

Nullaki Peninsula from McGeary's Rock, Denmark.
PHOTO: Craig Carter.



Coastal and Marine

SOUTHERN
PROSPECTS
2011-2016

COASTAL AND MARINE

This section describes the importance of our coastal and marine assets in the management of natural resources. The main components of the Coastal and Marine theme are described and factors affecting these assets are discussed. Aspirations (25+ years), Goals (10+ years) and Outcomes (one to five years) are outlined in a Program Logic Summary (see section 8.6).

ASPIRATION: *Our Coastal and Marine systems are maintained and/or improved through the community embracing social, cultural, economic and ecological values.*

This section outlines the aspirations, goals and desired outcomes for the coastal zone of the South Coast NRM Region. Estuaries have generally been considered in the Water theme. Goals and outcomes in the Biodiversity theme will also contribute to addressing targets for the coastal zone and are not repeated here.

Sources of information for this section include:

- The natural assets, threats and management targets of the South Coast Region's coastal zone. Background Paper 5 (Heydenrych, 2004)
- Marine biodiversity, management and planning in the South Coast. Background Paper 6 (Green & Heydenrych, 2004)
- Southern Shores 2009 – 2030: A strategy to guide coastal zone planning and management in the South Coast region of WA (Coffey Environments & South Coast Management Group, 2009)
- Draft Regional Marine Strategic Plan (Government of Western Australia, 2010a)
- Oceans of Opportunities – a proposed strategic framework for the marine waters of Western Australia's South Coast (Government of Western Australia, 2010b).

8.1 Principles

The principles for managing coastal and marine resources are:

- increase understanding through research and information sharing of coastal and marine environments
- maintain the functional integrity and health of coastal and marine systems
- reduce conflicts between users through engagement, collaboration and consultation

- use adaptive management and best practice methods for on-ground works.

8.2 What we know – values and threats

The region includes approximately 1000 km of coastline, and the coastal settlements of Albany, Esperance, Denmark, Bremer Bay, Hopetoun and Walpole support the majority of the region's population. The coastline is spectacular and diverse, alternating between sandy beaches, granite headlands, limestone cliffs, vegetated coastal dunes and includes numerous inlets and over 500 offshore islands, shoals and bombies. The Recherche Archipelago contains the majority of these features and is an important marine and terrestrial environment in WA. About 70% of the terrestrial coastal environment is contained in the conservation estate with the majority of the remainder being either managed by local government for recreation or is unmanaged crown land.

The marine component of the region extends from the coastline out to the three nautical mile State limit, including waters to three nautical miles off the coast of offshore islands (Map 1). This comprises a substantial area of State NRM responsibility (around one million ha), and over 1000 km of marine/coastal interface (the coastal zone). State marine waters in the region extend in places to approximately 70 km off the mainland around Esperance and at a broad scale include a range of major benthic habitats within the continental shelf.

South Coast marine waters are directly influenced by large scale ocean currents such as the Leeuwin Current, localised hydrological variations and inputs (e.g. river mouths), global and local climatic conditions and Southern Ocean currents and swell regimes.



Annually, more than 800,000 local people and tourists visit the region's coastal national parks and conservation reserves, contributing to the economic stability of the region through overnight stays and retail trade in residential centres. People also visit reserves (managed by Local Government Authorities)

and UCL, where management and facilities are sometimes limited. Coastal localities need to plan for, provide and maintain infrastructure to cater for the influx of locals and visitors during summer. In some localities, resourcing does not extend to catering for peak visitation.

The South Coast is spectacular and diverse.



PHOTO: Kijite Bishop

8.2.1 Coastal and marine biodiversity

The coastal and marine environments contain much of the region's most environmentally intact ecosystems, a high proportion of reserved land and a high degree of species endemism, in both the terrestrial and marine coastal environments.

The almost continuous strip of intact coastal native vegetation along the South Coast is the major east-west link in the region's macro corridor network (Wilkins et al., 2006). The coastal corridor is a very high priority linkage, significant in spatial scale and its links between high conservation value protected areas. The coastal corridor is only broken at the major towns of Albany and Esperance, and to a lesser extent at Denmark, Bremer Bay and Hopetoun (Wilkins et al., 2006). The integrity of the corridor is threatened by dieback and degradation from recreational and other land use pressures (such as development).

