

Department for Environment and Heritage Marine Planning Framework for South Australia



Government
of South Australia



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The Hon. Gail Gago, MLC
Minister for Environment
and Conservation

Foreword

South Australia's marine and coastal areas are precious environments that need to be cared and managed for current and future generations. It is increasingly important that human impacts are balanced against the ecological value of these wonderful assets.

The Government of South Australia is committed to the conservation and protection of our marine and coastal environments, home to a diverse range of species including the iconic Leafy Sea Dragon, migratory Southern-right Whales and the largest remaining breeding colonies of Australian Sea Lions.

The Marine Planning Framework for South Australia is a whole of Government approach to guide the management of current and future activities within the capacity of these environments.

The aim of this Framework is to sustain activity while recognising the cultural, recreational and economic values of these unique environments.

I would like to thank the previous Minister, Hon John Hill for his commitment to the development of this framework.

The State Government is pleased to present the Marine Planning Framework for South Australia.

The Hon. Gail Gago, MLC
Minister for Environment and Conservation



Executive Summary

South Australia's marine environment spans over 60,000 square kilometres of State waters bounded by approximately 4,000 kilometres of coastline.

It is both physically and biologically diverse with many endemic species of flora and fauna and a wide range of habitats maintained by a multitude of complex and interrelated processes. This environment has evolved in response to a unique set of circumstances and environmental conditions.

The abundance and diversity of our marine flora and fauna have supported the establishment of industries that are based on the harvesting or use of these resources. These industries add considerable value to the South Australian economy and are major sources of employment in rural areas.

Historically, towns grew around industrial initiatives and the siting of development was influenced by the need to access deeper waters for transport and their abundant resources. In many cases, developments and uses were established without consideration or understanding of the potential impacts on the surrounding habitats. The legacy of this has been that many of our most important marine, estuarine and coastal habitats are, or have been, experiencing high levels of pollution, declining water quality, loss of productive habitat, the introduction of marine pest species, and levels of resource use that are unsustainable.

The challenge faced by Government, industry and the community is to plan for, and manage the use of, our marine environment in an ecologically sustainable manner. *The Marine Planning Framework for South Australia* (the Framework) is an important tool for achieving the State Government's commitment, outlined in *South Australia's Strategic Plan*, (Government of SA 2004c) to sustainability in the marine environment. *The Living Coast Strategy for South Australia* (Government of SA 2004b) outlines the need to identify areas of ecological significance through the development of Marine Plans based on marine bioregions, and to test the concept of marine planning through the release of a pilot *Spencer Gulf Marine Plan* for public consultation.

The Framework provides for the development of six Marine Plans and associated Performance Assessment Systems (PAS) covering State waters in South Australia's eight marine bioregions. Based on the principles of ecologically sustainable development, ecosystem-based management and adaptive management, these Marine Plans establish an overarching strategic planning framework to guide State and local government planners and natural resource managers in the development and use of the marine environment.



Fundamental to these Marine Plans is an ecologically-based zoning model which defines areas according to marine, coastal and estuarine habitats and species identified as suitable indicators of environmental capability. Each zone is supported by goals, objectives and strategies for use and development in order to protect the integrity of these ecosystems.

An accompanying PAS also will be developed to monitor and evaluate the effectiveness of each Marine Plan. In particular, the PAS will highlight appropriate monitoring protocols, as well as existing research and management programs that currently provide valuable information on the marine environment. Importantly, the PAS also indicates responsibilities for the implementation of, and reporting on, strategies and actions under each Marine Plan.

Marine Plans will not in isolation address the challenge for ecologically sustainable use of our marine environment. Rather they complement and seek to influence outcomes related to the conservation, protection and management of the marine, coastal and estuarine environment in the State's *Planning Strategy for South Australia* (Planning SA 2003) and Natural Resources Management Plans.

Whilst management and control of activities in the marine and coastal environment such as fishing, boating, pollution and aquaculture to name but a few will still continue under existing relevant legislation, Marine Plans will guide those agencies responsible for administering this legislation, and may influence policy, for example, in Development Plans.

The community also plays an integral role in this process, as the protection of the marine environment will only be achieved through well-informed and aware citizens, industries and non-government organisations acting as custodians and ambassadors for the marine environment. Therefore community consultation has been identified as a critical component of each Marine Plan's development.

Regional Consultative Committees will be appointed to assist in the development of each regional Marine Plan. Membership will be based upon a spread of skills and knowledge to cover the geographic distribution and the economic, social and ecological values of the area.

This Framework provides the structure, tools and responsibilities to map the way forward for South Australia's marine environment into an ecologically sustainable future.



Policy Commitments

International

Our Common Future (Brundtland 1987), the Report of the World Commission on Environment and Development (WCED) 1987, defined sustainable development as:

Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

National

Ecologically Sustainable Development

The Commonwealth Government adopted the WCED international view of sustainable development as *Ecologically Sustainable Development* (ESD). In 1992, Heads of Government endorsed the *National Strategy for Ecologically Sustainable Development* (NSESD) (Commonwealth of Australia 1992). A challenge that now faces all Australian governments is how to manage 'use' of marine, coastal and estuarine resources in order to achieve ESD.

Commonwealth Initiatives for Integration in the Marine Environment

Australia's Oceans Policy (Environment Australia 1998), is central to the ecologically sustainable use of the marine environment. Regional marine planning is the key delivery mechanism for the Commonwealth Government to implement the *Australia's Oceans Policy*. Regional Marine Plans enable the integration of management to ensure ecologically sustainable use, and the conservation of ecologically important areas, whilst maintaining, economic, social and cultural values.

Commonwealth Regional Marine Plans primarily focus on Commonwealth waters but by agreement can extend to State waters. The *South-east Regional Marine Plan* (National Oceans Office 2004) encompasses Commonwealth waters from southern New South Wales, including Victoria and Tasmania, to Kangaroo Island in South Australia.

The *South-west Regional Marine Plan*, which is in the initial stages of development, will encompass Commonwealth waters from Kangaroo Island across the Great Australian Bight and up the south-west coast of Western Australia. This plan will complete the marine planning for all Commonwealth waters adjacent to South Australia.

Other national initiatives include *Integrated Coastal Zone Management* (ICZM) and *Integrated Oceans Management* (IOM). The South Australian Government is a partner in developing these programs and the framework for cooperation.

Interim Marine and Coastal Regionalisation for Australia (IMCRA)

In 1998, the Australian and New Zealand Environment and Conservation Council (ANZECC) released the *Interim Marine and Coastal Regionalisation for Australia* (IMCRA) (IMCRA Technical Group 1998). IMCRA describes an ecosystem-based series of classifications, which divides the marine environment of Australia into different biogeographical regions, or bioregions, eight of which cover South Australian waters.



South Australian Commitments

South Australia's Strategic Plan

The Government of South Australia is committed to the conservation of the marine environment and the ecologically sustainable use of our natural resources, both now and in the future. This commitment is outlined in the objectives of *South Australia's Strategic Plan* (Government of SA 2004c) for achieving sustainability in the marine environment. The *Marine Planning Framework* will provide the structure to fulfil the commitment to manage, in an ecologically sustainable way, natural resources across the broader seascape in areas that are not part of the protected area system.

Living Coast Strategy

The *Living Coast Strategy for South Australia* (Government of SA 2004b) outlines the need to identify areas of ecological significance through the development of Marine Plans based on marine bioregions, and to test the concept of marine planning through the release of a pilot *Spencer Gulf Marine Plan* for public consultation.

Other Government Initiatives

The *Marine Planning Framework* is just one of a number of tools used by the Government of South Australia to protect and conserve the State's marine environment.

The Framework must work closely with the *Natural Resources Management Act 2004* and Natural Resources Management Plans developed under this legislation. The *Natural Resources Management Act 2004* seeks to promote the sustainable and integrated management of the State's natural resources and also provides for their protection.

Marine Plans will provide guidance to Natural Resources Management Boards in the consideration of land-based impacts on the marine environment as well as the need to manage and conserve aquatic resources.

The *Living Coast Strategy* has identified the need for the establishment of a South Australian representative system of marine protected areas (also referred to as Marine Parks). This system, outlined in the *Blueprint for the South Australian Representative System of Marine Protected Areas 2004* (Government of SA 2004a), will develop a series of Marine Parks to protect and conserve representative samples of the diversity and complexity of South Australia's marine and estuarine environments.

In essence, Marine Parks will provide protection throughout the State's bioregions, similar to the role national parks play on the land. The Marine Planning Framework and the development of Marine Parks are complementary initiatives but are not synonymous. The Framework provides for environmental capability planning, whereas Marine Parks are designed primarily for biodiversity conservation purposes.

Marine Plans are prepared as an important input into the preparation of Development Plans for coastal waters in order to promote clear statutory policy direction for development under the *Development Act 1993*. As such, Marine Plans will broaden the guidance and information available to planners and proponents of development to include and address issues potentially affecting the State's waters.



The Framework

Marine Planning is a new concept for managing ecologically sustainable development and use in South Australian marine waters.

The Framework provides the structure and direction for the planning and management of activities in South Australia's marine environment. This section outlines the rationale, objectives and principles for marine planning and provides guidance for the delivery of this wide-ranging policy initiative.

