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Environmental, Economic and Social Values of the Eastern Spencer Gulf Marine Park

PART 1

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For further information, please contact:
Coast and Marine Conservation Branch
Department of Environment and Natural Resources
GPO Box 1047
ADELAIDE SA 5001

Telephone: (08) 8124 4900
Facsimile: (08) 8124 4920

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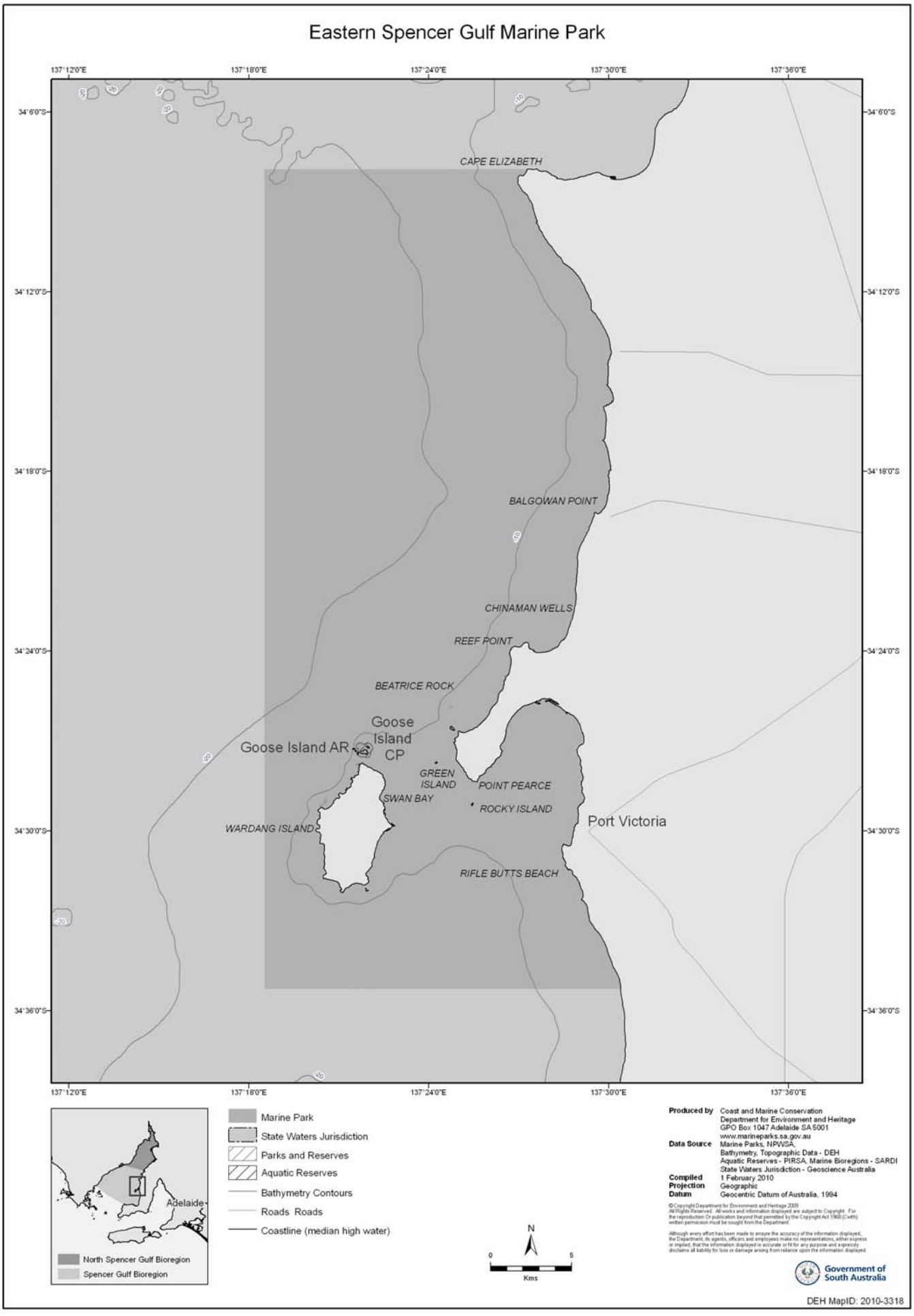
PART 2 AN ATLAS OF MAPS

