

Upper Spencer Gulf Marine Park Regional Impact Statement

A report prepared for
Department of Environment, Water and Natural Resources

Prepared by



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Contents

Contents	iii
List of Tables	iv
List of Appendix Tables.....	iv
List of Figures	v
List of Appendix Figures	v
Abbreviations	vi
Acknowledgements.....	vii
Document History and Status	vii
Executive Summary	viii
1. Introduction.....	1
1.1 Marine Park Planning Process.....	1
1.2 Policy Commitments	4
1.2.1 Displaced Commercial Fishing Policy Framework.....	4
2. Method of Assessment	5
2.1 Ecological	5
2.2 Economic.....	6
2.3 Social	7
3. Upper Spencer Gulf Marine Park Description	10
3.1 Ecological Description	10
3.2 Socio-economic Profile	11
4. Summary of Impacts.....	14
4.1 Ecological	14
4.1.1 Habitats	14
4.1.2 Species.....	16
4.1.3 Ecosystems	22
4.1.4 Case study - Giant Australian cuttlefish and subtidal reef at Point Lowly	24
4.2 Economic.....	25
4.2.1 Commercial Fishing	25
4.2.2 Aquaculture.....	28
4.2.3 Property Prices	28
4.2.4 Tourism.....	28
4.2.5 Port, Harbour and Shipping Operations	29
4.2.6 Mining	30
4.2.7 Coastal Development.....	31
4.3 Social	32
4.3.1 Summary of method.....	32
4.3.2 Expected social impacts – at a glance	33
4.3.3 Education and Wellbeing	34
4.3.4 Culture and Heritage.....	34
4.3.5 Recreation and Fishing	35
4.3.6 Local Government, Population and Housing	36
4.3.7 Community.....	37

4.3.8	SEIFA based analysis of impacts.....	38
4.3.9	Next Steps in Social Impact Assessment	39
References	41
Appendix 1	Socio-economic Profile – Upper Spencer Gulf	45
Appendix 2	Activities and Uses Tables	59
Appendix 3	List of Parties Consulted	72
Appendix 4	MPSIAT feedback.....	75
Appendix 5	Map of Marine Park Showing Draft Zoning.....	81

List of Tables

Table 1-1	Public consultation process to date.....	3
Table 3-1	Summary of habitats.....	11
Table 3-2	Summary of key economic and social indicators for the Upper Spencer Gulf region.....	13
Table 4-1	Predicted habitat responses to zoning at 5, 10 and 20 years.	15
Table 4-2	Potential first-order responses of some indicator species ^a	20
Table 4-3	Other species which may respond to or benefit from protection	22
Table 4-4	Average annual Marine Scalefish effort in draft sanctuary zones by sector.....	27
Table 4-5	Average annual Marine Scalefish catch in draft sanctuary zones by main species.....	27
Table 4-6	Social impact for Upper Spencer Gulf Impact Region	38

List of Appendix Tables

Appendix Table 1-1	Summary of key economic and social indicators for the Upper Spencer Gulf region	46
Appendix Table 1-2	Age distribution of the population for the Upper Spencer Gulf region and SA, 2000/01 to 2009/10	47
Appendix Table 1-3	Highest level of qualifications for persons aged 15 and over in the Upper Spencer Gulf region and SA, 2001 and 2006 ^a	49
Appendix Table 1-4	School enrolments in the Upper Spencer Gulf region and SA, 2001, 2006 and 2011	50
Appendix Table 1-5	Employment, household income and household expenditure, Upper Spencer Gulf region, 2009/10 ^a	54
Appendix Table 1-6	Components of gross regional product in the Upper Spencer Gulf region by industry, 2009/10 ^a	55
Appendix Table 1-7	Value of imports and exports by industry, Upper Spencer Gulf region, 2009/10 ^a	56
Appendix Table 4-1	General views about the Upper Spencer Gulf Marine Park	75
Appendix Table 4-2	Tourism, education & wellbeing impacts for Upper Spencer Gulf Marine Park.....	76

Appendix Table 4-3 Culture and heritage impacts for Upper Spencer Gulf Marine Park	77
Appendix Table 4-4 Recreation & fishing impacts for Upper Spencer Gulf Marine Park	78
Appendix Table 4-5 Population & housing impacts for Upper Spencer Gulf Marine Park	79
Appendix Table 4-6 Community response impacts for Upper Spencer Gulf Marine Park	80

List of Figures

Figure 1–1 Marine Park Zones	2
Figure 4–1 Simplified conceptual food web for subtidal seagrass meadow.....	23
Figure 4–2 Simplified conceptual food web for subtidal low profile reef at Point Lowly	25

List of Appendix Figures

Appendix Figure 1-1 Upper Spencer Gulf region	45
Appendix Figure 5-1 Map of Marine Park Showing Draft Zoning	81

Abbreviations

ABS	Australian Bureau of Statistics
C	Council
CBA	Cost Benefit Analysis
DC	District Council
DEH	Department for Environment and Heritage
DENR	Department of Environment and Natural Resources
DEWNR	Department of Environment, Water and Natural Resources
DMITRE	Department for Manufacturing, Innovation, Trade, Resources and Energy
fte	full-time equivalent
GABMPCC	Great Australian Bight Marine Parks Consultative Committee
GMUZ	General Managed Use Zone
GRP	gross regional product
HPZ	Habitat Protection Zone
MPLAG	Marine Park Local Advisory Group
MPSIAT	Marine Parks Social Impact Assessment Tool
NL	natural level
PIRSA	Department of Primary Industries and Regions SA
RAZ	Restricted Access Zone
RIAS	Regional Impact Assessment Statement
RIS	Regional Impact Statement
RISE	Regional Industry Structure and Employment
SA	South Australia
SAMPIT	South Australian Marine Parks Information Tool
SARFAC	South Australian Recreational Fishing Advisory Council
SARDI	South Australian Research and Development Institute
SEIFA	Socio-Economic Indexes for Areas
SIA	social impact assessment
SLA	Statistical Local Area
SPA	Special Purpose Area
SZ	Sanctuary Zone
UNHL	unnaturally high level
UNLL	unnaturally low level

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Executive Summary

The Upper Spencer Gulf Marine Park covers waters north of a line from the southern end of the Whyalla-Cowleds Landing Aquatic Reserve on the western side of Spencer Gulf to Jarrold Point on the eastern shore. The park also includes the uppermost reaches of Spencer Gulf extending north of Port Augusta. The landward boundary of the marine park extends at least to the median high water mark and where possible incorporates coastal Crown Lands including beaches, sand dunes, estuaries and saltmarshes, as shown in the map.

Impacts of implementing the draft management plans were assessed against a base case scenario of no management plans. The base case is not static, and requires an understanding of the existing trends in natural resource, economic and social conditions. There are external factors which influence both the 'with management plan' and the base case scenarios that were taken into consideration.

Marine Park Profile

The Upper Spencer Gulf Marine Park is an inverse estuary with salinities varying between 38 and 48 parts per thousand depending on season and distance north. The waters are sheltered from ocean swell but there is water movement from tidal, wind-driven and density currents. The tidal range is the highest in South Australia, but tidal currents are tempered each fortnight by a 'dodge' tide.

Upper Spencer Gulf is a recognised Wetland of National Importance characterised by extensive intertidal mangrove, saltmarsh and sand and mud flats which are linked offshore to extensive seagrass meadows, deeper channels with strong currents, and sandy plain habitats. Sandy and shell grit beaches are also present.

Rocky shorelines, headlands and reefs occur mainly on the western coastline, with those near Point Lowly and Backy Point recognised as an area of major significance for spawning aggregations of the giant Australian cuttlefish.

From a socio-economic viewpoint the community relevant to this marine park is that of the Upper Spencer Gulf region. The five statistical local areas (SLAs) that comprise the region are Whyalla (C), Port Augusta (C), Mount Remarkable (DC), Port Pirie – City (M) and Port Pirie – Bal (M). Some of the key socio-economic characteristics of the region include:

- a population of around 59,100 persons in 2010/11.
- a higher concentration of younger people (aged 0 to 14 years), a lower share of persons aged 15 to 64 years and a slightly lower share of people aged 65 and over compared with the State.
- The total population is projected to increase by 7 per cent by 2026, whereas the SA population is expected to increase by around 23 per cent.
- The unemployment rate in the Upper Spencer Gulf region was 5.5 per cent in the June quarter of 2011, similar to the state rate of 5.3 per cent.
- Approximately 20 per cent of businesses in the Upper Spencer Gulf region were classified in the agriculture, forestry and fishing sector.
- Mean income was \$52,700 in 2009/2010, 3 per cent below SA's average of \$54,300.

- Over the period 2000/01 to 2010/11, median dwelling prices increased by 245 per cent (\$200,000 in 2010/11) compared with a 197 per cent in SA as a whole (\$357,500).
- In 2009/10, the top contributors to GRP were the manufacturing (15 per cent), ownership of dwellings (10 per cent) and health and community services (8 per cent) sectors.
- The commercial fishing and tourism industries are important to the local economy in terms of contributing to jobs and GRP. Directly and indirectly commercial fishing and aquaculture contributed 0.2 per cent of GRP (\$5.1 million) and 0.3 per cent of employment (62 fte jobs) in 2009/10. By comparison, the tourism sector contributed 2 per cent of GRP (\$54.6 million) and 3 per cent of employment (740 fte jobs).

Ecological Impacts

Many habitats within the park can be considered to be in a condition comparable to the time of European settlement, however some habitats have been significantly modified, several introduced pests have become established, and water and/or sediment quality has been impacted by the discharge of industrial or urban pollutants. There is considerable further development proposed within the park. A number of species within the park were assessed as having lower abundances compared with pre-European levels. The current state of the ecosystems in the park was generally considered to reflect the condition of their component habitats and species.

The proposed management arrangements are predicted to have a net positive long-term impact on South Australia's marine biodiversity. Without the proposed management arrangements there is potential for future activities to occur that could impact on marine habitats, species and ecosystems. The positive ecological impacts inside the Upper Spencer Gulf Marine Park will include (1) maintenance of some habitats and ecosystems in relatively good condition, and (2) changes in some ecosystems towards a more natural and resilient condition. Such changes include increases in the size and abundance of some fished species, which may potentially have socio-economic benefits, and the overall shift towards a more natural ecosystem is also expected to provide a number of management benefits, although these potential benefits have not been quantified.

The proposed zoning alone does not address the pollution and introduced pest issues listed above, which would require complementary management measures, but various zone restrictions (with habitat protection and sanctuary zones covering about 32 per cent and 14 per cent of the park, respectively) will assist with the future protection of habitats from a range of potentially damaging activities that may otherwise be possible under the existing management framework. Some habitats of particular conservation note include linked saltmarsh, mangrove, sand flat and seagrass communities which provide nursery habitat and contribute to the productivity of fish throughout Spencer Gulf, internationally important habitat for wader birds and sea birds, and the giant Australian cuttlefish breeding habitat near Black Point. Maintenance of healthy habitats in general is essential for the functioning of ecosystems and the long-term sustainability of fisheries, aquaculture, and marine-based tourism.

There is some uncertainty about the extent to which zoning will provide future protection for the Upper Spencer Gulf Marine Park, due to the proposed establishment of a special purpose area overlaying all sanctuary and habitat protection zones within the park, to provide for significant economic development, and a number of other special purpose areas to provide transitional arrangements for existing and proposed

harbour, transport and marine-based infrastructure activities. However, it is expected that the designation of areas worthy of zoning as sanctuary and habitat protection zones would assist in directing future activities appropriately.

Species such as snapper and razorfish are predicted to have long-term increases in size and abundance inside some sanctuary zones. The implementation of a proposed sanctuary zone around a large proportion of the breeding habitat of the giant Australian cuttlefish near Point Lowly should have a positive effect on the future protection of the critical reef habitat, but it is unlikely to arrest the long-term decline in cuttlefish abundance. The causes of this decline are unknown, but legal fishing within the proposed sanctuary zone is unlikely to be contributing because taking cuttlefish is already prohibited.

Economic Impacts

In summary, the proposed draft zoning is expected to have the following economic impacts on the following sectors of the regional economy: potential positive impact in the tourism sector in the medium to long term, neutral impact in the aquaculture, property, marine infrastructure and operations and coastal development sectors, potential negative impact in the mining sector and short, medium and long term negative impacts in the commercial fishing sector.

Commercial fishing

The estimated economic impacts on commercial fisheries, based on SARDI's average annual displaced catches and corresponding average annual prices, are relatively small for the Upper Spencer Gulf Marine Park. The State Government has committed to buy out licences and quota entitlements of displaced effort and catch, although details of the buyout are yet to be finalised. Compensation payments have the potential to offset, at least in part, the negative impact of the displaced catch, estimated to have an average annual gross value of \$39,000 (mainly in the marine scalefish and charter boat sectors).

Aquaculture

There are no known current or potential impacts expected from the draft zoning in this marine park on current or future aquaculture enterprises. This is consistent with Government policy commitments.

Tourism

The actual placement of sanctuary zones is unlikely to place real restriction on recreational fishing with sanctuary zones over highly fished areas limited. However, the perception that recreational fishing opportunities will be restricted by implementing 'no-take' zones is real. So there is potential for a downturn in fishing-based tourism in the short-term until visitors are informed and convinced of the actual situation on the water. In the long-term, managed marine parks will provide certainty that the marine environment within them is being protected and this may support the growth of the ecotourism industry, provided the necessary investment in tourism infrastructure and support services is undertaken. Other, non-extractive tourism, such as diving, is likely to benefit from the implementation of sanctuary zones.

Property prices

Given that the overall impact on the region is not expected to be large in absolute terms, the impact on property values is, similarly, not expected to be significant. States

of Australia have introduced marine parks with sanctuary zones in the last decade without any known long-term effects on property values. External factors notwithstanding, the trend in Upper Spencer Gulf residential property prices illustrated in the regional socio-economic profile is unlikely to be affected by the proposed marine park zoning.

Port, harbour and shipping operations

There is considerable shipping and port activity in this park. Whyalla, Port Bonython and Port Pirie are major shipping and industrial hubs. Currently there are about 360 vessel movements per year and this is expected to increase to over 1,000 movements by 2020. In addition there are many barge movements. For example, on average 16 barges (i.e. 32 ship movements) are required to tranship iron ore from Whyalla to one Panamax size vessel. Should the Olympic Dam expansion proceed, BHP proposes to barge equipment from a transshipment point near Point Lowly to a landing facility 12 km south of Port Augusta at Snapper Point. There is potential for congestion in this area if the various planned inland mining developments take place, and access to suitable anchoring grounds and transshipment points is critical. However, no significant impacts on shipping activities arising from the zoning in this park expected, which is consistent with Government policy commitments.

Mining

Part of Pipeline Licence 1 (Moomba-Adelaide) is located across the park leading to Whyalla. This pipeline transports natural gas, and is declared a special purpose area. There are two mining leases partially within and two mining leases adjacent to the park near Whyalla. Southeast of Port Augusta, near Port Paterson, there are two mineral retention leases partially within the park for salt extraction. A mining claim exists within the park for metallic minerals offshore from Whyalla. Five mineral exploration licence applications overlap parts of this marine park.

Four geothermal exploration licence application overlaps parts of this marine park, and two geothermal exploration licences are located immediately adjacent to the marine park. A petroleum exploration licence has been applied for. This application covers the expected extent of a coal basin across both the Eyre Peninsula and the Upper Spencer Gulf. (PIRSA MER, pers. comm., 8 September 2011). Conditions attached to existing licences will not change and the operations to which these licences refer to will not be affected by zoning. Licence applications will be required to go through a joint approval process administered by DMITRE and DEWNR, which may be a potentially lengthier and therefore more costly process to the applicant. Zoning limits the types of exploration and extraction activities permitted, and could discourage certain types of applications and hence limit exploration and exploitation of resources.

Coastal development

Due to extensive development expected over the next ten years in the Upper Spencer Gulf, the sanctuary and habitat protection zones of the Upper Spencer Gulf Marine Park will be declared a special purpose area.

Social Impacts

The overall social impacts of the Upper Spencer Gulf Marine Park on communities living in the region of are expected to be low given the magnitude of the economic impacts that have been projected. Commercial fishing is not among the four top industry sources of employment but is estimated to contribute 62 jobs to employment in

the region, compared with tourism which contributes 740 jobs. Economic impacts from displaced commercial fishing in the region were too small to model and less than one fte job loss can be expected in the region. The State Government has committed to buy out licences and quota entitlements to offset any unsustainable displaced effort and catch. Although details of the buyout are yet to be finalised, any such payments have the potential to at least partially offset the negative impacts outlined above.

The impact on recreational fishing is considered to be low (except for the sanctuary zone at Black Point), with adjustments in zoning designed to minimise any potential negative impacts. Consequently, any impact on local community identity as a fishing centre, and on fishing as a way of life is also likely to be low.

No impacts on local government operations, infrastructure and revenue or compliance related activities are expected as a result of the proposed draft zoning.

Experience elsewhere in Australia and internationally, suggests that a range of benefits from the establishment of marine parks become evident over time. These include increased opportunities for education about marine life and conservation, and increased tourism and ecotourism opportunities. This experience indicates that these benefits usually take approximately five years to be evident, and that in the earliest stages of marine protected areas being developed, local communities are more likely to identify possible negative impacts than potential benefits. It takes time to observe how the park's ecological and economic impacts evolve, with social impacts (positive or negative) flowing from these.

Marine parks have broad support in the South Australian community. Market research commissioned by the state government between 2006 and 2012 found strong support for the concept of marine parks among South Australians with approximately 85 per cent in favour of them in 2012 (87 per cent support in metropolitan Adelaide and 82 per cent support in regional areas). Those least likely to support marine parks have been fishing groups (in 2009 55 per cent of respondents who did not support marine parks identified restricted fishing as the reason, this dropped to 39 per cent in 2012). Between 2011 and 2012 the market research findings identify a decline in those who believe they will have limited access to marine parks and an increase in those who associate swimming, boating and snorkelling with marine parks.

A critical factor in determining the ultimate impact of marine parks is how well local communities are able to adapt to change and how cohesive they are in supporting each other through change. Feedback provide for the social impact assessment indicates that communities living near the Upper Spencer Gulf Marine Park will be sufficiently resilient to manage these changes. The level of support provided by government to adjust to change is also crucial. One very important factor that affects community attitudes is how informed they are, and feedback from market research and MPLAGs, as well as analysis of media reports indicates a gap in this information. In particular, increasing communities' understanding of the scientific rationale underpinning marine protected areas, and the benefits that these can bring, needs to be enhanced. This is one of the functions of impact assessment which is best conceived of as a continuous process informing both the establishment and operation of marine parks.

1. Introduction

In 2009, the SA Government established 19 marine parks covering approximately 44 per cent of the State's waters. The Government has prepared a draft management plan for each of South Australia's marine parks. These draft management plans include a number of proposed zones where certain activities will be restricted for biodiversity conservation purposes. Global scientific research is demonstrating that marine parks have the potential to conserve coastal and marine biodiversity (PISCO 2007).

However, it is recognised that the zoning of marine parks will come with some costs such as restrictions on commercial and recreational activities. The *Marine Parks Act 2007* provides that when the Minister prepares a draft management plan, an impact statement of the expected environmental, economic and social impacts of the management plan must also be prepared. The impact statements are designed to assist the community to understand the projected impacts of the draft management plans during public consultation.

The Department of Environment, Water and Natural Resources (DEWNR) contracted EconSearch Pty Ltd and its project partners to provide:

1. Impact statements for each of the 19 marine parks which describe both positive and negative impacts of implementing the draft management plans on the local marine ecosystems, economies and communities. These impact statements are to comply with the SA Government's Regional Impact Assessment Statement Policy (RIAS) and with Section 14(4)(c) of the *Marine Parks Act 2007*.
2. A state level Cost Benefit Analysis (CBA) of the proposed management of the 19 marine parks through zoning regulations. The CBA is to comply with the SA Governments Regulatory Impact Statement (RIS) Policy, but is not a RIS in its own right. The results of the CBA are presented in the *Marine Park Impact Statements Main Report*.

1.1 Marine Park Planning Process

Marine parks in South Australia will be zoned for multiple-uses, providing for varying levels of conservation, recreational and commercial use. Zoning provides the basis for the management of marine parks, in accordance with the objects of the *Marine Parks Act 2007*. Figure 1–1 describes the marine park zones.

The Government has developed a table of activities and uses that occur in the marine environment and summarises how these activities are expected to be managed in each marine park zone. The prohibitions and restrictions in the matrix will be included in regulations that will be finalised when marine park management plans are adopted (see Appendix 2).

Figure 1–1 Marine Park Zones

<i>The management plans will contain the following management zones:</i>	
General managed use	A zone primarily established so that an area may be managed to provide protection for habitats and biodiversity within a marine park, while allowing ecologically sustainable development and use.
Habitat protection	A zone primarily established so that an area may be managed to provide protection for habitats and biodiversity within a marine park, while allowing activities and uses that do not harm habitats or the functioning of ecosystems.
Sanctuary	A zone primarily established so that an area may be managed to provide protection and conservation for habitats and biodiversity within a marine park, especially by prohibiting the removal or harm of plants, animals or marine products.
Restricted access	A zone primarily established so that an area may be managed by limiting access to the area.
<i>To accommodate site specific community needs, within a marine park there may be:</i>	
Special purpose area	An area within a marine park, identified as a special purpose area and with boundaries defined by the management plan for the marine park, in which specified activities, that would otherwise be prohibited or restricted as a consequence of the zoning of the area, will be permitted under the terms of the management plan.

Source: Adapted from sections 4 and 5, *Marine Parks Act 2007*.

The suite of protection provided by this framework will assist with the delivery of the objects of the *Marine Parks Act 2007*. Specifically:

- a) “to protect and conserve marine biological diversity and marine habitats by declaring and providing for the management of a comprehensive, adequate and representative system of marine parks; and
- b) to assist in—
 - i. the maintenance of ecological processes in the marine environment;
 - ii. the adaptation to the impacts of climate change in the marine environment;
 - iii. protecting and conserving features of natural or cultural heritage significance;
 - iv. allowing ecologically sustainable development and use of marine environments; and
 - v. providing opportunities for public appreciation, education, understanding and enjoyment of marine environments.”

The Government dedicated significant resources to gathering environmental, economic and social knowledge and working with community and key stakeholder interests to develop draft park zoning. Key elements of this process are described in Table 1-1

Table 1-1 Public consultation process to date

Initiative	Timeframe
Statewide consultation on Liberal Government draft policy document <i>Marine protected areas: a shared vision</i> . 23 public meetings/information sessions held involving some 1600 people.	2001/02
Labor Government policy <i>Blueprint for the SA representative system of marine protected areas</i> developed following the above consultation process, with further consultation undertaken with key stakeholders and across relevant government agencies.	2003/04
The Draft <i>Encounter Marine Park Zoning Plan</i> was released for 3 months' public consultation as a pilot process to test key concepts for statewide application. 427 submissions were received. Local consultation was undertaken targeting the Fleurieu Peninsula, Kangaroo Island and Adelaide. 15 public information days and 48 stakeholder group meetings were held.	2005
The Marine Parks Draft Bill (2006) was developed and 3 months' statewide consultation was undertaken on this, involving 16 regional public meetings/information sessions and 112 submissions.	2006-07
On 29 January 2009, the Minister for Environment and Conservation released the outer boundaries of 19 new marine parks, for a public consultation period of three months. During the comment period, approximately 15,000 copies of the consultation brochure with submission form were distributed through various means . By the end of the three month consultation 2,357 submissions had been received by the Department for Environment and Heritage (DEH) representing a total of 3, 295 individual respondents. In addition, 56 public information days were held and 4,800 people were estimated to have been directly engaged in the consultation process. Nearly 150 groups provided comment on either the marine parks network or one or more individual marine parks. These included key interest groups, organisations, businesses, associated bodies, local governments, not for profit organisations, community groups and recreational clubs. Three regional Pilot Working Groups with multi sectoral representation were established to advise on outer boundary design with minimum three meetings of each. Outer boundaries of seven parks were amended as a result of the consultation process.	2009
Phase 1 - Management planning for South Australia's marine parks network. A Statewide community engagement process was undertaken involving:	Late 2009 onwards
<ul style="list-style-type: none"> 13 Marine Park Local Advisory Groups (MPLAGs) established across the state, and the Great Australian Bight Marine Park Consultative Committee (GABMPCC). 67 public MPLAG meetings were facilitated. Peak stakeholders were invited to provide early advice on their preferred zoning for marine parks. A key stakeholder forum was held where broad agreement was reached on the priority areas for conservation 	April 2012

Source: Adapted from SA Government Submission to the Marine Parks Select Committee, 2011.

