GOVERNMENT OF WESTERN AUSTRALIA

PLAN FOR OUR PARKS
SECURING 5 MILLION HECTARES OVER 5 YEARS

Western Bight Marine Park

Management Plan 2024

Management Plan 104

GOVERNMENT OF WESTERN AUSTRALIA

Conservation and Parks Commission
Department of **Biodiversity, Conservation and Attractions**

Department of Biodiversity, Conservation and Attractions
17 Dick Perry Avenue
Technology Park, Western Precinct
KENSINGTON WA 6151

Phone (08) 9219 9000

dbca.wa.gov.au

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This management plan was prepared by the Conservation and Parks Commission through the agency of the Department of Biodiversity, Conservation and Attractions (DBCA) in consultation with Traditional Owners.

NB: The spelling of some of the traditional language words for Country and species of plants and animals may vary.

The recommended reference for this publication is:
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Front cover images

Main Point Culver. Photo – DBCA.

Inset Southern right whale. Courtesy of Peter van Schoubroeck.

Inset Weedy seadragon. Courtesy of Ocean Imaging.

This document is available in alternative formats on request.

Contents

Figures

Table

Maps

Acknowledgments

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Many groups and individuals provided valuable input to the CRC through Sector Advisory Groups, out-of-session discussions and individual submissions.

During the course of reserve planning, staff from various agencies including the Department of Primary Industries and Regional Development (DPIRD); Department of Energy, Mines, Industry Regulation and Safety (DEMIRS); and local governments, also provided valuable information and guidance relating to their areas of responsibility.

Point Culver. Photo – DBCA

1. Introduction

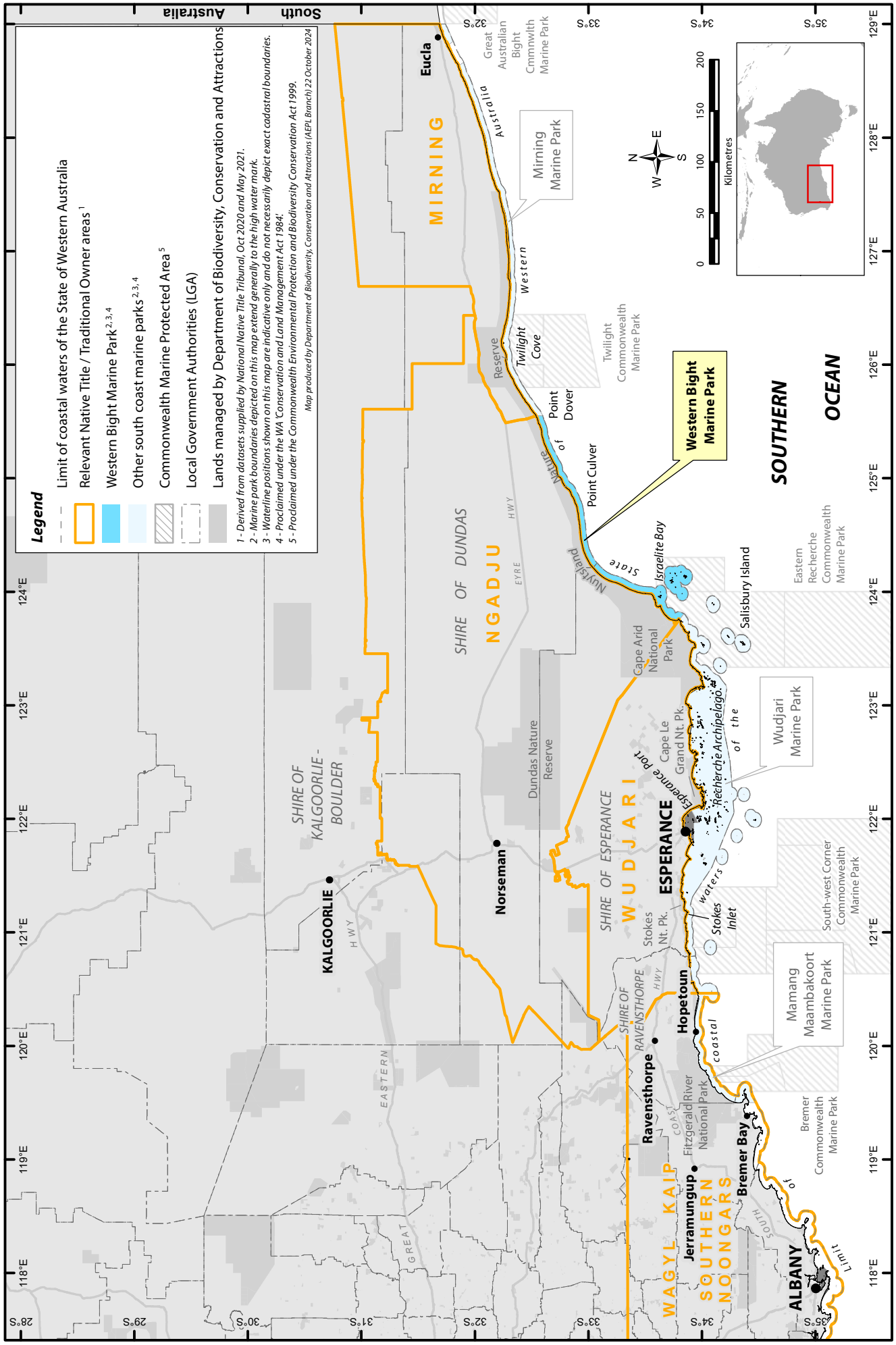
Located adjacent to the determined Ngadju Country, on the South Coast of Western Australia, the Western Bight Marine Park is a place of exceptional environmental value (Map 1). The marine park contains a diverse array of marine habitats and communities including seagrass, macroalgae and reef communities, as well as ecologically important foraging and breeding areas for a variety of threatened species. Southern right whales (*Eubalaena australis*) use the sheltered bays for breeding and calving between June and November each year, and Australian sea lions (*Neophoca cinerea*) and long-nosed fur seals (*Arctocephalus forsteri*) breed and forage in the area.

The area is also highly regarded for its social and economic values. Commercial fishing has been undertaken in the area for generations, providing livelihoods and fresh fish for local communities. Recreational fishing, both from the shore and boat, is also highly valued. Visitation to the marine park is limited to the adventurous, as road access and amenities along the coast are limited.

Ngadju Traditional Owners have been living on and looking after this Country for at least 50,000 years (NNTAC, 2023). To ensure the essential continuation of custodianship, this management plan will enable joint management of the marine park with Ngadju Traditional Owners in the future.

The marine park will contribute to the conservation and enhancement of the outstanding cultural and ecological values of Ngadju Country. It will allow for multiple uses in recognition of the exceptional conservation status, economic value, and potential of the area. It aims to find a balance between protecting the unique cultural and environmental values of the area whilst supporting recreational and commercial uses, for the benefit of present and future generations, as development and visitation of the area grows.

The establishment of the marine park was part of the Western Australian Government's Plan for Our Parks initiative to create five million hectares of new marine and terrestrial conservation reserves across Western Australia in five years. The marine park will add a further 201,110 hectares (approximately) to Western Australia's marine reserve system and will contribute to the National Representative System of Marine Protected Areas.



Map 1 – Locality of Western Bight Marine Park (including native title boundaries)

2. The management plan

2.1 Purpose of the plan

This management plan outlines how the Western Bight Marine Park will be managed by DBCA to enhance nature conservation, preserve and promote culture and heritage, and allow for ongoing sustainable recreational and commercial use.

The intended outcomes of the management plan are listed below:

- the establishment of the marine park as a Class A reserve over the State waters adjacent to Ngadju Country to extend initially to the low-water mark, and broaden to the high-water mark in future, subject to adjacent terrestrial tenure and addressing native title requirements under the Commonwealth *Native Title Act 1993*
- acknowledgement of the continued exercise of Ngadju native title rights recognising their ongoing connection to, and responsibility for, Country
- preservation of Ngadju culture and heritage values of the marine park
- the establishment of a framework to allow for ongoing sustainable multiple use
- promotion and support to build the capacity of the Ngadju Native Title Aboriginal Corporation (NNTAC) to engage in joint management of the marine park in the future
- a conservation framework to help ensure the ecological and cultural components and processes of Country are conserved, and the existing and potential pressures on the values are appropriately managed
- the establishment of seven management programs (management framework, education and interpretation, public participation, patrol and enforcement, management intervention and visitor services, and research and monitoring) with prioritised strategies to help achieve management objectives for the marine park
- contribution to the fulfilment, support and promotion of Australia's responsibilities under several international conventions such as the Convention on Biological Diversity, the International Union for the Conservation of Nature's Protected Areas Program and the United Nations Declaration on the Rights of Indigenous Peoples
- contribution to the National Representative System of Marine Protected Areas
- the continuation and enhancement of cultural, recreational and commercial uses for the benefit and enjoyment of Aboriginal people, the community, and visitors.

2.2 Development of the plan

This management plan has been prepared by DBCA in consultation with DPIRD – with input from the South Coast community and stakeholders through a ministerially appointed Community Reference Committee (CRC), and sector advisory groups.

Ngadju representatives attended CRC meetings and have oversight of the management arrangements for the marine park. This management plan enables joint management with NNTAC in the future and the ability to incorporate traditional knowledge and cultural protocols into management arrangements.

This management plan has been prepared in conjunction with the joint management plans for the Mamang Maambakoort Marine Park, Wudjari Marine Park and the Mirning Marine Park, to ensure consistency and complementarity of management arrangements across the neighbouring marine parks.

2.3 Structure of the plan

This management plan sets a vision for the area and identifies key ecological and socio-economic values and the pressures and potential pressures acting on them. It provides strategic direction and applies seven management programs to be implemented through management strategies. It is an outcome-based plan that provides a robust framework to support adaptive management which sets targets and performance measures to track progress against the stated management objectives over the life of the management plan. The key components of the management framework are shown in Figure 1.

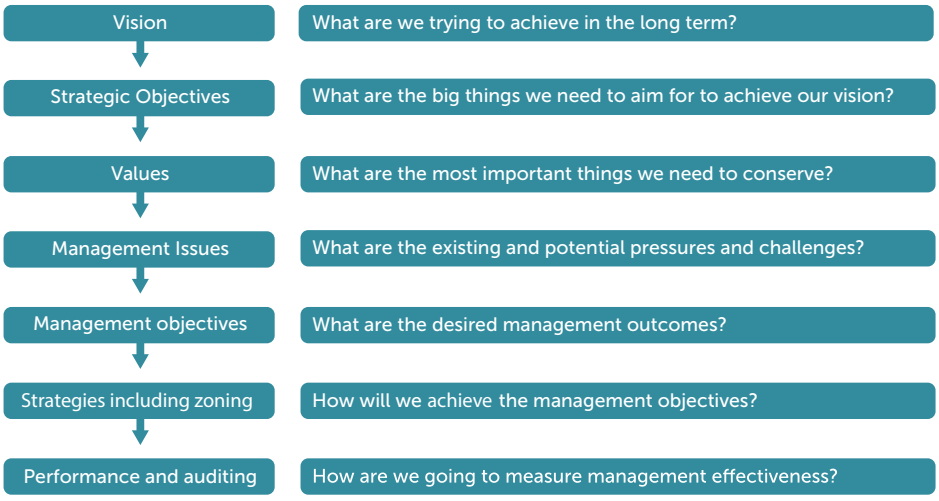


Figure 1 Structure of the plan.

The management plan will guide management of the marine park for 10 years, or until a new management plan is prepared under the *Conservation and Land Management Act 1984* (CALM Act). Any amendments required during the life of the plan require a statutory public comment period and approvals from the Minister for Environment, Minister for Fisheries and Minister for Mines and Petroleum.

DBCA will have the primary responsibility for coordinating and implementing the management of the marine park.

As the lead agency for the management of the State's fish and aquatic resources, DPIRD is responsible for leading, coordinating and undertaking management strategies relating to these resources.

In the case of overlapping or bordering management responsibilities, or mutual interests with other departments or organisations, collaborative operational plans and memoranda of understanding (MoUs) will be developed to ensure efficient and effective delivery of management arrangements.

The key terms used in this plan are defined below.

Terminology	Description
Vision	The long-term aspiration for the marine park.
Strategic objectives	The broad direction required to achieve the vision.
Values	The cultural, ecological, and socio-economic features and activities which are important to the area.
Pressures	Anything which affects or has the potential to affect the condition of a value. Pressures can be anthropogenic or natural.
Management objectives	Identify what the primary aims of management will be.
Management strategies	Provide direction on how the management objectives will be achieved. The prioritisation of the management strategies is based on the best available information and may change during the life of the plan.
Management programs	The seven categories across which management occurs (management frameworks, education and interpretation, public participation, patrol and enforcement, management intervention and visitor services, research and monitoring). This ensures a coordinated and prioritised approach is taken to implement strategies. The management programs are consistent across all marine parks in the State and are the basis for budgeting and annual reporting.
Key performance indicators (KPIs)	Assigned to key values to measure overall management effectiveness. These key values reflect the highest conservation and management priorities and form an important part of the audit process (see section 10). Each KPI has three components: performance measures, targets and reporting requirements.
Performance measures	Performance measures are indicators of management effectiveness in achieving the marine park's objectives and targets.
Management targets	The long-term targets provide specific benchmarks to assess the success or otherwise of management strategies within the life of the plan. For the purposes of this management plan, 'significant change' refers to a statistically significant change beyond the limits of natural variability. Specific limits for each ecological value will be determined as long-term monitoring datasets further develop.
Monitoring	Monitoring will be carried out to assess the condition of values in the marine park, with the most significant values being prioritised for monitoring. If the condition of a value has significantly decreased as a result of human activities in the area, adaptive management will be carried out.
Responsibilities	DBCA is the lead for all strategies. Where other organisations are required to support implementation of a management strategy, their name is listed in brackets next to the strategy. When an agency is listed as a support the agency will be engaged, with the level of involvement to be determined once the project is in development. Where an agency or body is required to take a lead role in strategy implementation, their name (or acronym) is in bold.

2.4 Vision

The vision statement represents the aspirations for the conservation and protection of the cultural and ecological values and sustainable use of the marine park and will provide guidance for ongoing management.

"Working together to care for our shared coastal and marine environment in ways that preserve, enhance, protect and celebrate all cultural, ecological and community values, and our shared knowledge, history and heritage for our families and future generations."

2.5 Strategic objectives

The strategic objectives of this plan provide more specific direction for the long-term realisation of the vision for the marine park.

Cultural values: Protect and conserve the cultural values and heritage of Ngadju Traditional Owners (to be further developed if joint management is entered into with Ngadju Traditional Owners).

Ecological values: Enhance, maintain and conserve marine biodiversity and ecological integrity.

Socio-economic values: Provide equitable and sustainable opportunities for recreational and commercial activities by allowing communities to safely utilise the marine environment as a source of income, food and enjoyment.

Research and monitoring: To encourage collaborative research and monitoring to guide, adapt and improve management.

Weedy seadragon. Courtesy of Ocean Imaging

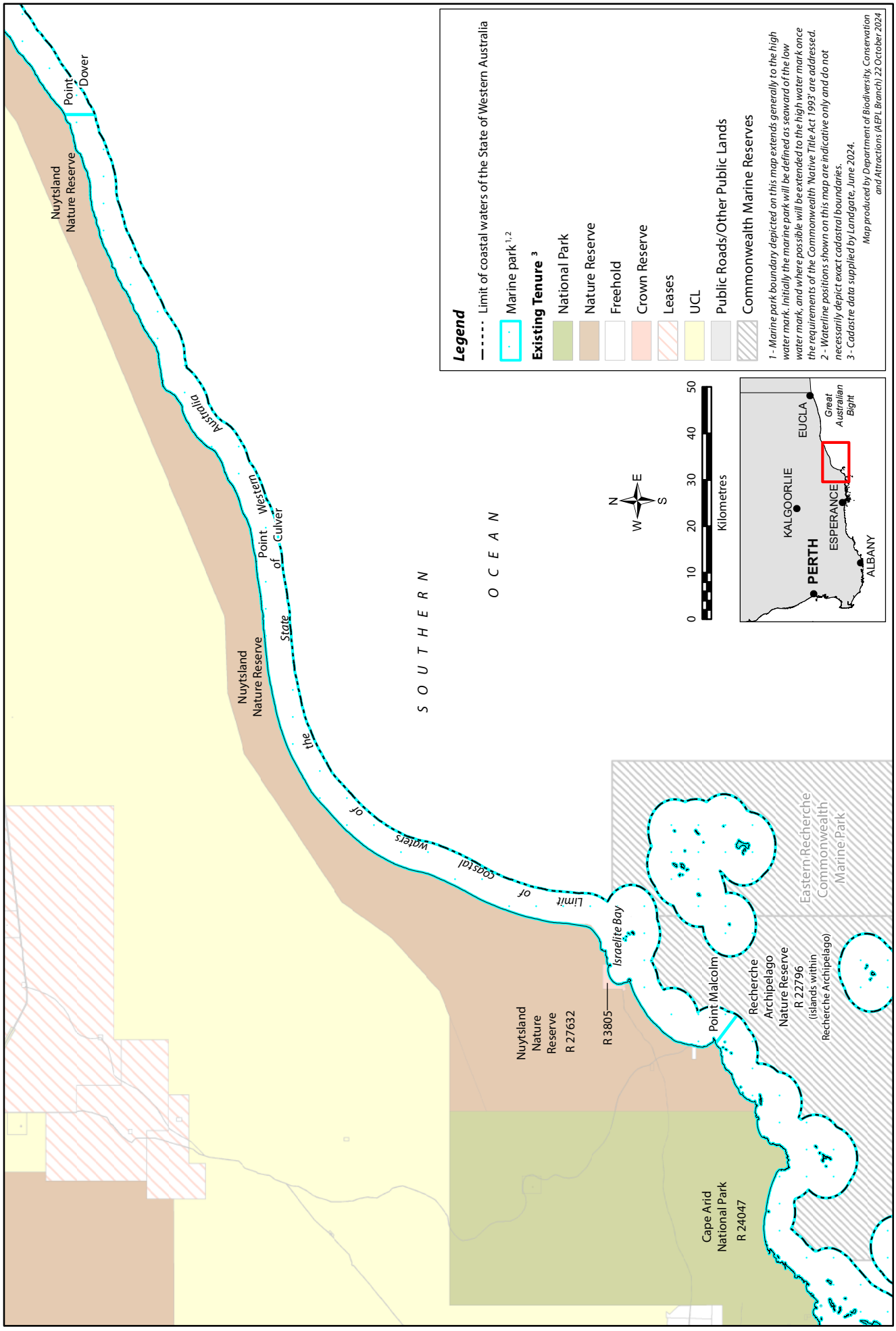
3. Management setting

3.1 Definition of area and tenure

Lying in the Integrated Marine and Coastal Regionalisation of Australia (IMCRA) South Coast and Eucla mesoscale bioregions, the Western Bight Marine Park is located along the South Coast of Western Australia. It covers approximately 201,110 hectares adjacent to the Shires of Esperance and Dundas. The western boundary of the marine park extends along the seaward continuation of the adjoining Ngadju and Wudjari native title determination boundaries, from Point Malcolm Beach to the limit of Western Australia's coastal waters. The eastern boundary of the marine park extends due south from the low water mark north-east of Point Dover where the adjoining Ngadju and Mirning native title determination boundaries meet, to the limit of Western Australia's coastal waters. The southern boundary of the marine park is aligned with the limit of coastal waters of Western Australia. It includes State waters around offshore islands that are surrounded by Commonwealth waters.

The management plan sets the framework for the marine park to include intertidal areas to the high-water mark in the future, subject to adjacent terrestrial tenure and addressing native title requirements under the Commonwealth *Native Title Act 1993*. The initial reservation of the marine park does not include the intertidal area, extending only to the low-water mark. Subject to adjacent tenure constraints and if an indigenous land use agreement (ILUA) is reached between the State and NNTAC, future reservation actions can reserve the park to the high-water mark. Adjacent conservation areas include Nuytsland Nature Reserve and the Commonwealth Eastern Recherche Marine Park. The outer boundary for the marine park and surrounding tenure is shown in Map 2.