The Framework provides for the development of six Marine Plans, based on ecological zoning arrangements, and associated Performance Assessment Systems covering State waters in South Australia's eight marine bioregions. These Marine Plans provide an important strategic planning input to State and local government planners and natural resource managers in the development of subordinate legislation, strategies, plans, policies and guidelines on issues related to the sustainable development and use of marine, coastal and estuarine resources. Marine Plans are not intended to duplicate existing policies, mechanisms or structures under other legislation, such as the *Development Act 1993* or the *Natural Resources Management Act 2004*.

The Framework is underpinned by three key principles: Ecologically Sustainable Development (ESD), Ecosystem-Based Management and Adaptive Management (see page 10).

Objectives of the Framework

1. Provide for integrated and ecologically sustainable development and use of South Australia's marine environment.
2. Further the conservation and protection of the ecological processes, biodiversity and intrinsic values of the marine environment.
3. Promote effective partnerships between community, industry and government.
4. Facilitate adaptive management, addressing the dynamic nature of the marine environment and uses of it.
5. Identify and facilitate the reduction of threatening processes in the marine environment.
6. Facilitate informed decision-making based on continually improving knowledge and understanding of the ecological processes of the marine environment.

Benefits of the Framework

The key benefits arising from the Framework include:

- increased certainty for management of development and resource use;
- long term protection of the marine environment;
- a broad range of activities can occur in an ecologically sustainable manner;
- strategic integrated planning in the marine environment across Government agencies; and
- implementation of the Performance Assessment System provides an integrated monitoring and assessment system for the marine environment linked to State of the Environment reporting.

Marine Plans

A Marine Plan is a tool that guides the management of development and use of the marine environment, within the capability of the ecosystem.

Marine Plan boundaries are based on ecological bioregions (see Table 1), overlaid with a system of zones integrating available ecosystem information. Development and use in the zones are guided by goals, objectives and strategies, which are outlined in each Marine Plan, and subsequently given statutory recognition for example, through amendments to Development Plans.

Marine Bioregions and Marine Plan Boundaries

In South Australia, there are eight defined marine bioregions, or regions with distinctive patterns of biodiversity, that are distributed across State waters.

The IMCRA mapping of bioregions identified the physical and biogeographical attributes of coastal and marine regions around the State at a scale of 1,000 km² (see Figure 1) and these have been identified as offering the most appropriate planning areas for the development of Marine Plans.



Table 1: Description of South Australia's Bioregions

Bioregion	Location	Size to continental shelf
Eucla	Cape Adieu to Western Australian border (extends westwards to Israelite Bay)	111 115 km ²
Murat	Cape Adieu to Point Brown	32 490 km ²
Eyre	Point Brown to Cape Torrens, to West Cape, to Port Neill and Cape Willoughby	70 185 km ²
Spencer Gulf	West Cape to Port Neill, Point Riley to Shoalwater Point	11 540 km ²
Northern Spencer Gulf	Point Riley to Port Augusta to Shoalwater Point	5 210 km ²
Gulf St Vincent	Cape Torrens to West Cape, Port Elliot to Cape Willoughby	13 165 km ²
Coorong	Port Elliot to Cape Jaffa	29 830 km ²
Otway	Cape Jaffa to Victorian border (extends eastwards to slightly north of Apollo Bay and including King Island environs)	37 330 km ²

Figure 1: South Australia's Marine Bioregions

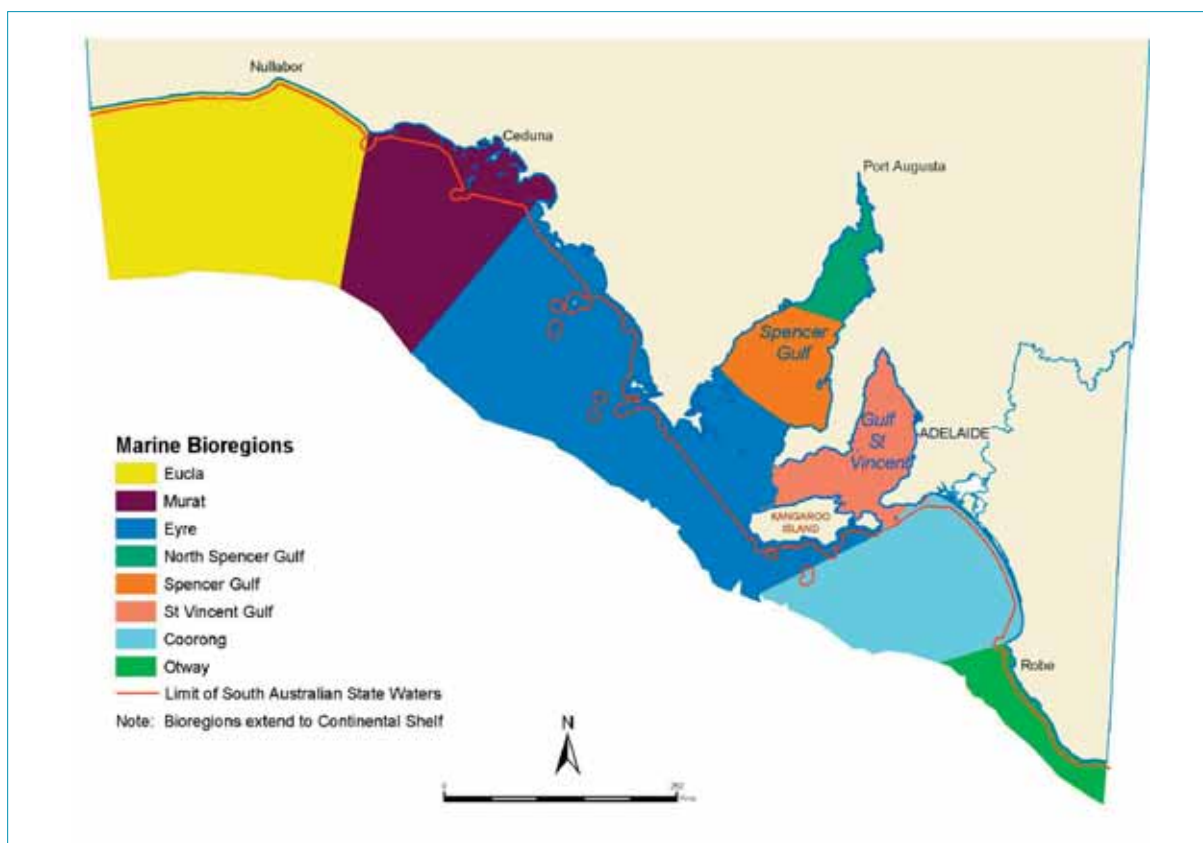
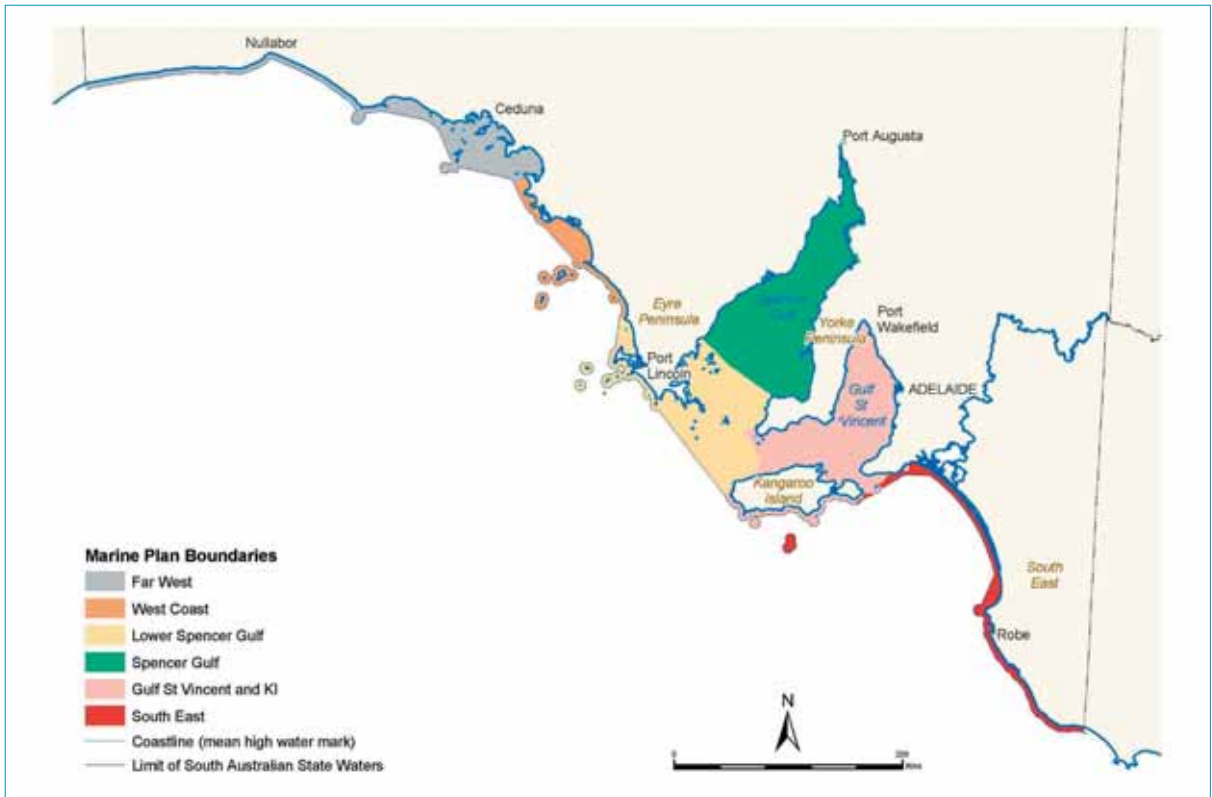




Figure 2: Marine Planning Areas



The Framework, which applies across South Australia's eight bioregions, identifies six regional marine planning areas (Figure 2) as follows:

1. Far West
2. West Coast
3. Lower Spencer Gulf
4. Spencer Gulf
5. Gulf St Vincent/Kangaroo Island
6. South East

Ecologically Rated Zoning

Zones, termed Ecologically Rated (ER), seek to:

- establish boundaries defined on ecological criteria rather than administrative or jurisdictional boundaries;
- recognise the complex interactions between ecological levels including interactions across varying scales such as habitats and regions; and
- focus management on the maintenance of ecosystem integrity.