The Scientific Working Group and Marine Parks Council of South Australia are independent advisory bodies providing advice to the Minister. In finalising draft management plans for public consultation, both the Scientific Working Group and Marine Parks Council assessed the merits of the draft zoning schemes and strategies for management against the objects of the *Marine Parks Act 2007* and provided the Minister with independent advice.

In finalising draft management plans, discussions were held with members of the Marine Parks Steering Committee as representatives of relevant Government agencies. The Steering Committee considered whether draft management plans took appropriate consideration of all relevant statutory requirements and effectively implemented the Government's policy commitments for marine parks.

Based on the collective advice from MPLAGs, other community members, peak stakeholders and discussions across relevant agencies, the Government developed a

draft management plan with zoning for each of the 19 marine parks for formal public consultation. The draft management plans are currently out for public consultation.

1.2 Policy Commitments

The Government has made a range of policy commitments¹ to help ensure South Australian lifestyles and livelihoods are maintained, and to provide more certainty for the industries that use the marine environment. The commitments informed the design of zoning for each marine park, and include:

- access to specific key recreational and commercial fishing sites through appropriate zoning
- access for existing and future aquaculture development through appropriate zoning
- certainty that marine parks will not affect access to, or use of, jetties, break walls or boat ramps
- accommodation of approved coastal development as well as future development and infrastructure needs
- accommodation of approved mining, petroleum and geothermal development activities
- accommodation of shipping and harbor activities
- certainty that marine parks will not create an extra approval process as government agencies will work together to streamline administration.

1.2.1 Displaced Commercial Fishing Policy Framework

The adoption of marine park management plans with zoning will displace some commercial fishing activities. This Policy Framework² describes the steps that support this process:

1. Avoid displacement by pragmatic zoning;
2. Redistribute effort only where possible without impacting ecological or economic sustainability of the fishery;
3. Market-based buy back of sufficient effort to avoid impact on the fishery;
4. Compulsory acquisition as a last resort option.

The Government expects that market based buy back of effort and any necessary compulsory acquisition will be undertaken under the authority of the Minister for Agriculture, Food and Fisheries. The Minister for Sustainability Environment and Conservation will consider any fair and reasonable compensation in accordance with section 21 of the *Marine Parks Act 2007*, and it is envisaged that regulations will be drafted to support this process.

¹ A complete list of the commitments is available at Appendix 2 of the *South Australia's Marine Parks Network Explanatory Document* which accompanies the draft management plans.

² The Displaced Commercial Fishing Policy Framework is provided at Appendix 5 of the *South Australia's Marine Parks Network Explanatory Document*

2. Method of Assessment

This study undertook both an impact analysis and an economic evaluation, in the form of a cost benefit analysis (CBA), of implementing the marine park draft management plans. The method and results of the CBA are presented in the Main Report.

Impacts of implementing the draft management plans were assessed against a base case scenario of no management plans. This also applies to the CBA. The base case is not static, and requires an understanding of the existing trends in natural resource, economic and social conditions. There are external factors which influence both the 'with management plan' and the base case scenarios that need to be taken into consideration.

2.1 Ecological

The ecological impact assessment was required to:

1. describe the current status of the marine habitats, plants and animals in each marine park;
2. discuss (in qualitative terms) the services that the protected ecosystems provide to South Australians (where not possible to measure their economic value);
3. identify the range of activities that impact on the environment and quantify how the draft management plans will influence the marine environment, against a base case of no management plans;
4. assess the implications of the management plans in 5, 10 and 20 years on species diversity and abundance, marine habitats, and ecosystem function;
5. include case studies that highlight the potential impacts of the draft management plans on iconic and threatened species and contribute to case studies that effectively communicate the trade-offs between the different environmental, social and economic factors.

The outcomes for Items 1, 4 and 5 listed above are included in each individual park statement and can be found in Section 4 of this impact statement. The outcomes for Item 2 are generic across the park network and are briefly introduced in Section 3.1 of this impact statement and detailed in Appendix 4 of the Main Report (see Ecosystem services). The outcomes for Item 3 inform the outcomes for Items 4 and 5, and are discussed in a generic sense in Appendix 1.1.4 of the Main Report. It should be noted that despite the broad spectrum of activities that can potentially be influenced by zoning under the *Marine Parks Act 2007*, the proposed zones have been located in such a manner that very few current activities will be affected. The most widespread of these is fishing, with the cessation of all forms of fishing inside most SZs and RAZs (with exceptions relating to existing restrictions), and benthic trawling inside HPZs of six parks. Furthermore, predicting species and ecosystem responses to the cessation of fishing is highly complex (see Appendix 1.3 of the Main Report) and, compared to other activities, there are generally more data available to inform the assessment. Consequently, the extent and depth of discussion on fishing-related responses may appear to be disproportionate in comparison to other activities, but this is not intended to place any particular emphasis on fishing as a threatening process.

The process of ecological impact assessment undertaken for the current report can essentially be summarised by three main steps:

1. Activities and uses: determining the range of activities and uses that potentially impact on the marine environment under current management regimes, and then determining how the marine park zoning and management arrangements will influence them.
2. Baseline: determining the current status of the marine species, habitats, and ecosystems in the marine parks; what are we comparing future changes against?
3. Predictions: assessing the implications of the marine park zoning and management arrangements in 5, 10 and 20 years on species, habitats, and ecosystems against the case of no marine park zoning and management arrangements.

A total of 205 species or species groups, 11 habitat types, and 11 habitat-based ecosystem types were selected for the impact assessment (see Appendices 2, 4 and 6 of the Main Report).

Further details of the methodology can be found in Appendix 1 of the Main Report.

2.2 Economic

At a regional level, the economic impact analysis was based on the input-output method. This method provides a standard approach for the estimation of the economic impact of a particular activity. The input-output model is used to calculate industry multipliers that can then be applied to various change scenarios, as has been done in this study.

For this impact assessment an input-output model was constructed specifically for the Upper Spencer Gulf region (see Map in Appendix 1). The model is known as a Regional Industry Structure and Employment (RISE) model which is an extension of the standard input-output model that is used within the SA Government for various types of impact assessment.

At a micro level individual businesses could be impacted by marine parks. To assess the impact on commercial fishing operations representative financial models of fishing businesses were constructed for each of the relevant fishing sectors. These models were based on financial information collected and reported by EconSearch (2010) over the past 13 years. The results of the financial modelling provided input into the regional RISE model to estimate impacts on the regional economy.

The principal driver for change in fishing industry operations and profitability is lost access to the resource. Estimates of displaced catch were provided by the South Australian Research and Development Institute (SARDI). PIRSA Fisheries and Aquaculture provided detailed information on the recreational and commercial fisheries relating to the:

- current condition of the fishery;
- outlook for the fishery without marine parks management plans;
- marine parks impacts on the fishery; and
- measures to mitigate anticipated impacts.

Discussions were also held with representatives of each of the commercial fishing sectors, recreational fishing, mining, various State Government departments and Local

Government (see Appendix 3). These discussions provided insights to the likely responses of businesses and organisations associated with or members of the interviewee's organisation. Because of time and resource constraints it was not possible to undertake discussions with or collect data from all potentially impacted parties.

Because some of the activities that could potentially be impacted by marine parks are related to the tourism sector, the Upper Spencer Gulf RISE model includes explicit specification of the regional tourism industry. This was done by following the standard ABS method of constructing tourism satellite accounts.

The following indicators of economic impact were generated using the economic modelling framework described above:

- value of output,
- gross regional product (GRP),
- household income and
- employment.

(Value of) Output is a measure of the gross revenue of goods and services produced by commercial organisations (e.g. the value of processed seafood products) and gross expenditure by government agencies. Total output needs to be used with care as it can include elements of double counting when the output of integrated industries is added together (e.g. the value of processed seafood includes the beach value of the fish).

Gross regional product (GRP) is a measure of the net contribution of an activity to the regional economy. GRP is measured as value of output less the cost of goods and services (including imports) used in producing the output. In other words, it can be measured as the sum of household income, 'gross operating surplus and gross mixed income net of payments to owner managers' and 'taxes less subsidies on products and production'. It represents payments to the primary inputs of production (labour, capital and land). Using GRP as a measure of economic impact avoids the problem of double counting that may arise from using value of output for this purpose.

Household income is a component of GRP and is a measure of wages and salaries paid in cash and in-kind, drawings by owner operators and other payments to labour including overtime payments, employer's superannuation contributions and income tax, but excluding payroll tax.

Employment is a measure of the number of working proprietors, managers, directors and other employees, in terms of the number of full-time equivalent (fte) jobs. Employment is measured by place of remuneration rather than place of residence.

Further details of the economic method can be found in Section 3.2 of the Main Report.

2.3 Social

The identification of potential social impacts of different marine park zoning options has been informed by a review of relevant research, analysis of the Environmental, Economic and Social Values Statements developed for each park, a review of the minutes and available correspondence of Marine Parks Local Advisory Groups (MPLAG), an overview of local media reports on the parks, an examination of market research on community perspectives on the establishment of marine parks, an

assessment of MPLAG member perspectives on zoning options and targeted impact assessment interviews. An analysis of SAMPIT³ data was also undertaken to identify the potential impact of the zoning proposal on recreational fishing. An examination of the impacts of the establishment of marine parks in relevant jurisdictions was undertaken to inform the design of the social impact assessment tool.

A 'Marine Parks Social Impact Assessment Tool' (MPSIAT) was developed by the Australian Workplace Innovation and Social Research Centre to identify and compare potential social impacts from the preliminary DEWNR marine park sanctuary zones (DEWNR zones) and zones resulting from Marine Park Local Advisory Groups advice (MPLAG zones). MPSIAT respondents provided perspectives on impacts of zoning proposals based on their experience and expertise. Final MPLAG zone advice was normally based on a majority view. While this approach to decision making delivers a decision it does tend to obscure differences in views and opposing views on potential impacts from the perspectives of different stakeholders. The MPSIAT has been designed to shed light on these differences in order to identify a range of potential social impacts identified by key stakeholders. In the context of the impact assessment process these perspectives can inform our understanding of what the social impacts of the draft zoning proposal are likely to be. This impact assessment statement helps to identify what the likely social impacts will be.

This social impact assessment provides baseline perspectives on potential positive and negative impacts across five domains:

- Education and wellbeing;
- Culture and heritage;
- Recreation and fishing;
- Population and housing; and
- Community.

Social vulnerability of the Impact Region associated with each Marine Park has been determined through a combination of Socio-Economic Indexes for Areas (SEIFA) indexes, population (health, family, education, Indigenous status) and economic characteristics (unemployment, job losses).

The SEIFA Indexes presented here provide a measure of the socio-economic disadvantage for the Impact Regions associated with Marine Parks at the time of the 2006 Census⁴. We have included figures from the Index of Relative Socio-economic Disadvantage, the Index of Economic Resources and the Index of Education and Occupation. Each of these provides a slightly different view of the socio-economic profile and potential vulnerability of each region.

SEIFA values have been standardised with Australia (as a whole) having a value of 1000 and a standard deviation of 100, low scores indicate greater disadvantage. South

³ The South Australian Marine Parks Information Tool (SAMPIT) is a computer tool designed to gather information from community members about their favourite fishing spots and areas they believe need protection. Data is collected and reported by 'grid cell'. SAMPIT data for 1,739 people is available including 1,311 recreational fishers. Quality control by the Department of Environment and Natural Resources included cross-verification of legitimate naming and activities from the data provided (DENR 2010b).

⁴ Australian Bureau of Statistics. 2008. *Census of Population and Housing: Socio-Economic Indexes for Areas (SEIFA), Australia - Data only 2006 (cat. no. 2033.0.55.001) and Information Paper: An Introduction to Socio-Economic Indexes for Areas (SEIFA), 2006 (cat. no. 2039.0)*. Note SEIFA Indexes for the 2011 Census are not yet available.

Australia sits below the Australian average with a relative disadvantage level of 979. At the SLA level, South Australian SEIFA relative disadvantage scores range from a low of 527 through to 1107.

A range of SEIFA values at the statistical local areas (SLA) level are associated with the Impact Regions, noting between one and seven SLAs are associated with each Impact Region. These capture information about average socio-economic conditions for the SLA and Impact Region but do not account for variation of individuals within the areas. Areas identified with relative disadvantage may well have individuals and sub-regions that are relatively advantaged. We have also presented individual variables to provide additional information about the potential social vulnerability of SLAs associated with the Impact Regions.

Where an Impact Region has an SLA falling within the top decile in South Australia (i.e. most disadvantaged) a ranking of High is provided. A ranking in the second highest decile is ranked as Moderate. Where there are moderate to high ranking SLAs they are rated to as Moderate-High.

It is important to acknowledge that the impact of marine parks on employment and wellbeing is likely to vary significantly across regions and will be mediated by a range of social and economic factors including:

- the age and retirement intentions of fishers;
- the ability of fishers to adapt to changes within the region in which they fish;
- the opportunities available to fishers and those dependent on fishers to work in other industry sectors;
- the impact of compensation packages provided to fishers on their financial circumstances and the local economy;
- the influence of lifestyle attachment and importance of place in the lives of fishers
- the extent to which the existence of marine parks might generate employment in tourism, research, education and other sectors.

3. Upper Spencer Gulf Marine Park Description

Located in the Northern Spencer Gulf Bioregion, the Upper Spencer Gulf Marine Park covers 1,602 km² and includes waters north of a line from the southern end of the Whyalla-Cowleds Landing Aquatic Reserve on the western side of Spencer Gulf to Jarrold Point on the eastern shore. The park also includes the uppermost reaches of Spencer Gulf extending north of Port Augusta. The landward boundary of the marine park extends at least to the median high water mark and where possible incorporates coastal Crown Lands including beaches, sand dunes, estuaries and saltmarshes, as shown in the map. This marine park includes a number of other protected areas, including Blanche Harbour-Douglas Bank, Yatala Harbour and Whyalla-Cowleds Landing Aquatic Reserves and overlays part of Winninowie Conservation Park (DENR, 2010a).

A map of the Upper Spencer Gulf Marine Park and the proposed draft zoning is provided at the end of this statement at Appendix 5.

3.1 Ecological Description

The Upper Spencer Gulf Marine Park is an inverse estuary with salinities varying between 38 and 48 parts per thousand depending on season and latitude. The waters are sheltered from ocean swell but there is water movement from tidal, wind-driven and density currents. The tidal range is the highest in South Australia, but tidal currents are tempered each fortnight by a 'dodge' tide (DENR, 2010a).

Upper Spencer Gulf is a recognised Wetland of National Importance characterised by extensive intertidal mangrove, saltmarsh and sand and mud flats which are linked offshore to extensive seagrass meadows, deeper channels with strong currents, and sandy plain habitats. Sandy and shell grit beaches are also present (DENR, 2010a).

Rocky shorelines, headlands and reefs occur mainly on the western coastline, with those near Point Lowly and Backy Point recognised as an area of major significance because of the annual winter spawning aggregations of the giant Australian cuttlefish (DENR, 2010a).

For the current impact assessment, coastal and marine habitats/ecosystems were divided into the following types: saltmarsh, mangrove, intertidal sand flat, subtidal sand, intertidal seagrass flat, subtidal seagrass, intertidal reef, subtidal high profile reef, subtidal low profile reef, beach, and pelagic. The extent of these habitats (except pelagic) mapped for this park are shown in Table 3-1.

These eleven habitats/ecosystems, and others not considered in the current impact assessment, support thousands of species (Edyvane, 1999; Baker, 2004). They also offer goods and services that are of economic, social and environmental value to SA. The economic value of these services can be difficult to determine but to illustrate the importance of valuing coastal marine habitats in SA a description of the necessary goods and services that need to be taken into account is provided. The goods and services provided by coastal, marine and estuarine habitats were classified under four headings by McLeod and Leslie (2009). These headings were:

- Life supporting services,
- Resources and products,

- Maintaining Earth's living space and
- Recreational and cultural services.

Each one of these headings was divided into categories that could be more easily valued, either directly or as a service. A more detailed discussion of these goods and services is provided in Appendices 4 (habitat specific information) and 5 (consolidated discussion) of the Main Report.

Table 3-1 Summary of habitats

Zone	Shoreline habitats (km of coastline)						Benthic habitats (km ²)				
	Beach	Intertidal sand	Intertidal seagrass	Intertidal reef	Mangrove	Saltmarsh	Subtidal high profile reef	Subtidal low profile reef	Subtidal sand	Subtidal seagrass	Unmapped
SZ-1					10.2	2.6			0.5	0.1	
SZ-2					12.6					0.1	
SZ-3	3.4				37.2				0	10.2	
SZ-4	7.3				19.7			0.1	9.8	18.8	
SZ-5	4.7				21.9				10.8	13.4	
SZ-6				4.2			0.6	2	0.2	3.7	
SZ-7										2	40.9
SZ-8	8.6				30.6				9	22.9	
SZ-9					43.7				0.4	0.3	
SZ-10	8.2				14				0	0	
HPZ-1	56.7	0.3			65.1	8.8		0.4	80.3	153.7	
HPZ-2					6				0.5	91.2	1.2
HPZ-3					41.3				14.5	132.6	
GMUZ-1	1.2				0.7				1.1	0.4	
GMUZ-2	67.7			4.8	98.9	0.4	1.1	10.5	195.9	434.7	208.2
Total	157.8	0.3		9	393.1	11.8	1.7	13	322.8	884.2	250.3

Source: based on GIS data provided by DEWNR.

Zones are labelled as shown in Appendix Figure 5-1.

Intertidal habitats are expressed as shoreline lengths to be consistent with DENR (2010a), and/or because of limitations of the available GIS data, and therefore do not provide a complete indication of the extent of these habitats within the park.

Zero values indicate presence but <0.05 km². Totals may differ slightly from column sums due to rounding.

3.2 Socio-economic Profile

The socio-economic profile provided in Appendix 1 presents a statistical summary of key economic and social information for the Upper Spencer Gulf region and, where possible, South Australia (SA). The profile brings together a wide range of existing Australian Bureau of Statistics (ABS) data and some non-ABS data. It has been designed, at a broad level, to aid understanding of the economic and social structure of the region, to indicate how the Upper Spencer Gulf region contributes to the State economy and to illustrate trends in economic growth or decline.

The Upper Spencer Gulf region is located north-west of Adelaide at the upper end of Spencer Gulf (Figure 1 in Appendix 1). The five statistical local areas (SLAs) that

comprise the region are Whyalla (DC), Port Augusta (DC), Mount Remarkable (DC), Port Pirie (DC) – City and Port Pirie (DC) - Balance. The Upper Spencer Gulf regional economy is relevant to the Upper Spencer Gulf Marine Park (MP10). Table 3-2 presents a summary of the key economic and social information detailed further in Appendix 1.

Some key points from the detailed socio-economic profile in Appendix 1 are as follows:

- The estimated resident population of the Upper Spencer Gulf region was around 59,100 persons in 2010/11.
- Compared with the age distribution of the state as a whole, the Upper Spencer Gulf region has a higher concentration of younger people (aged 0 to 14 years), a lower share of persons aged 15 to 64 years and a slightly lower share of people aged 65 and over.
- The total population in the Upper Spencer Gulf region is projected to increase by approximately 7 per cent by 2026, whereas the SA population is expected to increase by around 23 per cent.
- The unemployment rate in the Upper Spencer Gulf region was 5.5 per cent in the June quarter of 2011, similar to the state rate but is more than half of what it was in 2003 (June quarter).
- Over half of the businesses (57 per cent) operating in the Upper Spencer Gulf region did not employ anyone and almost one quarter (24 per cent) employed between 1 and 4 people.
- Over the period 2000/01 to 2009/10, the mean taxable income (in nominal terms) increased by 61 per cent in the Upper Spencer Gulf region (\$52,700 in 2009/10) and 54 per cent in SA as a whole (\$54,350 in 2009/10).
- Median dwelling (units and houses) prices increased by 245 per cent in the Upper Spencer Gulf region (\$200,000 in 2010/11) and 197 per cent in SA as a whole (\$357,500 in 2010/11) over the period 2000/01 to 2010/11.
- In 2009/10, the top four contributors to total jobs in the region were the retail trade (16 per cent), health and community services (15 per cent), manufacturing (14 per cent each) and education (10 per cent) sectors.
- In 2009/10, the top contributors to GRP were the manufacturing (15 per cent), ownership of dwellings (10 per cent) and health and community services (8 per cent) sectors.
- The commercial fishing and tourism industries are important to the local economy in terms of contributing to jobs and GRP. Directly and indirectly commercial fishing and aquaculture contributed 0.2 per cent of GRP (\$5.1 million) and 0.2 per cent of employment (62 fte jobs) in 2009/10. By comparison, the tourism sector contributed 2 per cent of GRP (\$54.6 million) and 3 per cent of employment (740 fte jobs).

Table 3-2 Summary of key economic and social indicators for the Upper Spencer Gulf region

Indicator	Upper Spencer Gulf	SA	Upper Spencer Gulf as a proportion of SA
Population, 2010/11 (no.)	59,135	1,656,299	3.6%
Birth Rate, 2009/10 (births/1000 residents)	12.7	12.2	-
Death Rate, 2009/10 (deaths/1000 residents)	8.5	7.9	-
Age Distribution, 2009/10:			
Proportion of Population aged 0-14	21%	18%	-
Proportion of Population aged 15-64	64%	67%	-
Proportion of Population aged 65+	15%	16%	-
Dependency Rate, 2009/10:			
Child	33%	27%	-
Aged	24%	23%	-
Total	57%	50%	-
Population Projection, Increase from 2006 to 2026	7%	23%	-
Employment, June qtr 2011:			
Labour Force (no.)	27,312	867,500	3.1%
Unemployed (no.)	1,492	45,300	3.3%
Unemployment Rate	5%	5%	-
Participation Rate, 2009/10	54%	63%	-
Businesses, June 2009 (no.)	2,945	141,625	2.1%
School Enrollments, 2011	9,364	247,356	3.8%
Tertiary Enrollments, 2011	7,146	208,706	3.4%
Non-school Qualifications, 2006	18,801	595,379	3.2%
Mean Taxable Income, 2009/10 (\$)	52,706	54,349	-
Proportion of Taxable Individuals, 2009/10	73%	74%	-
Value per Building Approval, 2010/11 (\$)	229,982	236,269	-
Median Dwelling Price, 2010/11 (\$)	200,000	357,500	-
Commercial Fishing, Ave/yr 2000/01 to 2009/10:			
Catch (t)	645	47,581	1.4%
Value of Catch (\$m)	8	202	4.1%
Charter Boats, Ave/yr 2007/08 to 2009/10 (no. of fish)	2,794	146,341	1.9%
Recreational Fishing, 2007/08:			
Fishers (no.)	14,451	236,463	6.1%
Days Fished (no.)	46,735	1,054,200	4.4%
Gross Regional Product, 2009/10 (\$m)	2,491	80,356	3.1%
Employment, 2009/10 (fte)	24,239	774,953	3.1%
Tourism, 2009/10 (\$m)	133	4,524	2.9%
Other Regional Exports, 2009/10 (\$m)	1,905	26,757	7.1%
Regional Imports, 2009/10 (\$m)	2,614	40,573	6.4%

Source: Appendix 1.

