
Marine Parks

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Environmental, Economic and Social Values of the Upper Gulf St Vincent Marine Park

PART 1



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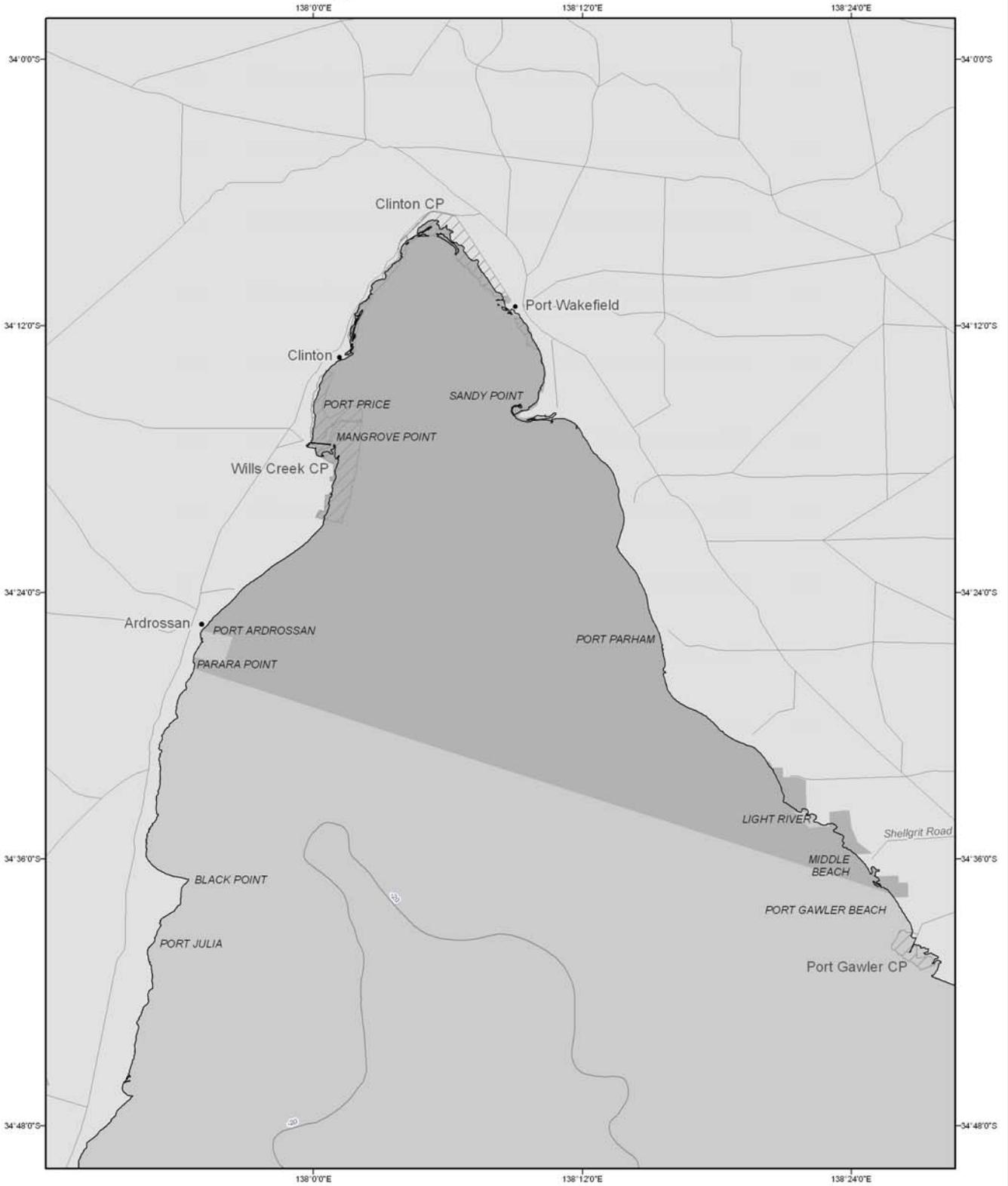
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PART 2 AN ATLAS OF MAPS

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>.