The coastal terrestrial reserves, in particular Two Peoples Bay Nature Reserve, Cape Arid and

Fitzgerald River National Parks, represent very significant habitat refuges for threatened indigenous fauna, such as the Gilbert's potoroo, the dibbler, the western ground parrot and the western whipbird.

The coastal wetland systems of Lake Warden in Esperance and nearby Lake Gore are registered as Ramsar sites, due to their high significance as a major refuge for migrant and resident water birds of the region during the dry season.

Offshore islands provide important habitat, breeding and resting sites for many species of seabirds (albatross, petrels, shearwaters, penguins and the endangered Cape Barren goose) and two species of marine mammals (the Australian sea lion and New Zealand fur seal). Offshore islands of the region have high cultural values, from both indigenous and European perspectives. Nature based tourism and visitor pressure on offshore islands is currently increasing.

A comprehensive broad-scale scientific research project, *Securing WA's Marine Futures (2006 –*

Commercial fishers are proactive in managing protected species interactions.



PHOTO: Jenelle Carter.



2008)(Radford et al., 2008), mapped and surveyed 510 km² of benthic habitat across four sites (Broke Inlet, Mount Gardner, Point Anne and Middle Island) along the South Coast in 2006-2008. Quantitative biodiversity assessments of primary producers, invertebrates and fish were undertaken through towed video, drop cameras, Baited Remote Underwater Videos and benthic trawls. The quantity and quality of baseline information gathered through this project has set a benchmark of resource condition and will allow effective and strategic monitoring of marine community assemblages. The project demonstrated that the temperate marine environment of the South Coast has high biodiversity values. Endemism is also high, particularly amongst invertebrates such as sponges (e.g. 78 of the 156 sponge species recorded were new discoveries).

8.2.2 Coastal and marine resource use

The oligotrophic waters of the region are not highly productive in comparison with other areas of the country and similar marine environments of the world. A small commercial fishing sector fleet within the South Coast marine bioregion consists of: Abalone Fishery; South Coast Purse Seine Fishery; Demersal Gillnet and Longline Fisheries; Australian Salmon Fisheries; Australian Herring Fishery; South Coast Crustacean Fisheries; South Coast Trawl Fishery; South Coast Estuarine Fisheries Octopus Fishery and a South Coast Scalefish Fishery. The small State-wide Marine Aquarium Fish Fishery and Specimen Shell Fishery also exist in the region.

Fishing along the coast has traditionally been practised by Aboriginal people for countless generations and remains an important cultural activity. *A Draft Aboriginal Fishing Strategy* (Aboriginal Fishing Strategy Working Group, 2003) has recognised the interests of Aboriginal people in the protection and use of fish resources.

Commercial fishers of the South Coast are proactive in managing protected species interactions in their fisheries and pursue development of Environmental Management Systems (EMS) and industry self-regulation. South Coast Licensed Fishermen's Association is the umbrella organization. OceanWatch Australia, SeaNet and the Western Australian Fishing Industry Council are supporting a smarter fishing industry to continually improve practices. An EMS for the South Coast Estuarine Fishery (SCEF) was developed in 2007. Codes of Conduct/Practice have been developed for the SCEF and Australian Salmon Fisheries. The South Coast

Purse Seine Fishery has invested in projects to reduce by-catch of shearwaters and adapted fishing practices to suit.

Coastal and marine aquaculture is a small industrial sector for the region, the main species being land-based abalone, mussels and oysters. The industry is guided by land-based marine aquaculture development guidelines (South Coast Management Group, 2002) and an Aquaculture Plan for the Recherche Archipelago (Department of Fisheries, 2000).

Marine tourism is one of the fastest growing tourism sectors world-wide. Currently, there are 25 fishing tour licences and four eco-tour licences issued for the South Coast marine bioregion. There are also seven commercial operations licences issued for Walpole and Nornalup Inlets Marine Park.