The marine park is gazetted as a Class A marine park and vested in the Conservation and Parks Commission (CPC). Class A reservation provides the highest security of tenure, requiring the approval of Parliament to amend or cancel a reserve's purpose or significantly alter its boundary. By contrast, the zoning scheme and management plan can be amended after a public consultation period with the approval of the Minister for Environment, Minister for Fisheries, and Minister for Mines and Petroleum.



Map 2 – Tenure within and adjacent to the Western Bight Marine Park

3.2 Legislative context

The marine park will be managed in accordance with the provisions of the CALM Act, the *Fish Resources Management Act 1994* (FRM Act), the Conservation and Land Management Regulations 2002 (CALM Regulations), the *Biodiversity Conservation Act 2016* (BC Act), DBCA policy and other relevant legislation mentioned throughout this plan.

The marine park will help to fulfil Australia's responsibilities and commitments under several international conventions, including the Convention on Biological Diversity, and will support the International Union for the Conservation of Nature's Protected Areas Program. The marine park will also contribute to Australia's National Representative System of Marine Protected Areas by conserving important marine ecosystems and protecting marine biodiversity through a comprehensive, adequate and representative system of marine reserves.

Within the marine park, continued customary activities such as fishing and hunting rights are ensured. The FRM Act recognises customary fishing rights and the CALM Act and BC Act provide for the undertaking of customary activities.

3.3 Intention for joint management

In the context of reserves established under the CALM Act, joint management is a partnership between Traditional Owners and DBCA to work together to care for and manage a certain area of Country or Sea Country.

Joint management is an ongoing and adaptive process, which would require Ngadju Traditional Owners and DBCA to actively work together and share decision making to manage the marine park. Joint management provides the structure to bring together appropriate resources, by combining traditional knowledge and practices with western science to achieve the cultural, ecological and social management objectives set out in a joint management plan. DBCA and NNTAC have discussed joint management opportunities for the marine park, and DBCA will continue to foster cooperative and consultative management arrangements with Ngadju Traditional Owners until a formal joint management agreement is finalised.

At such time that joint management with NNTAC is established, DPIRD would be invited to present on fisheries management matters to the joint management body.

4. Cultural values

Strategic objective: Protect and conserve the cultural values and heritage of Ngadju Traditional Owners.

Ngadju Traditional Owners have been practising their culture for thousands of years and this is recognised through determined native title rights. The Federal Court of Australia recognised the Ngadju peoples' exclusive possession native title on 21 November 2014 and 17 July 2017 (NNTAC, 2023). The Ngadju native title area (Ngadju Country) covers 102,000 square kilometres of land surrounding the town of Norseman, stretching along the southern coast of Western Australia to the northern limit of tall southern woodlands. The arid fringe of the Nullarbor is part of Ngadju Country to the east and to the west Ngadju Country is bounded by fertile soil in what is now Western Australia's wheatbelt (NNTAC, 2023).

An Indigenous Protected Area was declared over Ngadju Country in 2020. Ngadju Rangers are managing Country using traditional land management practices and western science to preserve the region's biodiversity and culture (NNTAC, 2023). This marine park management plan enables joint management with Ngadju and there is an aspiration for Ngadju to enter into joint management with DBCA to extend these traditional management practices to Sea Country. As such, this section, along with other relevant sections in this plan, will be further developed if joint management is entered into with Ngadju Traditional Owners to ensure the cultural and heritage values of the marine park are protected and conserved.

There are likely to be many cultural sites in and around the marine park. All Aboriginal heritage sites, registered and unregistered, are protected under the *Aboriginal Heritage Act 1972* and it is an offence to damage or alter an Aboriginal site unless authority is granted in accordance with the Act.

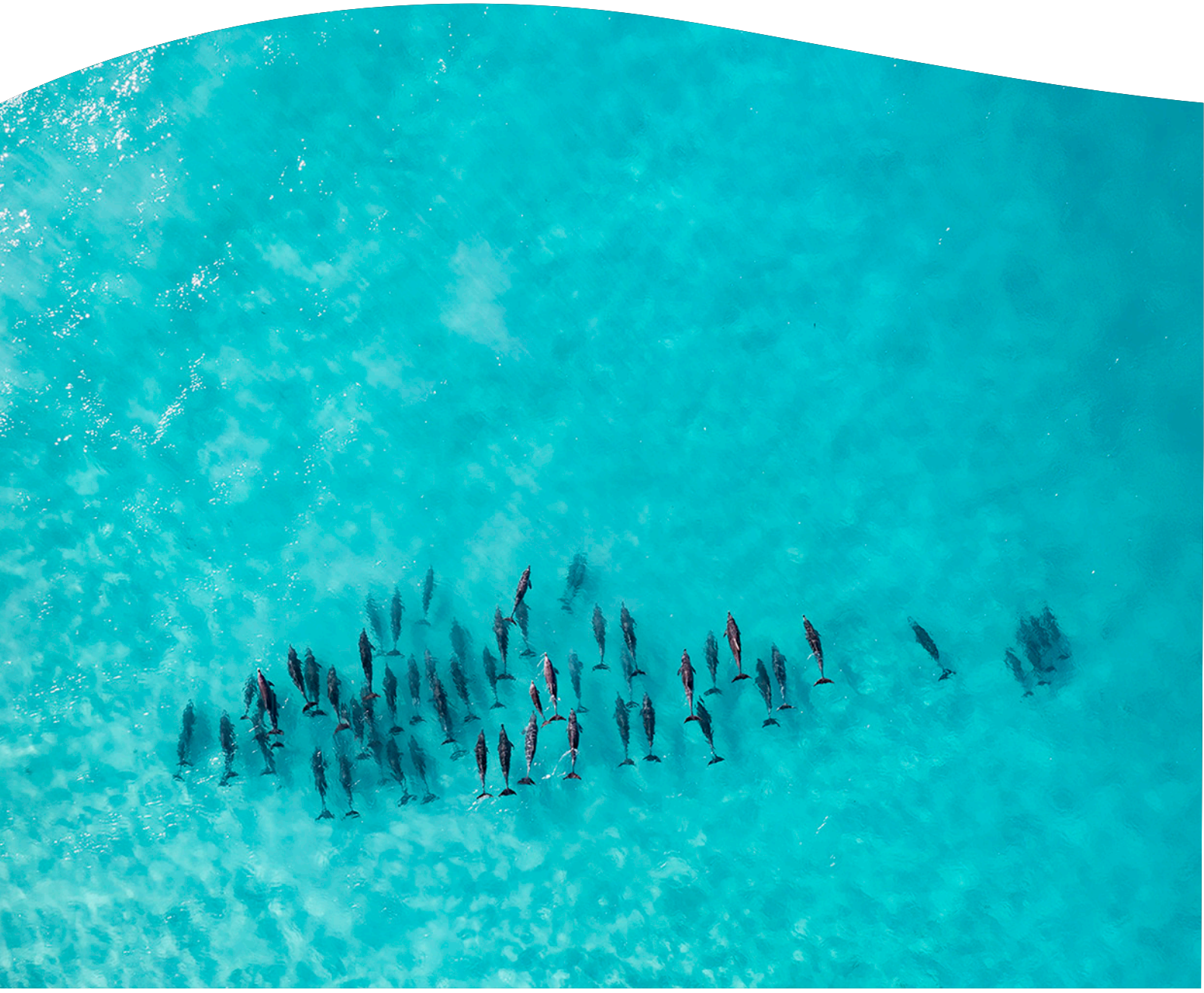
If management actions may disturb an Aboriginal site, an assessment is required before the operation proceeds. DBCA will work with the Department of Planning, Lands and Heritage and NNTAC to ensure Aboriginal sites are not damaged. DBCA will comply with the State Government's Cultural Heritage Due Diligence Guidelines when actions are proposed.

5. Ecological values

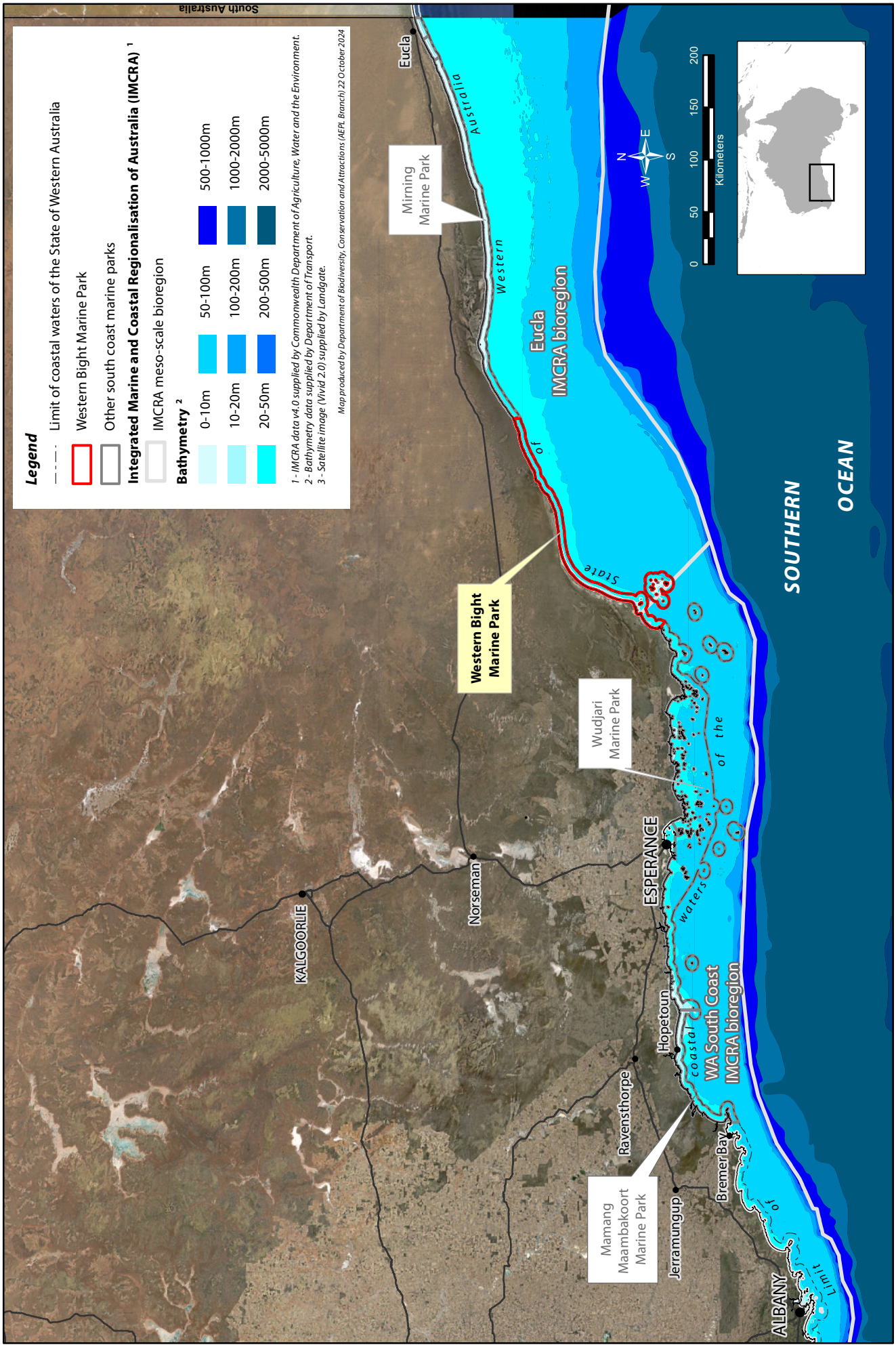
Strategic objective: Enhance, maintain and conserve marine biodiversity and ecological integrity.

Ecological values are the physical, geological, chemical and biological characteristics of an area. These values can be significant in terms of their biodiversity (representativeness, rareness or uniqueness) and ecosystem integrity roles. Ecological values can also have social significance because many social values are functionally dependent on the maintenance of ecological values.

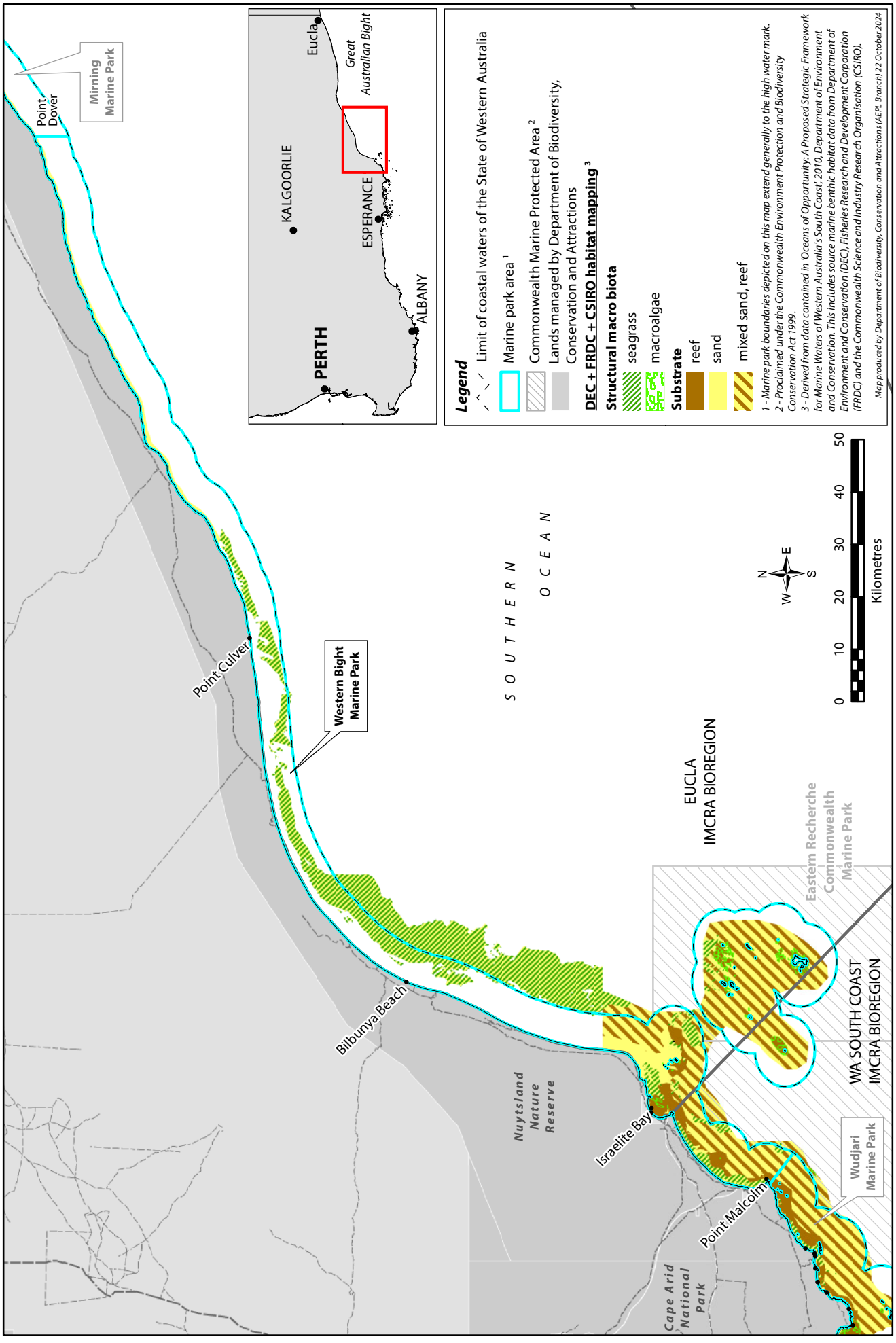
The marine park is mostly in the Eucla bioregion, although the western section of the marine park (Maps 3 and 5) includes a small portion of the Western Australian South Coast bioregion.



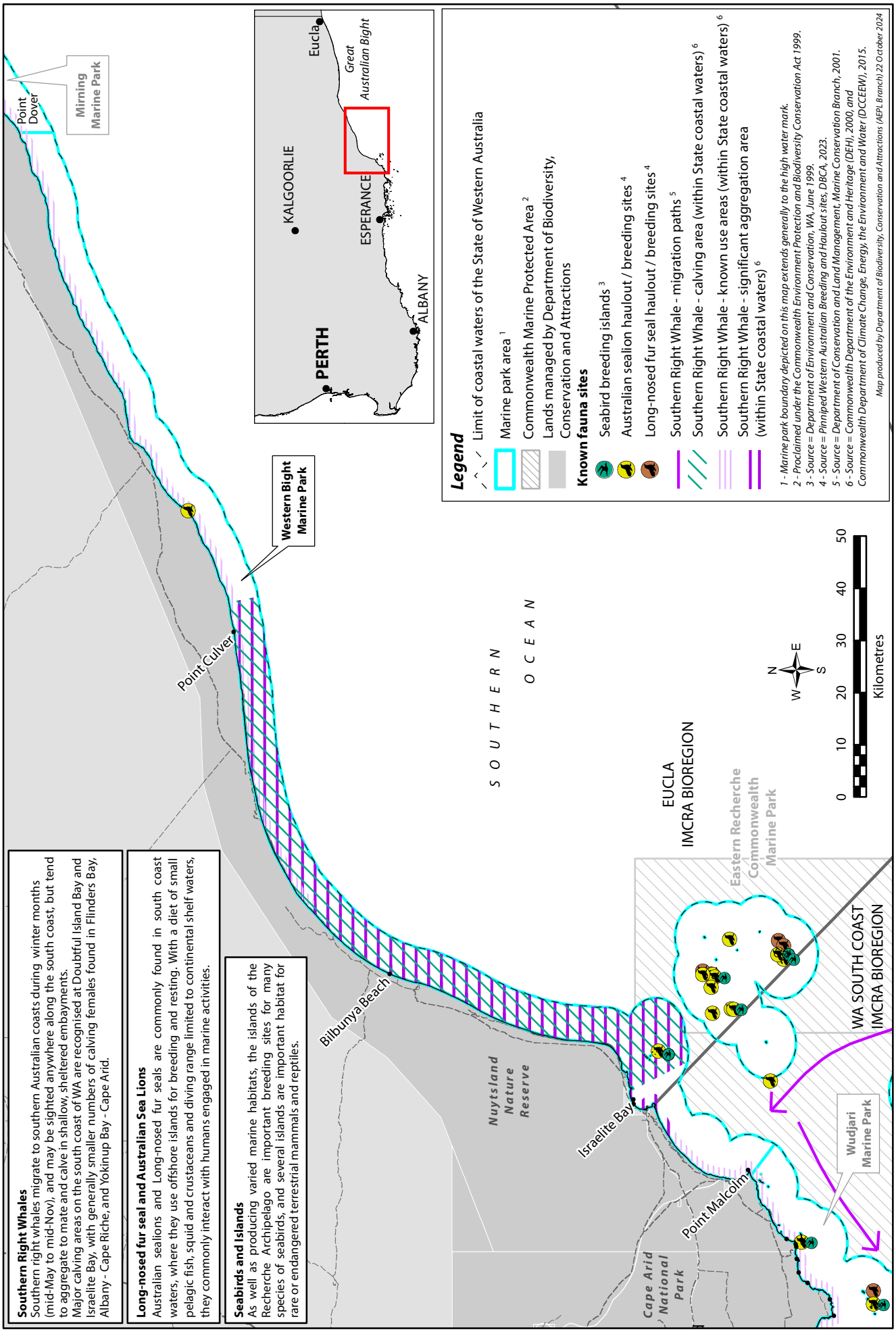
Indo-Pacific bottlenose dolphins of the South Coast. Courtesy of Tourism WA



Map 3 - Marine Bioregions, bathymetry and Western Bight Marine Park



Map 4 – Known marine habitats within and adjacent to Western Bight Marine Park.



Map 5 – Known marine fauna within and adjacent to Western Bight Marine Park.

5.1 Geomorphology

The geomorphology of the Western Australian South Coast is determined predominantly by wave refraction around discrete headlands and islands. Foredune plains occur in sheltered embayments. Oceanographic processes play a major part in shaping the coast, and together with the morphology of the seabed, influence the distribution of biota. Exposure to wave energy appears to determine the distribution of unconsolidated substrate and is the most useful regional scale predictor of rhodolith and seagrass habitats (Ryan et al., 2007).