4. Summary of Impacts

4.1 Ecological

This section presents the summarised results of the ecological impact assessment for this particular park. As such, output tables and other information presented that are not otherwise referenced, represent the professional judgement of the authors. Full details behind the assessments can be found in the Main Report and accompanying appendices (see cross-references below).

4.1.1 Habitats

Many habitats within the park can be considered to be in a condition comparable to the time of European settlement, however some habitats have been significantly modified. In many respects Upper Spencer Gulf is a good example of why a zoned marine park could be a useful tool to manage the cumulative impact of a variety of activities and developments in a region. For more than 100 years, Upper Spencer Gulf has supported a number of heavy industries and urban centres (Whyalla, Port Augusta, Port Pirie) that discharge effluent containing a variety of pollutants to the marine environment (BHP Billiton, 2009; EPA, 2004; DEWHA, 2011). Heavy metals from the lead smelter at Port Pirie, steelworks at Whyalla and power stations near Port Augusta enter the park via land, water and air, and can bioaccumulate (e.g. via razorfish) or contaminate the sediments (EPA, 2004; DEWHA, 2011). Loss of seagrasses has also occurred within False Bay (Harbison and Wiltshire, 1993).

There have been hydrocarbon leaks through groundwater from the hydrocarbon processing plant near Port Bonython, and the port facilities at Port Bonython, although outside the park, present an ongoing risk of hydrocarbon spills (one significant spill occurred in 1992) (AMSA, 2005). There are also potential hydrocarbon inputs from recreational boating.

Water quality is also affected by increased nutrients from the steelworks at Whyalla, wastewater treatment plants at all three urban centres, and potentially by septic tank overflows from communities throughout the park (Bryars, 2003). Areas adjacent to Winninowie Conservation Park (parts of SZ-3, SZ-5 and HPZ-1) are less likely to be subject to land-based threats. Intertidal habitats within SZ-2 at Curlew Point may be affected by altered patterns of water and sediment movement due to the existence of a power line causeway (Bryars, 2003).

Despite the existing management measures (see Section 3.1.1.2 of the Main Report) there is increased risk of introduced marine pests associated with shipping activities. A recent survey found 10 introduced species between Whyalla marina and Fitzgerald Bay (Dittmann et al., 2010; see also Wiltshire et al., 2010). One of these, a pearl oyster, is now well established in Upper Spencer Gulf and in some cases has replaced native razorfish beds.

Finfish aquaculture in Fitzgerald Bay, although recently significantly reduced in scale, may also potentially result in increased nutrients (de Jong and Tanner, 2004). Aquaculture of microalgae in False Bay has impeded tidal flow through mangroves, flows to saltmarsh communities have been disrupted by causeways and there is further possible physical disturbance by off-road vehicles, illegal rubbish dumping and grazing stock (Bryars, 2003).

Most of the township and industry-related impacts in the southern half of the park are restricted to GMUZ-2, with exceptions noted above, in addition to possible impacts on HPZ-3, SZ-6, SZ-7 and SZ-9.

Habitat changes attributed to prawn trawling have been documented in Spencer Gulf (Svane et al., 2009; Currie et al., 2011; see Appendix 1.1.5 of the Main Report), with the most intense historical trawling in the parts of GMUZ-2 to the south-east of Whyalla (Currie et al., 2009). Some habitat response to cessation of prawn trawling may occur in areas within HPZ-2 that have been previously, but lightly trawled (Ward and Burch, 2012; Currie et al., 2009). These areas may experience an increase in cover of the sessile benthic species that characterise the subtidal sand habitat (see Table 4-1). However, there is also potential for degradation of subtidal sand habitat outside HPZ-2 through redistribution of prawn fishing effort previously undertaken within it.

Table 4-1 Predicted habitat responses to zoning at 5, 10 and 20 years.

Habitat	Zones	Current status	Potential response after 5, 10 and 20 years					Notes
			Measure	Scenario	5	10	20	
Sand	HPZ-2	UNLL	Area	With Zoning	0	0	0	Probable loss of sessile benthic invertebrates due to prawn trawling in the area may recover following protection
		UNLL	Cover	With Zoning	+	++	+++	
		UNLL	Area	Without Zoning	0	0	0	Depletion of sessile benthic invertebrates may continue with prawn trawling in the area
		UNLL	Cover	Without Zoning	-	-	-	
		UNLL	Area	Net effect of Zoning	0	0	0	
		UNLL	Cover	Net effect of Zoning	++	+++	++++	

The proposed zoning alone does not address residual introduced pest or water quality and other pollution issues listed above (i.e. those that are not addressed by existing management), which require complementary management measures. However, the zoning plan will influence future activity in all zones and applies specific restrictions on future activity within HPZs, SZs and RAZs, with respectively increasing protection across this hierarchy of zone types (see Appendix 1.2.6 of the Main Report). The Upper Spencer Gulf Marine Park has about 32 per cent and 14 per cent of the total park area designated as HPZ and SZ, respectively.

In the case of aquaculture, HPZs will be managed under the *Aquaculture Act 2001* to ensure that all reasonable and practicable measures are taken to achieve the definition of the zone (i.e. no harm to habitats or the functioning of ecosystems).

There is some uncertainty about the extent to which zoning will provide future protection for the Upper Spencer Gulf Marine Park, due to a number of proposals for further development within the park (see Section 4.2.7 below). The Government has proposed a special purpose area (SPA) overlaying all SZs and HPZs within the park, to provide for significant economic development, in addition to other SPAs to provide transitional arrangements for existing and proposed harbour, transport and marine based infrastructure activities (as defined in Appendix 7 of the Main Report). Any such developments proposed within zones that would normally restrict such activity may be able to occur subject to the provisions of the management plan. As the management plans were not available for this report, it is not possible to assess the extent to which habitats would be protected. It is nevertheless expected that the designation of areas worthy of zoning as SZs and HPZs would assist in directing future activities appropriately.

For the Upper Spencer Gulf Marine Park, habitats of particular conservation note that will benefit from future protection include (DENR, 2010a):

- linked saltmarsh, mangrove, sand flat and seagrass communities which provide nursery habitat and contribute to the productivity of fish throughout Spencer Gulf, including many of the commercially and recreationally significant species, e.g. King George whiting, snapper, yellow-fin whiting, and garfish (HPZ-1, SZ-1 to 5, HPZ-2, SZ-8, HPZ-3, SZ-9, SZ-10)
- internationally important habitat for wader birds (HPZ-1 and particularly SZ-2 and SZ-3) and sea birds (SZ-3). Important sites at Ward Spit, Port Germein and Weeroona Island are either out of the park or within GMUZs.
- giant Australian cuttlefish breeding habitat near Black Point (SZ-6).

4.1.2 Species

4.1.2.1 Threatened and protected species

A large number of marine species are protected in SA under either State and/or Federal legislation, including all syngnathids (seahorses, seadragons, pipefishes, pipehorses), all marine mammals and most seabirds. Some of these species are also listed as threatened species under either State and/or Federal legislation. It was beyond the scope of this impact statement to assess all of these species, but some of the species or species groups that were identified in the Ecosystem Food Webs (see Appendix 6 of the Main Report) and/or that are a key feature of this particular marine park are considered here. Each of these species is discussed in more detail in Appendix 3 of the Main Report.

The following species may benefit from maintenance and/or improvement of habitats and ecological processes within the park:

- White shark (threatened and protected species)
- Syngnathids including the leafy and weedy seadragon (protected species)
- Bottlenose dolphin (protected species).

Changes in abundance of these species due to the introduction of the proposed management arrangements are not able to be predicted over the next 20 years due to the complexities of ecosystem interactions and/or a lack of data on current status and zone use. Nonetheless, it is unlikely that the main anthropogenic threatening processes to the white shark will be out-weighted by any potential positive impact from the park zoning and management arrangements (see Appendix 3 of the Main Report). There are known to be interactions between dolphins/sharks and the finfish aquaculture industry in Fitzgerald Bay (GMUZ-2) but the ramifications of this are unknown (de Jong and Tanner, 2004).

4.1.2.2 Fished species

South Australia's proposed system of marine parks was designed for biodiversity conservation purposes rather than as a fisheries management tool. Nevertheless, the impact assessment identified that species which are currently fished are most likely to show a direct first-order response over the next 20 years (relative to current uses) to the proposed management arrangements and zonings (see Appendix 1.3 of the Main Report). Therefore the assessment of the impact on 20 indicator fished species has been provided in a specific section here. More detailed discussion on the rationale for

selecting the indicator species, and their expected response to protection, can be found in Appendices 1.3.4 and 3 of the Main Report.

Commercial, recreational and charter fishing occurs within the park for a variety of species. The current status of some of the indicator species that were able to be assessed within various sanctuary zones of the park was considered to be at an unnaturally low level (UNLL) compared with a pre-European (pre-fishing) baseline (Table 4-2). A pre-fishing baseline rather than the current baseline is required to enable future predictions of change because the level of fishing activity prior to protection influences the response following protection (see Appendix 1 of the Main Report). The reduced levels of some species do not necessarily reflect poorly on fisheries management in accordance with the principles of ecologically sustainable development. The giant Australian cuttlefish breeding aggregation at Point Lowly has been in decline for some years and is considered to be at an UNLL but the causes of this status remain unclear (Hall, 2012; see Case Study below).

Predicting ecological responses to marine parks is inherently complex and depends on many factors (see Appendix 1.3.7 in the Main Report). In the few instances where it has been attempted, the actual changes have often been different to the predictions (Langlois and Ballantine, 2005). Nevertheless, as required for this assessment, some predictions have been attempted based on a number of assumptions listed in Appendix 1.3.13 of the Main Report. Each species is considered only in isolation and therefore interactions between species also need to be considered when interpreting the potential responses described below (see Section 4.1.3).

Table 4-2 summarises the outcomes of the predictive modelling that was undertaken on a subset of indicator species (see Appendix 1.3 of the Main Report for further details of the methodology, in particular the list of assumptions and limitations in Appendix 1.3.13). Using snapper as an example, Table 4-1 indicates that the current status of adult snapper is at an UNLL in SZ-6 and SZ-7, which include habitat used by snapper (reef and/or sand). Under the proposed zoning, the adults already resident in these proposed sanctuary zones and any adults visiting these zones from Spencer Gulf that then become resident (or recruits) would be protected. Snapper populations often comprise a mix of migrant and resident individuals and there is evidence that some individuals become resident in upper Spencer Gulf (see Species Profile in Appendix 3 of the Main Report); it is these fish that are predicted to increase in abundance over time in the absence of fishing activity. Consequently, the size and abundance of the adults is predicted to increase inside these zones after 5 years (shown as +), 10 years (shown as ++) and 20 years (shown as +++) (Table 4-2). Without the proposed zoning, adult fish would continue to be captured and the population level would remain as it is today, as indicated by the zeros at 5, 10 and 20 years. Thus the predicted net effect of the proposed zoning shown in Table 4-2 is a positive increase within these zones across 5, 10 and 20 years. Table 4-2 also shows for snapper that: a spill-over is expected as a result of the population density inside the SZs increasing relative to outside to the point where some fish will tend to migrate from the SZ; and increased larval production from inside the SZs has been predicted as spawning probably occurs in the area.

For several other species, predictions are made with variations according to the particular zones and the life histories of each species (see Species Profiles in Appendix 3 of the Main Report for further details). For species such as razorfish, SZ-3 and SZ-5 will protect the existing resident adults from immediate fishing on the tidal flats and will also protect the existing resident sub-adults and new post-larval recruits from future fishing. Thus the predicted net effect of the proposed zoning is a positive increase in size and abundance within these zones across 5, 10 and 20 years (Table 4-2). In

addition, increased larval export is predicted as razorfish are known to spawn in the area. However, there will be no spill over because razorfish are attached to the seabed and cannot move outside a sanctuary zone. For some species that are more transient in the park, such as King George whiting sub-adults, southern garfish, and blue swimmer crab, it is possible that in the absence of fishing their abundance will be temporarily increased during aggregation times inside SZ-6 (off Black Point) and in these cases they are noted with a + for each of 5, 10 and 20 years, but there is not predicted to be a cumulative increase in abundance over time as individuals will eventually move out of the protected zone. For blue swimmer crab there is potential for increased larval export due to increased egg production associated with higher abundances of crabs (see Species Profile in Appendix 3 of the Main Report for further discussion). Blue swimmer crab abundance may also be temporarily increased inside SZ-8 which lies inside an existing no-take reserve (Whyalla-Cowleds Landing Aquatic Reserve) but where fishing for blue swimmer crab is currently allowed in part of the reserve. The current access to blue swimmer crab within SZ-8 will not be allowed under the proposed zoning arrangements.

Notably, the giant Australian cuttlefish is not predicted to respond positively to the zoning as the threatening processes are not understood and may require other management actions (see Section 4.1.4 below). In zones where there is overlap with areas that have been trawled by the prawn fishery (HPZ-2; see 4.1.1 earlier) there is potential for an increase in size and abundance of western king prawns.

Of the other indicator species assessed (and which are not presented in Table 4–2), the following observations were made for the Upper Spencer Gulf Marine Park:

- Species occurring within the park but with insufficient habitat inside proposed zones to warrant an assessment include: yellowfin whiting and southern calamary.
- Species considered as not occurring within the park include: Bight redfish, swallowtail, harlequin fish, western blue groper, bluethroat wrasse, sea sweep, southern rock lobster, greenlip abalone, blacklip abalone, mud cockle and Goolwa cockle.

In addition to the species that were able to be assessed, there are numerous other species (target, byproduct, bycatch) that may also respond to or benefit from the cessation of fishing within SZs (see Appendix 1.3.4 of the Main Report), and which may be found in the relevant park zones (Table 4-3). By preventing fishing, a range of benefits for species may be realised including (but not limited to): elimination of direct fishing mortality and post-release mortality; more natural age, size structure and sex ratio of populations, age and size at maturity and fish behaviour; and reduced incidence of disease (see Section 6.1.1 and Appendix 1 of the Main Report for further discussion and references). Each of the species listed in Table 4-3 has a known interaction with fishing (see Appendix 2 of the Main Report) which justifies their inclusion here. While the impact of the interaction is largely unknown for most species, the point is that the interaction will be removed through zoning, providing a positive benefit to those species. For example, the weeping toadfish is incidentally caught as bycatch (e.g. Fowler et al., 2009) but little is known about the impacts of these interactions on toadfish populations. Nonetheless, toadfish will benefit from protection inside SZs.

Table 4-3 includes some of the more mobile finfish species which may not respond directly to zoning but may potentially increase in abundance within the park because of the proposed overall reduction of commercial and charter fishing effort, as per the PIRSA (2011) policy position. While it was assumed that the removal of this effort

would minimise negative impacts on areas outside SZs, there is potential for the abundance of some fished species to decline outside SZs through displacement of recreational fishing effort, possibly offset to some extent by spill-over (see Appendix 1.3.12 of the Main Report). However, it should be reiterated (see Appendices 1.1.2 and 1.3.13 of the Main Report) that the assessment of the proposed management arrangements does not take into account possible alternative management responses over the next 20 years within the existing management framework.

Even though there are 10 proposed SZs within the park, only four of them (SZ-3, SZ-5, SZ-6 and SZ-7) were assessed as showing some potential for a response from the indicator fished species. SZ-3, which is mainly intertidal, and SZ-5, which is also mostly intertidal (and part of which is already inside an existing no-take aquatic reserve, Yatala Harbour Aquatic Reserve) will provide a high level of protection for sessile species such as razorfish but not for more mobile species that move off the tidal flats at low tide. In contrast, SZ-6 (Black Point) and SZ-7 (Fairway Bank) will provide better protection for species such as snapper. SZ-4 and SZ-8, which overlay existing no-take aquatic reserves (Blanche Harbour – Douglas Bank Aquatic Reserve, and Whyalla – Cowleds Landing Aquatic Reserve), should not show any change directly attributable to the new zoning arrangements (except for possibly blue swimmer crab – see earlier) but could experience flow-on effects from the network of zoning across the parks system. SZ-2, which is comprised of mangroves/saltmarsh, is unlikely to show a direct response to the new zoning as fishing is unlikely to occur there currently or in the future. SZ-1, SZ-9 and SZ-10 are also in intertidal areas but have sections of tidal creeks that could be fished (Bryars, 2003) but were not predicted to show a response from the indicator fished species. Nonetheless, other fished species such as black bream (Table 4–3), could potentially respond to protection inside those zones.

In addition to possible responses to protection from fishing, many of the fished species will gain long-term positive benefits from protection of the habitats that they rely upon for various stages of their life cycles. These benefits will often be manifested both inside and outside the park boundaries. For the Upper Spencer Gulf Marine Park, protection of the intertidal sand/seagrass flat nursery habitats is critical for the long-term sustainability of King George whiting, yellowfin whiting, southern garfish, blue swimmer crab, and western king prawn (Bryars, 2003). For snapper, protection of the subtidal sand habitat will benefit the juvenile stages while for southern calamary protection of the shallow seagrass beds (viz. *Amphibolis*) will benefit reproductive output. For sessile or sedentary species such as razorfish, protection of intertidal habitats is critical for the adult, post-larval and juvenile stages of their life cycles (Bryars, 2003). Other fished species which were not directly assessed but which will benefit from nursery habitat protection in the Upper Spencer Gulf Marine Park include western Australian salmon, Australian herring, and yelloweye mullet (Bryars, 2003).

Table 4-2 Potential first-order responses of some indicator species^a

Species	Life stages	Sanctuary Zones	Habitat usage	Zone visitation	Recruitment to zone	Recruitment source	Current status	Potential first order responses to zoning at 5, 10 and 20 years							Notes
								Measure	Scenario	5	10	20	Spill over	Larval export	
Snapper	Adult, sub-adult	6, 7	Reef, Sand	Resident & Temporary resident	Yes (sub-adults, adults)	Spencer Gulf	UNLL	Size	With Zoning	+	++	+++			Resident fish in the population have potential to increase in size and abundance inside SZs
							UNLL	Abundance	With Zoning	+	++	+++			
							UNLL	Size	Without Zoning	0	0	0			Assumes stocks will remain at current levels under current fisheries management
							UNLL	Abundance	Without Zoning	0	0	0			
							UNLL	Size	Net effect of Zoning	+	++	+++	✓	✓	
UNLL	Abundance	Net effect of Zoning	+	++	+++										
Giant cuttlefish	Adult	6	Reef	Temporary resident	N/A	N/A	UNLL	Abundance	With Zoning	?	?	?			SZ-6 is within an existing no-take closure for cuttlefish during the breeding aggregation
							UNLL	Abundance	Without Zoning	?	?	?			The cuttlefish aggregation is currently in a trend of long-term decline and predicting the future trend in the population is not possible
							UNLL	Abundance	Net effect of Zoning	0	0	0			The SZ will not add to the existing level of protection (see Case Study later)
							UNLL	Abundance	Net effect of Zoning	0	0	0			
Razorfish	Adult, sub-adult	3, 5	Sand, Seagrass	Resident	Yes (post-larvae)	Local	UNLL	Size	With Zoning	+	++	+++			
							UNLL	Abundance	With Zoning	+	++	+++			
							UNLL	Size	Without Zoning	0	0	0			Assumes stocks will remain at current levels under current fisheries management
							UNLL	Abundance	Without Zoning	0	0	0			
							UNLL	Size	Net effect of Zoning	+	++	+++	x	✓	
UNLL	Abundance	Net effect of Zoning	+	++	+++										
Western king prawn	Adult, sub-adult	HPZ-2	Sand	Temporary resident	N/A	N/A	UNLL	Size	With Zoning	+	+	+			Size and abundance may be increased inside no-trawling zones but will not increase beyond 5 years
							UNLL	Abundance	With Zoning	+	+	+			
							UNLL	Size	Without Zoning	0	0	0			Assumes stocks will remain at current levels under current fisheries management
							UNLL	Abundance	Without Zoning	0	0	0			
							UNLL	Size	Net effect of Zoning	+	+	+	x	✓	There is some uncertainty around whether HPZ-2 has actually been trawled previously
UNLL	Abundance	Net effect of Zoning	+	+	+										

Species	Life stages	Sanctuary Zones	Habitat usage	Zone visitation	Recruitment to zone	Recruitment source	Current status	Potential first order responses to zoning at 5, 10 and 20 years							Notes
								Measure	Scenario	5	10	20	Spill over	Larval export	
King George whiting	Sub-adult	6	Seagrass	Temporary resident	N/A	N/A	UNLL	Size	With Zoning	0	0	0			Abundance may be temporarily increased during times when fish aggregate but there will be no cumulative increase over time
							UNLL	Abundance	With Zoning	+	+	+			
							UNLL	Size	Without Zoning	0	0	0			Assumes stocks will remain at current levels under current fisheries management
							UNLL	Abundance	Without Zoning	0	0	0			
							UNLL	Size	Net effect of Zoning	0	0	0	x	x	Spawning occurs in other areas
							UNLL	Abundance	Net effect of Zoning	+	+	+			
Southern garfish	Adult, sub-adult	6	Seagrass	Temporary resident	N/A	N/A	UNLL	Size	With Zoning	0	0	0			Abundance may be temporarily increased during times when fish aggregate but there will be no cumulative increase over time
							UNLL	Abundance	With Zoning	+	+	+			
							UNLL	Size	Without Zoning	0	0	0			Assumes stocks will remain at current levels under current fisheries management
							UNLL	Abundance	Without Zoning	0	0	0			
							UNLL	Size	Net effect of Zoning	0	0	0	x	?	Spawning locations are unknown
							UNLL	Abundance	Net effect of Zoning	+	+	+			
Blue swimmer crab	Adult, sub-adult	6	Seagrass	Temporary resident	N/A	N/A	UNLL	Size	With Zoning	0	0	0			Abundance may be temporarily increased during times when crabs aggregate but there will be no cumulative increase over time
							UNLL	Abundance	With Zoning	+	+	+			
							UNLL	Size	Without Zoning	0	0	0			Assumes stocks will remain at current levels under current fisheries management
							UNLL	Abundance	Without Zoning	0	0	0			
							UNLL	Size	Net effect of Zoning	0	0	0	x	✓	Potential for larval export if reproductive success is increased inside SZ
							UNLL	Abundance	Net effect of Zoning	+	+	+			
Blue swimmer crab	Adult, sub-adult	8	Seagrass	Temporary resident	N/A	N/A	UNLL	Size	With Zoning	0	0	0			Abundance may be temporarily increased during times when crabs aggregate but there will be no cumulative increase over time
							UNLL	Abundance	With Zoning	+	+	+			
							UNLL	Size	Without Zoning	0	0	0			SZ-8 is within an existing no-take Aquatic Reserve, but the take of blue swimmer crab is currently allowed in part of the reserve
							UNLL	Abundance	Without Zoning	0	0	0			
							UNLL	Size	Net effect of Zoning	0	0	0	x	✓	Potential for larval export if reproductive success is increased inside SZ
							UNLL	Abundance	Net effect of Zoning	+	+	+			

^a This table must be read in conjunction with the methods and assumptions detailed in Appendix 1.3 of the Main Report.

Labels in 'Sanctuary Zone' column refer to Appendix Figure 5-1, and are for SZs unless otherwise specified.

Life history information with supporting references is detailed in Appendix 3 of the Main Report.