A review of recreational fishing in the region commenced in 2002/03, and resulted in the production of a draft five year strategy for management of recreational fishing in the region (Department of Fisheries, 2004). Over a 12 month survey of recreational estuarine fishing in the South Coast bioregion during 2002/03, the total estimates for the estuaries and inlets surveyed were an effort 254,171 fisher hours, resulting in a catch of 212,575 kept fish and 201,710 released fish (Department of Fisheries, 2007).

A Sea Change for Aquatic Sustainability – Framework for a New Act of Parliament to replace the Fish Resources Management Act 1994 was released for public comment in June 2010 in response to growth in community and industry awareness of the need for effective environmental management and the shift needed within WA legislation in the way aquatic ecosystems and fisheries are conceptualized and managed.

Introduced marine pests are considered to be one of the major threats to the marine environment throughout the world's oceans (McDonald & Travers, 2008). A snapshot study that deployed settlement plates for six months in 2007-08 found 25 pests in Albany and 15 in Esperance (Wells, 2008). Further introductions that have the potential to devastate the marine environment of the region could come from the west coast of WA, eastern Australian and overseas. While both major marine areas were found to have a low risk of introductions and translocations from both commercial and recreational vectors, there is still a need for continued vigilance.

A number of marine cetaceans are resident or migrants to the region. The humpback and southern right whales calve and breed in the waters off the coast. Shore and boat-based whale watching is an important tourism draw card along the South Coast during winter months.

8.2.3 Coastal and marine planning

A Marine Bioregional Planning process has begun for Commonwealth marine waters from the three to 200 nautical mile offshore boundary. The area of the South West Marine region covers more than 1.3 million km² of ocean adjacent to the eastern tip of Kangaroo Island off the South Australian coast to waters off Shark Bay. The South-West Bioregional Profile and Background Reports were released in 2007 and the Department of the Environment, Water, Heritage and the Arts identified seven areas for further assessment as marine reserves in 2009, four of which are offshore from South Coast WA, on which to focus its efforts to collect finer scale information.

A regional marine strategic planning process is underway for State waters of WA's south coast (Cape Leeuwin to the South Australian border) to the three nautical mile State limit. The process involves the development of a comprehensive and integrated approach to the sustainable use and conservation of these waters. In September 2010, the State Government released the Draft Regional Marine Strategic Plan for the South Coast (Government of Western Australia, 2010a) and the accompanying reference report, *Oceans of Opportunity: a proposed strategic framework for the marine waters off WA's South Coast* (Government of Western Australia, 2010b). The State-coordinated process of developing a Regional Marine Strategic Plan is being done concurrently and cooperatively with marine planning for South West Commonwealth waters further offshore. At present there is one Marine Park in the South Coast marine bioregion. The Walpole and Nornalup Inlets Marine Park was gazetted in May 2009.

State policy for sustainable management and planning in coastal and near shore marine environments is defined in the *WA State Coastal Planning Policy* (Western Australian Planning Commission, 2003). This policy provides guidance for local and regional planning strategies, structure plans, schemes, subdivisions, strata subdivision and development applications, as well as other planning decisions and instruments relating to the coast.

The objectives of this Policy are to:

- protect, conserve and enhance coastal values, particularly in areas of landscape, nature conservation, indigenous and cultural significance
- provide for public foreshore areas and access to these on the coast
- ensure the identification of appropriate areas for the sustainable use of the coast for housing, tourism, recreation, ocean access, maritime industry, commercial and other activities
- ensure that the location of coastal facilities and development takes into account coastal processes including erosion, accretion, storm surge, tides, wave conditions, sea level change and biophysical criteria.

Planning for land use and infrastructure requirements is set out in the Lower Great Southern Strategy (Western Australian Planning Commission, 2007).

A regional coastal management strategy, *Southern Shores 2009-2030*, outlines regional objectives, management actions and opportunities for collaboration between stakeholders to better manage the coast (Coffey Environments & South Coast Management Group, 2009). One of the major issues identified by the community was the increasing impacts from vehicle use, both road-registered 4WDs and off road vehicles (ORV) on beaches and in the coastal zone. The *Control of Vehicles (Off Road Areas) Act 1978* exists to control, license and restrict ORV use in some areas, but enforcement is limited. However, vehicles have been prohibited on popular swimming beaches in Esperance (using local laws) and Albany (using State legislation).