The zoning system consists of four ER zones, distinguished by the highest diversity of marine, coastal and estuarine habitats and species that occur within a marine planning area. The ER zones are graded as follows:

- **ER1 Zone**
Containing the highest diversity of marine, coastal and estuarine habitats and species.
- **ER2 Zone**
Containing a high diversity of marine, coastal and estuarine habitats and species.
- **ER3 Zone**
Containing a moderate diversity of marine, coastal and estuarine habitats and species.
- **ER4 Zone**
Consisting of areas for which the available scientific data is inadequate to identify their importance to the maintenance of biodiversity, ecological health and productivity of the ecosystem.



Principles Underpinning the Framework

Ecologically Sustainable Development

The *National Strategy for Ecologically Sustainable Development* 1992 defines ESD as:

Using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased.

The guiding principles for the National Strategy for ESD are:

- decision-making processes should effectively integrate both long and short-term economic, environmental, social and equity considerations;
- the global dimension of environmental impacts of actions and policies should be recognised and considered;
- the need to develop a strong, growing and diversified economy, which can enhance the capacity for environmental protection, should be recognised;
- the need to maintain and enhance international competitiveness in an environmentally sound manner should be recognised;
- cost effective and flexible policy instruments should be adopted, such as improved valuation, pricing and incentive mechanisms; and
- decisions and actions should provide for broad community involvement on issues which affect them.

In addition to the above, the National Strategy for ESD also incorporates the Precautionary Principle:

Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

Application of the Precautionary Principle, to both public and private decisions should be guided by:

- careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and
- an assessment of the risk-weighted consequences of various options.

Ecosystem-Based Management

Ecosystem-based Management (EBM) means:

Management of ecosystem values and uses recognising the interactions with the environment

and responding to signals from the ecosystem to control anthropogenic activities and uses.

Australia's Oceans Policy states that:

Ecosystem-based Management is a management approach that recognises that maintaining the structure and function of ecosystems is vital and that human uses and ecosystem health are interdependent.

The key goals of EBM as outlined in Australia's Oceans Policy are to:

- maintain, throughout the ocean realm, viable populations of all native marine species in functioning biological communities;
- accommodate human uses of the oceans and the economic, social and cultural aspirations of people within these constraints;
- include, within a spectrum of protected areas, representatives of all marine habitat types across their natural range of variation;
- maintain ecological processes in all ocean areas, including water and nutrient flows, community and trophic structures, ecosystem linkages and their annual and longer term natural cycles, and the movement of broad-ranging and migratory species; and
- ensure recognition that ecosystems are dynamic and that management must be at spatial and temporal scales that maintains the evolutionary potential of marine biological diversity.

In order to be effective, management at an ecosystem level must be integrated and strategic, and recognise ecosystem structures and functions as well as their responses to multiple resource uses.

Adaptive Management

Adaptive management can be described as:

A systematic process for continually improving management policies and practices by learning from the outcomes of operational programs.

The concept of adaptive management is fundamental to the Framework to ensure that it is regularly reviewed to embrace new information as scientific and other research reveals more about the little known marine environment. The Performance Assessment System will provide the mechanism to deliver this outcome.



Developing the Framework

The Marine Planning Framework has been developed on a collaborative basis between a number of South Australian Government agencies, local government, industry and community representatives to ensure relevant views were taken into consideration.

The application of the Framework was 'tested' through the concurrent development of the *Spencer Gulf Marine Plan*. This enabled the Framework to both guide the process and to consider issues and concerns raised through the consultation process on the *Spencer Gulf Marine Plan*.

Regional Consultative Committees

To assist in the development of each Marine Plan, a Regional Consultative Committee will be established. Members of these committees will be sought from a diverse range of community interests with broad expertise in issues relevant to the marine environment including, but not limited to:

- marine conservation;
- marine ecology or biology;
- natural resources management or environmental protection;
- local government and/or urban and regional planning;
- Indigenous heritage and/or culture or native title;
- aquaculture production;
- commercial fisheries;
- industry; and
- recreational fishing.

Regional Consultative Committees are expected to contribute technical expertise, advice and local knowledge to the development of a Marine Plan. Interaction with members and the broader community for the purpose of exchanging ideas will be a key function of the group throughout the marine planning process.

A Focus document will be produced for each future Marine Plan to guide the Regional Consultative Committee assisting with its development. For example, the document *Focus - A Regional Perspective of Spencer Gulf* (Department for Environment and Heritage 2003) outlining the range of values in the Spencer Gulf planning area, helped guide the Spencer Gulf Regional Consultative Committee in making sound decisions during the marine planning process. These focus documents outline the biological, social, cultural and economic values of the region.

The Marine Planning Model

Bioregional marine planning is a relatively new concept worldwide. Consequently, there are no existing models of marine planning that could be reasonably applied to the South Australian marine environment.

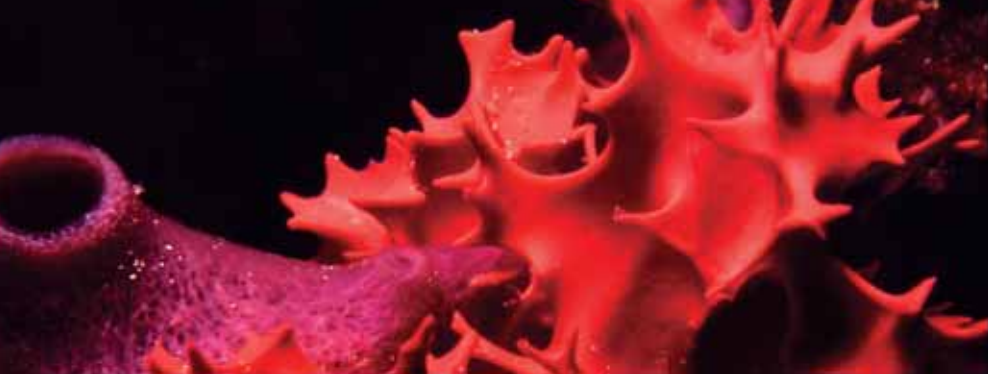
Assumptions behind the marine planning model are based on managing activities within the capability of the ecosystem.

The key assumptions behind the model are that the data available reasonably reflect:

- the ecological parameters fundamental to the function of the ecosystem and its biological diversity; and
- the spatial distribution of the ecological parameters of the ecosystem.

The aims of the model are to:

- zone the planning area based on ecological criteria; and
- identify and define the spatial boundaries of the zones.



Methodology

Steps in the development of a Marine Plan are:

1. Collect, create and collate spatial data for the planning area. Data are collected from a variety of sources including: published literature; information from the community and Internet; private businesses; and Government agencies, including the:
 - South Australian Research and Development Institute (SARDI);
 - Department of Primary Industries and Resources, South Australia (PIRSA);
 - Department of Aboriginal Affairs and Reconciliation (DAARE);
 - Australian Maritime Safety Authority (AMSA); and
 - Department of the Environment and Heritage (Commonwealth).
2. Sort spatial data into appropriate resource use categories of social, economic, environmental and cultural and heritage. The environmental data is used for the development of the marine planning model with the social, economic and cultural and heritage data used to support it.

3. Create Geographical Information System (GIS) layers from the environmental data collected, with each layer created referred to as an ecological variable (for example: seagrass is one of the 18 ecological variables used for the Spencer Gulf planning area).
4. Create planning unit spatial layers (Figures 3a and 3b) for the planning area to allow for the spatial summary of data into 5x5 km units.
5. Link the planning unit spatial layers to the ecological variables.
6. Group into ecologically rated zones using GIS software.
7. Undertake impact analysis using spatial data and/or surrogates for example, to determine areas of high concentrations of use.
8. Graphically display analysis results.

A detailed methodology is available upon request.