An atlas of maps containing environmental, economic and social/cultural information for this marine park has been produced as Part 2 of the Values Statement. The maps provide details specific to this park in a user-friendly visual format and may be viewed and downloaded from http://www.marineparks.sa.gov.au.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Bathymetry, Topographic Data - DEH
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Government of South Australia
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Eastern Spencer Gulf Marine Park

Covering an area of 784 km², the Eastern Spencer Gulf Marine Park is located on the eastern side of the gulf, just north of Port Rickaby and extending to Cape Elizabeth. The park encompasses the islands and waters of Goose Island Conservation Park and Goose Island Aquatic Reserve.

1 ENVIRONMENTAL VALUES

1.1 Ecosystem services

Ecosystems provide many critically important services that people benefit from, often at no direct cost to us. Examples of ecosystem services provided by coastal and marine habitats are shown in the following table. It is important to ensure that ecosystem health and integrity are maintained so that ecosystems continue to provide these services to us all.

Table adapted from McLeod, K and Leslie, H (2009).

	Life supporting services				Resources and products				Maintain earth's living space							Recreational and cultural services				
Coastal, estuarine and marine habitat types	Biogeochemical processes	Biophysical processes	Biodiversity	Nutrient cycling	Food	Fibre, fuel, shells etc	Non-biological materials (eg minerals)	Pharmaceuticals & nutriceuticals	Climate regulation	Waste processing	Flood/storm protection	Water flow/ circulation	Erosion control	Water quality	Sediment quality	Cultural and amenity	Recreation and tourism	Aesthetics	Spiritual, religious, lifestyle	Education and research
Bare sand	x	x	x	x	x	x	x			x		x		x	x	x	x	x	x	x
Seagrass	x	x	x	x	x	x		x	x	x		x	x	x	x	x	x	x	x	x
Reef (granite, limestone, calcarenite or low profile platform reef)	x	x	x	x	x	x	x	x	x	x		x	x	x		x	x	x	x	x
Water column	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x
Bedrock platform	x	x	x	x	x	x	x	x	x	x			x			x	x	x	x	x
Cliffs	x	x	x	x	x	x	x				x					x	x	x	x	x
Sandy beaches (dunes, coarse sand, fine sand)	x	x	x	x	x	x	x			x		x			x	x	x	x	x	x
Saltmarsh	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

The Eastern Spencer Gulf Marine Park will be designed to conserve examples of habitats and species found in the Spencer Gulf Bioregion. Habitats, species and natural processes found here are summarised below.

1.2 Physical influences

Physical influences shape the type of habitats and species found in an area. Physical influences typical of this marine park include:

- sea surface temperatures ranging from 11°C in winter to 24°C in summer;
- a semi-sheltered system, with warm temperate waters from northern Spencer Gulf mixing with the cooler seawater influx from the Southern Ocean;
- highly saline waters which flow along the seafloor down the eastern side of the gulf in winter months, influencing the ecology of the area.

1.3 Habitat variety

Table 1 Benthic (subtidal) habitats found in the Eastern Spencer Gulf Marine Park

Benthic Habitat**	Area (km²)*	% of park
Bare sand	25	3%
Dense seagrass	62	8%
Medium seagrass	202	26%
Heavy limestone reef	76	10%
Low profile platform reef	158	20%
Unmapped	261	33%

* habitat areas have been rounded to the nearest whole number
**habitats included are those found from mapping at a resolution of 1:100,000

Table 2 Shoreline (intertidal) habitats found in the Eastern Spencer Gulf Marine Park

Shoreline Habitat	Length in park (km)*	% of park length
Bedrock platform	6	7%
Coarse sandy beach	60	75%
Saltmarsh	14	18%

* habitat lengths have been rounded to the nearest whole number

Eastern Spencer Gulf Marine Park spans 50 km over a north-south gradient as well as shallow inshore to deeper offshore areas. Habitats include a mix of seagrass, granite reefs, limestone reefs, sandy bottoms and island environments.

