WELCOME TO THE SOUTH COAST REGION

The South Coast Regional Initiative Planning Team (SCRIPT) Inc brings people, organisations and information together to help the regional community drive sustainable natural resources management (NRM) with positive social and economic outcomes.

SCRIPT is not a statutory body. It is strongly independent, benefiting from a high degree of volunteerism, which reflects the strong sense of ownership and commitment within its community.

Initially aimed at developing a regional land and water strategy in the mid 90s, SCRIPT began as a grass-roots regional partnership utilising broad community consultation and support.

From this initial vision and strong leadership by key community members, a growing membership has dedicated considerable time to developing the partnerships and wider community support that has given governments confidence in SCRIPT as a sound vehicle for NRM investment, decision-making and advice.

Through community representatives, the Committee ensures regional planning and management takes account of the needs and circumstances of distinct geographical areas within The Region.

There is a close working relationship between community and government agencies in SCRIPT.

Of note is the highest level of input from government agencies via their regional managers and involvement and commitment of community stakeholder groups over a long period. SCRIPT relies heavily on its other key partners – the six South Coast subregional groups, LCDCs, farmers, tertiary institutions, environmental groups, local government authorities, industry groups, non-government organisations, coastal and marine groups and Indigenous organisations.

The Strategy development process required extensive consultation across a large and diverse region, recognising world-class biodiversity assets, spectacular coast, a rich marine biodiversity only recently exposed through the Recherche Archipelago study, water resources, high value horticulture and viticulture, broad acre agriculture and cultural heritage.

GETTING STARTED

SOUTHERN PROSPECTS 2004-2009

THE SOUTH COAST REGIONAL STRATEGY FOR NATURAL RESOURCE MANAGEMENT

8 September 2005 :: The drafting of Southern Prospects 2004 -2009: The South Coast Regional Strategy for Natural Resource Management was led by Paula Deegan, SCRIPT Manager, and David Jan, Resource Information Analyst. An electronic copy of this publication, together with the appendices and background papers that informed its development, are included on the companion CD-ROM.

ACKNOWLEDGEMENTS

SCRIPT would like to acknowledge the dedication and contribution of a wide range of individuals, community organisations, agencies and industry bodies that have helped develop this Strategy. Sincere thanks are also extended to all those who took part in community consultation workshops and gave their time to assist in the identification and discussion of relevant issues. SCRIPT would especially like to acknowledge the contributions of Paula Deegan, David Jan, John Simpson and Jean Webb. The contribution of the past and current members of the SCRIPT Management Committee, past and current members of the SCRIPT Regional Strategy Subcommittee and past and current members of SCRIPT staff is also recognised.

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A MESSAGE FROM THE CHAIRMAN

ENVIRONMENTAL, ECONOMIC & SOCIAL OUTCOMES DELIVERING SUSTAINABLE BENEFITS TO THE COMMUNITY.

With these great achievements arising from our regional partnerships, I feel both proud and optimistic for the future of natural resource management as the South Coast Region migrates to the new regional delivery model.

It gives me a sense of pride in the South Coast community to see the completion of *Southern Prospects 2004-2009*. This strategy for natural resource management in the South Coast Region has been developed over several years with extensive contributions from, and in consultation with, the diversity of stakeholders in our Region.

The comprehensive amount of information and support from government NRM agencies combined with the personal input of the people of The Region giving their aspirations and direction to this strategy has been a monumental achievement.

This document acknowledges a persistence and maturity of our community in adapting to a new way of managing our natural resources for their environmental, social and economic benefit. It sees a shift to a strong forward planning approach, where the visions of the community are to be delivered by strategic actions and investment to address threats to our natural resources.

With limited funds to invest compared to the size of the challenges before us, investment will be in those areas of highest priority where there is a likelihood of multiple benefits. A complementary Investment Plan to this Strategy has been developed in consultation with the community. It serves as a precursor to the investment of the largest ever allocation of funds by the Australian and State Governments to address threats to our natural and cultural assets.

I would like to thank all who have contributed to the process so far and look forward to your continuing involvement, particularly as we move through the investment phase and into implementation when all the past work will start to bear fruit.

GARRY ENGLISH
CHAIRMAN, SOUTH COAST REGIONAL INITIATIVE PLANNING TEAM (SCRIPT)

GETTING STARTED

EXECUTIVE SUMMARY

Southern Prospects 2004 -2009: The South Coast Regional Strategy for Natural Resource Management (the Strategy) aims to ensure the sustainable use of natural resources, protection of natural and cultural values, and the development and maintenance of strong and vibrant regional communities within the South Coast Region. It provides the vision and the framework for natural resource management (NRM) for the Region and will guide investment in, and delivery of, prioritised on ground actions for the sustainable management of the Region's natural resources.

The development of the Strategy was coordinated by the South Coast Regional Initiative Planning Team (SCRIPT), building on several previous regional planning processes and working in collaboration with the South Coast Management Group (SCMG). Extensive involvement with partner organisations and a comprehensive consultation process engaged the wider community and a range of stakeholders to collate information, discuss issues, identify regional priorities and provide input into setting realistic targets for NRM.

Two of the main requirements for the development of Regional NRM strategies are achieving effective integration across a range of land and water uses, management responsibilities and stakeholder interests, and getting the most effective return on the investment of time and resources by those stakeholders.

This Strategy is intended to strengthen the Region's ability to achieve that integration of purpose and effort, and work effectively to protect our natural resources by providing:

- The vision for NRM and directly related social and economic matters;
- The values and condition of, and threats to the Region's natural resources;
- The specific goals and targets that will provide the steps towards achieving the vision;
- A range of actions required to achieve the targets and an indication of their relative priorities;
- A framework for implementing the actions, with an emphasis on partnerships between stakeholders;
- The basis for an investment plan that will assign costs to the priority actions for the Region.

What can be achieved? The South Coast community's vision is to be recognised locally, nationally and internationally for its outstanding biodiversity, its sustainable primary production systems, respect for diverse cultural values and its strong community stewardship of valued natural resources.

With a clear vision of the long-term future to help direct efforts, objectives were set to focus actions:

- Community: The South Coast has a strong community with the capacity to plan and to manage natural resources for the maintenance of a wide range of employment, educational, recreational and lifestyle opportunities.

- Conservation: The Region's biodiversity is conserved and the natural landscapes and marine values are maintained.
- Sustainable use: The Region's economy is diverse and robust, and is based on managing all natural resource-dependent industries and activities in an ecologically, socially and economically sustainable manner.

What is important? Natural resource assets include Land, Water, Biodiversity, Coasts and Marine, Cultural Heritage and Regional Capacity. Each of these has environmental, social and economic values. An indication of the range and scope of those values is gained through a brief description of the Region:

> *The South Coast Region of Western Australia includes tall tingle and karri forests in the south west, southern WA's only mountain peaks in the Stirling Range and Porongurups, many remarkable rivers and inlets such as the Pallinup, Waychinicup and Walpole-Nornalup, hundreds of wetlands ranging from large lakes to small damplands, many offshore islands such as those of the Recherche Archipelago, and the waters of the Southern Ocean to the three nautical mile limit.*
>
> *It also includes agricultural landscapes that range from the broad acre cropping and grazing in areas such as the Jerramungup and Esperance plains to the expanding forestry, viticulture and horticulture industries and an increasing number of other natural resource-based industries, such as native seeds supply, sandalwood and nature-based tourism.*
>
> *The Region's community has a long history of involvement in caring for its assets, and a strong network of community groups and individuals working to protect, restore, sustainably use and better understand natural resources.*

The Strategy has developed Aspirational Goals and Outcomes to be achieved within the next 50 years for Land, Water, Biodiversity, Coasts and Marine and Regional Capacity. Progress on meeting the long-term Outcomes will be measured through Resource Condition Targets which will assist the Region to measure its progress in maintaining or improving its natural resources, and will also be included in State and national monitoring and evaluation frameworks to assist in measuring progress at those scales.

What are the threats? Threatening processes facing the Region include altered hydrology, degradation of soils, loss of habitat and ecological communities, plant diseases such as *Phytophthora cinnamomi* (dieback), weeds and feral animals, altered fire regimes, degradation of waterways and wetlands, and climate change. Some of the perceived social and economic threats include an increasing reliance on a decreasing number of volunteers for on ground actions, withdrawal of government resources (skills and funds) and institutional, legislative and market arrangements that either undervalue or actively degrade natural resources.

What needs to be done? Addressing the range of threats to the values of natural resources across the Region clearly requires the involvement of a wide range of individuals, organisations and governments, working cooperatively and with some common goals. This Strategy aims to provide the guidance for that cooperative effort through prioritised management actions. The management actions required to achieve the objectives include on ground works, building community capacity, developing our information base and management options, benchmarking and monitoring our performance, and any additional planning or policy measures that are required.

How to measure success? Setting measurable and achievable management action targets allows progress towards meeting objectives to be monitored. Meeting the targets requires collaboration and partnerships between stakeholders. This Strategy fits within a national framework requiring that certain resource condition targets be set.

What will it cost? The Strategy will provide the basis for an investment plan that will identify priority actions, assess their costs and relative benefits, and possible cost sharing arrangements. While the investment plan will be submitted to the Australian and WA governments for funding under the Natural Heritage Trust (NHT) and the National Action Plan for Salinity and Water Quality (NAPSWQ), it may also form the basis of a Regional NRM Prospectus for other investors.

Through this Strategy, SCRIPT seeks to ensure that the natural resources of the South Coast Region are better managed by a community that is informed, involved and inspired.

SECTION ONE

Setting

THE SCENE

SETTING THE SCENE

SETTING THE SCENE

1.1 REGIONAL OVERVIEW

The first occupants of the land were the Noongars[1], the collective name for the Indigenous people of the southwest corner of Western Australia (WA). Their lands took in everything to the west of a line drawn from Jurien Bay on the west coast to Esperance on the south coast (Bates, 1966). Noongars were divided into 13 different socio-linguistic groups, each with access two different ecological habitats in accordance with a long tradition of territorial occupation (CALM, 2000). The South Coast Region encompasses four of the 13 socio-linguistic groups:

- Kaneang: On the upper Blackwood River; east to a line joining Katanning, Tambellup, Cranbrook, and Tenterden; at Kojonup, Collie, Qualeup, Donnybrook, Greenbushes, Bridgetown; headwaters of Warren and Frankland rivers; south bank of Collie River to Collie; in later days the Kaneang went west to the coast and as far north as Harvey.
- Minang: King George Sound; north to Stirling Range, Tenterden, Lake Muir, Cowerup, and Shannon River; on coast from West Cliff Point to Boat Harbour; at Pallinup (Salt) River; at Mount Barker, Nornalup, Wilson Inlet and Porongurup Range.
- Koreng: From Gairdner River to Pallinup (Salt) River; at Bremer Bay; inland to Jerramungup, Pingrup, Nampup (Nyabing), Badgebup and Kibbleup near Broomehill; south to Stirling Range; at Gnowangerup and Ongerup; west to Cranbrook and Tambellup but not originally at Kojonup or Qualeup; the Koreng moved west and north under pressure from Wudjari.
- Wudjari: From near Gairdner River east to Point Malcolm; inland to edge of coastal slope, approximately 30 miles (50 km); at Kent, Ravensthorpe, Fanny Cove, Esperance and Cape Arid; western members moved into Bremer Bay area.

The Aboriginal "Dreaming" is commonly used to describe the Aboriginal creative epoch (Edwards, 1998). Dreaming stories explain how ancestral beings emerged at the beginning of time to create the earth and all things within it. These stories created complex relationships between the people, the land and the creatures/ animals. Through these relationships the sacred past is drawn into the present, where it continues to transform itself (Nyungar, 2003; Citizens and Civics Unit et al, 2004). The Dreaming provides a "blueprint for respect and utilisation of resources in a sustainable way" (Nyungar, 2003).

Some of these Dreaming stories are related in Background Paper No 1: Noongar Culture. They remind us that the human relationship with the area we now call the South Coast Region dates back tens of thousands of years, and that a vast knowledge of country was gathered over that time.

[1] There are several ways of spelling the word Noongar. This version refers to the people of the South Coastal and Central Great Southern Regions of southwest WA.

The South Coast Region of WA (see Map 1) covers a land area of more than 5.4 million hectares and extends to the 3 nautical mile limit which includes approximately 1 million hectares of State waters. Due to the location of numerous islands, State waters extend up to 70 km off shore, especially to the east of Esperance. It includes the catchments of all the southerly-flowing rivers from Walpole in the west to beyond Cape Arid in the east (and beyond, once the proposed boundary change is made), as well as some internally drained areas north east of Albany and north of Esperance.

The Region is renowned for its spectacular landscapes, including tall forest areas in the west, the southern coastline and many offshore islands, all of southern WA's mountain peaks, and many inlets, estuaries, waterways and wetlands. It has extremely high levels of biodiversity, with more than 20% of the State's floristic diversity within the Region, and numerous threatened flora and fauna species. The South Coast Region is internationally recognised as being part of one of the world's 25 biodiversity "hotspots" (***Myers et al, 2000***). This is reflected in the network of protected areas including iconic areas such as the Fitzgerald River and Stirling Range national parks and the Two Peoples Bay Nature Reserve.

Agricultural landscapes make up around 70% of the Region, and there is a strong economic reliance within the Regional community on agricultural production and related service industries. Increasingly, areas of plantation and farm forestry are changing parts of the landscape. There are some strong trends in parts of the Region to increase the diversity and resilience of land management systems both in agriculture and forestry. Major land uses are shown in Map 2, and partially reflect the climatic range across the Region (see Map 3).

The spectacular coastal scenery of the South Coast coastline with sweeping white beaches, granite headlands and vegetated coastal inlets, is an important natural feature of the Region. The coastal settlements are experiencing rapid change with the "sea change" population settlement phenomenon and annually increasing numbers of local and international tourists to the Region. The coastal and marine environments contain much of the Region's ecologically intact ecosystems, and more than 70% of the coastal vegetation corridor is currently under some form of conservation management. The coastal inlets are a highly valued aspect of the South Coast lifestyle experience, both for residential settlement and recreation.

The Region has an extensive fishing industry, with the catch including a range of species such as crab, lobster, abalone, scallop, cobbler, whiting, sea mullet, herring, bream, salmon, pilchard and shark. There is also a commercial fishery operating in various estuaries of the Region.

The Region is not a large mineral producer, although there is significant laterised nickel production in the Ravensthorpe area. Basic raw materials including agricultural lime, gypsum, dolomite, silica sand, spongolite and gravel are in demand and mined at a small scale but over many parts of the Region. This Strategy does not consider mineral resources.

The south west agricultural areas of WA experience climatic variability which can have major impacts on productivity, and there is serious potential for longer term climatic change impacting on production, water supplies, biodiversity and coastal systems. This is discussed further in Section 1.6.

The Region includes most, or all, of ten local government areas: Denmark, Plantagenet, the City of Albany, Cranbrook, Tambellup, Broomehill, Gnowangerup, Jerramungup, Ravensthorpe and Esperance, and parts of the Kojonup, Manjimup, Lake Grace and Kent Shires.

The ten local governments that form most of the Region have varying levels of involvement with Natural Resource Management (NRM) according to their ratepayer demands and resource capabilities. For most, their involvement is strongest at subregional or local level, and may include administrative or funding support for the employment of NRM Coordinators (e.g. Plantagenet, Cranbrook, Jerramungup, Denmark, and Broomehill) or for the direct support or management of priority projects in their areas. The Shire of Denmark and City of Albany have been key players in the identification and management of regionally and locally significant vegetation in their areas. The Shire of Jerramungup has had a long history of involvement with many aspects of NRM and continues to strongly support the Fitzgerald Biosphere Group (FBG). The coastal authorities (City of Albany and Shires of Denmark, Jerramungup, Ravensthorpe and Esperance) were instrumental in the development of Southern Shores, the strategy for management of the coastal and marine parts of the Region and, together with the Shire of Dundas, are partners in the SCMG.

Most local governments have indicated willingness to increase their involvement at both regional and subregional levels, but need both financial and technical support to make this effective.

Nearly 74% of the 57,399 people in the Region (Australian Bureau of Statistics, 2001b) live in the local government areas of Albany and Esperance and of these, an estimated 31,835 people live in the two urban centres. This means that less than half (44.5%) of the people in the Region live on farms or in small rural towns. Most inland towns have low and declining populations (Tambellup, Gnowangerup, Jerramungup and Cranbrook), while the populations of the coastal towns of Denmark, Albany and Esperance are increasing.

Table 1: Population change in South Coast Regional centres

LGA area	1996	2001	% change 1996-2001
Albany	28148	31236	+10.9
Broomehill	505	523	+3.5
Cranbrook	1159	1068	-7.8
Denmark	3891	4715	+21.1
Esperance	12300	13315	+8.2
Gnowangerup	1803	1579	-12.4
Jerramungup	1332	1244	-6.6
Plantagenet	4292	4688	+9.2
Ravensthorpe	1433	1504	+4.9
Tambellup	738	732	-0.8

Source: Australian Bureau of Statistics, Estimated Residential Population 1996 and Estimated Residential Population 2001

Compared with the rest of the State, the Region has more young children and older people but fewer youth (15 to 24 years of age) than the State average. This reflects young people leaving the Region to gain education and employment opportunities, and older people moving to the coast to retire.

There are approximately 1,741 Indigenous people in the Region (Australian Bureau of Statistics, 2001b).

About 20% of the workforce in the Region is directly employed in agriculture, forestry and fisheries. A number of employees in other sectors depend indirectly on agriculture, and businesses in towns in the Region report that buying patterns are directly related to seasonal conditions and commodity prices.

The Region makes a significant contribution to the WA economy. Albany and Esperance are the largest business and service centres in the Region. Many businesses in these centres have been established to service the needs of the agricultural and fishing industries. Primary industries such as broad acre cropping, wool, livestock, horticulture and fishing make up the core of the economy while manufacturing activity is based largely on the supply of equipment and machinery to the agricultural sectors and on the processing of agricultural commodities. The tourism and timber industries continue to expand, adding to employment and investment.

Physical and biological threats to the Region's natural resources include altered hydrology, degradation of soils, loss of habitat and ecological communities, plant diseases such as *Phytophthora cinnamomi*, weeds and feral animals, altered fire regimes, degradation of waterways and wetlands, and climate change. Some of the perceived social and economic threats include an increasing reliance on a decreasing number of volunteers for on ground actions, withdrawal of government resources (skills and funds) and institutional, legislative and market arrangements that either undervalue or actively degrade natural resources.

At the same time, there are opportunities in the Region that give good grounds for optimism. These include strong community organisations and existing capacity for innovation in land, water and coastal management; support for new industries including those based on native plants that can provide both ecological and economic outcomes; an increasing recognition of the role of Noongar people in sustainable land management; the development or trial of various farming systems and market based instruments to encourage more sustainable use of natural resources, and some innovative approaches to restoring functional landscapes by the non-government sector.

Most of all, the Region is home to many people who are passionate about this area and who have a wealth of knowledge, skills, experience and ideas to contribute to the development of an ecologically, socially and economically sustainable region.

1.1.1 SUBREGIONS

The Region has been subdivided into six subregions on the basis of drainage or administrative boundaries (Map 1).

- The **Kent-Frankland** subregion takes in the towns of Rocky Gully, Frankland, Cranbrook, Tambellup, Walpole and Broomehill. It contains the high rainfall, forested catchments flowing into the Nornalup and Irwin Inlets, with rainfall dropping off from in excess of 1200 mm per annum at Walpole in the south, to about 450 mm per annum at Broomehill in the north.

  Grazing activities and viticulture predominate in the upper Frankland catchment. Farm forestry, timber plantations and olive plantations are also increasing land uses. In the lower half of the catchment, State Forest predominates, with only small areas cleared for agriculture.

  In the Kent catchment there is a trend towards fewer, larger farms in the northern broad acre areas and greater numbers of smaller land holdings for rural residential and more intensive and diverse agricultural land uses in the high rainfall, southern coastal areas.

  Throughout the subregion nature conservation and recreational activities are popular in the southern half, with the coastal strip being popular for professional and amateur fishing.

- The **Albany Hinterland** subregion takes in the city of Albany and the towns of Denmark, Mount Barker, Manypeaks and Wellstead. It contains all of the Denmark, Hay and Kalgan River catchments flowing south from the Stirling Range and discharging into Wilson Inlet and Oyster Harbour.

  In the north-eastern part of the subregion, there is a trend towards fewer, larger broad acre farms focusing on traditional and diversified cropping and livestock industries. In the south-western part of the subregion, landholdings are becoming smaller with more focus on intensive and diverse agricultural systems. Throughout the subregion there is a trend for innovation and market development.

  New industries that have been established or are evolving in the subregion include viticulture, timber production, farm forestry, olives and fishing. The subregion is also renowned for its tourism, recreational and nature conservation values.

- The **North Stirlings Pallinup** subregion takes in the towns of Gnowangerup, Borden and Ongerup. It lies north of the Stirling Range and includes the Upper Pallinup catchment and North Stirling Basin.

  In the north, the Upper Pallinup landscape comprises an undulating dissected drainage system that flows southeast into the Pallinup River. This landscape differs to the very poorly, internally drained North Stirling Basin in the south of the subregion where soils are characterised by large areas of poorly structured grey sandy duplex and hard-setting clay soils. The basin is of hydrological significance in that the area has shallow perched groundwater table systems as well as an accumulation of large stores of salt within the basin sediments.

Agriculture in the Pallinup subregion comprises mixed farming with predominantly cropping (cereal production) to the north and east with more livestock (sheep grazing) to the southwest. The subregion boasts some of the highest Gross Value of Agricultural Production (GVAP) and crop yields in the Region.

Nature conservation and recreation is also a prominent feature, particularly in the Stirling Range National Park. New land use industries include large areas of lucerne and canola. There is developing interest in aquaculture, sandalwood production and nature based tourism.