Current status: UNLL = unnaturally low level compared to pre-fishing; NL = natural level compared to pre-fishing. A pre-fishing baseline was required to enable future predictions of change. A current status of UNLL does not necessarily imply that fisheries exploitation of the species is unsustainable.

The + and – symbols do not indicate the magnitude of a change, but are intended to be indicative of the trend over time. The potential responses do not take into account predator/prey interactions that are discussed in Section 4.1.3 below.

Table 4-3 Other species which may respond to or benefit from protection

Common name	Species name
Black Bream	<i>Acanthopagrus butcheri</i>
Bronze whaler	<i>Carcharhinus brachyurus</i>
Dusky whaler	<i>Carcharhinus obscurus</i>
Estuary catfish	<i>Cnidoglanis macrocephalus</i>
Greenback flounder	<i>Rhombosolea tapirina</i>
Hammer oyster	<i>Malleus meridianus</i>
King scallop	<i>Pecten fumatus</i>
Leafy seadragon	<i>Phycodurus eques</i>
Longsnout flounder	<i>Ammotretis rostratus</i>
Mulloway	<i>Argyrosomus japonicus</i>
Polychaete worms	Polychaete worms
Port Jackson shark	<i>Heterodontus portusjacksoni</i>
Purple urchin	<i>Heliocidaris erythrogramma</i>
Queen scallop	<i>Equichlamys bifrons</i>
Sand flathead	<i>Platycephalus bassensis</i>
Seagrass swimmer crab	<i>Nectocarcinus integrifrons</i>
Smalltooth flounder	<i>Pseudorhombus jenynsii</i>
Southern fiddler ray	<i>Trygonorrhina dumerilii</i>
Southern silverbelly	<i>Parequula melbournensis</i>
Sponges	Sponges
Spotted pipefish	<i>Stigmatopora argus</i>
Tiger pipefish	<i>Filicampus tigris</i>
Weeping toadfish	<i>Torquigener pleurogramma</i>
Yellowtail kingfish	<i>Seriola lalandi</i>

4.1.2.3 Other species

There are numerous species that are neither listed as protected/threatened nor fished but which may also benefit from maintenance and/or improvement of habitats and ecological processes in the park. Representatives of such species (see Appendix 2 of the Main Report) in the Upper Spencer Gulf Marine Park include: brittlestars, featherstar (*Cenolia trichoptera*), eleven-armed seastar (*Coscinasterias muricata*), Roe's abalone (*Haliotis roei*), blue-ringed octopus (*Hapalochlaena maculosa*), isopods, *Phasianotrochus eximius*, *Phasianotrochus irisodontes*, tulip shell (*Pleuroploca australasia*), Haswell's shore crab (*Helograpsus haswellianus*), *Salinator fragilis*, air breathing gastropod (*Marinula xanthosoma*), sea tulips (*Pyura* spp.), *Thalotia conica*, canopy-forming macroalgae (*Cystophora* spp., *Sargassum* spp. and *Scaberia agardhii*), meadow-forming seagrasses (*Posidonia* spp., *Amphibolis* spp.), mangrove (*Avicennia marina*), and *Sarcocornia quinqueflora*.

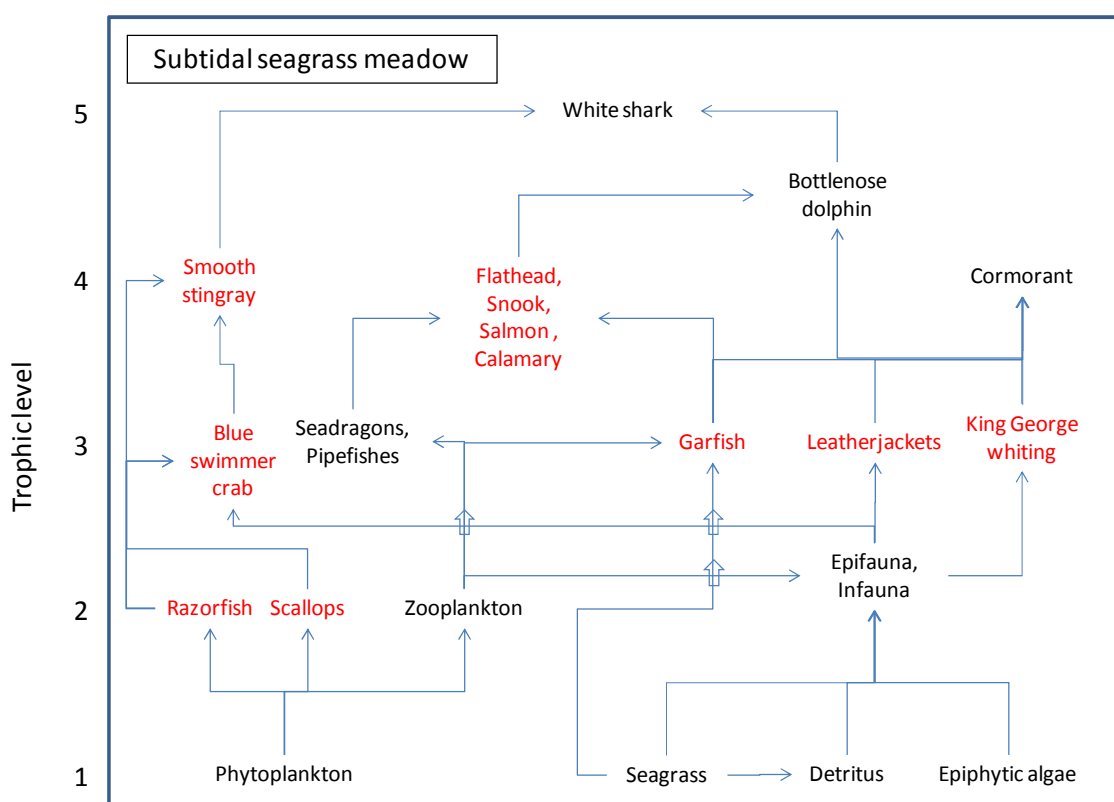
4.1.3 Ecosystems

The current state of the ecosystems in the park generally reflects the condition of the component habitats and species documented above. Similarly, responses of the ecosystem to the proposed management changes are informed by the predictions for habitats and species above. The proposed management changes also provide for the restoration of more natural predator-prey relationships (among other interactions) for

the more resident species within SZs of an appropriate size. This may result in increased abundances of some species, but decreases for others. Most notably, changes might be expected in the ecosystems of SZ-6 where several first-order fished species changes have been predicted to occur (see Section 4.1.2.2 earlier).

As an example of possible ecosystem interactions, Figure 4–1 shows a conceptual food web for a subtidal seagrass meadow indicating how changes in abundance of fished species may affect other species. Restoration and ongoing protection of habitats (particularly at lower trophic levels) should also provide long-term benefits for the ecosystem.

Figure 4–1 Simplified conceptual food web for subtidal seagrass meadow



Note: This figure shows links between a variety of species across all trophic levels and indicating those species that interact with fishing (highlighted in red). See Appendix 6 of the Main Report for further details about the food web.

Importantly, there are strong linkages between saltmarsh, mangrove, intertidal sand, intertidal seagrass and subtidal seagrass food webs (see food webs in Appendix 6 of the Main Report).

Natural food webs cannot be fully restored, due to the scales over which the more mobile higher- and middle-order fished species range. However, some increase in abundance of such species is expected as a result of the proposed overall reduction of fishing effort in the marine scalefish and charter fisheries, as per the PIRSA (2011) policy position, and there may be localised flow-on effects for food webs inside the marine parks.

It is also apparent from the simplified food webs (see Figure 4–1 and Appendix 6 of Main Report) that many fished species (shown in red text) and non-fished species are ultimately reliant upon the maintenance of habitat-forming species (such as

macroalgae and seagrasses) which lie at or near the base of the food webs, and it is these very habitats that will receive a high level of protection within the marine parks network. Thus the marine parks network will have a positive long-term impact on ecosystems regardless of whether there are zone-specific responses following implementation of the management plans.

4.1.4 Case study - Giant Australian cuttlefish and subtidal reef at Point Lowly

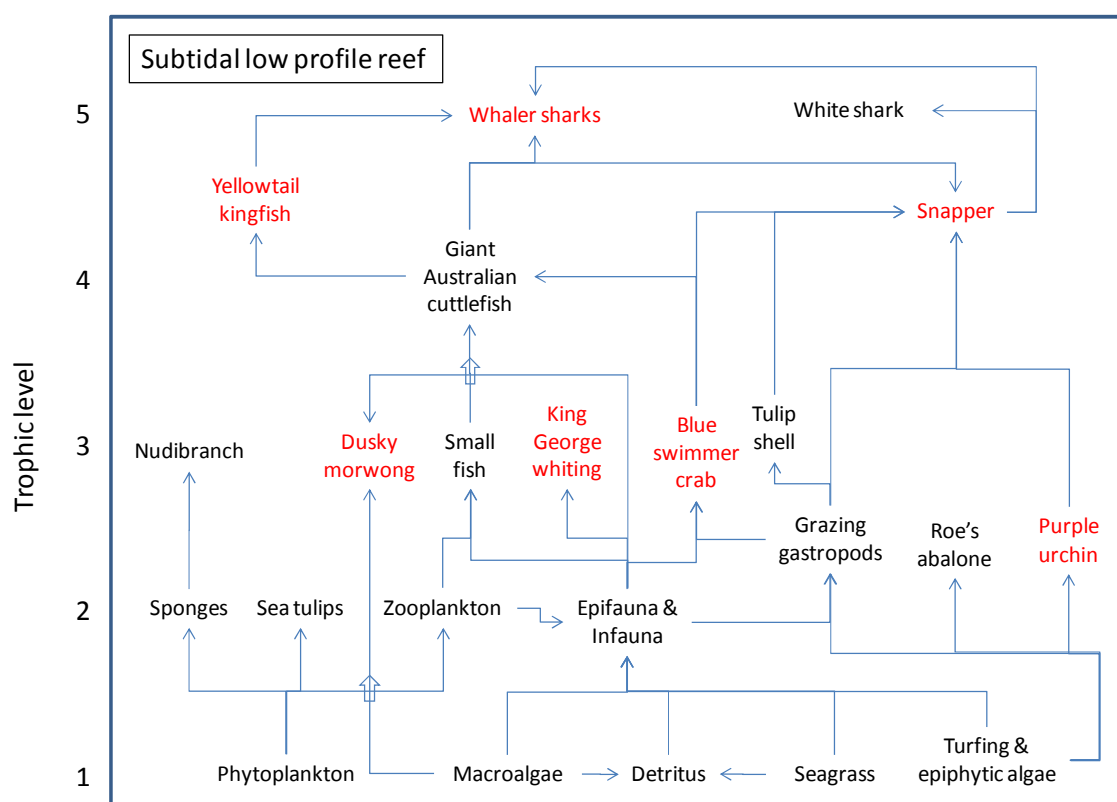
Each winter tens of thousands of giant Australian cuttlefish aggregate at the inshore reefs in the Point Lowly region to mate and lay their eggs (see Appendix 3 of the Main Report for a profile of this species). Recent studies have indicated that these cuttlefish originate from across northern Spencer Gulf and that they may be a separate sub-population to the other giant Australian cuttlefish populations across southern Australia (Gillanders and Donnellan, unpublished data, B. Gillanders pers. comm., November 2011). The reason that they aggregate at Point Lowly is because they require hard substrate (reef) to attach their eggs and there is very little suitable reef in other parts of northern Spencer Gulf. Many of the cuttlefish die following mating, but there is a proportion of the population that returns again the following year to repeat the process before dying (no cuttlefish live beyond two years) (Hall et al., 2007). If there is recruitment failure in successive years then the entire population could be at risk. The aggregation is internationally renowned and attracts tourist attention due to the sheer number of cuttlefish and their elaborate, colourful mating rituals. The proposed SZ at Point Lowly (SZ-6) encompasses a significant amount (but not all) of the cuttlefish breeding reef in the area. The sanctuary zone should assist with protection of this critical reef habitat from damaging activities that might be proposed in the future.

Historically the cuttlefish aggregations supported a small commercial bait fishery with annual catches rarely exceeding four tonnes, but this rapidly increased to approximately 250 tonnes in 1997 in an attempt to develop a niche fishery (Steer and Hall, 2005). Due to concerns of overharvesting, a spatial closure for the take of all cephalopods (cuttlefish, southern calamary and octopus) was introduced across False Bay under the *Fisheries Management Act 2007*. The closure has remained in place since 1998 and encompasses most of the reef that is used for breeding in the region, but does not prevent fishing inside False Bay (the take of cephalopods is prohibited and targeting which is generally done by jigging is not allowed). However, despite the closure, the giant Australian cuttlefish breeding aggregation at Point Lowly has been in decline for some years (Hall, 2012), and is considered to be at an unnaturally low level. A number of possible anthropogenic threats and environmental drivers have been linked with the decline, but the cause remains unknown. Due to the fishing closure, localised fishing cannot be considered as a current threat (unless there is mortality from interactions of cuttlefish with fishing techniques other than jigging, e.g. line and hook, which is doubtful). The Upper Spencer Gulf Marine Park lies within a region that is heavily industrialised with several known sources of pollution. Commercial and recreational fishing also occurs for cephalopods (including as prawn trawl bycatch) and other species in the region outside the cuttlefish closure. Negative ecosystem interactions, e.g. with snapper, or dolphins, also cannot be discounted.

The proposed SZ will not allow fishing (of any form) throughout the entire zone. The current level of protection (under the *Fisheries Management Act 2007*) that prevents take of cephalopods in False Bay is assumed to remain under the proposed park zoning and management arrangements. Thus the proposed SZ would sit inside the False Bay closed area. While the proposed SZ does provide an additional level of protection from all forms of fishing, fishing within the proposed SZ is not a current threat to giant Australian cuttlefish. However, a consideration with the introduction of

the SZ is that some fishes (such as snapper) may increase in abundance inside the SZ (see Section 4.1.2.2) and higher order ecosystem interactions may occur that negatively influence the abundance of cuttlefish during the aggregation. Thus, in the absence of detailed ecosystem models it cannot be assumed that the giant Australian cuttlefish aggregation will respond positively to the zoning as the threatening processes are not understood and may require other management actions. In addition, further industrial development is planned for the Point Lowly region (see Section 4.2.7 below), and the potential cumulative impacts of these developments (in addition to existing activities and uses) on the reef habitat and cuttlefish are unknown.

Figure 4–2 Simplified conceptual food web for subtidal low profile reef at Point Lowly



Note: showing links between a variety of species across all trophic levels and indicating those species that interact with fishing (highlighted in red). Giant Australian cuttlefish is not highlighted in red as it is currently protected from fishing within the proposed sanctuary zone. See Appendix 6 of the Main Report for further details about the food web.

4.2 Economic

4.2.1 Commercial Fishing

The analysis of the impact of displaced catch and/or effort on commercial fishing is based on:

- Estimates of displaced catch and/or effort provided by the South Australian Research and Development Institute (Ward and Burch 2012).
- PIRSA Fisheries and Aquaculture policy position on redistribution of displaced commercial fishing, which states that the displaced catch for

sardines can be redistributed, for prawns can be redistributed up to 2 per cent of total fishery catch, and for other fisheries cannot be redistributed (PIRSA 2011). For fisheries where displaced catch cannot be redistributed it is assumed that the displaced effort will be removed from the fishery.

For some fisheries, the relevant fishing industry association has undertaken their own assessment of displaced catch/effort. The methods and data used to make these industry assessments will be reviewed by SARDI (DEWNR pers. comm., 6 July 2012). Analysis of the impact of displaced catch/effort on commercial fishing based on these industry estimates has been included in the following sections.

4.2.1.1 Summary

The estimated economic impacts on commercial fisheries, based on SARDI's average annual displaced catches and corresponding average annual prices, are relatively small for the Upper Spencer Gulf Marine Park. The State Government has committed to buy out licences and quota entitlements of displaced effort and catch although details of the buyout are yet to be finalised. Compensation payments have the potential to at least partially offset the negative impact of the displaced catch, estimated to have an annual average GVP of \$39,000. If compensation is limited to the buyout of displaced fishing entitlements, the negative impacts on the local economy are unlikely to be fully offset:

- There would be no requirement for the recipients of the buyout to spend or invest the funds in the region.
- Even if all the funds were invested in full in the region it is unlikely the investment would generate economic activity and wealth equivalent to that generated by the displaced fishing activity. This is because fishers have the opportunity to sell their licences at any time (they are fully transferable) but choose not to. If there were alternative investment opportunities locally that fishers had the skill and risk bearing capacity to undertake, then it is reasonable to assume that they would already be doing it.

For entitlement holders there are potentially direct financial losses suffered as a direct consequence of the cancellation of their entitlement. These could take the form of:

- a pecuniary loss such as removal and re-establishment costs or legal costs in acquiring a replacement licence/entitlements
- a capital loss of business operation - the loss of a partial entitlement or the location of sanctuary zones may negatively impact the efficiency of business operations, which might in turn impact on the market value of plant and equipment, as well as the market value of remaining fishing entitlements held by the licence holder.

4.2.1.2 Sardines

SARDI estimates of historical catch in draft sanctuary zones indicate that there would be nil catch displaced from this marine park.

4.2.1.3 Prawns

SARDI estimates indicate that historically there has been minimal catch of prawns in the draft sanctuary zones in this marine park, i.e. an average annual catch of less than 10 kg.

4.2.1.4 Marine Scalefish

The following analysis, based on SARDI estimates, assumes that the fishing effort previously occurring in the sanctuary zones will be removed from the fishery.

SARDI estimates of historic effort in draft sanctuary zones for the Marine Scalefish Fishery are provided in Table 4-4 and historic catch for the main fishery species in Table 4-5. The total sanctuary zone catch of marine scalefish represents 0.76 per cent of the average annual catch in the Upper Spencer Gulf region.

The value of the sanctuary zone catch is estimated to be approximately \$20,000.

Table 4-4 Average annual Marine Scalefish effort in draft sanctuary zones by sector

Sector	Sanctuary zone effort (person days)	% effort of sector
Handline	50	0.18
Haulnet	9	0.67
Longline	37	0.67
Other	13	0.06

Notes: Handline, longline and other gear sectors based on 10 years of data, haulnet based on 3 years of data

Source: Ward and Burch 2012.

Table 4-5 Average annual Marine Scalefish catch in draft sanctuary zones by main species

Species	Sanctuary zone catch (kg)	% species catch in fishery
Garfish	565	0.20
King George whiting	74	0.02
Snapper	1,478	0.19
Southern calamary	201	0.06

Notes: based on 3 years of data

Source: Ward and Burch 2012.

4.2.1.5 Blue Crab

SARDI estimates indicate that historically there has been an average annual catch of 436 kg of blue crabs in the draft sanctuary zones in this marine park. This represents 0.08 per cent of the Spencer Gulf Blue Crab Fishery average annual catch or 0.43 per cent of the average annual catch in the Upper Spencer Gulf region. The value of the sanctuary zone catch is approximately \$4,000.

4.2.1.6 Charter Boat

SARDI estimates indicate that historically there has been an average annual charter boat effort of 58 person days in the draft sanctuary zones in this marine park. This represents 0.27 per cent of the average annual effort for the charter boat industry or 12.1 per cent of the average annual catch in the Upper Spencer Gulf region. The value of this displaced effort is estimated to be approximately \$15,000.

4.2.2 Aquaculture

There are no known current or potential impacts expected from the draft zoning on current or future aquaculture enterprises in marine parks. This is consistent with Government policy commitments. Any potential future prescribed criteria in aquaculture zone polices derived from Section 11 (3a) of the *Aquaculture Act 2001* could add cost to existing or future aquaculture activities, or have additional regulatory impact (PIRSA, pers. comm., 7 November 2011). However, no such prescribed criteria currently exist and potential impacts have not been assessed.

4.2.3 Property Prices

Given that the overall impact on the region is not expected to be large in absolute terms, the impact on property values is, similarly, not expected to be significant. States of Australia have introduced marine parks with sanctuary zones in the last decade without any known long-term effects on property values. External factors notwithstanding, the trend in Upper Spencer Gulf residential property prices illustrated in the regional socio-economic profile is unlikely to be affected by the proposed marine park zoning.

4.2.4 Tourism

The following assessment is based on discussions with the South Australian Tourism Commission, local councils and local offices of Regional Development Australia.

As discussed in section 4.3.5.2, the actual placement of sanctuary zones is unlikely to place real restriction on recreational fishing, with the exception of Black Point. However the perception that recreational fishing opportunities will be restricted by implementing 'no take' zones is real (for example, the charter boat industry has identified that they have benefited from an increased number of interstate clients in recent years who come to South Australia to fish because SA waters do not have marine park 'no take' zones). So there is potential for a downturn in fishing-based tourism in the short-term until visitors are informed and convinced of the actual situation on the water.

At least one ecotourism business operates in this park. It is an industry in its infancy and is expected to grow, however is unlikely to grow into a large industry because of the natural limitations of rough seas, cold water and sharks. Several organisations raised the issue of operator permits being a key factor in the ability of the industry to grow. In the past, one-year, renewable permits (issued under the *National Parks and Wildlife Act 1972*) were available which is viewed as a barrier to investment in this area. The permitting policy is being changed, with far greater flexibility on the length of time permits can be held, ranging from two-month permits up to 10-year permits⁵ which

⁵ See DEWNR's current *Commercial Tour Operators' Licensing and Permitting Policy* at http://www.environment.sa.gov.au/parks/Get_Involved/Commercial_Tour_Operators

is seen as likely to boost business investment. There will be situations where eco-tourism operations will occur within sanctuary zones which may benefit from zoning by, for example, not having to share the space with fishers. In the long-term managed marine parks will provide certainty that the marine environment within them is being protected and this is likely to support the ecotourism industry, provided the necessary investment in tourism infrastructure and support services is undertaken.

Other, non-extractive tourism, such as diving, is likely to benefit from the implementation of sanctuary zones however more detailed assessment has not been possible.

4.2.5 Port, Harbour and Shipping Operations

The existing arrangement where shipping, ports and harbour activities are managed pursuant to the *Harbours and Navigation Act 1993* will remain. This includes dredging and channel maintenance, development or improvement of facilities for anchorage, vessel maintenance, loading, unloading and storage of goods, associated commercial and industrial development, sporting and recreational purposes. Under the Government policy commitment on shipping and harbours, all harbours declared under provisions of the *Harbours and Navigation Act 1993* will be zoned special purpose areas. Current and future operations in harbours will not be affected and have been accommodated within marine parks as reflected in the draft management plan zoning.

The shipping industry has suggested that marine park zoning may place potential restrictions on port, harbour and shipping facilities through zoning restrictions. The draft management plans have been prepared in such a way as to minimise any such restrictions and all ports have been excluded from marine parks.

It should be noted that aids to navigation and markers are permitted in any waters in any marine park.

The harbours of Port Augusta, Port Bonython, Port Pirie and Whyalla have been declared special purpose areas, consistent with the Government policy commitment on shipping and harbours. There is considerable shipping and port activity in this park. Whyalla, Port Bonython and Port Pirie are major shipping and industrial hubs and, as either a port or an indentured area, excluded from the marine park.

Due to significant economic development expected over the next ten years in the Upper Spencer Gulf, the sanctuary and habitat protection zones of the Upper Spencer Gulf Marine Park has been declared a special purpose area, permitting specified activities.

Notwithstanding the zoning of the area, the following activities will be permitted in the Upper Spencer Gulf Marine Park:

- activities comprising a development or project, or that part of a development or project, within the ambit of a declaration under section 46 of the *Development Act 1993*; and
- activities comprising development approved under section 49 (Crown development and public infrastructure) or section 49A (Electricity infrastructure development) of the *Development Act 1993*.