There are large shallow seagrass meadows north of Wardang Island and in the bay north of Port Victoria. Limestone reefs interspersed with sandy seafloor habitat from Cape Elizabeth to Point Pearce are distinct from the granite reefs located around Wardang Island. Between Port Victoria and Wardang Island, reef and patches of sandy seafloor habitat dominate and extend seaward to a depth of 30 metres. Shallow reef systems adjacent to the coast include large colonies of the stony coral *Plesiastrea versipora* which is the only species of stony coral found in southern Australia. A reef system extends from the southern end of Wardang Island south towards Port Rickaby.

The shoreline of the park is characterised by sheltered sandy beaches backed by large, well vegetated dune systems such as the area from Cape Elizabeth to the south of Balgowan. Broad sandflats are found at Chinaman Wells. South of Port Victoria, the beaches are interspersed with sections of rocky coast. Intertidal shore platform reefs are an important feature as they are less common in other marine parks within the Spencer Gulf.

The coastline of Wardang Island comprises sandy beaches and saltmarshes on the sheltered landward side with rocky shores and intertidal and subtidal reefs facing the open gulf waters.

1.4 Marine species

The many habitats located within the Eastern Spencer Gulf Marine Park support a variety of marine and coastal species including fish, sharks, mammals, birds and invertebrates, some of which have been identified as ecologically important. Refer to Appendix 1 for a more detailed list of species. The Eastern Spencer Gulf Marine Park features:

- a high abundance of reef fish species surrounding Wardang Island;
- the gulf pipefish and the spotted snake-blenny, believed to be endemic to South Australia, which have both been recorded around Port Victoria;
- the unusual octopus (also known as paper nautilus) *Argonauta nodosa*.

1.4.1 Plants and algae

Reefs of this marine park are dominated by several species of large brown macro-algae such as *Ecklonia*, *Cystophora moniliformis, C. monilifera* and species of *Sargassum*. Coralline red algae and turfing species of brown macro-algae are also common features on the reef surfaces. *Scaberia* is also present on the reefs in the less exposed areas. *Posidonia* is the seagrass that dominates the area.

1.4.2 Bony fish, sharks and rays

The park provides habitat for one or more life stages of many commercially and recreationally important fish such as King George whiting, snapper, salmon, Australian herring (tommy ruff), southern garfish and mullet. For example juvenile snapper are mainly found in inlets, bays and shallow sheltered marine waters. As juvenile snapper get older there is a tendency to move to deeper gulf and offshore waters in which they will remain until they reach 12 to 13 years of age and then return to inshore waters for the remainder of their lives. King George whiting spawn in offshore areas, their larvae are then moved northward by currents to where they settle in shallow protected bays. Wardang Island is recognised for its high abundance of some reef fish such as old wife, silver drummer, sweep and leatherjacket species.

A comparatively large number of shark, ray and skate species have been recorded in the area, which is probably due to the variety of habitat and abundant fish and large invertebrates available as prey. Examples include coastal stingaree, whitespotted spurdog, spotted wobbygong, bronze whaler, dusky whaler, smooth hammerhead, school shark, black ray, eagle ray and fiddler ray as well as the nationally *vulnerable* white shark. The dusky whaler has been nominated for protection under the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act).

The protected leafy and weedy seadragons have been observed around Port Victoria to Wardang Island. The gulf pipefish and the spotted snake-blenny which may be endemic to South Australia, have both been recorded around Port Victoria. All *Syngnathid* species are protected in South Australia.

1.4.3 Marine mammals

The marine park features haul-out sites for the nationally and state listed *vulnerable* Australian sea lions on Goose Island and White Rocks.

1.4.4 Seabirds and local and migratory shorebirds

The eastern coastline of Spencer Gulf is home to the State *endangered* white-bellied sea eagle, the nationally *vulnerable* slender-billed thornbill, and the State *vulnerable* fairy tern and blue-winged parrot to name a few.

