Nuyts Archipelago Marine Park Regional Impact Statement

A report prepared for

Department of Environment, Water and Natural Resources

Prepared by

econsearch

In association with the Australian Workplace Innovation and Social Research Centre, Dr Hugh Kirkman, Dr Simon Bryars and James Brook

20 August 2012

EconSearch Pty Ltd
214 Kensington Road
Marryatville SA 5068
Tel: (08) 8431 5533
Fax: (08) 8431 7710
www.econsearch.com.au

Contents

List of Tables

List of Appendix Tables

List of Figures

List of Appendix Figures

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 Park 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
NRM	Natural Resource Management
PIRSA	Department of Primary Industries and Regions SA
RAZ	Restricted Access Zone
RIAS	Regional Impact Assessment Statement
RIS	Regional Impact Statement
SA	South Australia
RISE	Regional Industry Structure and Employment
SARFAC	South Australian Recreational Fishing Advisory Council
SAMPIT	South Australian Marine Parks Information Tool
SARDI	South Australian Research and Development Institute
SEIFA	Socio-Economic Indexes for Areas
SIA	social impact assessment
SPA	Special Purpose Area
SLA	Statistical Local Area
SZ	Sanctuary Zone
UNHL	unnaturally high level
UNLL	unnaturally low level

Acknowledgements

The consulting team has relied heavily on the voluntary cooperation of a range of government, industry and broader community representatives and is indebted to these people for providing the necessary information, guidance and assistance (list provided in Appendix 3). Janine Baker provided assistance to the ecological impact assessment team early in the project and we are grateful for that. DEWNR and PIRSA officers provided assistance, were supportive of the data collection and interpretation and offered valuable advice throughout.

Document History and Status

Doc Ver	Doc Status	Issued To	Qty elec	Qty hard	Date	Reviewed	Approved
1	Draft	Gary Frost	1	-	4/07/12	JBM	JBM
2	Final	Gary Frost	1	-	2/08/12	JBM	JBM
3	Final	Gary Frost	1	-	20/08/12	JBM	JBM

Printed:	20/08/2012 5:02:00 PM
Last Saved:	20/08/2012 5:02:00 PM
File Name:	S:\1_Projects\Current\1208_Marine Parks Revised\Reports\MP2\Impact Statement MP2_120820.doc
Project Manager:	Julian Morison
Principal Author/s:	Heather Bailey, Simon Bryars, John Spoehr, Julian Morison, James Brook, Kate Barnett, Ann-Louise Hordacre, Hugh Kirkman, Lisa Rippin
Name of Client:	Department of Environment and Natural Resources
Name of Project:	Marine Parks Revised
Document Version:	3
Job Number:	1208

Executive Summary

Nuyts Archipelago Marine Park is the largest single marine park in South Australia's marine parks network. It includes the Nuyts Reef complex, Fowlers Bay, islands of the Nuyts Archipelago and adjacent coastal bays.

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

Nuyts Archipelago Marine Park contains a complex, interconnected network of highly varied ecosystem components, including islands, shallow bays and estuaries subject to a variety of levels of wave energy, resulting in a high diversity of species and productivity.

Most of the shoreline consists of long stretches of sandy beach interspersed with cliffs and various forms of intertidal reef. The habitats of Smoky and Tourville Bays include tidal creeks, shallow seagrasses, samphires and mangroves, and there are significant mangroves on St Peter Island.

There are large areas of low and high profile subtidal reef offshore from Point Bell, Point Sinclair and at Nuyts Reef. Further offshore, there are 19 rocky islands with near-shore reefs plus a number of emerged rocks and submerged reefs. These reefs are primarily of granite, with some limestone or calcarenite reefs in the lee of some of the islands.

The park has some of the most significant expanses of seagrasses outside South Australia's gulfs including dense seagrass beds in Fowlers Bay, deepwater seagrasses in offshore Denial Bay, and other seagrass beds near various islands.

From a socio-economic viewpoint the community relevant to this marine park is that of the Far West Coast region. The two statistical local areas (SLAs) that comprise the region are Ceduna (DC) and Unincorporated West Coast. Some of the key socio-economic characteristics of the region include:

- a resident population of around 4,300 persons in 2010/11.
- a higher concentration of younger people (aged 0 to 14 years) and a lower than average share of people aged 65 and over compared with the State.
- The total population is projected to increase by just 5 per cent by 2026, whereas the SA population is expected to increase by around 23 per cent.
- The unemployment rate in the Far West Coast region was 8.6 per cent in the June quarter of 2011, well above the state rate of 5.3 per cent.
- Approximately 50 per cent of the businesses in the Far West Coast region were classified in the agriculture, forestry and fishing sector.
- Mean taxable income was $48,300 in 2009/10, 11 per cent below SA's average of $54,300.

- Over the 10 years to 2010/11, median dwelling prices increased by 273 per cent ($250,000 in 2010/11) compared with a 197 per cent in SA as a whole ($357,500).

In 2009/10, the top four contributors to gross regional product (GRP) were the agriculture, forestry and fishing (15 per cent), ownership of dwellings (14 per cent), health and community services and transport and storage (7 per cent each) sectors.

The commercial fishing, aquaculture 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 4 per cent of GRP ($6.1 million) and 6 per cent of employment (107 fte jobs) in 2009/10. By comparison, the tourism sector contributed 7 per cent of GRP ($12.4 million) and 9 per cent of employment (164 fte jobs).

Ecological Impacts

In general the habitats within the park can be considered to be in a condition comparable to the time of European settlement, although there are some potential minor threats from agricultural run-off or septic tank overflows in some areas, shellfish aquaculture and port activities, disturbance of sandy habitat by trawling, and potential disturbance of intertidal habitats. 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 Nuyts Archipelago Marine Park will include (1) maintenance of 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.

Various zone restrictions (with habitat protection zones and sanctuary zones covering about 51 per cent and 9 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 however, the proposed zoning alone does not address potential threats listed above, which would require complementary management measures. Some habitats of particular conservation note include seagrass meadows that provide nursery and feeding grounds for a variety of crustaceans, fishes and waterbirds, mangrove communities and Nuyts Reef. 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.

A number of species when considered in isolation (including southern rock lobster, greenlip and blacklip abalone, snapper, razorfish and mud cockle) have potential to increase in size and abundance inside some of the sanctuary zones. Some of these species also have potential for increased larval export to areas outside the sanctuary zones, as well as potential for spill-over of adults to areas outside the sanctuary zones. These changes may potentially have socio-economic benefits, although not quantified

in this report. However, the ecosystems in which these species interact are expected to shift towards a pre-European state, which may result in declines rather than increases of some species such as blacklip abalone. Some species of conservation concern such as the western blue groper and harlequin fish are also likely to benefit from protection inside some of the sanctuary zones.

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, mining and coastal development sectors and short, medium and long term negative impacts in the commercial fishing sector.

Commercial fishing

Table ES1 shows the economic impact on the regional economy of marine park zoning on all affected fisheries. Impacts are based on SARDI's average annual displaced catches and corresponding average annual prices expressed in 2011 dollars. In aggregate, it was estimated that the impact of marine park zoning will generate the following loss of regional economic activity on an ongoing annual basis.

- Approximately $1.04m in GRP, which represents 0.6 per cent of the regional total ($174m).
- Approximately 5 fte jobs which represent 0.3 per cent of the regional total (1,872 fte jobs).
- Approximately $0.69m in household income, which represents 0.8 per cent of the regional total ($90m).

Table ES1 Regional economic impact of marine park zoning based on SARDI estimates of displaced effort

Sector	Output		Employment [a]		Household Income		Contribution to GRP	
	($m)	%	(fte jobs)	%	($m)	%	($m)	%
Direct effects								
Abalone	-0.50	33%	0	0%	-0.38	55%	-0.49	47%
Rock Lobster	-0.11	8%	0	0%	-0.08	12%	-0.11	10%
Marine Scalefish	-0.07	4%	-1	16%	-0.03	5%	-0.05	5%
Downstream [b]	-0.32	22%	-1	25%	-0.06	8%	-0.10	10%
Total Direct [c]	*-1.00*	*67%*	*-2*	*41%*	*-0.55*	*80%*	*-0.75*	*72%*
Total Flow-on [c]	*-0.49*	33%	*-3*	59%	*-0.14*	20%	*-0.29*	28%
Total [c]	**-1.50**	**100%**	**-5**	**100%**	**-0.69**	**100%**	**-1.04**	**100%**
Regional Total [d]	297.55		1,872		89.52		173.59	
Impact on Region	-0.5%		-0.3%		-0.8%		-0.6%	

[a] Full-time equivalent jobs.
[b] Downstream activities consist of seafood processing, transport, retail trade and food services.
[c] Totals may not sum due to rounding.
[d] Far West Coast region (see Appendix 1).
Source: EconSearch analysis

Because the reduced access to the fishery will be permanent, the impacts reported in Table ES1 are an estimate of the on-going annual impact. 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 economic impacts could be greater as the estimated displaced catch, particularly abalone and rock lobster, may understate the actual catch in some sanctuary zones if they are located on important fishing grounds (hot spots). Impacts could also be over-estimated if sanctuary zones avoid hot spots (Ward and Burch 2012; Stevens et al. 2011a and 2011b). The zoning process attempted to avoid impacts on fishing by avoiding important fishing grounds. PIRSA has advised that statewide some draft sanctuary zones are located on important fishing grounds (hotspots), however advice specific to this park has not been provided. According to industry-derived estimates of displaced catch (which have not yet been reviewed by SARDI), the aggregate regional impacts could be as high as 12 fte jobs and $1.39m in GRP.

The potential cumulative impact of the proposed extension to and revised zoning of the Commonwealth Great Australian Marine Park and the proposed Western Eyre Commonwealth Marine Reserve may place further pressure on fishing business viability.

Although the aggregate impacts may not appear large in absolute terms, the economy of the Far West Coast region is a fragile, highly dependent one. Despite the increase in mining activity in recent years the region is still reliant on agriculture and fishing as the core drivers of economic activity. Indeed of the 366 businesses in the region approximately 50 per cent are classified in the agriculture, forestry and fishing sector.

Additionally, unemployment in the Far West Coast region is high (8.6 per cent at June 2011) when compared with the state average (5.2 per cent). This suggests that alternative regional opportunities for unemployed labour will be difficult to find and any job losses will be real and unlikely to be absorbed into the local workforce.

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, provided that any potential future prescribed criteria in aquaculture zone polices derived from Section 11 (3a) of the *Aquaculture Act 2001* do not add cost to existing or future aquaculture activities, or do not have regulatory impact. Because no such prescribed criteria currently exist such potential impacts have not been assessed, (PIRSA, pers. comm., 7 November 2011).

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 Far West Coast 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

The Port of Thevenard is excluded from the marine park. In addition the surrounding harbour of Thevenard has been declared a special purpose area. No significant impacts on shipping activities arising from the zoning in this park are expected, which is consistent with Government policy commitments.

Mining

There are no mineral, petroleum or geothermal tenements currently located within the marine park. A mining lease lies adjacent to the park inshore from the park boundary near Port Le Hunte, and extracts gypsum and salt. This operation is not expected to be affected by the zoning as it is not located near a sanctuary zone (where extractions and discharges of seawater are not permitted).

Coastal development

There is a proposal for a commercial and a recreational marina within the Ceduna-Thevenard area. If it goes ahead, this development will be within Thevenard Harbour, which is a SPA, where zoning would not restrict the activity.

Social Impacts

The overall social impacts of the Nuyts Archipelago Marine Park on communities living in the Far West Coast region of South Australia are expected to be moderate given the magnitude of the economic impacts that have been projected. Commercial fishing is one of the four top industry sources of employment and is estimated to contribute 107 jobs to employment in the region, compared with tourism which contributes some 164 jobs. Economic impact assessment identifies a loss of five fte commercial fishing-related 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. The impact on recreational fishing is considered to be low due to adjustments in zoning 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 likely to be moderate.

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. 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 marine park local advisory groups, 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[1] 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 Regional 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).

[1] The impact statements were prepared before the draft management plans were finalised.

Figure 1–1 Marine Park Zones

The management plans will contain the following management zones:	
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.
To accommodate site specific community needs, within a marine park there may be:	
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 *Marine protected areas: a shared vision.* 23 public meetings/information sessions held involving some 1600 people.	2001/02
Labor Government policy *Blueprint for the SA representative system of marine protected areas* developed following the above consultation process, with further consultation undertaken with key stakeholders and across relevant government agencies.	2003/04
The Draft *Encounter Marine Park Zoning Plan* 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
• 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 commitments[2] 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 Framework[3] 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.

[2] 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.

[3] 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. 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 Section 3.1 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 Far West Coast 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 Far West Coast 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 SAMPIT[4] 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 Institute for Social Research 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 Census[5]. 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.

[4] 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).

[5] 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.

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 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. Nuyts Archipelago Marine Park Description

At nearly 4,000 km^2, the Nuyts Archipelago Marine Park is the largest single marine park in South Australia's marine parks network. It is located on the west coast of South Australia in the Murat Bioregion and includes the Nuyts Reef complex, Fowlers Bay, islands of the Nuyts Archipelago and adjacent coastal bays. This marine park overlays parts or all of a number of other protected areas including Fowlers Bay Conservation Park, Isles of St Francis Conservation Park, Sinclair Islands Conservation Park, Nuyts Archipelago Conservation Park, Nuyts Reef Conservation Park, Wittlebee Conservation Park, Laura Bay Conservation Park, Chadinga Conservation Reserve and Point Bell Conservation Park (DENR, 2010a).

In 2009 part of the marine park was assessed for increased protection under the *Wilderness Protection Act 1992*. In 2010 the Minister for Environment and Conservation approved the creation of the Nuyts Archipelago Wilderness Protection Area. The area proclaimed as the Nuyts Archipelago Wilderness Protection Area comprises the land, to the low water mark, of Purdie Islands, Lounds Island, Lacy Islands, Evans Island, Goat Island, East and West Franklin Islands, Egg Island, Smooth Island, Freeling Island, Dog Island, West Island, St Francis Island, Masillon Island, Fenelon Island, Lilliput Island, Blefuscu Island, and Hart Island. Wilderness protection for these islands will provide an opportunity to create better links between land and sea conservation areas (DENR, 2010a).

A map of the Nuyts Archipelago Marine Park and the proposed draft zoning is provided at the end of this statement at Appendix 5.

3.1 Ecological Description

Nuyts Archipelago Marine Park contains a complex, interconnected network of highly varied ecosystem components, including islands, shallow bays and estuaries subject to a variety of levels of wave energy, resulting in a high diversity of species and productivity (DENR, 2010a).

Most of the shoreline consists of long stretches of sandy beach interspersed with cliffs and various forms of intertidal reef. The habitats of Smoky and Tourville Bays include tidal creeks, shallow seagrasses, samphires and mangroves, and there are significant mangroves on St Peter Island (DENR, 2010a).

There are large areas of low and high profile subtidal reef offshore from Point Bell, Point Sinclair and at Nuyts Reef. Further offshore, there are 19 rocky islands with near-shore reefs plus a number of emerged rocks and submerged reefs. These reefs are primarily of granite, with some limestone or calcarenite reefs in the lee of some of the islands (DENR, 2010a).

The park has some of the most significant expanses of seagrass outside South Australia's gulfs including dense seagrass beds in Fowlers Bay, shallow seagrasses in the margins of Tourville and Smoky Bays, deepwater seagrasses in offshore Denial Bay, and other seagrass beds near various islands (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.

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	4.2 (4.2)			7.3			52.6		0.1		51.8
SZ-2	5.6			5.8			1.8		1.4		50.8
SZ-3	1.9			0.3	6.5	3.2	0.1		2.3	5.2	0.5
SZ-4					6.5					0.6	0.4
SZ-5	2.6				3.6	1			4	2.8	0.3
SZ-6	0				3.1	0.2		0	1.9	0.8	0.1
SZ-7											10.7
SZ-8							6.8			0.5	115.3
SZ-9	3.6 (3.6)			6.1			1.5		2.1	7	4.1
SZ-10	0.2			2.7	4.6				1.1	1.6	0.3
HPZ-1	4.2			9.9			8.3	0.2	1.2		158.5
HPZ-2	23.1			11			35.8		7.2	15.6	103
HPZ-3	11.2						3.7		7.3		41.5
HPZ-4	5.3			5.2			3.6				54.1
HPZ-5							0.1				50.9
HPZ-6							0.8				635.1
HPZ-7	24.9			11.1	40	4	1.9	0.8	8.9	37.6	106.7
HPZ-8	29.1			22.7	12.7	4.5	50	10.3	84.8	291.3	264.8
GMUZ-1	5.7			11.3			14.1		1.1		56.1
GMUZ-2	15.8			9.2			11.9		2.1		98.5
GMUZ-3	62.3			35.4	8.1	7.5	109.7	22.2	22.8	150.3	1037
GMUZ-4											93.4
Total	199.8			137.9	85.1	20.4	302.7	33.5	148.4	513.2	2934

Source: based on GIS data provided by DEWNR.

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

Shoreline habitats are not available for islands. 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. Brackets indicate the length of shoreline habitat within an SZ along which shore-based line fishing is allowed.

Zero values indicate presence but <0.05 km/km^2. Totals may differ slightly from column sums due to rounding.

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.

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 Far West Coast 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 Far West Coast region contributes to the State economy and to illustrate trends in economic growth or decline.