Upper Gulf St Vincent Marine Park



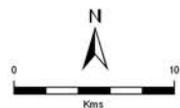
- Marine Park
- State Waters Jurisdiction
- Parks and Reserves
- Bathymetry Contours
- Roads
- Coastline (median high water)

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DEH MapID: 2010-3234

Upper Gulf St Vincent Marine Park

Located in the Gulf St Vincent bioregion, the Upper Gulf St Vincent Marine Park lies north of a line from Parara Point to the northern end of Port Gawler Beach, covering 950 km². This marine park partially overlays parts of Wills Creek Conservation Park and Clinton Conservation Park.

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).

Coastal, estuarine and marine habitat types	Life supporting services				Resources and products				Maintain earth's living space							Recreational and cultural services				
	Biogeochemical processes	Biophysical processes	Biodiversity	Nutrient cycling	Food	Fibre, fuel, shells etc	Non-biological materials (eg minerals)	Pharmaceuticals & nutraceuticals	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	x
Seagrass	x	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
Cliffs	x	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	x
Other beaches (boulder, pebble/cobble, mixed)	x	x	x	x	x	x	x		x		x	x		x	x	x	x	x	x	x
Mudflats and sandflats	x	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
Mangrove	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

The Upper Gulf St Vincent Marine Park will be designed to conserve examples of habitats and species found in the Gulf St Vincent 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 region include:

- inverse estuary with tidal extremes;
- clockwise circulation of currents;
- seasonal surface water temperatures ranging from 10.5° C in winter to 25° C in summer;
- salinity varying from 35.5 to 42 ppt;
- low wave energy;
- long shore drift, resulting in accumulation of sediments;
- dodge tides;
- large tidal range; and
- water depths ranging from shallow sheltered embayments to around 10-15 m.

1.3 Habitat variety

Table 1 Benthic (subtidal) habitats found in the Upper Gulf St Vincent Marine Park

Benthic Habitat**	Area (km ²)*	% of park
Bare sand	55	6%
Dense seagrass	604	64%
Dense seagrass patches	4	<1%
Sparse seagrass	16	2%
Unmapped	271	28%

* 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 Upper Gulf St Vincent Marine Park

Shoreline Habitat	Length in park (km)*	% of park length
Cliffs	2	1%
Coarse sandy beach	4	2%
Mudflats and sandflats	<1	<1%
Mixed beach	56	30%
Mangrove	123	66%
Saltmarsh	1	1%

* habitat lengths have been rounded to the nearest whole number

Upper Gulf St Vincent Marine Park has large areas of dense seagrass meadows in shallow, warm waters. The sheltered shoreline of the marine park is characterised by sand and shellgrit beaches, low dunes and tidal mudflats. Large areas of saltmarshes and mangroves are prominent and there are many intermittent streams, tidal mangrove creeks and a few larger rivers which flow into the Gulf. The Port Clinton area has the most significant undisturbed saltmarsh community in the Gulf St Vincent region. Rivers include the Wakefield River which flows into the Port Wakefield mangrove forest and the Light River which flows into the Light River Delta north of Middle Beach forming many smaller creeks and streams. The mangrove forest of the Light River Delta is considered to be one of the most ecologically intact mangrove and saltmarsh systems in South Australia.

1.3.1 Para Point to Port Clinton

The west side of the northern gulf is characterised by sheltered, generally shallow waters, with coarse sand and shellgrit beaches, medium cliffs in the Ardrossan area, low dunes and tidal mudflats. Around Ardrossan are dense seagrass meadows. Further out towards the centre of the Gulf seagrass is mixed with unvegetated sandy seafloor habitat.

The Price area and northward consists of saltmarsh, sand flats, mudflats, intertidal mangroves and shallow subtidal seagrasses. The mangrove forests are dissected by numerous small tidal channels, which provide effective drainage when the tide recedes. The mangrove stand is up to 2km wide in some places. There are old and recently formed sand spits above the supratidal zone, and a low limestone escarpment forms the western boundary of the area.