Figure 3a: Entire Planning Area

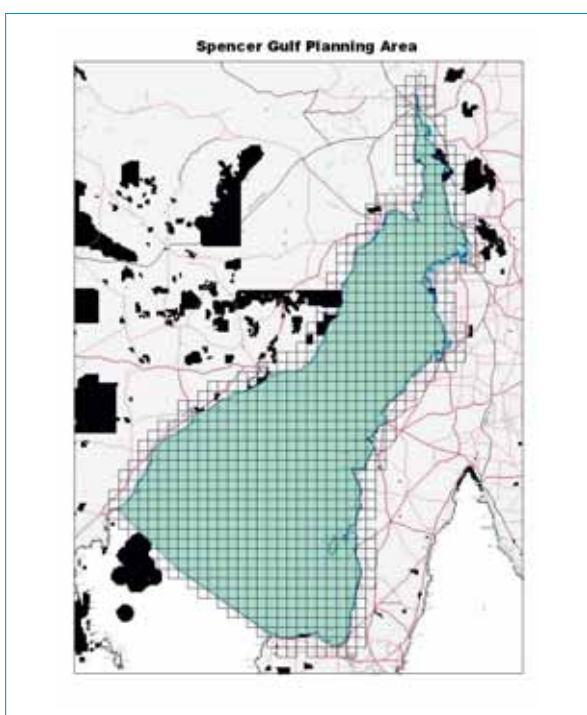
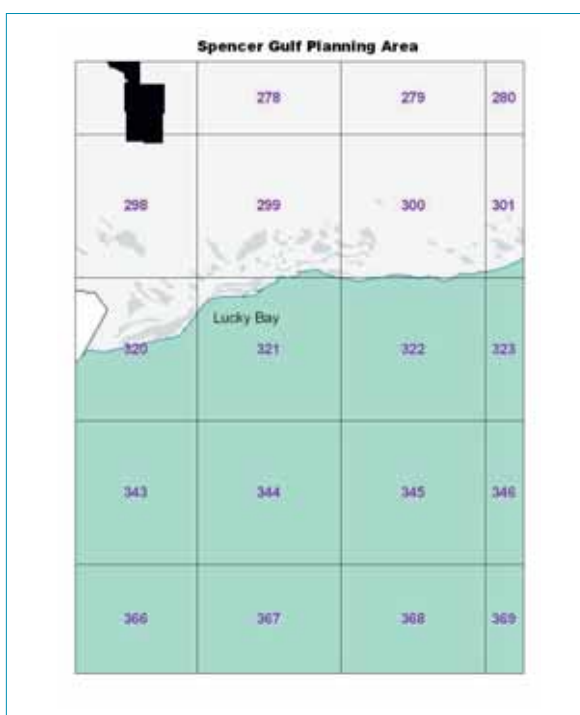


Figure 3b: Individual Planning Units





Data Analysis

Planning units are examined according to the ecological variables representative of the relevant planning area marine environment (see Appendix 2 for the ecological variables used in the *Spencer Gulf Marine Plan*). Variables will include, but are not limited to:

- major habitats for particular species;
- internationally recognised Wetlands of Importance;
- endangered marine species;
- migratory waders and shorebirds;
- breeding, spawning and nursery grounds; and
- key biodiversity areas.

Grouping of the data into the four zones is performed using GIS. The GIS system provides several approaches to grouping data, including the use of a natural breaks method, frequency and cumulative distribution, quartile and standard deviation methods. The natural breaks method was selected for the marine planning model. This is a well-accepted and robust scheme of grouping variables. It is important to note that all ecological variables are considered to be of equal value and zones are created dependent on the number of variables within each planning unit.

To identify potentially impacted areas within the planning area, analysis is undertaken in GIS using known variables. Each variable represents an activity that has a discernible impact on any marine habitat, flora or fauna. It is important to note that each variable is assigned a value of one. All activities are viewed as having the same degree of impact, even though this may not always be the case. Data are presented to reflect areas of the highest concentration of use and not the degree of impact that each variable may have independently or cumulatively.

The variables used in each particular Marine Plan are specific to the region to which it applies, and may change in future revisions. The basis for the model, however, will remain the same. Data will be analysed and reviewed every two and a half years, to consider new information, refine zoning and ensure that changes can be detected early enough for managers to adapt to changing circumstances. Each Marine Plan will be reviewed every five years.



Performance Assessment System

Purpose

The Performance Assessment System (PAS) for the Framework will evaluate the success of each Marine Plan by assessing and reporting on the maintenance of ecosystem conditions. In particular, the PAS will review the effectiveness of Marine Plans in providing guidance for the regulatory functions of management agencies in accordance with marine planning goals and objectives. The PAS is, therefore, the primary mechanism for assessing and reporting on cumulative impacts in South Australia's marine environment.

The PAS also has been developed in consultation with State Government agencies and non government organisations involved in management and monitoring of the marine environment. It establishes an agreed approach to the monitoring of selected indicators to detect change, both natural and human induced, in the condition of South Australia's marine ecosystems, biodiversity, habitats and species. When applied to the ER zone objectives, the results of monitoring will reveal the adequacy of management measures in conserving and facilitating responsible use of marine, estuarine and coastal resources.

In accordance with the *Living Coast Strategy*, the PAS will provide an integrating mechanism enabling all agencies to contribute to a statewide, collaborative approach to data collection, analysis and reporting on marine ecosystem conditions. This is a necessary prerequisite for constructing a best practice, adaptive approach to management and reporting.

Description

The PAS was developed from the Marine Plan goals and objectives set for each ER zone. These are expressed as outcomes in the PAS for each ecological variable (used to develop the Marine Plan; for example, seagrass), which are linked to criteria, performance indicators, benchmarks and monitoring protocols (see Figure 4, page 16).

For each of the ER zones, the criteria (see Table 2, page 15 for definitions) are:

- ER1 zone - not to exceed negligible impact;
- ER2 zone - not to exceed minor impact;
- ER3 zone - not to exceed moderate impact;
- ER4 zone - not to exceed minor impact (treated as an ER2 zone until research determines ultimate zoning).

Monitoring of the performance indicators in relation to the benchmarks is designed to be able to distinguish between natural variability (such as seasonal changes) and changes caused by human activities. The emphasis in each Marine Plan is on indicators that can be developed and applied in the current five year cycle. Therefore, existing monitoring programs are incorporated into and form the basis of the PAS, with clear guidance provided for the development of more comprehensive monitoring as agency and/or regional Natural Resources Management (NRM) resources permit.

Wide-ranging activities and the use of resources will generate a set of pressures and potential impacts on marine ecosystems. In order to establish the context and possible causal agents for any changes that may be observed over time, the level of specific pressures (potentially impacting activities or pollution sources) that may be related to changes in ecological conditions are assessed and reported within the context of the Marine Plan performance. Assessment of the pressure indicators in each Marine Plan is not intended to replace the role of other agencies in regulating and managing sustainable uses, but will provide a consistent and broader context for policy decisions and responses.



Table 2: Definition of Habitat or Population Impact Levels

Criterion	Ecological Impact (Habitat or Population)
Negligible	Not to exceed negligible impacts to habitats or populations. Unlikely to be measurable against background variability. Habitat and Ecosystem: Interactions may be occurring but it is unlikely that there would be any change outside of natural variation. <i>Recovery measured in days.</i>
Minor	Not to exceed minor impacts to habitats or populations, measurable against background variability. <i>Recovery measured in months.</i>
Moderate	Not to exceed moderate impacts to habitat or populations. Measurable changes to ecosystem components but not a major change in function (that is, no loss of components). <i>Recovery measured in years.</i>

Information Collection and Management

The PAS provides an opportunity to review the status of marine monitoring in South Australia and develop an integrated, systematic, whole of Government approach to data collection, analysis and public reporting. In developing the PAS, opportunities were identified to facilitate cooperative, cost effective, research and monitoring projects that would satisfy the reporting requirements of a number of agencies, including regional NRM Boards. The Department for Environment and Heritage (DEH) will work closely with other agencies to develop these opportunities.

Collaborative, statewide monitoring and Marine Plan reporting on the condition of the marine environment brings with it the requirement to develop an integrated system for agency based data collection, storage, analysis and reporting. The *Living Coast Strategy* recognises this need and DEH will work closely with all relevant agencies and groups to ensure the development of data collection and analysis protocols for Marine Plan reporting and an integrated data storage and management system.

The PAS and the monitoring data for Marine Plans will be reviewed on an ongoing basis and summarised in a technical report. These reports will form the basis for the five yearly review of each Marine Plan in South Australia and will contribute to the *State of the Environment Report*.

Decision System

The PAS operationalises the objectives underpinning marine planning ER zones by first prescribing performance indicators and benchmarks for guiding agency decision-making in conservation, development and use of the marine environment, and second, by establishing an assessment system that reports on the effectiveness of a Marine Plan (refer Figure 4, page 16). These benchmarks apply to all management agencies, including State and local government, and regional NRM Boards, for regulating the activities of user groups within government, industry and the community.

Marine Plans do not prohibit any type of development or use from a particular ER zone. Rather, decision-making processes related to development assessment and/or regulation of use are guided by the benchmarks for each ER zone.