The Far West Coast region is located in the far west of the state (Figure 1, Appendix 1). The two statistical local areas (SLAs) that comprise the region are Ceduna (DC) and Unincorporated West Coast. The Far West Coast regional economy is relevant to the Far West Coast (MP1) and Nuyts Archipelago (MP2) marine parks. 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 Far West Coast was around 4,300 persons in 2009/10.
- Compared with the age distribution of the state as a whole, the Far West Coast region has a higher concentration of younger people (aged 0 to 14 years), a similar share of persons aged 15 to 64 years and, consequently, a lower than average share of people aged 65 and over.
- The total population in the Far West Coast region is projected to increase by just 5 per cent by 2026, whereas the SA population is expected to increase by more than four times that, around 23 per cent.
- The unemployment rate in the Far West Coast region was 8.6 per cent in the June quarter of 2011, well above the state rate and is more than double the rate of 4 years earlier.
- Approximately 50 per cent of the businesses in the Far West Coast region were classified in the agriculture, forestry and fishing sector and 11 per cent were in the construction sector.
- Over the period 2000/01 to 2008/09, the mean taxable income (in nominal terms) increased by 61 per cent in the Far West Coast region ($45,600 in 2008/09) and 47 per cent in SA as a whole ($52,000 in 2008/09).
- Median dwelling (units and houses) prices increased by 273 per cent in the Far West Coast region ($250,000 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 agriculture, forestry and fishing (15 per cent), health and community services (14 per cent), education (13 per cent) and retail trade (12 per cent) sectors.

- In 2009/10, the top four contributors to GRP were the agriculture, forestry and fishing (15 per cent), ownership of dwellings (14 per cent), health and community services and transport and storage (7 per cent each) 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 4 per cent of GRP ($6.1 million) and 6 per cent of employment (107 fte jobs) in 2009/10. By comparison, the tourism sector contributed 7 per cent of GRP ($12.4 million) and 9 per cent of employment (164 fte jobs).

Table 3-2 Summary of key economic and social indicators for the Far West Coast region

Indicator	Far West Coast	SA	Far West Coast as a proportion of SA
Population, 2009/10 (no.)	4,330	1,644,582	0.3%
Birth Rate, 2008/09 (births/1000 residents)	15.6	12.1	-
Death Rate, 2008/09 (deaths/1000 residents)	6.5	7.7	-
Age Distribution, 2009/10:			
Proportion of Population aged 0-14	23%	18%	-
Proportion of Population aged 15-64	66%	67%	-
Proportion of Population aged 65+	11%	16%	-
Dependency Rate, 2009/10:			
Child	35%	27%	-
Aged	16%	23%	-
Total	51%	50%	-
Population Projection, Increase from 2006 to 2026	5%	23%	-
Employment, June qtr 2011:			
Labour Force (no.)	2,228	867,500	0.3%
Unemployed (no.)	192	45,300	0.4%
Unemployment Rate	9%	5%	-
Participation Rate, 2009/10	62%	63%	-
Businesses, June 2009 (no.)	366	141,625	0.3%
School Enrollments, 2006 (no.)	693	245,388	0.3%
Tertiary Enrollments, 2006 (no.)	578	202,011	0.3%
Non-school Qualifications, 2006 (no.)	1,208	595,379	0.2%
Mean Taxable Income, 2008/09 ($)	45,559	51,932	-
Proportion of Taxable Individuals, 2008/09	71%	75%	-
Value per Buiding Approval, 2009/10 ($)	188,295	213,828	-
Median Dwelling Price, 2010/11 ($)	250,000	357,500	-
Commercial Fishing, Ave/yr 2000/01 to 2009/10:			
Catch (t)	299	47,581	0.6%
Value of Catch ($m)	6	202	2.8%
Charter Boats, Ave/yr 2007/08 to 2009/10 (no. of fish)	4,242	146,341	2.9%
Recreational Fishing, 2007/08:			
Fishers (no.)	7,750	236,463	3.3%
Days Fished (no.)	35,656	1,054,200	3.4%
Gross Regional Product, 2009/10 ($m)	174	80,356	0.2%
Employment, 2009/10 (fte)	1,872	774,953	0.2%
Tourism, 2009/10 ($m)	26	4,524	0.6%
Other Regional Exports, 2009/10 ($m)	81	26,757	0.3%
Regional Imports, 2009/10 ($m)	185	40,573	0.5%

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

In general the habitats within the park can be considered to be in a condition comparable to the time of European settlement. SZ-2 is adjacent to Chadinga Conservation Reserve and is therefore unlikely to be subject to land-based threats. Elsewhere, there are a number of potential, but minor, land-based threats to water quality, including: elevated nutrient levels from septic tank overflows at the townships of Denial Bay (GMUZ-3), Fowlers Bay (HPZ-2) and Smoky Bay (HPZ-8) or diffuse agricultural run-off along various sections of the coast (including HPZ-7, SZ-3 to 6); and hydrocarbons and organometals from shipping activity at the port at Thevenard (GMUZ-3) (Bryars, 2003). There is also increased risk of introduced marine pests associated with shipping activities.

Prawn trawling can impact sand habitats (see Appendix 1.1.5 of the Main Report). Trawling is known to occur within the Nuyts Archipelago Marine Park in general (PIRSA, 2009) and specifically within GMUZ-4 (Currie and Ward, 2011), but estimates of historical catch indicate that there will be no trawling displaced from SZs or HPZs within the park (Ward and Bush, 2012).

Potential threats to saltmarsh communities in Tourville Bay (HPZ-7, SZ-3 to 6), and Laura Bay and Smoky Bay (HPZ-8) include physical disturbance by off-road vehicle use, stock grazing and/or illegal rubbish dumping (Bryars, 2003, Caton et al., 2011). Disturbance of acid sulphate soils in these habitats could potentially impact offshore biota (Caton et al., 2011).

Intertidal shellfish aquaculture focussed around Denial Bay (GMUZ-3) and Smoky Bay (HPZ-8) can potentially decrease nutrients, compete with native filter feeders, introduce non-native species (Pacific oyster), and physically disrupt habitat. There is also subtidal abalone aquaculture at Cape D'Estrees (HPZ-8).

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) however, the proposed zoning alone does not address the threats listed above, which would require complementary management measures. The Nuyts Archipelago Marine Park has about 51 per cent and 9 per cent of the total park area designated as HPZ and SZ, respectively.

The proposed zoning plan states that aquaculture within 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).

For the Nuyts Archipelago Marine Park, habitats of particular conservation note that will benefit from future protection include: seagrass meadows in Fowlers Bay, Smoky and Tourville Bays, and offshore seagrass meadows that all provide nursery and feeding grounds for commercially and recreationally important crustaceans and fishes (such as western king prawn, blue swimmer crabs, and King George whiting) as well as habitat and food sources for waterbirds (HPZ-6, 7 and 8, SZ-8); mangrove communities along Davenport Creek (Tourville Bay)—a Wetland of National Importance (HPZ-7, SZ-3 to 6), and on St Peter Island (HPZ-8); and Nuyts Reef and surrounding reefs, with a particularly high diversity of red algal species (SZ-1, HPZ-1). The pelagic habitat surrounding Hart Island (HPZ-6) is also significant because there are few deepwater (>50 m) pelagic areas with that level of protection within the marine parks network (DENR, 2010a).

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 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:

- Australian sea lion (threatened and protected species) (breeding sites at Nuyts Reef, Point Fowler, Purdie Island, Lound Island, Blefuscu and Lilliput Islands in Franklin Islands group, Breakwater/Gliddon Reef off St Peter Island, West and Fenelon Islands in Isles of St Francis group)
- Southern right whale (threatened and protected species) (calving and aggregation area in Fowlers Bay)
- Little penguin (protected species)
- New Zealand fur seal (protected species) (breeding sites at Nuyts Reef and Fenelon Island)
- White shark (threatened and protected species)
- Syngnathids including the leafy and weedy seadragon (protected species)
- Bottlenose and common dolphins (protected species)
- White-bellied sea eagle (threatened and protected species)
- Eastern osprey (threatened and 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, many of the major foraging grounds of the Australian sea lion

colonies in the region lie within the park boundaries. Listed threatened species often have individual recovery plans that identify objectives/actions required to mitigate against threatening processes that will ultimately allow recovery of the species. Protection of critical habitat is often identified in these plans as a useful objective, and thus the protection of breeding and aggregation areas under the proposed zoning arrangements should have some positive impact on the Australian sea lion, southern right whale, and white shark. However, it is unlikely that the main anthropogenic threatening processes to these species (or the white-bellied sea eagle and eastern osprey) will be out-weighed by any potential positive impact from the park zoning and management arrangements (see Species Profiles in Appendix 3 of Main Report). Nonetheless, some of the zones of particular note for threatened and protected species within the Nuyts Archipelago Marine Park are:

- SZ-1, SZ-7 and SZ-8 which includes the waters adjacent to the Australian sea lion breeding colonies at Nuyts Reef, Lound Island and Fenelon Island
- SZ-1 and SZ-8 which includes the waters adjacent to the New Zealand fur seal breeding colonies at Nuyts Reef and Fenelon Island
- SZ-8 and SZ-9 which are adjacent to white-bellied sea eagle territories
- SZ-1, SZ-2 and SZ-8 which are adjacent to eastern osprey territories

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 4-1). 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 reflect poorly on fisheries management in accordance with the principles of ecologically sustainable development. Some of the more resident reef fishes at offshore islands were considered to be at a natural level (NL) (Table 4-1).

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 4-1 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 southern rock lobster as an example, Table 4-1 indicates that the current status of adult southern rock lobster is at UNLL in sanctuary zones 1, 2, 7, 8 and 9, which all include reef habitat used by lobster. Under the proposed zoning, the adults and sub-adults already resident in these sanctuary zones and any post-larval juveniles that then become residents (or recruits) would be protected. Consequently, the potential exists for the size and abundance of adults to increase within these zones after 5 years (shown as +), 10 years (shown as ++) and 20 years (shown as +++) (Table 4-1). Without the proposed zoning, adult lobsters would continue to be harvested and the population level was assumed to 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 arrangements shown in Table 4-1 is a positive increase within these zones across 5, 10 and 20 years[6]. Table 4-1 also shows for southern rock lobster that there is potential for: a spill-over as a result of the population density inside the SZs increasing relative to outside to the point where some lobsters will tend to migrate from the SZ; and increased larval production from inside the SZs due to increased lobster abundance and increased spawning. A similar scenario to southern rock lobster is also predicted for greenlip and blacklip abalone in SZ-1, SZ-8 and SZ-9 (Table 4-1), except that spill-over is unlikely to occur because greenlip and blacklip abalone are highly sedentary (see Species Profiles in Appendix 3 of Main Report). In addition, second-order ecosystem interactions between blacklip abalone and higher order predators may limit their potential to increase (see Section 4.1.3). Density-dependent factors may also ultimately limit any potential increases in the size and abundance of sedentary species such as abalone that may have limited capacity to move out of an area (see Species Profiles in Appendix 3 of Main Report).

For several other species, similar predictions to southern rock lobster and greenlip/blacklip abalone are made with variations according to the particular zones and the life histories of each species (see Species Profiles in Appendix 3 of Main Report for further details). Snapper have potential to increase in size and abundance inside many of the SZs. Snapper populations often comprise a mix of migrant and resident individuals and there is evidence that some individuals become resident on the west coast (see Species Profile in Appendix 3); it is these fish that offer potential to increase in abundance over time in the absence of fishing activity. Within some of the smaller inshore SZs of Tourville Bay and Smoky Bay, razorfish and mud cockle have potential to increase in size and abundance on the intertidal flats, with larval export also possible.

For resident reef fishes of conservation concern and/or which are vulnerable to localized depletion (namely western blue groper, harlequin fish, bluethroat wrasse, Bight redfish, swallowtail, and sea sweep) and which are currently considered to be at NL in some SZs, there is potential that across 20 years their populations may decline without the zoning (as indicated by a – at 20 years), but that they would maintain current levels across the 20 year period with the proposed zoning; thus yielding a net positive benefit at 20 years of + (Table 4-1). However, this response may be limited to some extent by the continuation of shore-based recreational line fishing in SZ-1 and SZ-9.

[6] Current management arrangements are aiming for a recovery of lobster populations in the Northern and Southern Zones. Nonetheless, the increase inside SZs would still be expected to be greater than outside, but the net effect of the SZs would be lowered.

Of the other indicator species assessed (and which are not presented in Table 4–1), the following observations were made for the Nuyts Archipelago Marine Park:

- Species occurring within the park but with insufficient habitat inside proposed zones to warrant an assessment include: blue swimmer crab and western king prawn.
- Species occurring within the park but with insufficient information to enable an assessment include: King George whiting, southern garfish, and southern calamary.

Species considered as not occurring within the park include: yellowfin whiting 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 4-2). 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 4-2 has a known direct 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 southern blue devil is a long-lived (Saunders et al., 2010), site-attached reef fish (Bryars, 2010) that is incidentally caught as bycatch (e.g. Fowler et al., 2009) but which is susceptible to barotrauma (Saunders et al., 2010) and therefore may have a low rate of post-release survival. The southern blue devil will therefore benefit from protection inside SZs.

Table 4-2 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.

Overall, the proposed SZs within the park show significant potential for measurable responses of fished species. For nine of the 10 proposed SZs, predictions were made for a response by one or more of the indicator fished species to protection from fishing. In just one zone was it felt that no detectable changes may occur: SZ-4 which is in the upper intertidal of Tourville Bay and in which fishing for the indicator species does not (or is highly unlikely to) occur currently or occur in the future. Several of the SZs are likely to have considerable benefits for fished species because of their relatively large size and thus significant buffering effect from fishing at the boundaries: SZ-1 around Nuyts Reef; SZ-2 off Chadinga Conservation Park; and SZ-8 around the St Francis Isles. The benefits to fished species in the northern coastal part of SZ-1 and the eastern coastal side of SZ-9 (a zone which lies to the north of Point Brown) will be

somewhat diminished as shore-based recreational line fishing will be allowed to continue under the proposed management plan.

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 Nuyts Archipelago Marine Park, protection of the intertidal sand/seagrass flat nursery habitats is critical for the long-term sustainability of King George whiting, southern garfish, blue swimmer crab, and western king prawn (Bryars, 2003). For southern calamary protection of the shallow seagrass beds (viz. *Amphibolis*) and reefs will benefit reproductive output. For sessile or sedentary species such as southern rock lobster, abalone, razorfish and mud cockle, protection of 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 Nuyts Archipelago Marine Park include western Australian salmon, Australian herring, and yelloweye mullet (Bryars, 2003).

Table 4-1 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	1, 2, 7, 8, 9	Reef, Sand	Resident & Temporary resident	Yes (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**	+	++	+++	✓	×	No larval export as spawning may not occur in this region
							UNLL	**Abundance**	**Net effect of Zoning**	+	++	+++			
Southern rock lobster	Adult, sub-adult	1, 2, 7, 8, 9	Reef	Resident	Yes (post-larvae)	South Australia	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**	+	++	+++	✓	✓	Net effect will be lowered if current management arrangements aimed at long-term recovery of lobster stocks are realised
							UNLL	**Abundance**	**Net effect of Zoning**	+	++	+++			
Greenlip abalone, Blacklip abalone	Adult, sub-adult	1, 8, 9	Reef	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**	+	++	+++	×	✓	Predictions for blacklip abalone may be lowered by negative second order ecosystem interactions with predators such as southern rock lobster
							UNLL	**Abundance**	**Net effect of Zoning**	+	++	+++			
Razorfish	Adult, sub-adult	3, 5, 6, 10	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**	+	++	+++	×	✓	
							UNLL	**Abundance**	**Net effect of Zoning**	+	++	+++			
Mud cockle	Adult, sub-adult	3, 5, 6, 10	Sand	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**	+	++	+++	×	✓	Net effect may not be overly pronounced as SZs are not in the most productive areas for mud cockles within Tourville or Smoky Bays
							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	
Western blue groper	Adult, sub-adult	1, 7, 8, 9	Reef	Resident	Yes (sub-adults)	Unknown	NL	**Size**	**With Zoning**	0	0	0			Historical fishing activity for this species has probably been low at the offshore islands. Current status will be maintained with zoning.
							NL	**Abundance**	**With Zoning**	0	0	0			
							NL	**Size**	**Without Zoning**	0	0	-			Species is not fully protected here and is highly vulnerable to fishing/serial depletion of reefs. Fishing activity may increase in the region.
							NL	**Abundance**	**Without Zoning**	0	0	-			
							NL	**Size**	**Net effect of Zoning**	0	0	+			Net effect may not be as pronounced in parts of SZ-1 and SZ-9 where shore-based line fishing will still be allowed.
							NL	**Abundance**	**Net effect of Zoning**	0	0	+			
Sea sweep	Adult, sub-adult	1, 7, 8, 9	Reef	Resident	Yes (sub-adults)	Unknown	NL	**Size**	**With Zoning**	0	0	0			Current status will be maintained with zoning
							NL	**Abundance**	**With Zoning**	0	0	0			
							NL	**Size**	**Without Zoning**	0	0	-			Species have high intrinsic vulnerability to fishing/long-term serial depletion. Fishing activity may increase in the region.
							NL	**Abundance**	**Without Zoning**	0	0	-			
							NL	**Size**	**Net effect of Zoning**	0	0	+			Net effect may not be as pronounced in parts of SZ-1 and SZ-9 where shore-based line fishing will still be allowed.
							NL	**Abundance**	**Net effect of Zoning**	0	0	+			
Bight redfish, Swallowtail	Adult, sub-adult	1, 8	Reef	Resident	Yes (sub-adults)	Unknown	NL	**Size**	**With Zoning**	0	0	0			Current status will be maintained with zoning
							NL	**Abundance**	**With Zoning**	0	0	0			
							NL	**Size**	**Without Zoning**	0	0	-			Species have high intrinsic vulnerability to fishing/long-term serial depletion. Fishing activity may increase in the region.
							NL	**Abundance**	**Without Zoning**	0	0	-			
							NL	**Size**	**Net effect of Zoning**	0	0	+			
							NL	**Abundance**	**Net effect of Zoning**	0	0	+			
Harlequin fish, Bluethroat wrasse	Adult, sub-adult	1, 7, 8, 9	Reef	Resident	Yes (sub-adults)	Unknown	NL	**Size**	**With Zoning**	0	0	0			Current status will be maintained with zoning
							NL	**Abundance**	**With Zoning**	0	0	0			
							NL	**Size**	**Without Zoning**	0	0	-			Species have high intrinsic vulnerability to fishing/long-term serial depletion, but no current regulation on take. Fishing activity may increase in the region.
							NL	**Abundance**	**Without Zoning**	0	0	-			
							NL	**Size**	**Net effect of Zoning**	0	0	+			Net effect may not be as pronounced in parts of SZ-1 and SZ-9 where shore-based line fishing will still be allowed.
							NL	**Abundance**	**Net effect of Zoning**	0	0	+			

[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.

