeding, and resting on migration, were compiled for whales, sharks, seabirds and pinnipeds in the South-west marine region.

3.2.2 Existing spatial management measures

Principle 1 requires that existing spatial closures be incorporated into the network whenever possible and appropriate. Existing spatial management measures considered in the design of the network include:

- fisheries closures
- state and Commonwealth marine reserves (both existing and proposed)
- historic shipwrecks
- submarine telecommunication cable protection zones.

Fisheries closures

Permanent fisheries closures and habitat protection areas considered in the design of the reserves are:

- Three deep water habitat protection closures of the Great Australian Bight Trawl Sector of the Commonwealth-managed Southern and Eastern Scalefish and Shark Fishery.
- Two gulper shark (Southern Dogfish) protection zones of the Southern and Eastern Scalefish and Shark Fishery in the eastern Great Australian Bight.
- Metropolitan Zone Closure of the Western Australian West Coast Demersal Gillnet and Demersal Longline Fishery.
- Western Australian Abrolhos Islands Fish Habitat Protection Area.

Additional fisheries closures were implemented by the Australian Fisheries Management Authority in July 2010, however, these were not incorporated into the design of the proposed network.

Marine reserves

There is one Commonwealth Marine Reserve within the region, the Great Australian Bight Marine Park (see chapter 3). Several state marine reserves and areas identified for inclusion in future reserves are situated adjacent to the region (Figure 3.7). These include:

- the South Australian marine protected area network
- proposed Capes Marine Park (WA)
- Shoalwater Islands Marine Park (WA)
- Marmion Marine Park (WA)
- Jurien Bay Marine Park (WA).

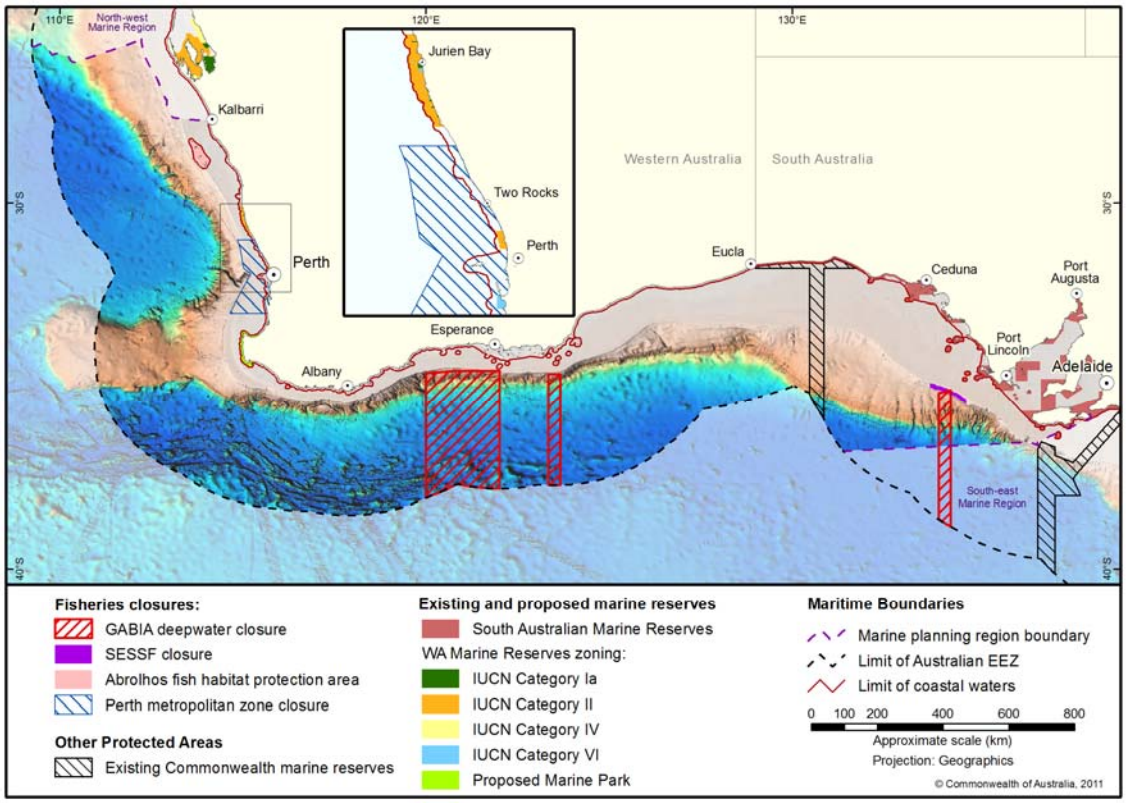


Figure 3.7 Location of fisheries closures and existing marine reserves in the South-west marine region

Historic shipwrecks

There are five historic shipwrecks protected under the *Historic Shipwrecks Act 1976* in the region, including the HMAS *Sydney* II and the HSK *Kormoran*, which have recently been added to Australia's Commonwealth and National Heritage Lists. More information is available from **www.environment.gov.au/heritage/shipwrecks**.

Submarine cables

There is one telecommunication cable linking Australia, via Perth, with South-East Asia (the SEA_ME_WE3), which is a submarine cable of national significance. The protection zone over the cable is two nautical miles wide and extends to a depth of 2000 metres (approximately 94.5 kilometres from land). More information is available from the Australian Communications and Media Authority web site **www.acma.gov.au**.

3.2.3 Socio-economic values

Principles 9 and 16 require that in considering alternative reserve locations, sizes and shapes, a key consideration should be to minimise socio-economic impacts.

Information incorporated into the reserve design process about existing human uses of the region included commercial, recreational and traditional uses. The majority of human uses are concentrated on the continental shelf, with limited activities in the deeper waters of the slope and deep ocean floor. Socio-economic data has been used to inform site selection, the delineation of boundaries and zoning to minimise socio-economic costs. Information about the following uses has been incorporated into the design of the proposed network:

- commercial fishing
- charter fishing
- recreational uses, including fishing and diving
- offshore aquaculture
- Native Title
- defence
- petroleum
- shipping and ports

Commercial fishing

Commercial wild-catch fishing is the most widespread activity in the south-west marine region. Twenty-four commercial fisheries operate in the region. On average, the total Gross Value of Production[3] (GVP) of fisheries operating in the region is around $521 million annually. In 2007–08 the region's catch amounted to 29 per cent of total Australian wild caught fish production. The most valuable fishery in the south-west marine region targets the Western rock lobster (*Panulirus cygnus*). In 2008–09 the total value of the catch of Western rock lobster was approximately $191 million (Fletcher and Santoro, 2010). Fishing effort is relatively evenly distributed across the region, with the highest effort concentrated along the Western Australian west coast, particularly just north of Perth, and around the shelf break in the Great Australian Bight.

[3] Fisheries data was incorporated into the reserve design process as annual average Gross Value of Production (GVP) which is the value of commercial fishery products at the point of landing. GVP does not take into account the cost to fishers of catching the fish, or the cost of transporting, processing and marketing the fish products for wholesale and retail markets. It also does not take into account flow-on effects such as value-adding and other potential benefits to individuals and communities.

Data on the distribution of commercial fishing was obtained from Commonwealth and state government fisheries management agencies. Data for Commonwealth-managed fisheries incorporated the years 2003–2008 and for state managed fisheries the years 2000–2006 (with the exception of the South Australian Marine Scalefish fishery (2004-2006) and the WA Demersal Scalefish and Deep sea crab fisheries (2007)).

Application and interpretation of fisheries data was informed by input obtained from industry representatives and fisheries managers during consultation undertaken by the department on the Areas for Further Assessment for the South-west region.

Charter fishing

In 2008-09 there were 108 licence holders (89 active vessels) in the South Australian charter industry, while in 2009-10 there were 125 licences to fish and an additional 23 licences to fish and run eco-tours in the west coast region of the Western Australian charter industry (Knight 2010, Fletcher and Santoro 2010). There is limited information on the distribution of fishing effort available for the charter fishing sector. Available information includes:

- The 2001 National Recreational and Indigenous Fishing Survey (Henry and Lyle 2003), which provides now dated information on the distribution of effort;
- Additional spatial information based on charter fishing surveys for the west coast of WA between Augusta and Kalbarri for the years 2005–06 (Sumner *et al.* 2008);
- Information on the charter industry has recently been published across broad reporting regions for South Australia for the years 2007-09 (Knight 2010). This information was not available for the development of network proposal, but it will inform the finalisation of the network.

Recreational uses, including fishing and diving

Recreational fishing effort is greater in Western Australia than in South Australia (Clifton *et al*. 2007). In 2001, 11 per cent of total recreational fishing days for Western Australia and three per cent for South Australia were spent in offshore areas, further than 5 kilometres from the coast (Henry and Lyle 2003). Limited information on the distribution of effort is available for the recreational fishing sector. Available information includes:

- The 2001 National Recreational and Indigenous Fishing Survey (Henry and Lyle 2003);
- Additional information on recreational fishing in Western Australia came from recreational fishing (creel) surveys undertaken by WA Department of Fisheries (Sumner *et. al.* 2008);
- Information on important recreational fishing ports and iconic recreational fishing areas was obtained through consultation with Western Australian and South Australian recreational fishing organisations, during consultation undertaken by the department on the Areas for Further Assessment for the South-west region.

Offshore aquaculture

Most aquaculture occurs within state waters adjacent to the region. The Aquaculture Development Council of Western Australia is assessing the potential for aquaculture in deeper, more exposed sites. There are currently three aquaculture sites within the region, all for scallop production, located offshore from Geraldton, Mandurah and Bunbury.

Native Title

Under the *Native Title Act*, Native Title holders have rights to the harvest of species in areas over which they have Native Title. Native Title determinations need not have been made in

order for this right to exist. Native Title information was provided by the National Native Title Tribunal; including all claims within and adjacent to the region. Further information is available from the National Native Title Tribunal at: **www.nntt.gov.au/PUBLICATIONS-AND-RESEARCH/MAPS-AND-SPATIAL-REPORTS/Pages**.

Defence

The Australian Defence Forces use the entire marine estate in the course of their activities, with specific areas set aside for training activities. Within the South-west marine region there is a large training area off the coast from Perth known as the Western Australian Exercise Area (WAXA).

Petroleum

The South-west marine region is not one of Australia's most significant resource areas for petroleum. The region includes one active production well, several areas of active exploration and areas of medium to high prospectivity where exploration is likely to increase in the future. Production of crude oil from the Perth Basin contributed 3.5 per cent to Australia's total production in 2007–08 (ABARE 2009). Continuing development of Australia's offshore petroleum resources is essential to Australia's energy security.

Information on the distribution of exploration and production leases and acreage releases in the region is available from the Department of Resources, Energy and Tourism. This was supplemented with current information about the relative prospectivity for petroleum of areas in the region supplied by Geosciences Australia.

There are currently 13 offshore petroleum acreages in the region, and a further two carbon capture and storage acreages. Further information is available from the Department of Resources, Energy and Tourism at:
http://www.ret.gov.au/resources/upstream_petroleum/Pages/UpstreamPetroleum.aspx

Shipping and ports

Most major ports in the region are either in the process of expanding or are earmarked for expansion in order to service the expanding mining industry in Western Australia. Spatial information on the distribution of shipping routes, volume of traffic and existing and proposed ports was used to avoid impacts on the shipping industry (Bureau of Rural Sciences 2004).

3.3 Approach to zoning

The *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) sets out the legal framework for declaring and managing Commonwealth marine reserves. It requires that, upon proclamation of new Commonwealth marine reserves, each reserve and any area within it must be assigned to one of the International Union for the Conservation of Nature's (IUCN) set of seven protected area management categories.[4] Schedule 8 of the EPBC Regulations outlines the Australian IUCN reserve management principles.

The approach to zoning is informed by Principles 19 and 20. There are two components to the approach to zoning:

1. determining the location, size and shape of different zones
2. determining what activities are allowed in the different zones

[4] For further information see **www.iucn.org/about/work/programmes/pa/pa_products/wcpa_categories**

Determining the location, size and shape of different zones

The selection of areas to be zoned as highly protected was based on Principle 18; that the network should aim to include some highly protected areas in each bioregion (i.e. IUCN Categories I or II). The requirement that each bioregion include highly protected areas, considered jointly with both the aim to minimise socio-economic impacts and information about the finer scale distribution of conservation features in the region, was the primary driver for the location, size and shape of the highly protected zones (identified as Marine National Park zones).

Determining what activities are allowed in the different zones

The South-west marine reserve network is proposed to include areas that are highly protected and areas where some natural resource use is allowed, as long as it is consistent with the objective of protecting and maintaining biodiversity in the long-term. Biodiversity conservation is the primary objective for all parts of the NRSMPA. This objective informs decisions about the compatibility of activities in marine reserves and requires the application of precaution in decision-making about the potential impacts of human activities. Therefore, although the mitigation of threats to biodiversity is not the basis on which the marine reserve networks in Commonwealth waters are identified, threat mitigation within proposed reserves is a consideration in decisions about proposed reserve zoning and about which activities can be permitted within zones.

Highly protected areas exclude most activities. On the other hand, multiple use zones generally allow sustainable use of the marine environment and its resources where they are compatible with the overarching objective of conserving biodiversity.

The zoning scheme proposed for the South-west reserves network includes marine national park zones (IUCN II) designed to provide the highest level of protection to conservation features; multiple use zones (IUCN VI), which allow a range of existing activities but exclude activities that carry a high risk to the conservation values; and special purpose zones (IUCN VI), which allow a wider range of commercial activities to lessen potential displacement of the commercial fishing industry.

The zoning arrangements that apply to each zone type are outlined in Table 3.5. Details of the conditions and approval or permit requirements that apply to specific activities within a Commonwealth marine reserve will be included in the South-west Commonwealth Marine Reserves Network Management Plan, which will be prepared once the network proposal is finalised and the marine reserves are proclaimed under the *Environment Protection and Biodiversity conservation Act 1999*. The development of the management plan is a statutory process and will involve two periods of public consultation.

Under the proposed zoning scheme, some activities may be undertaken subject to general approvals, operator registration or individual permit. Some activities, including exploration for and development of petroleum resources in multiple use areas, will be subject to individual project assessment and approval under the EPBC Act by both the Minister (or his delegate) and the Director of National Parks.

Table 3.5 - Proposed zoning framework for the South-West Marine Reserve Network

Activity	Marine National Park Zone (IUCN Category II)	Multiple Use Zone (IUCN Category VI)	Special Purpose Zone (IUCN Category VI)
Recreational fishing[a]	×	✓	✓
Recreational scuba diving and snorkelling[b]	✓	✓	✓
Research and monitoring[b]	✓	✓	✓
Tourism, including dive/snorkel tours, nature watching[b]	✓	✓	✓
Mining, including petroleum exploration and development[c]	×	✓	✓
Shipping[d]	✓	✓	✓
Charter fishing[e]	×	✓	✓
Offshore aquaculture[e]	×	✓	✓
Commercial fishing (except as indicated below)[e]	×	✓	✓
— demersal trawl	×	×	×
— demersal gillnet	×	×	✓
— demersal longline	×	×	✓

a	Recreational fishing is managed by the states. All state rules and regulations (e.g. size and bag limits) will apply in Commonwealth marine reserves unless otherwise specified in statutory management plans
b	Approval will be required for these activities (e.g. registration, general approval or individual permit) in Marine National Park Zones (IUCN Category II)
c	As currently applies, individual project assessment and approval is required by the Director of National parks and under the *Environment Protection and Biodiversity Conservation Act 1999* as Commonwealth marine areas are protected as a matter of national environmental significance.
d	Ballast water exchange is managed under national arrangements. Restrictions may apply in sensitive areas.
e	Approval will be required for these activities (e.g. registration, general approval or individual permit) in multiple use and special purpose zones

4. Performance of the network proposal against the Goals and Principles

4.1 Summary of the network

The proposal for the South-west Commonwealth Marine Reserve Network (Figure 4.1) consists of **eight** individual reserves:

- Abrolhos Commonwealth marine reserve
- Jurien Commonwealth marine reserve
- Perth Canyon Commonwealth marine reserve
- South-west Corner Commonwealth marine reserve
- Eastern Recherche Commonwealth marine reserve
- Great Australian Bight (extension) Commonwealth marine reserve
- Western Eyre Commonwealth marine reserve
- Western Kangaroo Island Commonwealth marine reserve.

The proposed reserve network covers an area of approximately 538 226 square kilometres, which equates to about 41 per cent of the area of the South-west marine region (Table 4.1).

Approximately 52 per cent of the network, or 21 per cent of the region, has been zoned as marine national park with the remainder zoned for multiple use and special purpose (details at Table 4.2).