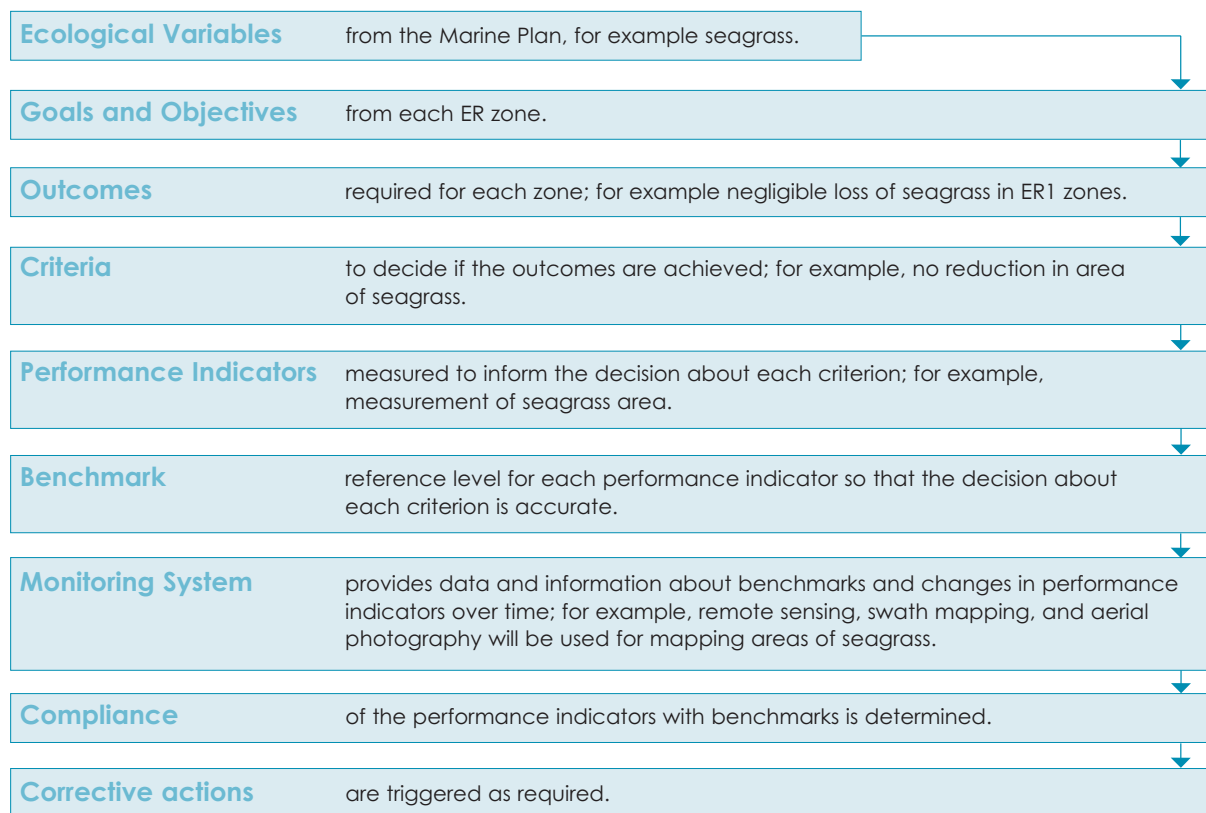
In an ER1 zone, for example, acceptable development or use is that which will not exceed a negligible level of impact to the biodiversity, habitats and ecological processes of the zone. For some forms of development, this may be achieved by applying appropriate conditions to a development approval (such as monitoring requirements or amendments to a proposal). If this is not practical or feasible, locating the development within an ER2 or ER3 zone may be more appropriate.

Marine Plans recognise that in some areas, particularly those adjacent to major industrial centres, impacts to the marine environment already exceed the benchmarks required to meet the ER zone objectives. They also recognise that some areas are governed by Indenture Acts developed to support the activities of specific industries.

In each of these cases, the Marine Plan objectives may be used to minimise current impacts and plan for future management decisions in a manner consistent with the relevant ER zone objectives. Over time, these actions will assist to facilitate the restoration, where possible, of acceptable ecosystem conditions.

Implementation of the Framework will occur through established institutional arrangements and responsibilities, and via effective reporting from the PAS. The setting of criteria, benchmarks and performance indicators will be developed to detect change both natural and human induced, in the condition of South Australia's marine ecosystems. Collaborative arrangements between government agencies, local governments, key stakeholders and communities will facilitate the preparation of reports.

Figure 4: Flow of Decisions in the Marine Planning Framework Performance Assessment System





Implementation

This Framework will be implemented as government policy through a coordinated and strategic approach in collaboration with South Australian Government agencies, local governments, key stakeholders and communities.

The overarching goals, objectives and strategies from the marine planning zones will, as appropriate, be incorporated into the *Planning Strategy for South Australia* under the *Development Act 1993*. Where necessary, amendment of Development Plans under the *Development Act 1993* will occur through the Plan Amendment Report (PAR) process taking into account the development related policies from the Framework.

In particular, the Better Development Plans project currently being undertaken by Planning SA will strengthen the linkages between the *Planning Strategy for South Australia*, Marine Plans and Development Plans. This will assist in ensuring that the strategies and objectives of Marine Plans are incorporated into the relevant Development Plans.

Control of activities not defined as 'development' under the *Development Act 1993* (for example, fishing, boating, discharges etc) will still occur under other resource management legislation. Consistency will be achieved by ensuring that resource management legislation (such as the *Fisheries Act 1982* and the *Petroleum Act 2000*) is amended where necessary, to address the implementation of relevant parts of the Marine Plans.

The Government is committed to providing improved management and protection for the marine environment and is preparing a public consultation package to review and update coastal and marine legislation and administrative structures in South Australia with a view to establishing a single, coastal and marine board. The review of current legislation would aim to reinforce integrated, multiple use planning, management and sustainable use of marine environment. It is anticipated that there will be a need for legislation to provide the statutory basis for Marine Plans under the Framework.

This revised legislation would be required to interact with, and inform, strategies, plans and policies under the *Development Act 1993*, the *Natural Resources Management Act 2004*, and other coast and marine resource use legislation.

The *Natural Resources Management Act 2004* establishes the NRM Council and regional NRM Boards. Importantly, the scope of the *Natural Resources Management Act 2004* extends to all of the State, including to the limit of State waters. NRM Boards will therefore have a key role in assessing and addressing land-based impacts on the marine environment.

Accordingly, Marine Plans will provide a sound basis for NRM Boards to meet their responsibilities in developing integrated natural resource management plans and strategies. Marine Plans will also provide clear guidance for the development of more comprehensive monitoring and assessment as regional NRM resources permit. It is envisaged that the goals, objectives and strategies from Marine Plans would be reflected in the *State NRM Plan 2006* (Natural Resources Management Council 2006) in a similar fashion to the *Planning Strategy for South Australia*.

DEH will lead a co-ordinated, whole of Government approach to the implementation of each Marine Plan. Existing responsibilities and jurisdictions of management agencies will remain, but the resource management policies, strategies and plans will, as appropriate, be progressively amended to manage development and use consistent with the objectives applied to relevant zones.

Close collaboration will be sought with local government, key stakeholders and communities. Authorities managing land-based activities that impact on the marine environment will also be involved in the implementation of each Marine Plan action (see Table 3, page 18, for the list of actions and responsible agencies).



Coordination and Partnerships

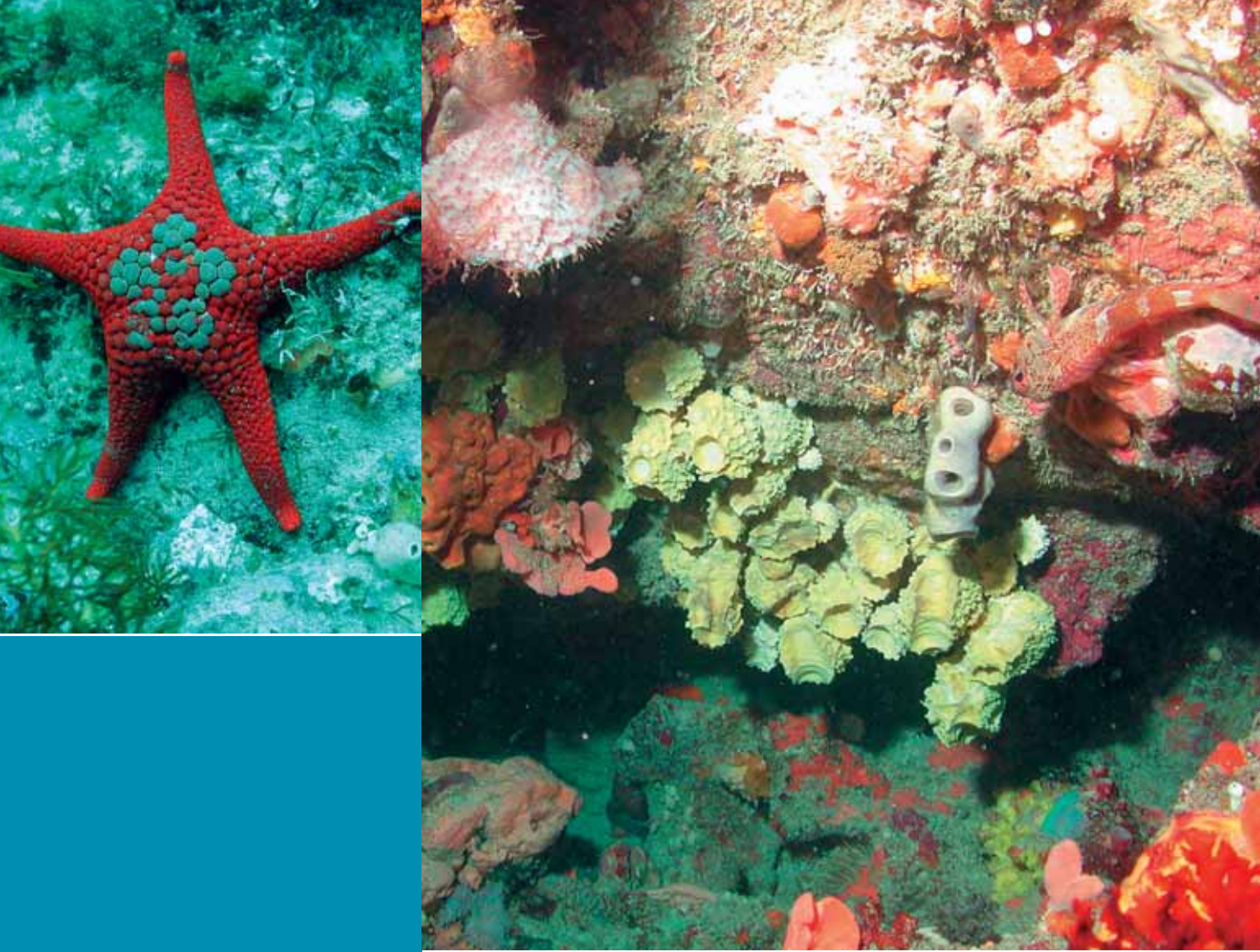
To achieve effective integration and ensure that Marine Plans guide ecosystem based planning and management, the implementation of each Marine Plan will be the joint responsibility of all sectors, including Government, industry, the community, State and regional NRM bodies.