The coastline in the west of the marine park is moderate to low energy. It has extensive sandy beaches with beach rock and wrack deposits, separated by granite rocky shores and backing onto low beach ridges and dunes (Range to Reef Environmental, 2014). The Recherche Archipelago extends into the west of the marine park.

The geomorphology of the area changes further east with significant features being the beaches and cliffs. The 80-metre-high Baxter Cliffs stretch for almost 200km to Twilight Cove (in the adjacent Mirning Marine Park).

The beaches along the open coast are exposed to heavy surf and generally consist of coarse sands. Intertidal sand flats occur only in sheltered corners (CALM, 1994). Sheltered sandy beaches have developed where offshore structures protect the shore from the direct effects of swell (Sanderson et al., 2000).

Beaches provide important habitat for macroinvertebrate assemblages and shorebirds. Limestone and granitic intertidal platforms provide a hard substrate on many of the beaches within the marine park and generally support a higher diversity of macroinvertebrates and marine flora (Bessey et al., 2018). Beaches are highly valued for coastal recreation and are significant for the lifestyle of South Coast residents and visitors.

Threats to the geomorphology of the marine park are minimal, but include climate change causing more severe storms and erosion, physical disturbance from recreational activities such as four-wheel driving and coastal development. Proposed developments likely to have a significant impact on the environment are referred to the Environmental Protection Authority (EPA) and may be subject to the environmental impact assessment requirements of the *Environmental Protection Act 1986* (EP Act).

Point Culver. Photo – DBCA

Summary of management arrangements for geomorphology			
Current status	The geomorphology of the marine park is generally undisturbed.		
Pressures	• Physical disturbance (e.g., trampling/4WD access). • Large scale coastal developments such as groynes, marinas and ports (both current and future projects). • Construction of general marine infrastructure (e.g., navigation markers, jetties). • Potential ground-disturbing mining exploration/development.		
Current major pressure	Climate change		
Management objectives	To ensure that the geomorphology of the marine park is not significantly affected by human activities.		
		Management program	**Priority**
Management strategies DBCA is the lead for all strategies. Supporting agencies are listed in brackets. If agencies are required to take a lead role, their name is in bold.	1. Undertake and/or support research to characterise the geomorphological features and processes in the marine park.	Research	L
	2. Monitor the condition of geomorphology and the pressures acting on it within the marine park.	Monitoring	L
	3. Educate users about the ecological importance of the marine park geomorphology and appropriate access to protect sensitive coastal landforms.	Education and interpretation	M
	4. Ensure advice relating to coastal and offshore development activities in the area with the potential to disturb the geomorphology of the marine park is provided to the relevant statutory authority as part of environmental impact assessment and approvals processes.	Management framework	As required
	5. Ensure effective management of commercial and recreational access and use of coastal landforms adjacent to the reserves through liaison with coastal land managers.	Management framework	M
Performance measures	Indicators to be developed but may include: • area of coastal disturbance • area of seabed disturbance.		
Target	• No significant change in seabed structural complexity as a result of human activity in the park except for approved development sites. • No significant change in coastal and island landform structural complexity as a result of human activity in the park except for approved development sites.		
Reporting	5-10 years		

5.2 Water and sediment quality (KPI)

High water quality in the Western Bight Marine Park is essential to maintain healthy ecosystems and support unique species that depend on the clear waters of the South Coast. Water quality in the area is strongly influenced by oceanographic processes, including water temperature, currents, wind and wave action. As there are no estuaries in this area, there is extremely low inputs from rainfall, resulting in very low and intermittent freshwater input into the marine environment (SCRMPWG, 2010).

Water quality in the marine park is believed to be relatively unaffected by marine pollution. Potential sources of marine pollution and other pressures on water quality in the Western Bight Marine Park include:

- marine debris and litter
- ship-sourced pollution incidents (i.e., oil spills) and operational related impacts (i.e., product spill and the release of anti-fouling biocides)
- wastewater from aquaculture projects which can potentially contain contaminants, pathogens and/or high levels of nutrients if not managed appropriately (noting there are no existing or proposed aquaculture projects within the marine park)
- dredging and dredge spoil disposal
- habitat degradation due to coastal developments.

Sewage discharge from vessels has the potential to increase nutrient levels and to cause health problems due to elevated bacterial levels. The impact of sewage discharge from vessels will vary considerably from place to place and seasonally as a consequence of environmental factors (e.g., water circulation) and human usage patterns (e.g., number of vessels). The *Strategy for Management of Sewage Discharge from Vessels into the Marine Environment* (Department of Transport, 2009) outlines guidelines for marine sewage discharge in Western Australian waters.

In the marine park, the following sewage discharge scheme is recommended, however, during the life of the management plan it may be amended if considered necessary:

- sanctuary zones and special purpose zones will be 'zone 1' (no discharge areas)
- waters in general use zones within 500m seaward of the low-water mark will be 'zone 2' (discharge only using approved treatment systems).
- waters in general use zones from 500m seaward of the low-water mark will be 'zone 3' (open discharge areas).

Development and infrastructure proposals with the potential to impact sediment and water quality in Western Australia are subject to assessment under the EP Act. The EPA can set conditions for sediment quality, which are subsequently regulated by DWER.

Summary of management arrangements for water and sediment quality			
Current status	Water and sediment quality within the marine park is believed to be in a generally excellent condition.		
Pressures	• Introduction of nutrients and toxicants from wastewater, storm water and potential aquaculture farms. • Vessel discharge (e.g., sewage, ballast water). • Large scale coastal developments such as groynes, marinas and ports (both current and future projects). • Construction of general marine infrastructure (e.g., navigation markers, jetties). • Potential sand mining dredging and other sand bypassing works. • Major pollution events (e.g., chemical or oil spills).		
Current major pressure	• Climate change (e.g., rising sea temperatures, ocean acidification). • Marine debris/litter.		
Management objectives	To ensure the water and sediment quality of the marine park is not significantly impacted by marine debris and human activities.		
		Management program	**Priority**
Management strategies DBCA is the lead for all strategies. Supporting agencies are listed in brackets. If agencies are required to take a lead role, their name is in bold.	1. Facilitate long-term management by accumulating spatial and temporal information on impacts on water quality from various activities in the reserves.	Research	H
	2. Educate users about regulations on boat sewage disposal and enforce controls on the discharge of sewage from vessels in the marine park.	Education and interpretation	H
	3. Patrol the shoreline and waters of the marine park for marine debris and remove and record as necessary, and seek support of partners and marine park users to do the same.	Management intervention and visitor services	M
	4. Develop an education campaign to encourage visitors to care for and clean the marine park, taking all rubbish with them, and cleaning up litter when they can.	Education and interpretation	H
	5. Support and/or promote research to establish the origin of litter, litter surveys, beach clean-up and other waste minimisation strategies for marine debris/plastic within the marine park.	Research	M
	6. Educate recreational fishers on responsible fishing behaviour, including ways to minimise gear loss and appropriate rubbish disposal. [DPIRD]	Education and interpretation	H
	7. Undertake and/or support research on water and sediment quality in the marine park, including establishing baselines for water and sediment quality and understanding natural variability.	Research	H
	8. Monitor the condition of water and sediment quality within the marine park and share this information with terrestrial land managers.	Monitoring	H
	9. Work with relevant departments, users of the marine park and stakeholders to address sources of marine debris in the marine park.	Management framework	M
Performance measures	Indicators to be developed but may include: sea temperature • nutrient concentration • toxicant concentration • pathogen concentration • marine debris mass.		
Target	• No significant increase in nutrient, toxicant and pathogen concentrations. • Decrease in marine debris/litter throughout the park.		
Reporting	3-5 years		

5.3 Seagrass communities (KPI)

Seagrass communities are important benthic primary producers which provide many ecosystem services, including supporting biological productivity, carbon sequestration, fisheries, improving water quality and stabilising sandbanks (Nordlund et al., 2016). Seagrasses are influenced by changes in environmental conditions associated with water movement, nutrient availability, light and temperature (Bearham et al., 2013; Lee et al., 2007). In the marine park, they are important for providing structurally complex habitat for a diverse range of finfish and invertebrates.

Seagrasses in the marine park are highly diverse and include endemic and rare deep-water species. Seagrass species within the marine park include *Posidonia sinuosa, P. australis, P. denhartogii, P. coriacea, P. ostenfeldii, P. kirkmanii, Amphibolis griffithii, A. antarctica, Halophila* spp. and *Zostera tasmanica* (Kendrick et al., 2005). Of approximately 72 seagrass species known worldwide, almost a third are restricted to southern Australia (Short et al., 2011; Carruthers et al., 2007). In the south-west coast of Australia, approximately half of the 19 seagrass species found there are endemic to the area (Carruthers et al., 2007; Kendrick et al., 2005; Kuo & McComb, 1989). Due to the exceptionally clear water of the South Coast, seagrasses can grow at depths below 40m (Kirkman & Kuo, 1990; Kilminster et al., 2018), with evidence of sparse *Halophila* spp., *Zostera tasmanica* and *P. ostenfeldii* complex growing in deep (42m) protected areas adjoining islands (Kendrick et al., 2005). Seagrass meadows growing in temperate zones, such as the South Coast, may also act as thermal refuges for those that are impacted by marine heatwaves and rising seawater temperatures further north.

Extensive seagrass meadows are present offshore in the marine park (Range to Reef Environmental, 2014) and aerial photographs show that there are extensive seagrass meadows adjoining beaches protected by coastal limestone reefs.

While no seagrass species are listed as Threatened in Western Australia, there is one listed priority ecological community—*Posidonia australis* complex seagrass meadows [Priority 3(i)] (Threatened Species Scientific Committee, 2013). The priority ecological community consists of the assemblage of flora, fauna and micro-organisms associated with the seagrass meadows (dominated by *Posidonia australis*).

Seagrass (and macroalgae, see section 5.4) that detach from reefs often accumulate on the shore, seabed and water surface where it is known as wrack. When wrack is washed onto shorelines it supports the structure and function of ecologically significant sandy beaches and surf zones by stabilising dynamic coastlines, supporting coastal food webs and nutrient breakdown flowing back into the surf zone (Hyndes et al., 2022). Furthermore, wrack contains large invertebrate communities on which surf zone fish and birds prey (Muhling & Ryan, 2002). Consequently, the removal of wrack from the marine park will be strictly managed and only considered where public access or safety is significantly impeded.

Seagrasses are susceptible to increased nutrient levels, which can cause an increase in epiphytic loads on seagrass leaves and/or increased phytoplankton in the water column that reduces the amount of light available for photosynthesis. Other potential threats to seagrasses in the marine park include climate change (e.g. extreme climatic events, gradual warming), unregulated anchoring and the construction of marine and coastal infrastructure.

Seagrasses are protected throughout the State under the BC Act and the FRM Act. Development proposals that may impact on seagrass communities are subject to an environmental impact assessment under the requirements of the EP Act.

Summary of management arrangements for seagrass communities			
Current status	Seagrasses are generally in good condition within the marine park.		
Pressures	• Unregulated mooring and anchoring that causes scouring in seagrass dominated areas. • Construction of general marine infrastructure (e.g., navigation markers and jetties). • Commercial and recreational fishing (e.g., damage to habitat). • Potential ground-disturbing mining exploration/development. • Discharge of toxicants and physical and chemical stressors (i.e., sediment and nutrients from inlet outflow). • Large scale coastal developments such as groynes, marinas and ports (both current and future projects). • Sewage discharge from vessels. • Pests/disease. • Major pollution events (e.g., chemical or oil spill). • Potential sand mining, dredging and other sand bypassing works.		
Current major pressure	Climate change		
Management objectives	• To ensure seagrass communities are not significantly impacted by human activities. • To improve understanding of the seagrass communities in the marine park to facilitate long-term management.		
		Management program	**Priority**
Management strategies DBCA is the lead for all strategies. Supporting agencies are listed in brackets. If agencies are required to take a lead role, their name is in bold.	1. Undertake and/or support research to characterise the diversity, density, abundance and distribution of seagrass communities in the marine park.	Research	H
	2. Monitor the condition of seagrass communities and the pressures acting on them within the marine park, and address as required.	Monitoring	H
	3. Educate users of the important ecological role of seagrass communities and the potential impacts of human activities, particularly vessel mooring and nutrient and pollution inputs on these communities and the biodiversity values of wrack. [DPIRD]	Education and interpretation	H
	4. Liaise with adjacent landowners and regulatory authorities to provide authorisation for wrack removal where required for public access or safety.	Management intervention and visitor services	As required
Performance measures	Indicators to be developed but may include: • percent cover • community composition.		
Target	• No significant decline in total cover as a result of human activity. • No significant change in community composition as a result of human activity.		
Reporting	3-5 years		

5.4 Macroalgae and rhodolith communities (KPI)

The South Coast has one of the highest levels of species richness and endemism of macroalgae in the world. Approximately 1,000 species of benthic macroalgae have been identified in the region, of which 62 percent are endemic to the South Coast (Entwisle & Huisman, 1998; Kerswell, 2006; McClatchie et al., 2006; Phillips, 2001; Wormersley, 1990).

The distribution and abundance of macroalgae species on the South Coast is not recorded in detail, however, a broad picture has been formed. Golden kelp (*Ecklonia radiata*) often forms dense beds in shallow coastal waters and is the dominant algae along the South Coast (CALM, 1994; McClatchie et al., 2006). Other common brown algae include *Cystoceira*, *Scytothallia*, *Cystophora* and *Hormosira banksii*. Conspicuous green algae include various species of *Caulerpa*, while red algae are represented by several temperate species (CALM, 1994). Results from surveys by Goldberg et al (2004) identified a geographic transition from kelp dominated areas to the west, into sargassum assemblages further east. The Leeuwin and Capes currents strongly influence the distribution of macroalgae along the south-western and southern coasts of Australia (McClatchie et al., 2006).

Rhodoliths are unattached, marine, benthic algal nodules of various sizes, with origins that are predominantly accreted by crustose coralline red algae precipitating calcium carbonate within their cell walls (Foster, 2001). Rhodolith beds are a unique substrate and functional habitat which support a high biodiversity of associated organisms, including macroalgae, filter feeding communities and fish (Kendrick et al., 2005). Eight species of rhodolith are known to occur in Australian waters, with only two species identified in Western Australia, namely *Lithophyllum stictiforme and Neogoniolithon brassica-florida* (Harvey et al., 2017).

Little is known about offshore habitats in this area. Significant rhodolith beds are likely to stretch between the Recherche Archipelago and Twilight Cove (Sutton & Day, 2021). Extensive, dense rhodolith beds are also likely to occur on the West Roe Terrace, which runs from just east of the South Australian border to Israelite Bay (James et al., 2001).

Macroalgae and rhodolith communities are susceptible to several impacts including heatwaves and warming ocean temperatures due to climate change. They can also be impacted by physical disturbance such as from anchoring, hydrodynamic forces (e.g., swell), infrastructure and some fishing methods (Burnett et al., 2022).

Macroalgae and rhodoliths are protected throughout the State under the BC Act and the FRM Act. In addition, development proposals that may impact on macroalgae communities are subject to an environmental impact assessment by the EPA.

Summary of management arrangements for macroalgae and rhodolith communities			
Current status	Macroalgae and rhodolith communities are generally in good condition within the marine park.		
Pressures	• Unregulated mooring and anchoring that cause scouring in macroalgal dominated areas. • Construction of general marine infrastructure (e.g., navigation markers and jetties). • Commercial and recreational fishing (e.g., damage to habitat). • Potential ground-disturbing mining exploration/development. • Discharge of toxicants and physical and chemical stressors. • Large scale coastal developments such as groynes, marinas and ports. • Sewage discharge from vessels. • Pests/disease. • Major pollution events (e.g., chemical or oil spill). • Potential sand mining, dredging and other sand bypassing works.		
Current major pressure	Climate change		
Management objectives	To ensure the diversity, cover and condition of macroalgae and rhodolith communities are not significantly impacted by human activity in the marine park.		
		Management program	**Priority**
Management strategies DBCA is the lead for all strategies. Supporting agencies are listed in brackets. If agencies are required to take a lead role, their name is in bold.	1. Undertake and/or support research to characterise the diversity, community composition and condition of macroalgae and rhodolith communities and increase their resilience in the marine park.	Research	H
	2. Monitor the condition, diversity and cover of macroalgae and rhodolith communities and the pressures acting on them within the marine park, and address as required.	Monitoring	H
	3. Educate marine park users about the ecological importance of the marine park's macroalgae and rhodolith communities and the potential detrimental impacts of physical disturbance on these communities.	Education and interpretation	H
Performance measures	Indicators to be developed but may include: • percent cover • community composition • macroalgae density (canopy forming species).		
Target	• No significant decline in cover of macroalgae and rhodoliths as a result of human activity. • No significant decline in density of macroalgae as a result of human activity. • No significant change in community composition of macroalgae and rhodoliths as a result of human activity.		
Reporting	3-5 years		

5.5 Subtidal soft-sediment communities

Soft-sediment habitats typically occur in sheltered areas where sediments formed by the erosion of cliff faces, limestone and skeletal fossil fragments in sedimentary rocks build up due to the high energy of the South Coast (Sutton & Day, 2021).

Soft-sediment environments within the marine park are known to host distinct infauna and epifauna communities (Sutton & Day, 2021), however, there is little information available on the condition of these communities within the marine park. Some species important to commercial and recreational fishing, such as the southern saucer scallop (*Ylistrum balloti*), tend to occur in pockets of high abundance within soft-sediment environments.

Threats to subtidal soft-sediment communities include climate change, unregulated mooring and anchoring, the construction of marine infrastructure, commercial fishing (particularly bottom trawling) and nutrient and toxicant input. Due to the low level of industrial and coastal development in the marine park and limited size and restrictions on the South Coast Trawl Fishery it is likely that these communities are in relatively undisturbed condition (SCRMPWG, 2010).