1.3.2 Clinton to Port Gawler

The largest seagrass meadows are found on the eastern side of the Gulf between Port Wakefield and Port Gawler where there are also stretches of unvegetated sandy plains close to the shore.

There are extensive saltmarsh areas, such as at Great Sandy Point where the area of saltmarsh extends up to 4km inland. The saltmarsh is interspersed with bare saline patches at both Great Sandy Point and Port Prime. Salt flats extend along this section of coastline, particularly around Webb Beach, Port Prime and Middle Spit and support significant populations of the bead glasswort.

The mangrove forests of Light River Delta contain numerous small tidal channels. The mangroves are backed by saltmarsh that extend more than 1km inland. This is a regionally uncommon habitat of mixed freshwater and saltwater wetland, providing habitat for both freshwater and saltwater species of plants and animals.

1.4 Marine species

The many habitats located within the Upper Gulf St Vincent Marine Park support a variety of marine and coastal species, some of which have been identified as ecologically important. Refer to Appendix 1 for a more detailed list of species. The Upper Gulf St Vincent Marine Park features:

- an important nursery area for the yellow-fin whiting near Port Clinton;
- the uncommon rock ling around Ardrossan;
- important nursery and feeding areas for bronze whaler pups; and
- key habitat for the slender-billed thornbill.

1.4.1 Plants and algae

The nationally and state listed *vulnerable* bead glasswort is found in a number of locations between Light River Delta and Port Parham. The samphire is particularly abundant around Middle Beach, with around 7,000 plants being recorded. Intertidal and shallow subtidal seagrass areas are dominated by *Heterozostera*. Deeper areas of seagrass meadows are dominated by *Posidonia*.

1.4.2 Bony fish, sharks and rays

The extensive mangrove tidal channels and tidal flats in the marine park are major nursery and/or feeding areas for a diversity of fish and ray species, including King George whiting, southern garfish, yellow-eye mullet, Australian herring (tommy ruff), flathead and the southern fiddler ray. The Port Clinton seagrass meadows are particularly important nursery areas for yellow-fin whiting with the smaller mangrove-lined embayments providing significant habitat for post-larvae and juveniles of yellow-fin whiting. High densities of Australian anchovy eggs are also found in northern Gulf St Vincent.

The uncommon rock ling is found on the muddy shell grit bottoms in the Ardrossan area feeding on fish, crabs, and other small crustaceans.

The shallow seagrasses of upper Gulf St Vincent are important habitat for a number of small fishes which breed amongst the seagrass fronds including pipefish, weed fish, snake-blennies and cardinal fish. The deep-bodied pipefish is found in sheltered areas of crystal clear water and silty bottoms amongst the seagrass from Port Gawler to Middle Beach.

The uncommon magpie fiddler ray may be endemic to Gulf St Vincent as it has only been found on vegetated soft sandy bottoms of the upper Gulf St Vincent area. The upper Gulf St Vincent may also be an important nursery and feeding area for bronze whaler shark pups, as evidenced by the abundance of bronze whalers that are caught in upper gulf waters.

Other sharks or rays of conservation concern that can be found in the park include the coastal stingaree, whitespotted spurdog, spotted wobbegong, dusky whaler and smooth hammerhead as well as the nationally *vulnerable* white shark. The dusky whaler has been nominated for listing under the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act).

1.4.3 *Marine mammals*

Nationally protected bottlenose dolphins are common in Upper Gulf St Vincent Marine Park where the sheltered, productive habitat provides areas for reproduction and feeding.

1.4.4 *Seabirds and local and migratory shorebirds*

Throughout the marine park there are many important sites for local and migratory shorebirds, as well as seabirds. Of particular importance is the Light River Delta. The tidal mudflats and saltmarshes of this region provide important feeding and resting habitats for more than 60,000 migratory shorebirds, which are resident in the summer months before returning to the northern hemisphere. These include ruddy turnstone, great knot, banded stilt and the lesser sand plover. Light River delta is also a key habitat for the state *vulnerable* slender-billed thornbill. These birds are covered under the JAMBA and CAMBA agreements, which are agreements between Japan and China relating to the conservation of migratory birds.