- The **Fitzgerald Biosphere** subregion is the largest of the six subregions and centres on the Fitzgerald River National Park, recognised internationally since 1978 as part of the United Nations Educational, Scientific and Cultural Organization (UNESCO) Man and the Biosphere (MAB) Programme. The subregion's boundary is based on a larger notional biosphere reserve boundary and contains the towns of Bremer Bay, Jerramungup, Ravensthorpe and Hopetoun. It takes in part of the Pallinup River catchment and all of the Bremer, Gairdner, Fitzgerald, Hamersley, West, Phillips, Steere and Jerdacuttup River catchments.

  Land use within cleared areas is predominantly winter cereal production and grazing. Wheat and barley are the main cereal crops, grown in rotation with lupins, canola and subterranean or medic pasture.

  Within uncleared areas, the conservation of unique flora, fauna and ecosystems within the conservation estate and tourism activities predominate.

- The **Esperance Sandplain** subregion is a 40 to 50 km wide coastal strip taking in the towns of Munglinup, Esperance and Condingup. West of Esperance is the Oldfield-Munglinup, Young, Lort and Dalyup River catchments. To the east are Coramup, Bandy and numerous other smaller creeks.

  The landscape comprises level to gently undulating sandplains with deep sand sheets, linear sand dunes and small undulating rises often leading to isolated granite domes (or monadnocks) protruding above the ground surface. Short rivers discharging into coastal lakes, lagoons and estuaries dissect the landscape.

  Agricultural importance of the subregion declined in the early 1900s until a boom in grain production around the mid 1920s. This was followed by another boom in the 1960s after the introduction of superphosphate fertiliser. Agricultural production focusing on wheat and barley grown in rotation with lupins, canola and subterranean or medic pasture is still the dominant industry throughout the subregion. Developing land use activities include farm forestry and plantations.

- The **Esperance Mallee** subregion lies north of the Esperance Sandplain and takes in the towns of Scaddan and Salmon Gums. It will also include the proposed eastern extension of the South Coast Region addressed in Section 1.9.1. The subregion characteristically comprises a level to very gently inclined, internally drained landscape. Clusters of natural salt lake systems are common.

Extensive cropping is highly profitable, with the main cereal crops of wheat and barley being grown in rotation with canola, lupins, field peas and subterranean or medic pasture. Livestock industries are also important. These include beef cattle, wool production and fat lambs.

1.1.2 COASTAL AND MARINE ENVIRONMENTS OF THE REGION

- The marine component of the South Coast NRM Region extends from the coastline out to the 3 nautical mile limit, including waters to 3 nautical miles off the coast of offshore islands. Currently the subregional boundaries for Kent Frankland, Albany Hinterland, Fitzgerald Biosphere and Esperance Sandplain extend out to this boundary. This comprises a substantial area of State NRM responsibility (approximately 1 million ha; see Map 1), and over 1000 km of marine and coastal interface (the 'coastline'). Coastline and marine management must address a high level of recreational usage and impact, often in highly fragile and dynamic landforms such as coastal dunes, and with very high community and amenity values. 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. These 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 swell regimes.

Box 1: South Coast Stories – Eileen Croxford

A CONVERSATION WITH EILEEN CROXFORD

WILDFLOWER MOTIVATOR

Where does your love of plants and wildflowers come from?

I reckon it was my father. He used to grow beautiful vegetables and the most beautiful chrysanthemums you ever saw. I think I developed a bit of his horticultural ability. I have always had a garden and I had a little business called the Garden Florist over the telephone.

When I shifted to the Albany airport in 1961 I had to have a garden there, so I thought I will have a wild flower garden because I can remember the airport before it really was a proper airport and it was just a field of flowers -it was beautiful. So I used to go over to the back of the airport, very carefully remove little plants and plant them in the beds. They all died, so I decided I had to do it properly: I had to really learn about these flowers so I could grow them, and I started pressing flowers. Dr John Beard1 came to the airport one day, and I said to John, 'Will you help me with these names?' He helped me a bit and said, 'Eileen you must not stop doing this - there are no plans in this government to do any research into the Albany region until 1995. Because you are so interested in wildflowers, how about you convene a meeting to form an Albany branch of the West Australian Wildflower Society'. Well, I did this, not expecting very many people, and nearly 40 people turned up and we went on from there. That was 1963.

How did you kick-start the Herbarium?

To help keep the people interested I started showing them my collection of wild flowers and saying to them, 'Look, wherever you go, you collect some wildflowers too', and that is basically how it all started. It was very amateurish to begin with.

It wasn't until late 1978, with the urging of botanist Dr Arthur Weston, that we began operating the Albany Regional Herbarium.2 Then in 1979 we had a visit – I thought this was a miracle – from a little Scots lady, she was as Scottish as you could make it, and she asked, 'Would I mind if she collected grasses for us?'[3] She saw what we were doing and she said, 'You are doing it all wrong lassie. You can't have these bits of cardboard and things like this. Now I will write down the papers you need and you go to the Albany Advertiser and see if they can get them for you.' She was really the one that set us on the right way and showed us how to present the specimens and accession them. Now I will write down the papers you need and you go to the Albany Advertiser and see if they can get them for you.' She was really the one that set us on the right way and showed us how to present the specimens and accession them.

At first we used to meet sometimes in each others garages and each others houses and continue pressing and so forth. It was like topsy it just grew. There are about 17,000 specimens in the collection now.4 It is an ongoing thing there is no doubt about it -it is too valuable now not to continue on, and there is still an awful lot of land we haven't collected off.

I was interested in anything that had a flower and over the years I've contributed about 8355 specimens to the collection. I was known as the Herbarium's Coordinator and I stayed in that until about 1998, when I was 86. At the present time my job is going through all the specimens that have got all these new names, rubbing off the old names and putting the new ones back on again.

The people who built it up must be very proud of that achievement

I have always thought it a bit strange that we manage to do it with very little botanical knowledge, that we were just keen on doing it. I am a self taught person: I left school when I was 10, but I have always sought knowledge. I am very deadly serious in everything I do.

We were all just ordinary housewives. We are not botanists, we are not qualified people, we just happened to be put on the right track and had enough brains to go ahead and keep on the right track. We have all learnt lots and of course many botanists have come in too and they have given their input. We had some very good speakers come down and they all lectured us on various things and also we have a course at the Summer School and we all pile along to that. We were given donations to buy a botanical microscope so that we could see all the things we were trying to understand.

Q: "I just feel I am a motivator. One thing is I talk too much and the other thing is when I do talk, I seem to be able to motivate people to get interested and point out to them the desirability of saving our wildflowers and what fun it is learning all about it."

EILEEN CROXFORD

Box 1: South Coast Stories – Eileen Croxford (cont'd)

***POTTED LIFE HISTORY**: Born 1912 in Plymouth, England. Family migrated to Denmark in 1924 under the Group Settlement Scheme. 'We just lived in these shacks - no floor, no doors, no windows. I was out to work by the time I was 12. I was 20 when I got married and then I proceeded to have a family. Then the war came, my husband went away to Japan and didn't come back again'.*

Married second husband, Cliff, in 1954. He was in the air force and became the groundsman at the Albany airport. 'Look what started there!' Botanists have named Melaleuca croxfordiae *and* Chamelaucium croxfordiae *in recognition of Eileen's botanical achievements..*

MY EUCALYPT? MY PINGRUP PINK?

TELL US THE STORY OF DISCOVERING THE PINK-FLOWERED MALLEE...

I have asked everyone who is going to have a go at propagating it, will they please name it Eucalyptus 'Pingrup pink'. [5]

We were on a trip to Kalgoorlie in the caravan and car in 1970. My husband got fed up with me shouting out 'stop, stop, stop', but this time we were on that road that goes off Gnowangerup-Jerramungup Road up to Pingrup, not far from Borden, and I just happened to look -it was all bush, it wasn't any farms or anything -and I just saw this mass of pink and I said, 'Oh, stop Cliff, stop, I must go and see what that pink is'. He did and when I went over there (in England you would have said it was a copse because a copse is always a big area of things all the same size and that is just what it was; it wasn't any taller than me) and it had these beautiful sprays of real baby pink, so I thought what on earth is it. I knew it was a eucalypt so I collected these seeds and collected a piece of flower and pressed it.

We went on to Kalgoorlie and decided to come back the same way, so I said to Cliff, 'We will stop and have a look at that pink eucalypt again', but there wasn't a thing there. A big ball and chain had been right through for miles and miles and miles and there was nothing there - it was all waiting to be burnt. It was all dead. I only got four plants out of the seed and I gave two away and I kept two myself: one lived and one died; the living one is still there at home in Spencer Park.

I think that was our greatest fear, the fact that the country was being cleared and nobody knew much about it. All the botanists that come down they always say, 'Oh, you must keep on collecting'.

Notes: The text is largely drawn from an interview recorded in Albany on 23 March 2004. The interviewer was Keith Bradby. A short follow-up interview and G. Janicke's A History of the Albany Regional Herbarium were minor sources. The latter is available from the Albany Regional Herbarium.

Acknowledgements: A contribution by Greening Australia (WA) to the SCRIPT South Coast Regional Natural Resources Management Strategy and the Gondwana Link project. Editing by Margaret Robertson and Keith Bradby. Special thanks to Eileen Croxford for sharing her story and to Hilary Thorn for paving the way. Thanks also to the Department of Environment and Margi Edwards for preparing the interview transcript.

[1] Then President of the Wildflower Society WA and Director of the Kings Park Board.

[2] The Albany Regional Herbarium is located within the Department of Conservation and La nd Management, on Albany Highway. Open 9.30 – 12.00, Mon – Thurs. Coralie Hortin is the co-ordinator.

[3] Her name was Mary McCallum Webster. 'She had already collected 5,000 grasses and put them in the herbarium at Kirsten Bosch in South Africa. And she had done all the grasses in Scotland -she really was an expert on grasses .'

[4] 'The WA Herbarium recognises us as a herbarium.' To house the herbarium and cover the cost of materials, the Albany branch of the Wildflower Society came to an arrangement with the Department of Conservation and Land Management in 1988.

[5] Eucalyptus sp. Presumed hybrid, but botanists will conduct DNA analysis. A pressed specimen can be seen in the Albany Regional Herbarium.

1.2 WHAT THIS STRATEGY IS ABOUT

In this section, the context for this Strategy is summarised, including why and how it has been developed and how it will be used.

1.2.1 WHAT IS NATURAL RESOURCE MANAGEMENT?

For the purposes of this Strategy, natural resource management (NRM) is defined as:

> *The ecologically sustainable management of land, water, marine and biodiversity resources for the benefit of existing and future generations and for the maintenance of the life support capability of the biosphere. It does not include mineral resources.*

In simple terms, this Strategy deals with the South Coast Region's land, water (inland and marine) and biodiversity, and how they can be managed within the principles of Ecologically Sustainable Development (ESD)[2].

The Strategy also recognises that the people of the Region are important, and that they are ultimately responsible for NRM and the prosperity of the Region. The Strategy therefore considers NRM in the context of social and economic development issues that depend upon or influence the use of natural resources in the Region. Strategies are identified to strengthen the capacity of the community[3] to manage natural resources to ensure environmental, social and economic outcomes are optimised. Wherever possible, links are made to other strategies or initiatives that more directly deal with the complementary issues of community health, regional development, education and employment.

1.2.2 HOW WILL THE STRATEGY MAKE A DIFFERENCE?

Two of the main requirements for managing natural resources for a sustainable future are achieving effective integration across a range of land and water uses, management responsibilities and stakeholder interests, and getting the most effective return on the investment of time and resources by those stakeholders. This Strategy is intended to strengthen the Region's ability to achieve that integration of purpose and effort, and to work effectively to protect our natural resources by providing:

- A clear statement of the South Coast community's vision for the management of natural resources and related social and economic matters;
- Analysis of the values and condition of the Region's natural resources;
- Analysis of the threats to the Region's natural resources;
- Specific goals and targets that will provide the steps towards achieving the Regional Vision;
- A range of actions required to achieve the targets and an indication of their relative priorities;

[2] The principles of, and strategies for, ESD have been adopted nationally and by the State. See, for example the ***National Strategy for Ecologically Sustainable Development*** (Commonwealth of Australia, 1992) and the State Sustainability Strategy for WA.

[3] The term "community" can have several meanings: it can refer to the whole regional community and include all the institutions, groups, departments and individuals within that region; it can refer to more localised communities within a catchment, or it can mean a particular social grouping, such as the land managers of an area or Indigenous communities. Unless otherwise qualified within the document, "community" is generally used in its widest sense to include all the stakeholders with an interest in the management of the Region's natural resources.

- A framework for implementing the actions, with an emphasis on partnerships between stakeholders;
- The basis for an Investment Plan that will assign costs to the priority actions and identify potential sources of funding. While a range of funding sources will be targeted, the initial Investment Plan will focus particularly on delivery of the Natural Heritage Trust (NHT) and the National Action Plan for Salinity and Water Quality (NAPSWQ) (see Box 2).

1.2.3 HOW HAS THE STRATEGY BEEN DEVELOPED?

SCRIPT (see Box 3) has coordinated the development of this Strategy, building on several previous regional planning processes undertaken within the South Coast Region. These include:

- The development of ***Southern Prospects*** (South Coast Regional Assessment Panel (RAP) and SCRIPT, 1996a) and six subregional Land and Water Care Strategies (South Coast RAP and SCRIPT, 1996b, 1996c, 1997a, 1997b, 1997c, 1997d) as the result of a Regional Initiative and 18 months of extensive community consultation across the Region. Those documents provided a guide to the priority issues and actions required to address them, and were used to develop projects and funding applications in subsequent years, many of which provided the basis for the NRM networks active in the Region today;
- A second phase of extensive community input on the development of the Regional Initiative into a Regional Strategy, resulting in the ***Draft Southern Prospects Regional Strategy*** (SCRIPT, 2000) and the subsequent public comments. The document and the public submissions were reviewed again in developing this Strategy;
- The development of ***Southern Shores: 2001-2021: A strategy to guide coastal and marine planning and management in the South Coast Region of WA*** (South Coast Management Group, 2001) through an extensive community consultation process involving six local government authorities (LGAs) and their communities.

The progress made on implementing these previous strategies and the recommendations yet to be addressed are outlined in Appendix 3 (South Coast Achievements). While substantial progress has been made on implementing the recommendations of the earlier strategies, some areas are yet to be addressed or still require action, and these have been included within this Strategy.

Since the release of the ***Draft Southern Prospects Regional Strategy*** in March 2000, a number of other regional, State and national studies of the condition of natural resources or threats to them have become available. Some examples are the outcomes of the extensive National Land and Water Resources Audit, the further development of WA's ***State Salinity Strategy*** (Government of Western Australia, 2000a) and the ***Salinity Investment Framework*** (Department of Environment, 2003). Other sources of information are referenced throughout this document. This additional information has allowed a more thorough analysis of the condition of and the threats to the Region's natural resources to be undertaken in the development of this Strategy.

The development of the Strategy has also been guided by the requirements under the Bilateral Agreements between the Australian Government and the WA State Government on the NHT Extension and the NAPSWQ (Commonwealth Government 2002, 2003) (see Box 2). Under the Bilateral Agreements, the delivery of funds under the NHT and the NAPSWQ will be directed to priority actions identified through accredited Regional strategies developed by nominated Regional bodies and with strong community participation. SCRIPT, in association with the SCMG, has been nominated under the Bilateral Agreement to develop a Regional NRM Strategy for the South Coast Region. Similar Regional organisations are developing Regional strategies within WA's five other NRM Regions (see Box 4).

To ensure that the Region is able to meet the accreditation requirements for NHT and NAPSWQ, and to respond to community feedback on the earlier strategies that requested clearer targets and priorities, SCRIPT has worked with community groups and government departments to develop this Strategy through the following process:

- Foundation Funding[4] was received by SCRIPT in June 2003 to review previous planning and more recent resource information, and to develop the Strategy in accordance with accreditation criteria. SCRIPT convened a working group to undertake the initial review and develop preliminary proposals. The working group included representatives from local government, community and State government agencies with responsibilities for managing natural resources.
- From October to December 2003, a formal consultation process was undertaken within the Region to extend awareness of the Regional NRM processes, and to gain wider input into the goals, objectives and targets of the Strategy.
- The Strategy was developed by SCRIPT's Regional Strategy Subcommittee, incorporating community input and supplemented by additional information sought from a range of government and non-government sources. The Draft document was then submitted for a Fast and Efficient (F&E) review by the Joint Steering Committee (JSC) as part of the accreditation process.

[4] Foundation Funding was a component of the NHT and NAPSWQ funding dedicated specifically to the support of Regional NRM organisational structures, the development of Regional NRM strategies to meet accreditation criteria, and the development of Regional Investment Plans based on the accredited strategies.

- The Strategy was edited as a result of the feedback from the F&E review and released for a six week public comment period on 21 June 2004. The public comment period was extended for two weeks and finished on 13 August, 2004. Throughout the public comment period, community and theme specific workshops were conducted across the Region. Individual workshops were also held for each of the local governments within the Region. Written feedback was invited with a template available to assist with submissions. In total, eight community workshops, ten local government workshops and three theme specific workshops were held with 71 written submissions received. As a result, in excess on 1500 individual comments were addressed in preparing the Strategy for accreditation. The process used theme facilitators for Land, Water, Natural Diversity, Coasts and Marine and Cultural Heritage who accessed specialist advice when required, to address comments associated to the theme areas. General comments were addressed by the Strategy coordinator using a specialist panel for verification.
- Indigenous consultation was commenced for the draft document and further consultation will continue after accreditation. The information gained to date has been incorporated into the Strategy.
- This formal consultation was part of a larger, ongoing consultation process within the Region, which is summarised in Appendix 9.

Throughout the document the term "community" is used. This can have several meanings: it can refer to the whole regional community and include all the institutions, groups, departments and individuals within the Region; it can refer to more localised communities within a catchment; or it can mean a particular social grouping, such as the land managers of an area or Indigenous communities. Unless otherwise qualified within the document, "community" is generally used in its widest sense to include all the stakeholders with an interest in the management of the Region's natural resources.

1.2.4 WHAT HAPPENS NEXT?

Following the consultation period, the Strategy will be finalised and submitted to the JSC established by the State and Australian Governments to oversee the accreditation of strategies. The JSC will refer the Strategy to State and Australian Government departments for review against accreditation criteria and then recommend to the State and Australian Government Ministers that it be accredited. The Strategy will be subject to ongoing review and evaluation (described in Section 3.4 of the Strategy).

The implementation of the Strategy is described in Section 3. An Investment Plan will be prepared by SCRIPT during the consultation and accreditation period to identify proposed investments by the State and Australian Governments and other potential sources. The Investment Plan will need to include sufficient information to allow potential investors, including the Governments, to determine their contributions.

Minimum requirements for the Investment Plan are:

- Detail of the specific actions or activities proposed to be undertaken;
- Costings of the actions and proposed sources of investment;
- Details of the proposed monitoring and evaluation (M&E) strategy for individual actions;
- Expected return on investments, in particular, a summary of what the proposed actions will deliver in relation to the targets outlined in the accredited Regional Strategy;
- Identification of the primary beneficiaries of the investment and proposed cost sharing arrangements (i.e. assessment of public versus private good);
- Urgency, significance or critical nature of the action, and the consequences of not undertaking it;
- The relationship with existing government policies or programs;
- The risk factors and how these will be managed;
- The assumptions for chosen actions; and
- The timelines, milestones and performance indicators for each action.

While SCRIPT will develop (with community consultation) and submit the Investment Plan, the implementation of actions or activities arising from the Plan is likely to be undertaken by various organisations including community groups, government departments, non-government organisations (NGOs) and education, training or research organisations. This is discussed further in Section 3.

1.2.5 HOW DOES THE STRATEGY RELATE TO LEGISLATION AND OTHER PLANS AND POLICIES?

The Strategy has been developed in accordance with the requirements for accreditation under the NHT and NAPSWQ Bilateral Agreements. These include recognition of the State and national legislative and policy frameworks for NRM, including the policy instruments included in Appendix 2. These frameworks have been further discussed or referenced where they have a direct influence on a proposed action arising from this Strategy.

Of particular relevance to the approach taken in the development of the Strategy are the ***State Salinity Strategy*** (Government of Western Australia, 2000a) and ***Salinity Investment Framework*** (Department of Environment, 2003), the ***Preliminary Agency Statement of Natural Resource Management Priorities in Western Australia*** (Government of Western Australia, November 2003b), and the ***Memorandum of Understanding between the State of Western Australia and the six Regional NRM Groups***. The Strategy should also be considered within the context of WA's ***State Sustainability Strategy*** (Government of Western Australia, 2003a), which addresses many of the State level issues previously raised in community consultation within the Region.

1.3 THE REASONING BEHIND THE STRATEGY

In this and the following section, the principles underpinning the Strategy are summarised and the Vision for the Region is discussed. The terminology used in later parts of the Strategy is introduced, and the relationship between the Vision, the outcomes we are seeking and the proposed targets and actions are described.

1.3.1 PRINCIPLES UNDERPINNING THE STRATEGY

In developing the Strategy, SCRIPT reviewed and adapted the guiding principles that were used in the development of earlier Regional strategies and modified these to reflect the intent of the guiding principles within the WA *Salinity Investment Framework*.

The principles are primarily concerned with the integration of environmental, social and economic outcomes, the importance of working in partnership with all stakeholders, and achieving effective outcomes by targeting the causes rather than the symptoms of problems.

1. Natural resource management outcomes are directly linked to people's long-term social and economic well being.
2. Integrated planning and management of all natural resources will produce the most effective outcomes.
3. A "whole of landscape" approach to planning and management will assist in integrating actions across different resources, issues and interests.
4. The underlying causes of threats to natural resources should be addressed wherever possible, rather than the symptoms.
5. Partnerships between and amongst non-government and government parties based on equity and accountability provide the best basis for planning and actions.
6. Planning and management of natural resources should be based on the best available information. A precautionary approach is wise, but action must proceed even where there is only limited information available on prevailing environmental, social and economic circumstances.
7. Public investment in NRM must target those actions from which the greatest public benefits will be gained.
8. To manage precious resources wisely into the future, we must be prepared to learn the lessons from past and present experiences and be prepared to adapt our thinking and actions accordingly.