Table 4.1 Overview of the proposal for the South-west Commonwealth marine reserve network

Total network area	538 226 km^2
Area highly protected (IUCN Category II)	285 929 km^2
Proportion of region in network	40.8%
Proportion of region highly protected (IUCN II)	21.3%
Proportion of continental shelf in network	33.8%
Bioregions	All provincial and meso-scale bioregions are represented within the network.
Depth ranges within provincial bioregions	All but one of the depth ranges within bioregions are represented within the network.
Key ecological features	All of the key ecological features are represented within the network.
Biological seascapes	Seventeen of the 18 biological seascapes are represented within the network.
Seafloor features (geomorphology)	Fifteen of the 16 seafloor features are represented within the network.

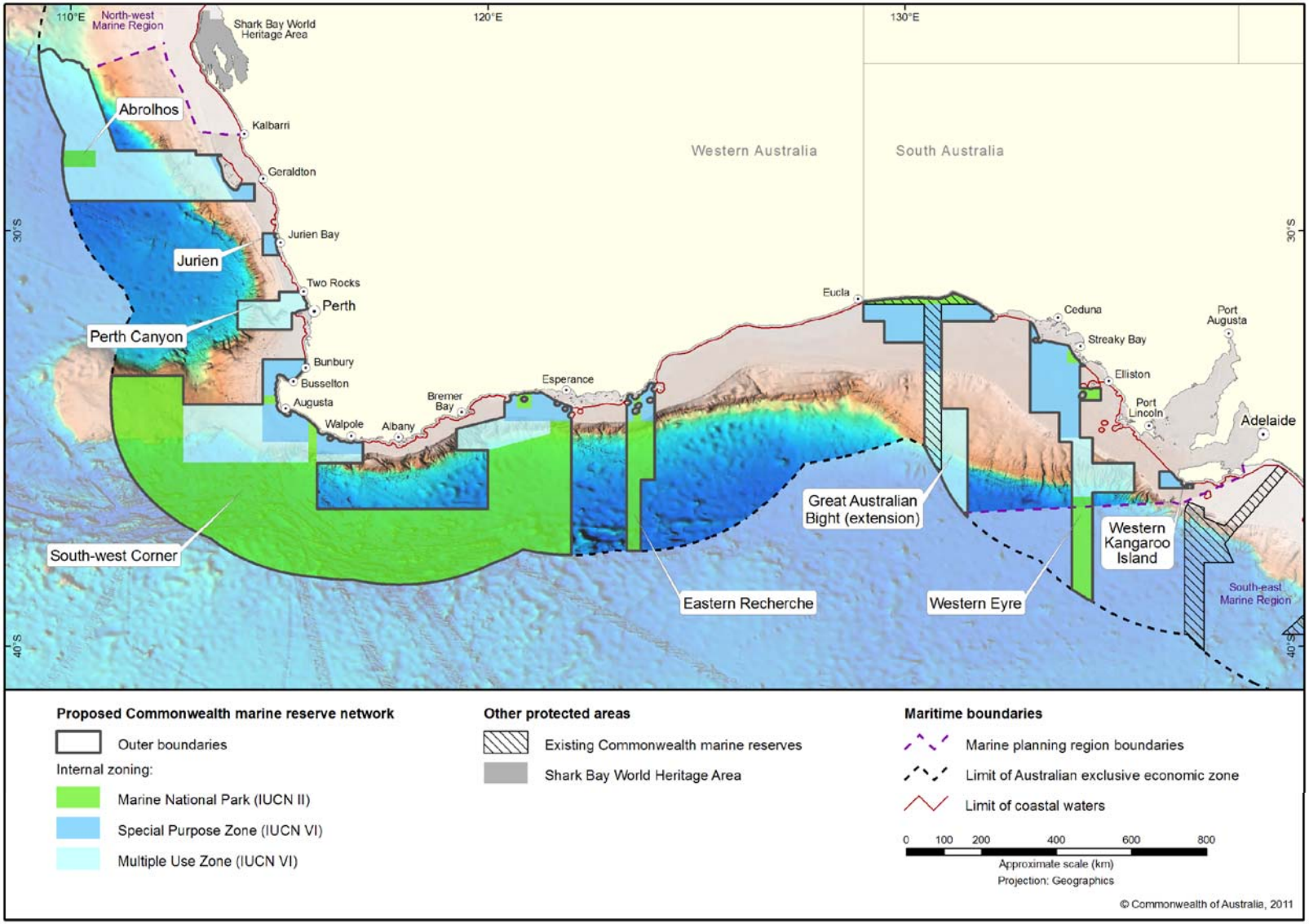


Figure 4.1 Proposal for the South-west Commonwealth marine reserve network

Table 4.2. Areas of reserves in the draft proposed South-west marine reserve network

Draft proposed reserve	Total Area (km²)*	Proportion of the network	Proportion of the region	Marine national park zone (km²)	Multiple use zone (km²)	Special purpose zone (km²)
Abrolhos	80,210	14.9%	6.2%	3,480	73,500	3,230
Jurien	1,880	0.3%	0.1%	-	-	1,880
Perth Canyon	11,720	2.2%	0.9%	-	11,720	-
South-west Corner	322,380	59.9%	25.0%	249,180	47,150	26,050
Eastern Recherche	19,240	3.6%	1.5%	15,770	-	3,470
Great Australian Bight (Extension)	49,660	9.2%	3.8%	3,850	22,680	23,130
Western Eyre	51,220	9.5%	4.0%	13,650	14,340	23,230
Western Kangaroo Island	1,930	0.4%	0.1%	-	-	1,930
TOTAL*	**538,240**	**100%**	**40.8%**	**285,930**	**169,390**	**82,920**

* The total area of the South-west marine region is 1,292,015 km^2

4.2 Achieving the goals

The proposed network achieves the four Goals to a large extent, by representing:

- Each of the seven provincial and seven meso-scale bioregions in the South-west (Goal 1 - *Each **bioregion** occurring in the Region should be represented at least once in the MPA network*)
- all but one depth range within provincial bioregions, with that one being well represented in Western Australia's Jurien Bay Marine Park (Goal 2 - *The MPA network should cover all **depth ranges** (50-5000+ m) occurring in the Region or other gradients in light penetration in waters over the continental shelf*)
- each of the key ecological features of the region and all but one of the biological seascapes. The one not represented is a small, very shallow seascape type found east of the Abrolhos Islands. (Goal 3 - *The MPA network should seek to include examples of **benthic/demersal biological** features known to occur in the Region at a broad sub-provincial, i.e. > 100s of kilometres, scale*); and
- all but one of the seafloor features found in the region, with that one (apron/fan) being well represented in the Abrolhos Islands Fish Habitat Protection Area (Goal 4 - *The MPA network should include all **types of seafloor** features*.

In total, of the 126 primary conservation features present in the region, 123 are represented in the network (Tables 4.3 and 4.4).

Table 4.3 Number of primary features included in the proposed network

Primary Conservation Features		Features in the region	Features represented within network
Goal 1	**Provincial Bioregions (PB)**	7	7
	Meso-scale Bioregions (MB)	7	7
Goal 2	**Depth ranges within PB**	62	61
Goal 3	**Key ecological features**	16	16
	Biological seascapes	18	17
Goal 4	**Seafloor types**	16	15
	Total	126	123

Table 4.4 Representation of conservation features in the proposed network

Feature	Name	Included in the Network
Provincial bioregions	Central Western Province	✓
	Great Australian Bight Shelf Transition	✓
	Southern Province	✓
	Southwest Shelf Province	✓
	Southwest Shelf Transition	✓
	Southwest Transition	✓
	Spencer Gulf Shelf Province	✓
Meso-scale bioregions	Abrolhos Islands	✓
	Central West Coast	✓
	Eucla	✓
	Eyre	✓
	Leeuwin-Naturaliste	✓
	Murat	✓
	WA South Coast	✓
Depth range within Central Western Province	Shelf Edge to Shallow Upper Slope Transition	✓
	Shallow Upper Slope	✓
	Shallow Upper Slope to Deep Upper Slope Transition	✓
	Deep Upper Slope	✓
	Deep Upper Slope to Shallow Mid-Slope Transition	✓
	Shallow Mid-Slope	✓
	Deep Mid-Slope	✓
	Deep Continental Slope	✓
	Continental Rise	✓
	Abyssal Plain below Calcite Compensation Depth	✓
	Abyssal Plain above Calcite Compensation Depth	✓
Depth range within Great Australian Bight Shelf Transition	Shallow Water	✓
	Shallow Water to Shallow Shelf Transition	✓
	Shallow Shelf	✓
	Shallow Shelf to Deep Shelf Transition	✓
	Deep Shelf	✓
	Deep Shelf to Shelf Edge Transition	✓
	Shelf Edge	✓
Depth range within Southern Province	Shelf Edge to Shallow Upper Slope Transition	✓
	Shallow Upper Slope	✓
	Shallow Upper Slope to Deep Upper Slope Transition	✓
	Deep Upper Slope	✓
	Deep Upper Slope to Shallow Mid-Slope Transition	✓
	Shallow Mid-Slope	✓
	Deep Mid-Slope	✓
	Deep Continental Slope	✓
	Continental Rise	✓
	Abyssal Plain below Calcite Compensation Depth	✓
	Abyssal Plain above Calcite Compensation Depth	✓
	Hadal Zone	✓

Feature	Name	Included in the Network
Depth range within Southwest Shelf Province	Shallow Water	✓
	Shallow Water to Shallow Shelf Transition	✓
	Shallow Shelf	✓
	Shallow Shelf to Deep Shelf Transition	✓
	Deep Shelf	✓
	Deep Shelf to Shelf Edge Transition	✓
	Shelf Edge	✓
Depth range within Southwest Shelf Transition	Shallow Water	✓
	Shallow Water to Shallow Shelf Transition	✓
	Shallow Shelf	✓
	Shallow Shelf to Deep Shelf Transition	✓
	Deep Shelf	✓
	Deep Shelf to Shelf Edge Transition	✓
	Shelf Edge	✓
	Edge to Shallow Upper Slope Transition	✓
Depth range within Southwest Transition	Shallow Upper Slope	✓
	Shallow Upper Slope to Deep Upper Slope Transition	✓
	Deep Upper Slope	✓
	Deep Upper Slope to Shallow Mid-Slope Transition	✓
	Shallow Mid-Slope	✓
	Deep Mid-Slope	✓
	Deep Continental Slope	✓
	Continental Rise	✓
	Abyssal Plain below Calcite Compensation Depth	✓
	Abyssal Plain above Calcite Compensation Depth	✓
Depth range within Spencer Gulf Shelf Province	Shallow Water	✗
	Shallow Water to Shallow Shelf Transition	✓
	Shallow Shelf	✓
	Shallow Shelf to Deep Shelf Transition	✓
	Deep Shelf	✓
	Deep Shelf to Shelf Edge Transition	✓
	Shelf Edge	✓
Key ecological features	Albany Canyons Group and adjacent shelf break	✓
	Ancient coastline at 90-120m depth	✓
	Areas important for small pelagic fish	✓
	Benthic invertebrate communities of the eastern Great Australian Bight	✓
	Cape Mentelle upwelling	✓
	Commonwealth waters surrounding the Houtman Abrolhos Islands	✓
	Commonwealth waters surrounding the Recherche Archipelago	✓
	Commonwealth waters within and adjacent to Geographe Bay	✓
	Commonwealth waters within and adjacent to the west coast inshore lagoons	✓
	Diamantina Fracture Zone	✓
	Kangaroo Island Pool, Canyons and adjacent shelf break, and Eyre Peninsula upwellings	✓
	Naturaliste Plateau	✓
	Meso-scale eddies	✓
	Perth Canyon and adjacent shelf break, and other west coast canyons	✓
	Western demersal slope and associated fish communities	✓
	Western Rock Lobster	✓
Biological seascapes	Cluster 2	✓
	Cluster 3	✗
	Cluster 4	✓
	Cluster 5	✓
	Cluster 6	✓

Feature	Name	Included in the Network
	Cluster 7	✓
	Cluster 9	✓
	Cluster 10	✓
	Cluster 11	✓
	Cluster 12	✓
	Cluster 13	✓
	Cluster 14	✓
	Cluster 15	✓
	Cluster 16	✓
	Cluster 17	✓
	Cluster 18	✓
	Cluster 19	✓
	Cluster 20	✓
Seafloor features	Abyssal-plain/deep ocean floor	✓
	Apron/fan	✖
	Bank/shoals	✓
	Canyon	✓
	Continental-rise	✓
	Deep/hole/valley	✓
	Escarpment	✓
	Knoll/abyssal-hills/hills/mountains/peak	✓
	Pinnacle	✓
	Plateau	✓
	Reef	✓
	Ridge	✓
	Shelf	✓
	Slope	✓
	Terrace	✓
	Trench/trough	✓

4.3 Applying the Principles

Twenty principles guide the location, selection, design and zoning of the proposed reserve network. This section outlines how the principles were addressed in the development of the proposed network.

Principle 1 - *MPAs will be located taking into account the occurrence and location of existing spatial management arrangements (e.g. existing protected areas and sectoral measures) that contribute to the goals.*

The Great Australian Bight Marine Park (Commonwealth Waters) is incorporated into the design of the network. Its boundaries are proposed to be extended to capture additional features.

Six of the eight proposed reserves abut seven existing and one proposed state marine reserves. Specifically:

- the proposed Jurien Commonwealth Marine Reserve is adjacent to the Western Australian-managed Jurien Bay Marine Park
- the proposed Perth Canyon Commonwealth Marine Reserve abuts the Western Australian Marmion Marine Park
- the proposed South-west Corner Reserve abuts the proposed Western Australian Capes Marine Conservation Reserve
- the proposed extension to the Great Australian Bight (Commonwealth) Marine park abuts the South Australian Far West Coast and Nuyts Archipelago Marine Parks
- the proposed Western Eyre Commonwealth Marine Reserve abuts the South Australian Nuyts Archipelago, West Coast Bays and Investigator Marine Parks
- the proposed West Kangaroo Island Commonwealth Marine Reserve abuts the South Australian Western Kangaroo Island Marine Park

Four large permanent fisheries closures are overlapped, either fully or to a large extent, by the network (Figure 4.2 and 4.3). These include the three large Deep Habitat Protection closures for the Commonwealth Great Australian Bight Trawl Fishery and the Western Australia-managed Metropolitan Closure off Perth. Additionally, smaller southern dogfish closures in the Southern and Eastern Scalefish and Shark fishery have been partially captured in the proposed Western Eyre reserve.

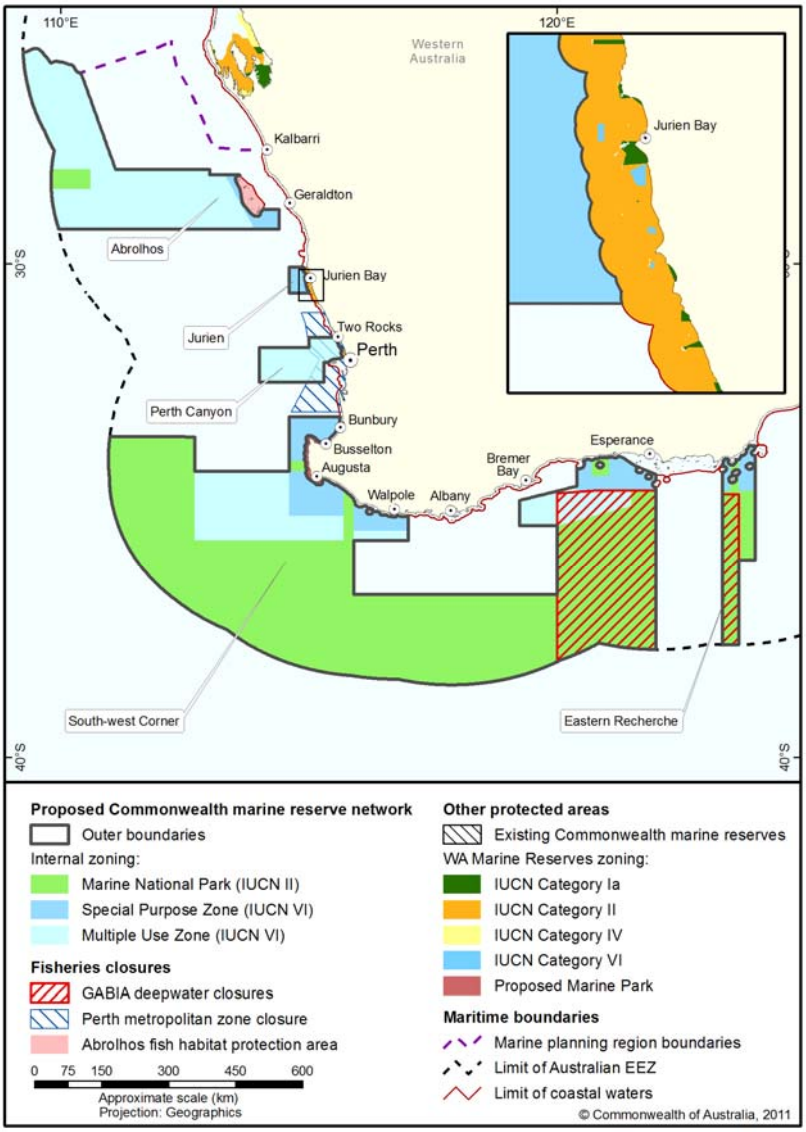


Figure 4.2 Location of fisheries closures and existing and proposed marine reserves in the South-west marine region off Western Australia