Amendments to relevant resource management legislation will ensure that strategies, plans, policies, actions and decisions taken under these Acts are consistent with this Framework, however, it is the on-ground implementation that will require the many agencies to adopt a collaborative, coordinated approach.

Performance assessment and adaptive management principles are integral to the smooth delivery of such wide-reaching policy change. It is anticipated that this process will increase resource sharing and communication between and within government agencies, local government, key stakeholders and communities. It is also anticipated that this process will increase awareness of the concepts of integrated ecosystem-based management, aid in fulfilling ecologically sustainable development requirements and widen understanding of the new concepts of planning for the marine environment.

Table 3: Implementation Actions for Marine Plans

No.	Implementation Actions for Marine Plans	Lead Agency
1.	Consult with agencies on PAS monitoring responsibilities.	DEH
2.	Implementation of PAS for each Marine Plan.	All agencies
3.	Consult with regional NRM Boards to assist coordination of NRM responsibilities and ensure linkages with NRM Plans.	DWLBC and DEH
4.	Develop a Ministerial PAR for each Marine Plan to ensure linkages with the <i>Planning Strategy for South Australia</i> .	Planning SA with input from DEH
5.	Ensure environmental management of existing aquaculture developments in the marine environment has regard to the marine planning goals and objectives.	PIRSA
6.	Ensure protection of fish breeding grounds by applying marine planning goals and objectives to resource use in the marine environment.	PIRSA
7.	Consult with Coast Protection Board on coastal issues in each Marine Plan.	DEH
8.	Consult with local government and Regional Development Boards regarding their responsibilities for each Marine Plan.	DEH
9.	Consult with industries regarding their responsibilities for each Marine Plan.	DEH
10.	Ensure linkages between Marine Plans and the <i>State of the Environment</i> reporting system.	DEH and EPA
11.	Review available zoning information for each Marine Plan every two and a half years and rezone according to any new data.	DEH
12.	Review each Marine Plan every five years.	DEH
13.	Review and update PAS every two and a half years.	DEH
14.	Provide any new data for rezoning.	All agencies
15.	Rehabilitate degraded habitat areas as per available funding.	NRM Boards and all agencies
16.	Develop an education brochure and program for recreational fishers, in consultation with South Australian Recreational Fishing Advisory Council, regarding their responsibilities in the marine environment.	DEH

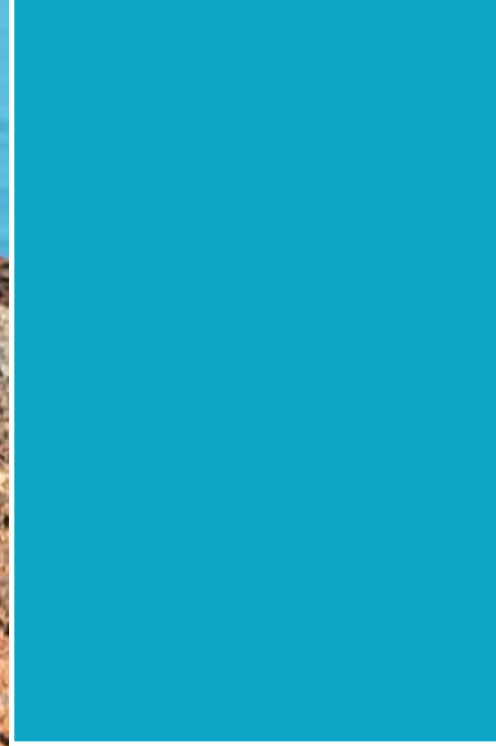


Reviewing, Monitoring and Reporting

The success of this Framework is dependent upon improving the current condition of the marine environment with a view to the future rehabilitation, where practicable, of degraded areas. The successful implementation of the Framework will be measured through an ongoing review process coupled with monitoring via the PAS to provide a reporting mechanism of ecosystem condition. This will also address the reporting requirement of the South Australian *State of the Environment Report*.

All users of the marine, coastal and estuarine environment must share accountability for the impacts arising from its use. As our knowledge increases, the effectiveness of goals and objectives can be assessed and this information will help in determining what future actions are needed. Hence, our approach to marine planning needs to be continuously reviewed to ensure that decisions are based on the most current available information.

Data will be analysed and reviewed every two and a half years, to consider new information, refine zoning and ensure that changes can be detected early enough for managers to adapt to changing circumstances. Each Marine Plan will be reviewed every five years.



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Glossary

Adaptive Management - A systematic process for continually improving management policies and practices by learning from the outcomes of operational programs.

Biodiversity - The variability among living organisms from all sources, including, *inter alia*, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part. This includes diversity within species, between species and of ecosystems.

Bioregion - An area defined by a combination of biological, social and geographic data, rather than by geopolitical considerations. Generally, a system of related, interconnected ecosystems.

Biounit - Biophysical Units (hundreds of km², microscale), which identify functional ecosystem based management units (for example: rocky shores, dune barrier systems, archipelagos, shoals or reef systems, coastal peninsula, etc), defined primarily on the basis of coastal physiography, topography and major marine physical habitat or seascape features and habitat distributions.

Conserve - To keep in existence areas of the natural environment from potential degradation arising from human use.

Conservation - Action(s) resulting in the preservation of the natural environment.

Critical - Refers to biodiversity, habitats and ecological processes without which the functioning capacity of the ecosystem would likely collapse.

Contribute - Refers to biodiversity, habitats and ecological processes without which the functioning capacity of the ecosystem would be impaired.

Cumulative - Created by successive additions (for example; of impacts).

Degradation - Action(s) causing a state of reduced environmental quality.

Development - Definition as per *Development Act 1993*.

Ecological consequences - Results of impacts (either positive or negative) on the biodiversity, habitats and ecological processes arising from development and use of the marine, coastal and estuarine environment.

Ecological processes - Dynamic biological and physical processes; for example; natural cycles, currents, sediment movements, nutrient cycling, community and trophic structures and migratory species movements.

Ecologically sustainable development - Using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased.

Ecologically sustainable use - Use of living things or areas within their capacity to sustain natural processes while maintaining the life support systems of nature and ensuring that the benefit to present generations of the use does not diminish the potential to meet the needs and aspirations of future generations.



Ecosystem - A dynamic complex of plant, animal and microorganism communities and their non-living environment interacting as a functional unit.

Ecosystem-based management - Management of ecosystem values and uses recognising the interactions with the environment and responding to signals from the ecosystem to control anthropogenic activities and uses.

Ecosystem integrity - The maintenance of the structure and function of a particular ecosystem.

Endemic - A species that is unique or restricted to a specific region or site.

Environmental capability - The ability of an ecosystem to sustain itself, in a healthy and productive manner, despite human interference and pressure. A healthy and productive marine environment is measurable by using natural variability measures as the reference point.

Essential - Refers to biodiversity, habitats and ecological processes without which the functioning capacity of the ecosystem would be severely impaired.

Estuaries - A partially enclosed coastal body of water, including its ecosystem processes and associated biodiversity, which is either permanently, periodically, intermittently or occasionally open to the ocean within which there is a measurable variation in salinity due to the mixture of seawater with water derived from on or under the land.

GIS - Geographical Information Systems. Computer-based mapping and modelling systems based on software designed to handle complex spatial information. Essentially a set of tools for collecting, storing, retrieving, transforming and displaying spatial data.

Goal - The overarching long-term outcome desired of a plan, zone or strategy.

Habitat - A characteristic biological assemblage (for example: seagrass meadow) and/or physical structure (for example: intertidal rocky platform).



Impact - A change in the composition, abundance or distribution of a population or assemblage arising from either human disturbance or natural events. Impacts may produce effects that are either positive or negative. Examples of impacts include the possible negative effects of waste discharge on seagrass meadows and the possible positive effects of establishing a marine protected area.

Key biodiversity area - An area supporting significant levels of biological diversity representative of the region identified by the MPA process.

Marine mammal - A species of mammal whose natural habitat is the marine environment.

Nursery area - Habitats providing shelter and food to marine fauna during the vulnerable, juvenile stages of life (for example: mangroves and associated seagrass communities are nurseries for many species of fish).

Objective - Components of a goal that, if met, would ensure that the goal is achieved; clear statements of what management is to achieve.

Precautionary principle - Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

Protect - To shield from harm.

Reef - Intertidal to partly submerged rocks occurring off the coast. In South Australia often formed of calcarenite and may parallel the coast along submerged barriers.

Saltmarsh - Coastal wetland plant community dominated by herbs and low shrubs and located in the upper intertidal and supratidal zones of the coast (often on the landward side of mangroves). Saltmarsh areas are usually waterlogged and frequently flooded with saltwater by the tide.

Seabird - Aerial birds (such as shearwaters) and swimming birds (such as penguins) usually seen at sea.