Middle Beach to Port Parham has been identified as an area of international significance for many species of shorebirds including the state *vulnerable* banded stilt and the nationally protected red-capped plover.

Mangroves throughout the region provide habitat for a variety of important bird species such as the state *rare* glossy ibis and the state *rare* musk duck as well as for breeding rookeries of species such as pied cormorants.

Wills and Shag Creeks on the western side of the Gulf at Price are a known breeding and feeding habitat for Australian pelican, sooty oystercatcher, Caspian tern, crested tern, black cormorant, little black cormorant, white-faced heron and great egret.

1.4.5 *Marine invertebrates*

The shallow seagrass beds of the Upper Gulf St Vincent provide important settlement areas for western king prawn larvae as well as smaller prawn species, such as strawberry prawns. Small prawn species are used as a major seasonal food source by a number of fish species such as snook.

Blue swimmer crabs are found throughout the waters of the park. The southern blue-ringed octopus is also abundant in the shallows around Ardrossan as juveniles feed on crabs, small fish, shrimps and shellfish.

Along the north-eastern shoreline there is an abundance of mud cockles and razorfish in the intertidal mud flats and nearshore seagrass meadows. Mud cockles, of which there are three main species in the area, may have important ecological roles because they are abundant suspension-feeders in the system. Razorfish shells provide important hard substrate for other animals to attach to, such as small sponges, ascidians, bryozoans and tube worms. The large milk bottle ascidian is abundant amongst razorfish beds.

Mud crabs are abundant on the intertidal mudflats. Tube and beach worms found in the sediment play an important role in sediment processing and nutrient recycling, and are a food source for other animals of the mudflats and sand flats.

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 Upper Gulf St Vincent Marine Park are summarised below. Information in the Commercial fishing, and Mineral and energy resources sections have been provided by PIRSA.

2.1 Commercial fishing

The commercial fisheries that operate in the Upper Gulf St Vincent Marine Park are:

- Blue Crab Fishery (Gulf St Vincent zone); 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 may not be specific to the Upper Gulf St Vincent Marine Park.

Table 3. The 2008/09 economic value of fisheries operating in the marine park for relevant fishery areas (figures are not specific to park).

	Catch value(\$m)	Value of flow-on to other sectors (\$m)	Fishing (FTE) employment	Flow-on (FTE) employment
Blue Crab (State)	5.1	9.9	28	48
Marine Scalefish (Gulf St Vincent/ Kangaroo Island)	7.2	6.0	192	34

EconSearch 2010 a and b.

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.

Blue swimmer crab fishers operate throughout the northern areas of the gulf. The total value of the fishery in 2008/09 (for both Gulf St Vincent and Spencer Gulf) was \$5.1m.

The Marine Scalefish Fishery is a diverse multi-species, multi-gear fishery that operates across State waters, targeting four key species: snapper, King George whiting, southern garfish and southern calamari.

Fishing charters also operate in 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

2.2 Mineral and energy resources

Gulf St Vincent has potential for offshore petroleum discoveries and two deep offshore exploration wells were drilled unsuccessfully in the 1990s. Access for seismic surveys may be needed.

The potential for offshore geothermal energy resources has not yet been addressed, however potential exists to utilise 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. Discovery of Hillside copper-gold deposit has focussed exploration interest on northern Yorke Peninsula to the west of the park.

Coal has been known in the region for many years. Recent advances in utilisation of coal for coal seam methane, in-situ gasification and coal-to-liquids have raised interest in this resource in this region.

Interstate, offshore mining for construction materials especially sand has taken place in high demand areas such as Sydney. Gulf St Vincent may be of interest for offshore construction materials.