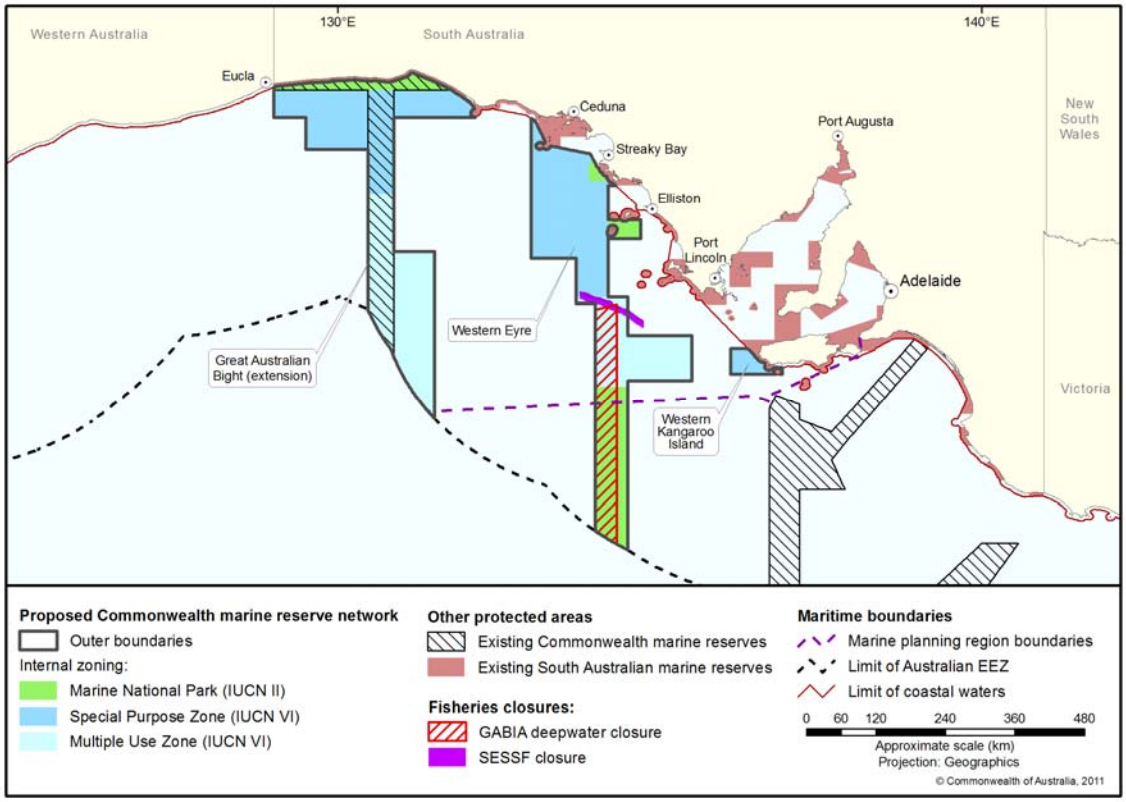


Figure 4.3 Location of fisheries closures and existing and proposed marine reserves in the South-west marine region off South Australia

Principle 2 – *The goals should be met with the least number of separate MPAs (i.e. a smaller number of larger MPAs rather than many small MPAs) to maximise conservation outcomes.*

The proposed network represents 120 primary conservation features within eight large reserves ranging in size from 1880 km^2 to 322 380 km^2.

Fewer larger reserves have many benefits over a larger number of smaller reserves, including better conservation outcomes and being more cost-efficient to manage. Conservation benefits are enhanced by minimising boundary length and maximising area of the reserves, and by maintaining connections among features within reserves. Large reserves have a greater chance of capturing the entire range of habitats required for an organism's life cycle, which enhances the conservation benefits.

The establishment of fewer large reserves generally leads to more efficient and effective management than is the case for many smaller reserves in terms of the compliance effort needed to manage the network as the overall length of boundaries will be lower for an equivalent area.

Principle 3 – *The capacity of an MPA to mitigate identified risks to conservation values.*

The draft South-west Marine Bioregional Plan identifies climate change as the most pervasive pressure on the South-west marine region's ecosystems[5]. The marine reserve network offers the opportunity to mitigate risks arising from climate change.

There is a growing scientific consensus on the role of marine reserve networks in maintaining the resilience of marine ecosystems in the face of the complex and

[5] see the *Marine Environment Report Card* at **http://www.environment.gov.au/coasts/mbp/south-west/index.html**

poorly understood pressures associated with global climate change. Ecosystem resilience is the ability of an ecosystem to maintain, or reinstate quickly, key functions and processes when disrupted or under pressure. Networks of representative marine reserves contribute to ecosystem resilience by providing key refuges for species and by reducing human pressures on the natural environment.

The capacity of a marine reserve network to contribute to ecosystem resilience is enhanced by applying best practice reserve design, such as by replicating features across their range, ensuring the size and level of protection of a reserve is adequate, and by protecting critical areas that are biologically or ecologically important. The draft proposed South-west Commonwealth marine reserve network has been designed to contribute to ecosystem resilience in the region and to provide refuges for species.

Principle 4 - *The occurrence of spatially defined habitats for and/or aggregations of threatened and/or migratory species.*

Biologically important areas for threatened and migratory species including whales, seals, seabirds and sharks have been included in the network (Table 4.5). For example, the waters surrounding the Abrolhos Islands have been identified as a biologically important area for vulnerable and migratory humpback whales and white sharks, vulnerable Australian sea lions and several species of vulnerable and/or migratory seabirds. Including biologically important areas in the proposed Abrolhos Reserve will help with the ongoing conservation of these species.

Table 4.5 Biologically Important Areas for threatened and migratory species that have been represented within the proposed south-west reserve network.

Species	Threatened	Migratory	Abrolhos	Jurien	Perth Canyon	South-west Corner	Eastern Recherche	Great Australian Bight (Extension)	Western Eyre	Western Kangaroo Island
Cetaceans										
blue whale	Endangered	Migratory			✓	✓		✓	✓	✓
southern right whale	Endangered	Migratory			✓	✓	✓	✓	✓	✓
humpback whale	Vulnerable	Migratory	✓	✓	✓	✓				
sperm whale		Migratory			✓	✓		✓	✓	✓
Pinnipeds										
Australian sea lion	Vulnerable		✓	✓	✓	✓	✓	✓	✓	✓
Seabirds										
Indian yellow-nosed albatross	Vulnerable	Migratory				✓				
Australian lesser noddy	Vulnerable		✓							
soft-plumaged petrel	Vulnerable				✓	✓				
common noddy		Migratory	✓	✓	✓					
fleshy-footed shearwater		Migratory				✓	✓			
wedge-tailed shearwater		Migratory	✓	✓	✓	✓				
bridled tern		Migratory	✓	✓	✓	✓				
Caspian tern		Migratory	✓	✓	✓	✓	✓		✓	✓
roseate Tern		Migratory	✓	✓	✓					
short-tailed shearwater		Migratory				✓	✓	✓	✓	✓
Sharks										
white shark	Vulnerable	Migratory	✓	✓		✓	✓	✓	✓	✓

Principle 5 - *The occurrence of ecologically important pelagic features which have a consistent and definable spatial distribution.*

A number of spatially predictable, ecologically important pelagic features are represented in the network:

- the Kangaroo Island Pool and Eyre Peninsula upwellings are represented in the proposed Western Eyre and Western Kangaroo Island reserves
- the Cape Mentelle upwelling is represented in the in the proposed South-west corner reserve
- five of the eight meso-scale eddy fields that form at predictable locations in the region are represented within the proposed network in the Abrolhos, Perth Canyon, South-west corner, Eastern Recherche and Western Eyre reserves

Principle 6 - *The occurrence of known small-scale (tens of kilometres) ecosystems associated with the benthic/demersal environment.*

Seafloor (geomorphic) features and biological seascapes have been used as surrogates for small-scale ecosystems associated with benthic/demersal environments (see Chapter 3). All except one of the seafloor features and one of the seascapes have been represented within the proposed network.

Additionally the biological communities associated with seafloor features can differ between bioregions and with depth. When representation of the seafloor features

within bioregions and within depth ranges is examined, 169 of the 204 of these features are represented within the reserve network.

Principle 7 - *Relevant available information about small-scale distribution of sediment types and sizes and other geo-oceanographic variables.*

The biological seascapes data set provides information on the small scale distribution of sediment types and sizes, and other geological and oceanographic variables. All except one of the biological seascapes have been represented in the proposed network.

Principle 8 - *Occurrence of listed heritage sites (where inclusion in the MPA network would improve administration of protection regimes).*

There are no World Heritage sites within or immediately adjacent to the South-west marine region. The historic shipwrecks of the HMAS *Sydney* II and the HSK *Kormoran* in deep-water off the continental shelf, south-west of Shark Bay, have recently been added to Australia's Commonwealth and National Heritage Lists. These historic wrecks have not been captured within the draft proposed network. One historic shipwreck, the SS *Cambewarra*, is protected within the proposed Jurien reserve.

Principle 9 - *Socio-economic costs should be minimised.*

Each step in the development of the proposed network has been guided by the principle of minimising socio-economic impacts. Where different options were available to meet the conservation objectives, the location with the least impact on existing users was chosen. Information on commercial fisheries, aquaculture, recreational and charter fishing, petroleum prospectivity, exploration and extraction, defence activities, ports, shipping, Native Title claims and future development considerations were included in the design of the proposed network from the beginning.

Principle 10 - *Individual areas should, as far as practicable, include continuous depth transects (e.g. from the shelf to the abyss).*

Five of the eight reserves cover continuous depth transects from the shelf to the deep ocean floor. By including a range of depths within a reserve, connectivity between habitats is better maintained. This is important as many species use a range of habitats in different depths during their life cycle.

The proposed reserves that do not cover all depth ranges are confined to the continental shelf and slope. The proposed Jurien and Perth Canyon Reserves provide important connectivity between shelf environments on the west coast, while the proposed Western Kangaroo Island reserve will enhance the connectivity between the proposed South-west reserve network and the existing South-east reserve network.

Principle 11 - *Whole seafloor (geomorphic) features should be included.*

The large size of most of the proposed reserves allows whole seafloor features to be represented. For example the Perth Canyon is entirely within the proposed Perth Canyon Reserve. The Perth Canyon has been identified as a key ecological feature for the South-west marine region due to its enhanced productivity and as an aggregation area for many species including blue whales and other deep diving cetaceans. The proposed deep-water extension to the existing Great Australian Bight Marine Park aims to fully include a large deep canyon that is only partially protected

under the existing Park's boundaries. Other whole seafloor features captured within the proposed network include many of the other large canyons (e.g. in the Western Eye reserve) and reefs (in the Commonwealth surrounding the Recherche Archipelago). The whole of the Diamantina Fracture Zone, a unique geomorphic feature, is included in the South-west Corner reserve.

Principle 12 - *Features should be replicated wherever possible within the system of MPAs (i.e. included more than once).*

The proposed reserves are generally large which allows replication of many of the features within the proposed network. Of the 126 primary conservation features related to the four goals, 95 are represented in multiple reserves (Table 4.6). This includes all of the provincial bioregions and the majority of the meso-scale bioregions. For the three meso-scale bioregions that have not been replicated in the proposed reserve network, namely the Abrolhos, Eucla and Murat, these have been replicated in protected areas in adjacent state waters.

Many of the features have not been replicated because the features either have a single occurrence in the region or a confined spatial distribution. In many cases where features have not been replicated a large proportion of these features have been incorporated into the reserve network. For example, three of the key ecological features and four of the seafloor features that are not replicated have been represented at over 90% of their area in a single reserve.

Table 4.6 Replication of conservation features in multiple reserves

Feature	Total Number	Number represented in more than one reserve
Provincial bioregions	7	7
Meso-scale bioregions	7	4
Depth ranges within provincial bioregions	62	52
Key ecological features	16	9
Biological seascapes	18	13
Seafloor features	16	10
Total	**126**	**95**

Principle 13 - *Size and shape should be orientated to account for inclusion of connectivity corridors and biological dispersal patterns within and across MPAs.*

The network accounts for connectivity within reserves and among them. The proposed reserves are generally large and cover a wide depth range. As a result, each reserve allows for the movement of species between the different habitats for foraging, mating, breeding and nursery areas. Modelling by CSIRO has demonstrated connections that allow for dispersal among the proposed reserves, largely driven by the Leeuwin Current and the associated eddies and counter-currents (see Box 4.2).

Wherever possible, the proposed Commonwealth reserves have been sited adjacent to state-managed marine reserves (both existing and proposed), which will aid connectivity between coastal and shelf waters. For example, the proposed Jurien Commonwealth Marine Reserve is adjacent to Western Australia's Jurien Bay Marine National Park.

Box 4.2 Connectivity in the proposed South-west network of Commonwealth marine reserves

The proposed South-west Commonwealth marine reserve network has been designed to ensure sufficient connectivity both within and between reserves for larval dispersal, migration and other species movement to support the life history stages of many marine organisms. Some species use different areas for breeding, nurseries, feeding grounds and migration routes. Large reserves covering all depth ranges facilitate connectivity by incorporating a variety of habitats within a single reserve. The connectivity between the areas for further assessment, on which the proposed network has been based, was modelled by CSIRO (England *et al.* 2009). Connectivity between neighbouring areas, primarily driven by the Leeuwin Current and associated eddies has been observed and was reflected in the CSIRO model. The key findings of the CSIRO report were that:

- the Leeuwin Current drives strong directional connectivity patterns between all areas for further assessment so that dispersal into or between them is most likely to occur from the north on the west coast, and west if on the south coast;
- connectivity is stronger in autumn months and during La Niña years when Leeuwin Current flow is at its maximum;
- connectivity is greater in the west coast areas for further assessment as a result of their closer proximity to each other, and the higher energy of the Leeuwin Current and associated eddy mixing;
- coastal and upper slope waters (0–500 m) show much greater connectivity between areas for further assessment than deeper waters;
- contrasting dispersal patterns can occur between shallow (0–100 m) and upper slope (100–500 m) waters; and
- generally reduced connectivity relative to shallower waters was observed at 100–500 m, although this contrast was weaker on the west coast.

The full CSIRO report can be downloaded from:

http://www.environment.gov.au/coasts/mbp/publications/south-west/south-west-afa-connectivity.html

Principles 14 and 15 - *Boundary lines should be simple, as much as possible following straight latitudinal/longitudinal lines* and *Boundary lines should be easily identifiable, where possible coinciding with existing regulatory boundaries.*

The boundaries of the draft proposed reserves are straight lines, generally along lines of latitude and longitude or lines that follow existing maritime boundaries (i.e. coastal waters limit or the limit of the Australian Exclusive Economic Zone). Wherever possible, the reserve boundaries have been aligned to existing boundaries including existing marine reserves (including the Great Australian Bight Marine Park and adjacent to many of the state marine reserves), and fisheries reporting blocks. Straight, simple boundaries, especially those following lines of latitude or longitude and coinciding with existing management lines, have benefits for management and compliance. For example, from both a user and compliance perspective, it is easier to determine whether a vessel is inside or outside a reserve when it is based on a straight line of latitude or longitude. Facilitating identification, enforcement and compliance of the proposed network is important as the majority of the proposed network is well offshore, away from prominent land marks.

Principle 16 - *The size and shape of each area should be set to minimise socio-economic costs.*

The reserves minimise socio-economic costs by avoiding overlap with existing users where consistent with the conservation objectives of the network. In cases where areas of high economic or social value overlapped with conservation values that were needed to build a representative reserve network, zoning was also used to minimise impacts on existing users. In addition, overlap with areas of medium to high petroleum prospectivity were avoided wherever possible.

The size and shape of the reserves also incorporate existing spatial management arrangements (principle 1), such as fishing closures, which further minimise socio-economic impacts.

Principle 17 - *Zoning will be based on the EPBC Act/IUCN categories of protection.*

Zoning of the proposed network is based on the IUCN Protected Area Management Categories, as required under Section 346 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The principles guiding the management for each IUCN Category zone are set out in Schedule 8 of the EPBC Regulations 2000.

Principle 18 - *The regional MPA network will aim to include some highly protected areas (IUCN Categories I and II) in each bioregion.*

The proposed network includes highly protected zones (IUCN Category II) in all but one of the seven provincial bioregions. The Southwest Shelf Transition province is not represented in a highly protected area. This province is highly valuable for the oil and gas industry (a number of leases exist over this province, which coincide with the highly prospective Perth Basin); for the commercial fishing sector (with the Western Rock Lobster Fishery being the most valuable single-species fishery in Australia) and for recreational fishing.