Western blue groper is assessed here, rather than in Section 4.1.2.1, as it is fully protected in only part of its range in SA.

Table 4-2 Other species which may respond to or benefit from protection

Common name	Species name
Black cowry	*Zoila friendii thersites*
Blue morwong	*Nemadactylus valenciennesi*
Blue swimmer crab	*Portunus armatus*
Bronze whaler	*Carcharhinus brachyurus*
Cobbler	*Gymnapistes marmoratus*
Dusky morwong	*Dactylophora nigricans*
Dusky whaler	*Carcharhinus obscurus*
Eagle ray	*Myliobatis australis*
Estuary catfish	*Cnidoglanis macrocephalus*
Giant cuttlefish	*Sepia apama*
Greenback flounder	*Rhombosolea tapirina*
Gummy shark	*Mustelus antarcticus*
Horseshoe leatherjacket	*Meuschenia hippocrepis*
King George whiting	*Sillaginodes punctata*
King scallop	*Pecten fumatus*
Longsnout boarfish	*Pentaceropsis recurvirostris*
Longsnout flounder	*Ammotretis rostratus*
Magpie perch	*Cheilodactylus nigripes*
Maori octopus	*Octopus maorum*
Moonlighter	*Tilodon sexfasciatus*
Mulloway	*Argyrosomus japonicus*
Polychaete worms	*Polychaete worms*
Purple urchin	*Heliocidaris erythrogramma*
Queen scallop	*Equichlamys bifrons*
Rock ling	*Genypterus tigerinus*
Sand crab	*Ovalipes australiensis*
Sand flathead	*Platycephalus bassensis*
School whiting	*Sillago bassensis*
Silver drummer	*Kyphosus sydneyanus*
Silver trevally	*Pseudocaranx georgianus*
Smalltooth flounder	*Pseudorhombus jenynsii*
Southern blue devil	*Paraplesiops meleagris*
Southern calamary	*Sepioteuthis australis*
Southern fiddler ray	*Trygonorrhina dumerilii*
Southern garfish	*Hyporhamphus melanochir*
Spider crab	*Leptomithrax gaimardii*
Spotted wobbegong	*Orectolobus maculatus*
Wavy volute	*Amoria undulata*
Weeping toadfish	*Torquigener pleurogramma*
Western king prawn	*Melicertus latisulcatus*
Yelloweye mullet	*Aldrichetta forsteri*
Zebrafish	*Girella zebra*

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 Nuyts Archipelago Marine Park include: herring cale (*Olisthops cyanomelas*), long-finned goby (*Favonigobius lateralis*), common bullseye (*Pempheris multiradiata*), Noarlunga hulafish (*Trachinops noarlungae*), Wood's siphonfish (*Siphamia cephalotes*), winkles (*Austrocochlea* spp.), brittlestars, featherstar (*Cenolia trichoptera*), eleven-armed seastar (*Coscinasterias muricata*), short-tail nudibranch (*Ceratosoma brevicaudata*), cartrut shell (*Dicathais orbita*), Roe's abalone (*Haliotis roei*), blue-ringed octopus (*Hapalochlaena maculosa*), *Lepsiella vinosa*, isopods, western black crow (*Nerita atramentosa*), reef crab (*Ozius truncatus*), *Paphies elongata*, *Phasianotrochus eximius*, *Phasianotrochus irisodontes*, red bait crab (*Plagusia chabrus*), Haswell's shore crab (*Helograpsus haswellianus*), air breathing gastropod (*Marinula xanthosoma*), gorgonian fan coral (*Mopsella klunzingeri*), green coral (*Plesiastrea versipora*), tulip shell (*Pleuroploca australasia*), *Salinator fragilis*, sea tulips (*Pyura* spp.), *Thalotia conica*, canopy-forming macroalgae (*Ecklonia radiata*, *Cystophora* spp., *Sargassum* spp. and *Scaberia agardhii*), meadow-forming seagrasses (*Posidonia* spp., *Amphibolis* spp.), mangrove (*Avicennia marina*), and *Sarcocornia quinqueflora*.

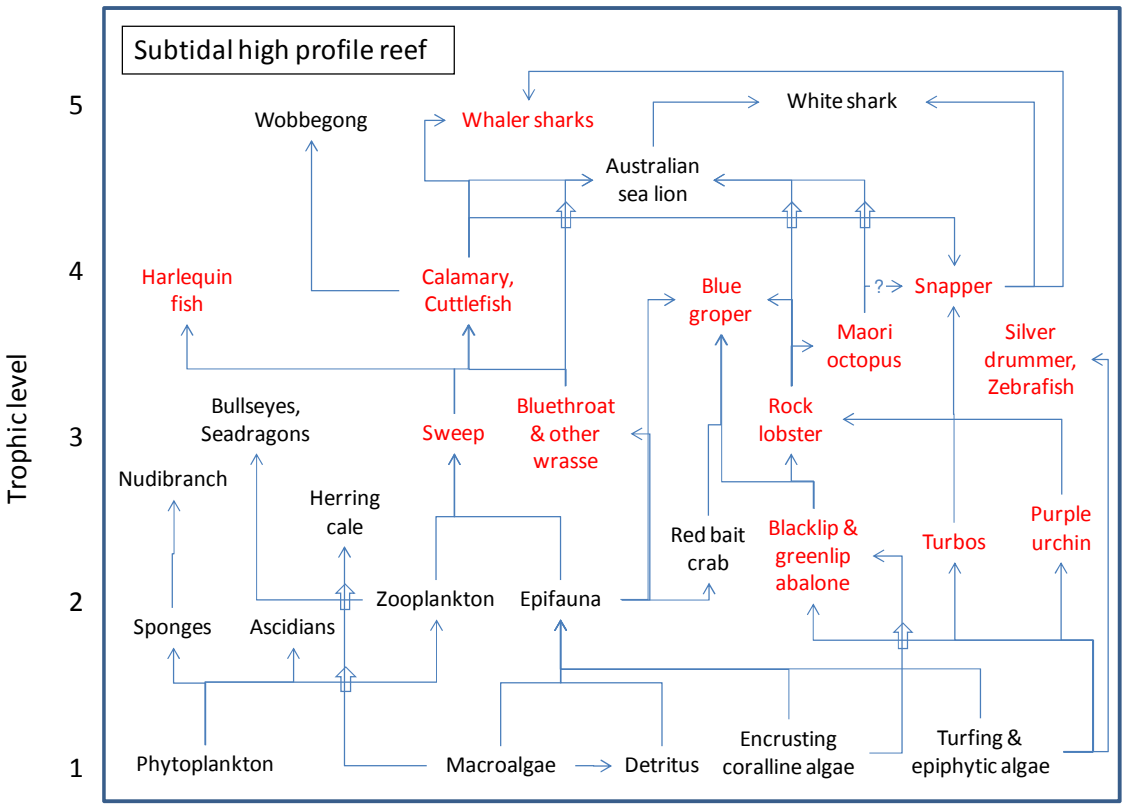
4.1.3 Ecosystems

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. In particular, it can be expected that there will be a response of reef ecosystems with interactions between lobster, blacklip abalone and urchins, and potentially also blue groper, snapper and octopus (see Figure 4–1). Any such response is likely to be most pronounced in the larger SZs, including SZs 1, 2 and 8, and perhaps also SZ-7 and SZ-9 (see Appendix 1.4.4 of the Main Report). The range of SZ sizes within the park provides the opportunity for adaptive management of the park system based on monitoring the response in a range of different sanctuary zone sizes.

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.

Figure 4–1 Simplified conceptual food web for subtidal high profile reef



Note: showing 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.

4.1.4 Case studies

The Nuyts Archipelago Marine Park is a large park with a wide variety of habitats, species, and ecosystems. Many of the islands in the Nuyts Archipelago are considered to have high biodiversity value (Baker, 2004) and to be relatively isolated from land-based sources of pollution. As an example of the biodiversity conservation benefits that may arise from the proposed zoning arrangements, two case studies are presented here: one on the Australian sea lion and its relationship with benthic habitats, and another on two reef fishes of conservation concern, the western blue groper and harlequin fish.

Australian sea lion and benthic habitats

The Australian sea lion is a threatened and protected species. The species was hunted to near extinction prior to its protection in the late 20th century. Despite being protected for several decades, the species is failing to recover in many of the colonies across SA (see Species Profile in Appendix 3 of Main Report). The lack of recovery in most colonies is attributed to negative interactions with the Commonwealth-managed shark gill-net fishery in areas where the fishing operations overlap with the foraging grounds of adults (Goldsworthy et al., 2010). A notable exception is Dangerous Reef in lower Spencer Gulf (SZ-5 in the Sir Joseph Banks Group Marine Park), where numbers have increased since protection from gill-netting in the area. Each of the breeding colonies appears to operate in isolation and has different foraging grounds; even for colonies that are adjacent to one another such as at the Franklin Islands. Australian sea lions

are benthic foragers, i.e. they hunt for food on the seabed. Significantly, several of the colonies that are located on the islands within the Nuyts Archipelago Marine Park also have foraging grounds that lie within the park, while some colonies have foraging grounds that extend offshore out of the park. It is the colonies with inshore foraging grounds that may benefit from the proposed zoning and management arrangements.

There are a number of SZs and HPZs within the park area between Point Bell to the west, Point Brown to the east and out to Hart Island that overlap with the known foraging grounds of some colonies (see Goldsworthy et al., 2010). Several species that are commercially and recreationally fished are predicted to increase in size and abundance or potentially benefit following protection from fishing within the SZs (see Section 4.1.2.2). These species include benthic fishes, crustaceans and cephalopods which are all prey for the Australian sea lion (see Figure 4–1 and Figure 4–2). In addition to the SZs, there are several large HPZs which overlap with prawn trawl fishing blocks. Although there has been no trawling within the proposed HPZs in recent years (Ward and Burch, 2012), future prawn trawling would be prevented within these zones. The future protection of the benthic fauna associated with the seafloor may be of benefit to the Australian sea lions that forage in the area. Thus the proposed zoning within the Nuyts Archipelago Marine Park has the potential to positively impact some colonies of the threatened Australian sea lion.

Western blue groper and harlequin fish

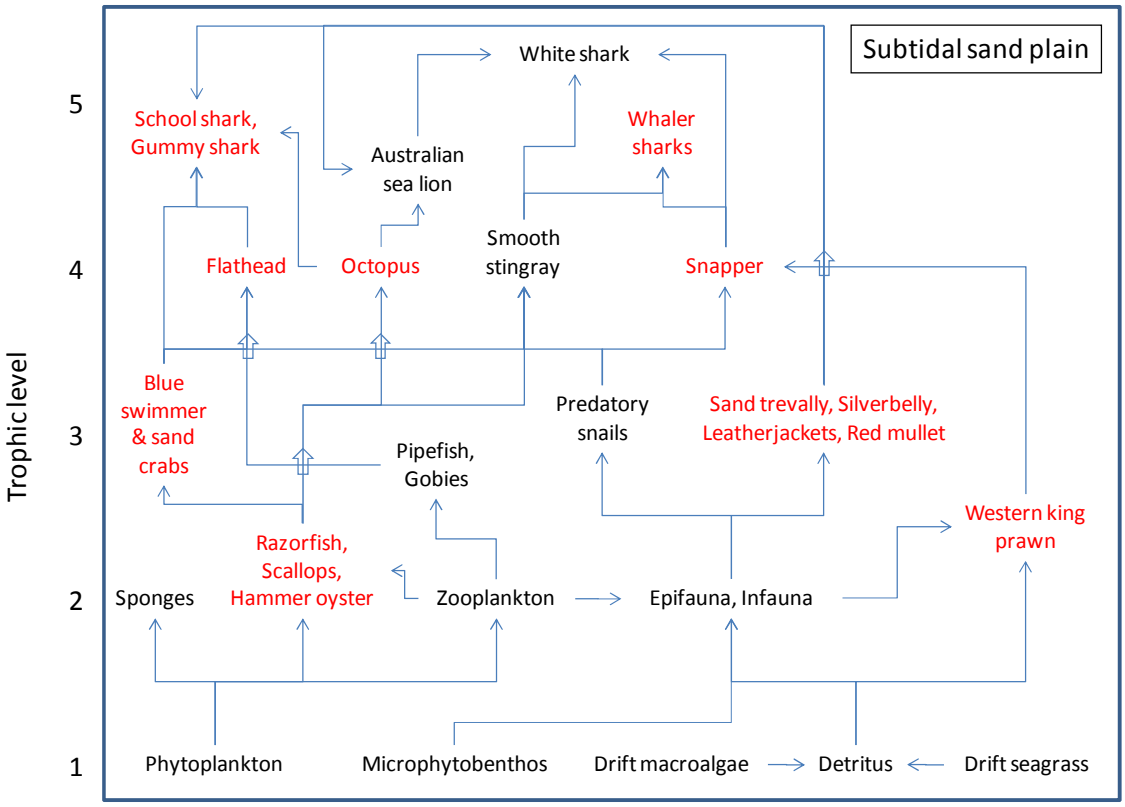
The reef systems in the St Francis Isles group are a hotspot for two reef fishes of conservation concern: the western blue groper and the harlequin fish. A relatively large (133.3 km^2) sanctuary zone (SZ-8) has been proposed to encompass this group of islands and it is anticipated that it will have significant benefits for these two species.

Both the western blue groper and harlequin fish are known to be incidentally captured by fishers in the area while targeting other species such as snapper. While the western blue groper is now protected in this part of SA, it is possible that their numbers were reduced during the 1960s and 1970s prior to their protection. For the harlequin fish there are currently no catch regulations. Furthermore, both species are known to suffer from barotrauma when hauled from depth, so even if fish are released, their survival may be low. Both species are also site-attached (Bryars et al., 2011, 2012a,b) and long-lived (blue groper 70 years, Coulson et al., 2009 and harlequin fish 42 years, Saunders et al., 2010). Thus the western blue groper and harlequin fish have characteristics that make them intrinsically vulnerable to overfishing and they cannot be fully protected from fishing using protected species status. However, the implementation of no-take sanctuary zones provides a means of totally protecting such species from fishing and other localised impacts.

Fortunately for both of these species, recent research indicates that relatively small sanctuary zones can fully encompass the home ranges of individual fish such that they cannot be captured at the zone boundaries (Bryars et al., 2011, 2012a,b). Acoustic tracking work has found that individual blue groper and harlequin fish are usually resident within small sections of coastal reef (of about 1 km or less) but that several kilometres of coastline may be required to encompass a population of fish and to accommodate temporary alongshore migrations (Bryars et al. 2011, 2012a,b; see also Species Profiles in Appendix 3 of the Main Report). Thus it is likely that SZ-8 with its expanse of reef systems around the St Francis Isles will provide a significant positive long-term conservation benefit for the western blue groper and harlequin fish by protecting fish that are already resident within the zone and by providing protection for new juvenile recruits (see also Section 4.1.2.2). Protection of these two species will

also have ecosystem benefits as they both likely play an important role in reef ecosystems in the region (see Figure 4–1).

Figure 4–2 Simplified conceptual food web for subtidal sand plain



Note: showing 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.

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

Table 4-3 shows the economic impact on the regional economy of marine park zoning on all affected fisheries. Impacts are based on SARDI's average annual catches and corresponding average annual prices expressed in 2011 dollars. In aggregate, it was estimated that the impact of marine park zoning will generate the following loss of regional economic activity on an ongoing annual basis.

- Approximately $1.04m in GRP, which represents 0.6 per cent of the regional total ($174m).
- Approximately 5 fte jobs which represent 0.3 per cent of the regional total (1,872 fte jobs).
- Approximately $0.69m in household income, which represents 0.8 per cent of the regional total ($90m).

Because the reduced access to the fishery will be permanent, the impacts reported in Table 4-3 are an estimate of the on-going annual impact.