The Department of Environment and Conservation develops terrestrial conservation reserve plans on behalf of the Conservation Commission of WA, and develops marine conservation reserve plans on behalf of the Marine Parks and Reserves Authority. The Department is currently in the process of reviewing regional plans for the Albany coastal reserves and Esperance and Recherché parks and reserves. With the assistance of local government, they carry out a significant amount of joint planning where reserves are adjacent.

Numerous local level coastal planning and management documents have been developed for local government coastal reserves (Shires of Denmark, Jerramungup, Ravensthorpe and Esperance).



8.2.4 Climate change

It is predicted that climate change will have significant impacts on the coastal and marine environment (Coffey Environments et al., 2009), including:

- sea level rise (of between 0.2 and 0.8 m by 2100; IPCC, 2007a, 2007b) and subsequent estuary water level rise with subsequent flooding, erosion and alteration of adjacent ecosystems
- possible modification of the Leeuwin Current with subsequent impacts on life cycle and distribution of marine fauna (including species of commercial interest)
- acidification of the marine environment may impact on vulnerable species.

These impacts contain considerable risks and the Community needs to develop and implement strategies to mitigate or adapt over future decades (Coffey Environments et al., 2009).

The State Coastal Planning Policy 2.6 (Western Australian Planning Commission, 2003) is being updated to recognise predicted sea level rise over the next 100 years. However, the new setbacks only apply to new development and not existing developments.

8.3 Achievements

The following provides a short summary of achievements for the Coastal and Marine theme (a more complete description of achievements has been compiled in a status report [South Coast NRM, 2011]):

- the Estuarine Fisheries Research Project has sampled and assessed estuarine fish abundance and condition in six estuaries (Broke, Irwin, Wilson, Oyster Harbour, Wellstead and Stokes) identifying indicators for estuarine health and activities for community involvement. The project also implemented a highly successful community fish tagging program in Wilson Inlet that was later expanded to Oyster Harbour.
- partnership arrangements have been progressed with the fishing industry to reduce the by-catch of fleshy-footed shearwaters, a threatened migratory seabird resulting in a significant reduction in shearwater death through altered fishing regimes and gear modifications. Further reductions are proposed in the future by improving knowledge of shearwater behaviour, through a bird banding and monitoring program at Breaksea Island off Albany.



PHOTO: Sheryn Prior.

Salty Summer Activities are a popular event for children.

- the Marine GIS Information and Resource Compilation project has on-going collation of information for management of the biodiversity, cultural and socio-economic values of the marine environment. It is anticipated the marine recreational usage and values survey developed and implemented as part of this project will be continued into the future to continue to capture coastal marine usage and value information.
- Salt Water Treasures is a community marine monitoring program that has fostered a high level of community interest with potential for introduced marine pest surveillance for the temperate South Coast marine waters
- implementation of the *Southern Shores 2001 – 2021* coastal management strategy, developed by the local government-based South Coast Management Group, has resulted in:
 - strategic coastal zone support
 - Regional Coastal Management Forum, Bremer Bay, November 2006
 - Sustainable Facilities project at Starvation Bay, Shire of Ravensthorpe
 - Wilson Inlet/River Boating and Recreation Facilities Plan, Shire of Denmark
 - Integrated Coastal Plan Fisheries Beach, Shire of Jerramungup



PHOTO: Kylie Bishop

The Southern Shores coastal grant program is assisting the community to protect their beaches.