Four of the seven meso-scale bioregions on the shelf are also represented in highly protected zones. The three that do not include highly protected zones are the Abrolhos and Central West Coast which are within the Southwest Shelf Transition provincial bioregion, and the Murat.

Principles 19 and 20 - *Zoning will be based on the consideration of the risk that specific activities pose to the conservation objectives of each MPA* and *Zoning of MPAs will seek to ensure that the conservation objectives of the area are protected, taking into account a precautionary approach to threats as well as the relative costs and benefits (economic, social and environmental) of different zoning arrangements.*

A draft zoning framework has been developed with consideration of the threats that specific activities pose to the conservation values of each reserve (section 3.3). This zoning framework was informed though assessment of the compatibility of different activities with the conservation objectives of the proposed reserve network. The potential for significant impacts on some fisheries resulted in the creation of Special Purpose zones within which some fishing methods otherwise excluded from multiple use areas are proposed to be allowed to operate.

4.4 Minimising the socio-economic impacts of the proposed network

The proposed network has been designed with the aim of meeting the reserve design goals and principles, which include the objective of minimising the potential impacts on industry and recreational uses.

A detailed assessment of the performance of the network proposal in minimising socio-economic impacts is yet to be undertaken as this requires feedback and input from those marine users potentially affected. This assessment will be undertaken during the public consultation process (see *Proposal for the South-west Commonwealth Marine reserves Network – Consultation Paper*[6]).

A preliminary evaluation of the potential impacts associated with the network proposal indicates that it will have no or minimal implications for most existing marine users and interest holders (Table 4.7). Commercial fishing is the sector most likely to be affected by the proposed network as it is widespread across the region. Initial analysis indicates that the proposed network would displace fisheries catch worth approximately 1–2 per cent of the annual gross value of production of the fisheries operating in the region.

Commercial fishing

Commercial fishing is the sector most likely to be affected by the proposed network as it is widespread across the region. Initial analysis indicates that the proposed network would displace fisheries catch worth approximately 1–2 per cent of the annual gross value of production of the fisheries in the region.

The proposed marine reserve network has been designed to avoid the areas of highest use and value to the commercial fishing industry. However, of the 24 fisheries operating in the region, 16 fisheries may be affected. Of these 16 fisheries, 3 fisheries may experience significant displacement of fishing effort—the Southwest Inshore Trawl Fishery, the Joint Authority Southern Demersal Gillnet and Longline Fishery, and the West Coast Demersal Gillnet and Longline Fishery.

For the three fisheries that are likely to experience significant displacement, the Southwest Inshore Trawl Fishery is likely to experience the majority of displacement in the shelf areas of the proposed Perth Canyon Reserve (Multiple Use Zone), with smaller amounts of displacement in the Special Purpose Zone of the proposed South-west Corner Reserve where it extends into Geographe Bay. The Joint Authority Southern Demersal Gillnet and Longline Fishery is likely to experience displacement from the Marine National Park zones of the proposed South-west Corner and Eastern Recherche Reserves where these zones extend onto the shelf and also from areas of Multiple Use Zone in the proposed South-west Corner Reserve where this fishery may operate further off-shore. The West Coast Demersal Gillnet and Longline Fishery may experience displacement from the Multiple Use Zones of the proposed Abrolhos Reserve.

Potential displacement from the majority of fisheries operating within the region, including the two demersal gillnet and demersal longline fisheries identified above, has been minimised through avoiding areas of high fisheries value or, where this is not possible, through zoning arrangements. For example, the areas of shelf habitat where many of the valuable fisheries operate have generally been zoned as Multiple Use or Special Purpose to reduce the social and economic costs to industry and associated communities.

[6] available at: **http://www.environment.gov.au/coasts/mbp/south-west/index.html**

The extent of displacement in some of the state fisheries is not clear due to the coarseness of the data (that is, logbook data are collected for large reporting grids); however, based on information from fisheries managers about the extent of operations in Commonwealth waters, the impact is thought to be low.

The Government has released a Fisheries Adjustment Policy to support the creation of new Commonwealth marine reserves.

Native title

No reduction of native title rights is expected in the three areas where the network overlaps with existing native title claims. Under the Native Title Act, Native Title holders have rights to the harvest of species in country over which they have Native Title. Native Title determinations need not have been made in order for this right to exist. There are currently three registered Native Title claims that extend into Commonwealth waters and overlap with the proposed network. These overlaps consists of a small overlap with the proposed Abrolhos reserve, and larger overlaps with the proposed Jurien reserve and Great Australian Bight marine park extension. Additionally two Native Title Claims which have yet to be registered overlap with the proposed Perth Canyon and Kangaroo Island reserves. The reserve network will not diminish Native Title rights. Areas of overlap between a reserve and Native Title may provide opportunities for co-management and other cooperative conservation strategies.

Recreational and charter fishing

Based on information available and initial input from the recreational fishing and boating sector, the proposed network does not appear to affect important recreational sites; for example, while the proposed Perth Canyon Marine Reserve overlaps with the popular fishing site at the head of the Canyon, it is zoned so that recreational activities may continue.

Important areas for recreational fishing occur off Western Australia including the Abrolhos Islands, Jurien Bay, offshore from Perth southwards to Busselton including the Perth Canyon, Albany, Bremer Bay and the Recherche Archipelago. Off South Australia low levels of recreational fishing occur in the Commonwealth waters, with important areas predominantly off the western Eyre Peninsula and Kangaroo Island.

The effects of the reserve network on recreational boating and fishing interests have also been assessed by determining the proportion of highly protected zones within a 40 nautical mile radius from each significant port or marina. The proposed network is estimated to restrict access to two per cent of the total area of interest to recreational fishers in the region.

Similarly, based on publicly available information, minimal displacement is expected for the charter fishing sector as a result of the proposed marine reserve network. Important areas for charter fishing were identified during the consultation on the south-west Areas for Further Assessment and supplemented with available published information (Henry and Lyle 2003, Sumner *et*. *al*. 2008 and Knight 2010).

Important areas for charter fishing in the south-west marine region include the offshore waters surrounding the Houtman-Abrolhos, Jurien Bay, the Perth Canyon, from Perth to Cape Naturaliste, Albany, Bremer Bay, Esperance, offshore from Fowlers Bay to Port Lincoln and waters surrounding Kangaroo Island.

Charter fishing would be a permitted activity within in all zones except for Marine National Park (IUCN II) zones of the proposed network. The majority of the overlap between the

proposed reserves and important areas for charter fishing has been zoned to allow for this activity. However the proposed Marine National Park (IUCN II) zones in the proposed South-west Corner and Western Eyre marine reserves may impact on some charter fishing activities. The Marine National Park zones off Margaret River, Windy Harbour and east of Esperance in the South-west Corner reserve overlap with areas with low levels of charter fishing. The Marine National Park zones off Streaky Bay and Elliston in the western Eyre reserve also overlap with areas identified as important for charter fishing.

Offshore petroleum exploration and development

The proposed reserve network has been designed to minimise impacts on the offshore petroleum industry. Overlap with areas of medium to high prospectivity was avoided wherever possible. Zoning was used to further reduce impact by zoning most areas overlapping with medium to high prospectivity as multiple use or special purpose zones, which allow petroleum exploration and extraction subject to EPBC Act approval. The proposed network overlaps with a total of 10 petroleum exploration leases and three acreage releases. All overlaps involve proposed multiple use and special purpose zones only. The following proposed reserves overlap with exploration leases and/or areas released as part of the petroleum acreage release program: Abrolhos (exploration lease and 2011 acreage release), Jurien (exploration lease and 2011 acreage release) Perth Canyon (exploration leases), South-west Corner (exploration leases), Great Australian Bight (extension) (exploration leases) and Western Eyre (2010 acreage release).

Shipping and ports

Shipping will not be affected by the reserve network and it will be allowed in all zones. Shipping and port operations were considered in the reserve design process through the incorporation of information on major shipping routes and ports within the region. Shipping within the reserve network will be allowed in all zones. Wherever possible, highly protected zones (Marine National Parks (IUCN II)) have not been placed in areas of high shipping traffic.

Most issues related to shipping are regulated through existing mechanisms. Mandatory ballast water management requirements have been in place since 2001 and are managed through the Australian Quarantine and Inspection Service. While shipping activities are allowed in all zone types, some restrictions to ballast water exchange may apply on a case by case basis in sensitive areas.

Aquaculture

There are only three offshore aquaculture sites in the South-west marine region. All of these sites are licensed for scallop production. Only one of the existing aquaculture sites (off Bunbury) overlaps with the proposed network. This site overlaps with an area proposed to be zoned as special purpose zone (IUCN VI) in the South-west corner reserve. Aquaculture will be allowed within both special purpose and multiple use zones (IUCN VI) subject to fishing gear restrictions (Table 3.5), however there may be the requirement for an approval process under the EPBC Act.

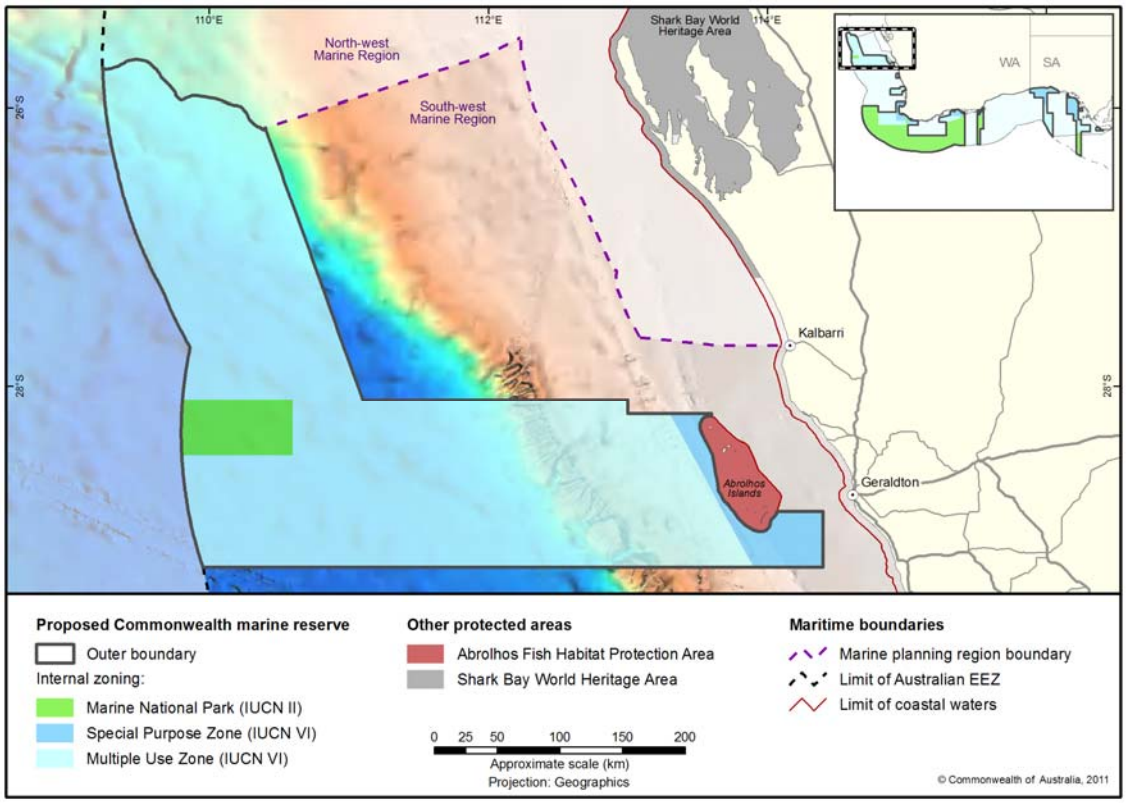
Table 4.7 Summary of intersection between proposed reserves and existing rights and uses

Existing rights and uses	Extent of intersection	Preliminary scoping of socio-economic impacts
Charter fishing	Minimal overlap of current effort (based on available data) with IUCN II.	Minimal impact expected.
Commercial fishing activities	Intersection between commercial fishing and proposed network is extensive, due to widespread nature of fishing in the region. Impact minimised through zoning and through avoidance of high value locations.	Some impact expected. It is estimated that out of 24 fisheries operating in the region, 16 fisheries might experience some restriction to access; of these, 3 fisheries may experience substantial restrictions.
Registered Native Title claims (total 9 claims in SWMR at April 2011)	Proposed network intersects with 3 claims.	No impact expected.
Defence training areas	The Department of Defence's Western Australian Exercise Area overlaps with the proposed Perth Canyon reserve.	Minimal impact expected.
Petroleum leases/ acreage releases	10 exploration leases & 3 acreage releases (no overlap with IUCN II).	No impact expected.
Major shipping routes	All proposed reserves overlap with shipping traffic.	No impact expected.
Existing offshore aquaculture leases (total 3 in SWMR in April 2011)	No overlap with IUCN II.	No or minimal impact expected.
Recreational fishing	No overlap with iconic fishing sites identified by the sector; minimal (1.9%) overlap with the 'recreational area of interest'*.	Minimal impact expected.

*Recreational area of interest is defined as the area within a 40 nautical miles radius from each of the ports and marinas of significance to the sector that is zoned as marine national park (i.e. would not allow extractive activities.

5. The proposed Commonwealth marine reserves in detail

5.1 Proposed Abrolhos Commonwealth marine reserve



Biophysical, ecological and conservation values

The Commonwealth waters surrounding the Houtman Abrolhos Islands have been identified as a key ecological feature of the South-west marine region. The proposed Abrolhos Commonwealth marine reserve covers approximately 80 210 km^2 of the Commonwealth marine environment adjacent to the Houtman Abrolhos Islands and extends into deep water off the continental shelf down to the abyssal plain (deep ocean floor). The Houtman Abrolhos Islands are among Australia's most important seabird breeding sites, with extensive foraging grounds in Commonwealth waters. The islands and surrounding reefs are also renowned for their high level of biodiversity, attributed to the mix of tropical, sub-tropical and temperate marine life resulting from the southward movement of species by the Leeuwin Current over thousands of years. The reefs contain 184 known species of corals, around 400 known fish species, 492 mollusc species, 110 sponge species, 172 echinoderm species and 234 species of algae. The shelf environments of the proposed reserve provide key habitat for the Western Rock Lobster, which is the dominant large benthic invertebrate of the bioregion and an important part of the food web.

Conservation values:

- Six key ecological features:
    - Commonwealth marine environment surrounding the Houtman Abrolhos Islands (high biodiversity, breeding and resting aggregations)
    - Ancient coastline (enhanced productivity)
    - Demersal slope and associated fish communities of the Central Western Province (communities with high species diversity)

    - Meso-scale eddies (enhanced productivity, feeding aggregations) west of the Houtman Abrolhos Islands
    - Examples of west coast canyons (enhanced productivity, feeding aggregations), including the Murchison Canyon
    - Western Rock Lobster habitat (species with an important ecological role)
- habitats and communities of the Southwest Shelf transition (Abrolhos Islands meso-scale bioregion) and Central Western province (feeding, foraging and breeding areas)
- foraging habitats of several seabirds (including the Australian lesser noddy) foraging area for the northern-most breeding colony of the Australian sea lion
- migration habitat for the threatened humpback whale

Existing uses

The Naaguja Peoples Native Title claim, covering 5 581 km^2 of land and sea, extends into Commonwealth waters and overlaps with the eastern corner of the proposed reserve.

Recreational fishing is a key activity around the Abrolhos Islands, mostly within the islands' state waters, with some recreational activities extending into Commonwealth waters. Charter fishing is a growing activity in the area.

The Western Rock Lobster Fishery and Abrolhos Island Trawl Fishery (targeting scallops and western king prawns) are the most significant fisheries operating within or near the proposed reserve. Other fisheries that operate in the area include the Commonwealth Western Tuna and Billfish Fishery, and three Western Australian fisheries: the West Coast Gillnet and Longline Fishery, the West Coast Demersal Scalefish Fishery and the West Coast Deep Sea Crab Fishery.

Petroleum prospectivity within the proposed boundaries is medium to high. The only production lease currently in place in the South-west Marine Region is approximately 45 km to the east of this reserve, at Cliff Heads.