Currently there are about 360 vessel movements per year and this is expected to increase to over 1,000 movements by 2020. In addition there are many barge

movements transshipping cargo to vessels moored in deeper waters. For example, on average 16 barges (i.e. 32 ship movements) are required to tranship iron ore from Whyalla to one Panamax size vessel. Should the Olympic Dam expansion proceed, BHP proposes to barge equipment from a transshipment point near Point Lowly to a landing facility 12 km south of Port Augusta at Snapper Point. There is potential for congestion in this area if the various proposed mining developments take place, and access to suitable transshipment points is critical. To facilitate the movement of vessels, a large body of water immediately south of the marine park will be notated on navigation charts for large vessel anchoring.

No significant impacts on shipping activities arising from the zoning in this park are expected, which is consistent with Government policy commitments.

4.2.6 Mining

The existing arrangements where DMITRE Minerals and Energy Resources Division oversee activities that support the mineral, petroleum and geothermal resource industries, pursuant to the *Mining Act 1972*, the *Petroleum and Geothermal Energy Act 2000*, the *Offshore Minerals Act 2000* and the *Petroleum (Submerged Lands) Act 1982*, will remain. All existing licences and leases will be accommodated with no change to existing conditions. Applications for new or renewal of licences and leases within and adjacent to marine parks will require the concurrence of the Minister responsible for marine parks under related amendments to the *Mining Act 1972* and the *Petroleum and Geothermal Energy Act 2000*. Where the proposed activity is consistent with the zoning regulations, no further approvals or permits will be required, apart from those required under legislation administered by DMITRE Minerals and Energy Resources Division. Section 19 of the *Marine Parks Act 2007* provides for consideration of activities that are inconsistent with marine park zoning regulations on a case-by-case basis with rigorous assessment and approval processes and due consideration of risk to environmental values (e.g. to consider new/emerging lower impact technologies). The Minister responsible for marine parks will be required to issue a special permit in such cases.

Part of Pipeline Licence 1 (Moomba-Adelaide) is located across the park leading to Whyalla. This pipeline transports natural gas, and is declared a special purpose area.

There are two mining leases partially within and two mining leases adjacent to the park near Whyalla. Southeast of Port Augusta, near Port Paterson, there are two mineral retention leases partially within the park for salt extraction. A mining claim exists within the park for metallic minerals offshore from Whyalla. Five mineral exploration licence applications overlap parts of this marine park. A further three mineral exploration licence applications have been made adjacent to the marine park.

A petroleum exploration licence has been applied for which covers the southern end of the marine park from Cowleds Landing to Weerona Island. This application covers the expected extent of a coal basin across both the Eyre Peninsula and the Upper Spencer Gulf. (PIRSA MER, pers. comm., 8 September 2011). Another petroleum exploration licence application rings the marine park and abuts the park boundaries at Point Paterson and Webb Beach.

Four geothermal exploration licence application overlaps parts of this marine park, and two geothermal exploration licences are located immediately adjacent to the marine park.

As mentioned above, conditions attached to existing licences will not change and the operations to which these licences refer to will not be affected by zoning. Licence applications will be required to go through a joint approval process administered by DMITRE and DEWNR, which may be a potentially lengthier and therefore more costly process to the applicant. Zoning limits the types of exploration and extraction activities permitted (see Appendix 2, Resource Exploration and Production tables). The geophysical and geological knowledge of the SA marine areas is very limited to non-existent and mining investors must invest significantly in exploration, and are unlikely to proceed if there is uncertainty surrounding whether the production activity will be granted a licence. A mineral exploration licence applicant has highlighted this concern and is reconsidering its intent to pursue exploration activities in this marine park (Spencer Metals, pers. comm., 30 July 2012).

4.2.7 Coastal Development

Marine parks will not prevent coastal developments approved under the *Development Act 1993*. Coastal developments and infrastructure are regulated under the provisions of the *Development Act 1993* with developments considered on a case by case basis by the relevant authorities to ensure that the achievement of the objects of the *Marine Parks Act 2007* and the aims of the specific zone where the development is proposed are supported appropriately. As part of the assessment process, advice or direction may be required from the Coast Protection Board and/or the Environment Protection Authority and other authorities, depending on the nature of the development. Development plans and significant projects are informed by the Planning Strategy which now includes the objects of the *Marine Parks Act 2007*.

The proclamation of the marine parks network will not affect access to, or use of, jetties, breakwalls or boat ramps.

Due to extensive development expected over the next ten years in the Upper Spencer Gulf, the sanctuary and habitat protection zones of the Upper Spencer Gulf Marine Park will be declared a Special Purpose Area. Existing coastal infrastructure within the park includes:

- Submarine water pipeline from Mambray Creek to Douglas Point
- Submarine gas pipeline from Mambray Creek to Douglas Point
- Electricity lines from Pyl to Curlew Point
- Two power stations at Port Augusta
- Submarine communication cables from Point Riley to Shoalwater Point
- Bridges and underlying corridors in Port Augusta

Notwithstanding the zoning of the area, the following activities will be permitted in the Upper Spencer Gulf Marine Park:

- activities comprising a development or project, or that part of a development or project, within the ambit of a declaration under section 46 of the *Development Act 1993*; and
- activities comprising development approved under section 49 (Crown development and public infrastructure) or section 49A (Electricity infrastructure development) of the *Development Act 1993*.

These include:

- Expansion of existing harbour facilities within OneSteel's indentured area at Whyalla to cater for an expansion of iron ore shipment from 6 million to 12 million tonnes per year
- Expansion of port facilities at Port Pirie to cater for a potential expansion in shipments of coal and/or iron ore
- Expansion at Port Bonython, including further development of industrial area and a second bulk commodity jetty
- A proposed desalination plant at Port Bonython
- A proposed landing facility at Snapper Point to support the expansion of BHP Billiton's Olympic Dam Project
- A number of proposed transshipment points to support the mining industry
- A proposal for a gas-boosted solar-thermal power/desalination plant on land north of SZ-3
- A proposal for a harbour in Fitzgerald Bay to support kingfish aquaculture activities
- Other infrastructure to support the export of bulk commodities, such as submarine pipelines to transfer slurried ore to vessels.

4.3 Social

4.3.1 Summary of method

The social impact assessment drew on multiple sources of information – a review of research relating to established marine parks elsewhere in Australia and overseas; an analysis of market research undertaken in relation to South Australian marine parks; an analysis of MPLAG minutes and of media reports relating to each park, a review of the social values statement prepared for the park, and analysis of the economic impacts identified.

Finally a Marine Parks Social Impact Assessment Tool (MPSIAT) was designed which sought feedback from MPLAG members on different types of social impact expected to flow from preliminary zoning options considered prior to the draft zones presented within the draft management plans.

The findings from these different sources were analysed separately and in combination to determine overall expected social impacts.

Although this report presents impact analysis relating to the draft zones, the MPSIAT findings are included because they represent part of the community consultation process and the draft zones reflect the SA government's response to the findings of that process.

Nine of 15 members⁶ (60 per cent) of the Upper Spencer Gulf MPLAG responded to the online social impact assessment for the Upper Spencer Gulf Marine Park.

4.3.2 Expected social impacts – at a glance

The overall social impacts of the Upper Spencer Gulf Marine Park on communities living in the region of are expected to be low given the magnitude of the economic impacts that have been projected. Commercial fishing is not among the four top industry sources of employment but is estimated to contribute 62 jobs to employment in the region, compared with tourism which contributes 740 jobs. Economic impacts from displaced commercial fishing in the park were too small to model and less than one fte job loss is anticipated. The State Government has committed to buy out licences and quota entitlements to offset any unsustainable displaced effort and catch. Although details of the buyout are yet to be finalised, any such payments have the potential to at least partially offset the negative impacts outlined above.

The impact on recreational fishing is considered to be low (except for the area associated with Black Point), with adjustments in zoning designed to minimise any potential negative impacts. Consequently, any impact on local community identity as a fishing centre, and on fishing as a way of life is also likely to be low.

A critical factor in determining the ultimate impact of marine parks is how well local communities are able to adapt to change and how cohesive they are in supporting each other through change. Feedback provide for the social impact assessment indicates that local communities are expected by most to be sufficiently resilient to manage these changes brought about by marine park zoning.

Experience elsewhere in Australia and internationally (Ledee *et al* 2011, Cocklin *et al* 1998), suggests that a range of benefits from the establishment of marine parks become evident over time. These include increased opportunities for education about marine life and conservation, and increased tourism and ecotourism opportunities. This experience indicates that these benefits usually take approximately five years to be evident, and that in the earliest stages of marine protected areas being developed, communities are more likely to identify possible negative impacts than potential benefits. It takes time to observe how the park's ecological and economic impacts evolve, with social impacts (positive or negative) flowing from these.

Certainly at this stage of the South Australian marine parks' development, monitoring of media reports, feedback from MPLAGs and analysis of their meeting discussions, illustrates the trend to expect the changes associated with their development to be problematic. One very important factor that affects community attitudes is how informed they are, and feedback from market research and MPLAGs, as well as analysis of media reports indicates a gap in this information. In particular, increasing communities' understanding of the scientific rationale underpinning marine protected areas, and the benefits that these can bring, needs to be enhanced.

Marine parks have broad support in the South Australian community. Market research commissioned by the state government between 2006 and 2012 (McGregor Tan Research 2006, 2007, 2008 and 2009; Square Holes 2009, 2011 and 2012) found strong support for the concept of marine parks among South Australians with approximately 85 per cent in favour of them in 2012 (87 per cent support in

⁶ Any MPLAG members who indicated they did not wish to participate in the social impact assessment a priori were not approached.

metropolitan Adelaide and 82 per cent support in regional areas). People interviewed for this research were able to identify seven main benefits arising from marine parks:

1. preservation of the environment for future generations
2. protection and conservation of marine habitats and wildlife
3. increases in fish stocks
4. greater opportunities for scientific research and education
5. greater opportunities for nature based tourism and recreation
6. protection of cultural and heritage sites
7. greater certainty for marine industries and users.

The research found in 2011 and again in 2012 that 88 per cent believe that protection of the marine environment through managed marine parks is the responsibility of current generations for the benefit of future generations.

The market research found that loss of commercial benefits is a particular concern, particularly for those living in regional areas (33 per cent in 2012) compared with those in metropolitan Adelaide (22 per cent in 2012). Those least likely to support marine parks have been fishing groups (in 2009 55 per cent of respondents who did not support marine parks identified restricted fishing as the reason, this dropped to 39 per cent in 2012).

Between 2011 and 2012 the market research findings identify a decline in those who believe they will have limited access to marine parks and an increase in those who associate swimming, boating and snorkelling with marine parks.

4.3.3 Education and Wellbeing

There is a diversity of views among MPSIAT respondents about whether the marine park zoning will provide increased opportunities for education about marine life or improve understanding about marine conservation issues. However, international researchers confirm that this is a key outcome and benefit of marine protected areas (Angulo-Valdes and Hatcher 2010). The establishment of marine parks is likely to attract domestic and international interest from researchers and be the focus of conservation focused education initiatives.

4.3.4 Culture and Heritage

DEWNR undertook a process of consultation with Aboriginal stakeholders about the establishment of the marine parks. No significant negative impacts on Aboriginal communities were identified. However, it is important that further consultation be undertaken in relation to the likely impact of the draft zoning.

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, Indigenous Land Use Agreements and Native Title considerations are being taken into account in developing the management plan for the Upper Spencer Gulf Marine Park.

The Nukunu, Kujani, Kokatha and Barngarla 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. The Nukunu (1996) and Barngarla (1996) people have lodged native title claims that contain parts of the Upper Spencer Gulf Marine Park. Aboriginal campsites have been located within Winninowie Conservation Park and a further ten campsites have been recorded nearby. Fish traps have been recorded along the shores of Fitzgerald Bay.

MPSIAT respondents held varied views about the likelihood of the marine park MPLAG zoning advice helping to maintain local Australian culture and heritage or the local community's identity as a fishing centre.

The impact on community identity is too early to determine at this stage, but given the low impact expected on fishing, it is unlikely that their negative expectations will be realised. Furthermore, there will be different groups within the community with varying degrees of attachment to identity as a fishing centre, just as there will be a range of views about being identified as a place of ecological value.

4.3.5 Recreation and Fishing

4.3.5.1 Recreation

A minority of MPSIAT respondents expected that the MPLAG zoning would encourage more recreational activity, a greater range of recreational activities and improved recreational facilities (see Appendix Table 4-4).

4.3.5.2 Recreational Fishing

The following assessment is based mainly on the SAMPIT mapping⁷, with material from separate interviews with the South Australian Recreational Fishing Advisory Council (SARFAC) and the DEWNR project coordinators who facilitated the MPLAG process, where appropriate.

Recreational fishing occurs:

- Whyalla. There is no sanctuary zone proposed for here.
- Black Point, around Point Lowly and into Fitzgerald Bay. SZ-6 is located around Black Point and will have impact. This sanctuary zone covers part of the Giant Australian cuttlefish aggregation grounds.
- Backy Point. There is no sanctuary zone proposed for here.
- From Yalata Harbor North to Port Augusta. Sanctuary zones 1, 2, 3, 4 and 5 avoid the heavily fished areas in this section.

With the exception of Black Point, there is limited impact expected from the sanctuary zones proposed.

⁷ The South Australian Marine Parks Information Tool (SAMPIT) is a computer tool designed to gather information from community members about their favourite fishing spots and areas they believe need protection. Data is collected and reported by 'grid cell'. SAMPIT data for 1,739 people is available including 1311 recreational fishers. Quality control by the Department of Environment and Natural Resources included cross-verification of legitimate naming and activities from the data provided (DENR 2010b).

4.3.5.3 Commercial Fishing

The overall social impacts of the Upper Spencer Gulf Marine Park on communities living in the region are expected to be low given the magnitude of the economic impacts that have been projected. Economic impacts from displaced commercial fishing in the park were too small to model and less than one fte job loss is anticipated. Commercial fishing is not among the four top industry sources of employment but is estimated to contribute 62 jobs to employment in the region, compared with tourism which contributes 740 jobs. The State Government has committed to buy out licences and quota entitlements to offset any unsustainable displaced effort and catch. Although details of the buyout are yet to be finalised, any such payments have the potential to at least partially offset the negative impacts outlined above. Consequently, any impact on local community identity as a fishing centre, and on fishing as a way of life is also likely to be low.

The following potential social impacts have been identified for the prawn and marine scalefish fisheries.

Australian researchers have identified the potential psychological impacts on fishing families arising from uncertainty about fishing business viability, reduced family income, reduced self-esteem arising from the loss of fishing occupation and the difficulty of finding alternative employment in the region (Schirmer et al. 2004: 7-8). Much depends on individual fishers' capacity to adapt which in turn has been found to depend on their financial situation, ability to work elsewhere, business skills and willingness to accept rather than resist change (Marshall and Marshall 2007). This diversity means that fishers will vary significantly in the way marine parks affect them, and will have differing views on that impact, as is reflected in Appendix Table 4-4.

Furthermore, there is minimal research on the social impacts of marine parks on commercial fishers and their families in particular, and on communities as a whole (Voyer 2011, 2012, Beeton et al 2012, Fairweather et al 2009). The Great Barrier Reef Marine Park Authority is cited as one exception to this trend (Voyer et al 2012, Beeton et al 2012) while social impact research has also been undertaken in relation to Ningaloo Marine Park in Western Australia (Northcote & Macbeth 2008).

By contrast, economic impacts of marine parks have been significantly more researched. Australian researchers have found that most commercial fishers have adapted their fishing activity and fishing business at least moderately well in the five years following implementation of the 2004 Great Barrier Reef Marine Park rezoning, leading them to conclude that many of the impacts experienced by fishers might be short-term and decline over time as fishers adapt to the change (Ledee et al. 2011: 8). Similarly, research undertaken in New Zealand's Leigh Marine Reserve has found that almost two decades after it was established in 1975, commercial and recreational fishers reported that fishing outside the boundaries had improved over time (Cocklin et al. 1998).

4.3.6 Local Government, Population and Housing

4.3.6.1 Local Government

Through the SA Regional Organisations of Councils, facilitated by the Local Government Association SA, all local government councils which border marine parks

in SA were invited to participate in a survey about potential impact of marine park zoning on council operations, council infrastructure and council revenues.

No local council responded. However, based on the response from other local councils and on the expected social and economic impacts, no impacts on local government operations, infrastructure and revenue or compliance related activities are expected as a result of the proposed draft zoning.

4.3.6.2 Population and housing

Economic impacts from displaced commercial fishing in the park were too small to model. There is low regional unemployment but moderate to high levels of measured relative disadvantage. Depending on the skills match, this suggests that alternative regional opportunities for unemployed labour may be available over time. Any jobs impact on the fishing industry is expected to be minimal and is not expected to have impact on the regional population or housing.

4.3.7 Community

Generally MPSIAT respondents believed new employment opportunities in the local area were unlikely. Similarly the majority of respondents expected the park zoning to have no impact, either positive or negative, on personal and community quality of life and overall way of life.

The draft zoning proposal is the result of considerable discussion about how potential negative impacts on users of marine resources in the marine park can be minimised. For this reason it is expected that personal quality of life in general and quality of community life is unlikely to be negatively impacted by the draft zoning proposal.

The Upper Spencer Gulf community was considered by most MPSIAT respondents to be sufficiently resilient to adapt to and manage changes brought by the proposed zoning of the marine park (see Appendix Table 4-6).

The majority of MPSIAT respondents did not expect business opportunities to increase as a result of the MPLAG zoning of the park, nor did they envisage the need for training programs to assist local people to transition to new occupations that may emerge from its establishment. However, thought should be given to training programs that assist people to manage changes brought by establishing the park. It is possible that new employment opportunities will emerge, and it will be important for local people to take advantage of those, with training being potentially important to their ability to do so.

There were mixed MPSIAT responses as to whether the marine park would be considered a source of pride to the local community. The establishment of the park was not expected to increase events and other activities that would bring the community together. Instead, the marine park was expected to be a source of division in the local community (see Appendix Table 4-6).

In open ended feedback a number of MPSIAT respondents raised concerns about the increasing industrial development and shipping in the marine park and its potential impact on fragile ecosystems, and the apparent inability of marine park planning and management to curtail this activity.

While there is little research evidence about the impacts of marine protected areas on communities as a whole, there are several studies in Australia and overseas that have

identified a range of positive impacts, including enhanced tourism opportunities with flow on benefits to other sectors in the local economy (Ward et al. 2001, Cocklin et al. 1998). However, these and other benefits are not apparent in the early implementation stages and where positive impacts are reported these tend to be evident after about five years, becoming increasingly evident over the longer term (Cocklin et al. 1998, reporting on New Zealand marine parks established from 1975 onwards).

Given the limited impacts expected on commercial sectors and on recreational fishing in this region from the proposed zoning, it is expected that the proposed management plan will not present significant adjustment pressures to the community.

4.3.8 SEIFA based analysis of impacts

Economic impacts from displaced commercial fishing in the Upper Spencer Gulf Impact Region were too small to model, and job losses are expected to be less than one fte in the region. In an area of low unemployment (5.6 per cent) and moderate to high relative disadvantage (SEIFA and leading indicators), any job losses are likely to have greater social impact where alternative employment opportunities are limited. The social impact is therefore expected to be low in the areas associated with the Upper Spencer Gulf Marine Park.

Table 4-6 Social impact for Upper Spencer Gulf Impact Region

Impact region	Upper Spencer Gulf
Marine Park # and Name	10: Upper Spencer Gulf
Jobs impact (fte)	^a
% impact on region	^a
Regional unemployment	Low (5.6%)
SEIFA relative disadvantage (SLA)	Moderate-high (Port Pirie City 884, Whyalla 887, Port Augusta 897)
Index of Economic Resources (SLA)	Moderate-high (Whyalla 868, Port Pirie City 885, Port Augusta 899)
Index of Education & Occupation (SLA)	Moderate-high (Port Pirie City 863, Whyalla 892, Port Augusta 893)
Proportion of single parent families ^{b,c}	Moderate-high (Whyalla 14.1%, Port Augusta 13.9%, Port Pirie City 12.4%)
Proportion with education lower than year 12 ^{b,c}	High (Port Pirie City 63.9%)
Proportion of population with Indigenous background ^{b,c}	Moderate-high (Whyalla 3.6% & Port Augusta 16.6%, Port Pirie City 2.6%)
% fair or poor health (self report)	High (Port Pirie City 19.3%)
Expected social impact	Low-

Note 1 SLA associated with Impact region

Note rounding errors do occur.

^a Impacts too small to model.

^b Source: Australian Bureau of Statistics (2007). *2006 Census Community Profile Series, South Australia (STE 4)*. Canberra: ABS

^c Source: Australian Bureau of Statistics (accessed 2012). *TableBuilder 2006 Census, South Australia (SLA)*. Canberra: ABS

^d Compiled by PHIDU using data estimated from the *2007-08 National Health Survey (NHS)*, ABS (unpublished); and ABS Estimated Resident Population, average of 30 June 2007 and 2008

Note, an Impact Region or SLA is considered high if it has at least one SLA in the highest decile in SA (a moderate value falls in the second highest decile).

4.3.9 Next Steps in Social Impact Assessment

4.3.9.1 Short term objectives

Social impact research constantly identifies insufficient information as a cause of concern for communities affected by the establishment of marine parks, and notes how important such information can be for effective participation in the process of designing and implementing these parks. This includes better communication of the underpinning science of marine protected areas and how it has influenced their design and the setting of zones (Fairweather et al. 2009). The more recent review of marine parks in NSW (Beeton et al 2012) also found that insufficient community informing, and an associated lack of resourcing for this purpose, has resulted in marine parks-related decision making and the benefits of marine parks being insufficiently understood the general public. There is also research evidence of the importance of informed participation in marine park decision making and management, and in the enforcement of compliance (McPhee 2011, Cocklin et al. 1998).

In this context it is important to note that a range of information provision and consultation strategies were implemented by DEWNR to inform the marine parks decision making process. The SAMPIT and MPLAG processes provided an important opportunity for key stakeholders to contribute to the design of the marine park. This impact assessment report is the foundation for a further community consultation process. Further details about the information provision and consultation processes undertaken by DEWNR are detailed in section 1.1.

A clear message from the market research, media reporting and feedback from MPLAGs is that the scientific arguments in favour of establishing marine parks, including the Upper Spencer Gulf Marine Park, need to be better understood by the wider community. This is one of the functions of this impact statement which is designed to inform judgements on the impact of the draft zoning proposal. MPSIAT feedback indicates that those members who do not understand the scientific arguments, also tend to disagree that the park's boundaries and proposed zoning are based on sound science.

In their evaluation of New South Wales marine parks, Fairweather et al. (2009: 26) recommended to the Marine Parks Advisory Council of NSW that they be '*... more assertive about the science and other research behind the NSW Marine Park system ...*' partly to refute misinformation being spread by opponents of the parks but also to ensure levels of understanding were increased. Acknowledging community concerns about possible negative impacts on their lives, the researchers identified the importance of ongoing socio-economic impact assessment as one means of improving understanding of the value of marine protected areas to Indigenous, recreational and commercial users of marine parks, mainly because it can capture the economic and social benefits that develop over time (Fairweather et al. 2009: 15-17).

MPSIAT respondents expressed the need for more information about this marine park and how it will operate. Reliance on public forums, open days and processes that involve giving information rather than listening to local voices, have been criticised in local media. It is important to note that a range of information provision and consultation strategies were implemented by DEWNR to inform the marine parks decision making process. The SAMPIT and MPLAG processes provided an important opportunity for key stakeholders to contribute to the design of the marine park. This impact assessment report is the foundation for a further community consultation

process. Further details about the information provision and consultation processes undertaken by DEWNR are detailed in section 1.1.