Box 2: NHT & NAPSWQ Initiative

NATIONAL ACTION PLAN FOR SALINITY AND WATER QUALITY AND THE NATURAL HERITAGE TRUST

COMMUNITY CAPACITY BUILDING & INSTITUTIONAL CHANGE	BIODIVERSITY CONSERVATION
REVERSE TRENDS IN DRYLAND SALINITY	IMPROVE WATER QUALITY
SUSTAINABLE USE OF NATURAL RESOURCES	ENABLE REGIONAL COMMUNITIES

Since the release of the Draft Southern Prospects Regional Strategy (March 2000), there has been significant evolution of programs and strategies for the implementation of NRM at national, State and local levels.

In particular, the Australian Government announced the National Action Plan for Salinity and Water Quality (NAPSWQ) in October 2000, and an extension to the Natural Heritage Trust (NHT) program in 2001.

Both of these programs are underpinned by Bilateral Agreements between the Australian Government and the WA Government.

Bilateral Agreements: *These agreements can be viewed on the websites:*

WWW.NAPSWQ.GOV.AU/
AND
WWW.NHT.GOV.AU/NHT2/BILATERALS

Natural Heritage Trust
Helping Communities Helping Australia

action Salinity & Water AUSTRALIA

NHT OBJECTIVES:

- Biodiversity conservation – the conservation of Australia's biodiversity through the protection and restoration of terrestrial, freshwater, estuarine and marine ecosystems and habitat for native plants and animals;
- Sustainable use of natural resources – the sustainable use and management of Australia's land, water and marine resources to maintain and improve the productivity and profitability of resource based industries; and
- Community capacity building and institutional change – support for individuals, land managers, communities, industry and organisations with skills, knowledge, information and institutional frameworks to increase capacity to implement biodiversity conservation, and sustainable resource use and management.

(Bilateral Agreement between the Commonwealth of Australia and the State of Western Australia, Dec 2002)

NAPSWQ GOALS:

To motivate and enable regional communities to use coordinated and targeted action to:

- Prevent, stabilise and reverse trends in dryland salinity affecting the sustainability of production, the conservation of biological diversity and the viability of our infrastructure; and
- Improve water quality and secure reliable allocations for human uses, industry and the environment.

(Bilateral Agreement between the Commonwealth of Australia and the State of Western Australia, 2003)

The NAPSWQ identifies national priority regions or catchments, including the South Coast Region of WA, that are eligible to receive funding under the joint WA-Australian Government funding agreement on regional delivery of the NAPSWQ.

Funding under both the NHT and NAPSWQ will be based on Regional strategies that are developed by Regional bodies and meet accreditation criteria outlined under the Bilateral Agreements. In brief, these criteria require that The Regional strategies are based on high quality scientific analysis, with wide community input, and with identified targets and outcomes that can be measured and reported. Investment plans to guide funding are to be based on the accredited strategies. SCRIPT, in cooperation with the SCMG, has been named under the Bilateral Agreements as the body within the South Coast Region with responsibility for developing this Strategy and Investment Plan.

The delivery of the NAPSWQ and NHT have been integrated under the one delivery mechanism, and accredited strategies and investment plans therefore need to address all aspects of NRM, and demonstrate how they link to and support national and State outcomes sought under such initiatives as the National and WA Water Quality Management Strategies, the Waterways WA Policy and the WA Salinity Action Plan.

Box 3: SCRIPT – Background

***ENGAGEMENT :: SCRIPT** embodies a close working relationship between community and government agencies. Of note is the input from government agencies via their regional managers and involvement and commitment of community stakeholder groups. SCRIPT relies heavily on other key partners - the six SCRIPT subregional groups, LCDCs, farmers, tertiary institutions, environmental groups, Local Government, industry groups, non-government organisations, coastal and marine groups and Indigenous organisations.*

Some of the roles and responsibilities of the network of South Coast participants in NRM are summarised in section 1.8.3. More information about SCRIPT can be found by visiting: www.script.asn.au

SCRIPT: THE SOUTH COAST REGIONAL INITIATIVE PLANNING TEAM (INC)

SCRIPT is an independent incorporated group that operates as the peak Regional body that brings people, organisations and information together so that the Regional community helps drive sustainable management of natural resources with positive social and economic outcomes. It is one of six Regional NRM groups that have been recognised as providing a suitable basis for community representation and involvement in the planning and delivery of NRM outcomes in WA.

SCRIPT's Regional representation depends on a network of catchment, landcare and other groups and individuals within the six subregions (subregional boundaries extend to the 3 nautical mile limit of the coast) that make up the South Coast Region (see Map 1). Communication with the network is through a combination of formal and informal meetings, newsletters, electronic networking and support for local and subregional networks. Regional Forums, at which a range of NRM issues and actions are discussed and debated, are held several times each year and are open to members and to anyone with an interest in NRM.

SCRIPT has a Management Committee made up of elected community (non-government) representatives, and nominated WA government representatives. The government membership constitutes no more than one third of the positions, and currently includes representatives from the Departments of Environment, Agriculture, Conservation and Land Management, and Planning and Infrastructure, and the Goldfields Esperance Development Commission. Each of the subregions has at least one elected community (non-government) representative, and the Region's local governments and the SCMG each are entitled to an additional representative. SCRIPT has always enjoyed strong representation from local government on its Management Committee, with present membership including several current and past local government representatives. All non-government members, including the Chairman and Treasurer, are elected by the SCRIPT general membership for fixed terms.

Since SCRIPT's formation in 1994, it has played a major role in the development and implementation of Southern Prospects (South Coast RAP and SCRIPT, 1996a) and its update into this Strategy. It has also had a key role in facilitating and administering funding under a number of programs of significant activities within the Region (some of these are summarised in Appendix 3), in advocacy on behalf of the Region, in developing and facilitating partnerships between stakeholders, and in the maintenance of strong community-based networks for communication and participation in a range of NRM activities.

Partnerships and networking are critical to the achievement of good outcomes for land, water, coastal and marine environments and biodiversity, and the Region has a long history of successful and enterprising groups and individuals engaged in NRM. A feature of many of the groups is the ability to recognise and adapt to changes in political, economic, social or biophysical conditions in order to better address the challenges of implementing sustainable development within the constraints of a landscape that is highly valued yet facing some severe threats.

Major subregional groups within the South Coast include the Esperance Regional Forum, Ravensthorpe Agricultural Initiative Network, Fitzgerald Biosphere Group, Albany Hinterland Groups (Wilson Inlet Catchment Committee, Oyster Harbour Catchment Group, Albany Eastern Hinterland), Pallinup North Stirlings Natural Resources, Kent Recovery Team and Frankland Gordon Catchment Management Group. Within each of the subregions there are numerous other catchment groups, LCDCs, Friends groups, conservation groups and other organisations that link into The Regional network. Other groups, such as the South Coast Management Group, the Malleefowl Preservation Group, the Gondwana Link partnership, the South East Forest Foundation and Timber 2020, represent interests that extend across and beyond the Region.

Box 4: NRM Framework in WA

NATURAL RESOURCE MANAGEMENT FRAMEWORK

| STRATEGY DEVELOPMENT | CONSULTATION | PRIORITISATION
| INVESTMENT PLANNING | ENGAGEMENT | ADVICE |

Regional NRM Groups in WA formed as non-statutory, community-based groups over the past decade to provide better coordination at a Regional level for the many catchment or local groups and to develop priorities and strategies that would assist in securing resources and getting more effective actions.

Structures of the Regional NRM Groups vary but generally they are comprised of community members, and state and local government representatives.

CONSISTENCY THROUGH REPRESENTATION

Within WA there are six Regional NRM Groups: Swan, Avon, Northern Agricultural and South West Catchment Councils (SWCC), SCRIPT and the Rangelands NRM Coordinating Group.

In June 2003, the State Government and the six Regional NRM Groups signed a memorandum of understanding.

This agreement formalises the working relationships between the State and the Regional NRM Groups, as well as providing a framework for greater co-operation, mutual support and accountability for conservation and sustainable land use within Western Australia.

Under the Memorandum of Understanding, the Regional NRM Groups will:

- Develop Regional NRM strategies for accreditation,
- Consult with the broad community,
- Develop an Investment Plan which includes the prioritisation of activities,
- Maintain community input into the implementation and evaluation of the Strategy,
- Provide advice at the State and regional level.

The Chairs of the six Groups meet regularly to ensure consistency of approach across the State, and to ensure that community concerns and issues are voiced to the State and Australian Governments.

The Regional Chairs Group provides advice to WA's NRM Council, which provides policy and strategic advice on NRM to the Cabinet Standing Committee on Environmental Policy.

The NRM Council's membership includes eight community (non-government) members and five nominated WA government representatives.

The government representatives are from the Departments of Environment, Agriculture, Conservation and Land Management, Planning and Infrastructure and Forest Products Commission.

1.4 THE SOUTH COAST VISION

The Vision is a statement about what the community wants for the Region's future. The South Coast Region is already on the way to achieving this Vision. Outstanding biodiversity has been recognised under a range of national and international criteria, and many of the Region's land managers have been recognised at State and national levels for their commitment to sustainability and to innovative land management practices. The community has a long history of collaborative action taken to improve the management of the Region's land, water, biodiversity and marine resources, and some well-established networks and partnerships. Some of the organisations that make up the networks are described in section 1.8.3.

1.4.1 FROM VISION TO ACTIONS

Included within the Vision are the three interrelated objectives for ecologically sustainable development: environmental (addressed explicitly in the "Conservation" objective), social (addressed as "Community"), and economic (addressed as "Sustainable Use"). All three are interdependent and are essential for sustainable management of natural resources.

To achieve the Vision, a series of shorter-term objectives and targets have been proposed. In keeping with the State and national frameworks developed under the Bilateral Agreements, the Strategy has developed these shorter-term objectives under a number of headings based on the Region's natural resource **assets**[5]. Six headings are used, four of which are largely biophysical (Land, Water, Biodiversity, and Coastal and Marine) and two of which are largely social or economic (Cultural Heritage and Regional Capacity). It is important to note that each type of asset has associated environmental, social and economic **values**. Section 1.5 provides a summary of the asset types and their values, as well as the approach used in determining the priorities within each asset type.

For each class of asset (Land, Water, Biodiversity, Coastal and Marine and Regional Capacity), the Strategy has developed **Aspirational Goals**[6] and a number of Outcomes to be achieved within the next 50 years. In this Strategy, Outcomes are defined as the result or impact of a number of management actions.

Progress on meeting the long-term Outcomes for the state of the Region's natural resources will be measured through **Resource Condition Targets**[7] that have been proposed for specific assets, such as some of the Region's highly valued waterways. The Resource Condition Targets will assist the Region to measure its progress in maintaining or improving its natural resources, and will also be included in State and national M&E frameworks to assist in measuring progress at those scales. In some cases, there is insufficient information available to be able to quantify these targets now, so a process and schedule for defining the targets is proposed.

[5] As part of the WA *State Salinity Strategy*, an investment framework has been developed that requires the identification of high value public assets (biodiversity, water resources, land, etc.) as part of the process for identifying priorities for investment and action. This "assets and threats" approach has been adapted in the development of this Strategy.

[6] Schedule 5 of the Bilateral Agreement for the NHT Extension describes "aspirational targets" or goals as "aspirational statements about the desired condition of (the Region's) natural resources in the longer term (e.g. 50+ years). These goals or targets would guide regional planning and set a context for the measurable and achievable targets required under this framework." Examples could include natural ecosystems, habitats and landscapes are conserved, restored, linked and managed to provide increased viability for native species and communities.

[7] Resource condition targets are defined under Schedule 5 of the Bilateral Agreement as "specific, time bound and measurable targets, relating largely to resource condition" which must be set for the minimum set of matters for regional targets (see Table 2).

Section 2 of the Strategy describes the actions that will be taken to meet the **Resource Condition Targets**. These **Management Actions** include on ground works, building community capacity, developing our information base, benchmarking and monitoring of our performance, and any additional planning or policy measures required. Targets are also proposed for management actions. These **Management Action Targets** are short-term targets (mostly one to five years) designed to assist in measuring the Region's progress on implementation of the Strategy.

The **Resource Condition and Management Action Targets** presented in this draft for public comment are interim targets only. They will be reviewed during the public comment period and over the course of the implementation to ensure they reflect community values and the requirements for targets as prescribed in the NAPSWQ/NHT2 Bilateral agreements. In addition, the time critical nature of the **Management Action Targets** will be reviewed during the course of the development of the Investment Plan.

1.4.2 NATIONAL OUTCOMES AND MINIMUM SET OF REGIONAL TARGETS

The Strategy has been developed within the frameworks agreed by the Australian and WA Governments. These include a set of agreed national outcomes (see Table 2) and a defined minimum set of matters for which Regional strategies must set regional targets. Technical working groups at State and national levels have been working to define indicators that should be used for each of these matters, as this would ensure consistent monitoring and evaluation across Australia and hence allow a clear picture of the effectiveness of nationally funded programs to emerge. However, as at February 2004, there has been no final definition of those indicators. The Strategy has therefore proposed Regional Resource Condition Targets based on the current availability and suitability of Regional datasets. These will need to be reviewed and refined as progress is made on identifying State and national indicators and finalising the State Monitoring and Evaluation Implementation Plan (see Appendix 12).

Table 2: National Outcomes and Minimum Set of Regional Targets

National Outcomes	Minimum set of matters for which Regional Targets must be set
The National Outcomes are aspirational statements about desired national natural resource Outcomes.	**Resource condition Matters for Targets**
1. The impact of salinity on land and water resources is minimised, avoided or reduced. 2. Biodiversity and the extent, diversity and condition of native ecosystems are maintained or rehabilitated. 3. Populations of significant species and ecological communities are maintained or rehabilitated. 4. Ecosystem services and functions are maintained or rehabilitated. 5. Surface and groundwater quality is maintained or enhanced. 6. The impact of threatening processes on locations and systems which are critical for conservation of biodiversity, agricultural production, towns, infrastructure and cultural and social values, is avoided or minimised. 7. Surface water and groundwater is securely allocated for sustainable production purposes and to support human uses and the environment, within the sustainable capacity of the water resource. 8. Sustainable production systems are developed and management practices are in place, which maintain or rehabilitate biodiversity and ecosystem services, maintain or enhance resource quality, maintain productive capacity and prevent and manage degradation	1. Land salinity. 2. Soil condition. 3. Native vegetation communities' integrity. 4. Inland aquatic ecosystems' integrity (rivers and wetlands). 5. Estuarine, coastal and marine habitats' integrity. 6. Nutrients in aquatic environments. 7. Turbidity/suspended particulate matter in aquatic environments. 8. Surface water salinity in freshwater aquatic environments. 9. Significant native species and ecological communities. 10. Ecologically significant invasive species. **Management Action Matters for Targets** 1. Critical assets identified and protected. 2. Water allocation plans developed and implemented. 3. Improved land and water management practices adopted.

Source: Modified from Bilateral Agreement between the Commonwealth of Australia and the State of Western Australia (December, 2002).

Box 5: South Coast Stories – Garry English

A CONVERSATION WITH GARRY ENGLISH

INNOVATIVE FARMER AND NATURE ADVOCATE

I was very driven to do something about the problems we had: about water-tables rising, preventing the land blowing away, and saving some of nature's treasures. I was driven to save my asset and driven emotionally, probably, in some people's minds, over the top, but we're still there, and it hasn't cost me my bottom line in income.

In fact, I believe that we've done very well, and the property is still there, but we've also been able to save some other assets: people just don't recognise how much you benefit from having a pristine bit of bush nearby that's full of birds that chirp in the morning around your house. That's what is so good about living in the bush.[1]

I was born into farming in 1944 at a little place called Kukerin and left there with my parents in 1953 to go down to Mt Barker. I got through Year 11 schooling and then went home to work with my father and also get a start on a Conditional Purchase block at Narrikup. It was a square mile, a block of bush, and I had to make a living out of that. My father gave me the backing to get it because I was only a kid about to turn 17. I just had a strong desire to go farming, simple as that.

After 12 years developing the block, and my marriage to Jan, we decided it wasn't viable so we left agriculture for four years. But we were looking for land, we were always going to get back to farming, so when an opportunity at Esperance appeared in late 1975, we grabbed it.

Acknowledgements: A contribution by Greening Australia (WA) to the SCRIPT South Coast Regional Strategy for NRM and the Gondwana Link project. Editing by Margaret Robertson and Keith Bradby. Special thanks to Garry English. Thanks also to Stephen Mattingley for assistance with the text, Amanda Keesing for photo editing, and Liz Turnbull for preparing the interview transcript.

PATERNAL INFLUENCE...

My father was a good role model who was very, very sensitive to the land and the way he developed it. At school we had some very good teachers, particularly in nature study in my younger grades and later in science. Here I am, 50 years on and still remember and appreciate them.[2]

Another influence was probably the shift from the wheatbelt down to Mt Barker: the jarrah forest came to 20 metres from the back door of the house — it was a tremendous sensation.

I've always had an interest in the degradation side of farming. I can recall reading agricultural journals from the early fifties, so I must have been about eight or nine. I can still remember sheet erosion as one of the topics, and wind erosion.

The 1970s really brought it home to us that we were clearing far too much land without any consideration of what we were doing. We were getting bigger and bigger chains between bigger and bigger bulldozers and just wiping everything in between, from wetlands to stone country to deep sand. Country that should never have been touched was all caught up in a 'million acres a year'. It was driven by government at the time, and it would have been '78 or '79 that I was starting to question why we shouldn't be trying to save some of those bits of the natural environment that were left and manage the land better. In some cases we could actually use it as an economic base, and still maintain it.

[1] With the exception of the material referred to in note 2, the text is taken from an interview recorded by M. Robertson in Hopetoun on 3/08/2004.

[2] This interview excerpt was taken from recordings made for the documentary film 'A Million Acres A Year', which was produced by Snakewood Films in association with SBS Independent, developed with the assistance of the Australian Film Commission and financed with the assistance of the Australian Film Finance Corporation. It is available from Film Australia.

[3] Using permanent wheel tracks throughout cropping and fallow cycles. GPS means Global Positioning System.

Box 5: South Coast Stories – Garry English (cont'd)

INNOVATION... NATURALLY

ASSET PROTECTION

We developed a banksia wildflower-picking enterprise, and that was pretty successful for seven or eight years. In about the mid-80s we started to fence out a lot of country which was not carrying its way economically, and that included the major wetlands system that goes through the top of our property. The birdlife on the wetlands is amazing.

Then we started fencing out deep sands. Anything that wasn't paying well, we fenced out and didn't allow stock in there, and it's the best thing we could ever have done. Our bottom line ended up being better because we weren't wasting fertiliser and resources on unproductive ground. It had enough seed and natural plants in it to regenerate, so we've got fairly large blocks of native vegetation. One block has eight species of Banksia and the habitat for everything from the little pygmy possums to parrots and kangaroos.

Anything liable to be at risk of water inundation was also fenced out and revegetated. They are sumps, but also an area of vegetation for nature conservation values.

In 1982 we put in our first lot of windbreaks, with *Pinus radiata*. They were the only pines which were seen as commercially viable. In 1984 we put in 45 km of tree lines. While we haven't made money out of them as a timber resource, I think we have saved our asset, the land base.

Now, as you fly half an hour out of Perth, you look out the right-hand window and there it is – it's the only place you see through to Sydney that stands out like that. It's a bit of a landmark. 1981, specifically, was what brought it home to us: it was wall-to-wall wind erosion and it was very frightening, just seeing our country blow away.

We've taken on other initiatives over the 28 years we've been here. We surveyed the whole farm and put in W drains and V drains to manage surface water ponding.

Then we got into putting in perennial pastures. I believe we should, to manage our land and use our out-of-season rainfall, include some perennial system. As long as meat prices stay up, we'll be putting in more perennials. And we've also tried rehabilitating land which has gone to barley grass and is in the early stages of salinity, putting in everything from salt bushes through to Puccinellia, tall wheat grass and lucerne, and we're currently trialling some new salt-tolerant pastures.

FARMING FOR THE LONG TERM

A PHILOSOPHY...

My philosophy is certainly to make agriculture pay — that's what pays the bills — but at the end of the day we want to keep our property as intact as we can. I also saw there were some things about the farm which made us feel very good: I've got photos where the kids weren't out in the open paddock where we were growing sheep, they were in the swamps, or they were in the creek. There's a very big social pay off for bringing up kids on a block that's got these natural features.

I try to use nature as much as possible. I have real concerns about weeds and chemical resistance, and also insect pests, and not having the natural predators there, because it's becoming broader and broader paddocks with no vegetation, nothing for even a crow to sit in. Modern systems of tramlining and GPS-driven machinery[iii] are not compatible with trees or finessing of your paddock, or keeping little bits of bush and wetlands, so somewhere along the line there is going to be some sort of crash point. I'm not going to go down that track.

I've always made it a philosophy that we'd do a project every year, and it doesn't matter what our economic circumstances are, there's always something you can do. In some of our leanest years, when having droughts and the like, we were still able to do things, even if it's down to implementing some of our farm plan by pulling out a fence which was in the wrong place and re-fencing.

It's not a spectacular block in agricultural terms, but it's one that has got a lot of me in it, and certainly my family have got a bit in it as well. I have invested an enormous amount of thought and energy into it. It's a lifetime that's invested in that property, so it's part of me.

1.5 ASSETS, VALUES AND THREATS

This section provides a summary of the Region's natural resource asset types and their values. In these tables, "Environmental Value" is defined as:

Particular values or uses of the environment that are important for a healthy ecosystem or for public benefit, welfare, safety or health and which require protection from the effects of pollution, waste discharges and deposits and activities which cause "environmental harm" (Environmental Protection Authority, 2003).