Proposed Zoning Arrangements and Management Principles

The proposed Abrolhos Islands Commonwealth Reserve contains three zones. The activities permitted in these zones under the proposed management arrangements are shown in Table 3.5:

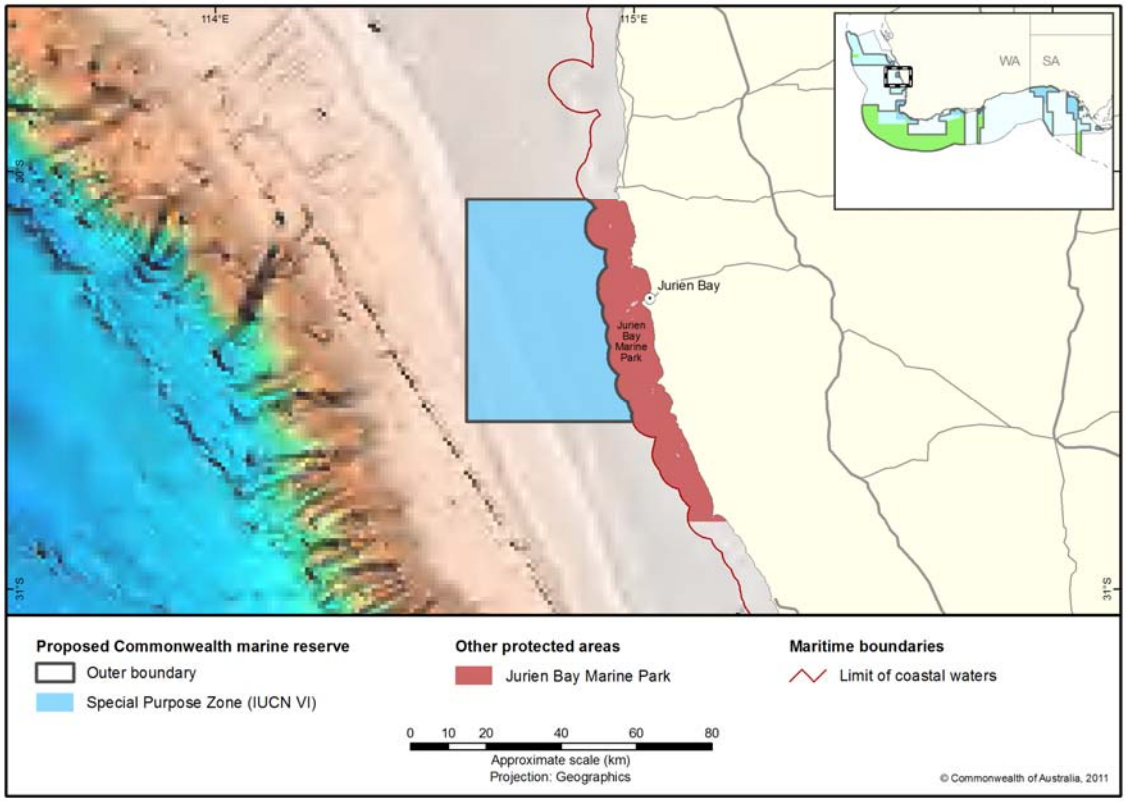
- A marine national park (3 480 km2) situated on the western edge of the region has been designed to preserve in their natural condition deep seafloor habitats representative of the northern ecosystems of the Central Western Province. This zone would be managed in accordance with the management principles for IUCN Category II. No commercial activities and no extractive recreational activities would be permitted in this area.
- The majority of the proposed reserve (73 500 km2) is zoned Multiple Use, to provide protection to the biological diversity of the Central Western Province while allowing for the sustainable use of the region's resources. This zone would be managed in accordance with the management principles for IUCN Category VI. A number of commercial and recreational activities would be allowed in this zone subject to environmental approvals and existing regulations. Some activities would not be permitted in this zone because of the risk they pose to its biological diversity. The overall management objective for this zone is to ensure the long-term protection of the reserve's biological diversity and other natural values, while allowing the ecologically sustainable use of its resources.
- The eastern part of the reserve has been zoned Special Purpose (3 230 km2) to provide

protection to the biological diversity of the Southwest Transition bioregion, while recognising the importance of this area for commercial fishing. This zone allows demersal gillnet and demersal longline fishing methods to be used. In the standard multiple use zoning these methods would be excluded because of their potential impacts, but they would be allowed in the special purpose zone in order to moderate socioeconomic impacts. The effects of these fishing methods on the biodiversity of the reserve would be monitored and reviewed under the reserve's management arrangements. This zone would be managed in accordance with the management principles for IUCN Category VI.

Table 5.1. Conservation features represented in the proposed Abrolhos reserve.

Feature	Name
Provincial bioregions	Central Western Province
	Southwest Shelf Transition
Meso-scale bioregions	Abrolhos Islands
	Central West Coast
Depth ranges within bioregions	**Central Western Province**
	Shelf Edge to Shallow Upper Slope Transition
	Shallow Upper Slope
	Shallow Upper Slope to Deep Upper Slope Transition
	Deep Upper Slope
	Deep Upper Slope to Shallow Mid-Slope Transition
	Shallow Mid-Slope
	Deep Mid-Slope
	Deep Continental Slope
	Continental Rise
	Abyssal Plain below Calcite Compensation Depth
	Abyssal Plain above Calcite Compensation Depth
	Southwest Shelf Transition
	Shallow Water to Shallow Shelf Transition
	Shallow Shelf
	Shallow Shelf to Deep Shelf Transition
	Deep Shelf
	Deep Shelf to Shelf Edge Transition
	Shelf Edge
Key ecological features	Ancient coastline at 90-120m depth
	Commonwealth waters surrounding the Houtman Abrolhos Islands
	Meso-scale eddies
	Perth Canyon and adjacent shelf break, and other west coast canyons
	Western demersal slope and associated fish communities
	Western Rock Lobster habitat
Biological seascapes	Cluster 4
	Cluster 5
	Cluster 10
	Cluster 19
	Cluster 20
Seafloor features	abyssal-plain/deep ocean floor
	bank/shoals
	canyon
	continental-rise
	deep/hole/valley
	escarpment
	reef
	shelf
	slope
	terrace

5.2 Proposed Jurien Commonwealth marine reserve



Biophysical, ecological and conservation values

The proposed Jurien Commonwealth marine reserve covers an area of approximately 1 880 km^2 adjacent to the existing Western Australian Jurien Bay Marine Park in state waters. It includes important shelf habitats defined by distinct ridges of limestone reef with extensive beds of macroalgae (principally *Ecklonia* species). These inshore lagoons are inhabited by a diverse range of coralline algae, sponges, molluscs, crustaceans and demersal and pelagic fish. Extensive schools of migratory fish visit the area annually. These small to mid-sized predators feed on smaller pelagic fish and squid, and in turn are eaten by larger predators. Small pelagic fish are considered a particularly important trophic link between plankton communities and larger fish-eating predators, including protected seabirds. Seagrass meadows occur in more sheltered areas and in the inter-reef lagoons along exposed sections of the coast. Benthic communities on the outer shelf and shelf break are dominated by adult snapper, while filter feeding sponges and bryozoans dominate hard substrates.

The proposed reserve includes important foraging habitat for the threatened Australian sea lion, adjacent to the existing state Marine Park which protects major breeding sites for the sea lion along the west coast.

Conservation values

- Three key ecological features:
    - Ancient coastline (enhanced productivity)
    - Demersal slope and associated fish communities of the Central Western Province (communities with high species diversity)
    - Western Rock Lobster habitat (species with important ecological role)

- seafloor and pelagic habitats and communities of the Central West Coast meso-scale bioregion of the South-west shelf transition, and small amounts of the Central Western Province
- Important foraging areas for the threatened soft-plumaged petrel, several species of migratory seabirds, the west coast breeding colonies of the threatened Australian sea lion, and the threatened white shark
- Important migration habitat for the threatened humpback whale

Existing uses

The Yued Native Title claim, covering 29 252 km^2 of land and sea, extends into Commonwealth waters along the eastern length of the proposed reserve.

The continental shelf is considered important for oil and gas prospectivity, and one exploration lease straddles the boundaries of the proposed reserve.

The valuable Western Rock Lobster Fishery operates across the continental shelf. Other important fisheries include the state-managed West Coast Demersal Scalefish Fishery, and the West Coast Demersal Gillnet and Demersal Longline fisheries.

Recreational and charter fishing and tourism are also important activities in this area. The proposed Jurien reserve has one of the highest concentrations of recreational fishing in the region, noting that the majority of recreational fishing occurs in the adjacent coastal waters.

Proposed Zoning Arrangements and Management Principles

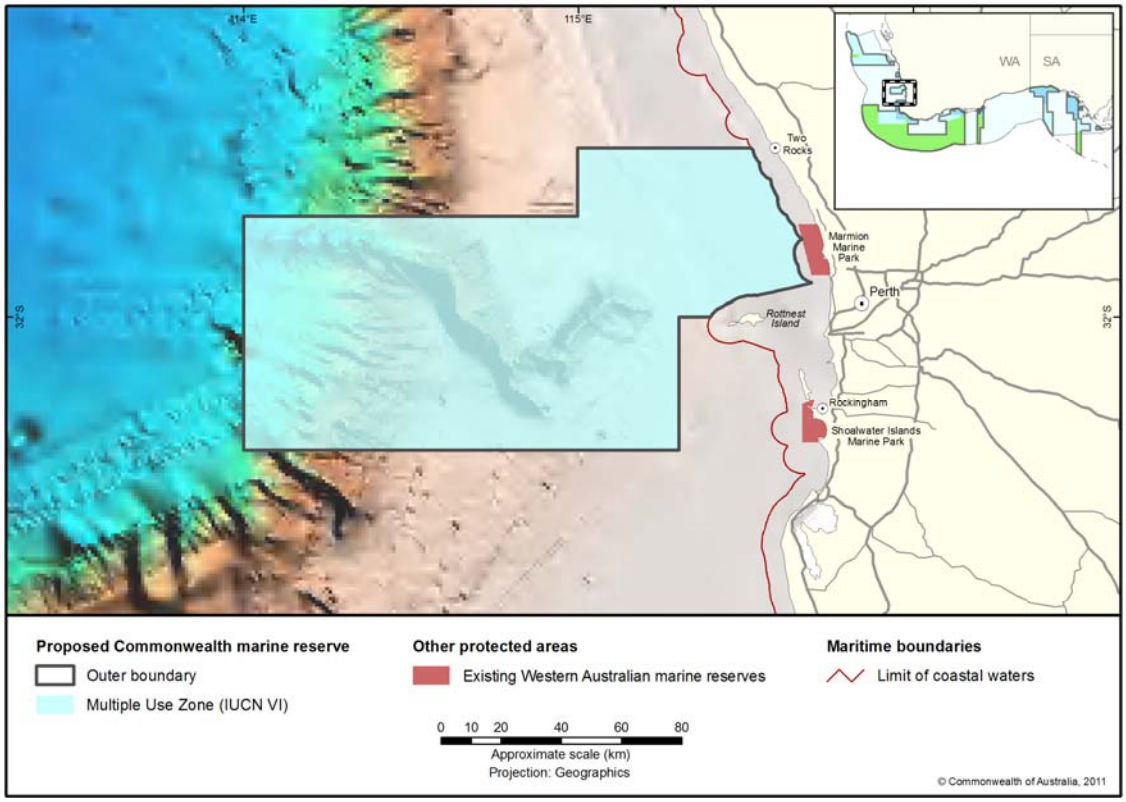
The proposed reserve is zoned as special purpose. The activities permitted in this zone under the proposed management arrangements are shown in Table 3.5.

This reserve protects the important shelf environments of the Central Western Province while recognising the importance of this area for commercial fishing. This zone allows demersal gillnet and demersal longline fishing methods to be used. In the standard multiple use zoning these methods would be excluded because of their potential impacts, but they would be allowed in the special purpose zone in order to moderate socioeconomic impacts. The effects of these fishing methods on the biodiversity of the reserve would be monitored and reviewed under the reserve's management arrangements. This zone would be managed in accordance with the management principles for IUCN Category VI. Recreational and charter fishing would also be able to continue under this zoning arrangement.

Table 5.2 Conservation features represented in the draft proposed Jurien reserve.

Feature	Name
Provincial bioregions	Central Western Province
	Southwest Shelf Transition
Meso-scale bioregions	Central West Coast
Depth ranges within bioregions	**Central Western Province**
	Shelf Edge to Shallow Upper Slope Transition
	Shallow Upper Slope
	Shallow Upper Slope to Deep Upper Slope Transition
	Southwest Shelf Transition
	Shallow Water to Shallow Shelf Transition
	Shallow Shelf
	Shallow Shelf to Deep Shelf Transition
	Deep Shelf
	Deep Shelf to Shelf Edge Transition
	Shelf Edge
Key ecological features	Ancient coastline at 90-120m depth
	Western demersal slope and associated fish communities
	Western Rock Lobster habitat
Biological seascapes	Cluster 10
Seafloor features	shelf
Geomorphic Feature	slope

5.3 Proposed Perth Canyon Commonwealth marine reserve



Biophysical, ecological and conservation values

The proposed Perth Canyon Commonwealth marine reserve covers approximately 11 720 km^2 from the state waters boundary north of Perth and Rottnest Island to Two Rocks and extending westward into deep water off the continental shelf, including the entire Perth Canyon. The Perth Canyon is Australia's largest submarine canyon and is a key ecological feature of the South-west marine region, being home to the largest feeding aggregations of blue whales in Australia. This unique feature is also of particular significance because it cuts into the continental shelf at approximately 150 m depth west of Rottnest Island, linking the shelf with deeper ecosystems. The topography of the canyon is thought to contribute to the frequent formation of eddies and frontal structures north of Rottnest Island. These eddies create nutrient-rich cold water masses of enhanced productivity nearer the surface and attract feeding aggregations of marine mammals and large predatory fish. The area within the proposed reserve is representative of the southern end of the transition area from tropical to temperate marine environments, a gradient that extends from the tropical ecosystems of Shark Bay to the predominantly temperate communities found at this latitude. The Leeuwin Current influences the biodiversity of this area and pushes subtropical water southward.

Conservation values

- Six key ecological features:
    - Ancient coastline (enhanced productivity)
    - Demersal slope fish communities (communities with high species diversity)
    - Meso-scale eddies (enhanced productivity, feeding aggregations)
    - Perth Canyon and other west coast canyons (enhanced productivity, feeding aggregations)

    - West coast inshore lagoons (high productivity and aggregations of marine life)
    - Western Rock Lobster habitat (species with important ecological role)
- ecosystems of the Central Western Province and Southwest Shelf Transition (including the Central West Coast meso-scale bioregion) and the Southwest Transition and Southwest Shelf Province (including the Leeuwin-Naturaliste meso-scale bioregion)
- Important foraging areas for the threatened soft-plumaged petrel, several species of migratory seabirds and the threatened Australian sea lion
- biologically important seasonal feeding aggregations of four whale species, including the northern most extent of seasonal calving habitat for the threatened southern right whale, foraging areas for the threatened blue whale and the sperm whale, and migration pathway for the threatened humpback whale.

Existing uses

The Swan River People 2 Native Title claim, covering 16 824 km^2 of land and sea, was logged in February 2011 and has yet to be assessed for registration. This claim extends into Commonwealth waters and overlaps with the eastern half of the proposed reserve.

A number of important fisheries operate in this area, including the state-managed Western Rock Lobster, South West Inshore (managed) Trawl, West Coast Purse Seine and West Coast Deep Sea Crab fisheries; and the Commonwealth Western Tuna and Billfish and Western Deepwater Trawl fisheries. The Western Australian Abalone Fishery also operates in the area, mostly within state waters (depths up to 40 m).

Recreational and charter fishing are also important, mainly near Rottnest Island, but extending to the head of the canyon. This is one of the most important recreational fishing destinations off the west coast.

A proposed aquaculture development zone overlaps with part of the proposed reserve.

Prospectivity for oil and gas is considered medium. Within the proposed reserve boundaries there are three existing petroleum exploration leases, and acreages open for bidding (including for carbon sequestration).

The Royal Australian Navy's Western Australia Exercise Training Area overlaps the proposed reserve. This area is of national significance for training exercises and submarine deployment.

While the reserve avoids the busiest shipping route into and out of Fremantle, shipping remains an important activity in the area.