There are numerous Mining Leases near Price and Dry Creek for salt extraction within and adjacent the park. There are five Extractive Mining Leases adjacent the park near Dry Creek for shellgrit extraction. Two Petroleum Exploration Licences (PELs 423 and 120) overlap part of this marine park. One mineral Exploration Licences (EL 4258 south of Pt Wakefield) and three Geothermal Exploration Licences (GELs 260, 261 and 262) overlap parts of this marine park on the east coast while GEL 425 lies adjacent to the park on the west coast of St Vincent Gulf. A Private Mine (PM 283) for construction materials is located adjacent the part near Pt Wakefield. A mineral Exploration Licence has been applied for adjacent to the park on Yorke Peninsula.

2.3 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.

Following consultation on the marine park outer boundaries, existing commercial ports and indenture areas that are heavily trafficked were excluded from the park boundaries in the July 2009 proclamation.

2.4 Local tourism

The local government area of Wakefield attracts an average of 29,000 domestic overnight visitors who spend an average of \$5m annually. Tourism provides an important employment opportunity for residents in the region with 165 businesses involved or reliant on tourism.

The coastal and marine environment is integral to the tourism experience throughout this region. Visitors are drawn to the sandy beaches and enjoy recreational fishing and boating. Port Clinton Conservation Park, which is adjacent to the marine park, is also a popular tourist destination.

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 Upper Gulf St Vincent Marine Park and is separated into three parts:

- Aboriginal and European cultural heritage;
- 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 Upper Gulf St Vincent Marine Park.

3.1.1 Language Groups

The Kurna and 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

The Kurna people have lodged native title claims that contain parts of the Upper Gulf St Vincent Marine Park. Parts of the marine park are also 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 Upper Gulf St Vincent Marine Park will recognise and complement sites of cultural and maritime heritage.

The copper mining boom in Burra in the late 1840s resulted in the development of a harbour, wharf and township at Port Wakefield in the early 1850s. The town and port also serviced the growing agricultural industry in the mid north of the state. Sections of the wharf remain just outside the Park boundary. Further development of Port Wakefield was hindered by the shallow waters and swampy land in the area.

Across the Gulf, Ardrossan was developed as a grain port for the northern Yorke Peninsula.

A section of the cliffs at Ardrossan has been recorded as a Geological Monument. The Clinton Conservation Park is included in the Register of the National Estate.

Two shipwrecks are located within the Marine Park. The *Sarah* was wrecked in 1879 and is protected and the fishing vessel *Sherry Anne*, wrecked in 1979, which is not protected.

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 viewsapes. The significance or quality of viewsapes 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 Upper Gulf St Vincent Marine Park has low-moderate scenic values (Lothian 2005).

Low cliffs at Ardrossan provide the most prominent coastal landscape feature within this marine park. The remainder of the coastline comprises extensive areas of mangrove and mud flats and long beaches with low vegetated dunes.

Scenic values of coastline in the Upper Gulf St Vincent Marine Park (Lothian 2005).

Rating	Coastal landform type	Ranking
6.0 – 6.5	Low cliffs	Moderate
5.0 – 6.5	Dunes and beaches	Moderate
4.0 – 4.5	Mangroves	Low

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

3.4 Recreational activities in the marine park

The coastal and marine environments of the Upper Gulf St Vincent Marine Park are very popular with recreational fishers, boat users, snorkellers, scuba divers, swimmers, surfers and sightseers. Some locations of these activities are listed 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 Upper Gulf St Vincent (region 16, 17 and 18) during 07/08 was 83,537 which amounted to 216,104 days of fishing. (Note figures relate to regions used for reporting fishing activities and include catches from outside the marine park boundary). Regionally Gulf St Vincent represented the highest fishing effort for the 07/08 period, with effort diminishing with greater distance from the Adelaide metropolitan area. Blue swimmer crab was the most abundantly caught species, followed by King George whiting, southern garfish, southern calamari and snapper for the Gulf St Vincent and Kangaroo Island region.

Boating and fishing is popular at many locations within the marine park including Ardrossan, Port Wakefield, Port Clinton, and Middle Beach. Numerous boat ramps are located within the park such as Tiddy Widdy, Macs Beach, Price, Port Clinton, Port Parham, Webb Beach and Middle Beach.