- regional on ground coastal work and coastal and marine education and awareness raising initiatives
- Regional Vehicles in the Coastal Zone fora at Bremer Bay in 2009 and 2010. The fora generated recommendations to guide future off road vehicle and four wheel drive management priorities in the coastal zone of the South Coast.
- *Southern Shores 2001-2021* was reviewed to produce *Southern Shores 2009-2030*. A Southern Shores 2009-2030 Implementation Plan has also been developed to guide the operation and activities of the South Coast Management Group into the future. Collectively, the group along with land managers and community, will continue to implement priority actions from Southern Shores where appropriate.
- the Southern Incentive 3 coastal and marine devolved grant program has supported local on- ground coastal works identified from Southern Shores and local coastal management plans, including:
 - dune brushing, rehabilitation, revegetation, weed eradication, seed collection and propagation (e.g. at Twilight Headland and other Esperance coastal locations, Hopetoun and surrounds, Boat Harbour near Wellstead, Lowlands Beach, Albany, Peaceful Bay and other coastal areas surrounding Denmark)
 - fencing, track and beach access delineation, off road vehicle track management (e.g. at coastal areas near Denmark, Walpole and Albany, Boat Harbour near Wellstead and locations in close proximity to Bremer Bay, Hopetoun, Munglinup and Esperance)
 - education and interpretive activities and signage as a component of on ground works (e.g. in popular locations surrounding Denmark, Albany, Bremer Bay, Hopetoun and Esperance)
 - provision of recreation facilities, viewing platforms and staircase infrastructure, campground maintenance, composting toilets and fish waste disposal management (e.g. in coastal locations such as Parry Beach and areas



in close to Denmark, Lowlands Beach and other popular locations around and in Albany, Boat Harbour near Wellstead, Starvation Bay and Hopetoun in the Shire of Ravensthorpe and coastal locations surrounding Esperance)

- support in the implementation of school-based education and awareness programs such as the Albany Senior High School Marine Science Program that has been a highly successfully program supported by South Coast NRM and partners for numerous years
- marine resource stewardship activities in coastal townships (e.g. in Albany and Esperance)
- other projects recently directly funded through the Caring for our Country program include on-ground works at Lions Lookout, Black Hole and Parry Beach in the Shire of Denmark; Betty's Beach in the City of Albany; Bremer Point Flat Rocks in the Shire of Jerramungup; West Beach and Flathead Point in the Shire of Ravensthorpe; and Castletown Quays in the Shire of Esperance. Other successful projects include by-catch reduction in the South Coast Estuarine Fishery, in partnership with OceanWatch and the Western Australian Fishing Industry Council; as well as the Cape Le Grand Track Rehabilitation and Sustainable Walk Trail Establishment project, delivered by the Department of Environment and Conservation and the Esperance Senior High School 'Bushrangers'.
- continued support for coastal community engagement activities and on-ground works is being facilitated by devolved grants available through South Coast NRM and Southern Incentives 2010-2011: Southern Shores Coastal Grant Program
- cultural, heritage and ecological surveys have been undertaken in eastern parts of the region and on some of the islands of the Recherche
- Aboriginal officers have assisted the Aboriginal community with rehabilitation of traditional water holes around Esperance. A management and dieback plan has been prepared for the Stockyards Reserve in consultation with the Esperance Noongar Aboriginal Corporation and community.
- Assessment of risk and monitoring of potential marine pests in the Albany and Esperance areas.

8.4 Current community capacity

The high value attached by the community to coastal areas, and corresponding pressure from recreational use, means that management of coastal reserves is high on local government natural resource management priorities. The five coastal Local Government Authorities within the region support and are members of the South Coast Management Group, a regional local government and community group formed in the mid 1990s with a vision to bring together people, organisations and information, so that communities in the South Coast NRM Region are able to work in partnership, to improve the quality of the coastal and marine environment, resulting in environmental, social and economic sustainability (<http://southcoastmanagementgroup.org.au>).

Community members have been involved in local-level coastal management projects to look after their local 'patch', supported through partnerships with Local Government Authorities and State agency land managers, and the coastal and marine theme staff.

Small grants for coastal projects have been sourced for projects across the region through regional, State-wide and national initiatives such as *Coastwest/Coastcare*, and Southern Incentives: Southern Shores grants made available via South Coast NRM through NHT and *Caring for our Country* programs. On-ground actions have assisted the community and land managers in implementing local and regional coastal zone management plans. The recently reviewed regional coastal strategy *Southern Shores 2009 - 2030* outlines future priority actions for the region's coastal zone. This, along with the review processes undertaken by the numerous Local Government Authorities of local coastal management plans means that the region is well placed to achieve on-ground outcomes. Coastal community volunteers and groups are well placed to do works to rehabilitate and protect coastal and marine environments but need to be supported and resourced in an on-going manner.