4.3.9.2 Ongoing impact assessment

Social impact assessment that is repeated over time, provides a mechanism for informing as well as engaging communities, involving them in decision making, and identifying and assisting with managing intended and unintended social consequences (Vanclay 2005). However coastal zone management is often criticised for a failure to facilitate effective community engagement in what has been termed a 'democratic deficit' (Vanclay 2012).

Perceptions of social impacts of change reflect knowledge, experience, values and roles. They provide a guide to possible but not certain impacts. To provide greater certainty about likely impacts we need to subject marine park zones to economic and environmental impact identification processes like those adopted in this impact assessment statement, repeating them over time to measure changes. The results of this process are necessary to inform judgments about the magnitude of social impacts.

The opportunity now exists for key stakeholders to provide perspectives on social impacts in the light of new knowledge about industry, employment, species and habitat impacts provided in this impact statement.

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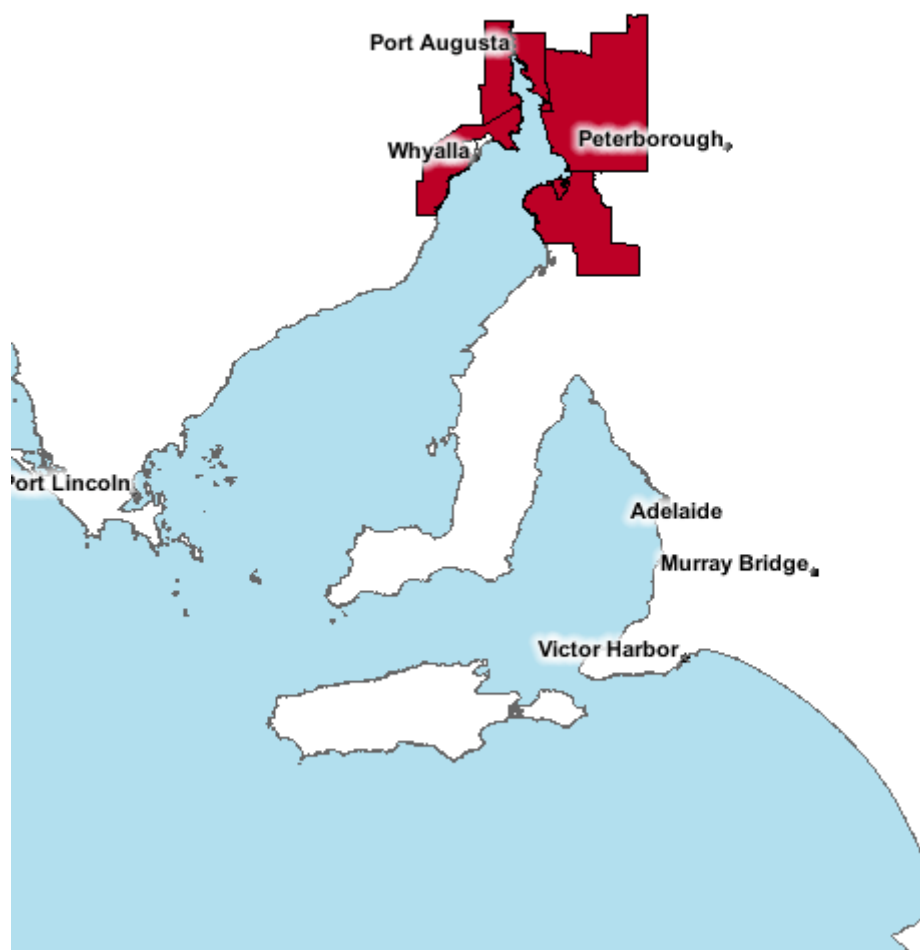
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Appendix 1 Socio-economic Profile – Upper Spencer Gulf

This socio-economic profile provides a statistical summary of key economic and social information for the Upper Spencer Gulf region and, where possible, South Australia (SA). The profile brings together a wide range of existing Australian Bureau of Statistics (ABS) data and some non-ABS data. It has been designed, at a broad level, to aid understanding of the economic and social structure of the region, to indicate how the Upper Spencer Gulf region contributes to the State economy and to monitor trends in economic growth or decline.

The Upper Spencer Gulf region is located north-west of Adelaide at the upper end of Spencer Gulf (Figure 1). The five statistical local areas (SLAs) that comprise the region are Whyalla (DC), Port Augusta (DC), Mount Remarkable (DC), Port Pirie (DC) – City and Port Pirie (DC) - Balance. The Upper Spencer Gulf regional economy is relevant to the Upper Spencer Gulf marine park (MP10). Table 1 presents a summary of the key economic and social information detailed further in the report.

Appendix Figure 1-1 Upper Spencer Gulf region



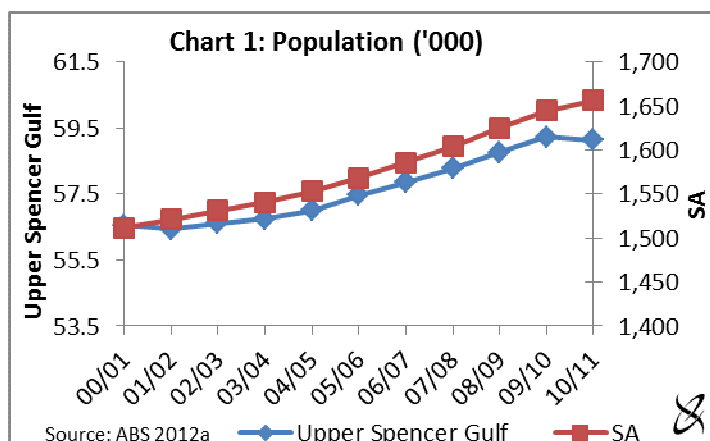
Source: ABS TableBuilder

Appendix Table 1-1 Summary of key economic and social indicators for the Upper Spencer Gulf region

Indicator	Upper Spencer Gulf	SA	Upper Spencer Gulf as a proportion of SA
Population, 2010/11 (no.)	59,135	1,656,299	3.6%
Birth Rate, 2009/10 (births/1000 residents)	12.7	12.2	-
Death Rate, 2009/10 (deaths/1000 residents)	8.5	7.9	-
Age Distribution, 2009/10:			
Proportion of Population aged 0-14	21%	18%	-
Proportion of Population aged 15-64	64%	67%	-
Proportion of Population aged 65+	15%	16%	-
Dependency Rate, 2009/10:			
Child	33%	27%	-
Aged	24%	23%	-
Total	57%	50%	-
Population Projection, Increase from 2006 to 2026	7%	23%	-
Employment, June qtr 2011:			
Labour Force (no.)	27,312	867,500	3.1%
Unemployed (no.)	1,492	45,300	3.3%
Unemployment Rate	5%	5%	-
Participation Rate, 2009/10	54%	63%	-
Businesses, June 2009 (no.)	2,945	141,625	2.1%
School Enrollments, 2011	9,364	247,356	3.8%
Tertiary Enrollments, 2011	7,146	208,706	3.4%
Non-school Qualifications, 2006	18,801	595,379	3.2%
Mean Taxable Income, 2009/10 (\$)	52,706	54,349	-
Proportion of Taxable Individuals, 2009/10	73%	74%	-
Value per Building Approval, 2010/11 (\$)	229,982	236,269	-
Median Dwelling Price, 2010/11 (\$)	200,000	357,500	-
Commercial Fishing, Ave/yr 2000/01 to 2009/10:			
Catch (t)	645	47,581	1.4%
Value of Catch (\$m)	8	202	4.1%
Charter Boats, Ave/yr 2007/08 to 2009/10 (no. of fish)	2,794	146,341	1.9%
Recreational Fishing, 2007/08:			
Fishers (no.)	14,451	236,463	6.1%
Days Fished (no.)	46,735	1,054,200	4.4%
Gross Regional Product, 2009/10 (\$m)	2,491	80,356	3.1%
Employment, 2009/10 (fte)	24,239	774,953	3.1%
Tourism, 2009/10 (\$m)	133	4,524	2.9%
Other Regional Exports, 2009/10 (\$m)	1,905	26,757	7.1%
Regional Imports, 2009/10 (\$m)	2,614	40,573	6.4%

Demographic indicators

- The estimated resident population of the Upper Spencer Gulf region increased by 5 per cent (almost 2,600 persons) between 2000/01 and 2010/11 and was around 59,100 persons in 2010/11. Over the same period SA experienced population growth of almost 10 per cent (Chart 1).
- A marginal increase in population together with little change in the birth and death rates (ABS 2011a,b) implies limited inward migration to the region over the period.
- Compared with the age distribution of the state as a whole, the Upper Spencer Gulf region has a higher concentration of younger people (aged 0 to 14 years), a lower share of persons aged 15 to 64 years and a slightly lower share of people aged 65 and over (Table 2).



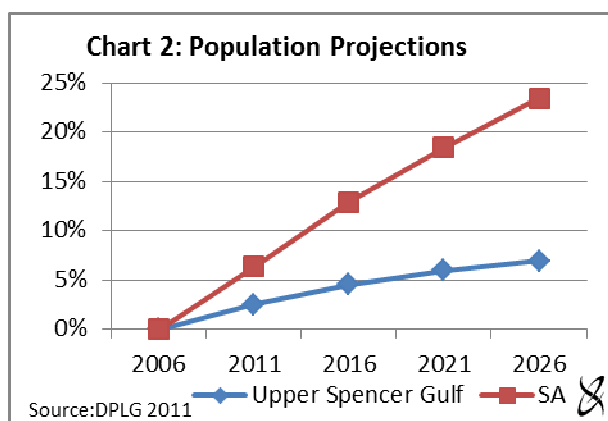
Appendix Table 1-2 Age distribution of the population for the Upper Spencer Gulf region and SA, 2000/01 to 2009/10

Age	Year									
	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
Upper Spencer Gulf										
0 to 14	22%	22%	22%	21%	21%	21%	21%	21%	21%	21%
15 to 64	64%	64%	64%	64%	64%	64%	64%	64%	64%	64%
65 or older	13%	14%	14%	14%	14%	14%	15%	15%	15%	15%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
South Australia										
0 to 14	19%	19%	19%	19%	18%	18%	18%	18%	18%	18%
15 to 64	66%	66%	66%	66%	66%	67%	67%	67%	67%	67%
65 or older	15%	15%	15%	15%	15%	15%	15%	15%	15%	16%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: ABS 2010a and ABS 2011c

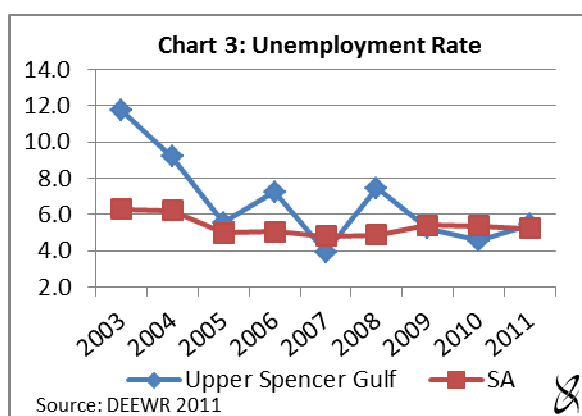
- The total dependency rate for the Upper Spencer Gulf region was 57 per cent in 2009/10. This implies that for any dependent person (persons aged 0 to 14 and over 65) there were 2 persons providing support. At the state level the dependency rate was 50 per cent in 2009/10 (ABS 2010a and ABS 2011c).

- According to the Department of Planning and Local Government (DPLG) population projections⁸, the total population in the Upper Spencer Gulf region is likely to increase by approximately 7 per cent by 2026, whereas the SA population is expected to increase by around 23 per cent (Chart 2).
- Population projections for the Upper Spencer Gulf region indicate there will be little change for persons aged 0 to 14 years and in the working age population (15 to 64 years). The population projections for persons 65 or older indicate that a significant increase of around 47 per cent in this age group is expected over the 20 years to 2026 (DPLG 2011).



Labour force indicators

- In the June quarter of 2011, the labour force in the Upper Spencer Gulf region was approximately 27,300 (by place of residence), an increase of 8 per cent from the March quarter of 2003. By comparison, the labour force for SA increased by 14 per cent over the same period (DEEWR 2011).
- The number of unemployed persons in the Upper Spencer Gulf region was almost 3,100 in March 2003 and 1,500 in June 2011, a decline of approximately 52 per cent over the period. By comparison, the number of unemployed persons in SA decreased by approximately 11 per cent over the same period (DEEWR 2011).
- The unemployment rate in the Upper Spencer Gulf region was 5.5 per cent in the June quarter of 2011. The unemployment rate for SA for the same quarter was lower at 5.2 per cent (Chart 3). The in Upper Spencer Gulf region the unemployment rate is more than half of that in 2003 (June quarters) (Chart 3).
- The labour force participation rate for the Upper Spencer Gulf region fluctuated over the years 2002/03 to 2009/10. In 2009/10 the labour force participation rate in the Upper Spencer Gulf region was around 54 per cent compared to 63 per cent for SA as a whole (DEEWR 2011, ABS 2010a and ABS 2011c).



⁸ Population projections are not forecasts, they are based on ABS 2006 *Census of Population and Housing* resident population estimates and trends in mortality, fertility and overseas and interstate migration for South Australia. A range of estimates are published, based on the assumed level of migration. The 'medium level of migration' series has been utilised in this analysis. The method used to compile the projections was not influenced by local factors such as land availability or zoning, that is, it was assumed that these factors would not be limiting on population growth.

Business Count

- The total number of businesses operating at the end of June 2009 in the Upper Spencer Gulf region was 2,945, 2.1 per cent of the total businesses operating in SA (almost 142,000) (ABS 2011d).
- Of the 2,945 businesses operating in the Upper Spencer Gulf region, approximately 20 per cent were classified in the agriculture, forestry and fishing sector, 15 per cent were in the construction sector and 11 per cent were in the retail trade sector (ABS 2011d).
- Over half of the businesses (57 per cent) operating in the Upper Spencer Gulf region did not employ anyone and almost one quarter (24 per cent) employed between 1 and 4 people (ABS 2011d).

Education and training

- The total number of residents in the Upper Spencer Gulf region with a non-school qualification increased over the 5 years to 2006. In 2006, approximately 43 per cent of all persons aged 15 or over held some form of non-school qualification, compared with 36 per cent in 2001 (ABS 2007 and 2010a).
- The level of qualification was generally lower for the Upper Spencer Gulf region than for SA, with the proportion of persons with a bachelor degree or higher being significantly lower (Table 3).

Appendix Table 1-3 Highest level of qualifications for persons aged 15 and over in the Upper Spencer Gulf region and SA, 2001 and 2006^a

Qualification	Upper Spencer Gulf			
	2001		2006	
Postgraduate Degree	147	1%	218	1%
Graduate Diploma & Graduate Certificate	280	2%	315	2%
Bachelor Degree	1,854	12%	2,188	12%
Advanced Diploma & Diploma	1,309	8%	1,665	9%
Certificate	7,557	49%	8,474	45%
Level of education not described or stated	4,393	28%	5,941	32%
Total	15,540	100%	18,801	100%
	South Australia			
	2001		2006	
Postgraduate Degree	15,203	3%	22,897	4%
Graduate Diploma & Graduate Certificate	14,361	3%	16,098	3%
Bachelor Degree	95,812	20%	120,979	20%
Advanced Diploma & Diploma	63,469	13%	79,698	13%
Certificate	185,129	38%	212,581	36%
Level of education not described or stated	115,200	24%	143,126	24%
Total	489,174	100%	595,379	100%

^a 2011 Census data on qualifications not available until the second release in October 2012.

Source: 2006 Census of Population and Housing (ABS 2007).

- The total number of students enrolled in primary school in the Upper Spencer Gulf region decreased by 18 per cent between 2001 and 2011. This decrease was comprised of a 22 per cent decrease in enrolments in government schools and a 5 per cent decline in enrolments at non-government schools (Table 4).
- The total number of Upper Spencer Gulf region students enrolled in secondary school increased by 1 per cent between 2001 and 2011. The rise was comprised of a 10 per cent decrease in government school enrolments and a 23 per cent increase in non-government school enrolments (Table 4).
- Between 2001 and 2011 the total number of Upper Spencer Gulf regions residents enrolled in a higher education institute increased by 48 per cent. This is greater than that for SA as a whole (38 per cent increase) (ABS 2012b).

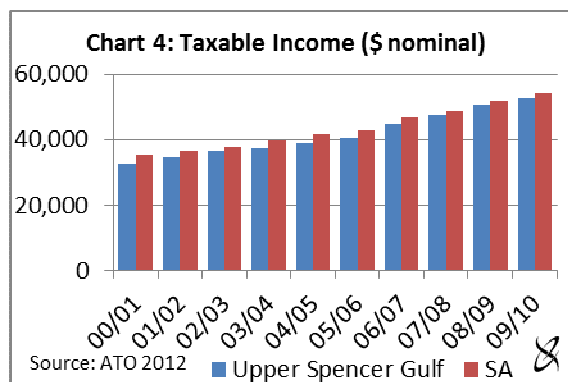
Appendix Table 1-4 School enrolments in the Upper Spencer Gulf region and SA, 2001, 2006 and 2011

	Census Year		
	2001	2006	2011
Upper Spencer Gulf			
Pre-school	826	717	819
Primary			
- Government	4,624	4,165	3,603
- Non-Government	1,589	1,626	1,504
Total Primary Student	6,213	5,791	5,107
Secondary Students			
- Government	2,277	2,017	2,057
- Non-Government	1,123	1,189	1,381
Total Secondary Students	3,400	3,206	3,438
South Australia			
Pre-school	18,246	18,533	20,537
Primary			
- Government	103,975	93,220	87,542
- Non-Government	43,150	45,796	48,634
Total Primary Student	147,125	139,016	136,176
Secondary Students			
- Government	57,770	51,752	51,901
- Non-Government	31,725	35,172	38,742
Total Secondary Students	89,495	86,924	90,643

Source: 2011 Census of Population and Housing (ABS 2012a)

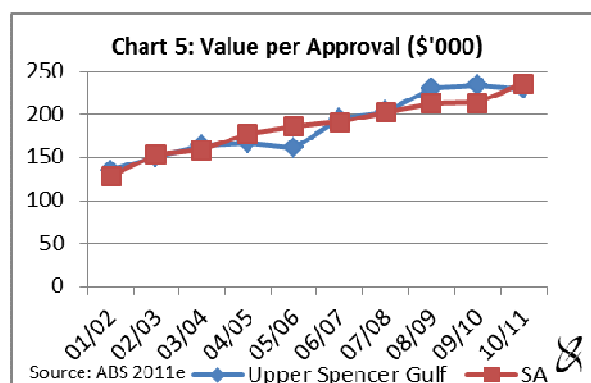
Household income

- The mean individual taxable income in the Upper Spencer Gulf region was consistently lower than the state average between 2000/01 and 2009/10 (Chart 4).
- Over the period 2000/01 to 2009/10, the mean taxable income (in nominal terms) increased by 61 per cent in the Upper Spencer Gulf region and 54 per cent in SA as a whole (Chart 4).
- In 2009/10 mean taxable income was approximately \$52,700 in the Upper Spencer Gulf region and around \$54,350 in SA (Chart 4).



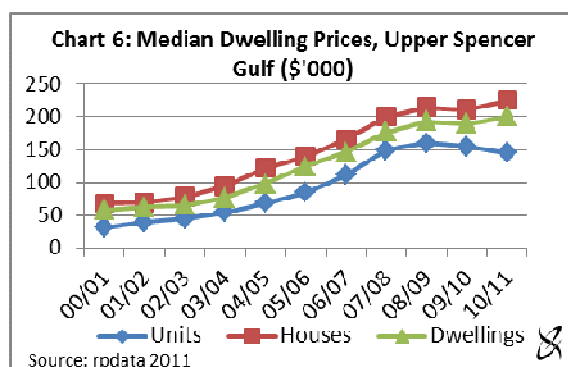
Building approvals

- The number of building approvals for the Upper Spencer Gulf region increased by 50 per cent over the period 2001/02 to 2010/11. However, the total value of approvals increased by significantly more than that, from \$14 million in 2001/02 to \$36 million in 2010/11, a rise of 156 per cent (ABS 2011e).
- For SA the total number of approvals was 3 per cent greater in 2010/11 than in 2001/02, while the total value was 90 per cent higher (ABS 2011e).
- The average value per approval in the Upper Spencer Gulf region increased by 71 per cent, from \$135,000 in 2001/02 to \$230,000 in 2010/11 (Chart 5).
- For SA, the value per approval increased from \$128,000 in 2001/02 to \$236,000 in 2010/11, an increase of 85 per cent (Chart 5).



Property Values

- Between 2000/01 and 2010/11, the median unit price in the Upper Spencer Gulf region increased by 360 per cent, from \$31,500 in 2000/01 to 145,000 in 2010/11 (Chart 6). The median unit price in SA as a whole increased by 215 per cent over the same period, from almost \$102,000 to \$320,000 (rpdata 2011).
- The median house price in the Upper Spencer Gulf region increased by 231 per cent between 2000/01 and 2010/11, from approximately \$68,000 to \$225,000 (Chart 6). In comparison, house prices in SA as a whole increased at a lower rate, from \$126,000 to \$370,000 over the same period, a 194 per cent increase (rpdata 2011).



- Overall median dwelling (units and houses) prices increased by 245 per cent in the Upper Spencer Gulf region (\$200,000 in 2010/11) and 197 per cent in SA as a whole (\$357,500 in 2010/11) over the period 2000/01 to 2010/11 (rpdata 2011).

Commercial Fishing

- In the Upper Spencer Gulf region over the past 10 years, 2000/01 to 2009/10, the average annual catch of prawns was approximately 247 tonnes with a beach value of almost \$260,000 (SARDI).
- Annual average catch of Marine Scalefish species including miscellaneous species in the Upper Spencer Gulf region over the period 2000/01 to 2009/10 was approximately 275 tonnes with a beach value of around \$1.3 million (SARDI).
- Blue crabs were caught in this region over the period 2000/01 to 2009/10 but due to the limited number of licence holders catch and value of catch are confidential.
- Between 2007/08 and 2009/10 the charter boat operators in the Upper Spencer Gulf region caught on average almost 3,000 fish per annum (SARDI). This compares to an annual average catch for SA of 146,000 fish over the same period (PIRSA 2010).

Recreational Fishing

- Between 2000/01 and 2007/08 the total number of SA resident recreational fishers (those aged 5 and older) in the Upper Spencer Gulf region (region 9 in the report South Australian Recreational Fishing Survey 2007/08 (Jones 2009)) decreased by 30 per cent, from almost 21,000 in 2000/01 to 14,000 fishers in 2007/08.
- Similarly, at the state level the number of SA resident recreational fishers decreased from an estimated 317,200 in 2000/01 to around 236,500 fishers in 2007/08 (a 25 per cent decrease) (Jones 2009).
- A similar pattern occurred in the total number of days fished by SA resident recreational fishers. In the Upper Spencer Gulf region the number of days fished by SA resident recreational fishers decreased from around 84,000 days in 2000/01 to approximately 47,000 days in 2007/08 (a 44 per cent decline) (Jones 2009).
- For SA as a whole, the total number of days fished by SA resident recreational fishers almost halved over the seven years, from 1.83 million days in 2000/01 to 1.05 million in 2007/08 (Jones 2009).

Economic Contribution of Tourism to the Region

In aggregate, it was estimated that expenditure by tourists in the Upper Spencer Gulf region in 2009/10 (approximately \$133m (TRA 2011 and EconSearch analysis)) generated the following level of regional economic and demographic activity.

- Approximately \$55 million in GRP which represents 2.2 per cent of the regional total (\$2.5 billion).
- Approximately 910 full-time and part-time jobs which represents 3.6 per cent of the regional total (25,500 total jobs).
- Approximately 740 fte jobs which represents 3.1 per cent of the regional total (24,200 fte).