The coast in this region provides important nesting areas for a range of coastal birds such as the state *rare* peregrine falcon, state *endangered* little tern and state *vulnerable* hooded plover, which nest on beaches above the tidal limit. Cape Elizabeth and Port Victoria are key areas for wading birds in South Australia.

Rocky Island, White Rocks and Goose Island provide important habitat for the crested tern, a species protected under international treaties. Other seabird species such as the Pacific gull, little

penguin and the black-faced cormorant also use the islands for nesting and roosting. Caspian terns breed on Wardang Island.

The exposed sand/mudflats adjacent to Chinaman Wells is a feeding and resting site for numerous local and migratory shorebirds. During the summer months migratory shorebirds feed and rest before their long journey back to the northern hemisphere during the Australian winter.

1.4.5 Marine invertebrates

South eastern Spencer Gulf provides habitat for the unusual octopus (or paper nautilus) *Argonauta nodosa*. Females produce decorative egg cases from arm secretions, known as 'paper nautilus'. The area also provides important habitats for adult southern calamari and the gulf as a whole has the largest known population of western king prawns in the world. Blue swimmer crabs are common in season throughout the park.

For further environmental and social information refer to http://www.marineparks.sa.gov.au

2 ECONOMIC VALUES

The marine environment is an important source of wealth for South Australia and its coastal communities. Marine parks will be designed to accommodate existing economic activities wherever possible. The main economic activities in the Eastern Spencer Gulf Marine Park are summarised below. Information in the Aquaculture and Commercial fishing sections have been provided by PIRSA.

2.1 Aquaculture

The South Australian aquaculture industry had a direct output value of $324 million in 2008/2009 (EconSearch, 2010a). Marine species grown and harvested in South Australia include (but are not limited to) Pacific oysters and mussels (bivalve molluscs), southern bluefin tuna (prescribed wild caught tuna), abalone, yellow-tail kingfish and other species of finfish (aquatic animals – other than prescribed wild caught tuna – which require regular feeding).

Table 3 The statewide economic value of aquaculture industries in South Australia, 2008/09 (excludes freshwater aquaculture)

	Gross value of on-farm production ($m)	Value to downstream* sectors ($m)	On-farm number of employees (FTE)	Number of employees in downstream* sectors (FTE)
Southern bluefin tuna (prescribed wild caught tuna)	$157.8	$16.0	348	58
Bivalve molluscs (oysters)	$32.6	$42.6	529	252
Finfish (other than prescribed wild caught tuna)	$29.2	$15.4	108	84
Bivalve molluscs (mussels)	$2.5	$2.8	114	16
Abalone	$8.1	$0	64	0
Other	$10.9	$0	44	0

EconSearch, 2010a

* Downstream activities include processing, transport, retail and food service.

The Eastern Spencer Gulf aquaculture zone policy exists in this marine park. Specifically, the farming of oysters occurs within the marine park boundary. The Eastern Spencer Gulf aquaculture zone policy is currently under review (as at October 2010). A map showing current active sites, applications and aquaculture zone policies can be accessed online through the Aquaculture Public Register at: http://www.pir.sa.gov.au/aquaculture/public_register

2.2 Commercial fishing

The commercial fisheries that operate in the Eastern Spencer Gulf Marine Park are:

- Central Zone Abalone Fishery;
- Spencer Gulf Prawn Fishery; and
- Marine Scalefish Fishery.

The value of each of these fisheries, including the direct and flow-on values, as well as the number of employees and export values, where available, are listed below. Note that the values provided below are for the entire area of the fishery and are not specific to the Eastern Spencer Gulf Marine Park.

Table 4. The 2008/09 economic value of fisheries operating in the marine park for relevant fishery areas (figures are not specific to the park area and include catches from outside the marine park boundary).

	Catch value($m)	Value of flow-on to other sectors ($m)	Fishing (FTE) employment	Flow-on (FTE) employment
Abalone (State)	30	45.2	90	225
Abalone (Central Zone)	5.7			
Prawn (Spencer Gulf & West Coast)	30.8	71.2	185	342
Marine Scalefish (Spencer Gulf/Coffin Bay)	10.9	10.0	249	51

EconSearch 2010 a, b and c.