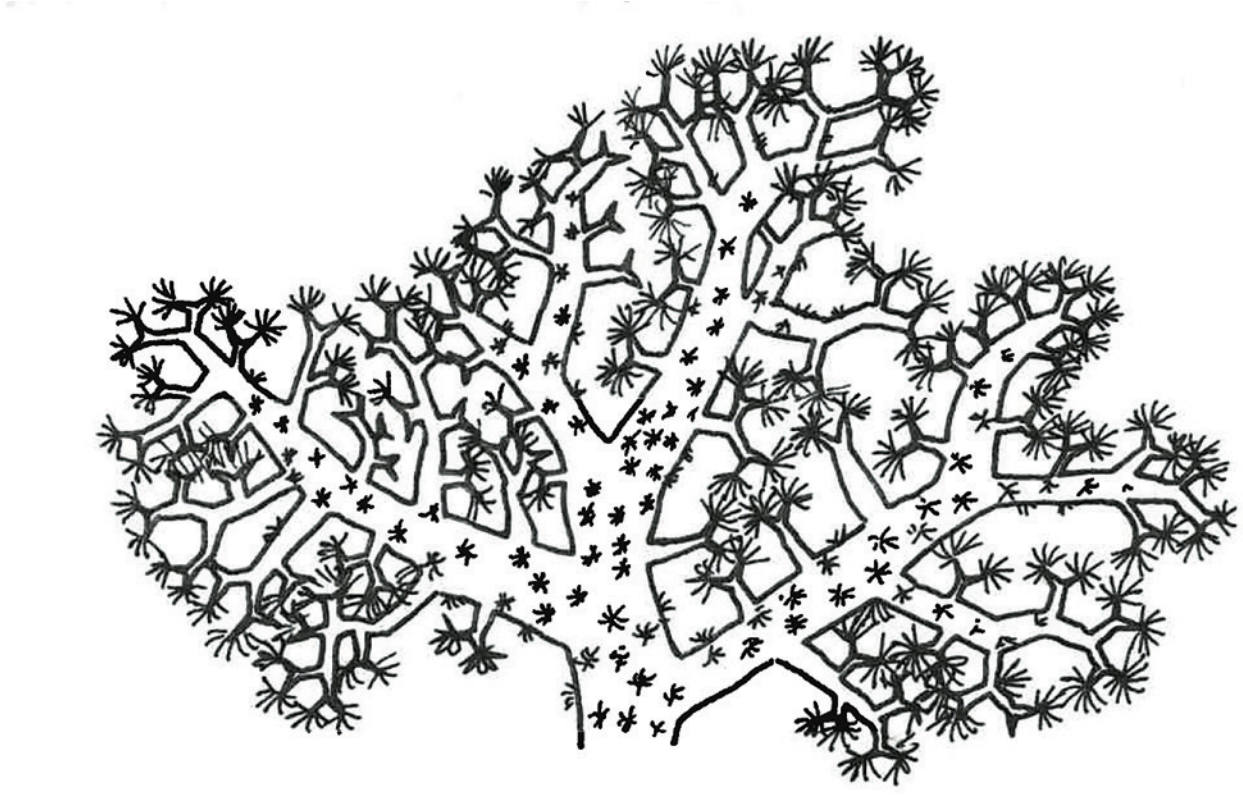
Summary of management arrangements for subtidal soft-sediment communities			
Current status	Limited information is available, however, subtidal soft-sediment communities within the marine park are believed to be in generally good condition.		
Pressures	• Climate change • Construction of general marine infrastructure (e.g., navigation markers and jetties). • Commercial and recreational fishing (e.g., damage to habitat). • Potential ground-disturbing mining exploration/development. • Discharge of toxicants and physical and chemical stressors. • Large scale coastal developments such as groynes, marinas and ports. • Sewage discharge from vessels. • Pests/disease. • Major pollution events (e.g., chemical or oil spill). • Potential sand mining, dredging and other sand bypassing works.		
Current major pressure	None currently identified.		
Management objectives	To ensure the species diversity and biomass of subtidal soft-sediment communities within the marine park are not significantly impacted by human activities.		
		Management program	**Priority**
Management strategies DBCA is the lead for all strategies. Supporting agencies are listed in brackets. If agencies are required to take a lead role, their name is in bold.	1. Undertake and/or support research to better characterise the flora, fauna and distribution of subtidal soft-sediment communities within the marine park. 2. Monitor the condition of subtidal soft-sediment communities and the pressures acting on them within the marine park. [DPIRD] 3. Educate users about the important ecological role of subtidal soft-sediment communities and the potential impacts that human activities have on these communities. [DPIRD]	Research Monitoring Education and interpretation	M M L
Performance measures	Indicators to be developed but may include: • diversity • species abundance.		
Target	No significant decline in diversity or species abundance as a result of human activity.		
Reporting	3-5 years		

5.6 Filter feeder communities

Filter feeder communities are comprised of species such as sponges, bryozoans, sea squirts and sea anemones. They are generally located in areas that have strong water currents and hard substrate. Limited information exists on filter feeder communities found within the marine park. It is likely that filter feeder dominated habitats are present within the marine park and consist of similar assemblages as those found to the west. One of the most diverse groups of filter feeders are sponges, which can occur in dense local populations across southern Australia known as 'sponge gardens'.

Very few coral species are found in the marine park. Coral fauna diminishes rapidly south of Rottnest Island, with some species flourishing in a few suitable habitats along the South Coast of Western Australia (Veron & Marsh, 1988). In the South Coast region, coral communities are generally found in the moderately sheltered waters (Ross et al., 2018). Hard corals occur sporadically, but do not form coral reefs (Wells et al., 2005). Veron & Marsh (1988) reported seven species from four genera that occur along the South Coast of Western Australia including *Coscinaraea mcneilli, Coscinaraea marshae, Plesiastrea versipora, Scolymia australis,* and three species of *Turbinaria.*

Globally, filter feeder communities are susceptible to several threats, including heatwaves and warming ocean temperatures due to climate change, hydrodynamic forces, some fishing methods, unregulated anchoring and the construction of marine infrastructure. Due to the low level of industrial and coastal development in the marine park and management of the South Coast Trawl Fishery it is likely that these communities are in relatively undisturbed condition (SCRMPWG, 2010).



Summary of management arrangements for filter feeder communities			
Current status	Limited information is available on filter feeder communities, but they are believed to be in generally good condition throughout the marine park.		
Pressures	• Commercial fishing (e.g., bottom trawling). • Climate change. • Unregulated anchoring. • Discharge of toxicants and physical and chemical stressors. • Potential sand mining, dredging and other sand bypassing works. • Large scale coastal developments such as groynes, marinas and ports. • Construction of general marine infrastructure (e.g., navigation markers and jetties). • Potential ground-disturbing mining exploration/development. • Pests/disease. • Major pollution events (e.g., chemical or oil spill).		
Current major pressure	None currently identified.		
Management objectives	• To ensure that filter feeder communities within the marine park are not significantly impacted by human activities. • To improve understanding of the distribution and diversity of filter feeder communities in the marine park.		
		Management program	**Priority**
Management strategies DBCA is the lead for all strategies. Supporting agencies are listed in brackets. If agencies are required to take a lead role, their name is in bold.	1. Undertake and/or support research to characterise the diversity, community composition and condition of filter feeder communities in the marine park. 2. Monitor the condition of filter feeder communities and the pressures acting on them within the marine park. [DPIRD] 3. Educate marine park users about the ecological importance of the marine park's filter feeder communities and the potential detrimental impacts of physical disturbance (e.g., anchoring) on these communities. [DPIRD]	Research Monitoring Education and interpretation	H H M
Performance measures	Indicators to be developed but may include: • diversity • total cover • community composition • introduced species.		
Target	• No significant decline in diversity or total cover as a result of human activity. • No significant change in community composition as a result of human activity. • No significant change in the abundance of introduced species as a result of human activity.		
Reporting	3-5 years		

5.7 Invertebrates

Marine invertebrates are animals without a backbone, such as sea urchins, sea stars, sea cucumbers, crabs, lobsters, octopus, abalone, jellyfish and anemones. Invertebrates have important functions within the ecosystem as a food source for other invertebrates, fish, and migratory birds, as well as in nutrient cycling. Invertebrate communities in the marine park exhibit high levels of endemism and consist of both tropical and temperate species. The presence and distribution of invertebrates within the marine park is influenced by substrate, depth, availability of food and the temperature gradient produced by the Leeuwin Current. As such invertebrates can be found across a wide variety of habitats in the marine park, including intertidal platforms, subtidal marine soft sediments (infauna and epifauna), subtidal reefs and in pelagic waters.

While specific species ranges within the marine park are unknown, approximately 347 species of temperate Australian echinoderms are known to occur across the South Coast from Albany to Eucla, and 115 species of decapod crustaceans are known to occur between Cape Naturaliste and the South Australian border (Wells et al., 2005).

Invertebrates are vulnerable to impacts from climate change such as ocean acidification (Clark, 2020) and storm intensity and frequency (Mieszkowska et. al., 2021). Commercial and recreational fisheries target species including the southern rock lobster (*Jasus edwardsii*), southern saucer scallop (*Ylistrum balloti*), greenlip abalone (*Haliotis laevigata*), brownlip abalone (*H. conicopora*), Roe's abalone (*H. roeii*) and a variety of specimen shells. In addition, bioprospecting, fisheries bycatch, and pollution may impact invertebrates.

DPIRD is responsible for managing the recreational and commercial take of invertebrate species under the FRM Act. DPIRD's management occurs across bioregions, zones within bioregions, at a resource level and in some cases at a smaller scale where fisheries operate within restricted areas. Noting the scale of management may not be at the marine park scale (Newman et al., [2023] notes a bioregional scale for most fisheries in Western Australia), populations of some species in a reserve could become locally depleted even when the fishery and resource is being managed at a sustainable level.

Invertebrates also form part of the marine environment's overall biodiversity and are therefore managed by DBCA under the CALM Act as one of the numerous ecological values within marine parks.

Summary of management arrangements for invertebrates	
Current status	Invertebrates are generally considered to be in good condition in the marine park.
Pressures	• Climate change. • Pests/disease. • Discharge of toxicants and nutrients. • Vessel discharge (e.g., sewage and ballast water). • Potential aquaculture (e.g., habitat exclusion, discharges). • Habitat degradation. • Potential ground-disturbing mining exploration/development. • Large scale coastal developments such as groynes, marinas and ports. • Potential sand mining, dredging and other sand bypassing works. • Illegal fishing.
Current major pressure	Commercial and recreational fishing for targeted species.
Management objectives	• To ensure non-targeted species are not significantly impacted by human activities within the marine park. • To manage targeted invertebrate species for ecological sustainability.

		Management program	Priority
Management strategies DBCA is the lead for all strategies. Supporting agencies are listed in brackets. If agencies are required to take a lead role, their name is in bold.	1. See section 9.2 – Zoning and permitted activities. 2. See section 6.2 – Recreational fishing. 3. See section 6.3 – Commercial fishing. 4. Undertake and/or support research to characterise the diversity, abundance, distribution and habitat requirements of invertebrates within the marine park. [DPIRD for targeted species] 5. Monitor the condition of invertebrates and the pressures acting on them within the marine park and take remedial action if required. [DPIRD for targeted species] 6. Educate marine park users about the ecological importance of invertebrates and ways to minimise disturbance to them, and relevant fisheries regulations that apply. [DPIRD] 7. Undertake and/or support research to characterise the sustainability of targeted invertebrate species and the consequences of their removal at the marine park scale. **[DPIRD]** 8. Provide updates to marine park managers in relation to management of recreational and commercial fisheries, including reviews and amendments where relevant to the marine park. **[DPIRD]**	 Research Monitoring Education and interpretation Research Management framework	 H H H H H
Performance measures	Indicators to be developed but may include: • diversity • target species abundance • community composition.		
Target	**Sanctuary zones** • No significant decline in diversity and abundance as a result of human activity. • No significant change in community composition as a result of human activity. **General use zones and special purpose zones** • No significant decline in community diversity as a result of human activity. • No significant change in community composition as a result of human activity. • No significant change in target species abundance beyond ecologically sustainable levels as a result of human activity (to be determined in consultation with DPIRD).		
Reporting	3-5 years		

5.8 Finfish, sharks and rays (KPI)

Fish communities of south-western Australia are diverse, with many endemic species (Hutchins, 2001; Thomson-Dans et al., 2003). This region is considered a hotspot for the discovery of species new to science (Stiller et al., 2015). The effect of the Leeuwin Current extends the range of many subtropical fish species into temperate areas of the southern coastline of Australia (Kendrick et al., 2009).

The white shark (*Carcharodon carcharias*) is listed as Vulnerable under both the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) and BC Act and is protected under the FRM Act. Most of the South Coast of Western Australia is recognised as a biologically important area for white sharks.

Shallow areas from east of Esperance through to the South Australian border provide significant nursery areas for Australian salmon (*Arripis truttacea*) and Australian herring (*Arripis georgianus*) (Gaughan & Santoro, 2019). Both species are important to the commercial fishing sector in the South Coast region of Western Australia.

Three species of seadragon endemic to Australia are found along the South Coast, namely the leafy seadragon (*Phycodurus eques*), weedy seadragon (*Phyllopteryx taeniolatus*) and ruby seadragon (*Phyllopteryx dewysea*). Leafy and weedy seadragons are protected under the FRM Act (DPIRD, 2021). The ruby seadragon was only described as a new species in 2015 so little is known about its distribution.

The primary pressures on finfish are extraction by commercial and recreational fishing (targeted removal and bycatch). Other threats include climate change, marine debris, introduction of marine pests and habitat damage.

DPIRD is responsible for the management of the recreational and commercial take of finfish, shark and ray species under the FRM Act. DPIRD's management occurs across bioregions, zones within bioregions, at a resource level and in some cases at a smaller scale where fisheries operate within restricted areas. Noting the scale of management may not be at the marine park scale (Newman et al., [2023] notes a bioregional scale for most fisheries in Western Australia), populations of some species in a reserve could become locally depleted even when the fishery and resource is being managed at a sustainable level.

Finfish, sharks and rays also form part of the overall biodiversity and are therefore managed by DBCA under the CALM Act as one of the numerous ecological values within the marine park.

Summary of management arrangements for finfish, sharks and rays			
Current status	Finfish, sharks and rays are generally considered to be in relatively good condition within the marine park.		
Pressures	• Climate change. • Marine debris (e.g., entanglement, ingestion). • Introduction of marine pests. • Feeding. • Mooring and anchoring—habitat damage. • Toxicants. • Potential sand mining, dredging and other sand bypassing works. • Sewage discharge from vessels. • Large scale coastal developments such as groynes, marinas and ports. • Aquaculture (e.g., habitat exclusion, entanglements, discharges). • Vessel noise and strike. • Major pollution events (e.g., oil or chemical spills).		
Current major pressure	Recreational and commercial fishing (direct removal and bycatch).		
Management objectives	• To ensure non-targeted species are not significantly impacted by human activities within the marine park. • To manage targeted species for ecological sustainability.		
		Management program	**Priority**
Management strategies DBCA is the lead for all strategies. Supporting agencies are listed in brackets. If agencies are required to take a lead role, their name is in bold.	1. See section 9.2 – Zoning and permitted activities. 2. See section 6.2 – Recreational fishing. 3. See section 6.3 – Commercial fishing.		
	4. Identify knowledge gaps and undertake and/or promote research programs to characterise finfish, shark and ray diversity, abundance, biomass and behaviour within the marine park, and conduct research to understand the ecological role of targeted finfish species and the consequences of their removal. [DPIRD for targeted species]	Research	H
	5. Undertake research on seadragons, investigating their behaviour, population numbers, ecological relationships and threats.	Research	H
	6. Monitor the biodiversity, current fish health and abundance of finfish, sharks and rays and the pressures acting on them in the marine park. [DPIRD for targeted species]	Monitoring	H
	7. Educate users about recreational fishing rules, the ecological importance of finfish, sharks and rays and responsible fishing behaviour. [DPIRD]	Education and interpretation	H
	8. Provide updates to marine park managers in relation to management of recreational and commercial fisheries, including reviews and amendments where relevant to the marine park. **[DPIRD]**	Management framework	H

Performance measures	Indicators to be developed but may include: • diversity • species abundance • species size distribution • community composition.
Target	**Parkwide** • No significant loss in diversity or abundance of protected species as a result of human activity. **Sanctuary zones** • No significant decline in diversity, species abundance or species size distribution as a result of human activity. • No significant change in community composition as a result of human activity. **General use zones and special purpose zones** • No significant decline in abundance of non-target species or species diversity as a result of human activity. • No significant change in community composition as a result of human activity. • No significant change in target species abundance or target species biomass beyond ecologically sustainable levels as a result of human activity (to be determined in consultation with DPIRD).
Reporting	3-5 years

5.9 Seabirds and shorebirds (KPI)

Seabirds generally forage at sea for the greater part of their lives, whereas shorebirds commonly feed by wading in shallow water along the shore. The sandy beaches, intertidal reef platforms and rocky outcrops of the marine park provide important feeding, roosting and nesting habitats for seabirds and shorebirds.

Of the 110 species of seabirds that comprise the Australian seabird fauna, 81 can be found in the South Coast region of Australia (McClatchie et al., 2006). The region also contains some of the most significant and diverse seabird breeding islands within Australian territorial waters (McClatchie et al., 2006).

Important breeding and nesting habitats for seabirds in the area include those in the Recherche Archipelago, which has been identified by Birdlife International as an important bird area (Dutson et al., 2009; McClatchie et al., 2006). The south-western population of the fleshy-footed shearwater (*Ardenna carneipes*), which is listed as a Vulnerable species under the BC Act, nests on islands between Cape Leeuwin and the South Australian border (Lavers, 2016).

Other threatened seabird and shorebird species known to occur on the South Coast include:

- wandering albatross (*Diomedea exulans*)
- grey-headed albatross (*Diomedea chrysostoma*)
- black-browed albatross (*Diomedea melanophris*)
- northern giant petrel (*Macronectes halli*)
- fairy tern (*Sterna nereis nereis*) (DPaW, 2016; Dutson et al., 2009).

The status of seabirds and shorebirds in the marine park is species dependent. Modelled estimates show a decline in eastern curlew (*Numenius madagascariensis*) and ruddy turnstone (*Arenaria interpres*) abundance around the Recherche Archipelago, and areas of increased and decreased abundance for red-necked stints (*Calidris ruficollis*) and sooty oystercatchers (*Haematopus fuliginosus*) depending on location (Clemens et al., 2016).

The decline in some species of seabirds and shorebirds is caused by a variety of factors, including overfishing of their prey, entanglement in fishing gear, plastic pollution, introduction of non-native predators to seabird colonies, destruction and changes to seabird habitat, and environmental and ecological changes caused by climate change.

In July 2021, DPIRD convened an ecological risk assessment (ERA) of the fisheries that access the Small Pelagic Scalefish Resource including the West Coast Purse Seine Fishery, South Coast Purse Seine Fishery, purse seine development zones and recreational fishers (Blazeski et al., 2021). A medium/high risk was given to fleshy-footed shearwaters due to the potential interaction with purse seine nets and uncertainty associated with population modelling and fishery-dependent data. A voluntary code of practice in the South Coast Purse Seine Managed Fishery has been put in place.

The national *Threat Abatement Plan* for the incidental catch of seabirds during oceanic longline fishing operations (2018) has been developed and implemented (Commonwealth of Australia, 2018). All seabird species and their eggs are protected under State and Federal Government legislation.

Hooded plover. Courtesy of Lori-Anne Shibush

Summary of management arrangements for seabirds and shorebirds			
Current status	Several seabird and shorebird species known to occur on the South Coast are listed as threatened or are declining.		
Pressures	• Entanglement in and ingestion of marine debris. • Introduction of non-native predators to seabird colonies. • Climate change. • Disturbance to feeding, roosting and nesting activity by people, vehicles, vessels, low flying aircraft (including remotely piloted aircraft). • Commercial fishing (e.g., bycatch). • Infrastructure development. • Major pollution events (e.g., oil or chemical spills). • Large scale coastal developments (e.g., loss or degradation of habitat). • Removal of wrack from beaches (important for foraging birds).		
Current major pressure	None currently identified.		
Management objectives	To ensure that the abundance and diversity of seabirds and shorebirds in the marine park are not significantly impacted by human activity.		
		Management program	**Priority**
Management strategies DBCA is the lead for all strategies. Supporting agencies are listed in brackets. If agencies are required to take a lead role, their name is in bold.	1. Undertake and/or support research to characterise bird diversity, abundance, natural variability, movement patterns and critical habitats within the marine park.	Research	H
	2. Assess the potential impacts of human activities to the seabird and shorebird populations in the marine park and implement an appropriate seabird and shorebird monitoring program.	Monitoring	H
	3. Design and implement an education and interpretation program that increases public awareness of the national and international significance of waterbird populations and informs visitors about impacts human activities can have on birds.	Education and interpretation	H
	4. Undertake research on shearwater behaviour, population numbers, ecological relationships, threats, and their capacity to act as bio-indicators.	Research	M
	5. Ensure that management of migratory shorebirds in the marine park supports relevant international agreements (e.g., Ramsar Convention, Convention on the Conservation of Migratory Species of Wild Animals).	Management framework	H
	6. Liaise with land managers to undertake complementary management actions on adjacent land and terrestrial reserves to manage potential detrimental impacts on seabirds and shorebirds.	Management intervention and visitor services	H
Performance measures	Indicators to be developed may include: • abundance • diversity • breeding success.		
Target	• No significant loss of diversity and abundance of seabird and shorebird species as a result of human activity. • No significant decline in breeding success of key seabird and shorebird species beyond the limits of natural variation due to human activities in the park.		
Reporting	3-5 years		

5.10 Pinnipeds (KPI)

Two species of pinniped, the Australian sea lion (*Neophoca cinerea*) and long-nosed fur seal (*Arctocephalus forsteri*), commonly use the islands of the South Coast as breeding and haul-out sites (CALM, 1994).

The Australian sea lion is endemic to Australia and listed as an Endangered species under the EPBC Act and the BC Act. Surveys of known Australian sea lion breeding sites estimate an overall population of several thousand (Goldsworthy et al., 2021). About 20 percent of the Australian population occurs at sites in Western Australia and 80 percent in South Australia. The Australian sea lion is neither increasing in population numbers nor expanding its range (DSEWPaC 2013; Goldsworthy et al. 2021).