Shorebirds - Also known as waders or wading birds, shorebirds include both resident and migratory species often seen feeding along the shorelines of beaches and in the tidal pools and mudflats of estuarine areas.

Soft-sediment communities - Plant and/or animal communities that inhabit the sand bed and/or muddy sediments in aquatic environments.

Spawning area - Area or habitat critical to the spawning stage of a species' reproductive cycle. Spawning areas are often geographically distinct from nursery areas. For example, King George whiting spawn in deeper waters but their larvae drift into sheltered coastal areas such as mangroves, which perform the nursery function.

Strategy - A plan of action intended to accomplish specific goals and objectives.

Threatening processes - Processes and activities that threaten the health and productivity of the marine, coastal and estuarine environment (usually of human origin).

Use - Economic, recreational, social or cultural activities in the marine, coastal and estuarine environment that may not be directly associated with development and as such may not be subject to regulation via the development assessment process. Many uses, such as commercial and recreational fishing, are regulated and managed by either a Commonwealth, State or Local Government authority.

Waders/wading birds - See shorebirds, above.

Appendix 1

Ecologically Rated Zones - Definitions, Goals, Objectives and Strategies Ecologically Rated Zone 1 (ER1)

Definition

Zones classified as ER1 contain the highest diversity of marine, coastal and estuarine habitats and species identified as suitable indicators of environmental capability. These include:

- habitats and ecological processes critical to ecosystem function;
- unique ecological communities;
- species of conservation concern, including protected, threatened, rare and endemic species; and
- habitats critical to the life cycle of species (eg breeding, nursery and feeding areas).

Arrangements for managing development and use in ER1 zones will be primarily concerned with conservation and protection of the marine, coastal and estuarine environment (species, habitats and ecological processes), as described under the Goal, Objectives and Strategies below.

Goal

Development and use of the marine, coastal and estuarine environment is managed such that it will cause negligible impacts on the biodiversity, habitats and ecological processes important to the health and productivity of the ecosystem.

Negligible impacts on habitats, negligible impediment to ecological processes

Negligible: Will not exceed negligible impacts to habitats or populations. Unlikely to be measurable against background variability. Habitat and ecosystem interactions may be occurring but it is unlikely that there would be any change outside of natural variation. Recovery measured in days.

Objectives - ER1 Zone

- 1 Ecologically sustainable development and use, both existing and future, of the marine, coastal and estuarine environment will not exceed negligible:
 - loss of biodiversity;
 - impediment of ecological processes;
 - degradation to seagrass, reef, mangrove, saltmarsh and soft-sediment habitats;
 - loading of sediments with heavy metals, persistent organic pollutants and other contaminants; and
 - change in water quality beyond the benchmark established by the Performance Assessment System for each Marine Plan.
- 2 Environmental management of existing and future development and use will adopt performance measures consistent with the Marine Plan objectives and develop strategies to ensure compliance.
- 3 Environmental impacts of past, existing and future development and use will be ameliorated actively.
- 4 Ecological processes underpinning economic, environmental, social and cultural values, including Indigenous cultural heritage, will be protected.
- 5 Monitoring, evaluation and research will be publicly available and aimed at increasing our understanding of the biodiversity, habitats and ecological processes of the marine, coastal and estuarine environment and the cumulative impacts of development and use.

The following strategies should be applied by all management agencies with jurisdiction over the marine, coastal and estuarine environment, all operators of developments and all individual users of these environments.

Strategies to Achieve Objectives of ER1 Zones

- 1 Adopt mechanisms to conserve and protect marine, coastal and estuarine:
 - biodiversity;
 - habitats;
 - key spawning, breeding and nursery areas;
 - key feeding and resting areas;
 - endemic species;
 - species of conservation concern; and
 - ecological processes.
- 2 Protect cultural and heritage values, including Indigenous cultural heritage associated with the marine, coastal and estuarine environment.
- 3 Adopt performance measures derived from the objectives (ER1 zone) and manage existing and future economic, recreational, social and cultural development and use, both catchment and marine based, to reduce and remove threats to achieving the objectives.
- 4 Plan for future development and use consistent with the objectives (ER1 zone) and with consideration of the cumulative impacts of development and use.
- 5 Adopt mechanisms for the rehabilitation of degraded areas that may include relocation of existing uses that do not comply with the goal and objectives (ER1 zone).
- 6 Respond to any change in water quality where a trend away from an established benchmark is detected. Maintain water quality at the recommended benchmark given in the Marine Plan Performance Assessment System.
- 7 Contribute to both site specific and ecosystem level research and monitoring.

Ecologically Rated Zone 2 (ER2)

Definition

Zones classified as ER2 contain a high diversity of marine, coastal and estuarine habitats and species identified as suitable indicators of environmental capability. This includes the interconnectivity between:

- seagrass and/or sand beds;
- soft-sediment ecological communities;
- intertidal and subtidal reefs; and
- mangrove and saltmarsh areas.

Management of development and use in ER2 zones will be cautious and primarily concerned with protecting and maintaining the integrity of the marine, coastal and estuarine environment (species, habitats and ecological processes), as described under the Goal, Objectives and Strategies below.

Goal

Development and use is managed to ensure minor impacts on the marine, coastal and estuarine biodiversity, habitats and ecological processes of the ecosystem.

Minor impacts on habitats, minor impediment to ecological processes

Minor: Will not exceed minor impacts to habitats or populations measurable against background variability. Recovery measured in months.

Objectives - ER2 Zone

- 1 Ecologically sustainable development and use, both existing and future, of the marine, coastal and estuarine environment will not exceed minor:
 - loss of biodiversity;
 - impediment of ecological processes;
 - degradation to seagrass, reef, mangrove, saltmarsh and soft-sediment habitats;
 - loading of sediments with heavy metals, persistent organic pollutants and other contaminants; and
 - change in water quality beyond the benchmark established by the Performance Assessment System for each Marine Plan.
- 2 Environmental management of existing and future development and use will adopt performance measures consistent with the Marine Plan objectives and develop strategies to ensure compliance.
- 3 Environmental impacts of past, existing and future development and use will be ameliorated actively.
- 4 Ecological processes underpinning economic, environmental, social and cultural values, including Indigenous cultural heritage, will be protected.
- 5 Monitoring, evaluation and research will be publicly available and aimed at increasing our understanding of the biodiversity, habitats and ecological processes of the marine, coastal and estuarine environment and the cumulative impacts of development and use.

The following strategies should be applied by all management agencies with jurisdiction over the marine, coastal and estuarine environment, all operators of developments and all individual users of these environments.

Strategies to Achieve Objectives of ER2 Zones

- 1 Adopt mechanisms to conserve and protect marine, coastal and estuarine:
 - endemic species;
 - species of conservation concern;
 - key spawning, breeding and nursery areas; and
 - key feeding and resting areas.
- 2 Adopt mechanisms to protect marine, coastal and estuarine:
 - biodiversity;
 - habitats; and
 - ecological processes.
- 3 Protect cultural and heritage values, including Indigenous cultural heritage associated with the marine, coastal and estuarine environment.
- 4 Adopt performance measures derived from the objectives (ER2 zone) and manage existing and future economic, recreational, social and cultural development and use, both catchment and marine-based, to reduce and remove threats to achieving the objectives.
- 5 Plan for future development and use consistent with the objectives (ER2 zone) and with consideration of the cumulative impacts of development and use.
- 6 Adopt mechanisms for the rehabilitation of degraded areas that may involve relocation of existing uses that do not comply with the goal and objectives (ER2 zone).
- 7 Respond to any change in water quality where a trend away from an established benchmark is detected. Maintain water quality at the recommended benchmark given in the Marine Plan Performance Assessment System.
- 8 Contribute to both site specific and ecosystem level research and monitoring.

Ecologically Rated Zone 3 (ER3)

Definition

Zones classified as ER3 contain a moderate diversity of marine, coastal and estuarine habitats and species identified as suitable indicators of environmental capability.

Management of development and use will provide for ecologically sustainable development and use, underpinned by the precautionary principle, as described under the Goal, Objectives and Strategies below.

Goal

Development and use is managed to ensure that moderate environmental impacts to the biodiversity, habitats and ecological processes of ER3 zones do not jeopardise the health and productivity of the ecosystem.

Moderate impacts on habitats whilst safeguarding ecological processes

Moderate: Will not exceed moderate impacts to habitats or populations. Measurable changes to ecosystem components without there being a major change in function (ie no loss of components). Recovery measured in years.

Objectives - ER3 Zone

- | | |
|---|---|
| 1 | Ecologically sustainable development and use, both current and future, of the marine, coastal and estuarine environment will not exceed moderate: <ul style="list-style-type: none">• loss of biodiversity;• degradation to soft-sediment habitats (where seagrass, reef, mangrove, saltmarsh habitats occur, refer to the objectives of ER2 zones); and• loading of sediments with heavy metals, persistent organic pollutants and other contaminants. |
| 2 | Degradation of habitats resulting from development or use will not compromise the ability of ecological processes to sustain ecosystems naturally. |
| 3 | Development and use will maintain water quality in accordance with the benchmark established by the Performance Assessment System for each Marine Plan. |
| 4 | Environmental management of existing and future development and use will adopt performance measures consistent with the Marine Plan objectives and develop strategies to ensure compliance. |
| 5 | Environmental impacts of past, existing and future development and use will be ameliorated actively. |
| 6 | Ecological processes underpinning economic, environmental, social and cultural values, including Indigenous cultural heritage, will be protected. |
| 7 | Monitoring, evaluation and research will be publicly available and aimed at increasing our understanding of the biodiversity, habitats and ecological processes of the marine, coastal and estuarine environment and the cumulative impacts of development and use. |

The following strategies should be applied by all management agencies with jurisdiction over the marine, coastal and estuarine environment, all operators of developments and all individual users of these environments.