These fisheries are important to regional economies of the area both directly, through employment in each fishery, and indirectly, through a range of additional services such as processing, local transport, marketing, local retail and food services. Each of these activities generates flow-on effects to other sectors, through purchases of inputs and employment of labour.

The abalone fishery targets greenlip and blacklip abalone. The park lies within the central zone of the abalone fishery. In 2008/2009, the central zone produced 18% of the State's total abalone harvest.

The Spencer Gulf Prawn Fishery is the largest of the three prawn fisheries in South Australia. Over 80% of South Australia's king prawn harvest comes from Spencer Gulf, with 1,800 tonnes taken from that region in 2008/09.

The Marine Scalefish Fishery is a diverse multi-species, multi-gear fishery that operates across State waters. The King George Whiting Fishery in Spencer Gulf is the second most significant region for the fishery, after the west coast. The catch of King George whiting from southern Spencer Gulf was about 23% of the State catch in 2007-08.

Blue swimmer crabs are fished commercially in Spencer Gulf.

Fishing charters also operate from a number of locations throughout this region.

For further information or to view maps of the fishing regions visit:
http://www.sardi.sa.gov.au/__data/assets/pdf_file/0010/99739/No_305_South_Australian_Wild_Fisheries_Information__and__Stats_report_200708_published.pdf

2.3 Mining and energy resources

The Eastern Spencer Gulf region is regarded as having low petroleum potential, with only thin, unprospective sedimentary cover on crystalline basement. The potential for offshore geothermal energy resources resources is most probably also low for high temperature geothermal energy for the same reason (insufficient sedimentary cover to serve as an insulator). However potential exists

to utilise low temperature geothermal energy in adjacent coastal or inland water settings for a variety of purposes, including power for desalination plants.

Regional magnetic and gravity data show that prospective rock units, particularly of the Gawler Craton, continue offshore in large areas of some parks. Prospectivity for minerals that could be dredged or remotely mined from the seabed is unknown. Exploration for basement rock targets, below the seabed, is likely to be limited to shallower water areas.

BHP's King George prospect exploration drillhole, 10km to the west of the park in 20-30m depth water, targeting coincident magnetic and gravity anomalies, intersected rocks similar to those hosting the copper mineralisation at Wallaroo.

No mineral, petroleum or geothermal licences or leases are currently located within this marine park. Two mineral Exploration Licences have been applied for covering part of the southern part of the park.

2.4 Transport and infrastructure

Transport and infrastructure provide an important economic contribution to the region, providing for maritime activities such as: shipping ports for import and export of goods; boat ramps for launching of recreational or commercial vessels; jetties for fishing; and breakwaters and groynes for coastal management.

2.5 Local tourism

Tourism is an important part of the region's economy. Yorke Peninsula has more intrastate visitors than any other tourist region in South Australia outside Adelaide. In 2009, the region attracted an estimated 435,000 visitors, staying more than 1.4 million nights, and a further 434,000 day-trip visitors. It was estimated that overnight and day-trip visitors spent $162 million. Going to the beach and fishing are the top two activities for tourists in Yorke Peninsula.

3 SOCIAL VALUES

The marine environment is an important recreational asset for coastal communities. Marine parks will be designed to accommodate existing recreational activities wherever possible. This section highlights the social values of Eastern Spencer Gulf Marine Park and is separated into four parts:

- Aboriginal and European cultural heritage;
- scenic values;
- recreational activities and popular locations; and
- interpretive and educational opportunities.

3.1 Aboriginal heritage

Aboriginal people have interacted with the marine environment for thousands of years and their relationships with the sea remain strong through customs, laws and traditions. Traditional usage, Aboriginal cultural heritage, Indigenous Protected Areas (IPAs), Indigenous Land Use Agreements (ILUAs) and Native Title considerations will be taken into account in developing the management plan for the Eastern Spencer Gulf Marine Park.