Proposed Zoning Arrangements and Management Principles

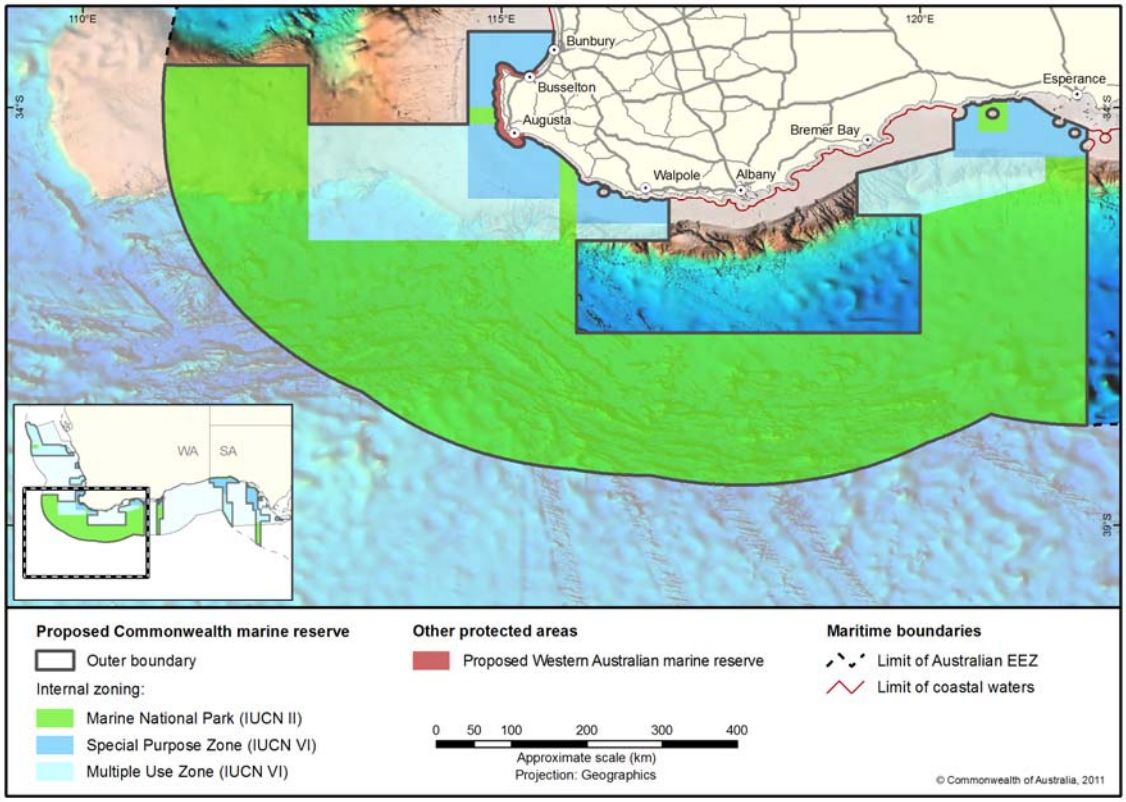
The proposed Perth Canyon Commonwealth marine reserve is a multiple use zone to reflect the high level of existing uses within the proposed boundaries. The activities permitted in this zone under the proposed management arrangements are shown in Table 3.5. The shelf waters in this area are already subject to the Western Australian Metropolitan Zone Closure, which excludes commercial fishing of demersal finfish species. The overlap with the fishing closure reduces impacts on the region's commercial fishers. This zone would be managed in accordance with the management principles for IUCN Category VI.

Table 5.3 Conservation features represented in the draft proposed Perth Canyon reserve.

Feature	Name
Provincial bioregions	Central Western Province
	Southwest Shelf Province
	Southwest Shelf Transition
	Southwest Transition
Meso-scale bioregions	Central West Coast
	Leeuwin-Naturaliste
Depth ranges within bioregions	**Central Western Province**
	Shelf Edge to Shallow Upper Slope Transition
	Shallow Upper Slope
	Shallow Upper Slope to Deep Upper Slope Transition
	Deep Upper Slope
	Deep Upper Slope to Shallow Mid-Slope Transition
	Shallow Mid-Slope
	Deep Mid-Slope
	Deep Continental Slope
	Continental Rise
	Abyssal Plain above Calcite Compensation Depth
	Southwest Shelf Province
	Shallow Water to Shallow Shelf Transition
	Shallow Shelf
	Shallow Shelf to Deep Shelf Transition
	Deep Shelf
	Deep Shelf to Shelf Edge Transition
	Shelf Edge
	Southwest Shelf Transition
	Shallow Water
	Shallow Water to Shallow Shelf Transition
	Shallow Shelf
	Shallow Shelf to Deep Shelf Transition
	Deep Shelf
	Deep Shelf to Shelf Edge Transition
	Shelf Edge
	Edge to Shallow Upper Slope Transition
	Southwest Transition
	Shallow Upper Slope
	Shallow Upper Slope to Deep Upper Slope Transition
	Deep Upper Slope
	Deep Upper Slope to Shallow Mid-Slope Transition
	Shallow Mid-Slope
	Deep Mid-Slope
	Deep Continental Slope
	Continental Rise
	Abyssal Plain above Calcite Compensation Depth
Key ecological features	Ancient coastline at 90-120m depth
	Meso-scale eddies
	Perth Canyon and adjacent shelf break, and other west coast canyons
	West-coast inshore lagoons
	Western demersal slope and associated fish communities
	Western Rock Lobster habitat
Biological seascapes	Cluster 2
	Cluster 6
	Cluster 7
	Cluster 10

Feature	Name
	Cluster 11
	Cluster 14
	Cluster 16
	Cluster 19
Seafloor features	bank/shoals
	canyon
	continental-rise
	pinnacle
	shelf
	slope
	terrace

5.4 Proposed South-west corner Commonwealth marine reserve



Biophysical, ecological and conservation values

The South-west corner reserve is the largest of the proposed reserves, covering approximately 322 380 km² of relatively pristine and unexploited ocean environments. It also includes one of the largest marine national park zones (i.e. high level of protection) in the world. The proposed reserve extends from Binningup (north of Bunbury) on the west coast around the capes area (Cape Naturaliste, Cape Mentelle and Cape Leeuwin) to east of Walpole. It extends offshore from Cape Leeuwin to the edge of Australia's EEZ and includes parts of the Naturaliste Plateau. The reserve then extends eastwards, capturing deep offshore habitats of the Diamantina Fracture Zone before joining the state waters to the west of Esperance and the Recherche Archipelago.

Due to its substantial latitudinal and longitudinal extent, the proposed reserve protects a wide range of important ecosystems in both shallow and deep water. It covers Commonwealth waters adjacent to Geographe Bay and Cape Naturaliste, both areas identified as key ecological features of the South-west marine region. Geographe Bay is an area of high productivity supported by extensive and diverse seagrass beds which extend into Commonwealth waters. Tropical and temperate seagrass species account for 80 per cent of the benthic primary production in the area. These meadows provide important nursery habitat for many species. Shoals of small planktivorous fish and squid in the bay are preyed upon seasonally by large mobile schools of predatory fish. Geographe Bay is also recognised as an important resting area for migrating humpback whales.

To the west of Cape Naturaliste the reserve captures a large part of the seasonal Cape Mentelle upwelling, also a key ecological feature. In the summer months, nutrient rich water from deep are brought along the continental shelf to shallow waters along the inner shelf which support phytoplankton blooms. These blooms lead to high productivity and support extended food chains characterised by feeding aggregations of small pelagic fish, large predatory fish, seabirds, dolphins and sharks.

The proposed reserve provides a unique opportunity to conserve in its natural condition a unique transect of protected land and sea extending from coastal land (existing Leeuwin-Naturaliste and D'entrecasteaux National Parks), to coastal waters (State Capes Marine Conservation Reserve Proposal) and into the deep ocean (proposed South-west Corner Commonwealth Reserve).

The south-west corner of the continent is characterised by two distinctive geomorphic features, the Naturaliste Plateau and the Diamantina Fracture Zone, both of which are believed to be associated with rich and possibly unique biological communities. Large areas of both these key ecological features are included in the proposed reserve.

The Recherche Archipelago is the most extensive area of reef in the South-west region. Its reef and seagrass habitats support a high diversity of warm temperate species including 263 known species of fish, 347 species of molluscs, 300 species of sponges, and 242 species of macroalgae. The proposed reserve captures one of the few areas where the reef extends into Commonwealth waters. It also contains breeding colonies of the Australian sea-lion, including in the western part of the Recherche Archipelago at Rocky Island and West Island.

The proposed reserve includes biologically important areas for several whale species, including resting places for migrating humpback whales, areas where sperm whales feed, and a migration route for endangered blue whales. It also contains important foraging areas for many seabirds, including four threatened species.

Conservation values

- Significant representation of three provincial bioregions: the Southwest Transition and Southern Province in the off-shelf area and the Southwest Shelf Province on the continental shelf. The proposed reserve also represents parts of the Leeuwin-Naturaliste meso-scale bioregion and the WA South Coast meso-scale bioregion
- Nine key ecological features:
    - Albany Canyons (enhanced productivity, feeding aggregations)
    - Ancient Coastline (enhanced productivity)
    - Cape Mentelle upwelling (enhanced productivity)
    - Commonwealth marine environment surrounding the Recherche Archipelago (high biodiversity, breeding and resting aggregations, including the most extensive areas of reef on the shelf within the region)
    - Commonwealth marine environment within and adjacent to Geographe Bay (enhanced productivity (benthic), high biodiversity, feeding, resting, breeding and nursery aggregations)
    - Diamantina Fracture Zone (unique seafloor feature likely to support deep-water communities characterised by high species diversity and endemism)
    - Meso-scale eddies (enhanced productivity, feeding aggregations)
    - Naturaliste Plateau (unique seafloor feature, likely to support deep-water communities characterised by high species diversity and endemism)
    - Western Rock Lobster habitat (species with important ecological role)
- seasonal calving habitat for the threatened southern right whale
- foraging habitat for the threatened white shark, Indian yellow-nosed albatross and soft-plumaged petrel and for several species of migratory seabirds

- biologically important areas for several whale species, including resting places for migrating threatened humpback whales, areas where sperm whales feed, and a migration route for threatened blue whales
- breeding colonies of the threatened Australian sea lion
- one of the few examples of temperate seagrass habitats extending into Commonwealth waters off Geographe Bay
- areas of pristine seafloor ecosystems offshore from the Recherche Archipelago
- seafloor habitats and communities of the Naturaliste Plateau, Diamantina Fracture Zone and the Leeuwin-Naturaliste meso-scale bioregion
- pelagic habitats and communities of southern Western Australia, in particular those environments associated with enhanced productivity and species aggregations (feeding, resting and breeding areas):
    - Albany Canyons and adjacent shelf break
    - seasonally predictable Cape Mentelle upwelling
    - meso-scale eddies south-west of Cape Leeuwin
    - area associated with the abrupt diversion to the east of the southbound Leeuwin Current.

Existing uses

The area is important for several fisheries, including the state-managed Western Rock Lobster, South Coast Crustaceans, Joint Authority Southern Demersal Gillnet and Demersal Longline, West Coast Demersal Scalefish, West Coast Deep Sea Crab, South Coast Trawl, South-west Inshore (managed) Trawl, South Coast Purse Seine, and South Coast 'open access' fisheries, and the Commonwealth Western Deepwater Trawl and Western Tuna and Billfish fisheries. The Western Australian Abalone Fishery also operates in the area, mostly within state waters.

Recreational and charter fishing are important activities, but are mostly limited to state waters.

Petroleum prospectivity in the area, which overlaps with the southern end of the Perth basin and the Mentelle and Bremer sub-basins, is low to medium. Two petroleum exploration licences are held within the proposed reserve boundaries, offshore from Bremer Bay. One acreage (part of the 2010 offshore petroleum acreage release) is adjacent and to the west of the proposed reserve, offshore from Cape Naturaliste.

Several shipping routes connecting western and eastern Australia converge in the area, south of Augusta.

Proposed Zoning Arrangements and Management Principles

The proposed South-west Corner Commonwealth Reserve contains three zones. The activities permitted in these zones under the proposed management arrangements are shown in Table 3.5:

- three separate marine national park zones designed to provide a high level of protection to unique features including the Naturaliste Plateau and the Diamantina Fracture Zone. A narrow band of this marine national park extends onto the shelf west of Windy Harbour which provides a high level of protection for shelf ecosystems in the Southwest Shelf Province. The boundaries of the offshore extent of the marine national park off Esperance align with the exiting deepwater closures of the Great Australian Bight Trawl

Sector of the Southern and Eastern Scalefish and Shark Fishery. Two smaller areas of marine national park also cover shelf ecosystems. One area is a 22 km wide strip running from the proposed Cape Freycinet Sanctuary Zone in Western Australian waters to the shelf break (690 km2), providing a high level of protection to shelf ecosystems and parts of the Cape Mentelle upwelling. The second area (1 190 km2) surrounds Investigator Island to the west of Esperance and provides a high level of protection to shelf ecosystems. No commercial activities and no extractive recreational activities would be permitted in these areas. This zone would be managed consistent with the management principles for IUCN Category II;

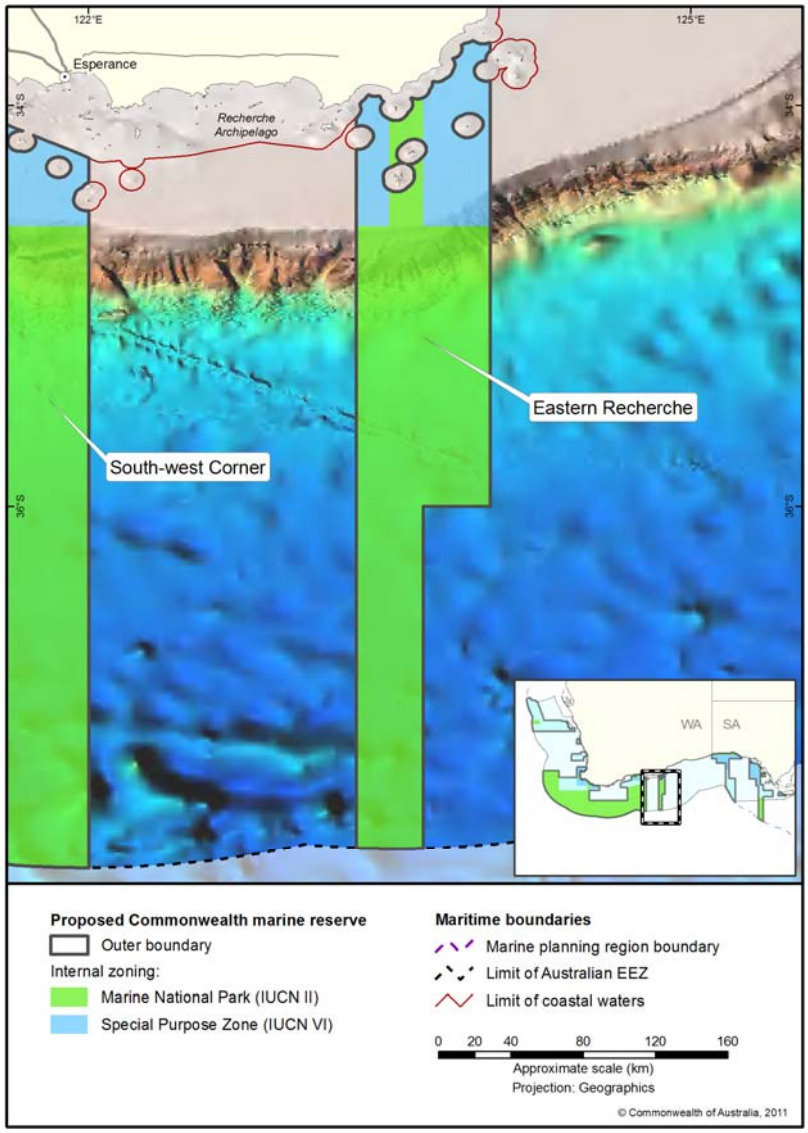
- three areas of multiple use zones. An offshore multiple use zone covers part of the Naturaliste Plateau, a large trench/trough and several deep-water canyons. The other two multiple use zones are offshore from Walpole and Bremer Bay. This zoning provides protection to the eastern and western parts of the Albany canyons, whilst allowing for minimal impact on existing users including the oil and gas industry and the commercial fishing sector (excluding bottom-trawling, demersal gillnetting and demersal longlining). This zone would be managed in accordance with the management principles for IUCN Category VI; and
- the remainder of the shelf area between Binningup and Walpole, and west of Esperance has been zoned as special purpose. This zoning reflects the importance of the shelf area for the existing users of the region including the oil and gas industry, the commercial fishing sector, and the recreational and charter fishing sectors. This zone allows demersal gillnet and demersal longline fishing methods to be used. In the standard multiple use zoning these methods would be excluded because of their potential impacts, but they would be allowed in the special purpose zone in order to moderate socioeconomic impacts. The effects of these fishing methods on the biodiversity of the reserve would be monitored and reviewed under the reserve's management arrangements. This zone would be managed in accordance with the management principles for IUCN Category VI.

Table 5.4 Conservation features represented in the draft proposed South-west corner reserve.