Table 4-3 Regional economic impact of marine park zoning based on SARDI estimates of displaced effort

Sector	Output		Employment [a]		Household Income		Contribution to GRP	
	($m)	%	(fte jobs)	%	($m)	%	($m)	%
Direct effects								
Abalone	-0.50	33%	0	0%	-0.38	55%	-0.49	47%
Rock Lobster	-0.11	8%	0	0%	-0.08	12%	-0.11	10%
Marine Scalefish	-0.07	4%	-1	16%	-0.03	5%	-0.05	5%
Downstream [b]	-0.32	22%	-1	25%	-0.06	8%	-0.10	10%
Total Direct [c]	*-1.00*	*67%*	*-2*	*41%*	*-0.55*	*80%*	*-0.75*	*72%*
Total Flow-on [c]	*-0.49*	33%	*-3*	59%	*-0.14*	20%	*-0.29*	28%
Total [c]	**-1.50**	**100%**	**-5**	**100%**	**-0.69**	**100%**	**-1.04**	**100%**
Regional Total [d]	297.55		1,872		89.52		173.59	
Impact on Region	-0.5%		-0.3%		-0.8%		-0.6%	

[a] Full-time equivalent jobs.
[b] Downstream activities consist of seafood processing, transport, retail trade and food services.
[c] Totals may not sum due to rounding.
[d] Far West Coast region (see Appendix 1).
Source: EconSearch analysis

The estimates of historical catches in sanctuary zones have a high level of uncertainty, for abalone, rock lobster and marine scale fish, because of the limited spatially-resolved data available for the fisheries (Ward and Burch 2012). According to industry-derived estimates of displaced catch (which have not yet been reviewed by SARDI), the aggregate regional impacts could be as high as 12 fte jobs and $1.39m in GRP.

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 reported in Table 4-3. However, 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 no catch in the draft sanctuary and habitat protection zones in this marine park, and it is expected that there will be no impact on the prawn fishery.

4.2.1.4 Abalone

Ninety per cent of fishing in Western Zone B of the fishery occurs within fishing block 2 (which essentially covers the marine park), and is particularly concentrated around Flinders Reef-Lacy Island-Isles of St Francis area (Abalone council of Australia, pers. Comm., 21 September 2011).

SARDI estimates indicate that historically there has been an average annual catch of 8,344 kg of greenlip abalone in the draft sanctuary zones in this marine park. This represents 34.37 per cent of the greenlip abalone Western Zone B catch. Likewise, SARDI estimates indicate that historically there has been an average annual catch of 2,664 kg of blacklip abalone in the draft sanctuary zones in this marine park. This represents 17.28 per cent of the blacklip abalone Western Zone B catch. The combined sanctuary zone catch of greenlip and blacklip abalone represents 27.73 per cent of the average annual catch in the Far West Coast region.

Based on these estimates, the value of output lost directly in the region by Abalone fishing enterprises was calculated to be $0.50m and a further $0.23m was estimated to be lost to associated downstream activities (processing, transport and retail/food

services). Flow-on output lost to other sectors of the regional economy was estimated to be $0.36m. The total loss in output in the region (direct plus indirect) was estimated to be $1.09m (Table 4-4). Because the reduced access to the fishery will be permanent, the impacts reported in Table 4-4 are an estimate of the on-going annual impact.

The loss in direct employment in the Abalone fishery in the region was estimated to be less than 1 fte job, while downstream activities were estimated to lose 1 fte job. Flow-on business activity was estimated to lose 2 fte jobs, while the total loss in employment is to be approximately 3 fte jobs.

Contribution to GRP is measured as value of output less the cost of goods and services (including imports) used in producing the output. The loss in total Abalone fishing industry related contribution to GRP in the region is $0.77m, $0.49m lost by fishing directly, $0.07m in downstream activities and $0.21m lost in other sectors of the regional economy.

Because the displaced catch equates to approximately 45 per cent of the quota of one Western Zone licence holder, it is likely that the removal of effort will be achieved by buying out quota only. If this is the case, there will be licence holders with a reduced quota (and income) but unchanged fixed costs which will negatively impact abalone profitability. It will reduce the rate of return on investment and thereby devalue the value of licences and quota. Other fishery specific equipment, such as shark cages may also be devalued, particularly if there is consolidation of licences.

Table 4-4 Regional economic impact of marine park zoning on the Abalone fishery based on SARDI estimates of displaced effort

Sector	Output		Employment [a]		Household Income		Contribution to GRP	
	($m)	%	(fte jobs)	%	($m)	%	($m)	%
Direct effects								
Fishing	-0.50	46%	0	0%	-0.38	73%	-0.49	63%
Downstream [b]	-0.23	21%	-1	25%	-0.04	7%	-0.07	9%
Total Direct [c]	*-0.73*	*67%*	*-1*	*25%*	*-0.41*	*80%*	*-0.56*	*72%*
Flow-on effects								
Trade	-0.07	6%	-1	23%	-0.02	4%	-0.03	4%
Manufacturing	0.00	0%	0	0%	0.00	0%	0.00	0%
Accom, Cafe, Rest	-0.03	3%	0	8%	-0.01	2%	-0.01	2%
Transport	-0.04	3%	0	6%	-0.01	1%	-0.02	2%
Other Sectors	-0.22	20%	-1	37%	-0.06	12%	-0.15	20%
Total Flow-on [c]	*-0.36*	33%	*-2*	75%	*-0.10*	20%	*-0.21*	28%
Total [c]	**-1.09**	**100%**	**-3**	**100%**	**-0.51**	**100%**	**-0.77**	**100%**

[a] Full-time equivalent jobs.
[b] Downstream activities consist of seafood processing, transport, retail trade and food services.
[c] Totals may not sum due to rounding.
Source: EconSearch analysis

These estimates of reduced regional economic activity and profitability are likely to persist into the future, i.e. over next 20 years, as the reduced access to the resource will be permanent given the current fully exploited status of the fishery.

It is worth noting that the SARDI estimates of historical abalone catches from the sanctuary zones have a high level of uncertainty because of the limited spatially-resolved data available for the fishery (Ward and Burch, 2012). Because of the variation in productivity at the individual reef level (influencing growth rates etc.) and the current targeting practices of Western Zone abalone fishers, the economic impact on the Western Zone abalone fishery for greenlip abalone may be higher than the proportion of the displaced catch if sanctuary zones are located in areas where large, higher value (i.e. greater than 170 mm shell length) greenlip abalone are taken. (PIRSA pers. comm. 23 December 2011).

According the Abalone Industry Association of South Australia (AIASA) the SARDI estimates are significantly below estimates prepared by licence holders[7]. The sanctuary zone catch of greenlip and blacklip abalone was estimated, by the Association to be 13,647 kg which represents 34.4 per cent of the average annual catch in the Far West Coast region.

Based on these estimates (which have not yet been reviewed by SARDI), the value of output lost directly in the region by Abalone fishing enterprises was calculated to be $0.62m and a further $0.29m was estimated to be lost to associated downstream activities. Flow-on output lost to other sectors of the regional economy was estimated to be $0.44m. The total loss in output in the region (direct plus indirect) was estimated to be $1.35m (Table 4-5).

Table 4-5 Regional economic impact of marine park zoning on the Abalone fishery based on industry estimates of displace effort

Sector	Output		Employment [a]		Household Income		Contribution to GRP	
	($m)	%	(fte jobs)	%	($m)	%	($m)	%
Direct effects								
Fishing	-0.62	46%	-1	28%	-0.40	70%	-0.53	61%
Downstream [b]	-0.29	22%	-1	18%	-0.04	8%	-0.09	10%
Total Direct [c]	*-0.91*	*67%*	*-2*	*47%*	*-0.44*	*78%*	*-0.62*	*71%*
Flow-on effects								
Trade	-0.08	6%	-1	16%	-0.03	5%	-0.04	4%
Manufacturing	0.00	0%	0	0%	0.00	0%	0.00	0%
Accom, Cafe, Rest	-0.04	3%	0	5%	-0.01	2%	-0.02	2%
Transport	-0.05	3%	0	4%	-0.01	2%	-0.02	2%
Other Sectors	-0.27	20%	-1	27%	-0.08	14%	-0.18	21%
Total Flow-on [c]	*-0.44*	33%	*-3*	53%	*-0.12*	22%	*-0.25*	29%
Total [c]	**-1.35**	**100%**	**-5**	**100%**	**-0.57**	**100%**	**-0.87**	**100%**

[a] Full-time equivalent jobs.
[b] Downstream activities consist of seafood processing, transport, retail trade and food services.
[c] Totals may not sum due to rounding.
Source: EconSearch analysis

[7] The AIASA estimates were based on industry knowledge and experience and average catch data reported from every map code in the Western Zone Abalone Fishery over a 20 year period from January 1991 to December 2010.

The loss in direct employment in the Abalone fishery in the region was estimated to be 1 fte job, while downstream activities were estimated to lose less than 1 fte job. Flow-on business activity was estimated to lose 3 fte jobs, while the total loss in employment is to be approximately 5 fte jobs.

The loss in total Abalone fishing industry related contribution to GRP in the region is $0.87m, $0.53m lost by fishing directly, $0.09m in downstream activities and $0.25m lost in other sectors of the regional economy.

The potential cumulative impact of the proposed extension to and revised zoning of the Commonwealth Great Australian Marine Park and the proposed Western Eyre Commonwealth Marine Reserve may place further pressure on fishing business viability.

4.2.1.5 Rock Lobster

SARDI estimates indicate that historically there has been an average annual catch of 2,246 kg of rock lobster in the draft sanctuary zones in this marine park. This represents 0.32 per cent of the Northern Zone Rock Lobster Fishery average annual catch or 4.1 per cent of the average annual catch in the Far West Coast region.

The value of output lost directly in the region by Northern Zone Rock Lobster fishing enterprises was estimated to be $0.11m and a further $0.02m was estimated to be lost to associated downstream activities (processing, transport and retail/food services). Flow-on output lost to other sectors of the regional economy was estimated to be $0.07m. The total loss in output in the region (direct plus indirect) was estimated to be $0.21m (Table 4-6). Because the reduced access to the fishery will be permanent, the impacts reported in Table 4-6 are an estimate of the on-going annual impact.

Table 4-6 Regional economic impact of marine park zoning on the Northern Zone Rock Lobster fishery, based on SARDI estimates of displaced effort

Sector	Output		Employment [a]		Household Income		Contribution to GRP	
	($m)	%	(fte jobs)	%	($m)	%	($m)	%
Direct effects								
Fishing	-0.11	56%	0	0%	-0.08	78%	-0.11	69%
Downstream [b]	-0.02	11%	0	16%	0.00	4%	-0.01	5%
Total Direct [c]	*-0.14*	*67%*	*0*	*16%*	*-0.09*	*82%*	*-0.12*	*74%*
Flow-on effects								
Trade	-0.01	6%	0	28%	0.00	4%	-0.01	4%
Manufacturing	0.00	0%	0	0%	0.00	0%	0.00	0%
Accom, Cafe, Rest	-0.01	3%	0	9%	0.00	2%	0.00	2%
Transport	-0.01	3%	0	5%	0.00	1%	0.00	2%
Other Sectors	-0.04	20%	0	40%	-0.01	11%	-0.03	19%
Total Flow-on [c]	*-0.07*	33%	*0*	84%	*-0.02*	18%	*-0.04*	26%
Total [c]	**-0.21**	**100%**	**-1**	**100%**	**-0.11**	**100%**	**-0.16**	**100%**

[a] Full-time equivalent jobs.
[b] Downstream activities consist of seafood processing, transport, retail trade and food services.
[c] Totals may not sum due to rounding.
Source: EconSearch analysis

The loss in direct employment in the Northern Zone Rock Lobster fishery in the region was estimated to be less than 1 fte job, while downstream activities were estimated to lose less than 1 fte job. Flow-on business activity was estimated to lose less than 1 fte job, while the total loss in employment is to be approximately 1 fte job.

Contribution to GRP is measured as value of output less the cost of goods and services (including imports) used in producing the output. The loss in total Northern Zone Rock Lobster fishing industry related contribution to GRP in the region is $0.16m, $0.11m lost by fishing directly, $0.01m in downstream activities and $0.04m lost in other sectors of the regional economy.

The economic impact on rock lobster fishers may be higher than the proportion of the catch that will be lost because the small, red lobsters typically taken in State waters (where sanctuary zones are located) are more valuable (reportedly an extra $10 per kg) than the larger, paler lobsters typically taken in Commonwealth waters (PIRSA, pers. comm. 29 September 2011). With the total allowable commercial catch at a historically low level, most licence holders in the fishery have targeted these high value rock lobsters to maximise the value of their catch. For this reason, if average trip length increases, costs will rise which is likely to lead to a reduction in profits, which will further diminish the value for licences, pots and quota.

Fishers usually fish “stop-over” areas (areas where pots are set on patchy reef en route to more distant fishing grounds) when fishers go on their usual 5-7 day trips (PIRSA, pers. comm. 29 September 2011). Sanctuary zones located over these fishing routes, even if not located in the most productive fishery areas, may disrupt this pattern leading to less efficient fishing patterns, which would mean greater cost per trip.

Since there has already been substantial consolidation occurring in the fishery, with the total allowable commercial catch presently at 310 tonnes, the introduction of sanctuary zones is likely to add further strain to many of the remaining licence holders.

The estimates of reduced regional economic activity, while relatively small, are likely to persist into the future, i.e. over next 20 years, as the reduced access to the resource will be permanent given the current fully exploited status of the fishery.

As with abalone catch, estimates of historical rock lobster catches in the sanctuary zones have a high level of uncertainty because of the limited spatially-resolved data available for the fishery (Ward and Burch 2012). For instance, it is assumed that catch of the fishery was evenly distributed in state waters within each marine fished area. According to Ward and Burch (2012) this assumption introduces considerable potential for bias in the estimates of historical catches for individual sanctuary zones because it may lead to:

- over-estimation of the historical catch from a sanctuary zone if the fishing hotspots (e.g. rock lobster, abalone or marine scalefish) in state waters of that marine fished area were outside the sanctuary zone; and
- under-estimation of the historical catch from that sanctuary zone if the fishing hotspots (e.g.. rock lobster, abalone or marine scalefish) were in a sanctuary zone.

According to Knuckey (2012) the industry estimate of displaced catch is significantly higher than the estimate prepared by SARDI. The sanctuary zone catch of rock lobster was estimated by Knuckey (2012) to be 7,374 kg which represents 13.6 per cent of the average annual catch in the Far West Coast region.

Based on these industry estimates (which have not yet been reviewed by SARDI), the value of output lost directly in the region by Rock Lobster fishing enterprises was calculated to be $0.38m and a further $0.08m was estimated, to be lost to associated downstream activities. Flow-on output lost to other sectors of the regional economy was estimated to be $0.22m. The total loss in output in the region (direct plus indirect) was estimated to be $0.67m (Table 4-7).

The loss in direct employment in the Rock Lobster fishery in the region was estimated to be 3 fte jobs, while downstream activities were estimated to lose less than 1 fte job. Flow-on business activity was estimated to lose 1 fte jobs, while the total loss in employment is to be approximately 5 fte jobs.

The loss in total Rock Lobster fishing industry related contribution to GRP in the region is $0.36m, $0.21m lost by fishing directly, $0.02m in downstream activities and $0.12m lost in other sectors of the regional economy.

The designation of sanctuary zones in State waters has the potential to transfer fishing activity into deeper, offshore Commonwealth waters. If this occurs, it may add to production costs because of increased travel. The potential cumulative impact of the proposed extension to and revised zoning of the Commonwealth Great Australian Marine Park and the proposed Western Eyre Commonwealth Marine Reserve may place further pressure on fishing business viability.

Table 4-7 Regional economic impact of marine park zoning on the Northern Zone Rock Lobster fishery based on industry estimates of displace effort

Sector	Output		Employment [a]		Household Income		Contribution to GRP	
	($m)	%	(fte jobs)	%	($m)	%	($m)	%
Direct effects								
Fishing	-0.38	56%	-3	66%	-0.13	63%	-0.21	58%
Downstream [b]	-0.08	11%	0	6%	-0.01	6%	-0.02	7%
Total Direct [c]	*-0.45*	*67%*	*-3*	*72%*	*-0.14*	*69%*	*-0.23*	*65%*
Flow-on effects								
Trade	-0.03	5%	0	8%	-0.01	5%	-0.02	4%
Manufacturing	0.00	0%	0	0%	0.00	0%	0.00	0%
Accom, Cafe, Rest	-0.02	2%	0	3%	0.00	2%	-0.01	2%
Transport	-0.02	3%	0	2%	0.00	2%	-0.01	2%
Other Sectors	-0.15	22%	-1	16%	-0.04	22%	-0.09	26%
Total Flow-on [c]	*-0.22*	33%	*-1*	28%	*-0.06*	31%	*-0.12*	35%
Total [c]	**-0.67**	**100%**	**-5**	**100%**	**-0.21**	**100%**	**-0.36**	**100%**

[a] Full-time equivalent jobs.
[b] Downstream activities consist of seafood processing, transport, retail trade and food services.
[c] Totals may not sum due to rounding.
Source: EconSearch analysis

4.2.1.6 Marine Scalefish

The difficulty in removing effort from the Marine Scalefish Fishery is the persistent high level of latent effort in the fishery. In 2009/10, approximately 10 per cent (32) of the 328 licences state wide were inactive, while a further 25 per cent of licences (84) were fished for less than 50 days (SARDI pers. comm., 20 September 2011). In such circumstances, significant funds can be expended in effort reduction programs with

little real reduction in effort. If the displaced effort is not removed from the fishery, then that effort will be applied to other areas. For many species, current harvest levels are at, or are close to, optimum sustainable yields (PIRSA pers. comm., 29 September 2011). Despite these practical difficulties, the following analysis, based on SARDI estimates, assumes that the fishing effort previously occurring in the sanctuary zones will be removed from the fishery[8].