There have been reports of an Australian sea lion breeding colony on rocks at the base of Baxter Cliffs, and a recently confirmed breeding colony at Twilight Cove (CALM 1994; Colman, 1998; Dennis & Shaughnessy, 1999; Goldsworthy et al., 2014; Goldsworthy et al., 2021).

Bycatch from fishing has been identified as one of the greatest threats to the Australian sea lion population as it often results in injury or death (Campbell et al., 2008; Hesp et al., 2012). To assist in mitigating these risks, in June 2018 DPIRD implemented fisheries management changes which created a network of 33 Australian sea lion gillnet exclusion zones throughout the known range of Western Australia's Australian sea lion colonies (Watt et al., 2021). Waters within the zones are closed to gillnet fishing by commercial demersal gillnet and demersal longline operators to reduce the risk of interaction between nets and sea lions. These zones range from 6 to 33 kilometres in radius around known breeding colonies and cover a total of 17,300 km^2 around Western Australia (Watt et al., 2021).

Sea lion exclusion devices are also a legislative requirement for operators in the commercial rock lobster fishery within a specified zone, to reduce the risk of Australian sea lions drowning in pots. A range of studies have demonstrated the effectiveness of these devices in mitigating interactions (How et al., 2023).

The long-nosed fur seal is listed as 'other protected fauna' under the BC Act. It is found in New Zealand and Australia with an estimated population of 50,000 in New Zealand (including outlying islands), and >15,000 long-nosed fur seals in Western Australia (Campbell et al., 2014). In Western Australia, long-nosed fur seals are found from the South Australian border to Jurien Bay (Campbell et al., 2014). Breeding grounds in Western Australia occur throughout the Recherche Archipelago. Within the state, long-nosed fur seal populations increased at ~1 percent per year between 1999-2011. This was down on the 1989-1999 estimates, which showed an increase of 10 percent per annum, however, their range is expanding (Campbell et al., 2014).

Current threats to both species include habitat and prey availability, fisheries bycatch, entanglement in demersal gillnets and marine debris, displaced or disturbed habitats and introduced diseases (DoPW, 2016; Hamer et al., 2013; Osterrieder et al., 2017; Shaughnessy et al., 2013). It has been recognised that tourism interactions can disturb sea lions (Lovasz et al., 2008).

Summary of management arrangements for pinnipeds			
Current status	• Australian sea lion numbers do not appear to be recovering in terms of population size and are listed as Endangered under the BC Act, EPBC Act and the IUCN red list. • Long-nosed fur seals in Western Australia appear to be stable or increasing in range.		
Pressures	• Commercial fishing (e.g., bycatch, prey availability). • Marine debris (e.g., ingestion, entanglement). • Discharge of toxicants and nutrients (e.g., from storm water). • Disturbance (e.g., wildlife watching and interactions). • Vessel strike. • Large scale coastal developments. • Potential aquaculture (e.g., habitat exclusion, entanglements). • Major pollution events (e.g., oil or chemical spills). • Provisioning (e.g., causing a change in behaviour). • Illegal culling (direct killing). • Disease or pathogens, such as tuberculosis (*Mycobacterium pinnipedii*), Q fever (*Coxiella burnetii*), hookworm and avian influenza.		
Current major pressure	Climate change		
Management objectives	To ensure the abundance of pinnipeds is not impacted by human activity in the marine park.		
		Management program	**Priority**
Management strategies DBCA is the lead for all strategies. Supporting agencies are listed in brackets. If agencies are required to take a lead role, their name is in bold.	1. Undertake and/or support research and monitoring projects on pinnipeds where they contribute to management effectiveness. [DPIRD]	Research and Monitoring	H
	2. Educate users of the marine park about pinnipeds, the impacts of human activities, and regulations for interactions (e.g., feeding and discarding of offal and bait, disturbance, marine debris, fishing gear).	Education and interpretation	H
	3. Implement an 8-knot speed limit within 500m of pinniped breeding and haul-out sites. **[Department of Transport (DoT)]**	Management intervention and visitor services	H
	4. Conduct targeted compliance and enforcement to monitor compliance within the gillnet exclusion zones around sea lion colonies. [DPIRD]	Patrol and enforcement	Ongoing
	5. Investigate sources of injury and causes of mortality of pinnipeds and maintain records of them in the marine park.	Monitoring	As required
	6. Assess and respond to marine fauna entanglements in collaboration with other agencies, considering capacity and circumstances as appropriate.	Management intervention and visitor services	As required
	7. Undertake complementary management actions in the terrestrial reserves such as restricting visitor access to haul-out and pupping areas, if required.	Management intervention and visitor services	As required
Performance measures	Indicators to be developed but may include: • number of reported pinniped injuries and deaths • number of Australian sea lion pups at breeding sites and adults at haul-out sites over the course of a breeding cycle.		
Target	• No significant increase in the number of reported pinniped injuries or deaths as a result of human activity. • No significant decline in the number of pinnipeds at haul-out or pupping sites and islands over the course of a breeding cycle within the marine park.		
Reporting	3-5 years		

5.11 Cetaceans (KPI)

Humpback (*Megaptera novaeangliae*) and southern right (*Eubalaena australis*) whales are the most common whale species that occur within the marine park.

The humpback whale breeding population of Western Australia (Southern Hemisphere Group IV) is one of the only heavily exploited whale populations to recover post whaling (Bejder et al., 2016), with last estimates of more than 30,000 (Hedley et al., 2011; Salgado-Kent et al., 2012). Humpback whales are frequently seen as they migrate along the South Coast to and from their summer feeding grounds in Antarctica to breeding and calving grounds in the north of Western Australia between May and November each year. The humpback whale is listed as Vulnerable under the EPBC Act and Conservation Dependent under the BC Act.

Southern right whales visit the South Coast between June and November each year. The females use sheltered bays on the South Coast as birthing and nursery areas, and cows and calves are often seen close to the shore from August to October (CALM, 1994). Southern right whales form large aggregations in coastal bays along the South Coast including Israelite Bay, during the 'over-wintering months' (i.e., June to November) where breeding, calving and rearing of young takes place.

An estimated 55,000–70,000 southern right whales could be found in the southern hemisphere in the late 1700s, however, whaling in the 19th century reduced southern right whale numbers in Australian waters. Current estimates of the south-western Australian subpopulation are at approximately 2,500 individuals. The population is increasing at a rate of ~5.4 percent annually (Smith et al., 2023) and the South Coast is the stronghold of the Australian population, given the 'eastern' population is estimated at approximately 268 (CI 146-650) breeding females (Stamation et al. 2020).

The southern right whale is listed as Endangered under the EPBC Act and Vulnerable under the BC Act.

Common dolphins (*Delphinus delphis*) are predominantly offshore inhabitants and are one of the world's most abundant dolphin species. They are commonly sighted throughout the South Coast region. Within Western Australian waters there are no estimates of population size, population trends, or information on specific calving areas or reproductive cycle for this species.

Indo-Pacific bottlenose dolphins (*Tursiops aduncus*) typically occupy coastal waters <20m deep. This species is known to have a slow reproductive rate, with prolonged maternal investment and a long interbirth interval of about 3-6 years, and relatively high calf mortality (Connor et al., 2000; Wells & Scott, 2000).

Threats to whales and dolphins include entanglement in marine debris and set fishing gear, climate change, overfishing, which reduces prey availability, habitat loss from coastal construction, disturbance, noise and vessel strike. Bottlenose and common dolphins can also be caught as bycatch in trawl, gillnet, purse seine and trap fisheries (Kemper & Gibbs, 2001; Kemper et al., 2003; Jaiteh et al., 2013; Jaiteh et al., 2014; Waples & Raudino, 2018).

DPIRD assesses fishing related threats to species and ecosystems, identifies and implements a range of management actions to mitigate impacts, and undertakes ongoing monitoring to review the effectiveness of measures put in place (How et al., 2021). The Australian Fisheries Management Authority initiated a bycatch action plan for several fisheries in 2001 to reduce bycatch of dolphins and other marine animals (Ross, 2006).

Summary of management arrangements for cetaceans	
Current status	• The humpback whale population that uses the marine park as part of its range is believed to be the largest breeding population in the world and has been downlisted to Conservation Dependent under the BC Act, as the population is beginning to recover from whaling impacts. • The southern right whale is listed as Vulnerable under the BC Act and while slowly recovering, population estimates are still low compared to the estimated population in the 1700s. • Little is known about the size or health of other cetacean species in the marine park, but they are assumed to be in a stable condition.
Pressures	• Marine debris (e.g., ingestion, entanglement). • Climate change (e.g., increasing water temperatures). • Discharge of toxicants and nutrients. • Disturbance (e.g. wildlife watching and interactions, noise from vessel traffic). • Vessel strike. • Potential mining exploration/development (e.g., seismic surveys). • Large scale coastal developments (e.g., habitat loss and/or modification, disturbance). • Major pollution events (e.g., oil and chemical spills). • Commercial fishery including aquaculture (entanglement, bycatch and prey depletion).
Current major pressure	None currently identified.
Management objectives	To ensure that cetaceans are not significantly impacted by human activity in the marine park.

Southern right whale. Courtesy of Peter van Schoubroeck

		Management program	Priority
Management strategies DBCA is the lead for all strategies. Supporting agencies are listed in brackets. If agencies are required to take a lead role, their name is in bold.	1. Undertake and/or support research characterising cetacean diversity, abundance, natural variability and habitat use within the marine park.	Research	H
	2. Undertake monitoring to: • assess the condition of cetaceans and the pressures acting on them within the marine park • monitor the effectiveness of any management responses to address pressures and issues involving cetaceans within the marine park • develop and maintain records on the incidence of entanglement, vessel strike, strandings or mortalities of cetaceans in the marine park.	Monitoring	H
	3. Report cetacean monitoring, population assessments and management outcomes to other government agencies and the wider community.	Education and interpretation	H
	4. Assess and respond to marine fauna entanglements, injuries and mortality events in collaboration with other agencies, considering capacity and circumstances as appropriate.	Management intervention and visitor services	As required
	5. Educate marine park users and commercial tour operators about cetaceans, the potential detrimental impacts of human activities on the marine park's cetaceans, responsible marine mammal viewing, and regulations relating to marine mammals under the BC Act.	Education and interpretation	H
	6. Enforce marine mammal regulations in place under the BC Act.	Patrol and enforcement	Ongoing
	7. Investigate the extent and significance of interaction between commercial and recreational fishing and cetaceans and address as required. **[DPIRD]**	Research	As required
Performance measures	Indicators to be developed but may include: • diversity • species local abundance • species local distribution.		
Target	• No significant decline in diversity or species local abundance as a result of human activity. • No significant change to species local distribution as a result of human activity.		
Reporting	10 years		

6. People on Country (socio-economic values)

Strategic objective: Provide equitable and sustainable opportunities for recreational and commercial activities by allowing communities to utilise the marine environment as a source of enjoyment, income and food.

Maintaining a healthy environment, respecting Ngadju cultural values and ensuring safe access for all users are essential to support the range of socio-economic values within the marine park.

6.1 Visitation, tourism and visitor safety

Tourism has become one of the most significant economic sectors on the South Coast (SCRMPWG, 2010). Patterns of recreational activity are mostly influenced by season and holiday periods, weather, access and proximity to population centres. The distance from a major population centre and road access to the coast is currently a limiting factor for visitation to the marine park. Most coastal recreational activity is centred around campgrounds.

Marine based activities carried out in the marine park include fishing, swimming, coastal walks, beachgoing and four-wheel driving.

Marine nature-based tourism has the potential to make an important contribution to protecting the region's ecosystem by fostering a greater understanding of the environment. However, if tourism is carried out inappropriately, it has the potential to reduce the quality of the features visitors seek to experience. Examples include visitors leaving litter, interacting inappropriately with wildlife and physically disturbing or damaging marine habitats.

The CALM Act and CALM Regulations require commercial businesses operating in marine parks and reserves to have a commercial operations licence and abide by the conditions outlined in the department's *Commercial Operator Handbook – Marine*, which provides specific information for commercial businesses operating in a marine park or reserve.

Recreation and tourism within the marine park will be managed in accordance with the department's Policy No. 18 – Recreation, tourism and visitor services, which focuses on both the management of activities consistent with protecting the marine park's values (the values on which commercial nature-based marine tourism depend), and maintenance of a viable tourism product.

6.1.1 Visitor safety

The remote nature of the marine park, combined with extreme weather conditions like strong winds, large swells and storms, poses a risk to visitors and other marine park users. This is particularly dangerous for visitors who may be inexperienced in, or unprepared for, such conditions. Visitors are advised to be mindful of risks that Australian sea lions and other wildlife can pose to their safety, and the effects of inappropriate interactions with them, such as feeding them or not maintaining separation distances. All species of seals and sea lions are protected under the BC Act and EPBC Act. A licence is required for marine tourism operations, and wildlife viewing must adhere to strict requirements. Restrictions also apply to recreational activities under the BC Act and BC Regulations, including minimum

separation distances and speed restrictions. All vessels must stay 100 m away from a seal or sea lion, and a person must stay 50m away in the water or 10m away on land. Restrictions also exist on recreational and commercial remotely piloted aircraft (drones) flying around marine mammals, with a 60m separation distance required.

Risks to visitors are managed under the framework of DBCA's Policy Statement No. 53 – Visitor risk management policy. Other departments and organisations which have a shared responsibility for visitor safety in the marine park include:

- DoT, which is responsible for installing and maintaining navigation aids and other boating safety measures in all state waters
- the Australian Maritime Safety Authority (AMSA), which is responsible for ensuring domestic commercial vessels comply with the requirements of the *Marine Safety (Domestic Commercial Vessel) National Law Act 2012.*

Summary of management arrangements for visitation, tourism and visitor safety			
Requirements	• High water quality. • Healthy marine and estuarine communities. • Clean beaches and coastal areas. • High aesthetic quality of the marine environment. • Provision of 'undisturbed' areas for nature appreciation. • Appropriate infrastructure and activities. • Equitable access to natural values in appropriate zones. • Avoidance or minimisation of visitor injury.		
Management objectives	• Ensure that tourism activities and recreational use are managed in a manner consistent with maintaining the cultural, ecological and social value of the marine park. • To maintain the ecological values of the marine park important for recreational, nature-based and cultural tourism. • To minimise risk to visitors and encourage appropriate behaviour. • To manage activities in a manner that minimises conflict between marine park users.		
		Management program	**Priority**
Management strategies DBCA is the lead for all strategies. Supporting agencies are listed in brackets. If agencies are required to take a lead role, their name is in bold.	1. Ensure the granting and renewal of commercial tour licences is consistent with the provisions of this management plan. 2. Encourage the establishment of Ngadju owned commercial tourism businesses in the marine park. 3. Conduct information exchange workshops and interpretation training for marine nature-based tourism operators. 4. Develop and maintain a database of the spatial and temporal patterns and potential environmental impacts of commercial tourism operations within the marine park. 5. Work with relevant agencies and industry bodies to adapt and improve existing mapping programs or apps reflecting marine park risks and management arrangements, including zoning. [DoT]	Management framework Management framework Education and interpretation Management intervention and visitor services Management intervention and visitor services	As required H H L L

	6. Work with Ngadju and commercial operators to promote appropriate visitation and facilitate the establishment of high-quality commercial tourism operations that: • increase visitor enjoyment and safety • demonstrate a commitment to protect and promote the park's cultural, natural, recreational and tourism values • conduct operations according to DBCA licence conditions • foster community stewardship of the marine park.	Management framework	H
	7. Guided by the Commercial operator's handbook – marine, develop codes of practice for commercial marine nature-based tourism operations in the marine park including performance measures, desired trends, short-term and long-term management targets, monitoring and reporting requirements.	Management framework	M
	8. Investigate opportunities to run safety campaigns to educate visitors on safe practices in and around the marine park	Education and interpretation	M
	9. Conduct visitor surveys to gather data on use of the marine park including visitor numbers, locations and anchoring points to understand potential impacts and direct monitoring programs.	Research	H
	10. Designate vessel speed restrictions for wildlife protection and/or for safety requirements if necessary. [DoT]	Management intervention and visitor services	H
	11. Collaborate with the charter boat sector in managing the marine park, particularly in key areas such as visitor education programs, mooring arrangements, compliance and monitoring programs. [Charter sector]	Management framework	Ongoing
	12. Educate marine park users about protocols and regulations for the use of remotely piloted aircraft (drones) to minimise impacts and disturbance to marine park values.	Education and interpretation	H
	13. Conduct periodic visitor risk assessment in the marine park as required and mitigate identified issues. [AMSA, DoT, DPIRD]	Management intervention and visitor services	H
Performance measures	• Visitor satisfaction (e.g., experiences and expectations) as determined by human use monitoring. • Number of visitor safety incident reports to DBCA.		
Target	• Visitor satisfaction is 85 percent or above within five years. • No significant increase in the total number of serious visitor safety incidents per capita compared to baseline levels.		
Reporting	Annually		

6.2 Recreational fishing

Recreational fishing is of great importance to the Western Australian community and to South Coast residents and visitors and generates significant economic activity in regional centres. The annual economic contribution to Western Australia from recreational fishing is estimated to be between $1.1 billion (Moore et al., 2023) and $2.4 billion, including a total of approximately $146.6 million in the Goldfields-Esperance region (McLeod & Lindner, 2018). The South Coast offers a diverse array of recreational fishing experiences and many South Coast recreational fishers fish to obtain a 'fresh feed' or 'fresh seafood'. Thus, continued access for the community to undertake recreational fishing is important for food security, ensuring the community's access to healthy and affordable food.

Other primary motives for recreational fishing include to relax and unwind, to be outdoors, for solitude, or to be with family and friends, highlighting the important social and mental health benefits recreational fishing provides.

Due to the remoteness of much of the coastline and limited access to many areas, recreational beach and boat fishing in the marine park tends to be concentrated around major population and holiday centres.

The main species targeted by beach and rock fishers on the South Coast include Western Australian salmon (*Arripis truttaceus*), Australian herring (*Arripis georgianus*), whiting (*Sillaginidae* spp.) and silver trevally (*Pseudocaranx* spp.). Common species targeted by boat-based fishers include pink snapper (*Chrysophrys auratus*), queen snapper (*Nemadactylus valenciennesi*), bight redfish (*Centroberyx gerrardi*) and King George whiting (*Sillaginodes punctata*), while mullet (*Muglidae spp*.) and black bream (*Ancanthopagrus butcheri*) are targeted in rivers and estuaries (Newman, et al., 2021).

The potential pressures associated with recreational fishing in the marine park include bycatch of non-target species, overfishing of targeted species, and associated impacts on other ecological values (i.e., from litter, discarded/broken off fishing gear, and disturbance of sensitive habitats).

Sanctuary zones, which prohibit extractive activities, including recreational fishing, will be used to ensure ecologically important and representative areas of ecosystems are protected from a variety of pressures including recreational fishing.

DPIRD is responsible for managing target fish stocks for sustainability, with fisheries rules continuing to apply both within and outside the marine park. Fish stocks are managed through a wide range of management tools, including size and bag limits, gear restrictions, licences and closed seasons.

Commercial tour operators offering recreational fishing who wish to operate in the marine park require a licence from DBCA under the CALM Act and must also adhere to the rules, provisions and regulations outlined by DPIRD and FRM Act.