Community initiatives have greatly increased local knowledge of coastal marine environments. The Recherche Advisory Group developed a research program with UWA which greatly increased the knowledge base for marine management of the Recherche Archipelago. Additional community marine surveys have been undertaken at Cheyne Island near Wellstead and a monitoring program was established at Greens Pool through the *Salt Water Treasures* program. Fish movements have been studied through tagging key estuarine species by

volunteer recreational fishers in the Wilson Inlet and Oyster Harbour, supported by Murdoch University and Recfishwest. The Albany Senior High School marine science program has collected ten years of juvenile fish data and the Denmark High School has recently commenced monitoring in Madfish Bay.

A South Coast Marine Education Officer working as part of the Marine Discovery West team at the Department of Fisheries conducts education programs through attendance, presentations and activities at primary and secondary schools, regional shows and festivals, community group meetings and fishing competitions. There is also a region wide coastal school holiday education program and school based program being implemented by South Coast NRM and partners.

There is an increasing capacity for enforcement of fisheries legislation with a number of Fisheries Officers recently being deployed in the region.

Partnerships established between South Coast NRM, OceanWatch, SeaNet, the Western Australian Fishing Industry Council and the Department of Fisheries through past projects presents opportunities for future projects in fisheries and marine NRM activities. The excellent baseline information collected through the *Marine Futures* project will allow for more efficient monitoring and reporting of marine assemblages. There are opportunities for community involvement in deployment of Baited Remote Underwater Videos and Diver Operated Videos to build on Marine Futures project data.

8.5 Gaps

The Coastal and Marine theme has identified the following gaps:

- building and maintaining capacity for coastal and marine works (current capacity of some volunteer community groups and small Local Government Authorities is limited)
- need for expansion of schools-based education and awareness programs to be effective in changing attitudes and behaviour to marine and coastal resource use
- long-term maintenance of coastal and marine management infrastructure
- managing increased visitor pressure on key areas (e.g. Hopetoun, Esperance, Bremer Bay, Albany and Denmark) due to increased industry, residential and tourism growth
- improving knowledge and baseline information on coastal and marine environments and use, including high resolution gridded bathymetry, other spatial data sets and information about commercial and recreational use of marine and coastal resources and the impacts of their use
- planning and implementing on-ground works for changes and threats associated with climate change, sea level rise and seasonal variability.

8.6 Program Logic Summary – Coastal and Marine

ASPIRATIONS (25+ YEARS)

Our Coastal and Marine systems are maintained and/or improved through the community embracing social, cultural, economic and ecological values.

- Increased understanding of coastal and marine habitats, including their biodiversity, social and economic values
- Established management priorities and managed threats to coastal and marine environments
- Established landscape linkages with integrity of Coastal Corridor protected and condition improved
- Established marine protected area system to preserve representative habitat and other values
- Water quality supports ecosystems and community use
- Sustainably managed recreational, commercial and traditional Aboriginal fisheries
- Integrated coastal zone management, linked with catchment and marine management
- Increased awareness, understanding and appreciation by the community of coastal and marine assets, values and management.



GOALS (10+ Years)

GOAL C1. Coastal ecosystems Maintain and/or improve condition of coastal ecosystems at representative and/or priority sites by 2020 with quantifiable targets set by 2012.

GOAL C2. Marine ecosystems Maintain and/or improve condition of marine ecosystems at representative and/or priority sites by 2020 with quantifiable targets set by 2012.

OUTCOMES (1-5 Years)

MEASURES AND MONITORING

Outcome C1. Establish baseline data Establish a monitoring program to inform baseline setting and detect change in coastal and marine ecosystems from current and potential threats by 2012.

Outcome C2. Increased knowledge Knowledge of coastal and marine assets is increased by the expansion of a coastal and marine research program at priority areas for priority communities and/or species and to evaluate management actions by 2015.

Outcome C3. Control Marine Pests Contribute to management of introduced coastal and marine pests and diseases at the local level through vigilance and monitoring by community and industry with implementation of effective risk management protocols and responses by 2015.