SARDI estimates of historic effort in draft sanctuary zones for the Marine Scalefish Fishery are provided in Table 4-8 and historic catch for the main fishery species in Table 4-9. The total sanctuary zone catch of marine scalefish represents 2.0 per cent of the average annual catch in the Far West Coast region.

Table 4-8 Average annual Marine Scalefish effort in draft sanctuary zones by sector

Sector	Sanctuary zone effort (person days)	% effort of sector
Handline	182	0.64
Haulnet	nil	nil
Longline	18	0.33
Other	24	0.11

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 4-9 Average annual Marine Scalefish catch in draft sanctuary zones by main species

Species	Sanctuary zone catch (kg)	% species catch in fishery
Garfish	21	0.01
King George whiting	2632	0.77
Snapper	516	0.07
Southern calamary	301	0.10

Notes: based on 3 years of data

Source: Ward and Burch 2012

The value of output lost directly in the region by Marine Scalefish fishing enterprises was estimated to be $0.07m and a further $0.07m was estimated to be lost to associated downstream activities (processing, transport and retail/food services). Flow-on output lost to other sectors of the regional economy was estimated to be $0.06m. The total loss in output in the region (direct plus indirect) was estimated to be $0.20m (Table 4-10). Because the reduced access to the fishery will be permanent, the impacts reported in Table 4-10 are an estimate of the on-going annual impact.

The loss in direct employment in the Marine Scalefish fishery in the region was estimated to be 1 fte job, while downstream activities were estimated to lose less than 1 fte job. Flow-on business activity was estimated to lose less than 1 fte job, while the total loss in employment is 2 fte jobs.

Contribution to GRP is measured as value of output less the cost of goods and services (including imports) used in producing the output. The loss in total Marine

[8] An adjustment was made in the analysis for the fact that SARDI estimates are based on 4 key species representing 57 per cent of the fishery.

Scalefish fishing industry related contribution to GRP in the region is $0.11m, $0.05m lost by fishing directly, $0.03m in downstream activities and $0.04m lost in other sectors of the regional economy.

The estimates of declining profitability and reduced regional economic activity, while relatively small, are likely to persist into the future, i.e. over next 20 years, as the reduced access to the resource will be permanent given the current fully exploited status of the fishery.

Many fishers in the Marine Scalefish Fishery do not own GPS, with knowledge of known fishing grounds passed down through the family. For these families the purchase of GPS will be necessary to ensure they comply with the marine park zoning rules, particularly those sanctuary zones, in offshore areas (PIRSA pers. comm. 29 September 2011). These types of one-off expenditures will have a short-term impact on cost only.

Table 4-10 Regional economic impact of marine park zoning on the Marine Scalefish fishery based on SARDI estimates of displaced effort

Sector	Output		Employment [a]		Household Income		Contribution to GRP	
	($m)	%	(fte jobs)	%	($m)	%	($m)	%
Direct effects								
Fishing	-0.07	34%	-1	50%	-0.03	49%	-0.05	45%
Downstream [b]	-0.07	34%	0	27%	-0.02	23%	-0.03	23%
Total Direct [c]	*-0.13*	*67%*	*-1*	*76%*	*-0.05*	*73%*	*-0.08*	*68%*
Flow-on effects								
Trade	-0.01	6%	0	8%	0.00	6%	-0.01	5%
Manufacturing	0.00	1%	0	0%	0.00	0%	0.00	0%
Accom, Cafe, Rest	-0.01	6%	0	5%	0.00	5%	0.00	4%
Transport	-0.01	4%	0	2%	0.00	2%	0.00	3%
Other Sectors	-0.03	17%	0	9%	-0.01	14%	-0.02	20%
Total Flow-on [c]	*-0.06*	33%	*0*	24%	*-0.02*	27%	*-0.04*	32%
Total [c]	**-0.20**	**100%**	**-2**	**100%**	**-0.07**	**100%**	**-0.11**	**100%**

[a] Full-time equivalent jobs.
[b] Downstream activities consist of seafood processing, transport, retail trade and food services.
[c] Totals may not sum due to rounding.
Source: EconSearch analysis

As with abalone and rock lobster, estimates of historical marine scalefish catches in sanctuary zones have a high level of uncertainty because of the limited spatially-resolved data available for the fishery (Ward and Burch 2012). It is assumed that catch of the fishery was evenly distributed in State waters within each marine fished area. This assumption introduces significant potential for over and under estimation of historical catches for individual sanctuary zones.

According the Marine Fishermen's Association the SARDI estimates are slightly below estimates prepared by licence holders[9]. The industry estimates indicated displaced effort in mud cockles with an annual average value of $93,000.

[9] Catch data from the last five to seven years provided by affected fishers (Marine Fishers Association, pers. comm., 19 June 2012).

Based on these industry estimates (which have not yet been reviewed by SARDI), the value of output lost directly in the region by Marine Scalefish fishing enterprises was calculated to be $0.09m and a further $0.09m was estimated to be lost to associated downstream activities. Flow-on output lost to other sectors of the regional economy was estimated to be $0.09m. The total loss in output in the region (direct plus indirect) was estimated to be $0.28m (Table 4-11).

The loss in direct employment in the Marine Scalefish fishery in the region was estimated to be 1 fte job, while downstream activities were estimated to lose 1 fte job. Flow-on business activity was estimated to lose 1 fte job, while the total loss in employment is to be approximately 2 fte jobs.

The loss in total Marine Scalefish fishing industry related contribution to GRP in the region is $0.16m, $0.07m lost by fishing directly, $0.04m in downstream activities and $0.05m lost in other sectors of the regional economy.

Table 4-11 Regional economic impact of marine park zoning on the Marine Scalefish fishery based on industry estimates of displace effort

Sector	Output		Employment [a]		Household Income		Contribution to GRP	
	($m)	%	(fte jobs)	%	($m)	%	($m)	%
Direct effects								
Fishing	-0.09	34%	-1	50%	-0.05	49%	-0.07	45%
Downstream [b]	-0.09	34%	-1	27%	-0.02	23%	-0.04	23%
Total Direct [c]	*-0.19*	*67%*	*-2*	*76%*	*-0.07*	*73%*	*-0.10*	*68%*
Flow-on effects								
Trade	-0.02	6%	0	8%	-0.01	6%	-0.01	5%
Manufacturing	0.00	1%	0	0%	0.00	0%	0.00	0%
Accom, Cafe, Rest	-0.02	6%	0	5%	0.00	5%	-0.01	4%
Transport	-0.01	4%	0	2%	0.00	2%	0.00	3%
Other Sectors	-0.05	17%	0	9%	-0.01	14%	-0.03	20%
Total Flow-on [c]	*-0.09*	33%	*-1*	24%	*-0.03*	27%	*-0.05*	32%
Total [c]	**-0.28**	**100%**	**-2**	**100%**	**-0.09**	**100%**	**-0.16**	**100%**

[a] Full-time equivalent jobs.
[b] Downstream activities consist of seafood processing, transport, retail trade and food services.
[c] Totals may not sum due to rounding.
Source: EconSearch analysis

As the marine scalefish fishery also operates in commonwealth waters, the potential cumulative impact of the proposed extension to and revised zoning of the Commonwealth Great Australian Marine Park and the proposed Western Eyre Commonwealth Marine Reserve may place further pressure on fishing business viability.

4.2.1.7 Charter Boat

SARDI estimates indicate that historically there has been an average annual charter boat effort of 16 person days in the draft sanctuary zones in this marine park. This represents 0.07 per cent of the average annual effort for the charter boat industry or 2.99 per cent of the average annual catch in the Far West Coast region. The value of this sanctuary zone effort is estimated to be $4,000.

4.2.1.8 Sharks[10]

The Gillnet, Hook and Trap sector of the Commonwealth Southern and Eastern Scalefish and Shark Fishery operates in the Nuyts Archipelago Marine Park. The fishery occurs predominantly in Commonwealth waters and therefore is managed by Australian Fisheries Management Authority under an Offshore Constitutional Settlement. Target species are school and gummy sharks. A preliminary estimate of an average catch of 204 kg per year will be displaced from the line fishing sector by sanctuary zones in this park. This sanctuary zone catch represents 1.29 per cent of the fishery's catch in State waters, and 0.07 per cent of the catch off SA (State and Commonwealth waters). Likewise with the gill-net sector, a preliminary estimate of average displaced catch of 1,025 kg per year is expected. This sanctuary zone catch represents 0.90 per cent of the fishery's catch in State waters, and 0.21 per cent of the catch off SA (State and Commonwealth waters).

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 Far West Coast 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.

Fishing-based tourism has been identified as important to the local economy. Several organisations have raised the point that towns identified as 'fishing centres' that are comparatively remote are more vulnerable to a downturn in fishing tourism if fishing visitors perceive that there may be restrictions to their activities. As discussed in section 4.3.5.2, the actual placement of sanctuary zones is unlikely to place real restriction on recreational fishing. 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

[10] Australian Fisheries Management Authority data shows no reported catch by the Southern Bluefin Tuna fishery or Great Australian Bight trawl fishery in South Australian state waters for the period 2001-2010. No impact from the draft zoning is anticipated on these fisheries.

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 permits[11] which 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 *Harbors 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 *Harbors 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 port of Thevenard is excluded from the marine park. In addition the surrounding harbour of Thevenard has been declared a special purpose area. An anchoring ground for large vessels has been accommodated within GMUZ-3. SPA-2 in Fowlers Bay and SPA-3, in the Isles of St Francis, allow for proposed transhipment points. Within the harbour limits, there is a proposal for a commercial and recreational marina at Thevenard and there has been discussion about deepening the port from 8 metres to 12 metres to accommodate Panamax size vessels.

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

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.

There are no mineral, petroleum or geothermal tenements currently located within the marine park.

A mining lease lies adjacent to the park inshore from the park boundary near Port Le Hunte, and extracts gypsum and salt. This operation is not expected to be affected by the zoning as it is not located near a sanctuary zone (where extractions and discharges of seawater are not permitted).

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.

As mentioned above, there is a proposal for a commercial and a recreational marina within the Ceduna-Thevenard area. If it goes ahead, this development will be within Thevenard Harbour, which is a SPA, where zoning would not restrict the activity.

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.

Six of 11 members[12] (55 per cent) of the Far West MPLAG responded to the online social impact assessment for the Nuyts Archipelago Marine Park.

4.3.2 Expected social impacts – at a glance

The overall social impacts of the Nuyts Archipelago Marine Park on communities living in the Far West Coast region of South Australia are expected to be moderate given the magnitude of the economic impacts that have been projected, high levels of regional unemployment and high levels of relative disadvantage. Commercial fishing is one of the four top industry sources of employment and is estimated to contribute 107 jobs to employment in the region, compared with tourism which contributes some 164 jobs. Economic impact assessment identifies a loss of five commercial fishing-related 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. The impact on recreational fishing is considered to be low due to adjustments in zoning 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 likely to be moderate.

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 provided 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.

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

Experience elsewhere in Australia and internationally (Ledge et al. 2011, Cocklin et al. 1995) 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 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 was a division of opinion among MPSIAT respondents in relation to the potential of the park to increase opportunities for education about marine life and for understanding 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.

The MPLAG zoning was not expected by most MPSIAT respondents to have any impact, positive or negative, on them or their families, or community quality of life, or to change overall current way of life. However, on these and other issues explored in feedback, a minority of MPSIAT respondents held more positive expectations.

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.

4.3.4 Culture and Heritage

DEWNR undertook a process of consultation with Aboriginal stakeholders about the establishment of marine parks. No significant negative impacts 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 many 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 Nuyts Archipelago Marine Park.

The Wirangu Aboriginal people have traditional associations with the region, including the marine environment and associated marine life, with many known heritage sites. Other Aboriginal groups such as Yalata and Maralinga Anangu, Mirning and some inland groups may have periodically used the coastal lands of the marine park.

A group of overlapping Native Title claimants have combined to form one claim known as the Far West Coast Native Title claim. This claim currently includes parts of the Nuyts Archipelago Marine Park. The Ceduna Keys Marina Indigenous land Use Agreement includes a section of Murat Bay, and has been reached by the people of the Far West Coast Native Title Claim Group, Aboriginal Legal Rights Movement and the District Council of Ceduna.

Unique Aboriginal heritage sites such as constructed fish traps are still visible on the coastline of the marine park and can be seen at several locations, such as Rocky Point, Tourville Bay, Murat Bay and Smoky Bay.

MPSIAT respondents were evenly divided about whether the marine park would help maintain the community identity as a fishing centre. The impact on community identity is too early to determine at this stage, but given the low (recreational fishing) to moderate (commercial fishing) 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 4-2).

4.3.5.2 Recreational Fishing

The following assessment is based mainly on the SAMPIT mapping[13], 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:

- From Beatrice Point (western-most edge of the marine park) to Fowler's Bay along the coast. SZ-1 allows shore-based recreational line fishing.
- At Clare Bay and Port Le Hunte along the coast. These areas do not have sanctuary zones.
- From Point Bell to Point Peter along the coast. These areas do not have sanctuary zones.
- In Tourville Bay. SZ-3, SZ-4, SZ-5 and SZ-6 are very lightly fished and very little impact is expected.
- In Murat Bay, which is the main area for recreational fishing. There is no sanctuary zone here.
- On the north side of Goat Island. There is no sanctuary zone here.
- From Cape Destrees and Laura Bay to Smoky Bay. SZ-10 is an area that is not fished. SZ-11, which is further along the coast, allows shore-based recreational line fishing.
- Around Masillon Island, Fenelon Island to Cannan Reefs. SZ_8 will impact recreational fishing around Masillon Island and Fenelon Island.

Overall the management plan zoning is expected to have low impact on recreational fishing, with access to areas fished near or from the shore maintained.

[13] 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 Nuyts Archipelago Marine Park on communities living in the Far West Coast region of South Australia are expected to be moderate given the magnitude of the economic impacts on commercial fishing that have been projected. Economic modelling has estimated a loss of five jobs from the fishing industry in the Far West Coast region, which represents an overall impact of - 0.2 per cent on regional employment. Commercial fishing is one of the four top industry sources of employment and is estimated to contribute 107 jobs to employment in the region, compared with tourism which contributes some 164 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 likely to be moderate.

The following potential social impacts have been identified for the abalone, rock lobster and marine scalefish fisheries.

There is a tendency for abalone divers to fish different parts of reef areas in a map code (little overlap with other divers). The declaration of sanctuary zones in some of these areas is likely to limit the reef area where divers can target abalone and this may result in an increase in the overlap of the area dived, which could lead to an increase in conflict between commercial fishers (PIRSA pers. comm. 29 September 2011). It could be expected that this type of conflict would be resolved over time and not persist into the medium to long-term.

The designation of sanctuary zones in State waters has the potential to transfer rock lobster fishing activity into deeper, offshore Commonwealth waters. If this occurs, it could increase safety risks with a probable increase in the length of fishing trips (PIRSA pers. comm. 29 September 2011). I

Given the preference for fishing in State waters, reducing the area of State waters that can be fished is likely to result in an increase in conflict amongst commercial rock lobster fishers in these waters. Furthermore, most recreational potting for rock lobsters is undertaken in State waters. The declaration of sanctuary zones in these waters is likely to result in an increase in the conflict between recreational and commercial fishers. (PIRSA pers. comm. 29 September 2011). It could be expected that this type of conflict would be resolved over time and not persist into the medium to long-term.

It is likely that most marine scalefish licence holders that currently fish in areas where there are proposed sanctuary zones will be impacted by the zoning either from restricted access or from displaced fishers shifting effort into their patch. This could lead to higher levels of conflict and competition between licence holders. (PIRSA pers. comm. 29 September 2011). It could be expected that this type of conflict would be resolved over time and not persist into the medium to long-term.

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 4-2.

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 modelling has estimated a loss of five jobs from the fishing industry in the Far West Coast region, which represents an impact on regional employment of -0.3 per cent. Unemployment in the Far West Coast region is high compared with the state average. This suggests that alternative regional opportunities for unemployed labour will be difficult to find and any job losses will be real and unlikely to be absorbed into the local workforce. It can be expected that some of these job losses may result in one or more families leaving the region.

The jobs impact on the fishing industry is not expected to have significant impact on the regional population or housing (see also Appendix Table 4-5).

4.3.7 Community

Most MPSIAT respondents believed that the community was sufficiently resilient to manage changes brought by the introduction of the proposed zoning in the Nuyts

Archipelago Marine Park however, they were less certain about the community's ability to embrace these changes (see Appendix Table 4-6).

The majority of MPSIAT respondents did not expect business opportunities to increase as a result of the proposed 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.

Most MPSIAT respondents did not anticipate the park creating a wider range of activities in which local people could participate. They were divided about whether the park would become a source of pride to their community.