3.1.1 Language Groups

The Narungga Aboriginal people have traditional associations with areas of the marine park including estuarine and coastal environments which provide food and resources for local Aboriginal people and still hold strong cultural significance today.

3.1.2 Agreements and Claims

Parts of the marine park are subject to an Indigenous Land Use Agreement (ILUA) with the Narungga People of Yorke Peninsula.

The Government is aware that there may be confidential Aboriginal heritage sites in South Australia's coastal areas. Where possible, these sites will be considered in the planning process. Future management plans will ensure these heritage sites are appropriately respected.

3.2 European heritage

Where possible, the management plan for the Eastern Spencer Gulf Marine Park will recognise and complement sites of cultural and maritime heritage.

A jetty and cargo shed were built at Port Victoria in 1878 to service the developing grain industry on Yorke Peninsula. By 1884 Port Victoria was regarded as the most important loading point on the western side of the Peninsula and by 1914 it was the fourth largest overseas shipping port in South Australia. In recognition of this significance the jetty and cargo shed (located adjacent to the marine park) are listed as State Heritage Places.

Although Wardang Island provided shelter for Port Victoria, it also posed a hazard to ships using the port. Many wrecks are located around Wardang Island and nearby waters. Some, like the *Monarch* (1909), SS *Australian* (1912), SS *Investigator* (1918) and the *Moorara* (1975) were small local schooners or coastal steamers. Others, such as the *Aagot* (1907), *Notre Dame D'Arvor* (1920) and *Songvaar* (1912) were larger vessels used to carry wheat overseas. These wrecks are all protected and a number of them are part of the Wardang Island Maritime Heritage Trail, popular with recreational divers.

A variety of geological features within or directly adjacent to the park which are recognised as geological monuments include Wardang Island, the cliffs at Balgowan and the foreshore rocks at Port Victoria. The Goose Island Conservation Park, Balgowan sand dunes, Wardang Island and Point Pearce Aboriginal Reserve (located adjacent to the marine park) are included in the Register of the National Estate.

3.3 Scenic values

The scenic quality of South Australia's coast is a significant social, economic and environmental resource. The coastline has high amenity value and includes high quality landscapes, also known as viewscapes. The significance or quality of viewscapes is derived from a combination of landform (relative relief, variety and complexity of landscapes), land cover (nature, scale and variety of vegetation), land use (impact of human activity), water, diversity, naturalism and colour.

The coastline of the Eastern Spencer Gulf Marine Park has moderate scenic values (Lothian 2005). A large proportion of this coastline consists of beaches, with low cliffs near Balgowan and Port Victoria. Lower scenic value is given to the saltmarshes in the bay north of Port Victoria.

Scenic values of Wardang Island and other offshore islands have not been assessed.

Scenic values of coastline in the Eastern Spencer Gulf Marine Park (Lothian 2005).

Rating	**Coastal landform type**	**Ranking**
6.0 – 6.50	Dunes and beaches	Moderate
5.75 – 6.25	Low cliffs	Moderate
4.0 – 5.0	Samphire and mangroves	Low

For further information on coastal scenic values and viewscapes refer to http://www.environment.sa.gov.au/coasts/management/coastal-viewscapes.html

3.4 Recreational activities in the marine park

The coastal and marine environments of the Eastern Spencer Gulf Marine Park are very popular with recreational fishers, boat users, snorkellers, scuba divers, swimmers, and sightseers. Examples of these activities are provided below.

3.4.1 Recreational beach and boat fishing locations

Recreational fishing is a popular past time in South Australia. Recreational fishers collectively harvest significant proportions of the total catch for a number of key species. The total number of recreational fishers for the Eastern Spencer Gulf (region 11 and 12) during 07/08 was 39,827 which amounted to 129,446 days of fishing. (Note figures relate to regions used for reporting fishing activities and include catches from outside the marine park boundary). King George whiting, snapper, southern garfish, southern calamari and blue swimmer crab were the most frequently caught species for the Spencer Gulf region.