Regional Economic Structure

- At the time of the 2006 population census it was estimated that approximately 92 per cent of the jobs in the region were held by local residents and the balance were held predominantly by residents of adjacent regions (i.e. travelled to work from the surrounding SLAs). Approximately 95 per cent of employed residents were employed locally, with the balance travelling to other areas in SA for work⁹.
- It was estimated that there were approximately 25,500 jobs (24,200 fte jobs) in the Upper Spencer Gulf region in 2009/10 (by place of remuneration) (Table 5).
- In 2009/10, the top four contributors to total jobs in the region were the retail trade (16 per cent), health and community services (15 per cent), manufacturing (14 per cent each) and education (10 per cent) sectors (Table 5).
- The Upper Spencer Gulf gross regional product (GRP) was estimated to be \$2.5 billion in 2009/10 (Table 6). This compares with gross state product (GSP) in the same year of \$80.36 billion (ABS 2010b).
- The GRP of the Upper Spencer Gulf region comprised approximately 3.1 per cent of the SA GSP.
- In 2009/10, the top contributors to GRP were the manufacturing (15 per cent), ownership of dwellings (10 per cent) and health and community services (8 per cent) sectors (Table 6).
- Expenditure by households accounted for just less than one quarter of the total value of goods and services imported into the region in 2009/10. Among of the intermediate sectors, the top importers in the region in 2009/10 were the manufacturing (29 per cent) and building and construction (9 per cent) sectors (Table 7).
- Expenditure by tourists (\$133m) contributed approximately 7 per cent of the total value of exports from the region in 2009/10 (Table 7).
- The top contributors to the value of 'other exports' from the region in 2009/10 were the manufacturing (62 per cent) and transport and storage (6 per cent) sectors (Table 7).

⁹ Based on detailed 'journey to work' employment data obtained from the ABS 2006 Census of Population and Housing using the *TableBuilder* database.

Appendix Table 1-5 Employment, household income and household expenditure, Upper Spencer Gulf region, 2009/10 ^a

SECTOR	Total Employment		FTE Employment		Household Income		Household Expenditure	
	(jobs)	(%)	(fte)	(%)	(\$m)	(%)	(\$m)	(%)
Agriculture, forestry and fishing	942	3.7%	1,080	4.5%	55	3.9%	6	0.4%
Mining	263	1.0%	335	1.4%	19	1.4%	2	0.1%
Manufacturing	3,496	13.7%	3,974	16.4%	191	13.7%	33	2.0%
Electricity, gas and water	600	2.4%	658	2.7%	29	2.1%	4	0.2%
Building and construction	1,691	6.6%	1,909	7.9%	43	3.1%	38	2.2%
Wholesale trade	782	3.1%	806	3.3%	2	0.2%	5	0.3%
Retail trade	4,042	15.9%	3,059	12.6%	14	1.0%	8	0.5%
Accommodation, cafes & restaurants	1,455	5.7%	1,129	4.7%	26	1.9%	1	0.0%
Transport and storage	1,042	4.1%	1,066	4.4%	293	21.0%	324	19.0%
Communication services	143	0.6%	137	0.6%	29	2.0%	22	1.3%
Finance and insurance	404	1.6%	372	1.5%	22	1.6%	1	0.1%
Ownership of dwellings ^b	0	0.0%	0	0.0%	10	0.7%	2	0.1%
Property and business services	1,629	6.4%	1,501	6.2%	179	12.8%	347	20.4%
Public administration and defence	1,224	4.8%	1,180	4.9%	94	6.7%	5	0.3%
Education	2,538	10.0%	2,385	9.8%	129	9.3%	57	3.3%
Health and community services	3,877	15.2%	3,351	13.8%	190	13.6%	46	2.7%
Cultural and recreational services	300	1.2%	249	1.0%	10	0.7%	18	1.1%
Personal services	1,056	4.1%	1,050	4.3%	60	4.3%	52	3.0%
Total Intermediate	25,486	100.0%	24,239	100.0%	1,396	100.0%	971	57.0%
PRIMARY INPUTS								
Household Income	-	-	-	-	-	-	0	0.0%
GOS and GMI ^c	-	-	-	-	-	-	0	0.0%
Taxes Less Subsidies	-	-	-	-	-	-	149	8.7%
Imports	-	-	-	-	-	-	585	34.3%
Primary Inputs Total	-	-	-	-	-	-	734	43.0%
GRAND TOTAL	25,486	100.0%	24,239	100.0%	1,396	100.0%	1,705	100.0%

^a The economic profile of the regional economy is also available in terms of a 60-sector industry classification if required.

^b The ownership of dwellings sector is a notional sector designed to impute a return to the state's housing stock. Total value of output in this sector is an estimate of rent earned on leased dwellings and imputed rent on the balance of owner-occupied dwellings.

^c Gross operating surplus and gross mixed income.

Source: ABS (2006), ABS (2008), ABS (2009), ABS (2010b,c), ABS (2011f), ABS (2012a), EconSearch (2009a,b) and EconSearch analysis.

Appendix Table 1-6 Components of gross regional product in the Upper Spencer Gulf region by industry, 2009/10 ^a

SECTOR	Household Income		GOS and GMI ^c		Taxes less Subsidies		Gross Regional Product	
	(\$m)	(%)	(\$m)	(%)	(\$m)	(%)	(\$m)	(%)
Agriculture, forestry and fishing	48	3.5%	12	1.4%	3	3.1%	63	2.5%
Mining	25	1.8%	99	12.0%	1	1.0%	125	5.0%
Manufacturing	223	16.0%	145	17.5%	10	10.3%	377	15.1%
Electricity, gas and water	58	4.2%	60	7.2%	6	6.6%	124	5.0%
Building and construction	124	8.9%	32	3.8%	6	6.1%	162	6.5%
Wholesale trade	50	3.6%	15	1.8%	5	5.2%	70	2.8%
Retail trade	91	6.5%	29	3.5%	6	6.2%	127	5.1%
Accommodation, cafes & restaurants	54	3.8%	14	1.6%	7	7.6%	74	3.0%
Transport and storage	61	4.3%	65	7.8%	6	6.2%	132	5.3%
Communication services	15	1.1%	19	2.2%	1	1.4%	35	1.4%
Finance and insurance	52	3.8%	46	5.5%	6	6.1%	104	4.2%
Ownership of dwellings ^b	0	0.0%	218	26.3%	20	21.0%	238	9.6%
Property and business services	111	8.0%	30	3.7%	5	5.5%	147	5.9%
Public administration and defence	94	6.7%	16	2.0%	2	2.4%	112	4.5%
Education	129	9.3%	8	0.9%	3	2.9%	140	5.6%
Health and community services	190	13.6%	12	1.5%	5	5.3%	208	8.3%
Cultural and recreational services	10	0.7%	3	0.4%	1	0.7%	14	0.6%
Personal services	60	4.3%	6	0.7%	2	2.3%	68	2.7%
Total Intermediate	1,396	100.0%	828	100.0%	96	100.0%	-	-
Net Taxes in Final Demand	-	-	-	-	-	-	171	6.9%
Gross Regional Product	-	-	-	-	-	-	2,491	100.0%

^a The economic profile of the regional economy is also available in terms of a 60-sector industry classification if required.

^b The ownership of dwellings sector is a notional sector designed to impute a return to the state's housing stock. Total value of output in this sector is an estimate of rent earned on leased dwellings and imputed rent on the balance of owner-occupied dwellings.

^c Gross operating surplus and gross mixed income.

Source: ABS (2006), ABS (2008), ABS (2009), ABS (2010b,c), ABS (2011f), ABS (2012a), EconSearch (2009a,b) and EconSearch analysis.

Appendix Table 1-7 Value of imports and exports by industry, Upper Spencer Gulf region, 2009/10 ^a

SECTOR	Tourism		Other Exports		Total Exports		Imports	
	(\$m)	(%)	(\$m)	(%)	(\$m)	(%)	(\$m)	(%)
Agriculture, forestry and fishing	0	0.0%	81	4.3%	81	4.0%	23	0.9%
Mining	0	0.0%	94	5.0%	94	4.6%	51	2.0%
Manufacturing	8	5.8%	1,177	61.8%	1,185	58.1%	747	28.6%
Electricity, gas and water	0	0.0%	83	4.4%	83	4.1%	66	2.5%
Building and construction	0	0.0%	9	0.5%	9	0.5%	225	8.6%
Wholesale trade	4	3.3%	15	0.8%	19	1.0%	60	2.3%
Retail trade	23	17.1%	0	0.0%	23	1.1%	74	2.8%
Accommodation, cafes & restaurants	23	17.1%	37	2.0%	60	2.9%	64	2.4%
Transport and storage	5	3.4%	113	5.9%	117	5.7%	90	3.4%
Communication services	0	0.0%	22	1.1%	22	1.1%	24	0.9%
Finance and insurance	0	0.0%	51	2.7%	51	2.5%	28	1.1%
Ownership of dwellings ^b	5	4.1%	0	0.0%	5	0.3%	27	1.0%
Property and business services	0	0.3%	50	2.6%	51	2.5%	89	3.4%
Public administration and defence	0	0.0%	36	1.9%	36	1.8%	46	1.7%
Education	0	0.1%	3	0.2%	3	0.1%	23	0.9%
Health and community services	0	0.0%	39	2.0%	39	1.9%	29	1.1%
Cultural and recreational services	3	2.3%	3	0.1%	6	0.3%	18	0.7%
Personal services	0	0.0%	11	0.6%	11	0.6%	22	0.9%
Total Intermediate	71	53.4%	1,824	95.8%	1,895	93.0%	1,702	65.1%
PRIMARY INPUTS								
Household Income	0	0.0%	0	0.0%	0	0.0%	-	-
GOS and GMI ^c	0	0.0%	0	0.0%	0	0.0%	-	-
Taxes Less Subsidies	13	9.9%	8	0.4%	21	1.0%	-	-
Imports	49	36.7%	73	3.8%	122	6.0%	-	-
Primary Inputs Total	62	46.6%	81	4.2%	143	7.0%	-	-
FINAL DEMAND								
Household Expenditure	-	-	-	-	-	-	585	22.4%
Government Expenditure	-	-	-	-	-	-	27	1.0%
Gross Fixed Capital	-	-	-	-	-	-	178	6.8%
Change in Inventories	-	-	-	-	-	-	0	0.0%
Tourism	-	-	-	-	-	-	49	1.9%
Other Exports	-	-	-	-	-	-	73	2.8%
Final Demand Total	-	-	-	-	-	-	912	34.9%
GRAND TOTAL	133	100.0%	1,905	100.0%	2,038	100.0%	2,614	100%

^a The economic profile of the regional economy is also available in terms of a 60-sector industry classification if required.

^b The ownership of dwellings sector is a notional sector designed to impute a return to the state's housing stock. Total value of output in this sector is an estimate of rent earned on leased dwellings and imputed rent on the balance of owner-occupied dwellings.

^c Gross operating surplus and gross mixed income.

Source: ABS (2006), ABS (2008), ABS (2009), ABS (2010b,c), ABS (2011f), ABS (2012a), EconSearch (2009a,b) and EconSearch analysis.

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Appendix 2 Activities and Uses Tables

The following tables summarise how activities and uses are expected to be managed once marine park management plans are adopted. The prohibitions and restrictions described in the tables (grey shaded boxes) will be represented in the *Marine Park (Zoning) Variation Regulations 2012*.

Section 4 of the *Marine Parks Act 2007* establishes four types of marine park zones. These are General Managed Use, Habitat Protection, Sanctuary and Restricted Access Zones.

Section 5 of the *Marine Parks Act 2007* provides for Special Purpose Areas. These are areas within a marine park, defined by management plans, in which specified activities will be allowed that would otherwise be prohibited or restricted by zoning.

No additional permits under the *Marine Parks Act 2007* will be required if the activity is already permitted or licensed under another Act.

Exemptions

- The Minister responsible for marine parks may provide a permit for any activity to take place that would not ordinarily be allowed in a specific zone in accordance with section 19 of the *Marine Parks Act 2007*.
- The Regulations also provide an exemption for any person acting in the course of an emergency.
- The Regulations will not apply to a person exercising official powers or functions under a State or Commonwealth Act or an Aboriginal person acting in accordance with an ILUA or Aboriginal tradition..

Existing activities and uses

When management plans are developed, existing and reasonably foreseeable activities and uses will be accommodated, (as outlined by the policy commitments endorsed by Government) by appropriate zoning, the application of Special Purpose Areas or the provision of permits. Apart from fishing activities, any permits, licences or leases that are current at the time of the adoption of management plans, will not be affected by these restrictions.

KEY

GMUZ	General Managed Use Zone - being a zone primarily established so that an area may be managed to provide protection for habitats and biodiversity within a marine park, while allowing ecologically sustainable development and use
HPZ	Habitat Protection Zone - being a zone primarily established so that an area may be managed to provide protection for habitats and biodiversity within a marine park, while allowing activities and uses that do not harm habitats or the functioning of ecosystems
SZ	Sanctuary Zone - being a zone primarily established so that an area may be managed to provide protection and conservation for habitats and biodiversity within a marine park, especially by prohibiting the removal or harm of plants, animals or marine products
RAZ	Restricted Access Zone - being a zone primarily established so that an area may be managed by limiting access to the area

KEY

	Activity is deemed to be consistent with the definition of the zone (i.e. no change to current activity/use).
limit	Activity is deemed to be consistent with the definition of the zone when conducted in accordance with stated limits under the Regulations.
permit	Activity is deemed to be consistent with the definition of the zone when conducted in accordance with a permit under the Regulations.
	Activity is deemed to be inconsistent with the definition of the zone and will not be allowed. However, the Minister for Sustainability, Environment and Conservation may grant a permit for an activity that would otherwise be prohibited or restricted in a zone on a case by case basis.

RECREATION, EDUCATION AND OTHER

	GMUZ	HPZ	SZ	RAZ	Limits / Permits / Exceptions
Operating aircraft				limit	Limit: Aircraft cannot fly within 300m of the ground or sea level, and helicopters not within 500m of the ground or sea level.
Diving e.g. scuba/snorkel					
Pedestrian access					
Recreational boating/yachting					
Surfing/swimming					
Domestic animals			limit		Limit: Dogs on leads (up to 2m long); or animals confined to vessels/vehicles; or animals under effective control and behaving in accordance with relevant local Council by-laws.
Research			permit	permit	Permit ³ : A permit is not required for research authorised under another Act.
Commercial photography / film making			permit		Permit ³ : A permit is not required for commercial photography/film making authorised under another Act.
Competitions / organised events (non-fishing)			permit		Permit ³ : A permit is not required for non-fishing competitions/organised events authorised under another Act.
Tourism operations			permit		Permit ³ : A permit is not required for tourism operations authorised under another Act.

RECREATION, EDUCATION AND OTHER					
	GMUZ	HPZ	SZ	RAZ	Limits / Permits / Exceptions
Animal feeding/baiting/berleying ¹					
Motorised water sports ²					
Lighting and supervision of fires		limit	limit		Limit: Lighting and supervision of fires is confined to designated areas.
Camping		limit	limit		Limit: Camping is confined to designated areas.
Collection of naturally occurring materials for burning in fires					

Notes:

¹ Feeding/baiting/berleying animals is not recommended in marine parks, except as required for fishing, aquaculture, research or tourism purposes.

² A person may transit through a sanctuary zone in a motorised vessel, but gear such as water skis or a wake board must be stowed.

³ Standard permits (and conditions) may be issued for activities that are deemed to be low impact. All other activities will be subject to case-by-case assessments and non-standard permits (and conditions) may be issued. DEWNR will develop a permit policy to provide clear guidance to users about activities that require permits.

KEY

	Activity is deemed to be consistent with the definition of the zone (i.e. no change to current activity/use).
limit	Activity is deemed to be consistent with the definition of the zone when conducted in accordance with stated limits under the Regulations.
permit	Activity is deemed to be consistent with the definition of the zone when conducted in accordance with a permit under the Regulations.
	Activity is deemed to be inconsistent with the definition of the zone and will not be allowed. However, the Minister for Sustainability, Environment and Conservation may grant a permit for an activity that would otherwise be prohibited or restricted in a zone on a case by case basis.

FISHING AND COLLECTING (commercial, recreational and traditional)

Fishing activities are regulated under provisions of the *Fisheries Management Act 2007*.

	GMUZ	HPZ	SZ	RAZ	Limits / Permits / Exceptions
Bait digging/pumping					
Berleying for fishing					
Cockling (pipi and mud cockles)					
Collecting fish by hand (abalone, urchin, scallop, etc)					
Line fishing (including long lining)					
Netting (e.g. dab, haul, swing, gill, beach or power)					
Pot and trap fishing (including drop/hoop nets)					
Purse seine netting (including sardine)					
Raking (crab)					
Spear fishing					
Competitions / organised events (fishing)					

FISHING AND COLLECTING (commercial, recreational and traditional)

Fishing activities are regulated under provisions of the *Fisheries Management Act 2007*.

	GMUZ	HPZ	SZ	RAZ	Limits / Permits / Exceptions
Traditional fishing and collecting (Aboriginal)					Limit: Activity is limited to persons who are exercising their rights in accordance with an ILUA or Aboriginal tradition.
Collecting seagrass/algae (including beach cast)					
Collecting sessile assemblages, stromatolites, fossils and archaeological remains					
Trawling					

KEY

	Activity is deemed to be consistent with the definition of the zone (i.e. no change to current activity/use).
limit	Activity is deemed to be consistent with the definition of the zone when conducted in accordance with stated limits under the Regulations.
permit	Activity is deemed to be consistent with the definition of the zone when conducted in accordance with a permit under the Regulations.
	Activity is deemed to be inconsistent with the definition of the zone and will not be allowed. However, the Minister for Sustainability, Environment and Conservation may grant a permit for an activity that would otherwise be prohibited or restricted in a zone on a case by case basis.

HARBOR, NAVIGATION & TRANSPORT ACTIVITIES ¹

Harbor, navigation and transport activities are regulated under provisions of the *Harbors and Navigation Act 1993*.

	GMUZ	HPZ	SZ	RAZ	Limits / Permits / Exceptions
Navigation markers/aids					
General navigation and operation of vessels (other than anchoring)					
Anchoring of vessels – less than 80 metres (overall length)					
Anchoring of vessels – 80 metres and over (overall length)					Special Purpose Areas will provide for anchoring of vessels 80 metres and over in all harbors and in designated transshipment and anchoring locations and pilot boarding grounds
Permanent vessel moorings			permit		Permit: A permit will be required, which includes assessment by DEWNR and DPTI.
Dredging		limit			Limit: Activity is confined to harbors established under the <i>Harbors and Navigation Act 1993</i> .
Depositing dredged materials		limit			

Notes:

¹ Activities undertaken to support the ongoing operation of ports and harbors will be provided for in all zones. Also, given the extensive development expected to occur over the next 5-10 years in Upper Spencer Gulf, transitional arrangements will be required. For this purpose all HPZ, SZ and RAZ in Upper Spencer Gulf Marine Park will be declared Special Purpose Areas. This will provide for (a) developments comprising a development or project, or that part of a development or project, within the ambit of a declaration under section 46 of the *Development Act 1993*; and (b) activities comprising development approved under section 49 (crown development and public infrastructure) or section 49A (Electricity infrastructure development) of the *Development Act 1993*. This arrangement will be assessed at the time the first management plan is reviewed.

KEY

	Activity is deemed to be consistent with the definition of the zone (i.e. no change to current activity/use).
limit	Activity is deemed to be consistent with the definition of the zone when conducted in accordance with stated limits under the Regulations.
permit	Activity is deemed to be consistent with the definition of the zone when conducted in accordance with a permit under the Regulations.
	Activity is deemed to be inconsistent with the definition of the zone and will not be allowed. However, the Minister for Sustainability, Environment and Conservation may grant a permit for an activity that would otherwise be prohibited or restricted in a zone on a case by case basis.

COASTAL DEVELOPMENTS AND INFRASTRUCTURE ¹

Coastal developments and infrastructure are regulated under provisions of the *Development Act 1993*.

	GMUZ	HPZ	SZ	RAZ	Limits / Permits / Exceptions
Infrastructure (marinas, jetties, pontoons, breakwalls)					
Outfall and pipelines					
Renewable energy infrastructure (wind, wave, tidal)					

Notes:

¹ Coastal developments and infrastructure in HPZ will be managed under the *Development Act 1993* to achieve the definition of the zone (i.e. no harm to habitats or the functioning of ecosystems). Developments will be considered on a case by case basis to ensure that the achievement of the objects of the Act and the zone are supported appropriately. Development Plans and significant projects are informed by the Planning Strategy which now includes the objects of the *Marine Parks Act 2007* so consideration of these will inform the assessment process. In addition, as part of the assessment process, advice or direction may be required from the Coast Protection Board and/or the Environment Protection Authority and other authorities, depending on the nature of the development. These agencies also have the requirement to take into account the objects of the *Marine Parks Act 2007*.

KEY

	Activity is deemed to be consistent with the definition of the zone (i.e. no change to current activity/use).
limit	Activity is deemed to be consistent with the definition of the zone when conducted in accordance with stated limits under the Regulations.
permit	Activity is deemed to be consistent with the definition of the zone when conducted in accordance with a permit under the Regulations.
	Activity is deemed to be inconsistent with the definition of the zone and will not be allowed. However, the Minister for Sustainability, Environment and Conservation may grant a permit for an activity that would otherwise be prohibited or restricted in a zone on a case by case basis.

AQUACULTURE

Aquaculture activities are regulated under provisions of the *Aquaculture Act 2001*.

	GMUZ	HPZ	SZ	RAZ	Limits / Permits / Exceptions
Farming of bivalve molluscs					
Farming of aquatic animals (other than prescribed wild-caught tuna) with regular feeding					
Farming of prescribed wild-caught tuna					
Farming of algae					
Pilot leases					

Notes: Aquaculture in HPZ will be managed under the *Aquaculture Act 2001* to ensure that all reasonable and practicable measures are taken to achieve the definition of the zone (i.e. no harm to habitats or the functioning of ecosystems). The *Aquaculture Act 2001* operates in addition to the *Marine Parks Act 2007* and requires aquaculture policies to seek to further the objects of the *Marine Parks Act 2007* where they apply within a marine park.

KEY

	Activity is deemed to be consistent with the definition of the zone (i.e. no change to current activity/use).
limit	Activity is deemed to be consistent with the definition of the zone when conducted in accordance with stated limits under the Regulations.
permit	Activity is deemed to be consistent with the definition of the zone when conducted in accordance with a permit under the Regulations.
	Activity is deemed to be inconsistent with the definition of the zone and will not be allowed. However, the Minister for Sustainability, Environment and Conservation may grant a permit for an activity that would otherwise be prohibited or restricted in a zone on a case by case basis.

WASTEWATER DISPOSAL/ DISCHARGES

Discharges are generally regulated under provisions of the *Environment Protection Act 1993* and the *Environment Protection (Water Quality) Policy 2003*.

	GMUZ	HPZ	SZ	RAZ	Limits / Permits / Exceptions
Discharge ¹					Discharges regulated under sections 3(2) or 8(7) of Schedule 1 of the <i>Environment Protection Act 1993</i> are prohibited
Extraction and disposal for a desalination plant ¹					
Vessel discharge of wastewater ²					Specifically regulated by Clause 36 of the <i>Environment Protection (Water Quality) Policy 2003</i>

Notes:

¹ Discharges in HPZ will be managed under the *Environment Protection (Water Quality) Policy 2003* to ensure that all reasonable and practicable measures are taken to achieve the definition of the zone (i.e. no harm to habitats or the functioning of ecosystems).