Strategies to Achieve Objectives of ER3 Zones

1. Adopt mechanisms to conserve and protect marine, coastal and estuarine:
 - endemic species;
 - species of conservation concern;
 - key spawning, breeding and nursery areas; and
 - key feeding and resting areas.
2. Adopt mechanisms to protect marine, coastal and estuarine:
 - biodiversity;
 - habitats; and
 - ecological processes.
3. Protect cultural and heritage values, including Indigenous cultural heritage associated with the marine, coastal and estuarine environment.
4. Adopt performance measures derived from the objectives (ER3 zone) and manage existing and future economic, recreational, social and cultural development and use, both catchment and marine-based, to reduce and remove threats to achieving the objectives.
5. Plan for future development and use consistent with the objectives (ER3 zone) and with consideration of the cumulative impacts of development and use.
6. Adopt mechanisms for the rehabilitation of degraded areas.
7. Respond to any change in water quality where a trend away from an established benchmark is detected. Maintain water quality at the recommended benchmark given in the Marine Plan Performance Assessment System.
8. Contribute to both site specific and ecosystem level research and monitoring.

Key Habitat Standards

Saltmarsh, mangroves, seagrass beds, reef habitats, and defined spawning areas are the conspicuously critical habitat types for marine ecosystems in South Australian waters. Where any of these key habitats are recognised to occur in ER3 zones, the *Marine Planning Framework* requires that these habitats be managed by the goals and objectives set for a ER2 zone. This may occur where habitat information is limited or the particular habitat type was restricted. These areas may be rezoned as more information becomes available. Other key habitat types may be determined in conjunction with stakeholders and agencies, and these will be added to the list of key habitats after due consideration by the agencies.

Ecologically Rated Zone 4 (ER4)

Definition

Zones classified as ER4 include those marine, coastal and estuarine habitats and species for which the available scientific data are inadequate to identify their importance to the maintenance of biodiversity, ecological health and productivity of the ecosystem.

Until appropriate research suggests otherwise, management agencies will adopt a precautionary stance, applying the environmental impact criteria of 'minor' to the management of development and use.

Research will ultimately enable the reclassification of this zone to ER1, ER2 or ER3.

Goal

Development and use of the marine, coastal and estuarine environment is preceded by research to improve knowledge of the biodiversity, habitats and ecological processes of ER4 zones.

Research will determine allowable consequences to habitats

Objectives - ER4 Zone (to be applied pending reclassification of an area following research)

- 1 Future development and use will be contingent on an appropriate level of scientifically based knowledge.
- 2 Until research suggests otherwise, ecologically sustainable development and use, (both existing and future), of the marine, coastal and estuarine environment will not exceed minor:
 - loss of biodiversity;
 - impediment of ecological processes;
 - degradation to seagrass, reef, mangrove, saltmarsh and soft-sediment habitats;
 - loading of sediments with heavy metals, persistent organic pollutants and other contaminants; and
 - change in water quality beyond the benchmark established by the Performance Assessment System for each Marine Plan.
- 3 Environmental management of existing and future development and use will adopt performance measures consistent with the Marine Plan objectives and develop strategies to ensure compliance.
- 4 Environmental impacts of past, existing and future development and use will be ameliorated actively, through targeted rehabilitation, and passively, as natural regeneration becomes an outcome of improved development and use.
- 5 Ecological processes underpinning economic, environmental, social and cultural values, including Indigenous cultural heritage, will be protected.
- 6 Monitoring, evaluation and research will be publicly available and aimed at increasing our understanding of the biodiversity, habitats and ecological processes of the marine, coastal and estuarine environment and the cumulative impacts of development and use.
- 7 Improved understanding of the ecology of areas within ER4 zones will result in their reclassification to ER1, ER2 or ER3, as appropriate.

The following strategies should be applied by all management agencies with jurisdiction over the marine, coastal and estuarine environment, all operators of developments and all individual users of these environments.

Strategies to Achieve Objectives of ER4 Zones

- | | |
|---|--|
| 1 | Ensure development or use is preceded by appropriate research to identify ecological risks and the vulnerability of the receiving environment. |
| 2 | Protect cultural and heritage values, including Indigenous cultural heritage associated with the marine, coastal and estuarine environment. |
| 3 | Ensure that as new knowledge is gained, zoning and management of use is revised, according to the goals, objectives, and strategies for ER1, ER2 or ER3 zones, as appropriate. |
| 4 | Review classification of zoning every two and a half years, incorporating the latest research. |

Appendix 2

Ecological Variables used in the Spencer Gulf Marine Plan

No.	Layer
1.	Seagrass
2.	Reef
3.	Sand and soft sediment
4.	Mangroves
5.	Saltmarsh
6.	Wetlands of importance
7.	All other wetlands
8.	<i>Zostera mucronata</i> seagrass protected under the <i>National Parks and Wildlife Act 1972</i>
9.	Rhodoliths - type of marine sponge found in Spencer Gulf
10.	Endangered marine macro-algae (COSEMA Database)
11.	Key biodiversity areas
12.	Spawning areas
13.	Nursery areas
14.	Breeding areas
15.	Wader bird feeding grounds
16.	Seabird nesting locations
17.	Seabird nesting locations (Vulnerable)
18.	Australian sea lion breeding/haul out sites

Photo Credits

(From left to right, top to bottom)

Front Cover	Lighthouse at Cape de Couedic, Flinders Chase National Park (S Barker), Leafy Seadragon, (<i>Phycodurus eques</i>) (D Muirhead, Marine Life Society of SA), West Beach (Coast Protection Branch, DEH), Fin Fish Farming, Port Lincoln (PIRSA), Sunset over North Haven Marina (V Day, DEH), Reefwatch Diver (G Adams, The Advertiser)
Page 1	Giant Kelp (D Boyle, Marine Life Society of SA),
Page 2	Cummings Lookout, Southern Eyre Peninsula (M Morris, DEH)
Page 3	Port Lincoln Jetty (M Goecker, DEH), Great Australian Bight (S Connell),
Page 4	Nudibranch, Kangaroo Island (D Muirhead, Marine Life Society of SA), Southern Right whale and calf, Great Australian Bight Marine Park (DEH).
Page 5	Coastline (DEH), Lacy Bryozoan, Red (D Muirhead, Marine Life Society of SA).
Page 6	Moonta Bay Jetty (V Day, DEH), Southern Rock Lobster, Western Cove River, Kangaroo Island (D Muirhead, Marine Life Society of SA).
Page 7	Holdfast Bay, SA (Coast Protection Branch, DEH), Purple Ascidians (I Svane).
Page 8	Blue Grasper (S Connell).
Page 9	Horseshoe Leather Jacket (S Connell), Recreation (Murray Darling Basin Commission).
Page 10	Brown Algal Community, (D Boyle, Marine Life Society of SA), Tanker at Port Adelaide (EPA).
Page 11	Sand Dredging (Coast Protection Branch), Beach Fishing, Western River Cove, Kangaroo Island (South Australian Tourism Commission).
Page 12	Pink Sponge, (<i>Dendrilla rosea</i>), Port Hughes Jetty (D Muirhead, Marine Life Society of SA).
Page 13	Old Wives (D Muirhead, Marine Life Society of SA), Seagrass, (<i>Posidonia australis</i>), (S Connell).
Page 14	Boat Club, Port Adelaide (B Pendlebury, DEH), Holdfast Shores, Glenelg (Coast Protection Branch, DEH).
Page 15	Cuttlefish, (<i>Sepia apama</i>), (D Muirhead, Marine Life Society of SA), Epibiotia (S Connell).
Page 16	Sponge (S Connell).
Page 17	Pelicans on Mudflat, (D Boyle, Marine Life Society of SA).
Page 18	Stenhouse Bay (M Morris, DEH), Old Wives in <i>Scaberia aghardi</i> (D Muirhead, Marine Life Society of SA).
Page 19	Red starfish (S Connell), Epibiotia and fish (S Connell).
Page 20	Australian Sea Lion, Outer Harbour (B Pendlebury, DEH), Shipwreck, (Heritage SA).
Page 21	Port Lincoln Marina (M Goecker, DEH), Red Velvet Fish, Stokes Bay, Kangaroo Island (D Muirhead, Marine Life Society of SA).
Page 22	Lobster Fishing Boat, Ward Island (PIRSA), Lacy Bryozoan, Orange (Marine Life Society of SA).
Page 23	Pencil Urchin (<i>Goniocidaris tubaria</i>), Glenelg (D Muirhead, Marine Life Society of SA).
Page 24	Sharpnose Weedy Whiting, Glenelg (D Muirhead, Marine Life Society of SA), Lighthouse, Point Lowly (M Morris, DEH).

Maps Produced by Coast & Marine Conservation Branch
Department for Environment and Heritage
GPO Box 1047 Adelaide SA 5001
Website: www.environment.sa.gov.au/coasts

Data Source Topographic data and NPWSA - DEH
Marine Planning Areas - DEH
State Water Limit - AMSA
Bioregions - PIRSA

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Datum Geocentric Datum of Australia, 1994

Compiled March 2006

For further information please contact:

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A companion document, the *Marine Planning Framework for South Australia – Performance Assessment System*, is also available on request.

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