Feature	Name
Provincial bioregions	Southern Province
	Southwest Shelf Province
	Southwest Transition
Meso-scale bioregions	Leeuwin-Naturaliste
	WA South Coast
Depth ranges within bioregions	**Southern Province**
	Shelf Edge to Shallow Upper Slope Transition
	Shallow Upper Slope
	Shallow Upper Slope to Deep Upper Slope Transition
	Deep Upper Slope
	Deep Upper Slope to Shallow Mid-Slope Transition
	Shallow Mid-Slope
	Deep Mid-Slope
	Deep Continental Slope
	Continental Rise
	Abyssal Plain below Calcite Compensation Depth
	Abyssal Plain above Calcite Compensation Depth
	Hadal Zone
	Southwest Shelf Province
	Shallow Water
	Shallow Water to Shallow Shelf Transition
	Shallow Shelf
	Shallow Shelf to Deep Shelf Transition
	Deep Shelf
	Deep Shelf to Shelf Edge Transition
	Shelf Edge
	Southwest Transition
	Shelf Edge to Shallow Upper Slope Transition
	Shallow Upper Slope
	Shallow Upper Slope to Deep Upper Slope Transition
	Deep Upper Slope
	Deep Upper Slope to Shallow Mid-Slope Transition
	Shallow Mid-Slope
	Deep Mid-Slope
	Deep Continental Slope
	Continental Rise
	Abyssal Plain below Calcite Compensation Depth
	Abyssal Plain above Calcite Compensation Depth
Key ecological features	Albany Canyons Group and adjacent shelf break
	Ancient coastline at 90-120m depth
	Cape Mentelle upwelling
	Commonwealth waters surrounding the Recherche Archipelago
	Commonwealth waters within and adjacent to Geographe Bay
	Diamantina Fracture Zone
	Meso-scale eddies
	Naturaliste Plateau
	Western Rock Lobster habitat
Biological seascapes	Cluster 7
	Cluster 9
	Cluster 10
	Cluster 11

Feature	Name
	Cluster 12
	Cluster 13
	Cluster 14
	Cluster 15
	Cluster 16
	Cluster 17
	Cluster 18
	Cluster 19
Seafloor features	abyssal-plain/deep ocean floor
	bank/shoals
	canyon
	deep/hole/valley
	knoll/abyssal-hills/hills/mountains/peak
	pinnacle
	plateau
	reef
	ridge
	shelf
	slope
	terrace
	trench/trough

5.5 Proposed Eastern Recherche Commonwealth marine reserves



Biophysical, ecological and conservation values

The proposed Eastern Recherche marine reserve covers approximately 19 240 km^2, from Cape Pasley in the eastern part of the Recherche Archipelago into deep water off the continental shelf to the limit of the EEZ. The waters surrounding the Recherche Archipelago are a key ecological feature of the South-west marine region. The proposed reserve provides protection to representative examples of habitats adjacent to the Archipelago, an area recognised globally for its biodiversity. The Archipelago contains over 150 islands stretching over 200 km of ocean and represents the most extensive area of rocky reef environments in the region. Its reef and seagrass habitats support a high diversity of warm temperate species including 263 known species of fish, 347 species of molluscs, 300 species of sponges, and 242 species of macro-algae. The proposed reserve captures one of the few areas where the reef extends into Commonwealth waters. The islands are important seabird breeding areas and the surrounding waters contain important breeding and foraging areas for Australian sea lions and New Zealand fur seals, and calving and resting areas for the endangered southern right whales.

Plant and animal assemblages of the Southwest Shelf Province resemble the cooler water communities to the east, although a distinct sub-tropical element is maintained by the

eastbound Leeuwin Current. The bioregion is characterised by a higher diversity of temperate macroalgal species compared with bioregions further north. Macroalgae colonise exposed rocky shorelines and reefs, while seagrass meadows are found in sheltered bays and in the lee of some rocky reefs. Seagrass meadows in this bioregion are noted for their high species diversity and endemism. In shallow waters, western blue groper and queen snapper (blue morwong) are prominent large benthic feeders. Small pelagic fish are thought to be particularly important trophic links between plankton communities and larger fish-eating predators. Southern rock lobster is the dominant lobster species in this bioregion. The proposed reserve would represent part of the meso-scale eddy of the Leeuwin Current that occurs predictably south-east of Esperance. The eddy is an important transporter of nutrients and plankton communities, taking them far offshore into the Indian Ocean. Clockwise eddies are considered to play an important role in lifting deep water towards the surface where it can enhance production of plankton communities that attract aggregations of marine life.

Conservation values

- Three key ecological features:
    - Ancient coastline (enhanced productivity)
    - Meso-scale eddies (enhanced productivity, feeding aggregations)
    - Recherche Archipelago (high biodiversity, breeding and resting aggregations, including most extensive areas of reef on the shelf within the South-west marine region)
- seafloor habitats and communities of the Southwest Shelf province (Western Australian South Coast meso-scale bioregion) and the Southern province
- Seasonal calving habitat for the threatened southern right whale
- Foraging habitat for the threatened white shark
- Foraging habitat for breeding colonies of the threatened Australian sea lion and for several species of migratory seabirds

Existing uses

The area is of value to the Western Australian–managed Esperance Southern Rock Lobster and South Coast Trawl fisheries, and the Joint Authority Southern Demersal Gillnet and Demersal Longline Fishery. The Western Australian Abalone Fishery operates in the coastal waters adjacent to the proposed reserve.

Recreational fishing and tourism are important but are mainly confined to state waters.

Proposed Zoning Arrangements and Management Principles

The proposed Eastern Recherche Commonwealth Reserve contains two zones. The activities permitted in these zones under the proposed management arrangements are shown in Table 3.5:

- An extensive marine national park zone from east of Pasley Island to the shelf break and then incorporating the entire reserve beyond the shelf break to the limit of the Australian EEZ. This zone has been designed to provide a high level of protection to the biodiversity of the area, in particular to areas of pristine seafloor ecosystems and foraging habitats surrounding the Recherche Archipelago, and to provide connectivity with deeper water environments. The offshore extent of this reserve aligns with the existing deepwater closures of the Great Australian Bight Trawl Sector of the Southern and Eastern Scalefish and Shark Fishery (SESSF). No commercial activities and no

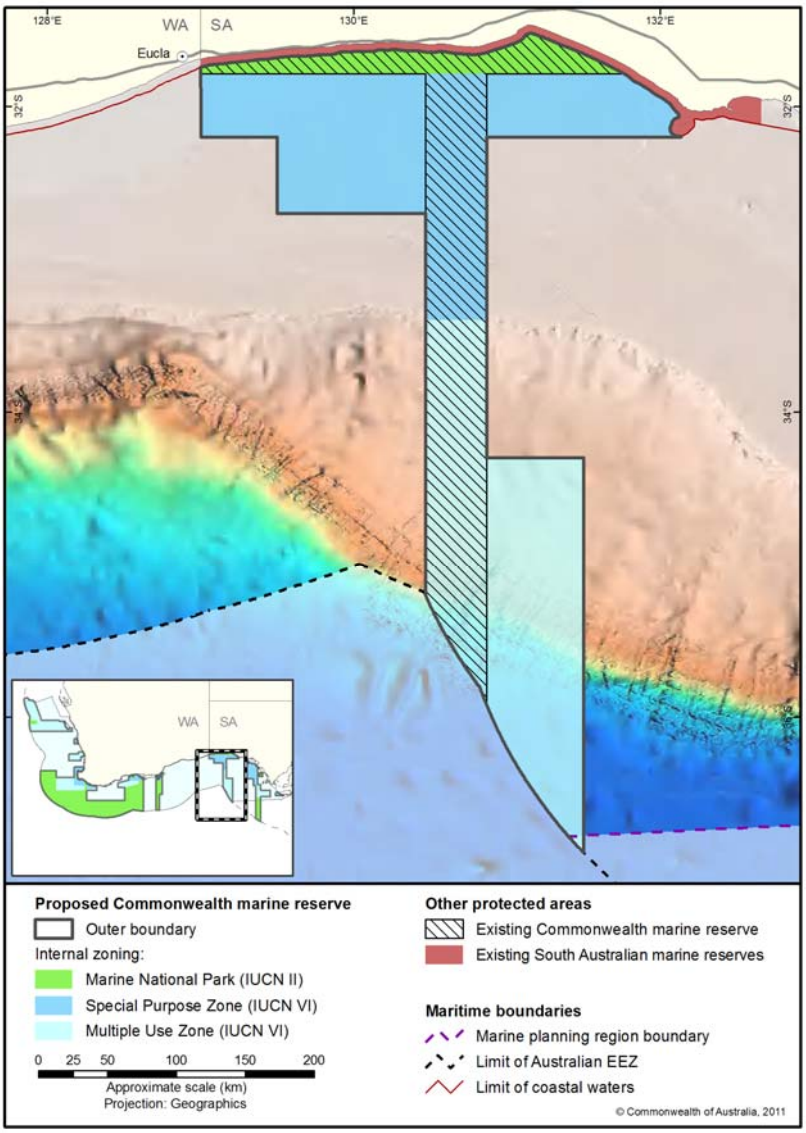
extractive recreational activities would be permitted in this area. This zone would be managed consistent with the management principles for IUCN Category II.

- East and west of Pasley Island on the continental shelf are small areas of special purpose zones (920 and 2550 km2) which are designed to protect and maintain the biodiversity of the shelf ecosystems in the long-term, while allowing the sustainable use of resources, taking into account the commercial fisheries operating in the area. This zone allows demersal gillnet and demersal longline fishing methods to be used. In the standard multiple use zoning these methods would be excluded because of their potential impacts, but they would be allowed in the special purpose zone in order to moderate socioeconomic impacts. The effects of these fishing methods on the biodiversity of the reserve would be monitored and reviewed under the reserve's management arrangements. This zone would be managed in accordance with the management principles for IUCN Category VI.

Table 5.5 Conservation features represented in the draft proposed Eastern Recherche reserve.

Feature	Name
Provincial bioregions	Great Australian Bight Shelf Transition
	Southern Province
	Southwest Shelf Province
Meso-scale bioregions	Eucla
	WA South Coast
Depth ranges within bioregions	**Great Australian Bight Shelf Transition**
	Shallow Water to Shallow Shelf Transition
	Southern Province
	Shelf Edge to Shallow Upper Slope Transition
	Shallow Upper Slope
	Shallow Upper Slope to Deep Upper Slope Transition
	Deep Upper Slope
	Deep Upper Slope to Shallow Mid-Slope Transition
	Shallow Mid-Slope
	Deep Mid-Slope
	Deep Continental Slope
	Continental Rise
	Abyssal Plain below Calcite Compensation Depth
	Abyssal Plain above Calcite Compensation Depth
	Southwest Shelf Province
	Shallow Water to Shallow Shelf Transition
	Shallow Shelf
	Shallow Shelf to Deep Shelf Transition
	Deep Shelf
	Deep Shelf to Shelf Edge Transition
	Shelf Edge
Key ecological features	Ancient coastline at 90-120m depth
	Commonwealth waters surrounding the Recherche Archipelago
	Meso-scale eddies
Biological seascapes	Cluster 6
	Cluster 7
	Cluster 9
	Cluster 11
	Cluster 12
	Cluster 14
	Cluster 15
	Cluster 16
	Cluster 18
Seafloor features	abyssal-plain/deep ocean floor
	shelf
	slope

5.6 Proposed Great Australian Bight Commonwealth marine reserve (extension to existing Marine Park)



Biophysical, ecological and conservation values

The proposed extension to the Great Australian Bight (GAB) Marine Park covers approximately 30 290 km^2 which, if added to the existing reserve, would make a total of 49 660 km^2. The proposed reserve covers the Commonwealth marine environment associated with the continental shelf adjacent to and offshore from Eucla east to Nuyts Reef and extending into the deep abyssal zone of the central Great Australian Bight. The waters of the GAB are recognised globally for their southern right whale calving grounds and breeding colonies of vulnerable Australian sea lions. The existing GAB Marine Park was established to protect habitat for these two species as well as an area representative of the benthic habitat of the region. Small pelagic fish, which have been identified as a key ecological feature of the region, provide an important trophic link between plankton communities and larger fish-eating predators in this area. The benthic invertebrate communities found on the inner shelf, particularly sponges, ascidians and bryozoans, are among the world's most diverse in soft sediment ecosystems. A 2002 survey of benthic marine life sampled 798 species, including 360 species of sponge, 138 ascidian species and 93 species of bryozoans, many of which were new to science. The shelf in this part of the region is also part of the world's

largest cool-water carbonate province, an area of sediments dominated by the calcium carbonate remains of organisms that absorb these elements from the surrounding sea-water into their shells and skeletons.

The proposed reserve boundaries not only capture marine environments characteristic of the bioregions in the area but also include examples of key seafloor features such as reef, submarine canyons and the unusually large expanse of terrace, a seafloor feature that lies between the continental shelf and the slope towards the deep ocean floor. The extension to the deeper parts of the GAB Marine Park is proposed to complete the protection of a large and elongated canyon that cuts into this terrace, previously only partially protected by the existing reserve.

Conservation values

- Three key ecological features:
    - the ancient coastline (enhanced productivity)
    - the benthic invertebrate communities of the eastern Great Australian Bight (communities with high species diversity)
    - areas important for small pelagic fish (species group with important ecological role)
- seafloor and pelagic environments associated with the Eucla meso-scale bioregion of the GAB Shelf Transition and the Southern province
- Calving habitat for the threatened southern right whale at the Head of Bight
- Foraging areas for the threatened Australian sea lion (including colonies along the Bunda Cliffs and at Nuyts Reef), the threatened white shark, the endangered blue whale, the sperm whale, and the migratory short-tailed shearwater.

Existing uses

Important Indigenous heritage values exist within the proposed reserve and the adjacent Yalata Indigenous Protected Area. The Far West Coast Native Title claim, covering 84 964 km^2 of land and sea, extends into Commonwealth waters along the northern length of the proposed reserve.

The Commonwealth Southern Bluefin Tuna Fishery is the most significant fishery operating within or near the proposed reserve. Other key fisheries include the Commonwealth Gillnet, Hook and Trap sector and the GAB Trawl sector of the Southern and Eastern Scalefish and Shark Fishery; the Commonwealth Western Skipjack Tuna, and Western Tuna and Billfish fisheries; and the South Australian Marine Scalefish and Rock Lobster fisheries. The high-value South Australian Abalone Fishery also operates in this area, mostly confined to state waters. Key fishing grounds which extend into Commonwealth waters, including reefs to the north of the Investigator group of islands, are outside the proposed reserve boundaries.

The petroleum prospectivity is high in the Ceduna sub-basin, which extends out from the shelf break down the continental slope within the proposed boundaries. The proposed reserve overlaps with four existing petroleum exploration titles which were awarded in January 2011.

Recreational and charter fishing are mostly confined to state waters.

Proposed Zoning Arrangements and Management Principles

The proposed Great Australian Bight (extension) Commonwealth Reserve contains three zones. The activities permitted in these zones under the proposed management

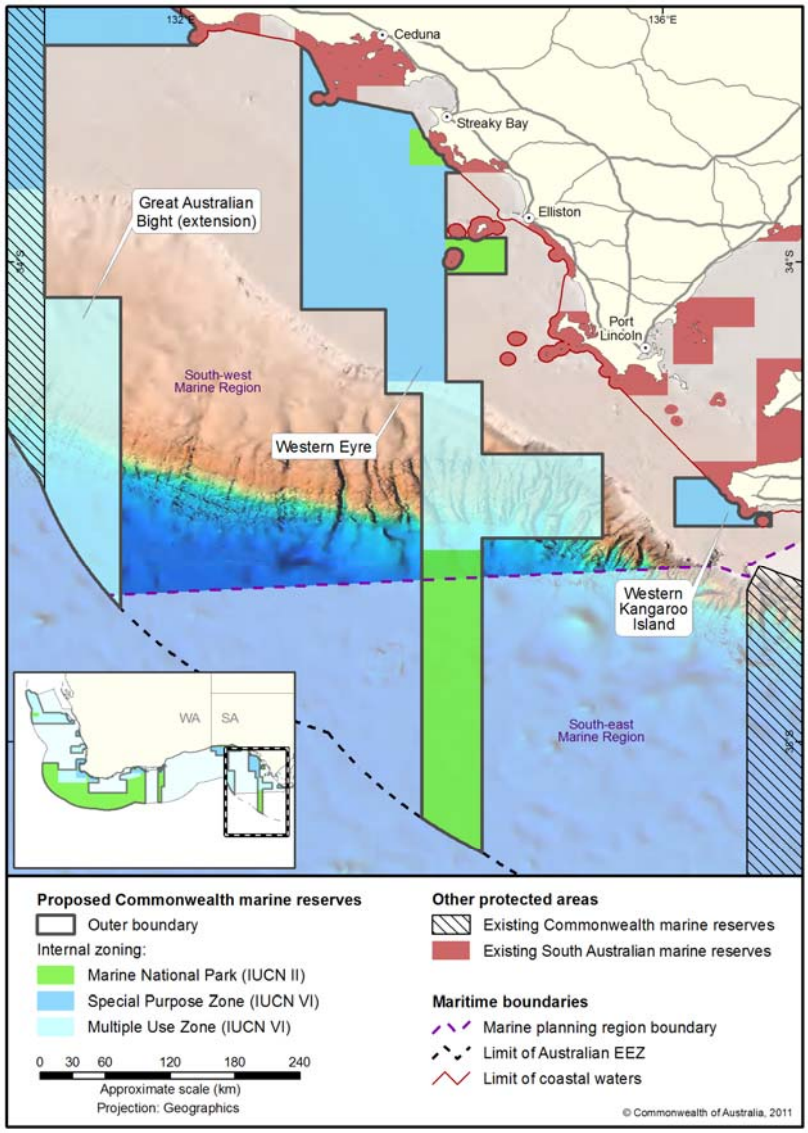
arrangements are shown in Table 3.5. The zoning would update that of the existing GAB Marine Park:

- A marine national park zone is proposed for the inner shelf from Eucla to Nuyts Reef. This would increase protection of the existing Marine Mammal Protection Zone of the GAB Marine Park (currently zoned as IUCN Category VI). This zone would enhance the protection for both the Australian sea lion which has breeding colonies along the Bunda Cliffs (east of Eucla) and the southern right whale which has one of three known major calving grounds at the Head of Bight. No commercial activities and no extractive recreational activities would be permitted in this area. This zone would be managed consistent with the management principles for IUCN Category II.
- The off-shelf component of the reserve has been zoned multiple use. A number of commercial and recreational activities would be allowed in this zone subject to environmental approvals and relevant existing regulations. Some activities would not be permitted because of the risk they pose to its biological diversity. This zone provides protection to the ecosystems of the Southern Province, including an extensive amount of terrace and a large submarine canyon which cuts into the deeper extent of this terrace. Four petroleum exploration titles overlap with this zone. The use of multiple use zoning would allow for petroleum exploration and development, subject to assessment and approval under the EPBC Act. This zone would be managed consistent with the management principles for IUCN Category VI.
- The majority of the continental shelf within the proposed reserve has been zoned special purpose, to protect and maintain biodiversity in the long-term while recognising the importance of this area for commercial fishing. This zone covers the ecosystems associated with the world's largest cool-water carbonate province in the central part of the GAB Shelf Transition. This zone allows demersal gillnet and demersal longline fishing methods to be used. In the standard multiple use zoning these methods would be excluded because of their potential impacts, but they would be allowed in the special purpose zone in order to moderate socioeconomic impacts. The effects of these fishing methods on the biodiversity of the reserve would be monitored and reviewed under the reserve's management arrangements. This zone would be managed consistent with the management principles for IUCN Category VI.