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 expected economic and recreational fishing impacts of the draft zoning it is not likely that the proposed management plan will present significant adjustment pressures to the broader community, although there will be some adjustment required in the commercial fishing sector.

4.3.8 SEIFA based analysis of impacts

Job losses in the Far West Coast Impact Region are expected to be low in the range of approximately 5 fte (-0.2 per cent impact on the region). In an area of relatively high unemployment (8.6 per cent) and high relative disadvantage (SEIFA and leading indicators) this is likely to have a greater social impact where alternative employment opportunities are limited. The social impact is therefore expected to be moderate in areas associated with the Nuyts Archipelago Marine Park and low in the areas associated with the Far West Coast Marine Park.

Table 4-12 Social Impact for Far West Coast Impact Region

Impact region	**Far West Coast**	
Marine Park # and Name	**1: Far West Coast**	**2: Nuyts Archipelago**
Jobs impact (FTE)	0	-5
% impact on region	0%	-0.20%
Regional unemployment	High (8.6%)	
SEIFA **relative disadvantage** (SLA)	High (Unincorp. West Coast 889)	
Index of **Economic Resources** (SLA)	Moderate (Ceduna 921, Unincorp. West Coast 926)	
Index of **Education & Occupation** (SLA)	Low	
Proportion of **single parent** families[b,c]	Moderate (Ceduna 11.0%)	
Proportion with **education** lower than year 12[b,c]	Low	
Proportion of population with **Indigenous** background[b,c]	High (Ceduna 24.0%, Unincorp. West Coast 35.8%)	
% fair or poor **health** (self report)	Low	
Expected social impact	***Low***	***Moderate***

Note 2 SLAs 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 Nuyts Archipelago 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.

References

Angulo-Valdes, J. and Hatcher, B. 2010, "A new typology of benefits from marine protected areas", *Marine Policy*, 34: 635-644.

Baker, J.L. 2004, *Towards a System of Ecologically Representative Marine Protected Areas in South Australian Marine Bioregions - Technical Report*, prepared for Coast and Marine Conservation Branch, Department for Environment and Heritage, South Australia.

Beeton RJS, Buxton CD, Cutbush GC, Fairweather PG, Johnston EL & Ryan R (2012) Report of the Independent Scientific Audit of Marine Parks in New South Wales, Department of Primary Industries and Office of Environment and Heritage, NSW – http://www.marineparksaudit.nsw.gov.au/audit-report/

Bryars, S. 2003, *An Inventory of Important Coastal Fisheries Habitats in South Australia*, Fish Habitat Program, Primary Industries and Resources South Australia, Adelaide.

Bryars, S. 2010, *Monitoring marine fishes of conservation concern on Adelaide's coastal reefs: results of 2009/2010 surveys for the southern blue devil and harlequin fish,* report to the Adelaide and Mount Lofty Ranges Natural Resources Management Board, Department of Environment and Natural Resources, 29 pp.

Bryars, S., Rogers, P., Huveneers, C., Payne, N. Smith, I., and McDonald, B. 2011, *What size do marine protected area sanctuary zones need to be to protect the western blue groper, harlequin fish, and bluethroat wrasse?* Report to the Department of Environment and Natural Resources Wildlife Conservation Fund Project Number 0638. 36 pp.

Bryars, S., Rogers, P., Huveneers, C., Payne, N. Smith, I., and McDonald, B. 2012a, Small home range in southern Australia's largest resident reef fish, the western blue groper (*Achoerodus gouldii*): implications for adequacy of no-take marine protected areas. *Marine and Freshwater Research* 63: 552–563.

Bryars, S., Rogers, P., and Miller, D. 2012b, *Protecting the harlequin fish within South Australia's new system of marine parks: acoustic tracking to determine site fidelity and movement patterns*. Report to the Department of Environment and Natural Resources Wildlife Conservation Fund Project Number 1455. Department of Environment and Natural Resources, Adelaide.

Caton, B., Detmar, S., Fotheringham, D., Laurence, S., Quinn, J., Royal, M., Rubbo, N. and Sandercock, R. 2011, *Eyre Peninsula Coastal Action Plan and Conservation Priority Study, Volume 1*, Eyre Peninsula NRM Board and Department of Environment and Natural Resources, Adelaide.

Cocklin, C., Craw, M. and Mcauley, I. 1998, "Marine reserves in New Zealand: use rights, public attitudes, and social impacts", *Coastal Management*, 26 (3) 213-231.

Coulson, P.G., Hesp, S.A., Hall, N.G. and Potter, I.C. 2009, The western blue groper (Achoerodus gouldii), a protogynous hermaphroditic labrid with exceptional longevity, late maturity, slow growth, and both late maturation and sex change. Fisheries Bulletin, 107, 57–75.

Currie, D. and Ward, T. 2011, *Estimating historical catches from the proposed sanctuary zone scenarios in South Australia's marine parks*, report to PIRSA Fisheries and Aquaculture, South Australian Research and Development Institute (Aquatic Sciences), Adelaide, SARDI Publication No. F2011/000307-1.

Department of Environment and Natural Resources (DENR) 2010a, *Environmental, Economic and Social Values of the Nuyts Archipelago Marine Park,* Department of Environment and Natural Resources, South Australia.

Department of Environment and Natural Resources (DENR) 2010b, *Nuyts Archipelago Marine Park - Fishing data from SAMPIT Submissions 10 May 2010*, Coast and Marine Conservation – Department of Environment and Natural Resources.

Department of Primary Industries and Resources South Australia (PIRSA) 2009, Ecological Assessment of the South Australian Prawn Fisheries. Spencer Gulf, Gulf of St. Vincent and West Coast Prawn Fisheries. Reassessment Report Prepared for the Department of Environment, Water, Heritage, and the Arts For the purposes of Part 13 and 13(A) of the Environment Protection and Biodiversity Conservation Act 1999.

Department of Primary Industries and Resources South Australia (PIRSA) 2011, *Policy Position Regarding Redistribution of Displaced Commercial Fishing – Marine Parks,* Department of Primary Industries and Resources of South Australia.

Department for Transport, Energy and Infrastructure (DTEI) 2011, *Introduction to South Australian sea exports Financial year 2009-10*, Department for Transport, Energy and Infrastructure, South Australia.

EconSearch 2010, *Economic Indicators for the Commercial Fisheries of South Australia, Summary report, 2008/09*, report prepared for Primary Industries and Resources South Australia, August.

Edyvane, K. 1999, *Conserving Marine Biodiversity in South Australia – Part 1 – Background, Status and Review of Approach to Marine Biodiversity Conservation in South Australia*, SARDI Report Number 38, PIRSA.

Fairweather, P., Buxton, C. and Robinson, J. 2009, *Marine Park science in NSW: an independent review*, a report prepared for the Marine Parks Advisory Council, NSW.

Fowler, A.J., Lloyd, M. and Schmarr, D. 2009, *A preliminary consideration of by-catch in the Marine Scalefish fishery of South Australia*, F2009/000097-1, SARDI Research Report Series No. 365, South Australian Research and Development Institute (Aquatic Sciences), Adelaide.

Goldsworthy, S.D., Page, B., Shaughnessy, P.D. and Linnane, A. 2010, *Mitigating Seal Interactions in the SRLF and the Gillnet Sector SESSF in South Australia, report to the Fisheries Research and Development Institute,* South Australian Research and Development Institute (Aquatic Sciences), Adelaide, SARDI Publication No. F2009/000613-1, SARDI Research Report Series No. 405.

Government of South Australia 2011, *Government Submission to the Marine Parks Select Committee*, July 2011.

Knuckey, I. 2012, *Impacts of Proposed Marine Park Sanctuary Zones on the South Australian Rock Lobster Industry*, report to SARLAC Inc.

Langlois, T.J. and Ballantine, W.J. 2005, "Marine ecological research in New Zealand: Developing predictive models through the study of no-take marine reserves", *Conservation Biology* 19:1763–1770.

Ledee, J., Sutton, S., Tobin, R. and De Freitas, D. 2011, "Responses and adaptation strategies of commercial and charter fishers to zoning changes in the Great Barrier Reef Marine Park", *Marine Policy*, doi: 10.1016/j.marpol.2011.05.009

Marshall, N. and Marshall, P. 2007, "Conceptualizing and operationalizing social resilience within commercial fisheries in Northern Australia", *Ecology and Society*, 12 (1) www.ecologyandsociety.org/vol12/iss1/art/

McGregor Tan Research 2006, *Marine Parks Regional Study Report*, report prepared for the Department for Environment and Heritage.

McGregor Tan Research 2007, *Marine Parks Research – June 2007 McGregor Tan Household Omnibus Survey*, report prepared for the Department for Environment and Heritage.

McGregor Tan Research 2008, *Marine Parks Statewide Study Final Report*, report prepared for the Department for Environment and Heritage.

McGregor Tan Research 2009, *Marine Parks Regional Study Report*, report prepared for the Department for Environment and Heritage.

McLeod, K. L. and Leslie, H. M. 2009, *Ecosystem-Based Management for the Oceans,* Island Press, Washington, DC.

McPhee, D. 2011, "Marine Park planning and recreational fishing: is the science lost at sea? Case studies from Australia", *Int. Jl of Science in Society*, 2 (2) 23-37.

Northcote J & Macbeth J (2008) *Socio-economic impacts of sanctuary zone changes in Ningaloo Marine Park,* CRC for Sustainable Tourism Pty Ltd - http://researchrepository.murdoch.edu.au/4762/1/socio-economic_impacts.pdf

PISCO 2007, *The Science of Marine Reserves (2nd Edition, International Version)*, Partnership for Interdisciplinary Studies of Coastal Oceans.

Saunders, R.J., Bryars, S.R. and Fowler, A.J. 2010, P*reliminary consideration of the biology of several of South Australia's marine fish species that have conservation or management interest*, report to the Department for Environment and Heritage, South Australian Research and Development Institute (Aquatic Sciences), Adelaide, 41 pp. SARDI Publication Number F2009/000693-1. SARDI Research Report Series No. 426.

Schirmer, J., Casey, A. M. and Mazur, N. 2004, *Socio-economic impact assessment of the proposed Cod Grounds Marine Protected Area*, report prepared for Department of Environment and Heritage, Canberra.

Square Holes 2009, *Marine Parks*, report prepared for the Department for Environment and Heritage.

Square Holes 2011, *Reserve Today Preserve Forever – Marine Parks Tracking Report*, report prepared for the Department of Environment and Heritage.

Square Holes 2012, *Reserve Today Preserve Forever – Marine Parks Tracking Report*, report prepared for the Department of Environment and Heritage.

Stevens, R., Smith, A. and Morgan, G. 2011a, *Expert Advisory Panel Final Report on Displaced Commercial Fishing Activities*, report to PIRSA Fisheries and Aquaculture, 22 June 2011.

Stevens, R., Smith, A. and Morgan, G. 2011b, *Expert Advisory Panel Final Report (Supplementary Report) on Displaced Commercial Fishing Activities*, report to PIRSA Fisheries and Aquaculture, 17 October 2011.

Vanclay F (2005) *Engaging communities with social impact assessment: SIA as a social assurance process*, Tasmanian Institute of Agricultural Research, University of Tasmania - http://www.engagingcommunities2005.org/abstracts/Vanclay-Frank-final.pdf

Vanclay F (2012) 'The potential application of social impact assessment in integrated coastal zone management', *Ocean and Coastal Management,* http://www.sciencedirect.com/science/article/pii/S0964569112001251?v=s5

van't Hof, T. 1998, *Social and economic impacts of marine protected areas: a study and analysis of selected cases in the Caribbean*, Caribbean Natural Resources Institute (CANARI), Saba, Netherlands Antilles.

Voyer M (2011) *Why social factors affect the success of marine parks* School of Environment, University of Technology, Sydney - http://www.aqob.com.au/details.php?p_id=714&seo=Why_social_factors_affect_the_success_of_marine_parks&listid=528&menuid=category_id_24&submenuid=categorylist_id_528

Ward T and Burch P 2012, *Revised estimates of historical commercial fishery catches/effort in draft sanctuary zones and draft habitat protection zones in South Australia's Marine Parks*, report to PIRSA Fisheries and Aquaculture. South Australian Research and Development Institute (Aquatic Sciences), Adelaide. SARDI Publication No. F2011/000307-6. SARDI Research Report Series No. 642

Ward, T., Heinemann, D. and Evans, N. 2001, *The Role of Marine Reserves as Fisheries Management Tools: a review of concepts, evidence and international experience*, Bureau of Rural Sciences, Canberra.

Disclaimer

We have prepared the above report exclusively for the use and benefit of our client. Neither the firm nor any employee of the firm undertakes responsibility in any way whatsoever to any person (other than to the above mentioned client) in respect of the report including any errors or omissions therein however caused.

Appendix 1 Socio-economic Profile – Far West Coast

This socio-economic profile provides a statistical summary of key economic and social information for the Far West Coast 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 Far West Coast region contributes to the State economy and to monitor trends in economic growth or decline.

The Far West Coast region is located in the far west of the state (Figure 1). The two statistical local areas (SLAs) that comprise the region are Ceduna (DC) and Unincorporated West Coast. The Far West Coast regional economy is relevant to the Far West Coast (MP1) and Nuyts Archipelago (MP2) Marine Parks. Table 1 presents a summary of the key economic and social information detailed further in the report.

Appendix Figure 1-1 Far West Coast region

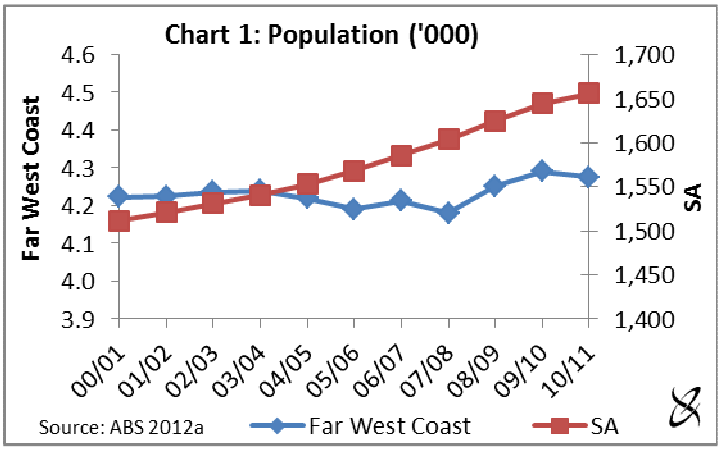
Source: ABS TableBuilder

Appendix Table 1-1 Summary of key economic and social indicators for the Far West Coast region

Indicator	Far West Coast	SA	Far West Coast as a proportion of SA
Population, 2010/11 (no.)	4,315	1,656,299	0.3%
Birth Rate, 2009/10 (births/1000 residents)	16.9	12.2	-
Death Rate, 2009/10 (deaths/1000 residents)	8.1	7.9	-
Age Distribution, 2009/10:			
Proportion of Population aged 0-14	23%	18%	-
Proportion of Population aged 15-64	66%	67%	-
Proportion of Population aged 65+	11%	16%	-
Dependency Rate, 2009/10:			
Child	35%	27%	-
Aged	16%	23%	-
Total	51%	50%	-
Population Projection, Increase from 2006 to 2026	5%	23%	-
Employment, June qtr 2011:			
Labour Force (no.)	2,228	867,500	0.3%
Unemployed (no.)	192	45,300	0.4%
Unemployment Rate	9%	5%	-
Participation Rate, 2009/10	62%	63%	-
Businesses, June 2009 (no.)	366	141,625	0.3%
School Enrollments, 2011 (no.)	691	247,356	0.3%
Tertiary Enrollments, 2011 (no.)	642	208,706	0.3%
Non-school Qualifications, 2006 (no.)	1,208	595,379	0.2%
Mean Taxable Income, 2009/10 ($)	48,314	54,349	-
Proportion of Taxable Individuals, 2009/10	72%	74%	-
Value per Buiding Approval, 2010/11 ($)	215,969	236,269	-
Median Dwelling Price, 2010/11 ($)	250,000	357,500	-
Commercial Fishing, Ave/yr 2000/01 to 2009/10:			
Catch (t)	299	47,581	0.6%
Value of Catch ($m)	6	202	2.8%
Charter Boats, Ave/yr 2007/08 to 2009/10 (no. of fish)	4,242	146,341	2.9%
Recreational Fishing, 2007/08:			
Fishers (no.)	7,750	236,463	3.3%
Days Fished (no.)	35,656	1,054,200	3.4%
Gross Regional Product, 2009/10 ($m)	174	80,356	0.2%
Employment, 2009/10 (fte)	1,872	774,953	0.2%
Tourism, 2009/10 ($m)	26	4,524	0.6%
Other Regional Exports, 2009/10 ($m)	81	26,757	0.3%
Regional Imports, 2009/10 ($m)	185	40,573	0.5%

Demographic indicators

- The estimated resident population of the Far West Coast region increased by 1 per cent (around 50 persons) between 2000/01 and 2010/11 and was 4,315 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 small rises 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 Far West Coast region has a higher concentration of younger people (aged 0 to 14 years), a similar share of persons aged 15 to 64 years and, consequently, a lower than average share of people aged 65 and over (Table 2).