Summary of management arrangements for recreational fishing			
Requirements	• Maintenance of key habitats (e.g., nursery and spawning areas). • High water quality. • Equitable and safe access to fishing grounds in appropriate zones. • Maintenance of targeted fish stocks. • Appropriate provision and placement of infrastructure and facilities.		
Management objectives	• To work collaboratively, to maintain and promote safe and enjoyable recreational fishing opportunities consistent with maintaining marine park values. • To maintain ecological values of the marine park that support recreational fishing.		
		Management program	**Priority**
Management strategies DBCA is the lead for all strategies. Supporting agencies are listed in brackets. If agencies are required to take a lead role, their name is in bold.	1. See section 9.2 – Zoning and permitted activities.		
	2. Educate recreational fishers on recreational fishing rules, including in the marine park. [DPIRD]	Education and interpretation	H
	3. Educate recreational fishers on customary fishing and rights of Traditional Owners. [DPIRD]	Education and interpretation	H
	4. DPIRD to conduct and/or support research to determine if ecosystem effects from recreational fishing are occurring in the marine park, and undertake adaptive management actions if required. **[DPIRD]**	Research	H
	5. Implement safety signage in dangerous areas in/ around the marine park. [LGA]	Education and interpretation	H
	6. Engage with local recreational fishing groups to promote responsible fishing behaviour (i.e., best catch care practices). **[DPIRD]**	Education and interpretation	H
	7. Monitor recreational fishing catch and effort in the marine park. **[DPIRD]**	Monitoring	H
	8. Review existing fisheries management and seek to amend if there are sustainability concerns. **[DPIRD]**	Monitoring	Ongoing
	9. Provide updates to marine park managers in relation to fisheries management and monitoring. **[DPIRD]**	Management framework	H
	10. Assess possible displacement of fishing effort, changes in fishery dynamics (exploitation patterns) and other impacts that may be influenced by restrictions on fishing access in the marine park to ensure ongoing efficacy of stock assessment data-inputs and examine potential management responses. **[DPIRD]**	Research	H

6.3 Commercial fishing

Commercial fishing is recognised as an important social and economic contributor to Western Australia's regional communities, generating more than half a billion dollars of income directly into the State economy. It also supplies locally caught, fresh and sustainable seafood to Western Australian communities, employment, training and career opportunities for regional youth, and contributes to the diversity and resilience of local economies. Community access to fish is a key value of the marine park for its importance in food security as a healthy, sustainable and affordable food source.

Western Australia's commercial fishing industry is based on a mix of products and markets, with many products that have traditionally accessed overseas markets transitioning in recent years to focus on increased local supply to support community access to sustainable seafood. This is particularly important for food security in regional towns where cafes, restaurants, fish and chip shops and tourism businesses need to be able to access Western Australian caught fish to make their business viable.

Commercial fishing in Western Australia is managed by DPIRD under the FRM Act using an ecosystem-based fisheries management approach. DPIRD's management of all commercial fishing is underpinned by scientific research, with 98 percent of Western Australia's aquatic resources currently being sustainably managed. Commercial fishing is managed through a wide range of fisheries management tools, including gear restrictions, licences, spatial closures, temporal closures, quota allocations and/or bag and size limits. Twelve commercial fisheries operate in the region (see Appendix 2 for details).

Further information about each of these fisheries and status assessments are publicly available in DPIRD's annual *Status Reports of the Fisheries and Aquatic Resources of Western Australia: The State of the Fisheries.*

Various aquaculture leases exist across the South Coast, however, none lie in the marine park. *Fisheries Management Paper 140 – Aquaculture Plan for the Recherche Archipelago* identifies future development opportunities for the aquaculture sector in the Recherche Archipelago, particularly York, Mart, Remark, Tory and Mondrain Island groups. Future aquaculture proposals can be accommodated in general use zones.

Approximately 80 percent of the combined South Coast marine parks are available for commercial fishing. Sanctuary zones which prohibit extractive activities will be used to ensure ecologically important and representative areas of ecosystems are protected from a variety of pressures including commercial fishing.

DBCA will work with DPIRD to ensure the continued sustainability of commercial fishing practices in the marine park. Fishing practices can result in unwanted bycatch, habitat damage, ecosystem impacts, altered food web dynamics and a decline in stocks.

Summary of management arrangements for commercial fishing			
Requirements	• Maintenance of sustainable, targeted fish stocks. • Equitable access to fishing grounds in appropriate zones, across all extractive activities. • Appropriate provision and placement of infrastructure and facilities.		
Management objectives	To ensure that, in collaboration with industry and DPIRD, commercial fishing in the marine park is managed in a manner that is consistent with maintaining the ecological and cultural values of the marine park.		
		Management program	**Priority**
Management strategies DBCA is the lead for all strategies. Supporting agencies are listed in brackets. If agencies are required to take a lead role, their name is in bold.	1. Work with commercial fishers through peak bodies to ensure operations are done in a culturally sensitive manner. **[DPIRD]**	Management framework	H
	2. Monitor commercial fishing catch and effort in the marine park to inform periodic reviews of its management of commercial fisheries and aquatic resources. **[DPIRD]**	Monitoring	H
	3. Investigate the extent and significance of interactions between commercial fishing and threatened, endangered or protected species and address as required. **[DPIRD]**	Research	H
	4. Conduct research to determine if ecosystem effects from commercial fishing occur in the marine park and undertake adaptive management actions if required. **[DPIRD]**	Research	H
	5. Provide updates to marine park managers in relation to fisheries management and monitoring. [DPIRD]	Management framework	H
	6. Ensure that any future aquaculture authorisations are consistent with the management plan and include appropriate monitoring programs, lighting, navigational marking and site utilisation conditions. [DPIRD and DoT]	Management framework	As required
	7. Assess possible displacement of fishing effort, changes in fishery dynamics (exploitation patterns) and other impacts that may be influenced by restrictions on fishing access in the marine park to ensure ongoing efficacy of stock assessment data-inputs and examine potential management responses. **[DPIRD]**	Research	H

6.4 Industry, mining and development proposals

6.4.1 Development proposals

During the life of the management plan there may be proposals to install or construct infrastructure in or adjacent to the marine park. The nature of the proposed development will determine the appropriate level of assessment. DoT and DPLH are responsible for the planning and development of coastal infrastructure. Any developments with the potential to have environmental impacts may be subject to an environmental impact assessment under the EP Act.

6.4.2 Mining exploration and development

The CALM Act specifies that mining and petroleum exploration and production is permitted in a marine park general use zone if it is compatible with the specified purpose of that zone. The environmental and cultural impacts of mining and petroleum exploration or production proposals within or adjacent to the marine park will be subject to evaluation through the normal assessment and approvals process under Western Australian and Commonwealth legislation. Mineral, petroleum and pipeline activities are regulated by the Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) under the *Mining Act 1978*, *Offshore Minerals Act 2003*, the *Petroleum and Geothermal Energy Resources Act 1967*, the *Petroleum (Submerged Lands) Act 1982* and *Petroleum Pipelines Act 1969*. Projects of state significance may be administered by the Department of Jobs, Tourism, Science and Innovation under project specific agreement acts.

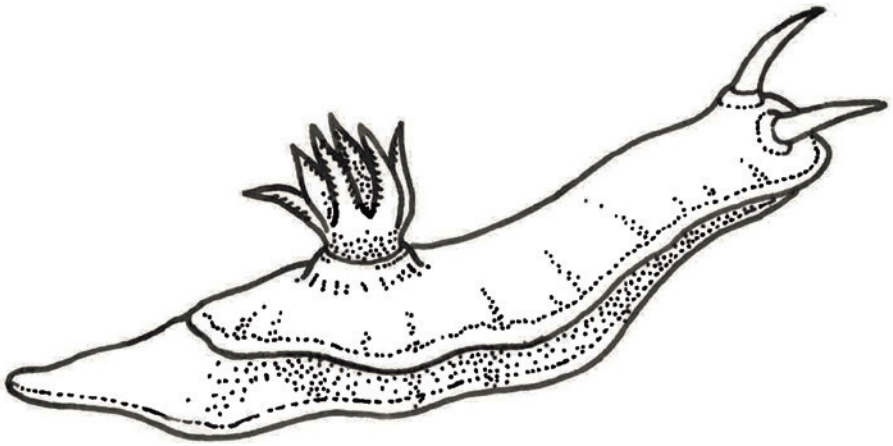
Exploration and development proposals that may cause significant impact on key biodiversity values should be referred to the EPA for environmental impact assessment under the EP Act. Applications to explore or mine within parks vested in the CPC may also be referred to the Minister for Environment as required under environmental, mining and petroleum legislation. Exploration and development that may have a significant impact on matters of national environmental significance may also require approval under the EPBC Act.

The oil and gas industry uses seismic surveys to explore for natural resources. Marine seismic surveys can increase background noise levels while they are in progress and have the potential to impact marine wildlife by disrupting communication, navigation, and foraging habits. Some marine species such as whales may temporarily move away from the affected area. Any seismic survey in the marine park will be subject to evaluation as part of the applicable State and Commonwealth government approvals processes.

6.4.3 Mooring and anchoring

Management of moorings and anchoring is a key aspect of managing increasing vessel use in Western Australia's marine parks. With an expected increase in commercial and recreational vessels visiting and operating on the South Coast, it is expected that mooring and anchoring activities will increase over time. The marine park allows for mooring and anchoring activities, however, if not installed and maintained correctly moorings may cause irreversible damage to the surrounding habitat and pose a risk to marine park users and property.

Summary of management arrangements for industry, mining and development proposals			
Requirements	Access to suitable and culturally appropriate locations for current and future activities.		
Management objectives	To ensure industry, development and associated activities are managed in a manner consistent with the objectives of the marine park.		
		Management program	**Priority**
Management strategies DBCA is the lead for all strategies. Supporting agencies are listed in brackets. If agencies are required to take a lead role, their name is in bold.	1. Provide formal advice to the CPC and the EPA relating to industry, mineral, petroleum and renewable energy resources and coastal development activities in and adjacent to the marine park. [DPIRD, DWER, DEMIRS]	Management framework	As required
	2. If required, develop a mooring and anchoring plan, with appropriate consultation on ecological and social impacts and suitable capacities. [DoT]	Management framework	As required
	3. Refer, or recommend the referral of exploration or development proposals, that may impact significantly on the values of the park, to the EPA for consideration under the Environmental Protection Act or to the Commonwealth Department of Climate Change, Energy, the Environment and Water for assessment under the EPBC Act.	Management framework	As required
	4. Ensure that license conditions of approved industry activities include appropriate environmental performance measures, desired trends, short-term and long-term management targets, and monitoring and reporting requirements. [DWER]	Management framework	As required
	5. Assess the viability and applicability of project proposals on Country from both scientific and cultural perspectives.	Management framework	As required



7. Research and monitoring

Strategic objective: To encourage collaborative research and monitoring to guide, adapt and improve management.

7.1 Research and education

The diversity of marine habitats, flora, and fauna, combined with the range of human activities which occur in the marine park, provide excellent opportunities for research and education.

The marine park is located within the IMCRA South Coast and Eucla mesoscale bioregions which are influenced by the Leeuwin and Capes currents. The influence of these currents provides a temperature gradient along the length of the South Coast and Eucla bioregions and, as a result, the area is of significant scientific interest. The sanctuary zones will provide an opportunity for scientists to undertake research on the recovery/maintenance of marine ecosystems over time when pressures are removed (with the exception of climate change). All zones provide the opportunity for social research with regard to use patterns and community perceptions.

Research and education can empower people to become stewards for marine parks and increase public understanding. Research and education can also help to create an affinity and respect for marine life and encourage participation in marine park use and management, and better compliance with marine park rules.

With pressures likely to increase, an increased understanding of the cultural, ecological and social values of the marine park will be critical to effective management. Research in the marine park, informed by traditional ecological knowledge, will assist with continuous improvement of management practices and decisions and ensure the marine park is effectively managed.

Research within the marine park will require a licence issued by DBCA. This will enable DBCA to:

- maintain an understanding of research effort
- direct research effort, where necessary, so it is relevant to management
- collaborate with researchers where possible
- share research outcomes with others.

Additional permits or special permissions may also be required from DBCA to take flora and fauna, and from DPIRD to carry out research on fish in the marine park. These additional requirements are particularly relevant if the activity would otherwise be prohibited, such as the take of protected fish or the use of prohibited fishing gear.

Research and education strategies specific to particular values of the marine park are detailed in sections 5 to 6. A summary of the generic management objectives, strategies and targets for the research and education program are described in the table opposite.

Summary of management arrangements for research and education			
Requirements	• Equitable access to the full range of research and educational opportunities in appropriate zones. • Access to representative sites covering the range of major human activity in the marine park. • Access to representative sites free of major human influences.		
Management objectives	• To obtain an increased understanding of the biodiversity, biocultural and cultural values and key ecological processes and socio-economic uses within the marine park to inform management. • To promote research that improves knowledge of the values of the marine park and effectiveness of current management strategies to inform future management decisions. • To maximise the integration of conservation science with traditional ecological knowledge in all aspects of research in the marine park. • To promote and facilitate the use of the park for education.		
		Management program	**Priority**
Management strategies DBCA is the lead for all strategies. Supporting agencies are listed in brackets. If agencies are required to take a lead role, their name is in bold.	1. Identify, prioritise and communicate high priority ecological and social research projects relevant to the management of the marine park to appropriate research organisations.	Research	H
	2. Develop a research and engagement web portal, detailing relevant Ngadju protocols, research expectations, ongoing research and engagement news, interpretation and education content, and upcoming research opportunities.	Research	L
	3. Develop collaborative research relationships with marine researchers and their institutions.	Research	H
	4. Encourage community and local industry involvement in research and education programs.	Research	M
	5. Develop and implement education and interpretation programs to: • ensure users are aware of and understand the values of the marine park • ensure users are aware of management zones and regulations and the reasons for these controls.	Education and interpretation	H
	6. Develop and distribute to the local community and visitors a range of education materials about the marine park's values and management.	Education and interpretation	H
	7. Encourage commercial tour operators to provide educational courses/ materials to their staff and customers to foster community stewardship of the marine park.	Education and interpretation	H
	8. Encourage and support Traditional Owner participation in the development and implementation of research and education programs and identify appropriate opportunities for integrating traditional knowledge.	Management framework	H
	9. Facilitate knowledge transfer and uptake of research findings to adaptive marine park management and planning.	Education and interpretation	H
Performance measures	• Research plans have been developed and approved. • Research projects are being undertaken which are providing the required information to support management.		
Target	• Preparation and implementation of a research plan. • Ongoing and completed research projects.		
Reporting	To be determined.		

7.2 Monitoring

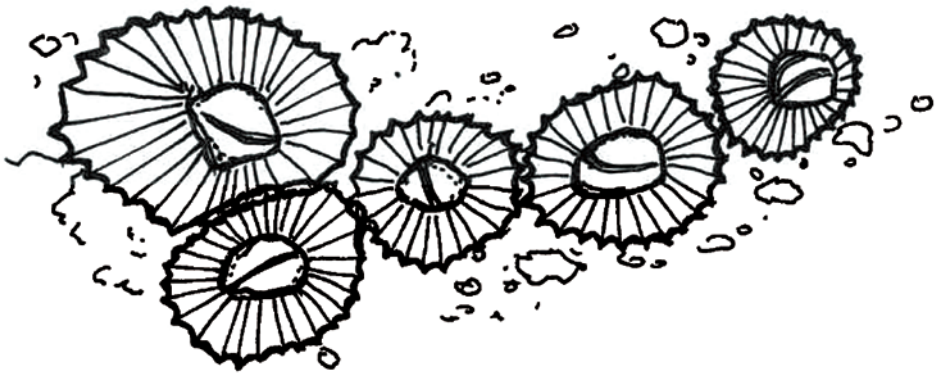
Long-term monitoring of the condition of values in the marine environment and the pressures that impact those values is essential to understand natural variation, to evaluate management effectiveness and inform an adaptive management approach. Monitoring enables the detection of detrimental impacts and can determine trigger points for corrective management action before cultural, ecological or social values of a marine park become significantly degraded. Where changes have occurred and remediation measures are required, a monitoring program should also determine the rate of recovery of an affected area or value. The detection of human induced changes requires an understanding of what is 'natural' as a benchmark and this information should be progressively established through ongoing monitoring across spatial zone types that limit human activities, and through the research program.

DBCA, in collaboration with joint management partners around the State, is progressively implementing the DBCA Marine Monitoring Program in the State's marine parks and reserves, designed to improve understanding of management effectiveness, and to inform future research, monitoring and decision making.

Monitoring any part of the marine park east of Israelite Bay will be limited due to the remoteness and exposure of this coast. However, in addition to joint management partners, other organisations involved in monitoring include DPIRD (for targeted species as defined in the FRM Act), universities and community groups. Monitoring of the marine park will focus on determining trends in key ecological, cultural and social values within a 'condition-pressure-management-response' framework that measures the 'health' of values against defined management targets.

West Australian nudibranch. Photo - John Huisman/DBCA

Summary of management arrangements for monitoring			
Requirements	• Equitable access to the full range of monitoring opportunities in appropriate zones. • Access to representative sites covering the range of major human activity in the marine park. • Access to representative sites free of major human influences.		
Management objectives	To monitor key cultural, ecological and social values in the marine park within a condition-pressure-management response framework, to provide a basis to assess, adapt and improve management.		
		Management program	**Priority**
Management strategies DBCA is the lead for all strategies. Supporting agencies are listed in brackets. If agencies are required to take a lead role, their name is in bold.	1. Facilitate knowledge transfer and uptake of research and monitoring findings to adaptive marine park management, planning and policy, and where relevant report on conservation achievements and challenges. [DPIRD]	Monitoring	H
	2. Prepare a monitoring plan which considers existing information and the strategies and priorities listed in this management plan.	Monitoring	H
	3. Investigate opportunities and develop a process to integrate traditional ecological knowledge in monitoring, where appropriate.	Monitoring	H
	4. Provide necessary information and support for assessments of the management plan implementation by the CPC. [DPIRD]	Monitoring	As required
Performance measures	The development and implementation of a prioritised monitoring program.		
Target	• Preparation and implementation of a monitoring plan. • Ongoing and completed monitoring projects. • Number of values, including KPIs, currently being monitored.		
Reporting	To be determined.		



8. Climate change

Climate change refers to changes in weather patterns (i.e., temperature, rainfall) and associated changes in oceans, land surfaces and ice sheets, occurring over a period of decades or longer (CSIRO & BoM, 2015; Australian Academy of Science, 2020). The effects of ocean warming and sea level rise due to climate change are currently impacting the marine environment globally and climate change is considered to be one of the greatest threats to marine life (Pörtner et al., 2019). It is possible that the impacts of climate change may limit the extent to which management objectives stated in the plan can be achieved.

The ecological impact of climate change effects, including increased temperatures and frequency of episodic events such as heatwaves can range from species shifting their geographic ranges, seasonal activities and migration patterns, to decreased ocean productivity, altered habitats and greater incidence of disease or mortality (Hoegh-Guldberg & Bruno, 2010). This can in turn affect cultural and social values by changing the ecological health of the marine resources upon which customary, recreational and commercial activities rely. Ocean warming is occurring not only in shallow ecosystems but in environments exceeding 2,000m deep in the Southern Ocean (Cooley et al., 2022).