The primary environmental values of natural resource assets are:

- Natural diversity: genes, species, communities and life-supporting ecosystem services.
- Ecological function: ecological processes vital for the provision of ecosystem services and the survival and the continued evolution of living organisms.
- Physical structure and habitat.

1.5.1 LAND – VALUES, THREATS AND METHODS OF ASSESSMENT

Environmental Values	Methods of assessment
The Region's outstanding terrestrial biodiversity is partly a result of the complexity of its soil mosaics, as well as its geological stability, climatic history, comparative isolation and its Gondwanan origins. The soils themselves contain a vast but relatively unknown diversity of micro organisms, fungi, lichen and invertebrates.	Soil types have been mapped, but generally the units used in this Regional Strategy are Agro- ecological Zones (AeZ) that reflect soils and landscape units. Biodiversity within the soil environment is virtually unknown.
Healthy soils maintain their structure and fertility and can be resilient to erosion through effective vegetation cover or thoughtful cultivation processes. Stabilisation of fluvial materials can contribute to protection of wetlands, waterways and near shore coastal waters.	See section of table below, Major Threats.
Primary production can have environmental values where it contributes to the maintenance of hydrological balance (predominantly through native or non-native perennial species). Native plant based industries and some forestry species can contribute to habitat and buffer high value conservation areas.	The risk of changes to hydrology have been assessed at AeZ and subregional scales, but estimates of the area of perennials required at a catchment scale to restore or maintain hydrological balance are not available.
Carbon sequestration refers to the uptake and storage of carbon by trees or plants. Revegetation can increase the sequestration and, through lowering atmospheric carbon levels, assists in reducing the rate of human induced climate change (Pittock, 2003).	Areas where native plant based industries and forestry can have highest beneficial environmental values are generally within the macro corridors (see Background Paper No 2: Biodiversity) surrounding high value conservation areas, or in the catchments of high value waterways and wetlands.

Economic and Social Values	Methods of assessment
Healthy landscapes, under production or used for other purposes, can contribute significantly to economic and social growth and awareness through the areas of tourism, recreation, education and culture. The agriculture and forestry sectors are estimated to contribute about 20% of employment in the Region.	The total direct value from agricultural production is around $730 million for ten LGAs within the Region (Australian Bureau of Statistics, 2001a).
Areas of regional significance for agriculture have been identified, and around 60,000 ha have been identified as suitable for additional forestry production including areas suited to Blue Gums, Maritime Pine, Radiata Pine, Sandalwood and Oil Mallees.	The *WA Salinity Investment Framework* identifies agricultural land values by AeZ. Background Paper No 7: Agriculture - risk assessment identifies regionally significant land for agriculture. The Forest Products Commission (FPC) has identified areas suitable for the establishment of tree plantations (FPC, 2002). Australian Bureau of Statistics economic and demographic information has been used to identify economic values.

Major Threats	Methods of assessment
Declining soil health associated with: • subsurface acidification; • water repellence; • water erosion and inundation; • structural decline and wind erosion; • salinity; • nutrient export; • declining fertility and organic content. • Climate change (see Section 1.6).	Risks to soil health were assessed by AeZ and are summarised by subregion in Section 2.1 and Background Paper No 7: Agriculture - risk assessment. Additional information on salinity risks is taken from the NLWRA (2000a). Insufficient information available to assess the significance of soil fertility and organic content.
Land uses and management not matching land capability.	The Department of Agriculture have conducted land capability mapping for the Region (see Background Papers No 7 & No 8)
Pest plants, animals and diseases.	The location of declared weeds under the *Agricultural Resource Protection Act* (1976) and Weeds of National Significance are listed in Table 9.
Threats that are outside the scope of this Strategy include external factors such as market and trade conditions.	Not assessed.

1.5.2 WATER – VALUES, THREATS AND METHODS OF ASSESSMENT

Environmental Values	Methods of assessment
The Region contains 107 major rivers or tributaries, 33 estuaries, more than 300 Conservation category wetlands and regionally significant freshwater aquifers.	Information from a variety of sources was collated and analysed to allow waterways and wetlands to be categorised according to their condition and trends in various parameters, such as nutrient levels and salinity. This information is summarised in Background Paper No 4: Water Resources.
Lakes Gore and Warden are internationally significant and are listed under the Ramsar Convention. A further 13 wetland systems are listed on the Directory of Important Wetlands as being nationally significant, and 15 wetland suites are listed on the Register of the National Estate. Wetland attributes include the diversity and richness of flora and fauna, particularly species that are rare or endangered, while functional values include provision of habitat and breeding areas, removal of sediments and nutrients, ground water recharge, and control of water flow and erosion.	Only broad-scale classification of wetlands has taken place at the Regional scale, and no comprehensive ecological surveys, mapping or threat assessments have occurred. This information is summarised in Background Paper No 4: Water Resources.
There are 24 river systems with relatively uncleared (<20% cleared) catchments, and three of these (the Deep, St Mary and Dempster) are recognised by the Australian Heritage Council as "Wild Rivers." The upper catchments of some other rivers (e.g. the Oldfield, Lort and Young) are also relatively unmodified. Rivers also provide a range of habitats and, with their fringing vegetation, provide important north-south linkages in the landscape and are important parts of the corridors network. The range of river types within the Region (flows, land systems, climate, etc.) can be expected to be reflected in the diversity of flora, fauna and ecological communities they support, but ecological information is very limited. Of the south west's ten species of freshwater fish eight species are endemic to the Region. The Region is the only part of the State where the Trout *Minnow Galaxias truttaceus* and the Spotted Minnow *G. maculatus* occur.	Knowledge of the Region's rivers is limited, with only a fifth having had foreshore assessments completed, and no comprehensive comparative assessment of ecological values available. This information is summarised in Background Paper No 4: Water Resources.

The Region's 33 estuaries form part of a spectacular coastline. Only four estuaries (Walpole/Nornalup, Princess Royal Harbour, Oyster Harbour and Waychinicup Inlet) are permanently open to the ocean, while others only open as a result of high rainfall and run off. Only four estuaries (Dempster, St Mary, Jorndee and Poison Creek) have their catchments entirely protected within national parks.	There is reasonably extensive information available for Wilson Inlet, Princess Royal Harbour and Oyster Harbour because of specific research programs. Eight other estuaries (Oldfield, Hamersley, Gordon, Wellstead, Beaufort, Parry, Walpole and Nornalup) have been monitored quarterly by the Department of Environment (DoE) since 1998 but the information is insufficient to detect any trends as yet.
Estuaries provide important fish habitat and nursery areas. Most support high populations of wading birds. Princess Royal Harbour, Beaufort, Stokes and Wilson Inlets are on the Register of the National Estate, and Oyster Harbour, Culham Inlet and Fitzgerald Inlet are on the Directory of Important Wetlands.	Supplementary information was taken from the NLWRA Terrestrial Biodiversity and Catchments, Rivers and Estuaries Assessments, the Statewide Waterways Needs Assessment, the Preliminary Agency Statement of NRM Priorities in WA, and the *Salinity Investment Framework Interim Report*. This information is summarised in Background Paper No 4: Water Resources.

Economic and Social Values	Methods of assessment
Public water supplies are dependent on coastal groundwater reserves and surface water supplies, mainly from rivers in the western most part of the Region. Walpole River (for Walpole town supply), Quickup River and sometimes the Denmark River (for Denmark), Angove and Limeburners Creeks (Albany and Mt Barker) are the main sources. Future potential supplies include the Bow and Denmark Rivers and Marbellup Brook. Coastal aquifers provide the bulk of the supply, including all the supply for Esperance, Hopetoun and Bremer Bay, and 65% of the Lower Great Southern Supply for Albany and Mt Barker. Smaller towns, including Wellstead and Cranbrook, are dependent on roaded catchments, while other settlements are dependent on rainwater tanks for self-supply. As well as water supply, some rivers and estuaries support commercial fisheries (e.g. Princess Royal and Oyster Harbours, Irwin, Wilson, Parry, Beaufort, Gordon, Hamersley, Culham and Stokes Inlets and Oldfield and Torradup Estuaries), with many being important recreational fisheries and locations for traditional Indigenous subsistence fishing. Much of the essential character of the Region is related to the high social and amenity value of its rivers and estuaries, and in some the recreational pressures are high. Tourism in the Region is growing, with some of the waterways supporting houseboats or other tourism accommodation.	A comparative assessment of the economic and social values of the Region's rivers and estuaries was made by DoE and is described more fully in Background Paper No 4: Water Resources. Factors considered included current or future potential for use for water supply, commercial fisheries or aquaculture; tourism use, visual amenity, recreational facilities and level of use.

Major Threats	Methods of assessment
• Changed hydrology of catchments due to clearing resulting in increased flows in rivers and increased water levels in wetlands. • Salinity. • Nutrient enrichment. • Sedimentation. • Loss of fringing and riparian vegetation. • Lack of information, knowledge and awareness of values, functions and processes. • Unmanaged livestock access. • Over extraction of water. • Inappropriate land uses in water supply catchments. • Unmanaged recreational use (particularly on the lower reaches of major rivers). • Pollution from urban and rural uses. • Drainage practices. • Weeds and feral animals. • Acid Sulphate Soils (ASS).	A comparative assessment of the threats to rivers and estuaries was based on the level of clearing in the catchment (strong correlation with altered hydrology, nutrient levels and sedimentation), available monitoring of salinity and nutrient levels, and known occurrence of nuisance algae. The limited monitoring information available for wetlands made a comparative assessment more difficult, but other local knowledge of the degree of disturbance, level of management and state of catchments was used where possible. Regional information was supplemented with information from the *Salinity Investment Framework*, *Preliminary Agency Statement of NRM Priorities in WA*, State Waterways Needs Assessment and NLWRA assessments as appropriate. ASS are known to occur around Oyster Harbour, Princess Royal Harbour, Torbay and Wilson Inlet. The extent of ASS occurrence has been predicted for these estuaries (DoE, 2004 preliminary mapping) and ASS are also likely to occur adjacent to other unmapped southern estuaries. Agricultural drainage schemes in the Torbay area are known to have disturbed ASS, although the continued impact of this disturbance (the drains still exist) is not known. Increased pressure for development of land around estuaries in Albany, Torbay and Denmark (and also smaller estuaries further east and west) raises the risk of ASS disturbance, which could have immediate consequences for the health of the estuaries.

1.5.3 NATURAL BIODIVERSITY – VALUES, THREATS AND METHODS OF ASSESSMENT

Environmental Values	Methods of assessment
The Region sits entirely within the SW Botanical Province, one of 25 global "hotspots" due to its outstanding biodiversity and the level of threat (Myers et al, 2000). More than 4600 taxa, or more than 60% of the flora of the SW Botanical Province, occur here and around 400 of these are endemic to the Region. The Threatened Species Scientific Committee for the Australian Government has recently identified the Fitzgerald Ravensthorpe area as one of 15 national Biodiversity Hotspots (see http://www.deh.gov.au). Recent unpublished analysis of floristic diversity and floristic endemism by Gioia and Hopper (in prep 2003) has identified four of six centres of plant diversity in the South West in the Region: Walpole-Frankland, Stirling Range, Manypeaks, Bremer Bay-Ravensthorpe (Map 9), and major centres of plant endemism in the Stirling Range and Fitzgerald areas (Map 10). Invertebrate fauna is poorly known save for some key work on Trapdoor Spiders (York Main) and other threatened terrestrial invertebrates mainly in the Stirling Range, Porongurup and Walpole areas. It is apparent that the Region is likely to have a very rich invertebrate fauna and a challenge for this Strategy is to develop improved understanding of its biological and ecological dimensions and management requirements.	"Hotspots" information, including Myers et al (2000), Commonwealth of Australia (2003), Gioia and Hopper (in prep 2003). Australian Terrestrial Biodiversity Assessment (National Land and Water Resources Audit, 2002b). CALM NRM data (provided to SCRIPT by CALM GIS Branch). Identification and analysis of regional databases, including those held outside CALM (see for example Background Paper No 3: Fungi of the South Coast). Information from a range of regional and other sources on endemic species, species at the extremes of their geographic range, other significant communities or associations. A trial application of the Site Conservation Planning approach (Background Paper No 2: Biodiversity).
Around 120 vegetation associations as described by Beard (Hopkins et al, 2001) are represented, and 44 of these occur either exclusively or mostly (>90%) within the Region.	Analysis of extent and reservation status of native vegetation associations' extent (Tables 7 and 8, and Appendix 4). (NB This is based on Beard's mapping of vegetation associations, which are used as surrogates for ecological communities. Mapping by Newbey is preferable but covers only part of the Region; see Fig 1 in Section 2.4.1).

The vertebrate fauna totals a known 414 species, including 12 endemic to the Region. About 90% (42) of the non-marine mammals' native to the south west occur in the Region. One of these, Gilbert's Potoroo, occurs only as a small critically endangered population in Two People's Bay Nature Reserve (Background Paper No 2: Biodiversity). About 270 bird species are found on land and sea adjacent to the Region, including five endemic to the area. The islands off the Region's coast are important breeding areas, and migratory waders use the Region's wetlands. There are 22 known frog species including two that are endemic, about 70 species of reptile (two endemic) and ten freshwater fish (two endemic).	Australian Terrestrial Biodiversity Assessment (National Land and Water Resources Audit, 2002b). CALM NRM data (provided to SCRIPT by CALM GIS Branch). Identification and analysis of regional databases, including those held outside CALM (see for example Background Paper No 3: Fungi of the South Coast & Background Paper No 2: Biodiversity.)
The Region currently includes 94 taxa of Threatened Flora (27% of the State's Threatened Flora) and a further 547 taxa listed as Priority species. There are 49 threatened terrestrial and marine fauna (33% of the WA total) listed under State legislation and five Threatened Ecological Communities recognised through the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*.	State and national listings of threatened and priority flora, fauna and communities (see Background Paper No 2: Biodiversity and Appendix 5).

Economic and Social Values	Methods of assessment
The Region's biodiversity contributes to the tourism, agriculture and fisheries industries and is closely linked to the Indigenous, social and economic base. It assists with the maintenance of water quality and soil condition, and contributes to pest plant and animal control (e.g. through insect control where native bird species are maintained). Pollination of agricultural crops can be dependent on native fauna. The Region's biodiversity is increasingly being recognised as a potential source of commercial opportunities, including through seed collection, cut flowers and various timber products (sandalwood, mallet poles etc.) and has an unknown potential for pharmacological products. The nature of the Region – its "sense of place" – is largely due to the nature of its plants and animals and its landscapes. Much of the Region's community depend on natural areas for their recreational activities, whether it be fishing, walking or just taking in the surrounding scenery.	Visitor numbers to the Region and to CALM managed reserves (where available). Indirect measures through regional tourism figures. Community feedback on values and priorities.

Major Threats	Methods of assessment
Loss of habitat and habitat decline associated with: • Clearing, inappropriate land uses. • Phytophthora cinnamomi dieback and other plant diseases. • Salinity and changes to hydrology. • Agricultural practices. • Climate change. • Pest plants and animals. • Inappropriate fire management. • Inadequate knowledge and awareness of values and appropriate management. • Urban development. • Recreational pressures. • Public firewood gathering.	Australian Terrestrial Biodiversity Assessment (NLWRA, 2002). Analysis of extent of vegetation associations against National Objectives and Targets for Biodiversity Conservation (2001) (see Appendix 4). Review of regional and State information sources, including Site Conservation Planning sessions and SCRIPT Science Forum. Limited data (mapping or quantification of potential impacts) available for most threats (Maps 5-8, 11-12). Risk assessments for salinity and changed hydrology (see Section 1.5.1, Methods of Assessment). Site Conservation Planning workshops (Background Paper No 9: Site Conservation Planning).

1.5.4 COASTAL AND MARINE SYSTEMS – VALUES, THREATS AND METHODS OF ASSESSMENT

Environmental Values	Methods of assessment
The coastline is spectacular and diverse, alternating between sandy beaches, granite headlands, limestone cliffs, vegetated coastal dunes and coastal wetlands and inlets, and includes 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 conservation estate with the majority of the remainder being vested to Local Government for recreation. This makes the coastal area an important east–west corridor for vegetation and fauna migration.	Coastal values were documented through the development of *Southern Shores* and supporting reports (South Coast Management Group, 2001). Background Paper No 5: Coastal Zone reviews the information available for coasts and marine areas, and incorporates information and data from CALM and the Department of Fisheries (DoF), including Value-Threat matrices, *State of the Fisheries Report* (2001/2003) and listings under the *Environmental Protection and Biodiversity Conservation (EPBC) Act* (1999).
The sections on Biodiversity and Water have included other coastal values, including the presence of threatened species and communities, and the values of the Region's estuaries. The marine environment of the Region is generally poorly understood. It is expected that endemism will be high, particularly amongst invertebrates such as sponges, and new species are still being described. For example, approximately 150 new sponge species, and six previously undescribed fish species have been found in the Recherche Archipelago in the last two years.	
At present there are no marine protected areas in the south coast marine bioregion although a selection process undertaken by the Marine Parks and Reserves Selection Working Group (CALM 1994) identified nine areas for consideration as Marine Protected Areas under WA legislation (see Table 1, Background Paper No 6: Marine Biodiversity). The community consultation process has commenced for the proposed Nornalup Inlet/Walpole Marine Protected Area.	

Economic and Social Values	Methods of assessment
Commercial fishing within the south coast marine bioregion includes South Coast Rock Lobster Fishery, Abalone Managed Fishery, WA Salmon Fishery, Australian Herring Fishery, South Coast Purse Seine Fishery, Demersal Gillnet and Demersal Longline Fisheries. Commercial fishing for deep-sea crabs occurs within the Rock Lobster Fishery and a small fishery exists for scallops. Commercial fishing also takes place under State and/or Australian Government licensing with some vessels involved in local fisheries having home bases elsewhere in the country. Recreational fishing participation for the south coast of Western Australia, between Augusta and the WA/SA border, is estimated at around 96,000 anglers per year resulting in 330,000 fishing days. There are also 23 fishing charter licences and 4 ecotourism licences that have been issued for the south coast marine bioregion. Important recreational fishing target species include: King George Whiting, Herring, Salmon, Skip Jack, King Fish, Red Snapper, Pink Snapper, Samson Fish, Southern Blue Fin Tuna, Whaler Shark, Gummy Shark, Harlequin, Dhufish, Queen Snapper, and Western Blue Groper. Traditional Indigenous subsistence fishing is widely practised. The collection of marine fish and invertebrates, including weedy sea dragons, supports a small marine aquarium trade. Whale watching is a popular and increasing activity and a significant contributor to the tourism economy in winter months. Humpback and Southern Right Whales are the most common of the migratory cetaceans, and are known to mate and calve in the waters adjacent to the Region.	Background Paper No 5: Coastal Zone reviews the information available for coasts and marine areas, and incorporates information from the DoF, CALM and sources including the State of the Fisheries Report (2001/2003).

Major Threats	Methods of assessment
• Limited information, knowledge and awareness of the Region's marine values, species, communities, habitats and ecological processes. • Increasing recreational and development pressures in some coastal and marine areas. • Lack of integrated fisheries management. • Potential for introduction of pest species through port operations. • Pollution from urban and rural activities. • Climate change and rising sea levels.	Independent community consultation and research in the Region for the production of the Regional coastal and marine strategy *Southern Shores: 2001-2021* and the draft Background Marine Biodiversity Conservation Paper.

1.5.5 CULTURAL HERITAGE – VALUES, THREATS AND METHODS OF ASSESSMENT

Environmental Values	Methods of assessment
Noongar culture is inseparable from caring for country. As such, it contains valuable knowledge and approaches to managing land, water and seas that can enrich non-Indigenous knowledge and attitudes. Indigenous ethno-botanical and ethno-ecological knowledge are an important component of sustainable resource management, especially for understanding, assessing and managing existing natural ecosystems, and revegetation and restoration of landscapes.	The Region's Indigenous culture is poorly documented (although oral tradition ensures survival of the culture) and generally not well known or understood by non-Indigenous people. Background Paper No 1: Noongar Culture outlines some of the Noongar concerns for country, and summarises ways in which the Noongar culture encompasses environmental values.
Non-Indigenous heritage in the Region includes a variety of other information resources regarding the pre-colonisation landscapes and the changes that have occurred.	The non-Indigenous history is better known but no concise history of landscape changes throughout the Region has been compiled. Some of the "South Coast Stories" throughout the Strategy illustrate some of the environmental knowledge to be gained from historical sources.

Economic and Social Values	Methods of assessment
Noongar cultural heritage includes utilising the country for food (hunting, fishing, gathering bush foods), water, shelter and bush medicine, all of which have an important economic and social function. There is also a strong correlation between the maintenance of Noongar cultural heritage, the health and pride of the community and its members. These social issues all have corresponding economic implications for Noongar people and for the community at large. There are many sites and places of significance to Noongar people. Sites or areas may be registered under the *Aboriginal Heritage Act* (1972) but many sites remain unregistered. Non-Indigenous historic sites may be identified under the *Heritage of Western Australia Act* (1990) and/or listed on the Register of the National Estate. Noongar culture and European history are both potentially important for nature based tourism in the Region and for education.	Background Paper No 1: Noongar Culture includes information on Noongar culture in the Region. Cultural sites are shown in Background Paper No 1: Noongar Culture. Sites listed on the Register of the National Estate are listed in Appendix 6.

Major Threats	Methods of assessment
• Lack of identification, valuing and understanding of Noongar culture. • Inadequate representation of Noongar interests in NRM decision making. • Loss of cultural knowledge. • Erosion. • Salinity. • Pest plants and animals.	See Background Paper No 1: Noongar Culture. Threats to land, water and biodiversity may similarly threaten cultural heritage sites.