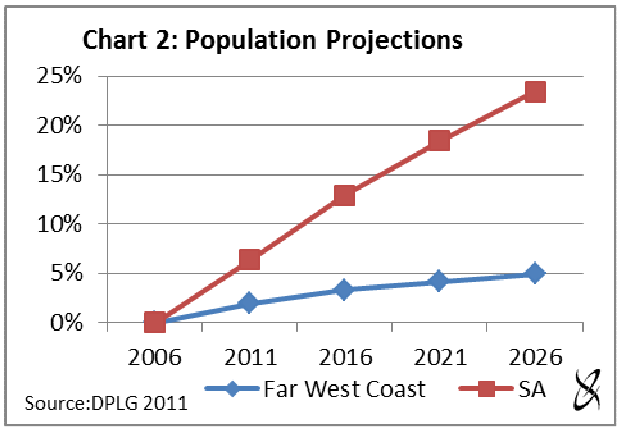
Appendix Table 1-2 Age distribution of the population for the Far West Coast region and SA, 2000/01 to 2009/10

Age	Year									
	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
Far West Coast										
0 to 14	26%	26%	26%	25%	24%	23%	23%	23%	23%	23%
15 to 64	65%	65%	65%	66%	67%	67%	67%	66%	66%	66%
65 or older	9%	9%	9%	9%	9%	10%	10%	10%	10%	11%
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 Far West coast region was 51 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).

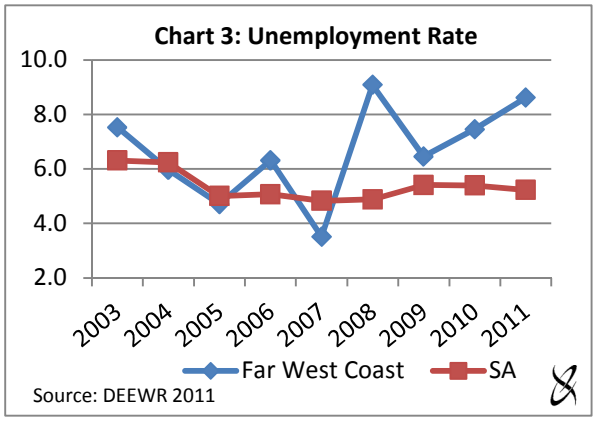
- According to the Department of Planning and Local Government (DPLG) population projections[14], the total population in the Far West Coast region is likely to increase by almost 5 per cent by 2026, whereas the SA population is expected to increase by more than four times that, around 23 per cent (Chart 2).



- Population projections for the Far West Coast region for persons aged 0 to 14 years indicate that there will be a decrease (14 per cent from 2006) in this age category. The working age population (15 to 64 years) is projected to decrease slightly (by 6 per cent from 2006). The population projections for persons 65 or older indicate that a significant increase of almost 130 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 Far West Coast region was approximately 2,200 (by place of residence), a decrease of 1 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 Far West Coast region was 180 in March 2003 and 190 in June 2011, an increase of approximately 7 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 Far West Coast region was 8.6 per cent in the June quarter of 2011. The unemployment rate for SA for the same quarter was significantly lower at 5.2 per cent (Chart 3). In the Far West Coast region the unemployment rate is more than double the rate of 4 years earlier (June quarter 2007).



- The labour force participation rate was consistently higher for the Far West Coast region than for the whole of SA, over the years 2002/03 to 2008/09, reflecting the lower proportion of elderly people living in the Far West Coast region. However, in 2009/10 the labour force participation rate in the Far West Coast region fell below that of SA as a whole (63 per cent) and was just under 62 per cent (DEEWR 2011, ABS 2010a and ABS 2011c).

[14] 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 Far West Coast region was 366, 0.3 per cent of the total businesses operating in SA (almost 142,000) (ABS 2011d).
- Of the 366 businesses operating in the Far West Coast region, approximately 50 per cent were classified in the agriculture, forestry and fishing sector and 11 per cent were in the construction sector (ABS 2011d).
- Over half of the businesses (56 per cent) operating in the Far West Coast region did not employ anyone and over one quarter (26 per cent) employed between 1 and 4 people (ABS 2011d).

Education and training

- The total number of residents in the Far West Coast region with a non-school qualification increased over the 5 years to 2006. In 2006, approximately 39 per cent of all persons aged 15 or over held some form of non-school qualification, compared with 30 per cent in 2001 (ABS 2007 and 2010a).
- The level of qualification was generally lower for the Far West Coast 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 Far West Coast region and SA, 2001 and 2006 [a]

Qualification	Far West Coast			
	2001		2006	
Postgraduate Degree	3	0%	10	1%
Graduate Diploma & Graduate Certificate	28	3%	32	3%
Bachelor Degree	133	14%	140	12%
Advanced Diploma & Diploma	119	12%	137	11%
Certificate	398	41%	449	37%
Level of education not described or stated	284	29%	440	36%
Total	965	100%	1,208	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).

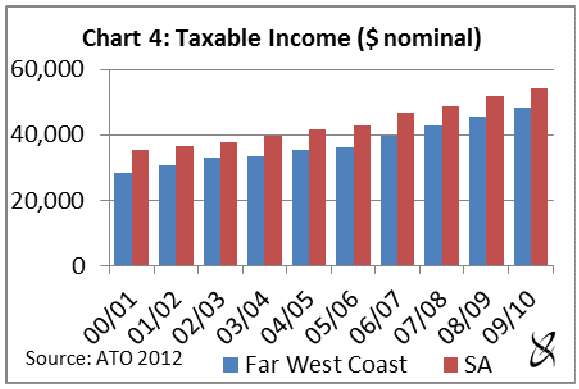
- The total number of students enrolled in primary school in the Far West Coast region decreased by 18 per cent between 2001 and 2011. This decrease was comprised of an 2 per cent decrease in enrolments in government schools and a 63 per cent decline in enrolments at non-government schools (Table 4).
- The total number of Far West Coast region students enrolled in secondary school rose by 8 per cent between 2001 and 2011. The increase was comprised of a 17 per cent increase in government school enrolments and a 52 per cent decline in non-government school enrolments (Table 4).
- Between 2001 and 2011 the total number of Far West Coast regions residents enrolled in a higher education institute increased by 86 per cent. This is significantly greater increase than for SA as a whole (38 per cent increase) (ABS 2012b).

Appendix Table 1-4 School enrolments in the Far West Coast region and SA, 2001, 2006 and 2011

	Census Year		
	2001	2006	2011
Far West Coast			
Pre-school	76	58	63
Primary			
- Government	378	333	369
- Non-Government	128	101	47
Total Primary Student	506	434	416
Secondary Students			
- Government	171	159	200
- Non-Government	25	29	12
Total Secondary Students	196	188	212
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

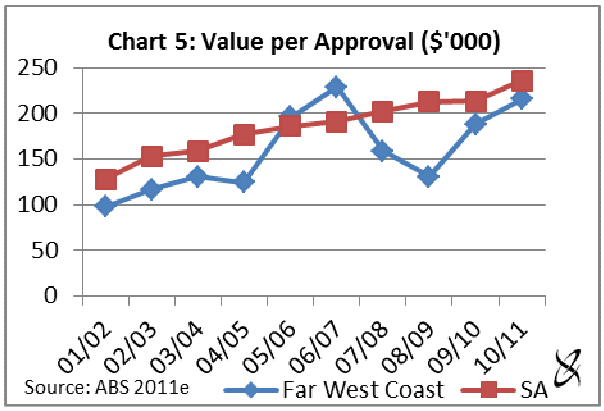
Source: *2011 Census of Population and Housing* (ABS 2012b)

Household income



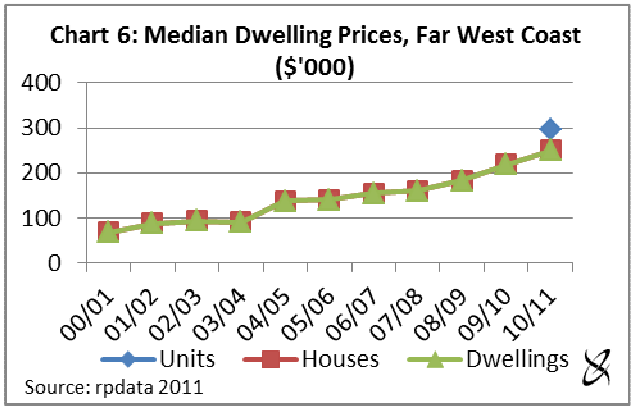
- The mean individual taxable income in the Far West Coast region was consistently lower than the state average between 2000/01 and 2009/10 (Chart 4).
- Over the period 2000/01 to 2009/10, the mean taxable income (in nominal terms) increased by 71 per cent in the Far West Coast region and 54 per cent in SA as a whole (Chart 4).
- In 2009/10 mean taxable income was almost $48,300 in the Far West Coast region and around $54,350 in SA (Chart 4).

Building approvals



- The number of building approvals for the Far West Coast region increased by 114 per cent over the period 2001/02 to 2010/11. However, the total value of approvals increased significantly more from $2.1 million in 2001/02 to $9.7 million in 2010/11, an increase of 371 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 Far West Coast region increased by approximately 120 per cent, from $98,000 in 2001/02 to $216,000 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 there were limited unit sales in the Far West Coast region and insufficient for reporting in all years bar 2010/11 (Chart 6). The median unit price in SA as a whole increased by 215 per cent over the 10 year period, from almost $102,000 to $320,000 (rpdata 2011).
- The median house price in the Far West Coast region increased by 273 per cent between 2000/01 and 2010/11, from approximately $67,000 to $250,000 (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 273 per cent in the Far West Coast region ($250,000 in 2010/11) (Chart 6) 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

- The average annual catch of abalone in the Far West Coast region over the past 10 years, 2000/01 to 2009/10, was almost 42 tonnes. The value of this average annual catch was around $1.6 million (SARDI by special request).
- Prawns were caught in this region over the period 2000/01 to 2009/10 but due to the limited number of licence holders in the West Coast Prawn fishery catch and value of catch are confidential.
- Annual catch of rock lobster in the Far West Coast region averaged around 39 tonnes with a beach value of approximately $1.3 million over the period 2000/01 to 2009/10 (SARDI).
- Annual average catch of Marine Scalefish species including miscellaneous species in the Far West Coast region over the period 2000/01 to 2009/10 was approximately 200 tonnes with a beach value of around $1.5 million (SARDI).
- Between 2007/08 and 2009/10 the charter boat operators in the Far West Coast region caught on average approximately 4,000 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 Far West Coast region (regions 1 and 2 in the report South Australian Recreational Fishing Survey 2007/08 (Jones 2009)) decreased by 30 per cent, from approximately 11,100 in 2000/01 to 7,750 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 Far West Coast region the number of days fished by SA resident recreational fishers decreased from almost 48,500 days in 2000/01 to around 35,700 days in 2007/08 (a 26 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 Far West Coast region in 2009/10 (approximately $26m (TRA 2011 and EconSearch analysis)) generated the following level of regional economic activity.

- Approximately $12 million in GRP which represents 7.1 per cent of the regional total ($174 million).
- Almost 180 full-time and part-time jobs which represents 8.9 per cent of the regional total (2,000 total jobs).
- Approximately 160 fte jobs which represents 8.8 per cent of the regional total (1,870 fte).

Regional Economic Structure

- At the time of the 2006 population census it was estimated that approximately 97 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 92 per cent of employed residents were employed locally, with the balance travelling to other areas in SA for work including a significant proportion in the Streaky Bay and Unincorporated Far North SLAs[15]).
- It was estimated that there were approximately 2,000 jobs (1,870 fte jobs) in the Far West Coast region in 2009/10 (by place of remuneration) (Table 5).
- In 2009/10, the top four contributors to total jobs in the region were agriculture, forestry and fishing (15 per cent), health and community services (14 per cent), education (13 per cent) and retail trade (12 per cent each) sectors (Table 5).
- The Far West Coast gross regional product (GRP) was estimated to be $174m 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 Far West Coast region comprised approximately 0.2 per cent of the SA GSP.
- In 2009/10, the top four contributors to GRP were agriculture, forestry and fishing (15 per cent), ownership of dwellings (14 per cent), health and community services and transport and storage (7 per cent each) sectors (Table 6).
- Expenditure by households accounted for almost 42 per cent 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 building and construction (10 per cent) and agriculture, forestry and fishing and transport and storage (5 per cent each) sectors (Table 7).
- Expenditure by tourists ($26m) contributed approximately 24 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 agriculture, forestry and fishing (48 per cent) and transport and storage (13 per cent) sectors (Table 7).

[15] 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, Far West Coast region, 2009/10 [a]

	Total Employment		FTE Employment		Household Income		Household Expenditure	
SECTOR	(jobs)	(%)	(fte)	(%)	($m)	(%)	($m)	(%)
Agriculture, forestry and fishing	291	14.5%	320	17.1%	14	15.3%	0	0.2%
Mining	14	0.7%	17	0.9%	1	1.1%	0	0.0%
Manufacturing	26	1.3%	28	1.5%	1	1.4%	1	0.6%
Electricity, gas and water	12	0.6%	12	0.6%	0	0.2%	0	0.0%
Building and construction	102	5.1%	112	6.0%	0	0.5%	1	0.7%
Wholesale trade	82	4.1%	82	4.4%	0	0.0%	0	0.0%
Retail trade	238	11.9%	214	11.4%	0	0.5%	1	0.3%
Accommodation, cafes & restaurants	159	8.0%	146	7.8%	4	4.1%	0	0.0%
Transport and storage	124	6.2%	120	6.4%	19	20.8%	24	13.7%
Communication services	6	0.3%	9	0.5%	3	3.1%	3	1.9%
Finance and insurance	20	1.0%	21	1.1%	1	1.1%	1	0.3%
Ownership of dwellings [b]	0	0.0%	0	0.0%	2	1.7%	1	0.3%
Property and business services	96	4.8%	80	4.3%	8	9.5%	33	18.9%
Public administration and defence	185	9.2%	152	8.1%	10	11.3%	2	0.9%
Education	256	12.8%	228	12.2%	10	11.6%	6	3.4%
Health and community services	284	14.1%	246	13.1%	12	13.1%	5	2.7%
Cultural and recreational services	4	0.2%	4	0.2%	0	0.1%	0	0.1%
Personal services	105	5.2%	82	4.4%	4	4.6%	4	2.5%
Total Intermediate	2,005	100.0%	1,872	100.0%	90	100.0%	80	46.6%
PRIMARY INPUTS								
Household Income	-	-	-	-	-	-	0	0.0%
GOS and GMI [c]	-	-	-	-	-	-	0	0.0%
Taxes Less Subsidies	-	-	-	-	-	-	15	8.7%
Imports	-	-	-	-	-	-	77	44.6%
Primary Inputs Total	-	-	-	-	-	-	92	53.4%
GRAND TOTAL	2,005	100.0%	1,872	100.0%	90	100.0%	173	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 Far West Coast region by industry, 2009/10 [a]

	Household Income		GOS and GMI [c]		Taxes less Subsidies		Gross Regional Product	
SECTOR	($m)	(%)	($m)	(%)	($m)	(%)	($m)	(%)
Agriculture, forestry and fishing	14	15.3%	11	18.5%	1	17.6%	26	15.1%
Mining	1	1.1%	2	4.0%	0	0.2%	3	2.0%
Manufacturing	1	1.5%	1	1.5%	0	1.2%	2	1.4%
Electricity, gas and water	1	1.0%	1	1.2%	0	0.6%	2	1.0%
Building and construction	7	7.6%	3	4.7%	0	6.0%	10	5.8%
Wholesale trade	4	4.8%	1	2.2%	0	5.2%	6	3.5%
Retail trade	5	6.0%	2	2.8%	0	4.4%	7	4.3%
Accommodation, cafes & restaurants	6	6.5%	1	2.4%	1	10.0%	8	4.6%
Transport and storage	5	6.0%	6	10.0%	1	8.2%	12	6.9%
Communication services	1	0.9%	1	1.6%	0	0.9%	2	1.1%
Finance and insurance	3	2.9%	3	4.8%	0	4.2%	6	3.3%
Ownership of dwellings [b]	0	0.0%	22	36.9%	2	25.6%	24	13.9%
Property and business services	5	5.7%	2	3.4%	0	3.8%	7	4.3%
Public administration and defence	10	11.3%	2	2.9%	0	3.1%	12	7.0%
Education	10	11.6%	1	1.0%	0	2.8%	11	6.5%
Health and community services	12	13.1%	1	1.3%	0	4.0%	13	7.4%
Cultural and recreational services	0	0.1%	0	0.0%	0	0.0%	0	0.1%
Personal services	4	4.6%	0	0.7%	0	2.0%	5	2.7%
Total Intermediate	90	100.0%	60	100.0%	8	100.0%	-	-
Net Taxes in Final Demand	-	-	-	-	-	-	16	9.4%
Gross Regional Product	-	-	-	-	-	-	174	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, Far West Coast region, 2009/10 [a]

	Tourism		Other Exports		Total Exports		Imports	
SECTOR	($m)	(%)	($m)	(%)	($m)	(%)	($m)	(%)
Agriculture, forestry and fishing	0	0.0%	39	48.0%	39	36.5%	10	5.4%
Mining	0	0.0%	4	4.5%	4	3.4%	0	0.1%
Manufacturing	0	1.7%	3	3.6%	3	3.1%	3	1.6%
Electricity, gas and water	0	0.0%	0	0.0%	0	0.0%	1	0.6%
Building and construction	0	0.0%	1	1.6%	1	1.2%	19	10.4%
Wholesale trade	1	2.8%	0	0.0%	1	0.7%	5	2.8%
Retail trade	3	11.8%	0	0.0%	3	2.8%	5	2.5%
Accommodation, cafes & restaurants	5	18.4%	4	5.1%	9	8.3%	8	4.3%
Transport and storage	1	4.9%	11	13.2%	12	11.3%	10	5.2%
Communication services	0	0.0%	1	1.5%	1	1.1%	1	0.7%
Finance and insurance	0	0.0%	0	0.3%	0	0.2%	2	0.9%
Ownership of dwellings [b]	1	4.3%	0	0.0%	1	1.0%	3	1.6%
Property and business services	0	0.6%	3	3.8%	3	3.0%	5	2.9%
Public administration and defence	0	0.0%	7	8.9%	7	6.7%	5	2.7%
Education	0	0.2%	1	1.8%	1	1.4%	2	1.1%
Health and community services	0	0.0%	3	4.2%	3	3.2%	2	1.1%
Cultural and recreational services	0	0.4%	0	0.0%	0	0.1%	0	0.1%
Personal services	0	0.0%	1	0.8%	1	0.6%	2	0.9%
Total Intermediate	12	45.1%	79	97.3%	90	84.8%	83	45.1%
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	2	9.1%	-1	-1.2%	1	1.3%	-	-
Imports	12	45.8%	3	3.9%	15	14.0%	-	-
Primary Inputs Total	14	54.9%	2	2.7%	16	15.2%	-	-
FINAL DEMAND								
Household Expenditure	-	-	-	-	-	-	77	41.7%
Government Expenditure	-	-	-	-	-	-	2	0.8%
Gross Fixed Capital	-	-	-	-	-	-	8	4.4%
Change in Inventories	-	-	-	-	-	-	0	0.0%
Tourism	-	-	-	-	-	-	12	6.3%
Other Exports	-	-	-	-	-	-	3	1.7%
Final Demand Total	-	-	-	-	-	-	101	54.9%
GRAND TOTAL	26	100.0%	81	100.0%	107	100.0%	185	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.