ON GROUND ACTIONS

Outcome C4. Improved condition Coastal and marine systems are maintained and/or improved by implementing 25% of priority actions from Southern Shores (South Coast Management Group, 2009), by 2015.

Outcome C5. Climate change adaptation Priority coastal and marine assets at risk from effects of climate change, sea level rise, storm surge and associated threats are identified and protected by the implementation of adaptive management responses by 2015.

Outcome C6. Coastal zone on-ground action and implementation Integrated coastal zone management capacity increased by continuing the implementation of on-ground actions identified in regional and local coastal zone planning initiatives involving key coastal stakeholders by 2015.

CAPACITY BUILDING

Outcome C7. Increased information accessibility and application Increase accessibility of information through development of a regional coastal and marine database, with shared, validated, reviewed and up to date information applied to coastal and marine planning and management by 2015.

Outcome C8. Education and awareness Engage coastal users (e.g. 4WD, motorbike and off road vehicle users, youth, fishermen, surfers) to enhance knowledge and appreciation of coastal and marine asset values and promote behavioural change through the development and implementation of a regional coastal and marine education and awareness program by 2012.

PLANNING AND POLICY FRAMEWORKS

Outcome C9. Marine planning and implementation Marine management capacity increased by continuing integrated regional and local planning and implementation initiatives involving key stakeholders by 2015.

Outcome C10. Coastal zone planning and implementation Coastal zone management capacity increased by continuing integrated regional and local planning and implementation initiatives involving key stakeholders by 2015.



8.7 Measures and Indicators

Use of the following indicators and measures (Table 11) as a guide will assist in setting targets for projects and programs and allow for standard

approaches to measurement. Indicators should be selected according to the principles of cost, simplicity, consistency, practicality and capacity to deliver information across the region.

Table 11: Measures and Indicators – Coastal and Marine

ASSET	INDICATOR HEADING	RECOMMENDED INDICATORS
Estuarine, coastal and marine habitat	<ul style="list-style-type: none"> Estuarine, coastal and marine habitat extent and distribution 	<ul style="list-style-type: none"> Beaches Dune vegetation Wetlands Estuaries Seagrass Sediment dominated.
	<ul style="list-style-type: none"> Estuarine, coastal and marine habitat condition 	<p>Biological condition</p> <ul style="list-style-type: none"> Algal blooms Animal or plant species abundance Chlorophyll a Mass mortality events Pest species (number, density, distribution) Targeted pathogen counts Vertebrates impacted by human activities. <p>Physical/chemical condition</p> <ul style="list-style-type: none"> Dissolved oxygen Nutrients pH Presence and extent of litter Salinity (EC) Sedimentation and erosion rates Shoreline position Temperature Toxicants (in water, sediment, biota) Turbidity, water clarity.

(Based on Department of Environment, Water, Heritage and the Arts, 2007)



8.8 Trade-offs

The coastal and marine area is an environmentally, economically, socially and culturally important asset to the community of the region and beyond. Pressures on coastal and marine environments are numerous and are becoming more severe. An integrated approach to the management of these areas is vital for their sustainable use. It must be accepted that trade-offs need to be considered between the economic, social and environmental aspects of the management of the coastal and marine zone.

While it is desirable to continually create and involve new groups in coastal zone management, there are sometimes limited resources to support all ideas and/or projects. The ongoing support of active existing groups and stakeholders is essential to achieve the best NRM outcome for the coastal zone and should not be sacrificed just to start new projects or programs.

Trade-offs need to be considered between on ground actions and investment in expanding the knowledge base for the coastal and marine biological systems. Local communities will also need to consider trade-offs between recreational use of coastal areas and the conservation of the coastal and marine zone. With more than 70% of the coastal environment in some form of conservation management, the demands to develop the remaining areas will only increase. Climate change and its associated threats and impacts are more of a certainty, although complex interactions make some aspects difficult to predict with certainty. Adaptation trade-offs related to possible changes in the coastal and marine zone need to be considered by the community (including loss or modification of foreshore reserves, private land and other NRM assets).

Some of the issues outlined in the Biodiversity theme can be equally applied to threats to coastal and marine assets and values.

The ongoing support of the community is essential for the protection of the coastal zone.



PHOTO: South Coast NRM.