Table 5.6 Conservation features represented in the draft proposed Great Australian Bight (extension) reserve.

Feature	Name
Provincial bioregions	Great Australian Bight Shelf Transition
	Southern Province
Meso-scale bioregions	Eucla
	Murat
Depth ranges within bioregions	**Great Australian Bight Shelf Transition**
	Shallow Water
	Shallow Water to Shallow Shelf Transition
	Shallow Shelf
	Shallow Shelf to Deep Shelf Transition
	Deep Shelf
	Deep Shelf to Shelf Edge Transition
	Shelf Edge
	Southern Province
	Shelf Edge to Shallow Upper Slope Transition
	Shallow Upper Slope
	Shallow Upper Slope to Deep Upper Slope Transition
	Deep Upper Slope
	Deep Upper Slope to Shallow Mid-Slope Transition
	Shallow Mid-Slope
	Deep Mid-Slope
	Deep Continental Slope
	Continental Rise
	Abyssal Plain below Calcite Compensation Depth
	Abyssal Plain above Calcite Compensation Depth
Key ecological features	Ancient coastline at 90-120m depth
	Benthic invertebrate communities of the eastern Great Australian Bight
	Areas important for small pelagic fish
Biological seascapes	Cluster 6
	Cluster 9
	Cluster 11
	Cluster 12
	Cluster 14
	Cluster 16
	Cluster 17
Seafloor features	abyssal-plain/deep ocean floor
	canyon
	reef
	shelf
	slope
	terrace

5.7 Proposed Western Eyre Commonwealth marine reserve



Biophysical, ecological and conservation values

The proposed Western Eyre reserve covers approximately 51 220 km^2 of the Commonwealth marine environment associated with the continental shelf adjacent to and offshore from the Nuyts Archipelago southeast to the Investigator Group and extending into the deep abyssal zone of the eastern Great Australian Bight off the Eyre Peninsula. It includes waters surrounding the Nuyts Archipelago and Investigator Group, which form part of the ecologically important 'shield' islands. These and other islands near the coastline are home to key breeding colonies of the Australian sea lion.

Stretching from Kangaroo Island to the west of the Eyre Peninsula, seasonally predictable local upwellings of nutrient rich water make this an area of regional ecological importance. Supported by the Kangaroo Island canyons, which provide localised upwellings, this area is a hotspot for productivity, with feeding aggregations for a range of threatened whale species, aggregations of gulper sharks, spawning aggregations for a range of slope fish species, and an important feeding area for seabirds including the crested tern, little penguin, and short-tailed shearwater. The proposed reserve abuts the recently established South Australian Investigator and West Coast Bays and Nuyts Archipelago Marine Parks.

Conservation values

- Five key ecological features:
    - ancient coastline (enhanced productivity)
    - Kangaroo Island pool, canyons and adjacent shelf break, and Eyre Peninsula upwelling (enhanced productivity, breeding and feeding aggregations)
    - meso-scale eddies (enhanced productivity and feeding aggregations) south-west of the Eyre Peninsula
    - benthic invertebrate communities of the eastern Great Australian Bight (communities with high species diversity)
    - areas important for small pelagic fish (species group with important ecological role)
- seafloor habitats and communities of the Murat meso-scale bioregion of the Great Australian Bight shelf transition, the Eyre meso-scale bioregion of the Spencer Gulf shelf province and the Southern province
- Important seasonal calving habitat for the threatened southern right whale
- Important foraging areas for the threatened Australian sea lion including major colonies at Streaky Bay, the Investigator Group and Nuyts Archipelago; the threatened white shark; the endangered blue whale; the sperm whale; and the migratory seabirds short-tailed shearwater and Caspian tern.

Existing uses

This area is important for the commercial fishing sector. Charter fishing occurs in some areas of Commonwealth waters, but is generally confined to state waters and the offshore islands. Recreational fishing is largely within state waters.

The South Australian Rock Lobster and Sardine fisheries and the Commonwealth Gillnet, Hook and Trap sector of the Southern and Eastern Scalefish and Shark Fishery are the most significant fisheries operating within or near the proposed reserve.

Other key fisheries include the South Australia Marine Scalefish Fishery, the Commonwealth Great Australian Bight Trawl sector of the Southern and Eastern Scalefish and Shark Fishery, and the Commonwealth Small Pelagic and Western Skipjack Tuna fisheries. The high-value South Australian Abalone Fishery operates in this area, but is mostly confined to state waters. Key abalone fishing grounds which extend into Commonwealth waters, including reefs to the north of the Investigator group of islands, are outside the proposed reserve boundaries.

Petroleum prospectivity within the proposed boundaries is medium–high to high from the shelf break to the lower parts of the continental slope. The proposed reserve overlaps partially with two offshore petroleum acreage releases.

Proposed Zoning Arrangements and Management Principles

The proposed Western Eyre Commonwealth Reserve contains three zones. The activities permitted in these zones under the proposed management arrangements are shown in Table 3.5:

- Two marine national park zones are proposed over the shelf, one adjacent to the Investigator Group (1 320 km^2) and the other south of Streaky Bay (610 km^2). These zones would enhance the conservation outcomes of the adjacent Investigator and West Coast Bays South Australian reserves, particularly for the Australian sea lion. They also

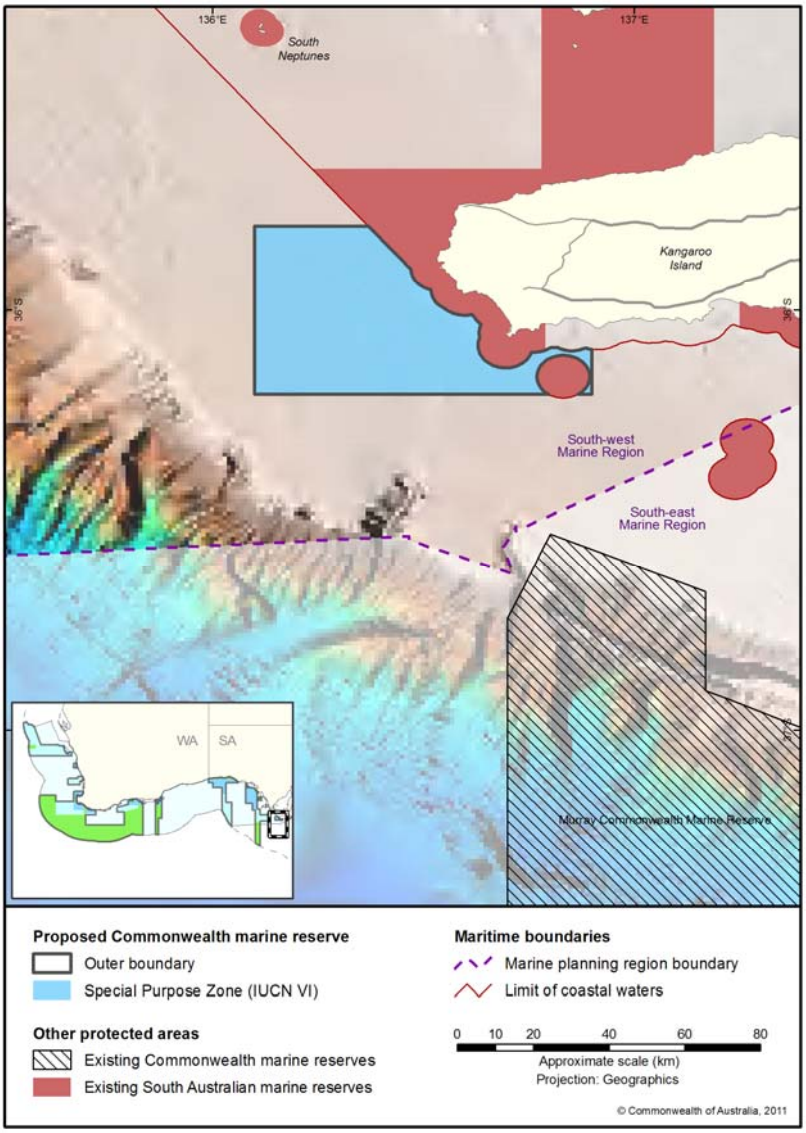
provide a high level of protection for the ecosystems of the Spencer Gulf shelf Province (including the Eyre meso-scale bioregion). A third marine national park zone (11 730 km2) covers the deep waters of the abyssal zone south of the Eyre Peninsula which would provide a high level of protection for the ecosystems associated with the eastern part of the Southern Province. This zone incorporates the boundaries of the existing deepwater closure for the Great Australian Bight Trawl sector of the SESSF. No commercial activities and no extractive recreational activities would be permitted in this area. This zone would be managed consistent with the management principles for IUCN Category II.

- A multiple use zone covers the shelf break and slope ecosystems of the eastern part of the Southern Province. A number of commercial and recreational activities would be allowed, subject to environmental approvals and relevant existing regulations. Some activities would not be permitted in this zone because of the risk they pose to its biological diversity. This zone would be managed in accordance with the management principles for IUCN Category VI.
- The majority of the continental shelf area has been zoned special purpose to provide protection to the biological diversity of the Spencer Gulf Shelf Province (including the Eyre meso-scale bioregion) and the Great Australian Bight Shelf Transition (including the only representation of the Murat meso-scale bioregion) while acknowledging the importance of commercial fishing activities. This zone allows demersal gillnet and demersal longline fishing. In the standard multiple use zoning these methods would be excluded because of their potential impacts, but they would be allowed in the special purpose zone in order to moderate socioeconomic impacts. The effects of these fishing methods on the biodiversity of the reserve would be monitored and reviewed under the reserve's management arrangements. This zone would be managed in accordance with the management principles for IUCN Category VI.

Table 5.7 Conservation features represented in the draft proposed Western Eyre reserve.

Feature	Name
Provincial bioregions	Great Australian Bight Shelf Transition
	Southern Province
	Spencer Gulf Shelf Province
Meso-scale bioregions	Eyre
	Murat
Depth ranges within bioregions	**Great Australian Bight Shelf Transition**
	Shallow Water to Shallow Shelf Transition
	Shallow Shelf
	Shallow Shelf to Deep Shelf Transition
	Southern Province
	Shelf Edge to Shallow Upper Slope Transition
	Shallow Upper Slope
	Shallow Upper Slope to Deep Upper Slope Transition
	Deep Upper Slope
	Deep Upper Slope to Shallow Mid-Slope Transition
	Shallow Mid-Slope
	Deep Mid-Slope
	Deep Continental Slope
	Continental Rise
	Abyssal Plain below Calcite Compensation Depth
	Abyssal Plain above Calcite Compensation Depth
	Spencer Gulf Shelf Province
	Shallow Water to Shallow Shelf Transition
	Shallow Shelf
	Shallow Shelf to Deep Shelf Transition
	Deep Shelf
	Deep Shelf to Shelf Edge Transition
	Shelf Edge
Key ecological features	Ancient coastline at 90-120m depth
	Benthic invertebrate communities of the eastern Great Australian Bight
	Kangaroo Island Pool, Canyons and adjacent shelf break, and Eyre Peninsula upwellings
	Meso-scale eddies
	Areas important for small pelagic fish
Biological seascapes	Cluster 6
	Cluster 7
	Cluster 9
	Cluster 10
	Cluster 11
	Cluster 12
	Cluster 14
Seafloor features	abyssal-plain/deep ocean floor
	canyon
	shelf
	slope
	terrace

5.8 Proposed Western Kangaroo Island Commonwealth marine reserve



Biophysical, ecological and conservation values

The proposed Western Kangaroo Island reserve covers approximately 1 930 km^2 of the Commonwealth marine environment associated with the continental shelf to the south-west of Kangaroo Island. These waters are host to rich and diverse marine life. The island has one of the eight largest known Australian sea lion breeding colonies, producing more than 100 pups a year. Waters within the proposed reserve boundaries are also important foraging areas for New Zealand fur seals and many seabird species such as the short-tailed shearwater and Caspian tern. The proposed reserve protects a key ecological feature of the south west marine region, the 'Kangaroo Island Pool' west of Kangaroo Island, a hotspot for productivity, with feeding aggregations for a range of whale species including endangered blue and pygmy blue whales. During summer, pygmy blue whales feed on krill aggregations associated with upwelling of nutrient-rich waters. The proposed reserve abuts one of the new South Australian reserves, the Western Kangaroo Island Marine Park, and would enhance the protection of many of its conservation values.

Conservation values

- Two key ecological features:

- ancient coastline (enhanced productivity)
- Kangaroo Island pool, canyons and adjacent shelf break, and Eyre Peninsula upwelling (enhanced productivity, breeding and feeding aggregations)

- Examples of the southern most ecosystems of the Spencer Gulf Shelf Province (including the Eyre meso-scale bioregion)
- Important seasonal calving habitat for the threatened southern right whale
- Important foraging areas for the threatened Australian sea lion; the threatened white shark; the endangered blue whale; the sperm whale; and the migratory seabirds short-tailed shearwater and Caspian tern.

Existing uses

The Ramindjeri Native Title claim, covering 20 225 km^2 of land and sea, was logged in October 2010, however has not been accepted for registration. This claim extends into Commonwealth waters and overlaps with the eastern side of the proposed reserve.

Recreational and charter fishing occur in the area, mostly within state waters, with some activities extending into Commonwealth waters.

The area is of value to commercial fishers and the oil and gas industry. The South Australian Rock Lobster and Sardine fisheries are the most significant fisheries operating within or near the proposed reserve. Other key fisheries include the Commonwealth Gillnet, Hook and Trap sector of the Southern and Eastern Scalefish and Shark Fishery, and the South Australian Marine Scalefish Fishery. The high-value South Australian Abalone Fishery also operates in this area, but is mostly confined to state waters.

Petroleum prospectivity within the proposed boundaries is considered medium to high, and there is a petroleum acreage release area to the west of the proposed reserve.

Proposed Zoning Arrangements and Management Principles

The entire reserve is zoned Special Purpose in order to provide protection to the biological diversity of the Spencer Gulf Shelf Province while recognising the importance of the area for commercial and recreational fishing. The activities permitted in this zone under the proposed management arrangements are shown in Table 3.5. This zone allows demersal gillnet and demersal longline fishing methods to be used. In the standard multiple use zoning these methods would be excluded because of their potential impacts, but they would be allowed in the special purpose zone in order to moderate socioeconomic impacts. The effects of these fishing methods on the biodiversity of the reserve would be monitored and reviewed under the reserve's management arrangements. This zone would be managed in accordance with the management principles for IUCN Category VI.

Table 5.8 Conservation features represented in the draft proposed Western Kangaroo Island reserve.

Feature	Name
Provincial bioregions	Spencer Gulf Shelf Province
Meso-scale bioregions	Eyre
Depth ranges within bioregions	**Spencer Gulf Shelf Province**
	Shallow Water to Shallow Shelf Transition
	Shallow Shelf
	Shallow Shelf to Deep Shelf Transition
	Deep Shelf
	Deep Shelf to Shelf Edge Transition
Key ecological features	Ancient coastline at 90-120m depth
	Kangaroo Island Pool, Canyons and adjacent shelf break, and Eyre Peninsula upwellings
Biological seascapes	Cluster 7
	Cluster 9
	Cluster 14
	Cluster 15
Seafloor features	shelf

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