1.5.6 REGIONAL CAPACITY – VALUES, THREATS AND METHODS OF ASSESSMENT

Environmental Values	Methods of assessment
The Region's community has a long history of involvement in caring for land, water and biodiversity, including one of the first Landcare groups in the State (still active), and a strong network of community groups and individuals working to protect, restore or better understand natural resources. Individual volunteers have made a significant contribution to the scientific knowledge and awareness of the Region's biodiversity. The conservation of some large and highly valued areas of the Region is largely due to the efforts of individuals and groups taking action to prevent release of the land for mining and agricultural purposes, particularly in the 1980s. Noongar extended families and land related organisations have long held knowledge and commitment to 'caring for country'.	Some past achievements are summarised in Appendix 3. The range of organisations, their roles and responsibilities are given in Section 1.8.3. Throughout the Strategy there are "South Coast Stories" to illustrate individuals' contributions.

Economic and Social Values	Methods of assessment
The existence of knowledge, intellectual capital and research capacity greatly adds to the Region's social and economic fabric. A number of Universities, including the University of WA (UWA) and Edith Cowan University (ECU), are increasing their activity in the Region. UWA has established a Centre of Excellence in NRM (CENRM) in Albany with assistance from DAWA, DoE, Great Southern Development Commission (GSDC), Department of Premier and Cabinet, Australian Government Department of Transport and Regional Services and City of Albany, while the Great Southern TAFE also provides training in NRM. Noongar communities and land related organisations have the potential to facilitate NRM initiatives of major social and economic value. Employment opportunities in NRM are an important part of the Region's rural economy.	

Major Threats	Methods of assessment
• Volunteer burnout. • High turnover in coordinator/ community support positions due to funding insecurity. • Lack of support structures. • Population decline and ageing. • Administration overload. • Lack of recognition of contributions.	Issues regarding the maintenance of regional capacity are addressed in Section 1.5.

Box 6: South Coast Stories – William Webb

FROM CONVICT TO NATURALIST

In England, at age 26, he was convicted of highway robbery with violence (assault, theft of a key, a pencil sharpener, and a half-penny), sentenced to 10 years penal service and transported.[2] Webb was listed as a semi-literate manual labourer on his arrival in Albany in 1862.[3]

From 1863 to 1868 he was employed as a shepherd and sandalwooder by the settlers of Kojonup, Albany and Cape Riche. In 1863 he was granted a Ticket of Leave, in 1868 a Conditional Pardon, and in 1870 a Certificate of Freedom. He settled in Albany and in 1875 married Lucy Mew, with whom he raised seven children.

Q: "'In your issue of July 15th you kindly noticed a marine zoophyte found by me at Emu Point. You say I believe it to be a new kind to science. When I said that, I only meant that it was a new species, as far as I was able to judge; I had in fact already traced it to a family of zoophytes, known as sea pens, pennatula and virgularia ... I must however confess that my knowledge of the science of natural history is very limited, as I am only a natural history collector, and although this object is strange and new to me it may well be known to the scientific world.'[1]"

WILLIAM HEATON WEBB
WRITING IN THE ALBANY MAIL, JULY 1884

SALTBUSH AND CURIOS

Webb went into partnership with naturalist and collector George Maxwell, collecting seeds, plant and animal specimens for sale. Together they ran a curio shop in Stirling Terrace, Albany.

On a visit to Albany, the English botanical artist Marianne North wrote of Webb:

"That man had many curious things to show, which he sold to the ships when they passed through King George's Sound ... I bought from him a pair of lovely green ground-parrots with spread fan-tails".[4]

Webb was a practical observer of economically important plants and their conservation. In a letter to the Australian Advertiser[5] headed 'Salsolaceous Plants' he spoke of the species found in WA and then described "…a small sheep-walk known by the native name of Wahbeerup" where a particular saltbush favoured by sheep, "I take it to be *Chenopodium cristatum*", survives after rich grasses and herbaceous fodder plants die off in summer.

He urged that "…squatters should by every means in their power endeavor to preserve salt bush when they have it on their runs, and encourage it to grow where they have it not."

[1] Albany Mail, 22 July 1884, p2.
[2] R. Erickson (comp.), The bicentennial dictionary of Western Australians pre 1829-1888, vol. IV, UWA Press, Nedlands, 1988; Prisoner calendar, Assize Courts, England. Webb was convicted in 1860.
[3] R. Erickson & G. O'Mara, Convicts in Western Australia 1850-1887, Dictionary of Western Australia, vol. IX, UWA Press, Nedlands, 1994.
[4] M. North, Recollections of a happy life: being the autobiography of Marianne North, ed. Mrs J.A. Symonds, vol. II, MacMillan, London, 1893, p. 167.
[5] Australian Advertiser, 15 July 1891. According to Webb's letter, Wahbeerup was 'About 90 miles in a north-easterly direction from Albany'.
[6] Australian Advertiser, 19 September 1892.
[7] Australian Advertiser, 19 September 1892.
[8] D.J. and S.G.M. Carr (eds), People and plants in Australia, Academic Press, Sydney, 1981.
[9] D.L. Serventy and H.M. Whittell, Birds of Western Australia, 5th ed. revised, UWA Press, Nedlands, 1976, p.39.
[10] Australian Advertiser, 6 February 1897.
[11] Albany Mail, 10 January 1883; D.J. and S.G.M. Carr (eds), People and plants in Australia, Academic Press, Sydney, 1981.
[12] D.L. Serventy and H.M. Whittell, Birds of Western Australia, 5th ed. revised, UWA Press, Nedlands, 1976, p.39; Australian Advertiser, 15 July 1895, p4.
[13] G.S. Cowles, British Museum (Natural History), letter to Mr. M. Woolley, 16 February 1989 (copy held in Albany Public Library).
[14] Australian Advertiser, 2 December 1892; Australian Advertiser, 16 June 1893.

Box 6: South Coast Stories – William Webb (cont'd)

Webb appeared not to be a quiet man, but the sort of person we might now call 'involved' in his community. He moved from convict to free man, shepherd to businessman, naturalist and correspondent, advisor and debater. Most often he expressed his opinion on things that interested him and which he apparently thought would benefit his wide community, particularly in matters of the land, and was active in the Albany Literary, Scientific and Debating Society.[14]

His contributions to natural history and science, and knowledge of the land, and his willingness to enquire, suggest and share his enthusiasm, marks him as one of our special southern figures.

Note: Where Webb's use of language, including Latin names of plants or animals, is quoted it has not been altered.

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W. WEBB,
Natural History Collector,
Taxidermist,
CURIO DEALER.
STIRLING TERRACE,
ALBANY.
BIRDS, Reptiles, Animals, &c.,
carefully stuffed and mounted.
Seeds and Live Plants of West

A LOCAL NATURALIST

In 1892 he wrote to the editor: "I have repeatedly been employed by Baron Sir Ferd Von Mueller Government Botanist of Victoria to collect specimens of the poison plants of this colony for analytical purposes…". He then describes his shepherding of flocks for Alex, Andrew and George Moir and in particular his experiences with poison plants "at Matalup on the head of the Salt River".[6]

He is a droll correspondent: "It is pretty well known in Albany that I am none too well supplied with the thing that speaks all languages, viz., the Almighty Dollar. Therefore if there is any money to be spent on the poison question or any other natural history project concerning Western Australia, I would be glad to have the pleasure of raking a little of it in."[7]

Webb's interest in botanical specimens spans the period from the 'residential botanist', such as von Mueller, to the growth of Australia as a wealthy country complete with firmly established schools, universities, state herbaria, botanic gardens, museums, libraries and scientific and Royal societies.[8] This stage is Webb's milieu, his time, and he enjoyed writing and talking about it. His significant contribution as a naturalist and collector earned him consideration as Western Australia's 'first resident naturalist'.[9]

Webb's death notice in 1897 tells us that up to the time of the death of Baron von Mueller, he "acted as West Australian correspondent to that distinguished botanist".[10] He also supplied von Mueller with botanical specimens, including a collection from Mt Lindesay near Denmark.

In 1883 it was announced that the collection included a new species, which von Mueller named after Webb: *Bossiaea webbii*. [11]

Noted for his collection of noisy scrub-bird skins, Webb wrote, "It is very shy of been seen, but not at all afraid of being heard and it will sing quite cheerfully whilst one kicks and shakes the bush in which it is hiding."[12] He collected specimens of 62 bird and 14 mammal species for the WA Government Exhibit at the Indian and Colonial Exhibition in London, 1886, which was then sent to the British Museum.[13]

The Albany Mail of 18 June 1887 reports that "Mr Webb, our local naturalist, has had the honour of a large order to supply Cambridge University Museum with a number of skins of birds and animals skeletons, & c., of specimens peculiar to Western Australia."

1.6 CLIMATE CHANGE

Climate change is a threatening process for all the Region's natural resources. Addressing the causes of climate change, however, needs to occur at a national and international scale, although addressing potential site-specific impacts and, does need to be addressed on a regional scale. The scientific knowledge and skills to do so, are not readily available at present within the Region, however.

The scientific basis for climate change predictions, and the likely impacts of those predictions on Australian regions, has been described in ***Climate Change: An Australian Guide to the Science and Potential Impacts*** (Pittock, 2003). The following information is taken from that report.

Annual average temperatures in Australia are projected to increase by 0.4 to 2.0 °C by 2030, and 1.0 to 6.0 °C by 2070, relative to 1990. There would be associated increases in potential evaporation and heat waves, and fewer frosts. Warming is expected to be greater inland than near the coast. Projections for changes in annual rainfall suggest changes in the south west lie in the range of –20% to +5% by 2030, and –60% to +10% by 2070.

When rainfall changes are combined with increases in potential evaporation, a general decrease in available soil moisture is projected across Australia, with droughts likely to become more severe. Most regions would experience an increase in the intensity of heavy rain events.

Climate variability is a major factor in the Australian economy, principally through the flow-on effects of El Nino Southern Oscillation (ENSO) related major droughts on agriculture. Farmers will be increasingly vulnerable if interannual droughts occur more frequently or are more intense in the future. Less secure water supplies would accentuate competition between users and threaten allocations for environmental flows and future economic growth. Adelaide and Perth are the main cities with water supplies that are most vulnerable to climate change.

Warming of 1 °C would threaten the survival of species currently living near the upper limit of their temperature range, notably in some Australian alpine regions where some species are already near these limits, as well as in the south west of WA. Other species that have restricted climatic niches and are unable to migrate because of fragmentation of the landscape, soil differences, or topography could become endangered or extinct. Other ecosystems that are particularly threatened by climate change include coral reefs and freshwater wetlands in the coastal zone and inland.

Climate change will be only one factor affecting Australian agriculture, but it may exacerbate an already difficult situation, particularly in regard to the availability of water for irrigation. Agricultural activities are particularly vulnerable to projected regional reductions in rainfall in the south west and possibly other parts of southern Australia, and are especially threatened by general warming that will increase potential evaporation and water demand. Enhanced plant growth and water-use efficiency resulting from carbon dioxide increases may provide initial benefits that offset any negative impacts from climate change, although the balance is expected to become negative with warmings in excess of 2 to 4 °C and associated rainfall decreases. Thus by the mid to late 21st century net effects on agriculture are likely to be negative.

1.6.1 ADAPTATION

Adaptation to climate change, as a means of maximising gains and minimising losses, is important for Australia, but is relatively little explored at the location-specific level and in a cost-benefit framework. Impacts assessments, to be realistic, must include at least some adaptation. Options include improving water use efficiency and effective trading mechanisms for water, more appropriate land use policies, provision of climate information and seasonal forecasts to land users to help them manage the effects of climate variability and change, improved crop cultivars, revised engineering standards and zoning for infrastructure development, and improved quarantine and health services. Such measures will often have other benefits, but they will also have costs and limitations. Systematic exploration of adaptation options, and the need for appropriate foresight where this involves investment, would require more attention to the understanding, interests and motivation of multiple stakeholders.

Further research is necessary to reduce the uncertainties, better establish probabilities, and identify the most cost-effective adaptation and mitigation options and strategies, which in most cases need to be location- and sector-specific.

1.7 DETERMINING PRIORITIES

Part of the purpose of the Strategy is to identify the priority actions that must be undertaken to ensure the sustainable management of natural resources. The WA Government, through its ***State Salinity Strategy*** (Government of WA, 2000a), and the Australian Government, through its acceptance of WA's ***Salinity Investment Framework*** as a schedule to Bilateral Agreements for the NHT and NAPSWQ, have clearly indicated that their future investments in NRM will need to be proven to be effective and strategic.

The development of the South Coast Investment Plan following accreditation of this Regional NRM Strategy will require detailed costings and feasibility studies for proposed actions. Indicative priorities for the Management Actions described in Section 2 of the Strategy have been proposed and are based on an adaptation of the guiding principles for the ***Salinity Investment Framework*** (see Appendix 8).

The factors considered in proposing priority levels for Management Actions were:

- Does the management action protect or restore a high value asset or underpin its protection or restoration?
- Does the management action reduce or remove a high threat or is it essential to underpin threat abatement?
- Is the action technically feasible?
  i.e. Is there strong evidence or experience to support this action contributing to an improvement in the resource condition, as measured by the Resource Condition indicators?
- Is there a risk that the action may have direct or indirect impacts on other resource condition targets?
  i.e. Is the action likely to be beneficial or detrimental to other resource condition targets?
- Is there support from the community for the action?
  i.e. Are people likely to be committed to implementing the action?
- Will the management action address causes rather than the symptoms of threats to natural resources?

Actions were scored against each of the above questions (see Appendix 8 for ratings used) and then given a further priority according to whether the action might be required as a first step in a program or sequence of actions, or to address a situation which may become more difficult and costly to address if action is not taken immediately. Actions were prioritised within each section only and not compared with actions from other sections (i.e. between Land and Biodiversity). In addition, the use of the term 'priority catchments' in each of the theme areas relates to that theme area only. Overall priority will be established in the investment plan stage.

The prioritisation of Management Actions was conducted by the Regional Strategy Subcommittee, with expert advice consulted where necessary and done under the assumption that all the proposed actions will be of environmental, social and economic benefit to some extent. It was also assumed that all proposed actions are targeted to priority areas as identified in the background papers. Prioritisation of Cultural Heritage and Regional Capacity management actions has not been conducted to date as the current prioritisation matrix (see Appendix 8) is not suitable for these management actions. Prioritisation will occur during the public comment stage and development of the subsequent Investment Plan.

It should be emphasised that the proposed priorities may be subject to change as further information comes to light or, for high cost actions, where more detailed investigation of costs and benefits causes re-consideration of the feasibility of the action.

For investment under the NHT and NAPSWQ programs, it should also be recognised that national and State outcomes, priorities and statutory obligations will need to be considered and included in regional programs.

1.7.1 TRADE-OFFS

Under the accreditation criteria, the Strategy is also required to address any "trade-offs" between or within environmental, social and economic outcomes in pursuing the Strategy objectives. The concept of trade-offs is not always palatable, particularly when much advertising and business hype would suggest that anything short of a "win-win situation" is a failure.

Given limited financial and human resources, it is inevitable that some trade-offs will have to be made and the priority-setting process is one of the ways in which these can be made explicit. It is also true that many of our NRM problems arise from conflicting land use demands or the conflicts between meeting long and short-term goals. This Strategy is unlikely to be able to resolve some of those conflicts, but it can potentially assist in increasing the awareness of the impacts of the choices that are made, not just in the immediate future but in the legacy that is left to future generations living in the Region.

Trade-offs are therefore addressed qualitatively for each of the main asset types discussed in Section 2 of the Strategy. Some of the trade-offs may be able to be quantified at least partially in the development of the Investment Plan, but quantification of the environmental and social costs and benefits is generally beyond the capacity and resources of the Region.

1.8 REGIONAL CAPACITY

This section describes the importance of regional capacity to the sustainable management of natural resources. The main components of regional capacity are described and some of the factors affecting regional capacity are discussed. Recommended actions to improve the Regional capacity to manage natural resources are included in Section 2.6.

Regional capacity simply means the ability within the Region to manage natural resources and achieve the NRM objectives. The Region has a long history of participation in understanding and managing natural resources and some of the stories of people who have contributed in the past are included throughout this Strategy.

Capacity can be considered under four general headings, although these are closely interrelated:

- Awareness: Individuals being aware of NRM issues, and understanding the links between these issues and the long-term viability of the community and the Region's natural resources.

  Community-based organisations, networks and local events, communication, and formal and informal education can all contribute to the community's awareness and understanding of NRM issues and their impacts.

  An increased effort in raising awareness will assist in involving more people in NRM and therefore in spreading the load more evenly. It is particularly important that awareness is raised in urban areas, where the higher populations have the greatest potential to ensure that NRM becomes a more urgent issue at all political levels. Building better understanding and awareness of the values of natural resources, their interrelationships, and the causes and costs of degradation is essential to achieving the changes in uses and management practices that are needed to maintain the Region's natural resources.

- Information and knowledge: Managers and users of natural resources able and willing to access the necessary information, data and science (biophysical, social and economic) to make sound NRM decisions.

  Collecting information and data, undertaking research, identifying and valuing the sources of knowledge (including local and Indigenous knowledge), developing and using models and decision-support systems, sharing of information in suitable formats for users, and developing approaches to extension and adoption of new knowledge all contribute to increasing the information and knowledge base and its use in decision making.

The development of the Strategy has identified large gaps in the knowledge base and in baseline monitoring for a number of natural resources. There have also been difficulties in identifying and accessing information, and in integrating information collected at a variety of scales and held under a variety of formats. Some valuable sources of information have also been identified, however, and these need to be acknowledged and valued. Indigenous knowledge has not been well identified or accessed, and the development of support includes the provision of technical support to regional and local groups, and mechanisms to support full participation by all community members, including Indigenous people, local governments and industry bodies. It includes provision of adequate government and non-government organisational capacity within the Region. One of the most valued support mechanisms is the employment of locally-based coordinators under secure employment contracts, while support to local groups for administrative functions helps to keep people's energies directed to on ground actions rather than being consumed by bureaucratic procedures.

The role of community-based organisations such as Landcare groups, catchment groups, coastal action groups and others in building and maintaining social cohesion in rural and regional communities should not be underestimated. Protocols and other arrangements for sharing of that knowledge while not abusing its rightful ownership are urgently needed.

- Skills and training: Managers and users of natural resources require access to the planning, technical and management skills needed to participate in sustainable NRM at property, local and regional levels.

  Training in the range of skills necessary to implement NRM can involve training institutions, industry and other organisations. The Region has the advantage of TAFE departments dedicated to NRM and well-developed programs through organisations like Green Skills Inc that are already contributing to skills development.

- Facilitation and support: Support systems in place to ensure participation, motivation and ownership of NRM decision making and implementation.

1.8.1 THREATS TO REGIONAL CAPACITY

The most severe threat is inadequate or unstable funding for developing all aspects of regional capacity. This results in loss of experience, skills and knowledge when people are unable to remain in stable employment, or when volunteers become "burned out." Adding to these difficulties are the small (and decreasing) populations in many regional areas, resulting in a small number of people having to take responsibility for a range of voluntary activities to maintain their communities. This can include, for example, participating in NRM groups, volunteer fire and emergency services, health and education support activities, and unpaid service as elected local government members, as well as maintaining their businesses/properties.

Other threats to voluntary community organisations include the difficulties in ensuring good administrative and financial management and dealing with the taxation, insurance and other measures that can overload the smaller groups. In such situations, developing leadership skills and planning for succession within organisations is often the lowest priority, but can be one of the biggest factors determining the "success" of a group.

The availability of sufficient resources in the Region to maintain effective government services, including through NRM agencies, is also critical. Colocation of government employees, particularly in smaller regional centres, would potentially allow more regionally-based services without prohibitive infrastructure costs being incurred by individual agencies. The eastern part of the Region is particularly poorly serviced.

1.8.2 HOW REGIONAL CAPACITY IS DEALT WITH IN THIS STRATEGY

In Sections 2.2 to 2.6 of the Strategy, management actions are included to build community capacity to manage the Region's land, water, biodiversity, and coastal and marine resources.

Specific actions to build Indigenous communities' capacity for managing natural resources have been integrated where appropriate through Section 2.7 Regional Capacity which includes management actions that provide integration and ensure that the basic structures and functions needed for managing natural resources are in place.

The following provides a summary of the major stakeholders who are involved in NRM in the Region.

1.8.3 MAJOR STAKEHOLDERS INVOLVED IN NRM

Land managers	
Individual landholders and land managers are the key group impacting on catchment health through their use of resources. They all have a duty of care to ensure that land, water and the associated natural resources are managed in an environmentally, economically and socially sustainable way, to avoid ongoing degradation.	
Regional Community	
Partnerships and networking with the Regional community are critical to the achievement of good outcomes for our land, water and biodiversity. Significant numbers of voluntary active individual residents, groups and visitors are involved in NRM activities. In addition, there is a range of active voluntary NRM groups in the Region:	
Community Groups	
Community groups play an active role in on ground work programs for environmental improvement. Types of groups include Bushcare, Catchment, Coastcare, Friends, Landcare and Weed Groups.	
Major Subregional Groups	
Albany Eastern Hinterland Inc (AEH)	The AEH is a not for profit community group that aims to foster, initiate and coordinate activities that lead to an improvement in the AEH environment. The group also aims to promote and extend information that will increase sustainable production and increase awareness of environmental issues.
Esperance Regional Forum (ERF)	The group aims to provide a community forum that will promote public participation in decision making processes that will lead to the sustainable use of the Esperance natural resource base.
Fitzgerald Biosphere Group Inc (FBG)	The FBG is a not for profit grower and NRM group operating within the Shire of Jerramungup. The group works with farmers, researchers, industry groups and federal and State agencies to address local production issues (e.g. diseases, pests and nutrient limitations) and NRM issues (i.e. salinity and soil acidification) to ensure the long-term sustainability of the agricultural industry and the communities within the Region. The group is focused on research, marketing, education and environment.
Frankland Gordon Catchment Management Group Inc (FGCMG)	The FGCMG is a body of motivated land managers concerned about the future of the catchment. The group was established in May 1994 and since that time biodiversity and sustainable farming have been their priority initiatives. The aims of the FGCMG are to combine and coordinate small groups and individuals to enable large activities to be completed successfully, to provide an overall picture of problems facing the whole catchment, to enlist the help of all land managers and Land Conservation District Committees (LCDCs), and to be aware of, and trial the latest sustainable farming techniques.