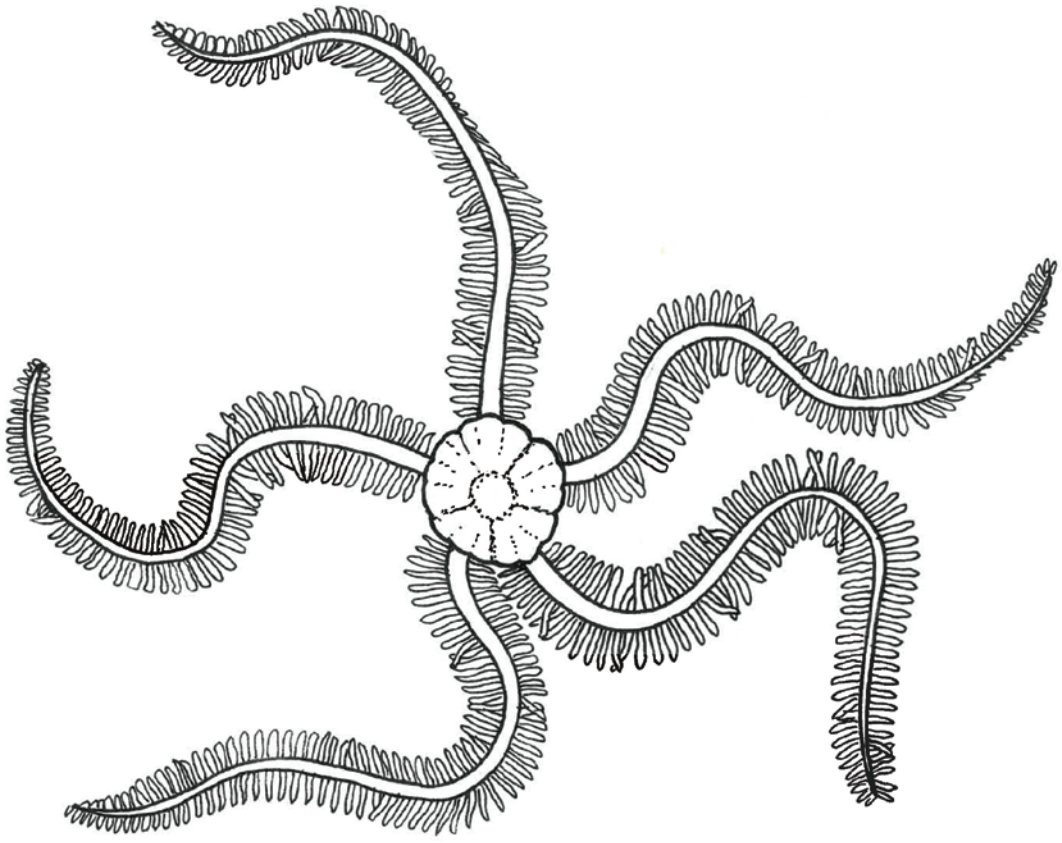
Establishing marine protected areas can contribute to maintaining climate change resilience and rebuilding ecological and social resilience (IUCN, 2017). Protection of coastal carbon habitats such as seagrass and kelp, can help to ensure that carbon is not released as a result of the loss and degradation of those areas, while maintaining the carbon pathways in the fauna associated with these critical habitats. Effective management of human use and local pressures can also help to maintain or increase ecosystem health, thereby increasing resilience to external pressures such as climate change. Although marine protected areas can contribute to reducing local stressors and build ecological resilience to change, the protection they provide against the broadscale impacts of climate change is less known, which is one of the biggest challenges that marine protected area managers face.

Little is known about the current impact of climate change on the marine park. Research and monitoring programs contribute to our understanding of the effects of climate change, as well as the development of effective adaptive management responses.

Management to reduce the impacts of climate change on the marine park will focus on:

- increasing knowledge and understanding of the effects of climate change on the values of the marine park
- monitoring the effects of climate change on the values and pressures of the marine park
- increasing the health and resilience of ecosystems through the sound management of human uses and local pressures
- undertaking local adaptive management.

Summary of management arrangements for climate change			
Management objectives	To increase understanding of climate change on the marine park and increase the resilience of ecological values to climate change.		
		Management program	**Priority**
Management strategies DBCA is the lead for all strategies. Supporting agencies are listed in brackets. If agencies are required to take a lead role, their name is in bold.	1. Support international and national climate change initiatives, where relevant, in marine park research and adaptive management.	Management framework	Ongoing
	2. Ensure that impacts of climate change are considered in monitoring programs for the KPIs for the marine park.	Monitoring	H
	3. Assess areas, habitats and species which are most at risk from the effects of climate change and increase their resilience by reducing other pressures where possible. [DPIRD]	Research	H
	4. Monitor values of the marine park and the climate-related pressures acting on them to inform the development of local and regional-level adaptive management responses for the protection of park values.	Monitoring	H
	5. Educate users of the marine park about the effects of climate change on the values of the marine park.	Education and interpretation	L
	6. Support or provide necessary information to contribute to climate forecast models to help predict the impacts of climate change on the values of the marine park.	Research	As required



9. Plan implementation and operation

Sections 5 to 8 outline the management objectives, strategies, performance measures and targets required to achieve the strategic objectives for the marine park. To successfully implement these strategies a number of supporting management strategies are required to effectively administer the park, support overall management and ensure compliance with management arrangements. The implementation of all strategies is ultimately subject to resource availability.

9.1 Administration and governance

The following strategies will ensure appropriate arrangements are in place to effectively implement management actions and manage the marine park in a collaborative setting.

Summary of management arrangements for administration and governance			
Management objectives	To ensure the marine park has appropriate legal, administrative, financial, operational and human resource frameworks in place so that it is effectively managed in a collaborative setting.		
		Management program	**Priority**
Management strategies DBCA is the lead for all strategies. Supporting agencies are listed in brackets. If agencies are required to take a lead role, their name is in bold.	1. Implement all statutory notices required to support implementation of the management plan within 12 months of marine park gazettal.	Management framework	H
	2. Collaborate with and provide advice to agencies, stakeholders and adjacent land managers, where necessary, to ensure the protection of marine park values and complementary management of adjacent reserves.	Management framework	Ongoing
	3. Secure and maintain appropriate funding for staff structures, operational equipment, including vessels, and infrastructure to adequately implement the management plan. [DPIRD]	Management framework	H
	4. Investigate the possibility of developing an information sharing platform for all agencies involved in managing the marine park to share their data (e.g., a data dashboard).	Management framework	L
	5. Develop annual work plans.	Management framework	H
	6. Develop collaborative operational plans for implementation of relevant strategies in the plan. [DPIRD]	Management framework	H
	7. Ensure cultural safety protocols are observed by marine park managers by developing health and safety plans and protocols for all management and research operations conducted on Ngadju Country.	Management framework	H
	8. Develop a communications plan and protocol for management actions, research and decision making, to ensure that Traditional Owners are aware of work on Country and are afforded opportunities to participate.	Management framework	H
	9. Pursue external funding and partnership opportunities to implement strategies in the management plan.	Management framework	H
	10. Assess impacts on marine park values and manage appropriately as required (e.g., speed limits and/or additional measures to protect threatened species, ecological communities, and natural features or for safety reasons). [DoT]	Management intervention and visitor services	H

9.2 Zoning and permitted activities

The implementation of an appropriate zoning scheme is an important strategy for the conservation of marine biodiversity, increased recognition and protection of culturally significant areas and the management of human use in the marine park. Importantly the application of the zoning scheme should not be viewed in isolation, but as one tool in a suite of complementary tools available to marine park managers to achieve desired ecological, cultural and social outcomes.

9.2.1 Zoning design

Multiple use zoning is a key strategy to protect the health and resilience of the marine park, while supporting ongoing tourism, recreation, commercial activities and fishing.

The CALM Act requires marine parks to be zoned as one or a combination of sanctuary, recreation, special purpose or general use zones. Where possible and appropriate, marine park zoning seeks to accommodate existing recreational and commercial uses while also ensuring cultural and environmental protection.

The zoning scheme for the combined Mamang Maambakoort, Wudjari, Western Bight and Mirning marine parks is comprised of:

- 29 sanctuary zones covering approximately 261,730 hectares or 20 percent of the parks.
- Nine special purpose zones (cultural protection) covering approximately 52,460 hectares or four percent of the parks.
- Three special purpose zones (whale conservation) covering approximately 75,180 hectares or six percent of the parks.
- Two special purpose zones (wildlife conservation) covering approximately 3,710 hectares or less than one percent of the parks
- General use in the remainder of the parks, covering approximately 899,970 hectares or 70 percent of the parks.

Map 6 shows the zoning scheme for the marine park. A summary of the activities permitted in each zone is presented in Table 1.

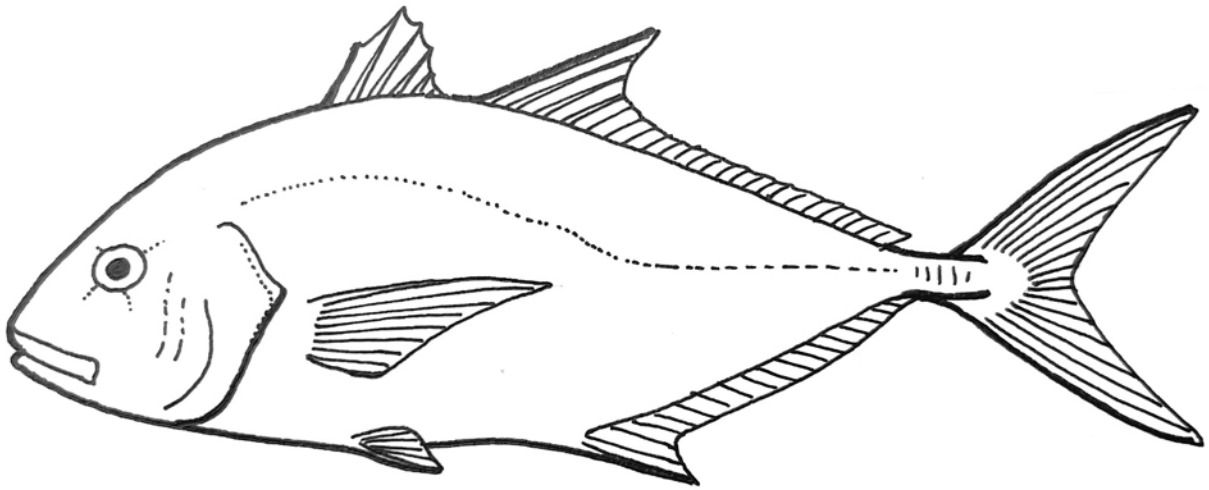
Design of the zoning scheme was guided by a set of principles which aim to provide for ecological, cultural, recreational, tourism and other sustainable use values (see Appendix 1).

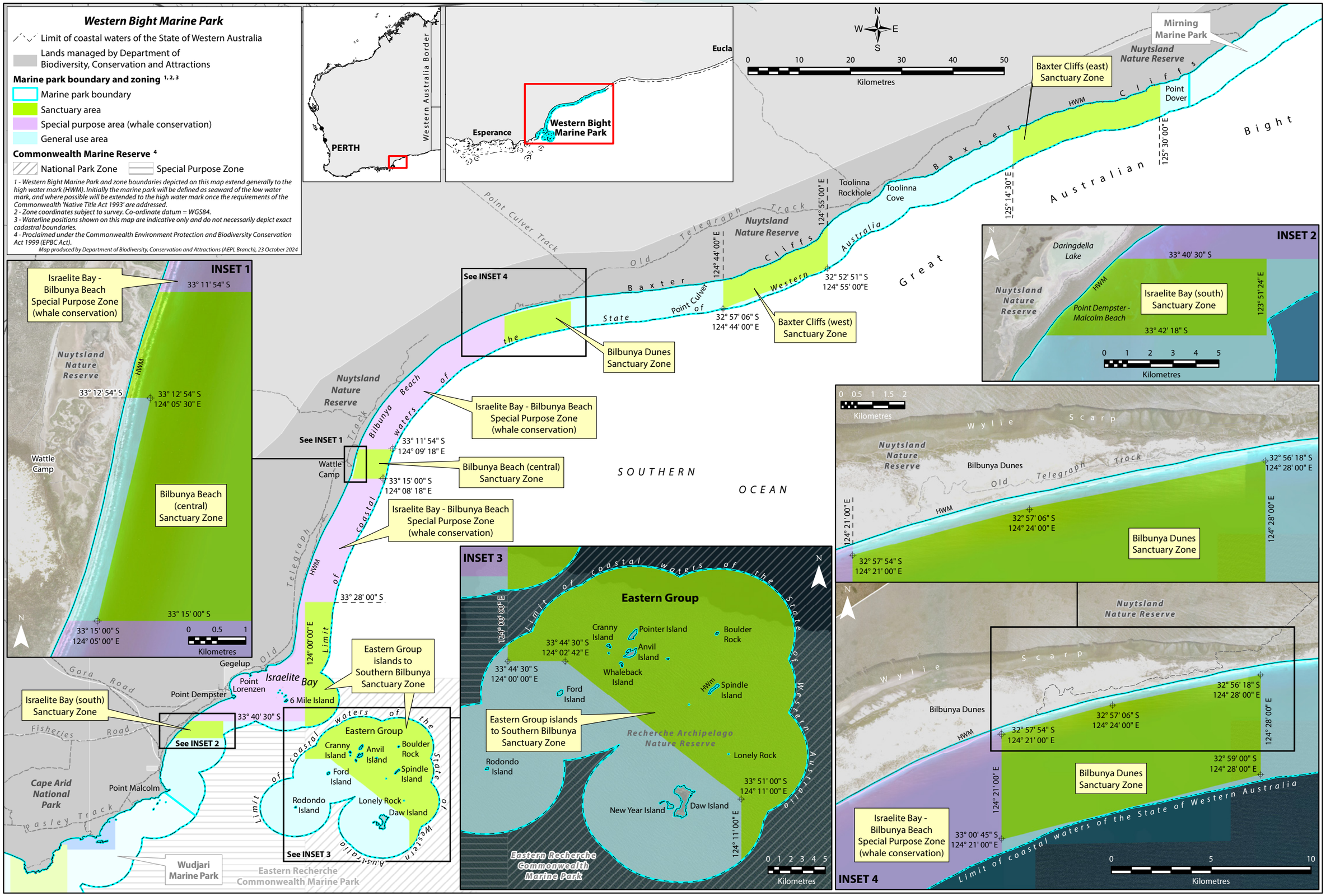
The zoning scheme is based on a comprehensive, adequate and representative (CAR) approach. It aims to protect ecologically and culturally important high priority values such as seagrass, macroalgal, reef, soft substrate and filter feeding communities and considers the level of current and projected future pressures on these values. The zoning scheme is designed to provide connectivity from coastal environments out to deeper water and offshore islands and provide complementarity to adjacent marine and terrestrial reserves.

The zoning scheme recognises and allows for recreation and tourism and allows for ongoing sustainable use by considering the needs of park users such as commercial and recreational fishers. Where possible, the zoning scheme has been designed to be easy for users to understand and comply with (e.g., creating zones with straight line boundaries which align with degrees of longitude and latitude and/or aligning boundaries with prominent features on the coast or islands).

The national guidelines for establishing marine protected areas recommend that the IMCRA bioregions form the basis for reserve design, with one or more examples of conservation features (e.g., habitats and ecosystems) found in each bioregion represented in highly protected zones (ANZECC, 1999). The marine park falls within the Western Australian IMCRA South Coast and Eucla bioregions. To complement the bioregional framework, a network-based approach was taken, considering the adjacent marine parks which were being developed concurrently.

Ultimately the zoning scheme aims to ensure the marine park is managed to maintain ecosystem function and increase ecosystem resilience.





Map 6 – Zoning for Western Bight Marine Park.

9.2.2 Sanctuary zones

The sanctuary zones play an important role in protecting areas of critical habitat to maintain the healthy functioning of the complex ecosystems that make up the marine park. Sanctuary zones act as benchmarks to compare to other areas with similar habitats and ecosystems that are subject to extractive use. This allows managers to better understand local and regional pressures on the marine environment over time. As such, sanctuary zones provide important opportunities for education, research and monitoring. Sanctuary zones can help to increase ecosystem health by reducing pressures on the ecosystems protected, thereby increasing resilience to external pressures such as climate change.

Israelite Bay South Sanctuary Zone

The Israelite Bay South Sanctuary Zone (approximately 2,275 hectares) protects representative examples of marine habitats, including seagrass communities, macroalgal communities, reef and soft-sediment communities in the South Coast bioregion. The sanctuary zone protects important feeding areas for shorebirds, including migratory species and breeding areas for sooty oystercatchers. A portion of the large established southern right whale aggregation area used for breeding and calving is included in this zone. The location of this sanctuary zone, adjacent to the Nuytsland Nature Reserve and the Eastern Recherche Marine Park (in Commonwealth waters) provides connectivity across these conservation reserves.

Eastern Group Islands to Southern Bilbunya Sanctuary Zone

The Eastern Group Islands to Southern Bilbunya Sanctuary Zone (approximately 37,709 hectares) protects representative examples of marine habitats, including seagrass, macroalgal, reef and soft-sediment communities in the Western Australian South Coast and Eucla bioregions. The bathymetry around the island group is complex, with a range of depths and depth gradients. A variety of species are protected in the sanctuary zone from marine mammals such as the southern right whale and Australian sea lion to migratory birds and fish. The sanctuary zone has high ecological importance and includes multiple breeding and foraging sites for Australian sea lions and long-nosed fur seals. Breeding and foraging areas for a variety of bird species will also be protected including for the Cape Barren goose, little penguin, great-winged petrel, flesh-footed shearwater, white-faced storm petrel, Pacific gull, Caspian tern, fairy tern and silver gull. Boating and wildlife watching can continue to be enjoyed in this area. The sanctuary zone borders the Eastern Recherche Marine Park in Commonwealth waters and the Recherche Archipelago Nature Reserve, providing connectivity between these conservation reserves.

Bilbunya Beach (Central) Area Sanctuary Zone

The Bilbunya Beach (Central) Area Sanctuary Zone (approximately 3,115 hectares) represents a change in aspect to a predominantly east-facing coastline with more gradually sloping depths to around 25m. The coastline is also known to accumulate large volumes of wrack which is ecologically important for marine food webs. The zone protects representative examples of marine habitats, including seagrass, and provides significant representation of soft-sediment communities in the Eucla bioregion. Important feeding areas for shorebirds (including migratory species) and breeding areas for sooty oystercatchers are protected in this zone. The area has high ecological importance to southern right whales for breeding and calving. The sanctuary zone is adjacent to the Nuytsland Nature Reserve, providing connectivity between these important marine and terrestrial conservation reserves.

Bilbunya Dunes Sanctuary Zone

The Bilbunya Dunes Sanctuary Zone (approximately 5,710 hectares) coastline is backed by large dune systems. Depths in the zone go down to 30m. The sanctuary zone protects representative examples of marine habitats, including seagrass and soft-sediment communities in the Eucla bioregion. The zone includes a portion of the large established southern right whale aggregation area used for breeding and calving. The sanctuary zone is adjacent to the Nuytsland Nature Reserve, providing an integrated expanse of these important marine and terrestrial conservation reserves.

Baxter Cliffs (West) Sanctuary Zone

The Baxter Cliffs (West) Sanctuary Zone (approximately 9,840 hectares) is characterised by a coastline backed by large cliffs, and protects representative examples of low cover seagrass, and soft-sediment and reef communities in the Eucla bioregion. The sanctuary zone is adjacent to the Nuytsland Nature Reserve, providing connectivity between these important marine and terrestrial conservation reserves. Protection of this area is important as Baxter Cliffs is likely to represent a genetic transfer barrier for a range of species.

Baxter Cliffs (East) Sanctuary Zone

The Baxter Cliffs (East) Sanctuary Zone (approximately 14,864 hectares) protects representative examples of marine habitats, including low cover seagrass communities, soft-sediment communities, subtidal platform reef communities and high-profile nearshore reef communities in the Eucla bioregion. The sanctuary zone is adjacent to the Nuytsland Nature Reserve providing connectivity between these important marine and terrestrial conservation reserves. Baxter Cliffs is likely to represent a genetic transfer barrier for a range of species.

Cuttlefish. Courtesy of Ocean Imaging

9.2.3 Special purpose zone (whale conservation)

The special purpose zone (whale conservation) (approximately 48,575 hectares) provides management measures that enhance protection in a portion of the marine park that is used by southern right whales for breeding and calving. This zone will conserve the sheltered bays that are ecologically important to southern right whales and to protect a range of habitats.

9.2.4 General use areas

All areas in the marine park not included in sanctuary or special purpose zones are zoned as general use (approximately 79,023 hectares). Management of general use areas is provided for through mechanisms under the CALM Act and CALM Regulations, as well as the implementation of management strategies. The general use areas provide for a higher level of scrutiny over development activities and allow a range of uses including recreational and commercial fishing, and aquaculture.

9.2.5 Permitted uses

The permitted uses table (Table 1) summarises the range of permitted activities in the different zone types in the marine park. Users should be aware that many of the listed activities are also regulated under complementary legislation and regulations, such as those regarding wildlife interactions, the disposal of sullage, and size and bag limits for recreational fishing. In accordance with the CALM Act, a licence is required to carry out some activities (e.g., commercial tourism and research) in State marine parks. The implementation of the management plan may include management actions such as temporal closures. Development of such management actions will aim to limit the impacts on the permitted activities whilst meeting the management objectives.

An activity marked as 'assess' indicates an assessment is required by the appropriate agencies in accordance with relevant legislation and the management objectives and targets in this plan.

Any changes to the permitted activities and uses table requires a statutory two-month public comment period and approvals from the Minister for Environment, Minister for Fisheries and Minister for Mines and Petroleum.