² Wastewater includes black water, concentrated black water and grey water as defined by the *Environment Protection (Water Quality) Policy 2003*.

KEY	
	Activity is deemed to be consistent with the definition of the zone (i.e. no change to current activity/use).
limit	Activity is consistent with the definition of the zone when conducted in accordance with stated limits.
*	Activity is deemed to be inconsistent with the definition of the zone and will not be considered until such time as it can be demonstrated otherwise.
	Activity is deemed to be inconsistent with the definition of the zone and will not be permitted.

RESOURCE EXPLORATION AND PRODUCTION

These activities are regulated under provisions of the *Mining Act 1971*, the *Petroleum and Geothermal Act 2000*, the *Offshore Minerals Act 2000* and the *Petroleum (Submerged Lands) Act 1982* to achieve the objectives of the marine park zones described under the *Marine Parks Act 2007*.

	GMUZ	HPZ	SZ	RAZ	Limits / Permits / Exceptions
Exploration (passive)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
– satellite/high level airborne					
– airborne surveys				*	*Will depend on the nature and timing of the proposed survey in relation to key environmental considerations (e.g. breeding and migration cycles of protected species).
– geophysical/geochemical surveys			limit		Limit: Will depend on the nature and timing of the proposed survey in relation to key environmental considerations (e.g. breeding and migration cycles of protected species).
Exploration (active)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
– geological sampling			*		* Will depend on nature of proposed surveying
– geophysical/geochemical surveys			*		* Will depend on nature of proposed surveying
– drilling (drill rig within zone)		*			* Will depend on nature of proposal and its location
– deviated drilling (drill rig outside zone)			limit	*	Limit: Activity will need to be conducted in accordance with approved conditions * Deviated drilling from outside zone may be considered if consistent with the zone
– trenching/bulk sampling	*	*			* Will depend on nature of proposal and its location

RESOURCE EXPLORATION AND PRODUCTION

These activities are regulated under provisions of the *Mining Act 1971*, the *Petroleum and Geothermal Act 2000*, the *Offshore Minerals Act 2000* and the *Petroleum (Submerged Lands) Act 1982* to achieve the objectives of the marine park zones described under the *Marine Parks Act 2007*.

	GMUZ	HPZ	SZ	RAZ	Limits / Permits / Exceptions
Gas storage					
– carbon sequestration (surface facilities within zone)		*	x	x	* Will depend on nature of proposal and its location
– carbon sequestration (surface facilities outside zone)			*	*	* Deviated drilling from outside zone may be considered if consistent with the zone
Production/ Extraction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
– seawater (for extraction of resources such as salt)					
– through drillhole (surface facilities within zone)		*			* Will depend on nature of proposal and its location
– through drillhole (surface facilities outside zone)			limit	*	Limit: Activity will need to be conducted in accordance with approved conditions * Extraction from deviated drillhole from outside zone may be considered if consistent with the zone
– underground mining with surface facility	*				* Will depend on nature of proposal and its location
– underground mining with no surface facility		limit	*	*	Limit: Activity will need to be conducted in accordance with approved conditions. May be considered if activity does not compromise habitats or the functioning of ecosystems. * Will depend on nature of proposal and its location.
– pipeline on/above ground/seabed/trenched		*			* Will depend on nature of proposal and its location
– pipeline underground			*	*	* Will depend on nature of proposal and its location
– seabed dredging	*				* Will depend on nature of proposal and its location
– pit-type extraction	*				* Will depend on nature of proposal and its location

RESOURCE EXPLORATION AND PRODUCTION

These activities are regulated under provisions of the *Mining Act 1971*, the *Petroleum and Geothermal Act 2000*, the *Offshore Minerals Act 2000* and the *Petroleum (Submerged Lands) Act 1982* to achieve the objectives of the marine park zones described under the *Marine Parks Act 2007*.

	GMUZ	HPZ	SZ	RAZ	Limits / Permits / Exceptions
Processing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
– mineral facility (mobile e.g. vessel based)	*				* Will depend on nature of proposal and its location
– mineral facility (permanent)					
– petroleum/geothermal facility					

Notes: All licence applications under the *Mining Act 1971* and the *Petroleum and Geothermal Act 2000* within and adjacent to marine parks are referred by the Minister for Mineral Resources and Development to the Minister for Sustainability, Environment and Conservation for concurrence. A referral process is required for the approval of on-ground exploration, and production activities, as part of the relevant mining regulation protocols between DMITRE and DEWNR. This provides for case-by-case assessment of each proposed activity. This includes activities deemed consistent with with the definition of the zone. The table indicates which activities are likely to be restricted when leases, licences and permits are considered by the Ministers. Activity proposals are considered by assessing risk. Activities likely to compromise the values of any zone would not be approved. A similar process is expected to be undertaken for activities authorised under the *Offshore Minerals Act 2000* and the *Petroleum (Submerged Lands) Act 1982*.

This table may be revised over time as new technologies and techniques are developed, to ensure that new technologies are appropriately considered, consistent with marine park zone objectives.

The following types of special purpose area may be identified in accordance with section 13(1)(c) of the *Marine Parks Act 2007*. Notwithstanding the zoning of the area, the following activities will be permitted in the special purpose areas.

Special Purpose Areas (significant economic development)

Activities comprising a development or project, or that part of a development or project, within the ambit of a declaration under section 46 of the *Development Act 1993*; and

Activities comprising development approved under section 49 (Crown development and public infrastructure) or section 49A (Electricity infrastructure development) of the *Development Act 1993*.

Special Purpose Areas (harbor activities)

Activities undertaken by or on behalf of the Minister responsible for the administration of the *Harbors and Navigation Act 1993*, or a port operator, for the purposes of maintaining or improving a harbor or port. (Harbor, port and port operator have the same meanings as in the *Harbors and Navigation Act 1993*.)

Special Purpose Areas (submarine cables and pipelines)

Activities undertaken for the purposes of maintaining or improving submarine cables or pipelines comprising public infrastructure (within the meaning of section 49 of the *Development Act 1993*).

Special Purpose Areas (transhipment)

Activities comprising the establishment, maintenance or improvement of facilities for a transhipment point prescribed or to be prescribed under the *Harbors and Navigation Regulations 2009*; and

Activities comprising or connected with loading or unloading a vessel at a transhipment point prescribed under the *Harbors and Navigation Regulations 2009*.

Special Purpose Areas (anchoring)

Activities comprising anchoring a commercial vessel (within the meaning of the *Harbors and Navigation Act 1993*) in an area recommended for that purpose by way of a Notice to Mariners by the Minister responsible for the administration of the *Harbors and Navigation Act 1993*.

Special Purpose Areas (shore-based recreational line fishing)

Recreational fishing from the shore by use of a hand line or rod and line. (Hand line, recreational fishing and rod and line have the same respective meanings as in the *Fisheries Management Act 2007*.)

Special Purpose Areas (Murray Mouth dredging)

Activities associated with dredging undertaken for the purposes of maintaining or improving water flows through the mouth of the River Murray.

Special Purpose Areas (Defence Prohibited Area)

Activities undertaken by the Department of Defence in relation to the Proof and Experimental Establishment (Port Wakefield).

Special Purpose Areas (Aquaculture)

Activities authorised under the *Aquaculture Act 2001*.

Appendix 3 List of Parties Consulted

Name		Affiliation	Organisation
Natalie	Ban	Research Fellow	James Cook University
James	Bennett	Fishery Management Officer	Department for Primary Industries and Resources SA
Michelle	Besley	Fishery Manager	Department for Primary Industries and Resources SA
Andrew	Burnell	Principal Advisor	Department of Environment and Natural Resources
Mark	Cant	Chief Executive Officer	Regional Development Australia, Whyalla
Jenny	Cassidy	Senior Project Officer	Department for Transport, Energy and Infrastructure
Simon	Clark	Executive Officer	Spencer Gulf & West Coast Prawn Fishermen's Association
Dave	Cockshell	Chief Petroleum Geophysicist	Department for Primary Industries and Resources SA
Harvey	Cook	Director	Spencer Metals Pty Ltd
Shaun	de Bryn	Manager	South Australian Tourism Commission
Graham	Edgar	Senior Research Fellow	University of Tasmania
Barry	Evans	Prawn fisher	Prawn Fisheries
Alice	Fistr	Manager, Fisheries Policy	Department for Primary Industries and Resources SA
Ian	Fitzgerald	Secretary	South Australian Recreational Fishing Advisory Council
David	Hitchcock	Director, Environment & Infrastructure	The Local Government Association of SA
Peter	Hollister	Director, Marine Transport and Policy	Department for Transport, Energy and Infrastructure
Vera	Hughes	Team Leader, Legislation and Governance	Department of Environment and Natural Resources
Ian	Janzow	Member	Metropolitan Fishers Alliance
Sean	Kalling		Tony's Tuna International Pty Ltd
Carl	Kavina	General Manager Marine Operations	Flinders Ports Pty Ltd
Keld	Knudsen	Senior Policy Adviser	Australian Petroleum Production and Exploration Association
David	Lake	Manager	South Australian Tourism Commission
Peter	Lauer	Manager Aquaculture Policy, Planning and Environment Unit	Primary Industries and Regions South Australia
Ian	Llewellyn	Senior Project Officer	Department for Transport, Energy and Infrastructure
Nigel	Long	Director Corporate and Social Responsibility	South Australian Chamber of Mines and Energy

Name		Affiliation	Organisation
Neil	MacDonald	Executive Officer	Charter Boat Owners and Operators Association
Tim	McConachy	Director	Spencer Metals Pty Ltd
	Members		Marine Park Council
	Members		South Australian Regional Organisation of Councils
	Members	The Scientific Working Group	Department of Environment and Natural Resources
Angus	Mitchell	Principal Policy Officer	Department of Environment and Natural Resources
Gary	Morgan	Chairman	Wildcatch Fisheries SA
Merilyn	Nobes	Policy Manager, Fisheries and Aquaculture	Department for Primary Industries and Resources SA
Peter	Noble	Secretary	Surveyed Charter Boat Owners and Operators Association
Craig	Noell	Fishery Manager	Department for Primary Industries and Resources SA
Greg	Palmer	Prawn fisher	Prawn Fisheries
David	Pearce	Project Coordinator, Marine Parks Project	Department of Environment and Natural Resources
Justin	Phillips	Executive officer	Blue Crab Pot Fishers Association
Justin	Phillips	Executive Officer & Industry Liaison Officer (PIFS)	South Australian Rock Lobster Advisory Council, South East Professional Fishermen's Association, Northern Zone Rock Lobster Fishing Association
Keith	Rowling	Fishery Manager	Department for Primary Industries and Resources SA
Brenton	Schahinger	Chairman	South Australian Recreational Fishing Advisory Council
Rob	Shaw		Department for Primary Industries and Resources SA
Scoresby	Shepherd	Senior Research Fellow	South Australian Research and Development Institute
Peter	Short	Project Director	Department for Transport, Energy and Infrastructure
Emmanuelle	Sloan	Manager, Aquaculture Planning Unit	Department for Primary Industries and Resources SA
Sean	Sloan	Director of Fisheries and Aquaculture Policy	Primary Industries and Regions South Australia
Adam	Stanford	Commercial Analyst	South Australian Tourism Commission
Graham	Tapley	President	South Australian Sardine Industry Association
Chris	Thomas	Branch Manager	Department of Environment and Natural Resources
Lianos	Triantafillos	Fishery Manager	Department for Primary Industries and Resources SA
Hank	van der	President	Scuba Divers Federation of SA

Name		Affiliation	Organisation
	Wijngaart		
Tim	Ward	Program Leader, Wild Fisheries	South Australian Research and Development Institute
Paul	Watson	Executive Officer	South Australian Sardine Industry Association
Peter	Welch	Executive Officer	Marine Fishers Association
Ian	Winton	Deputy Chairman	South Australian Recreational Fishing Advisory Council
Alison	Wright	Project Coordinator, Marine Parks	Department of Environment and Natural Resources
Qifeng	Ye	Acting Chief Scientist	South Australian Research and Development Institute

Appendix 4 MPSIAT feedback

Appendix Table 4-1 General views about the Upper Spencer Gulf Marine Park

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Don't know
Fully understand scientific arguments in favour of this Marine Park	0	4	1	2	2	0
Establishment of this Marine Park is based on sound scientific evidence	1	5	1	1	1	0
DENR Preliminary Marine Park zone for this Marine Park is about right	2	3	0	3	1	0
MPLAG zone advice for this Marine Park is about right	0	3	0	3	3	0
More information is needed about this Marine Park & how it will operate	0	3	2	2	2	0

Note: 9 of 15 members responded to the MPSIAT.

Source: Australian Workplace Innovation and Social Research Centre MPSIAT 2011

Appendix Table 4-2 Tourism, education & wellbeing impacts for Upper Spencer Gulf Marine Park

	Very unlikely	Unlikely	Neither likely nor unlikely	Likely	Very likely	Don't know
MP likely to increase tourism in our area						
DENR zone	4	1	0	3	1	0
MPLAG zone	2	3	0	2	2	0
There will be more opportunity for charter boats to exploit ecotourism opportunities						
DENR zone	2	3	0	3	1	0
MPLAG zone	2	1	2	3	1	0
MP will provide increased opportunities for education about marine life						
DENR zone	2	1	2	1	3	0
MPLAG zone	2	2	2	1	2	0
MP will provide increased opportunities for our understanding of marine conservation issues						
DENR zone	2	3	0	2	2	0
MPLAG zone	2	1	2	2	2	0
MP will create new employment opportunities for local people						
DENR zone	6	1	0	1	1	0
MPLAG zone	4	2	2	0	1	0
MP will have no impact (positive or negative) on me or my family						
DENR zone	1	4	0	2	2	0
MPLAG zone	0	4	2	2	1	0
MP will improve the quality of life of people in my community						
DENR zone	5	1	0	0	3	0
MPLAG zone	2	3	1	2	1	0
MP will improve my personal quality of life						
DENR zone	5	1	0	2	1	0
MPLAG zone	3	2	2	0	2	0
MP will negatively change our way of life*						
DENR zone	2	2	0	4	1	0
MPLAG zone	2	2	1	3	1	0

Note: 9 of 15 members responded to the MPSIAT. *Question is negatively scored.

Source: Australian Workplace Innovation and Social Research Centre MPSIAT 2011

Appendix Table 4-3 Culture and heritage impacts for Upper Spencer Gulf Marine Park

	Very unlikely	Unlikely	Neither likely nor unlikely	Likely	Very likely	Don't know
MP will respect the interests of Aboriginal communities						
DENR zone	0	3	2	3	1	0
MPLAG zone	0	3	3	2	0	1
MP will help preserve Aboriginal culture & heritage						
DENR zone	1	3	2	1	2	0
MPLAG zone	0	6	0	2	0	1
MP will help preserve local Australian culture & heritage						
DENR zone	1	3	1	2	2	0
MPLAG zone	0	5	1	2	0	1
MP will help maintain our community identity as a fishing centre						
DENR zone	0	4	2	1	2	0
MPLAG zone	2	3	2	1	0	1

Note: 9 of 15 members responded to the MPSIAT.

Source: Australian Workplace Innovation and Social Research Centre MPSIAT 2011

Appendix Table 4-4 Recreation & fishing impacts for Upper Spencer Gulf Marine Park

	Very unlikely	Unlikely	Neither likely nor unlikely	Likely	Very likely	Don't know
MP will help to encourage recreational activities						
DENR zone	1	5	0	2	1	0
MPLAG zone	1	5	1	1	1	0
MP will discourage recreational fishing*						
DENR zone	2	1	0	4	2	0
MPLAG zone	0	4	0	5	0	0
MP will bring better local facilities e.g. for recreation & fishing						
DENR zone	5	2	0	0	1	1
MPLAG zone	4	3	0	2	0	0
MP will bring a wider range of activities for local people to participate in						
DENR zone	4	3	1	0	1	0
MPLAG zone	4	3	1	1	0	0
Any significant losses in commercial fishing would be very damaging for my family*						
DENR zone	3	3	0	0	3	0
MPLAG zone	1	4	1	0	3	0
Any significant losses in commercial fishing would be very damaging for the community*						
DENR zone	1	2	1	2	3	0
MPLAG zone	0	3	2	2	2	0

Note: 9 of 15 members responded to the MPSIAT. *Question is negatively scored.

Source: Australian Workplace Innovation and Social Research Centre MPSIAT 2011

Appendix Table 4-5 Population & housing impacts for Upper Spencer Gulf Marine Park

	Very unlikely	Unlikely	Neither likely nor unlikely	Likely	Very likely	Don't know
MP will bring too many tourists here & change the quality of our life						
DENR zone	5	4	0	0	0	0
MPLAG zone	2	5	1	1	0	0
MP will see too many locals leaving the area						
DENR zone	2	2	2	3	0	0
MPLAG zone	1	5	1	2	0	0
MP will increase property prices making it more difficult for locals to buy houses						
DENR zone	4	4	1	0	0	0
MPLAG zone	1	6	2	0	0	0
MP will lead to a lowering of beachfront property prices						
DENR zone	1	4	0	3	1	0
MPLAG zone	0	4	2	2	1	0

Note: 9 of 15 members responded to the MPSIAT.

Source: Australian Workplace Innovation and Social Research Centre MPSIAT 2011

Appendix Table 4-6 Community response impacts for Upper Spencer Gulf Marine Park

	Very unlikely	Unlikely	Neither likely nor unlikely	Likely	Very likely	Don't know
Our community will adapt well to having the MP						
DENR zone	0	3	2	2	2	0
MPLAG zone	0	4	2	2	1	0
Our community is strong enough to manage changes brought by the MP						
DENR zone	0	2	2	4	1	0
MPLAG zone	0	1	4	2	2	0
A number of potential business opportunities will be brought by the MP						
DENR zone	4	2	0	2	1	0
MPLAG zone	2	4	2	1	0	0
Need for training programs to help people adapt to new occupations associated with the MP						
DENR zone	0	3	2	3	1	0
MPLAG zone	0	3	2	3	1	0
MP will divide our community into those for & against it*						
DENR zone	0	3	1	3	2	0
MPLAG zone	1	2	0	4	2	0
MP will be a source of pride to this community						
DENR zone	2	3	1	2	1	0
MPLAG zone	2	2	1	3	1	0
MP will increase number of events & other activities that bring the community together						
DENR zone	4	2	2	1	0	0
MPLAG zone	4	3	2	0	0	0

Note: 9 of 15 members responded to the MPSIAT. *Question is negatively scored.

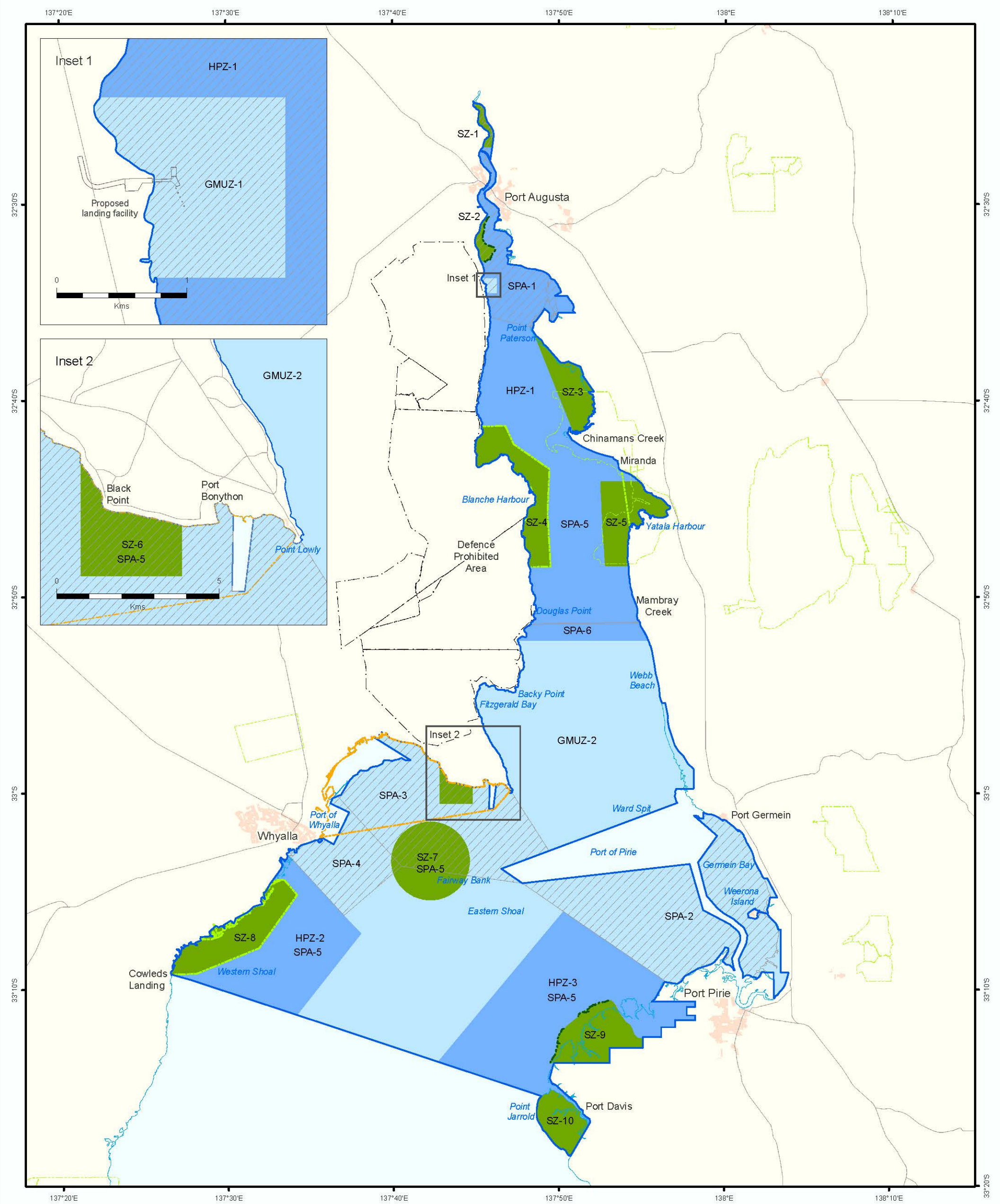
Source: Australian Workplace Innovation and Social Research Centre MPSIAT 2011

Appendix 5 Map of Marine Park Showing Draft Zoning

Appendix Figure 5-1 Map of Marine Park Showing Draft Zoning

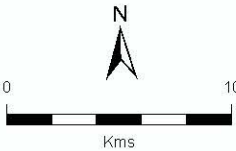
See next page.

Marine Park 10 - Upper Spencer Gulf



- Marine Park Draft Zoning**
- Sanctuary Zone
 - Habitat Protection Zone
 - General Managed Use Zone
 - Special Purpose Area (Significant Economic Development)
 - Special Purpose Area (Harbor Activities)
 - Special Purpose Area (Submarine Cables and Pipelines)

- Topographic**
- Built Up Area
 - Marine Park Boundary
 - Cephalopod Fishing Closure Area (including squid, cuttlefish and octopus)
 - Existing Reserves under other Acts
 - Defence Prohibited Area
 - Seaward Mangrove Extent
 - Coastline (median high water)
 - Major Road



THIS MAP IS INDICATIVE ONLY AND IS NOT INTENDED FOR NAVIGATIONAL PURPOSES

Produced by Marine Parks Project
Department of Environment, Water and Natural Resources
GPO BOX 1047 Adelaide SA 5001
www.marineparks.sa.gov.au
Data Source Marine Parks, NPWSA, Topographic Data, Coastline (median high water) - DEWNR
Aquatic Reserves - PIRSA
Compiled 6 August 2012
Projection Lambert Conformal Conic
Datum Geocentric Datum of Australia, 1994

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