Kent Recovery Team	The Kent Denmark Recovery Team is a partnership between the rural community of the Kent and Denmark catchments and DoE, DAWA and CALM. The nine community members actively farm in the catchments and represent their sub catchment groups and 2 local governments on the Team. The role of the Kent Denmark Recovery Team is to strategically direct this community and government collaboration to "recover" the water quality of the Kent and Denmark Rivers to potable levels. The Team, with leadership from DoE, annually oversees the disbursement of about $200,000 to land managers who implement salinity management works in the Public Water Supply Recovery Catchments.
North Stirlings Pallinup Natural Resources Inc (NSPNR)	The group aims to bring together people, organisations and information, so that communities in the North Stirlings Pallinup subregion are able to drive the better management of Natural Resources, resulting in social, economic and environmental sustainability. They work to inspire current and future generations through coordination, education and example about the benefits accruing from sustainable management of the Region's natural resources.
Oyster Harbour Catchment Group Inc (OHCG)	OHCG aims to increase the awareness of the importance of NRM within the catchment and encourage the incorporation of NRM concerns within planning strategies at the local, regional, State and national level. The catchment group also aims to promote ecologically and economically sustainable farming practices.
Ravensthorpe Agricultural Initiative Network Inc (RAIN)	RAIN is a not for profit community group promoting responsible NRM and long-term sustainable agricultural systems in the Ravensthorpe district. RAIN supports the community and other stakeholders in a wide range of NRM activities including the planning and implementation of on ground activities; coordination of trials, research and education, and providing a forum for NRM issues.
South Coast Management Group (SCMG)	The SCMG is a regional representative body of coastal planners and managers and the lead body responsible for the development and implementation of *Southern Shores*, a strategic guide for regional coastal and marine planning and management on the South Coast. The SCMG has strong community representation, as required by its constitution, and has the stated vision that communities of the Region work in partnership to improve the quality of the coastal and marine environment. SCMG provides a bi-monthly forum for the discussion of issues relating to coastal and marine planning and management and also actively promotes best practice coastal management in the Region.
Wilson Inlet Catchment Committee Inc (WICC)	WICC is the peak community based incorporated body within the catchment. WICC is involved in integrated catchment management. Implementation of their Action Plan is achieving results with land managers on the ground.
Regional NRM Group	
South Coast Regional Initiative Planning Team (SCRIPT)	SCRIPT is the peak Regional body that brings people, organisations and information together so that the Regional community helps drive sustainable management of natural resources with positive social and economic outcomes. It is an incorporated body, managed by a committee, which includes non-government (two thirds) and government (one third) members. SCRIPT is responsible for coordinating the development of the Strategy and Investment Plan and for subsequent reporting on investment outcomes (see Box 3).

Local Government

Local Government is an important influence on NRM through its responsibilities for land use planning, development approvals, rates and a variety of services, such as road construction and maintenance, waste management, and pest control. Local government also owns and manages large areas of land. Councils with jurisdiction across the South Coast Region are Albany, Broomehill, Cranbrook, Denmark, Esperance, Jerramungup, Gnowangerup, Kent, Kojonup, Lake Grace, Manjimup, Plantagenet, Ravensthorpe and Tambellup.

Other Non-Government Organisations

NGOs cover a broad field. NGO's roles and responsibilities include on ground actions, policy development and promotion, and representation of particular interest groups. These include the Conservation Council of WA, Malleefowl Preservation Group (MPG), Gondwana Link partnership, Green Skills Inc, Greening Australia (WA), Progress Associations, South East Forest Foundation, Timber 2020 and WA Greenhouse Council.

Research and Development Groups

Regional organisations involved in research and development (R&D), such as Centres of Excellence for NRM (CENRM) and universities, are important bodies to fill information gaps across the Region. Research outcomes and expertise should be accessible to a variety of groups.

Educational Institutions

University of WA (UWA) Albany Centre, Edith Cowan University (ECU), Curtin University of Technology (Centre for Regional Education), Great Southern TAFE and Esperance Community College are educational institutions operating in the Region. They have a vital role in producing graduates with extensive knowledge of natural management issues.

Industry Groups

Industry groups have a significant responsibility to develop and promote operating procedures and best practice management in NRM. They are responsible for implementing systems to promote sustainable practices and support regional health initiatives. There are a number of industry groups established at the national, State and regional levels. Examples of industry groups include Pastoralists and Graziers Association, Western Australia No-Till Farmers Association, private agricultural consultants and WA Farmers Federation.

Indigenous Groups

Noongar people have a long history in the Region and possess intricate knowledge of traditional ecological and sustainable land management practises. Their knowledge must be recognised, valued and protected. There are approximately 20 major Indigenous groups in the Region who should be involved more broadly to ensure preservation of cultural practices, languages and culturally important places. These include the Native Title claimant groups, Land And Sea Council (GLASC) and South West Aboriginal Land and Sea Council (SWALSC).

Government Agencies

The Federal Government provides high level policy and guidance on matters which have national significance, and is involved in the delivery of joint State/Australian Government programs. Key Federal Government Agencies involved with State NRM matters are Agriculture Fisheries and Forestry Australia (AFFA) and Environment Australia (EA). Various State Government departments and agencies are involved in NRM and related activities in the Region, and commit significant resources to those activities. These departments include:

Department of Agriculture (DAWA)	DAWA delivers services to assist the State's Agriculture, Food and Fibre industries through information, science and innovation, responsible management of the resource base and policy and regulation across all elements of the supply chain.

Department of Conservation and Land Management (CALM)	CALM has lead responsibility throughout the State for conserving our rich diversity of native plants, animals and natural ecosystems, and many of our unique landscapes, for their intrinsic values and for the benefit of present and future generations of the people of WA. On behalf of the Conservation Commission of WA it manages national parks, nature reserves, conservation parks, State forests and timber reserves. In addition, on behalf of the Marine Parks and Reserves Authority, CALM manages marine parks and marine nature reserves. CALM also has been given responsibility for weeds, introduced animals and pre-suppression fire activities on unallocated Crown land outside of townsites as well as contributing to the conservation of cultural heritage and to national and international programmes including the IUCN (the World Conservation Union) and international conservation treaties.
Department of Environment (DoE)	During 2004, the formation of a new agency, the Department of Environment, took place through the amalgamation of the Department of Environmental Protection, the Water and Rivers Commission and the Keep Australia Beautiful Council. DoE's role is to lead the protection and enhancement of the State's natural resources and environment, working in partnership with the community. This is achieved through managing, influencing and regulating people's attitudes and behaviours towards the environment and natural resources. DoE is specifically responsible for the allocation of water resources, protection of rivers, wetlands and estuaries and management of discharges to the environment and salinity management.
Department of Fisheries (DoF)	Department of Fisheries is responsible for the management of the State's commercial fisheries and recreational fisheries, development and promotion of the State's aquaculture industry, and management and conservation of fish and fish habitats. As part of its responsibilities, DoF undertakes fisheries research, surveillance, enforcement and education in the marine parks and reserves.
Department of Indigenous Affairs (DIA)	DIA aims to achieve a society where Indigenous people determine their lives and where there is social and economic equity, respect and value for land, Aboriginal heritage and culture.
Department for Planning and Infrastructure (DPI)	In July 2001, the Ministry for Planning amalgamated with the Department of Transport to become the Department for Planning and Infrastructure. As at 1 July 2003, the management of Crown land in WA, including pastoral leases, moved from the Department of Land Administration to DPI. This agency supports the WA Planning Commission to develop integrated planning and infrastructure programs. It provides population projections/forecasts and a forum to coordinate communications between planning bodies and supports the development and implementation of DPI's and WAPC's statutory and strategic land use planning initiatives. In addition, the Regional Services division for the Great Southern Region works with the community to plan for the delivery of quality land use, transport and infrastructure services. It also provides the community with information on all forms of land, sea and air transport and associated issues including aviation, boating, cycling, freight transport and health and safety issues.

Forest Products Commission (FPC)	FPC is the WA Government trading enterprise for plantation management and commercial production from renewable timber resources. FPC is implementing its Infinitree program in the Region, aiming to secure triple bottom line benefits from the expansion of tree farming.
Goldfields Esperance Development Commission (GEDC) and Great Southern Development Commission (GSDC)	GEDC's and GSDC's role is to encourage, promote, facilitate and monitor the Region's economic development. The organisations' objectives are to maximise job creation and improve career opportunities, develop and broaden the economic base of the Region, identify infrastructure services that promote economic and social development, provide information and advice to promote business development, ensure that regional government services are comparable to the metropolitan areas, and coordinate linkages between relevant statutory bodies and State government agencies.
Main Roads Western Australia	Responsible for the management of transport related services and infrastructure (e.g. roads), Main Roads works in conjunction with Local Government and its local road network in order to create an integrated transport network.

Box 7: South Coast Stories – Katie Syme

POTTED LIFE HISTORY: *Born in 1947. Emigrated from England to Donnybrook in 1953. Went teaching to Dalwallinu and met husband Alex at Junior Farmers. Moved from their Wubin farm to Denmark 28 years ago. Mother of two.*

Tucked under Katrina's belt are over 35 painting and textile exhibitions; four art commissions, including at the Royal Botanic Garden, Kew; a string of fungi-related publications, papers and presentations; and a Churchill Fellowship.

Notes: The text is drawn from an interview recorded in Albany on 11 March 2004. The interviewer was Keith Bradby. For further fungi information and description of Katrina's work, see her paper 'Fungi information for the South Coast Regional Natural Resources Management Strategy' published in this volume.

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A CONVERSATION WITH KATRINA SYME

FUNGI LUMINARY AND BOTANICAL ARTIST

Right now, I'm probably the only person in Australia who paints fungi, recognises many genera of fungi, collects and writes descriptions of them, and looks down the microscope to draw the spores. There are other people who do paintings of fungi now and then, but I don't think anyone else has concentrated on them, completely.

Back in the early '90s, with funding from the Australian Heritage Commission, I went to Two Peoples Bay every week for almost a year and collected fungi there. In 1996 I met Dr Tom May, senior mycologist at the National Herbarium of Victoria, who said it was the first time that had ever been done anywhere in Australia. I didn't know at the time that I was doing something extraordinary, but he told me that I had.

Mycologists and other interested people who were doing any work on the south coast, they'd come down and collect for a day or two days, or a week at the most, and then maybe not come back for two or three years. I happen to live here and I'm looking at the same places year after year. So it's that continual observation and collecting, because I'm here, right on the spot.

I've probably put fungi on the map in the southern part of the State through running workshops and more recently a project called Fungimap, which was started by Tom May to address this problem of the lack of work being done on fungi. He asked if I'd become the WA Co-ordinator, so I've run workshops throughout the south-west, and then I organised the inaugural Fungimap Conference in 2001. I've been made an Honorary Associate of the Royal Botanic Gardens in Melbourne because of my work with Fungimap and sending collections to support students, which is rather a nice recognition.[4]

'Fungi of Southern Australia' was a project Neale Bougher and I did together and which I worked on over a long period. I went out and collected the fungi over seven or eight years, painted them, and did proper field notes for them. It was probably the first comprehensive reference book for fungi done in Australia. It's set a standard for future books too.

[1] The scientific study of fungi.

[2] About 1280 have been lodged in herbaria.

[3] Gilbert's potoroo is considered to be Australia's most endangered mammal.

[4] Nominated by mycologist Dr Teresa Lebel.

Box 7: South Coast Stories – Katie Syme (cont'd)

BACK TO THE BEGINNING

I've always been interested in natural history, and I did pretty accurate scientific drawings of plants when I was at school, but mycology[1] happened when we sold the farm at Wubin and we had 5,000 dollars left over. We didn't do something sensible that would have sustained us for the rest of our lives, we went for a holiday to Tasmania, and I discovered fungi there.

When we came back home to Denmark, I wrote a letter to the 'Fungi Expert, Botany Department, UWA', and got a reply from Roger Hilton, he was senior lecturer in mycology, and I organised for him to come down and run a workshop. We found loads of fungi, but I was the only person who was really, really interested in them. So I just started keeping records, painting pictures of them, drying them over the wood stove, which didn't work terribly well, and it went from there.

After going out and collecting them all through winter and covering the kitchen table with them, and neglecting housework, which is a waste of time anyway, I got to recognise what was different.

Q: "When it's not the fungi season I will stoop to painting other things. This summer I've painted sandalwood, quandongs, and I'm going to paint some emu plums, but I'll have to be quick because it's autumn and I won't be interested in those very shortly - I don't find anything as interesting as fungi."

KATIE SYME

PASSION AND COMMITMENT – A MOTIVATING FORCE

The thrill of the hunt! I just grab my bucket, my waxed lunch wrap, some plastic containers, and my trusty truffle rake, and off I go and collect a few species. If you're making a proper, vouchered, herbarium collection, or painting them, you need to get a full range of the species, all growing within the same area, so that you know they're all from the same fungus -they've all got the same DNA. And you need to get the buttons right through to mature specimens. I've made 1,302 fully documented collections so far.[2]

Anybody who looks for fungi in Australia would have found new species -can't help it because so little is known about them, so I find that really exciting. I can just open my front door, walk down the road, find a new species of fungi, come back and have a cup of tea.

So little has been done that maybe I'm driven by the feeling that it's nice to make some sort of contribution to the world - something that's lasting. And trying to get people to understand how important they are, and how neglected they've been. People talk about biodiversity, but they're ignoring probably the second largest group of organisms on the planet. When I did the survey of underground fungi at Two Peoples Bay, looking at the diet of the Gilbert's potoroo, there were truffle-like fungi to be found every month of the year, as there needs to be for an animal that relies on fungi for more than 90 percent of their diet.[3]

Alex and I sat down once and tried to work out how much it really cost to do the work for the book and we came up with about 60,000 dollars. I did all the travelling at my own expense, and, well, I just did it all. I had to sell some of the paintings to help pay for it, which was a pity - it would have been nice to have kept them as an entire collection. Royalties are small, about 5 percent of book sales. But it was worth doing; I wouldn't not have done it, but I couldn't afford to do it again! I don't know how I've kept my fungi work going - with the indulgence of the family, and you have to come and see our house sometime and see how neglected it is!

I just enjoy everything about fungi. Going out and finding them, doing the descriptions of them, painting them, looking down the microscope at their spores, and there are so many fabulous people involved in the fungi world. Oh, it's just nice having a focus when you go anywhere.

WHAT'S NEXT?

The tingle forest is fantastic: there's just a proliferation of fungi there -large fungi, purple fungi, pink fungi. They're just on everything. It really is lovely. But I'm really getting very, very interested in the drier areas.

I can't wait for the fungi season to begin.

1.9 REGIONAL BOUNDARIES

Regional boundaries have been set in the Bilateral Agreements. As any change to a boundary requires approval from State and Australian Government Ministers, the boundaries defined by the Bilateral Agreements have been used in all information analyses in the preparation of this Strategy.

A management action to cater for additional assets that will need to be considered due to the expansion of the SCRIPT boundary can be found in Section 2.7.10. Further management actions that result from the identification of additional assets will undergo the prioritisation process before being considered for possible investment.

The following sections explain boundaries issues that require consideration.

1.9.1 EAST

The boundary as shown in Map 1 was established in the early 1990s and was based partly on catchment boundaries and, in the east of the Region, on the administrative boundaries used by the Department of Agriculture (DAWA). It follows the extent of cleared and farmed land in the Shires of Esperance and Ravensthorpe.

This boundary has been used as the basis for the definition of NRM Regions in the Bilateral Agreements referred to in Section 1.2. It should be noted that the boundaries do not coincide with the jurisdictional regional boundaries for any of the main State Government departments with responsibilities for NRM. Nor do they concur with Local Government boundaries, and they do not align in any way with the cultural boundaries referred to in Section 1.1 and shown in Background Paper No 1: Noongar Culture.

Catchments provide the most sensible boundaries for natural resources planning and management, particularly as so many of the management issues are related to catchment hydrology and its effects on water, vegetation and land condition. Since the NRM Regional boundaries were defined, however, DoE has completed more accurate catchment mapping that has shown some discrepancies in the Regional boundaries (see the blue and red boundaries, Map 1).

In the north-eastern part of the Region, catchments become harder to define. SCRIPT and the Rangelands NRM Coordinating Group put a proposal to the JSC that the boundaries between the two Regions be altered to coincide with the boundary of the Shire of Esperance and to partially coincide with the Shire of Ravensthorpe boundary (see red boundary, Map 1).

The proposal is in part pragmatic, as the Rangelands Region currently takes in more than 90% of the State and 32 LGAs. By altering the boundary in this way, there would be few impacts on SCRIPT other than the need to review natural resource information for the affected area and include consideration of any required management actions for the area in future investment planning. For the Rangelands NRM Coordinating Group, the effect would be to reduce the number of LGAs which would need to participate in development of the Rangelands NRM Strategy. This arrangement would reduce the need for these two Shires to participate in two Regional NRM Strategies.

No pastoral properties are included in the affected area. The recognition of the South Coast Region as a priority Region under the NAPSWQ (only the Ord catchment of the Rangelands Region is a priority under NAPSWQ) is not considered to be an impediment, as the affected area is largely Unallocated Crown Land and is unlikely to be identified as a priority salinity area compared to other parts of the South Coast Region.

The expansion of the South Coast Region boundary to coincide with the Esperance Shire boundary brings with it the added responsibility of an increase in the coastal and marine zone. This is a significant area increase as it includes all islands of the Recherche Archipelago, which is noteworthy for both its marine and terrestrial importance, and offshore of these islands to the three nautical mile limit.

Communication from the JSC (22 April 2004) advised SCRIPT to proceed by reviewing, in consultation with its State Government partners, the natural resource information for the affected area and submit a report on proposed consultation with stakeholders in the area and on any implications for future Investment Plans. This stakeholder consultation will be conducted during the public comment stage of the Strategy in order to determine major NRM assets and threats.

It should be noted that the two Regional NRM Groups already cooperate on issues that are cross-regional. For example, the Coastal and Marine Facilitator employed through SCRIPT is partly supported by the Rangelands NRM Coordinating Group to cover the coastal zone in the Shire of Dundas (east of Esperance) and this arrangement is likely to continue.

1.9.2 WEST

The current western boundary between the SWCC and SCRIPT, as defined by the Bilateral Agreements, divides the catchment for the Walpole Inlet between the two Regions, with the Deep and Walpole River catchments located in the SWCC Region.

In examining this cross-regional boundary, the following points need to be considered:

- The Frankland, Walpole and Deep River catchments drain into the Walpole Inlet system.
- The Walpole and Deep River catchments are largely State Forest and National Park.

- There is only a small amount of private land within the Walpole and Deep River catchments.
- DoE South Coast regional office has strong involvement in the Walpole Nornalup estuary water management issues and has supported waterways management in these catchments for many years.
- There are increasing links between the Upper Frankland-Gordon Catchment Group and the lower Frankland group.
- DoE South Coast regional office currently works in cooperation with the Water Corporation to manage the Walpole River, as it is a current water supply for the town of Walpole. This also includes managing the licence requirements for the Walpole Wastewater Treatment Plant.
- A sustainable agriculture position currently supports the Walpole/Tingledale LCDC.

Many different sets of social, physical and administrative boundaries affect interactions in numerous ways. No single boundary can ever accommodate the various geographies. Community connections and aspirations must be considered in the attempt to achieve one 'line on the map.'

As negotiations are continued with SWCC and the State and Australian Governments, SCRIPT will endeavour to ensure effective cross-boundary management of these particular catchments and recognise opportunities for partnerships for activities at the applicable level (local, LCDC, LGA and regional).

Map 1: South Coast Region

Map 2: South Coast Land Use

Map 3: South Coast Climate

SECTION TWO

Strategies FOR CHANGE

STRATEGIES FOR CHANGE

2.1 INTRODUCTION

This section examines the asset types identified in Section 1.5 (Land, Water, Natural Biodiversity, Coastal and Marine Systems, Cultural Heritage and Regional Capacity) in relation to Management Action Targets (MATs) and Management Actions (MAs). A brief outline of the asset type including a summary of "What We Know" and the "Current Community Capacity" precedes the aspirational goals and desired outcomes. Resource Condition Targets (RCTs) have been identified for the Land, Water, Natural Biodiversity and Coastal and Marine System asset types. For each asset type, MATs and MAs have been developed and prioritised using the process outlined in Section 1. MATs and MAs are separated into four categories: benchmarking and monitoring, on- ground actions, capacity building and institutional frameworks, planning and policy. For each MAT, an indication is given as to the RCT on which it will impact. Table 3 lists all of the RCTs and the associated MATs from all theme areas and highlights the integration between themes. The Key Responsibility identifies the key organisation/s that are seen to be essential in meeting that target. Exclusion of an organisation from the Key Responsibility column does not exclude them from participating in meeting the target, nor does inclusion shift responsibility solely onto those organisations. A database, The South Coast Regional Resource Register, will be established for all interested parties to document their NRM expertise and the MATs they feel they are best suited to help achieve. The information from this database will allow the investment planning team to bring together the most appropriate combination of skills required to meet any particular MAT through specific actions.