Table 1. Summary of permitted uses for the Western Bight Marine Park

Activity	Sanctuary zones	Special purpose zones (whale conservation) [a]	General use zones
Customary			
Customary activities (e.g., sustainable harvesting and fishing)	Yes [b]	Yes [b]	Yes [b]
Commercial fishing and aquaculture [c]			
Commercial abalone fishing	No	Yes	Yes
Commercial crustacean fishing	No	Yes	Yes
Commercial line and trap fishing	No	Yes	Yes
Commercial nearshore net fishing	No	Yes	Yes
Commercial purse seine fishing	No	Yes	Yes
Commercial salmon fishing	No	Yes	Yes
Commercial demersal longline (shark) fishing	No	Yes	Yes
Commercial demersal gillnet (shark) fishing	No	Yes	Yes
Commercial trawl fishing (scallop)	No	Yes	Yes
Commercial octopus fishing	No	Yes	Yes
Commercial specimen shell fishing	No	Yes	Yes
Commercial marine aquarium fishing	No	Yes	Yes
Commercial fishing (other)	No	Yes	Yes
Aquaculture	No	No	Yes
Commercial - other			
Ground-disturbing mining and petroleum exploration and development [d]	No	No	Assess
Non-ground-disturbing activities including geophysical surveys, geological mapping, sampling and geochemical surveys [e]	No	No	Assess
Ship loading and other mining related infrastructure (e.g., ship loading docks, cabling or pipelines)	No	No	Assess
General marine infrastructure (e.g., groynes, jetties and boat launching facilities)	No	Assess	Assess
Artificial structures	No	No	Assess
Dredging and dredge spoil dumping	No	Assess [f]	Assess
Scenic flights (charter) [c]	Yes	Yes	Yes
Commercial tour operators – fishing [c]	No	Yes	Yes
Commercial tour operators – non-extractive (e.g., wildlife viewing) [c]	Yes	Assess [g]	Yes
Commercial use of remotely piloted aircraft (drones) [c]	Assess	Assess	Assess
Commercial (other) [c]	Assess	Assess	Assess
Wildlife/fish feeding	No	No	No
Recreational			
Boating (motorised and non-motorised)	Yes	Yes	Yes
Nature appreciation and wildlife viewing	Yes	Yes	Yes
Recreational fishing [c- from a boat]	No	Yes	Yes
Remotely piloted aircraft (drone) launching and landing [h]	Yes	Yes	Yes
Recreational live mollusc shell collecting	No	No	Yes

Activity	Sanctuary zones	Special purpose zones (whale conservation) [a]	General use zones
Other use			
Access	Yes	Yes	Yes
Vessel transit	Yes	Yes	Yes
Navigation aids	Yes	Yes	Yes
Research and monitoring [c]	Yes [i]	Yes	Yes
Anchoring [j]	Yes	Yes	Yes
Mooring	Assess	Assess	Yes
Seaplane and helicopter launching and landing [k]	Assess	Assess	Assess
Vessel sewage discharge and de-ballasting	No	No	Yes [l]

Permitted activities provisions

[a] Seasonal restrictions to vessels such as speed limits may apply.
[b] Customary take is confined to Ngadju Traditional Owners, or where Traditional Owners have provided consent to another Aboriginal person or group.
[c] Licence or permit required under the *Conservation and Land Management Act 1984* and/or *Fish Resources Management Act 1994* and related regulations.
[d] Ground-disturbing mining and petroleum exploration and development activities include any activity that disturbs the land, seabed and/or subsoil within the marine park (e.g., drilling).
[e] Geophysical surveys will be assessed by the Department of Energy, Mines, Industry Regulation and Safety.
[f] Activity permitted if activity is shown to be compatible with the specified purpose of the zone. Only small-scale dredging for the purpose of public access and safety will be considered.
[g] Any new proposals to also be referred to marine park managers.
[h] Recreational use of RPAs must comply with Civil Aviation Safety Authority (CASA) rules as well as legal requirements under the CALM Act, BC Act, and the *Bushfires Act 1954* and related regulations. Restrictions on the use of RPAs may be applied in some areas or for certain periods of time subject to the Civil Aviation Regulations 1988 and the Civil Aviation Safety Regulations 1998, under the *Civil Aviation Act 1988*.
[i] Non-extractive/destructive research and monitoring activities only.
[j] Except where restrictions are put in place for the protection of ecological and/or cultural values.
[k] Lawful authority must be obtained to launch, land or touchdown in an aircraft on CALM Act lands and waters.
[l] Only in gazetted sewage discharge areas.
- Consideration will be given where existing permissions relating to animal exercise areas are in effect.
'Assess' is denoted where matters require statutory assessment and approval according to other regulatory processes; or where an activity is to be assessed against the primary conservation purpose of a zone.

9.3 Community stewardship and compliance

Education and public participation will increase public awareness and understanding of the values and management issues in the marine park. Increased understanding helps to ensure appropriate behaviour, develop a sense of community stewardship and lead to better protection and management of the park. While most users comply with management arrangements when they understand why they are implemented, it is important to monitor compliance and mitigate inappropriate or illegal behaviour. It will also be important for users of the marine park to play self-regulatory and peer surveillance roles.

Summary of management arrangements for community stewardship and compliance			
Management objectives	• To enhance community understanding of and support for the marine park and achieve a high level of compliance with regulations, permitted uses and other management arrangements within the marine park. • To acknowledge the strong connection of the marine environment to the identities of local communities and to promote stewardship of the marine park.		
		Management program	**Priority**
Management strategies DBCA is the lead for all strategies. Supporting agencies are listed in brackets. If agencies are required to take a lead role, their name is in bold.	1. Install zone markers and educational signage for the marine park where appropriate. [DPIRD for signage]	Education and interpretation	H
	2. Develop and implement a collaborative patrol and enforcement program. [DPIRD]	Patrol and enforcement	H
	3. Ensure marine park users, including researchers, obtain and comply with appropriate formal permissions. [DPIRD]	Patrol and enforcement	H
	4. Monitor, promote and enforce compliance with fisheries and marine park legislation. [DPIRD]	Patrol and enforcement	H
	5. Encourage voluntary compliance and peer enforcement of regulations. [DPIRD, DoT]	Education and interpretation	H
	6. Develop and implement a public participation plan for the marine park, which encourages community involvement in management through a range of opportunities including in education, research and monitoring.	Public participation	M
	7. Develop an education and interpretation plan which communicates: • the importance of the marine park's values • Ngadju culture and values • the purposes of management zones and regulations • appropriate behaviour to reduce human impacts and ensure public safety • considers all education and interpretation strategies listed in the management plan.	Education and interpretation	H
	8. Maintain a database of compliance statistics and adapt management strategies to address any non-compliance issues. [DPIRD]	Patrol and enforcement	H
Performance measures	To be determined		
Target	To be determined		

10. Assessing management effectiveness

Progress in implementing the management plan and in assessing management effectiveness against stated objectives will be regularly reviewed through a formal process consisting of annual management effectiveness reports, as well as periodic and ten-year reviews of the management plan.

10.1 Annual reviews

The prioritised management strategies contained in the management plan will be implemented by DBCA primarily through the collaboration of DBCA's Esperance district, Marine Science Program and other specialist branches, and DPIRD. Dependent on the status of joint management arrangements, Ngadju Traditional Owners may also be involved in the implementation of the management plan. An annual review of the implementation of the management plan will be considered by the CPC. Key parts of the annual review will include:

- progress in implementing management plan strategies
- assessment of the condition of values, the pressures acting on values, management response and management effectiveness
- identifying issues affecting implementation
- resource allocation.

10.2 Periodic assessments

The CPC has a statutory responsibility to periodically assess the implementation and effectiveness of management plans. The department will provide information from monitoring and other operational programs to the CPC to enable an assessment of the plan's implementation.

Australian sealion. Courtesy of Peter Nicholas

10.3 Revision of the management plan

The management plan will guide management of the marine park for 10 years, or until a statutory revision is undertaken and a new management plan is prepared. If such a revision does not occur by the end of the plan's specified lifespan, the plan will remain in force in its original form unless it is revoked by the Minister for Environment, or a new plan is approved. Full public consultation will occur at the time of revision, and endorsement of a revised management plan will be sought from the CPC. Approval of the Minister for Environment following concurrence from the Minister for Mines and Petroleum and Minister for Fisheries is also required.

Summary of management arrangements for assessing management effectiveness			
Management objectives	To assess and evaluate management effectiveness.		
		Management program	**Priority**
Management strategies DBCA is the lead for all strategies. Supporting agencies are listed in brackets. If agencies are required to take a lead role, their name is in bold.	1. Develop and implement a management effectiveness reporting process that is consistent with DBCA and CPC policy. [CPC]	Management framework	H
	2. Develop and implement a monitoring and evaluation framework to assess management effectiveness for the marine park.	Management framework	H
	3. Provide necessary information and support for the management effectiveness reporting process. [DPIRD]	Monitoring	As required
	4. Where possible, implement management strategies to mitigate or stop any impacts from human activities within the marine park which are negatively impacting the values of the marine park. [DPIRD]	Management intervention and visitor services	As required

Horseshoe leatherjacket. Courtesy of Peter Nicholas

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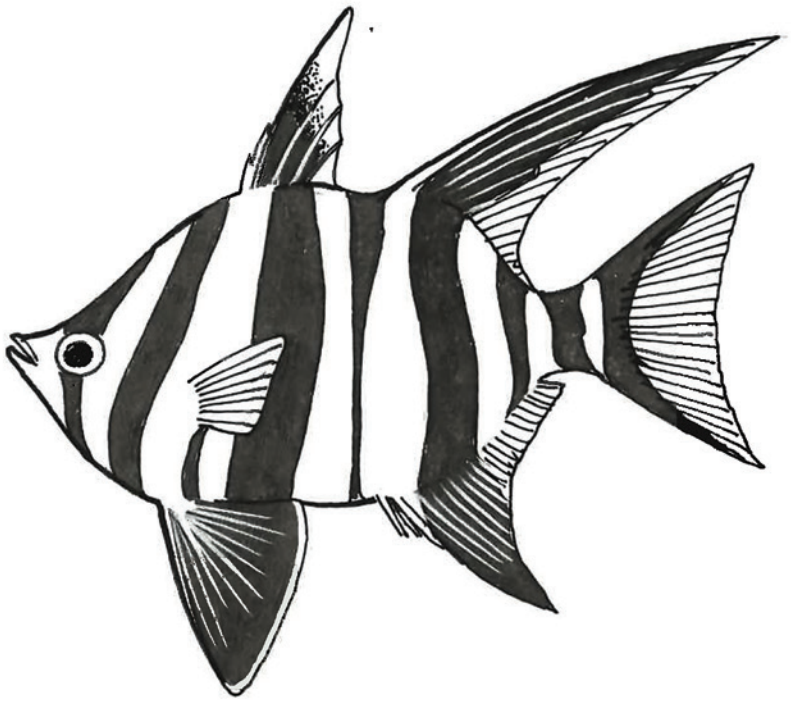

Appendix 1 – Design principles

Comprehensiveness: The full range of ecosystems, habitats and communities present within and across each bioregion are represented within the network.

Adequacy: The network includes enough of each component of biodiversity (enough of each habitat) to maintain a healthy functioning marine ecosystem.

Representativeness: Biodiversity features should be represented across their natural range, biological and genetic diversity and variability. For example, habitats and communities should be represented across a range of depths and across different wave exposures.

Precautionary principle: Lack of scientific certainty should not be used as a reason for postponing measures to protect the marine environment. A precautionary approach is a proactive (rather than reactive) approach designed to protect areas that are currently in relatively good condition, helping to ensure they stay that way into the future. Where biodiversity data is limited, a precautionary approach uses surrogates (e.g., mapped and unmapped habitats, geomorphology or other physical or environmental gradients) for biodiversity.

Ecological importance, vulnerability and resilience: Biologically and ecologically important areas play an essential role in sustaining populations and maintaining ecosystem function. Likewise, the inclusion of natural areas, with a higher degree of integrity and resilience, as well as areas with vulnerable habitats or vulnerable life stages will help protect and sustain marine environments. Ecologically important features may include known nursery, foraging, breeding and calving areas; areas that are unique, unusual or highly productive; and areas that are important for or where known aggregations occur of rare, threatened or protected species.

Connectivity: Connectivity refers to the way components of a marine ecosystem are connected through tides, currents and the behaviour of plants and animals (DEH 2009). Key considerations for connectivity may include: dispersal ranges for different marine organisms; distances between and within marine parks and sanctuary zones; benthic-pelagic linkages; connections between catchments to the coast to deep water environments; physical oceanography, such as tides and currents; and foraging areas and migratory pathways for a range of marine animals.

Protect and conserve Aboriginal culture and heritage: The protection of cultural and heritage values including:

- conserving culturally significant sites and areas important for culturally significant species
- respecting and providing for ongoing connection to Country and culture, including customary activities
- where culturally appropriate, providing consistency with cultural laws, lore and protocols, including cultural management arrangements
- where culturally appropriate, contributing to raising awareness of Aboriginal culture and heritage values
- respecting current and future aspirations and arrangements for Sea Country, including opportunities for economic development, training and management.

Provide for ongoing ecologically sustainable use: The zoning scheme should:

- consider the full diversity of marine uses, including economic use, social use and ecosystem services
- have complementarity
- promote opportunities for recreation and appreciation of the marine environment
- provide for natural and maritime heritage values
- provide for education and research
- be designed so that it is easy for users to identify, understand and comply with zoning and management arrangements.

Appendix 2 – Commercial fisheries operating on the South Coast

The South Coast Crustacean Managed Fishery (SCCMF)
The SCCMF extends from Augusta to the South Australian border. This multi-species, effort-controlled pot-based fishery targets southern rock lobster (*Jasus edwardsii*), western rock lobster (*Panulirus cygnus*) and deep-sea species such as giant crab (*Pseudocarcinus gigas*), crystal crab (*Chaceon albus*) and champagne crab (*Hypothalassia acerba*). This fishery is managed through limited entry as well as size limits and ITQ (Individually Transferable Quota). (How and Baudains, State of the Fisheries Report 2020/21).

Abalone Managed Fishery
Abalone species targeted by commercial abalone divers are greenlip (*Haliotis laevigata*), brownlip (*H. conicopora*) or Roe's (*Haliotis roei)* abalone on the southwest and South Coast of Western Australia. The abalone fishery is a dive fishery that operates in the shallow coastal waters off the coast, with the abalone collected by hand. This fishery is managed through Total Allowable Commercial Catches, meaning it is a quota-based fishery (Strain, Fabris and Jones, Status of the Fisheries Report 2020/21).

The South Coast Estuarine Managed Fishery (SCEMF)
This fishery operates within the South Coast bioregion in 13 estuaries between Cape Beaufort on the south-west and the South Australian border. It targets estuarine fish species and blue swimmer crabs (*Portunus armatus*) via gill netting, purpose-designed crab traps and haul netting. This fishery is managed through input controls (restrictions on the number, length and mesh size of nets used, and the number of crab traps used), size limits and temporal closures (Duffy, Harris, and Blay, State of the Fisheries Report 2020/21).

The South Coast Salmon Managed Fishery (SCSMF)
This fishery operates between Cape Beaufort on the southwest and the South Australian border using beach seine nets to target Western Australian salmon (*Arripis truttaceus*). This fishery is managed through input controls (restrictions on the type, length and mesh size of nets) and size limits (Duffy, Harris and Blay, Status of the Fisheries Report 2020/21).

The South Coast Purse Seine Managed Fishery (SCPSMF)
The SCPSMF operates between Cape Leeuwin and the South Australian border, catching pilchards (*Sardinops sagax*) and other small pelagic fish with purse seine nets, and is managed through limited entry (with a restricted number of licences issued) and Total Allowable Commercial Catches (it is a quota-based fishery). Other input controls include restrictions on the number, length and mesh size of nets, and size limits. There are five management zones for this fishery – King George Sound (Zone 1); Greater Albany (Zone 2); Bremer Bay and Esperance (Zones 3 and 4); and Augusta (Zone 5) (Norriss and Blazeski, Status of the Fisheries Report 2020/21).

The South Coast Demersal Gillnet and Demersal Long Line Managed Fishery (SDGDLF)
This fishery operates between 33°S on the south-west to the South Australian border. Demersal gillnets are used to target primarily sharks, with scalefish as a by-product, or operators can use demersal longline. The main targeted species include gummy (*Mustelus antarcticus*), dusky (*Carcharhinus obscurus*), whiskery (*Furgaleus macki*), and sandbar (*C. plumbeus)* sharks. This fishery is managed through the use of input controls with restrictions of the number, length, drop and mesh size of nets, and the size of hooks on longlines. There are also other controls in the form of limited effort and size limits (Braccini and Watt, Status of the Fisheries Report 2020/21).

The South Coast Line and Fish Trap Managed Fishery (SCLFTMF)
The SCLFTMF operates between Black Point in the south-west and the South Australia border (excluding the waters of the South Coast Estuarine Fishery). The fishery is divided across four licence classes – Class A (line and hook); Class B (line and jig for squid); and Class C and D (fish trap in oceanic waters and King George Sound). This fishery is managed through limited entry (with a restricted number of licences issued) and input controls with restrictions of the number of lines and hooks, jigs and traps used, as well as size limits (Duffy, Harris, and Blay, State of the Fisheries Report 2020/21).

The South Coast Nearshore Net Managed Fishery (SCNNMF)
Operators are licenced to fish by net in the SCNNMF between Black Point and the South Australian border. They target scalefish (excluding Western Australian salmon and small pelagic fish) and squid (*Sepioteuthis australis*) using beach seine, haul and gill nets. The fishery is managed through limited entry (with a restricted number of licences issued) and input controls (restrictions on the number, length and mesh size of nets), and size limits (Duffy, Harris, and Blay, State of the Fisheries Report 2020/21).

Octopus Interim Managed Fishery (OIMF)

The OIMF is a state-wide fishery that targets the western rock octopus (*Octopus djinda*), using trigger traps or unbaited, passive shelter pots. Commercial octopus catch is harvested from three different fisheries, however, most of the commercial catch comes from the OIMF. This fishery is managed through input controls with restrictions of the number of pots or traps permitted (Newman, Wise, Santoro, and Gaughan, State of the Fisheries Report 2020/21).

Specimen Shell Managed Fishery (SSMF)

Shell licence holders can operate throughout Western Australia. About 200 species of specimen shell are collected each year, using a variety of methods. The main methods are by hand, by wading along coastal beaches or, in some instances, by use of remotely operated underwater vehicles. While the fishery covers the entire Western Australian coastline, some concentration of effort occurs in areas adjacent to population centres such as Broome, Exmouth, Shark Bay, Geraldton, Perth, Mandurah, the Capes area, Albany and Esperance. This fishery is managed via limited entry (with a restricted number of licences issued) and input controls such as restrictions on the gear used as well as closed areas (Hart, Bruce, and Steele, State of the Fisheries Report 2020/21).

Marine Aquarium Fish Managed Fishery (MAFMF)

The MAFMF operates in all State waters between the Northern Territory border and South Australian border. The fishery is typically more active in waters south of Broome with higher levels of effort around the Capes region, Perth, Geraldton, Exmouth, Dampier and Broome. The MAFMF resource potentially includes more than 1,500 species of marine aquarium fish and uses small nets or hand collection techniques. Operators in the MAFMF are also permitted to take coral, live rock, algae, seagrass and invertebrates (Newman, Bruce and Bissell, State of the Fisheries Report 2020/21).

The South Coast Trawl Fishery (SCTF)

The SCTF targets saucer scallops (*Ylistrum balloti,* formerly *Amusium balloti*) using otter trawl nets on the South Coast of Western Australia from 115° 30′ E to 125° E east of Augusta to east of Israelite Bay. Key fishing areas include Bremer Bay (Doubtful Islands), the Recherche Archipelago and Israelite Bay. This fishery is managed through limited entry (with a restricted number of licences issued) and input controls with restrictions of the length and mesh size of nets used, as well as seasonal closures. The nets used must also have bycatch reduction devices incorporated, in the form of a grid (Kangas, Wilkin, Breheny, Cavalli, Grounds and Brown, State of the Fisheries Report 2020/21).