Port Victoria is renowned for its whiting and good jetty and beach fishing. There are numerous shore, boat and jetty fishing opportunities throughout the park with access via boat ramps at Balgowan and Port Victoria.

The southern and north western sides of Wardang Island are popular boat fishing locations. The reefs and beaches in front of Chinaman Wells are popular fishing and crabbing grounds with local shack owners.

3.4.2 Popular swimming beaches

Located in the park are several well visited swimming beaches such as Rifle Butts Beach and adjacent to the township of Port Victoria.

3.4.3 Popular diving locations

The Wardang Island Maritime Heritage Trail is popular with shipwreck diving enthusiasts. It has eight shipwrecks within ten nautical miles of each other. Mooring buoys are located at five of the wrecks. The Port Victoria Jetty is also a popular dive location.

3.4.4 Other recreational activities

There are caravan/camping facilities located adjacent to the park at Port Victoria.

3.5 Interpretive and educational locations within the marine park

At Port Victoria there is a Geology Trail, which runs south from the jetty to Rifle Butts Beach. Highlights of the trail include evidence of volcanic action from nearly 2,000 million years ago.

The Wardang Island Maritime Heritage Trail consists of underwater plaques adjacent to the shipwrecks, a waterproof booklet and several interpretive signs at Port Victoria.

APPENDIX 1 SPECIES LIST

This list of some of the species identified in the Eastern Spencer Gulf Marine Park indicates the diversity of species found there.

Bony fish, sharks and rays

Australian herring	*Arripis georgianus*
black ray	*Dasyatis thetidis*
bronze whaler	*Carcharhinus brachyurus*
coastal stingaree	*Urolophus orarius*
crested pipefish	*Histiogamphelus cristatus*
dusky whaler	*Carcharhinus obscurus*
eagle ray	*Myliobatis australis*
fiddler ray	*Trygonorrhina fasciata*
gulf pipefish	*Stigmatopora narinosa*
King George whiting	*Sillaginodes punctata*
leafy seadragon	*Phycodurus equus*
leatherjacket	Monacanthidae
mullet	*Aldrichetta forsteri*
old wife	*Enoplosus armatus*
salmon	*Arripis truttaceus*
school shark	*Galeorhinus galeus*
silver drummer	*Kyphosus sydneyanus*
smooth hammerhead	*Sphyrna zygaena*
snapper	*Pagrus auratus*
southern bluefin tuna	*Thunnus maccoyi*
southern garfish	*Hyporhamphus melanochir*
spotted snake-blenny	*Ophiclinops pardalis*
spotted wobbygong	*Orectolobus maculatus*
sweep	*Scorpis aequipinnis*
weedy seadragon	*Phyllopteryx taeniolatus*
white shark	*Carcharadon carcharias*
whitespotted spurdog	*Squalus acanthias*
yellow-tail kingfish	*Seriola lalandi*

Marine mammals

Australian sea lion	*Neophoca cinerea*

Seabirds and local and migratory shorebirds

black-faced cormorant	*Phalacrocorax fuscescens*
blue-winged parrot	*Neophema chrysostoma*
Caspian tern	*Sterna caspia*
crested tern	*Sterna bergii*
fairy tern	*Sterna nereis*
hooded plover	*Thinornis rubricollis*
little penguin	*Eudyptula minor*
little tern	*Sterna albifrons*
Pacific gull	*Larus pacificus*
peregrine falcon	*Falco peregrinus*
slender-billed thornbill	*Acanthiza iredalei rosinae*
white-bellied sea eagle	*Fregetta grallaria grallaria*

Marine invertebrates

blacklip abalone	*Haliotis rubra*
blue swimmer crab	*Portunus pelagicus*
greenlip abalone	*Haliotis laevigata*
king prawn	*Melicertus latisulcatus*

King scallop	*Pecten fumatus*
mussel	Mytilidae
oyster	*Crassostrea gigas*
Pacific oysters	*Crassostrea gigas*
paper nautilus	*Argonauta nodosa*
southern calamari	*Sepioteuthis australis*
stony coral	*Plesiastrea versipora*
western king prawn	*Melicertus latisulcatus*

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