STRATEGIES FOR CHANGE

Table 3: Summary of all management action targets associated with resource condition targets

Resource Condition Targets	Management Action Targets (insert MAT prefix)			
	Benchmarking & monitoring	On ground actions	Capacity building	Institutional frameworks, planning & policy
RCT L1: Achieve 300,000 ha of Albany and Esperance Sandplains with subsoil (10-20 cm) pH 5.0 or higher by 2020, as measured at identified representative sites.	L1, L2, L6, B4	L8, L13, W8	L15, L16, L20	L23
RCT L2: Reduce water repellence over 120,000 ha (10%) of sand surfaced soils currently identified at risk of water repellence by 2010, as measured at identified representative sites.	L1, L2, L6, B4	L8, L9, L13, W8	L15, L16, L17, L20	L23
RCT L3: Reduce subsurface compaction on 150,000 ha (30%) of soils in high risk areas by 2025, as measured at identified representative sites.	L1, L2, L6, B4	L8, L13, W8	L15, L16, L20	
RCT L4: Achieve 3.5 million ha (95% of properties) at or above 50% ground cover by 2020 (to reduce wind erosion).	L1, L2, L6, B4	L8, L9, L12, L13, W8, B6, B12	L15, L16, L17, L18, L19, L20, L21	
RCT L5: For agricultural land in priority catchments and areas that contain high value biodiversity (see Section 2.3), water resources (see Section 2.2), infrastructure and agricultural assets (see Background paper No 8): Reduce the rate of rise in groundwater levels by 50% by 2025. Reduce and/or maintain depth to groundwater below critical levels (>2m) by 2025, with quantifiable target set by 2006.	L4, L5, L6, B4	L7, L8, L9, L10, L12, L13, B6, B8, B12	L15, L16, L17, L18, L19, L20, L21, L23, C5, C6	L23
RCT L6: In the headwaters of priority sub catchments, achieve a downward trend in nutrient levels by 2025, with quantifiable target set by 2006.	L1, L2, L3, L4, L6	L7, L8, L9, L10, L11, L13, B8	L15, L16, L17, L18, L19, L20, L21	L23
RCT W1: Achieve no net loss in native vegetation cover from 2004 levels, in "near pristine" (see glossary) river catchments.	B1, B3, B4, B5	W7, W8, B6, B7, B12	B16	W13, W14
RCT W2: Maintain or improve foreshore condition for "near pristine" rivers from 2004 levels, with quantifiable target set by 2006.	W1	W7, W8		W13, W14
RCT W3: Achieve downward trend in nutrient (N and P) levels in priority sub catchments including the Sleeman and Cuppup Rivers (Wilson Inlet) and Torbay waterways by 2010, with quantifiable target set by 2006.	L3, B4	L8, L9, L11, L12, W7, W9, W10, W11	L15, L16, L17, L18, L19	L23, W13, W14,
RCT W4: Maintain or improve river condition for priority rivers by 2020, with quantifiable target set by 2006.	L3, L4, W1, W5, W6, B4	L7, L8, L9, L10, L11, L12, W7, W9, W10, W11, B6, B8, B12	L15, L18, L19, L17	L23, W12, W13, W14
RCT W5: Maintain or improve estuarine condition for Wilson and Torbay Inlet (targets set by 2005) and for eight other estuaries by 2020, with quantifiable targets set by 2006.	L3, L4, C1, W1, W3, W5	L7, L8, L9, L10, L11, L12, W7, W9, W10, W11, B8, B10, B12	L15, L17, L18, L19	L23, W12, W13, W14

Resource Condition Targets	Management Action Targets (insert MAT prefix)			
	Benchmarking & monitoring	On ground actions	Capacity building	Institutional frameworks, planning & policy
RCT W6: Maintain or improve extent and condition of internationally, nationally and regionally significant wetlands by 2020, with quantifiable targets set by 2007.	W2, W4, W5, L4	L7, L8, L9, L10, L11, L12, W9, W10, W11, B8, B12	L16, L17, L18, L19	L23, W13, W12, W14
RCT W7: Reduce salinity for the priority rivers: Denmark River to be at 500 mg TSS at Mt Lindesay gauging site by 2020. Kent River to be reviewed and new target set by 2006.		L7, L9, L11, L12, W11	L18, L19	
RCT W8: Maintain water use within proclaimed ground water and surface water areas within sustainable limits (see glossary).		L12,		W15
RCT W9: Maintain or improve water quality within public drinking water source areas from 2004.		L7, L12,		L23
RCT B1: Achieve no net loss of native vegetation, with condition maintained or improved, as measured against benchmarks, with quantifiable target to be set by 2006.	L4, L5, L6, W3, W5, B1, B4, B5	L13, L14, W7, B7,B8, B9, B10, B11, B12	B13, B15, L19, L20, L22, C5, C6	B16, B17, B18, L23, C8, C9, W12
RCT B2: Condition target for significant taxa and associations, and potentially threatened species and ecological communities, set by 2008, after completion of MAT B2.	B1, B3, B4, B5, W5	B6, B7, B11	B13, B14, B15, W13, C6, C8, C11	B16, B17, B18, L23, C9, W13
RCT B3: Maintain or improve extent and condition of significant taxa, threatened species and ecological communities by 2020, with quantifiable target set by 2006.	C1, C2, C3, W2, W3, W5, B2, B3, B4, B5	C4, W7, B7, B8, B9, B11, B12	B13, B14, B15, C5, C6	B16, B17, B18, B19, L23, W12, W13, C8, C9
RCT B4: Reduction in extent and occurrence of ecologically significant invasive species by 2025, with quantifiable target set by 2006.	B3, B4, L5, L6	L14, C4, B9, B10, B11, B12	B13, B14, B15, L15, L16, L20, L22	B16, B18, B20
RCT C1: Maintain and improve condition of coastal ecosystems, as determined at representative sites within each subregion, by 2020, with quantifiable target set by 2006.	C1, C2, L5	L14	C5, C6, L22	C8, C9, L23
RCT C2: Maintain and improve condition and diversity of marine habitats, as determined at representative sites, by 2020, with quantifiable target set by 2006.	C1, C2		C5, C6	C8, C9
RCT C3: Maintain and improve condition of marine fauna, as determined at representative sites, by 2025, with quantifiable target set by 2006.	C3	C4	C5, C6, C7	C8, C9

KEY: L = Land | W = Water | B = Natural Biodiversity | C = Coastal and Marine systems

2.2 LAND

Managing healthy soils and sustainable primary production.

Healthy soils support the Region's biodiversity and its land-based primary production. Healthy soils also contribute to healthy waterways and marine environments by avoiding erosion, nutrient export and sedimentation. Primary production, including agriculture and forestry, contributes strongly to the Region's economy and social structures but faces some significant threats if major efforts are not made to develop and manage more sustainable farming systems.

One of the threats is changed hydrology as a result of clearing and replacement of deep-rooted species with lower water-using species. In parts of the Region, this is associated with a significant salinity risk. Hydrological changes and salinity are significant threats to biodiversity and to the Region's water resources as well as to agricultural production, but they are addressed in this section as they are largely a result of past land management practices. Moreover, the most effective responses to restore hydrological balance are likely to be through the development and widespread uptake of sustainable primary production practices, together with more specific revegetation and surface water management or drainage where feasible and justified.

Around 70% of the Region's 5.4 million terrestrial hectares is under some form of primary production, the majority being cropped (including wheat, canola, etc..) or under pasture, but with more than 125,000 ha under timber plantations and around 4,000 ha under viticulture and various forms of horticulture. Beef production occurs in the southern parts of the Region and there are a number of dairy farms in parts of the Albany Hinterland and the Kent Frankland, and a small but growing number of more diverse enterprises, including inland aquaculture (e.g. Barramundi at Broomehill), cut flowers and native seed production, venison farms and experimental truffle production. There are also an increasing number of organic and biodynamic farming enterprises, ranging from grains to beef, dairy, poultry and vegetable production.

The establishment of tree crops in the past decade, particularly in the higher rainfall areas, has marked a significant change in the Region's land uses. By far the largest areas have been planted to Blue Gums. Also a woodchip plant at Mirambeena north of Albany, and export facilities at the Port of Albany are now significant contributors to the Region's economy.

Table 4 shows the major land uses by area for each of the Shires within the Region.

Table 4: Major land uses by local government area

Local Government Authority (LGA)	Albany	Broomehill	Cranbrook	Denmark	Esperance	Gnowangerup	Jerramungup	Plantagenet	Ravensthorpe	Tambellup
Conserved natural water body (ha)			338							
Cropping (ha)	263311	69350	203215	35841	1487294	311176	429729	248649	387627	136490
Dairy (ha)				321						
Grazing and improved pastures (ha)			1500	3756						
Habitat/Species management area (ha)	4550									
Hardwood plantation (ha)	401	27	1772	250		34		1571	18	44
Livestock grazing (ha)							614			
Managed natural water body (ha)	2315						947			
Managed resource protection (ha)	7546		5158	55160	543	31		35071		
National park (ha)	13893		26558	17059	36983	36286	140513	51893	163837	
Nature conservation (ha)			11	30					1	
Other minimum intervention use (ha)	309	1	32	116	31060	2	169	9	118358	0
Plantation forestry (ha)	49008		18571	1299	191	392		51720	26	
Remnant native cover (ha)	73470	1563	32553	66148	35575	13877	71941	93116	271286	6039
Residential (ha)	312	1	6	22		6	27	35	37	1
Seasonal horticulture (ha)				28						
Services (ha)				5						
Softwood plantation (ha)	656		78	2		16	37	282	28	1
Strict nature reserves (ha)	13237	235	7365	7836	65354	3092	5071	5566	29544	1086
Traditional Indigenous uses (ha)	276				8043	25		11		10
Total Area (ha)	429283	71178	297156	187872	1665041	364937	649047	487924	970762	143671
% in South Coast Region	100%	61%	100%	100%	39%	86%	100%	100%	72%	100%

Source: National Land and Water Resource Audit (NLWRA), Land use theme 2001 (tertiary land use). Other LGAs that fall partly within the South Coast Region but have not been included in the table above include the Shires of Kojonup (23% within South Coast Region), Manjimup (6%), Kent (5%) and Lake Grace (3%). Map 1 shows the Shire areas within the Region.

2.2.1 WHAT WE KNOW

- DAWA (Agriculture Resources Management program) has identified eight strategic program areas for 2005 to 2015 as shown in Appendix 10. Key management actions and management action targets from the Strategy have been identified for each strategic program.
- Soils have been extensively mapped (see for example Schoknecht, 2002), and are one of the parameters used to define Agro-ecological Zones (AeZs). These units are based on common soil, hydrological, geological, geomorphological, climate, biological and vegetation differences, and have been used for the analysis of the major risks to soils. Fourteen AeZs cover the Region and are shown in Map 4. While the risks have been analysed for AeZs, they are reported at a subregional scale in Background Paper No 7: Agriculture - risk assessment.
- The risk analysis is based on potential risks, and has not included analysis of the actual levels of degradation. This would require additional information on soil condition and management practices that is generally not readily available or accessible at a regional scale.
- Approximately 30% of farmers test their topsoils annually (DAWA, Albany pers comm) but there is no regional database of the results, so no clear evidence for the condition or trends in soil fertility and other factors. Agricultural statistics from the Australian Bureau of Statistics provide some information on the level of use of soil ameliorants and can be used to infer regional soil conditions and trends, but are insufficient to establish definitive benchmarks on land condition in high risk areas.
- The major risks to soils in the Region are subsurface acidity, water repellence, phosphorous export and salinity. Wind erosion, waterlogging, structural decline and subsurface compaction are also risks but are rated lower at a regional scale. This does not imply that these risks are not of major significance at a local scale in parts of the Region. The Regional analysis (see Table 5) and maps of these risks are summarised in Background Paper No 7: Agriculture - risk assessment.

Table 5: NRM risk to agricultural production by subregion

Sub region NRM Issue	Albany Hinterland	Esperance Sandplain	Fitzgerald Biosphere	Kent-Frankland	North Stirlings Pallinup	Mallee
Subsurface acidity	High	High	High	High	High	Low
Water repellence	High	High	High	Moderate	Moderate	Low
Phosphorus export	High	Moderate	Moderate	High	Low	Low
Salinity	Moderate	Moderate	High	Moderate	Moderate	Low
Wind erosion	Moderate	Moderate	Moderate	Moderate	Moderate	Low
Waterlogging	Moderate	Moderate	Moderate	Low	Low	Low
Water erosion	Low	Low	Moderate	Moderate	Moderate	Low
Structural decline	Low	Low	Low	Low	Low	Low
Subsurface compaction	Low	Low	Low	Low	Low	Low

Source: Background Paper No 7: Agriculture - risk assessment.

- Subsurface acidity is considered to be the greatest threat to agricultural land condition within the Region because of the low buffering capacity and inherently low pH of the sandy topsoils in the Region, and the acidifying effect of agriculture (e.g. addition of acidic fertilisers, removal of produce and nitrogen leaching). There is limited information about the significance of off-site impacts of soil acidity, but these are most likely to be through reduced plant growth increasing the risk of other threats, particularly salinity and phosphorous export. There is no direct evidence as yet of lowered pH in waterways and wetlands as a result of soil acidity, although monitoring information is limited.

- Gazey (2003) summarised the management of acidity in agriculture, which is largely dependent on soil testing, appropriate fertiliser use, and the application of lime or dolomite. While incentive schemes such as the South Coast Productivity Grants have increased the application of lime within the Region in recent years, lime use is still less than that considered optimal for agricultural production in studies such as Porter and Miller (1998) (quoted in Department of Resources Development, 2001).

- There are social and environmental issues associated with the supply of appropriate quality lime for agriculture, as well as issues of competition with the mining (including the lateritic nickel industry in the Ravensthorpe area) and construction industries. The Department of Industry and Resources is developing a State Lime Supply Strategy (Discussion Paper released 2000). Issues of supply and demand within the Region need to be addressed and included in planning for the Region to ensure that conservation values of supply areas are not compromised.

- Water repellence is considered to be a high risk to agriculture in sandy topsoils of the Esperance Sandplain, Albany Hinterland and Fitzgerald Biosphere subregions. Claying is the most common and effective treatment. Reduced water infiltration can exacerbate other risks, including nutrient and chemical loss in run off.

- Phosphorus export has been assessed as a high risk for soils in the Albany Hinterland and Kent Frankland subregions, largely due to the landscape relief. Like salinity, phosphorous export is largely a result of land practices rather than an inherent characteristic of the Region's soils, and is also associated with significant off-site impacts including eutrophication of waterways and wetlands. Wilson Inlet, Torbay Inlet and Oyster Harbour have a significant level of eutrophication. Other eutrophic estuaries are listed in Appendix 2 of the Water Resources Background Paper No 4: Water Resources.

- Salinity will have a high impact on agricultural production in the Fitzgerald Biosphere as it will develop in a short time frame with a new equilibrium reached before 2020. A moderate impact of salinity is expected in the Albany and Esperance Sandplain, Kent Frankland and North Stirling Pallinup subregions due to a longer time frame until equilibrium. For the Esperance Mallee subregion, salinity should have a low impact within a longer time frame. The impacts of salinity on water resources and on biodiversity may be of high significance, particularly for areas of high public and conservation value. High salinity and nutrient levels impact upon the riverine systems that run out of agricultural land, into and through conservation reserves. These polluted waters may also have an impact on wetland, estuarine, coastal and marine systems. These potential impacts are dealt with more fully under Sections 2.2 and 2.3.

- The ***Western Australian State Salinity Strategy*** (2000a), the ***Salinity Taskforce Report*** (2000) and the State Government's ***Response to the Salinity Taskforce*** (2000b) established a framework for a strategic approach for managing salinity. The State Salinity Strategy recognised three over-arching management goals of Recovery, Containment, and Adaptation and that the appropriate areas for these approaches needed to be based on an analysis of public and private assets and the threats to them, and an assessment of the technical and economic feasibility of the management options. The State Government endorsed principles developed by the former State Salinity Council for the strategic investment of public funds into managing salinity, and these have been incorporated in the development of the ***Salinity Investment Framework*** (SIF). As yet, the SIF process has only been developed and applied at a State level and in the Avon River catchment.

- While an assessment of salinity risk has been attempted within the Region, the scale at which most information is available and the hydrological complexity throughout much of the Region requires more detailed investigations to be completed before the identification of specific catchments or sub catchments for containment, recovery or adaptation are identified. Current salinity mapping for the Region is shown in Maps 5-7. The Catchment Demonstration Initiative project underway in the Fitzgerald River catchment and the proposed extension of the groundwater bore monitoring network will assist in revising management actions to address salinity and hydrological imbalances within the life of this Strategy.

- As a peak grower driven group, the Saltland Pastures Association (SPA) are leading the strategic analysis for the sustainable use of salt affected land in the agricultural area of WA. This is being done as part of the SPA's strategic plan called One Million Hectares of Productive Use of Land with Salinity (1MPULS>) (Saltland Pastures Association Inc, 2002; Saltland Pastures Association Inc, 2003). 1MPULS> aims to achieve the revegetation of one million hectares of saline land in farming areas of WA over a ten year period. Revegetation will be for both biodiversity conservation and economic agricultural production. The outcomes of 1MPULS> have been documented and several activities are being successfully implemented on the ground with results benefiting all the NRM Regions. One such activity is the Sustainable Grazing on Saline Lands (SGSL) Grower Network program, which addresses the issue of grazing on salt affected land as well as developing an approach to assist land managers to adapt to living with salt affected lands. As a result of this program there are currently nine trial sites across the Region, which range in size from 10 to over 50 hectares. The 1MPULS> document also outlines projects that still require further development and will equally benefit the Region.
- Productive Use and Rehabilitation of Saline Land (PURSL). Commonly used as a term for the best management practice of saline land, PURSL is also a nationally branded term used to represent an interim network of people interested in progressing the best management practice use of saline land.

Table 6: Generic management options for salinity, (based on Soil-Landscape scale definition and assessment of technical feasibility and probability of adoption)

Agro-ecological Zone (Soil Landscape)	Zone No	Percentage of zone in South Coast Region	Value of land (PV of gross benefit; $/ha)	Objective	Management options
Pallinup	241	98	Med; Low	Recovery	Phase farming (5/10), drainage
				Containment	Drains and perennials (Lucerne phase) and surface water management
				Adaptation	Saltbush, Tall wheat grass
Albany Sandplain	242	100	Low; Low	Recovery	Commercial trees, phase farming, some pumping and drainage
				Containment	Phase farming and surface water management
				Adaptation	Saltbush, Tall wheat grass and related PURSL
Jerramungup	243	100	Med; Low	Recovery	Phase farming (5/10)
				Containment	Drains and perennials (Lucerne phase) and surface water management
				Adaptation	Saltbush, Tall wheat grass and surface water management
Ravensthorpe	244	100	Low; Low	Recovery	Perennials, drainage (open, siphon) and surface water management (including raised beds)
				Containment	Perennials (Lucerne) and drains
				Adaptation	Surface water management and PURSL
Esperance Sandplain	245	95	High; Med	Recovery	Commercial trees, some perennials, drainage and surface water management
				Containment	Perennials, drainage and surface water management
				Adaptation	Surface water management and PURSL
Salmon Gums-Mallee	246	52	Low; Low	Recovery	Drainage where permeability and soils allow, and surface water management
				Containment	Oil mallees, Lucerne where practical, surface water management
				Adaptation	Surface water management and PURSL

Agro-ecological Zone (Soil Landscape)	Zone No	Percentage of zone in South Coast Region	Value of land (PV of gross benefit; $/ha)	Objective	Management options
Stirling Range	248	100	Low; Med	Recovery	Phase farming (5/10) and drainage (e.g. deep open drains, siphons) where gradient is adequate (including raised beds)
				Containment	Phase farming (3/3)
				Adaptation	Saltbush, Tall wheat grass, alleys with annuals
SE Zone of ancient drainage	250	8	Med; Low	Recovery	Drainage systems (except where limited by sodicity), limited siphons and pumping
				Containment	Some Lucerne, oil mallee, surface water management (including raised beds)
				Adaptation	Saltbush systems (PURSL)
Warren-Denmark Southland	254	44	High; High	Recovery	Commercial trees, drainage (siphons, deep drains), large engineering systems in recovery catchments
				Containment	Alleys including perennials, surface water management (including raised beds)
				Adaptation	Salt-tolerant pastures, surface water management
Southern Zone of rejuvenated drainage	257	17	High; Med	Recovery	Drainage and pumping (siphons in dissected areas)
				Containment	Oil mallee alleys, Lucerne and long season annuals, surface water management (including raised beds)
				Adaptation	PURSL, surface water management

Source: Department of Environment, 2003.

- A number of incentive schemes have operated in the past, including the South Coast Productivity Grants (SCPG) and the Southern Incentive (Strategic Actions) NHT project. Southern Incentive has contributed to the establishment of around 1500 ha of perennial pastures and 120 ha of woody perennials in the past two years. Further uptake of perennial species will require significant industry investment and land manager participation in the development of profitable farming systems, including research and development of suitable species for South Coast conditions.

- Waterlogging, water erosion, wind erosion, structural decline and subsurface compaction have all been assessed as posing a moderate to low risk at a subregional scale, although these may pose higher risks to agricultural production at a property or local scale. The range of management options available has been summarised by Stuart-Street (2003).
- There has been minimal mapping for acid sulphate in the Region, but the incidence of such soils is believed to be low. Where they do exist and are disturbed however, the potential impacts on significant natural assets could be high. A State-wide project is underway to map the occurrence of such soils and to develop protocols for appropriate management.
- Soil fertility and organic content decline were not assessed for the Region because of the inadequate information base.
- Management options to address the main risks to soil health have been identified and their effectiveness evaluated by Stuart-Street (2003) for the South West Region. The management options and implications will be similar in most cases for the Region. Farmers in the Region are already adopting many of the identified options.
- Rapid Catchment Appraisals (RCA) or Focus Catchment studies have been carried out for many of the Region's catchments by inter-disciplinary study groups. RCA reports, for example, include catchment analysis (climate, geology, soils and landforms, hydrogeology, salinity risks, etc..) as well as information on appropriate management options for the catchments. Reports covering 51 sub catchments in the western part of the Region have been completed, with another 23 underway. In the east of the Region, reports have been prepared for the Lort and Young catchments and for catchments within the Beaumont Condingup area, with work on catchments in the Grass Patch Salmon Gums area underway.
- As well as the management practices already mentioned, two of the most beneficial practices that can be employed to improve the sustainable management of land are whole of farm planning, including careful matching of land uses and practices to land capability, and the more widespread use of perennial species. Most of the Region is ideally suited to perennial species due to the high probability of summer rainfall. The use of perennial species (including trees and pastures) to restore or maintain hydrological balance has been identified in Table 6 as a preferred option for managing salinity, but can also assist in reducing or avoiding nutrient export, subsurface compaction, water repellence, waterlogging, and wind and water erosion.
- There is also likely to be increasing pressure for primary production industries to demonstrate that their production methods are sustainable and that they are using best management practices as part of accredited production systems. An Environmental Management System (EMS) is currently being developed and implemented in the Fitzgerald Biosphere subregion by the FBG in conjunction with CENRM and Edith Cowan University, as part of the NHT-funded national program.
- About 48 properties are operating as organic farming businesses, with 20 of these being certified under recognised organic standards. The range of produce includes beef, mixed vegetables, wine, olives and some grains.