Crabbing for blue swimmer crabs is popular along many of the extensive intertidal mud flats in the marine park particularly Port Parham, Port Wakefield, Thompson Beach and Port Clinton.

3.4.2 Popular swimming beaches

Swimming is popular at Tiddy Widdy Beach and Ardrossan.

3.4.3 Popular diving locations

Ardrossan jetty is a popular dive location.

3.4.4 Other recreational activities in the park

Caravan parks and camping facilities are located adjacent to the marine park at Ardrossan, Price, Port Clinton and Port Wakefield.

3.5 Interpretive and educational locations within the marine park

Beach walking and walking trails are found between Port Clinton and Price, Tiddy Widdy Beach and the Samphire Discovery Trail in upper Gulf St Vincent. Many towns in the Samphire Coast region have coastal walks and bird hides giving access to shore bird watching. The Samphire Coast Education, Recreation and Interpretative Centre is located at Middle Beach, which is the start of the Samphire Discovery Trail.

APPENDIX 1 SPECIES LIST

This list of some of the species identified in the Upper Gulf St Vincent Marine Park indicates the diversity of species found there.

Plants and algae

bead glasswort *Sarcocornia quinqueflora*

Bony fish, sharks and rays

Australian anchovy *Engraulis australis*
Australian herring *Arripis georgianus*
black ray *Dasyatis thetidis*
bronze whaler *Carcharhinus brachyurus*
cardinal fish *Vincentia conspersa*
coastal stingaree *Urolophus orarius*
crested pipefish *Histiogamphelus cristatus*
deep-bodied pipefish *Kaupus costatus*
dusky whaler *Carcharhinus obscurus*
flathead *Platycephalus bassensis*
King George whiting *Sillaginodes punctata*
magpie fiddler ray *Trygonorrhina melaleuca*
pipefish Signathidae
rock ling *Genypterus tigerinus*
smooth hammerhead *Sphyrna zygaena*
snake-blenny Ophiclinidae
snapper *Pagrus auratus*
snook *Sphyrna novaehollandiae*
southern fiddler ray *Trygonorrhina guaneri*
southern garfish *Hyporhamphus melanochir*
spotted wobblygong *Orectolobus maculatus*
weed fish Clinidae
white shark *Carcharodon carcharias*
whitespotted spurdog *Squalus acanthias*
yellow-eye mullet *Aldrichetta forsteri*
yellow-fin whiting *Sillago schomburgkii*

Marine mammals

bottlenose dolphin *Tursiops truncatus*

Seabirds and local and migratory shorebirds

Australian pelican *Pelicanus conspicillatus*
banded stilt *Cladorhynchus leucocephalus*
Caspian tern *Sterna caspia*
crested tern *Sterna bergii*
glossy ibis *Plegadis falcinellus*
great egret *Ardea alba*
great knot *Calidris tenuirostris*
lesser sand plover *Charadrius mongolus*
little black cormorant *Phalacrocorax sulcirostris*
musk duck *Biziura lobata*
pied cormorant *Phalacrocorax varius*
red-capped plover *Charadrius ruficapillus*
ruddy turnstone *Arenaria interpres*
slender-billed thornbill *Acanthiza iredalei rosinae*
sooty oystercatcher *Haematopus fuliginosus*
white-faced heron *Egretta novaehollandiae*

Marine invertebrates

ascidian	Ascidiacea
beach worm	<i>Australonuphis teres</i>
blue swimmer crab	<i>Portunus pelagicus</i>
bryozoans	Bryozoa
cockles	Bivalvia
milk bottle ascidian	Ascidiacea
mud cockle	<i>Katelysia</i> spp.
mud crab	<i>Scylla serrata</i>
razorfish	<i>Pinna bicolour</i>
southern blue-ringed octopus	<i>Hapalochlaena maculosa</i>
southern calamari	<i>Sepioteuthis australis</i>
sponge	Porifera
strawberry prawn	<i>Metapenaeopsis</i> spp
tube worm	<i>Galeolaria caespitosa</i>
western king prawn	<i>Melicertus latisulcatus</i>

REFERENCES AND SUGGESTED FURTHER READING

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