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

References

Australian Bureau of Statistics (ABS) 2006, *2003/04 Household Expenditure Survey Summary of Results,* ABS Cat. No. 6530.0, Canberra, electronic version.

ABS 2007, *2006 Census Tables,* Cat. No. 2068.0, Canberra, June.

ABS 2008, *Agricultural Commodities: Small Area Data, Australia, 2005/06,* ABS Cat. No. 7125.0, Canberra.

ABS 2009, *Australian National Accounts: Input-Output Tables - Electronic Publication 2005-06*, ABS Cat. No. 5209.0.55.001, Canberra.

ABS 2010a, *National Regional Profiles,* Cat. No. 1379.0, Canberra, November (and previous issues).

ABS 2010b, *2009/10 Australian National Accounts, State Accounts*, ABS Cat. No. 5220.0, Canberra.

ABS 2010c, *Australian National Accounts, Tourism Satellite Account, 2009/10*, ABS Cat. No. 5249.0, Canberra.

ABS 2011a, *Births, Australia, 2009,* Cat. No. 3301.0, Canberra, March (and previous issues).

ABS 2011b, *Deaths, Australia, 2009,* Cat. No. 3302.0, Canberra, March (and previous issues).

ABS 2011c, *Population by Age and Sex, Regions of Australia, 2009/10,* ABS Cat. No. 3235.0, Canberra, August.

ABS 2011d, *Counts of Australian Businesses, including Entries and Exits, June 2007 to June 2009,* Cat No. 8165.0, Canberra, February.

ABS 2011e, *Building Approvals, Australia,* Cat. No. 8731.0, Canberra, August (and previous issues).

ABS 2011f, *Value of Agricultural Commodities Produced, Australia, 2009/10,* ABS Cat. No. 7503.0, Canberra.

ABS 2012a, *Regional Population Growth, Australia, Population Estimates by Statistical Local Area, 2001 to 2010,* Cat. No. 3218.0, Canberra, March (and previous issues).

ABS 2012b, *2011 Census of Population and Housing, Basic Community Profiles*, June.

Australian Taxation Office 2012, Taxation Statistics 2009/10, *Table 3: Personal Tax, Selected items, by state/territory and postcode, for taxable individuals, 2009/10 income year* (and previous issues).

Department of Education, Employment and Workplace Relations (DEEWR) 2011, *Small Area Labour Markets – June Quarter 2011*, Canberra, December, (and previous issues).

Department of Planning and Local Government 2011, *Age-sex Population Projections by Local Government Area, 2006 to 2026,* May.

EconSearch 2009a, *Economic and Environmental Indicators for South Australia and its Regions, 2006/07*, report prepared for the DTED, May.

EconSearch 2009b, *Input-Output Tables for South Australia and its Regions, 2006/07: Technical Report*, report prepared for the Department of Trade and Economic Development, May.

Jones, K. 2009, *South Australian Recreational fishing Survey 2007/08,* Fisheries Division, Primary Industries and Resources South Australia, December.

PIRSA 2010, *2010 Data Summary of the South Australian Recreational Charter Boat Fishery,* September.

Rpdata 2011, *Median unit, house and dwelling prices by region, 2000/01 to 2010/11*, by special request

Tourism Research Australia (TRA), 2011, *Regional Tourism Profiles 2009/10,* Canberra.

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.
Animal feeding/baiting/berleying [1]					

RECREATION, EDUCATION AND OTHER	GMUZ	HPZ	SZ	RAZ	Limits / Permits / Exceptions
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 transhipment 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 *Harbors and Navigation Act 1993*.
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 rojects 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 *Environment Protection Act 1993* are prohibited
Extraction and disposal for a desalination plant[1]					
Vessel discharge of wastewater [2]					Specifically regulated by Clause 36 of the *Environment Protection (Water Quality) Policy 2003*

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)	□	□	□	□	
– 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)	□	□	□	□	
– 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)		*	×	×	* 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	□	□	□	□	
– 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	□	□	□	□	
– 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
Shaun	de Bruyn	Manager	South Australian Tourism Commission
Graham	Edgar	Senior Research Fellow	University of Tasmania
Jon	Emmett	Project Coordinator, Marine Parks Project	Department of Environment and Natural Resources
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
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
Neil	MacDonald	Executive Officer	Charter Boat Owners and Operators Association

Name		Affiliation	Organisation
	Members		Marine Park Council
	Members		South Australian Regional Organisation of Councils
	Members	The Scientific Working Group	Department of Environment and Natural Resources
Samara	Miller	Executive officer	Abalone Industry Association of SA Inc.
Angus	Mitchell	Principal Policy Officer	Department of Environment and Natural Resources
Steve	Moriarty	Rock lobster Fisher	Rock lobster fisheries
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
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
Emmanualle	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
Chris	Thomas	Branch Manager	Department of Environment and Natural Resources
Lianos	Triantafillos	Fishery Manager	Department for Primary Industries and Resources SA
Hank	van der Wijngaart	President	Scuba Divers Federation of SA
Tim	Ward	Program Leader, Wild Fisheries	South Australian Research and Development Institute
Paul	Watson	Executive Officer	South Australian Sardine Industry Association

Name		Affiliation	Organisation
Ian	Winton	Deputy Chairman	South Australian Recreational Fishing Advisory Council
Jonas	Woolford	SA Director	Abalone Council Australia Ltd
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 Nuyts Archipelago 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	2	2	1	1	0
Establishment of this Marine Park is based on sound scientific evidence	1	2	1	0	2	0
DENR Preliminary Marine Park zone for this Marine Park is about right	3	2	1	0	0	0
MPLAG zone advice for this Marine Park is about right	1	0	1	1	3	0
More information is needed about this Marine Park & how it will operate	0	1	2	1	2	0

Note: 6 of 11 members responded to the MPSIAT.

Source: Australian Workplace Innovation and Social Research Center MPSIAT 2011

Appendix Table 4-2 Recreation & fishing impacts for Nuyts Archipelago 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	3	1	0	1	0
MPLAG zone	1	2	2	0	1	0
MP will discourage recreational fishing*						
DENR zone	0	2	2	1	1	0
MPLAG zone	0	2	3	0	1	0
MP will bring better local facilities e.g. for recreation & fishing						
DENR zone	4	0	0	2	0	0
MPLAG zone	1	3	1	1	0	0
MP will bring a wider range of activities for local people to participate in						
DENR zone	4	0	0	1	1	0
MPLAG zone	1	3	1	0	1	0
Any significant losses in commercial fishing would be very damaging for my family*						
DENR zone	2	0	1	0	3	0
MPLAG zone	2	0	1	0	3	0
Any significant losses in commercial fishing would be very damaging for the community*						
DENR zone	0	0	0	1	4	1
MPLAG zone	0	1	0	1	3	1

Note: 6 of 11 members responded to the MPSIAT. *Question is negatively scored

Source: Australian Workplace Innovation and Social Research Center MPSIAT 2011

Appendix Table 4-3 Tourism, education & wellbeing impacts for Nuyts Archipelago 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	3	1	0	1	1	0
MPLAG zone	2	2	1	0	1	0
There will be more opportunity for charter boats to exploit ecotourism opportunities						
DENR zone	2	2	1	0	1	0
MPLAG zone	2	0	3	0	1	0
MP will provide increased opportunities for education about marine life						
DENR zone	2	1	1	1	1	0
MPLAG zone	2	0	1	2	1	0
MP will provide increased opportunities for our understanding of marine conservation issues						
DENR zone	1	2	1	1	1	0
MPLAG zone	1	1	1	2	1	0
MP will create new employment opportunities for local people						
DENR zone	3	1	0	1	1	0
MPLAG zone	2	2	1	0	1	0
MP will have no impact (positive or negative) on me or my family						
DENR zone	3	0	1	0	2	0
MPLAG zone	1	3	0	0	1	1
MP will improve the quality of life of people in my community						
DENR zone	3	1	1	0	1	0
MPLAG zone	2	2	1	0	1	0
MP will improve my personal quality of life						
DENR zone	5	0	0	0	1	0
MPLAG zone	2	3	0	0	1	0
MP will negatively change our way of life*						
DENR zone	1	2	1	1	1	0
MPLAG zone	1	2	2	0	1	0

Note: 6 of 11 members responded to the MPSIAT. *Question is negatively scored.

Source: Australian Workplace Innovation and Social Research Center MPSIAT 2011

Appendix Table 4-4 Culture and heritage impacts for Nuyts Archipelago 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	2	2	0	1	1	0
MPLAG zone	1	1	1	2	1	0
MP will help preserve Aboriginal culture & heritage						
DENR zone	3	1	0	1	1	0
MPLAG zone	1	1	1	2	1	0
MP will help preserve local Australian culture & heritage						
DENR zone	3	1	0	1	1	0
MPLAG zone	1	2	2	0	1	0
MP will help maintain our community identity as a fishing centre						
DENR zone	2	2	2	0	0	0
MPLAG zone	1	1	1	3	0	0

Note: 6 of 11 members responded to the MPSIAT.

Source: Australian Workplace Innovation and Social Research Center MPSIAT 2011

Appendix Table 4-5 Population & housing impacts for Nuyts Archipelago 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	2	3	1	0	0	0
MPLAG zone	3	2	1	0	0	0
MP will see too many locals leaving the area						
DENR zone	1	4	0	0	1	0
MPLAG zone	3	3	0	0	0	0
MP will increase property prices making it more difficult for locals to buy houses						
DENR zone	4	0	2	0	0	0
MPLAG zone	2	3	1	0	0	0
MP will lead to a lowering of beachfront property prices						
DENR zone	2	1	0	1	2	0
MPLAG zone	1	3	0	1	1	0

Note: 6 of 11 members responded to the MPSIAT.

Source: Australian Workplace Innovation and Social Research Center MPSIAT 2011

Appendix Table 4-6 Community response impacts for Nuyts Archipelago 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	1	1	0	2	0	2
MPLAG zone	0	1	2	2	0	1
Our community is strong enough to manage changes brought by the MP						
DENR zone	1	0	0	3	0	2
MPLAG zone	0	0	2	3	0	1
A number of potential business opportunities will be brought by the MP						
DENR zone	3	1	0	1	1	0
MPLAG zone	2	2	1	0	1	0
Need for training programs to help people adapt to new occupations associated with the MP						
DENR zone	2	2	0	1	1	0
MPLAG zone	3	1	1	0	1	0
MP will divide our community into those for & against it*						
DENR zone	0	0	1	3	2	0
MPLAG zone	1	0	3	2	0	0
MP will be a source of pride to this community						
DENR zone	3	0	1	1	1	0
MPLAG zone	2	1	1	1	1	0
MP will increase number of events & other activities that bring the community together						
DENR zone	3	1	1	0	1	0
MPLAG zone	2	2	1	0	1	0

Note: 6 of 11 members responded to the MPSIAT. *Question is negatively scored.

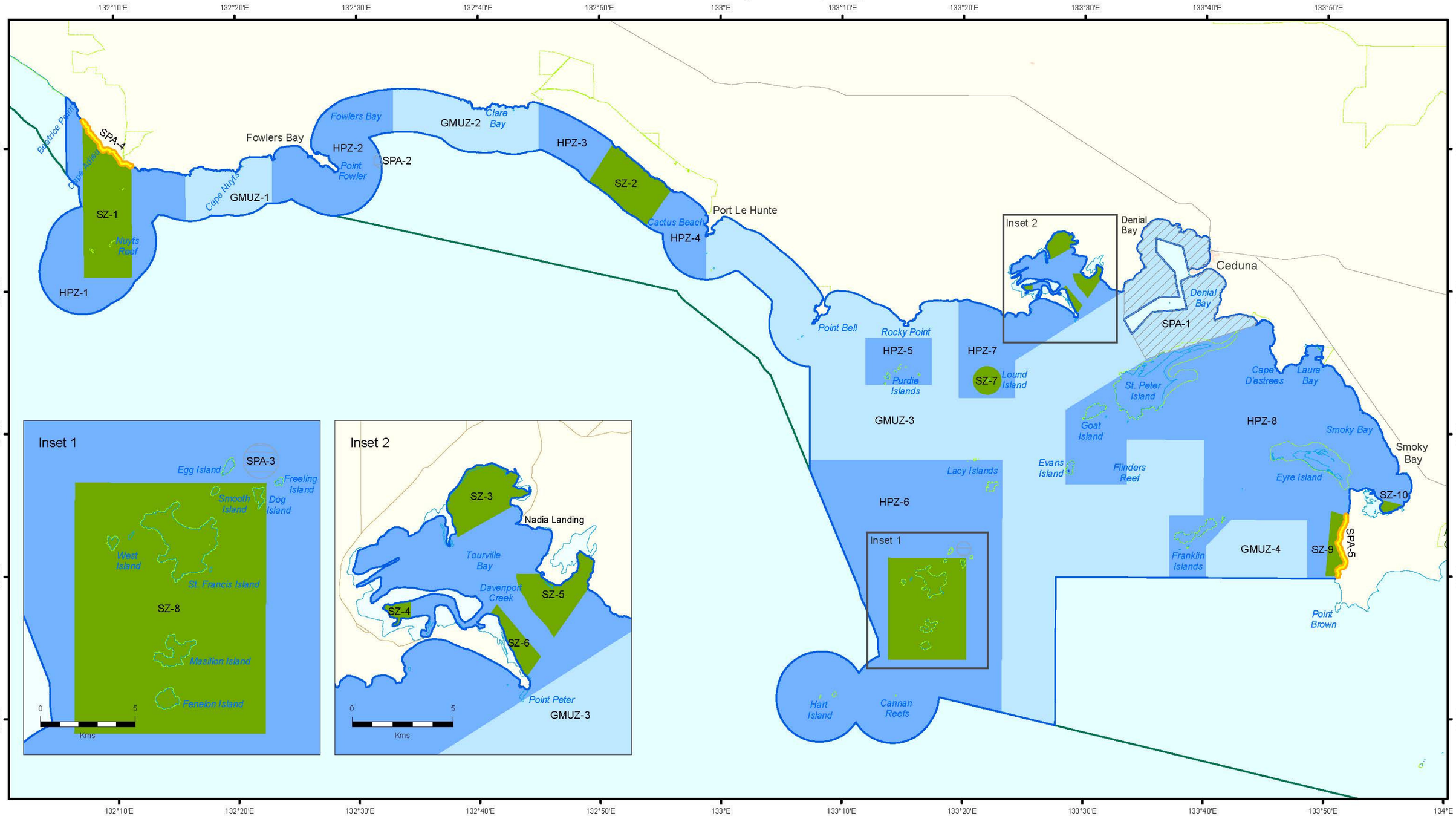
Source: Australian Workplace Innovation and Social Research Center MPSIAT 2011

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 2 - Nuyts Archipelago



Marine Park Draft Zoning
- Sanctuary Zone
- Habitat Protection Zone
- General Managed Use Zone

- Special Purpose Area (Harbor Activities)
- Special Purpose Area (Transhipment)
- Special Purpose Area (Shore-based recreational line fishing)

Topographic
- Built Up Area
- Marine Park Boundary
- Existing Reserves under other Acts

- Coastal Waters of the State
- Coastline (median high water)

N

0 20
Kms

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
Coastal Waters of the State - Geoscience Australia

Compiled 6 August 2012
Projection Lambert Conformal Conic
Datum Geocentric Datum of Australia, 1994

Government of South Australia

DEH MapID: 2012-6049