Forest products, tree farming and native plant-based industries

- In the higher rainfall (>600 mm) areas of the Region, a new industry based on Tasmanian blue gum was pioneered by the WA Government in the 1980s. The industry is now entirely under the management of private companies. There are currently around 125,000 ha of blue gum plantations within 160 km of Albany and at least 21, 000 ha within 160 km of Esperance. Blue gum chip wood is exported out of the Port of Albany by a private Japanese consortium – currently at a rate of 400,000 tonnes per year and predicted to increase to around 2.5 million tonnes by 2008 as additional exporters commence operations.
- Affecting the tonnage of blue gum chip wood will be the proposed development of an Engineered Strand Lumber plant, due to commence 2006 which will operate with around 400,000 tonnes of blue gums in full production by the year 2010.
- A Green Power Station is proposed for construction in Albany to take the residues from plantations, wood processing and municipal and agricultural waste green products.
- In the medium rainfall (400-600 mm) areas of the Region, FPC is undertaking the Infinitree program which is establishing softwoods, hardwoods and WA sandalwood on cleared farmland in partnership with land managers. Timber 2020 Inc, the private forestry development committee for the Great Southern Region, is currently developing an industry development plan for the dryland (<600 mm) zone.
- In the lower rainfall areas, oil mallees have been established by the Oil Mallee Company and private investors, mainly in the Esperance area. Investigations into other commercial tree farming opportunities are ongoing.
- Farm Forestry makes a positive contribution to rural and regional landscapes, environments and communities including helping to control rising water table which threatens biodiversity, water supplies, agricultural land and infrastructure assets. Farm Forestry can be integrated with farming businesses and provides for diversification of farm income and employment in rural areas. Appropriately placed trees provide shelter for stock, crops and pasture.
- Plantings of *Pinus radiata* commenced in 1987, and there are now around 3,500 ha established within an 80 km radius of Albany. *Pinus pinaster* planting commenced in 1997 and there are now 2,500 ha established within 120 km of Albany and 2,000 ha within 160 km of Esperance.
- Eucalypt sawlog plantings commenced with a pilot industry phase in 2001.
- Establishment of WA sandalwood in the Region commenced in 1999 and continues under the FPC's Infinitree program and efforts by Greening Australia (WA) (GAWA). Research into sandalwood establishment techniques in the Region is being undertaken by scientists working with SCRIPT, GAWA and CENRM. Incentives for land managers to establish sandalwood for both commercial and biodiversity outcomes have been available under the Southern Incentive (Strategic Actions) NHT project, and are being further developed and applied by GAWA through the Gondwana Link program.

- GAWA, Green Skills, the Gondwana Link partnership, SCRIPT and CENRM are involved in identifying and promoting opportunities for other native plant based industries. There is obvious potential for Noongar people to be strongly involved in these industries, and the Gondwana Link partnership in particular is looking to develop these opportunities. The CALM SEARCH Project trialled melaleuca and other potential woody perennial species on a large scale in the agricultural region in 2002 and 2003.
- Green Skills Farm Forestry Program (established in 1990) has been assisting farmers to establish and manage commercial farm forestry timber lots for demonstration and education purposes.
- A *Casuarina obesa* Working Group was established in 2001 to develop this species commercially. The Great Southern Regional Industry Development Plan for Farm Forestry in the Dryland Zone (currently under development by Timber 2020 Inc) includes consideration of *Casuarina obesa* and a number of other potential forest products industries.
- There is potential for carbon sequestration credits assisting uptake of woody perennials. GAWA has teamed up with Shell to undertake a project called "Reconnections" which involves large-scale revegetation of native plants between the Stirling Range and Fitzgerald River National Parks. This involves extensive revegetation for multiple outcomes including biodiversity, wildlife habitat and potential native-plant based industries, and supports the work of Greening Australia in the Gondwana Link partnership. In addition, and with the assistance from the CRC for Greenhouse Accounting, the project will investigate the carbon sequestration potential of revegetation in low rainfall areas using a diversity of native plants.

Land use planning – urban and industrial uses

- Town planning schemes and statutory regional planning by local governments and the Department for Planning and Infrastructure (DPI) can be powerful mechanisms for achieving regional natural resource condition outcomes if they are integrated with NRM objectives. This can be encouraged through cross-participation in planning activities, and by the maintenance and sharing of comprehensive and compatible data sources between organisations. Integrated planning and information sharing is considered further in Section 2.6 (Regional Capacity). Statements of Planning Policy provide an over-arching framework for the statutory planning mechanisms and can be used to coordinate actions on issues such as regional drainage, biodiversity corridors and coastal planning.

2.2.2 CURRENT COMMUNITY CAPACITY

- While there is a fairly comprehensive level of information available to land managers on different management options and their effectiveness, there is still a need to improve both the accessibility of that information and to target those land managers who most need to alter their practices. DAWA has in the past been responsible for developing and extending information to land managers, but their role has more recently been focused on developing information systems rather than providing extension services.
- A large part of the responsibility for provision of information and extension services has fallen on community-based NRM (formerly Landcare) Coordinators. The Coordinators have a wider NRM responsibility, often with responsibility for developing and implementing other catchment-based programs for biodiversity, water management or coastal protection. Moreover, they have often been employed on short-term and insecure contract conditions, and this has hindered the retention of highly skilled and experienced people in these roles. Technical, scientific and managerial support to the Coordinators is variable across the Region. Some LGAs provide significant administrative or financial support for the Coordinator positions, but this, too, varies across the Region.
- Total farm planning, including soil management planning, can potentially assist in addressing the suite of farm sustainability issues but has not as yet been taken up on a large scale, particularly by the private sector (agricultural consultants).
- The Fitzgerald Biosphere Marketing Association (FBMA) was formed to identify marketing opportunities that increase recognition of the Biosphere concept and its sustainable development ethos. This is linked to the Fitzgerald Biosphere development and trial of an Environmental Management System (EMS). The Great Southern Marketing Association (GSMA) and the Great Southern Wine Producers Association (GSWPA) are working to increase the profile of the Region's producers and their market share. Developments such as the Albany Farmers Market are increasing the exposure of consumers to the Region's producers, including organic and biodynamic enterprises, and "value-adding" to these enterprises.
- A number of training and skills-development programs have been conducted, including five Master Tree Grower Programs for farmers, and two Introduction to Farm Forestry Courses for NRM professionals. There is currently a Farm Forestry Development Officer employed through CALM under NHT funding and based at Albany, but a position based at Esperance has been discontinued due to funding problems. Two Regional Private Forestry Committees (Timber 2020 and South East Forest Foundation) operate within the Region.
- A number of local tree nurseries, contractors and service providers are now servicing the plantation and farm forestry industries.

2.2.3 ASPIRATIONAL GOAL, OUTCOMES AND RESOURCE CONDITION TARGETS

Managing Land – Healthy Soils and Sustainable Primary Production

Aspirational Goals:

- Soil and land resources are protected and improved.
- Land uses and management are matched to land capability.
- Profitable and ecologically sustainable primary production systems are based on land capability, innovation and the best possible management practices.

Outcomes:

- Information base for managing soils and land, and monitoring effectiveness of management practices.
- Best management practices maintaining soil health and reducing off-site impacts.
- Primary production systems and practices matched to land capability.
- Increased innovation and land manager participation in developing sustainable and profitable production systems to meet NRM goals.
- Increased range of commercial land use options with beneficial environmental values.
- Appropriate management options for containment, adaptation or restoration of hydrological balance in priority catchments.
- Minimal nutrient and chemical export from primary production.
- Reduced threats from pest plants and animal species and diseases.
- Profitable and sustainable tree crop industries in both high and medium-low rainfall zones.
- Tree cropping as part of whole farm planning.
- Tree and forest industry opportunities in isolated rural towns.
- Value-adding opportunities decreasing reliance on single commodity.
- Increased capacity to predict and manage change.

Achievable Resource Condition Targets (RCTs):

Recommended indicators for measuring soil health are yet to be agreed by the State and Australian Government M&E Working Groups. Benchmarking information is limited for most of the recommended indicators for National Standards and Targets. The following are therefore proposed as interim targets and should be reviewed, as further advice from the Working Groups is received and benchmarking and monitoring actions progress.

RCT L1. Achieve 300,000 ha of Albany and Esperance Sandplains with subsoil (10-20 cm) pH 5.0 or higher by 2020, as measured at identified representative sites.

RCT L2. Reduce water repellence over 120,000 ha (10%) of sandy surfaced soils currently identified as high risk of water repellence by 2010, as measured at identified representative sites.

RCT L3. Reduce subsurface compaction on 150,000 ha (30%) of soils in high risk areas by 2025, as measured at identified representative sites.

RCT L4. Achieve 3.5 million ha (95% of properties) at or above 50% ground cover by 2020 (to reduce wind erosion) by 2020.

RCT L5. For agricultural land in priority catchments and areas that contain high value biodiversity (see Section 2.3), water resources (see Section 2.2), infrastructure and agricultural assets (see Background paper No 8):

Reduce the rate of rise in groundwater levels by 50% by 2025.

Reduce and/or maintain depth to groundwater below critical levels (>2m) by 2025, with quantifiable target set by 2006.

RCT L6. In the headwaters of priority sub catchments, achieve a downward trend in nutrient levels by 2025, with quantifiable target set by 2006.

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Other RCTs that relate to Management Actions in the section are:

RCT W3. Achieve downward trend in nutrient (N and P) levels in priority sub catchments including the Sleeman and Cuppup Rivers (Wilson Inlet) and Torbay waterways by 2010, with a quantifiable target set by 2006.

RCT W4. Maintain or improve river condition for priority rivers by 2020, with quantifiable target set by 2006.

RCT W5. Maintain or improve estuarine condition for Wilson and Torbay Inlet (targets set by 2005) and for eight other estuaries by 2020, with quantifiable targets set by 2006.

RCT W6. Maintain or improve extent and condition of internationally, nationally and regionally significant wetlands by 2020, with quantifiable targets set by 2007.

RCT B1. Achieve no net loss of native vegetation, with condition maintained or improved, as measured against benchmarks, with quantifiable target to be set by 2006.

RCT B2. Condition target for significant taxa and associations, and potentially threatened species and ecological communities, set by 2008, after completion of MAT B2.

RCT B3. Maintain or improve extent and condition of significant taxa, threatened species and ecological communities by 2020, with quantifiable target set by 2006.

RCT B4. Reduction in extent and occurrence of ecologically significant invasive species by 2025, with quantifiable target set by 2006.

2.2.4 MANAGEMENT ACTIONS AND TARGETS

Management Action Target (MAT)	Management Action (MA)	Geographical focus	Key responsibility	Priority scores
Benchmarking and monitoring				
MAT L1 Benchmarks established for selected soil parameters by 2006 (RCT L1, L2, L3, L4, L6)	• Survey to establish actual soil condition within identified risk areas and level of application of best management practices	Regional, based on high risk areas for selected parameters	DAWA	20a
MAT L2 Industry best management practices defined one set per year by 2009 (RCT L1, L2, L3, L4, L6)	• Define current industry best practices and monitor uptake by land managers for industries including grains, animal industries, forestry and tree cropping, horticulture and viticulture • Establish benchmarks for implementation of industry BMPs	Regional, based on high risk areas for selected parameters	DAWA, industry organisations	23a
MAT L3 Nutrient management modelling and monitoring applied in priority catchments by 2009 (RCT L6, W3, W4, W5)	• Monitor nutrient export levels and use modelling to determine potential for improved management outcomes	Priority rivers and estuaries for eutrophication management (see Tables 6 and 10 in Background Paper No 4: Water Resources)	DAWA, DoE	19a
MAT L4 Catchments identified for recovery, containment and adaptation identified by 2005 (RCT L5, L6, W4, W5, W6, B1)	• Identify priority catchments for recovery, containment and adaptation through hydrological analysis, extension of bore network and use of SIF methodology • Refine management options and develop precise management targets for perennials, drainage, surface water management and commercial tree species • Develop further bore network and implement monitoring	Regional, priority to high risk salinity catchments (see Maps 5–7)	DAWA, DoE, CALM, SCRIPT	23b
MAT L5 Regional monitoring program established for pest plants, diseases and animals by 2007 (RCT B1, B4, C1)	• Identify benchmarks and establish regional monitoring program on GIS for pest plants, diseases and animals	Regional	DAWA, CALM, SCRIPT (SCRIC)	23a
MAT L6 Sustainability indicators developed for two farming systems by 2007 (RCT L1, L2, L3, L4, L5, L6, B1, B4)	• Trial two industry-based systems for subsequent accrediting of better practices (precursors to Codes of Practice or EMS/QA systems) • Incorporate sustainability indicators into accreditation systems	Regional, with indicators to be developed within State and national M&E frameworks	DAWA, EPA, CALM, FPC, Sustainability Policy Unit, Industry, subregional production groups	18a

Management Action Target (MAT)	Management Action (MA)	Geographical focus	Key responsibility	Priority scores
On Ground actions				
MAT L7 Risk containment programs for salinity and water management incorporated in 300 farm plans (40% high risk farms) by 2010 (RCT L5, L6, W4, W5, W6, W7, W9)	• Incorporate risk containment programs for salinity and water management (salinity, eutrophication, chemical off site impacts, waterlogging, sedimentation) through development of and implementation of farm business plans that increase sustainability (economic, social and environmental)	Regional, priority to high risk salinity catchments (see Maps 5-7)	Land managers, agribusiness, DAWA	22b
MAT L8 Soil health initiatives implemented on 100 farms per year from 2007 to 2010 (RCT L1, L2, L3, L4, L5, L6, W3, W4, W5, W6)	• Use no-till/minimum till in 90% of cropped areas (3.24 million ha) • Develop and implement coordinated soil health initiatives package addressing soil condition, including subsurface acidity, structure, nutrient status, waterlogging, inundation, water repellence, water erosion and wind erosion	Priority risk areas (see Maps in Background Paper No 7: Agriculture - risk assessment)	DAWA, GSDC, industry	20a
MAT L9 Implementation of perennial farming systems commenced by 2006 (Targets for additional areas of perennials in permanent and phase farming systems identified in MAT L4) (RCT L2, L4, L5, L6, W3, W4, W5, W6, W7)	• Partner sub catchment groups with industry to implement adoption of perennial farming systems • Implement sustainable grazing on saline lands for adaptive salinity management on 50,000 ha (15% of high risk areas) • Implement Profitable Perennials Initiative in priority areas identified through hydrological analysis • Transfer outcomes of CDI to similar catchments	Regional, priority to high risk salinity catchments (see Maps 5–7)	Subregional groups, DAWA, CRC for Plant Based Solutions to Salinity, Saltland Pastures Association, FPC	22a
MAT L10 Management options, including farm water requirements, incorporated in property and catchment surface water management plans by 20% of landholders in priority areas by 2010 (RCT L5, L6, W4, W5, W6)	• Implement Waterwise and Drainwise programs • Identify areas matched to specific engineering solutions • Implement integrated surface and ground water management programs to protect high risk agricultural land, manage industry water requirements, protect biodiversity and protect community infrastructure assets • Develop recovery plans and commence implementation for townsites of Tambellup and Cranbrook and identify other priority assets	Strategic catchments in each NRM Region	Land managers, DAWA, DoE, Main Roads, LGAs	16a

Management Action Target (MAT)	Management Action (MA)	Geographical focus	Key responsibility	Priority scores
MAT L11 Key best management plans for chemical and nutrient management adopted by industry and implemented on 20% of high risk areas (60 farms) by 2010 (RCT L6, W3, W4, W5, W6, W7)	• Increase by 10% efficiency of use of on-site and imported resources (in farming systems) in priority catchments • Adopt farm gate nutrient balance as management tool by 40% of farms in high priority areas	Regional	DAWA, land managers, agricultural consultants	21a
MAT L12 Five sustainable tree cropping and/or native plant based industries under development by 2010 (RCT L4, L5, W3, W4, W5, W6, W7, W8, W9)	• Establish tree crops in medium to low rainfall zones on 50,000 ha • Establish integrated wood processing facility at Mirambeena Industrial Site • Operate native plant based industries for two additional industries • Complete feasibility studies and commence commercial scale trials for at least three new potential industries • Establish market research and industry development for feasible native plant based industries • Make available comprehensive information and support package for landowners in low-medium rainfall areas • Integrate tree cropping into farm enterprises • Expand tree cropping and/or native plant based industries processing and value adding opportunities • Support tree cropping and/or native plant based industries research, development and extension	Regional, priority to catchments identified as highly modified hydrology High risk areas (see Background Paper No 7: Agriculture - risk assessment)	Timber 2020, South East Forest Foundation (SEFF), FPC, DoE, Green Skills, GAWA, land managers, Industry, DAWA, agribusiness, land managers, GSDC, CALM	22a
MAT L13 Key limiting factors for farming systems identified in two AeZs and 350 farmers involved in developing improved amelioration practices used by 2010 (RCT L1, L2, L3, L4, L5, L6)	• Implement participative development of resource management systems, including improved management practices for subsurface acidity, compaction, water repellence and other degrading soil processes	High risk areas (see Background Paper No 7: Agriculture - risk assessment) and NRM innovation sites	Industry, DAWA, GRDC, agribusiness, land managers	20a
MAT L14 Priority pest species control under trial for at least three new methods by 2008 (RCT B1, B4, C1)	• Expand methods for controlling invasive terrestrial and aquatic plant species, diseases, feral animals and other pests	Regional, locations dependent on research outcomes and suitability of trial areas	DAWA, CALM, DoE, CSIRO, LGAs, subregional groups, land managers	17b

Management Action Target (MAT)	Management Action (MA)	Geographical focus	Key responsibility	Priority scores
Capacity building				
MAT L15 Land potential initiatives developed by at least three subregional groups by 2010 (RCT L1, L2, L3, L4, L5, L6, W3, W4, W5, B4)	• Develop and implement Land Potential Initiatives based on improved use of land resource information to determine land potential, capability and suitability for land uses and management practices • Develop and utilise in at least three subregions information tool kits, including AGMAPS CD-ROM and targeted best management practices techniques	Regional	Land managers, DAWA and agribusiness	19a
MAT L16 NRM management skilling programs conducted through 25 activities per year by 2006 (RCT L1, L2, L3, L4, L5, L6, B4, W3, W6)	• Develop and promote comprehensive decision support tools and programs to improve ability of NRM Coordinators, land managers and agribusiness to promote and implement NRM programs	Regional, priority to high risk salinity catchments (see Maps 5– 7)	DAWA, DoE, subregional groups	24a
MAT L17 Three new perennial plant options (native and/or introduced) developed for two AeZs by 2010 (RCT L2, L4, L5, L6, W3, W4, W5, W6)	• Continue and extend participative R&D into plant options for sustainable farming systems suitable for conditions	Regional	CRC Plant Based Solutions to Salinity, DAWA, CENRM, industry, land managers	18a
MAT L18 One biomass processing plant established by 2010 (RCT L4, L5, L6 W3, W4, W5, W6, W7)	• Support further investigation into opportunities and appropriate locations for production of biomass for energy generation	Regional	GSDC, GEDC, LGAs, Timber 2020	18a
MAT L19 Three "carbon investors" active by 2006 (RCT L4, L5, L6 W3, W4, W5, W6, W7, B1)	• Investigate and develop opportunities for carbon sequestration that provide economic incentives for regeneration and revegetation	Regional	GAWA, Gondwana Link Partners, DoE, SCRIPT, FPC, Timber 2020, SEFF, CALM	18a
MAT L20 50% of specialist agricultural products sold/exported used regional and/or subregional branding in accordance with EMS principles by 2010 (RCT L1, L2, L3, L4, L5, L6, B1, B4)	• Support regional branding and marketing of products based on achieving sustainable production	Regional	DAWA, subregional groups, GEDC, GSDC, FBMA, GSRMA, GSWPA	17c

Management Action Target (MAT)	Management Action (MA)	Geographical focus	Key responsibility	Priority scores
MAT L21 Regional plan developed to provide management responses to climate change and seasonal variability by 2007 (RCT L4, L5, L6)	• Improve methodology and capacity to manage and adapt to seasonal variability and long-term climate change • Identify and commence implementation of land use and management systems for adapting to climate change	Regional	Industry, DAWA, DOE, subregional groups, land managers	15a
MAT L22 Subregional targets for invasive species control established by 2008 (RCT B1, B4, C1)	• Implement invasive species coordination system • Develop community programs for protecting biodiversity and primary production from invasive species • Manage invasive species through development of community programs for protecting biodiversity and primary production from invasive species, develop and maintain capacity to detect and eradicate new infestations of pest animals, plants or diseases, secure dedicated APB officers, and provide resources (funding and information) to community groups for pest control programs • Publish information on top ten environmental weeds and management recommendations • Develop and maintain information packages on invasive species • Review requirements to maintain or improve regional capacity to detect and eradicate invasive species (See also MAT L14)	Regional, priority to areas of greatest impacts on biodiversity and production	DAWA, CALM, DoE, LGAs, SCRIPT, subregional groups, land managers	22a
Institutional frameworks, planning, policy				
MAT L23 Regional and local planning strategies and statutory planning instruments reviewed and linked as necessary to State Sustainability Strategy objectives and targets by 2008 (RCT L1, L5, L6, W3, W4, W5, W6, W9, B1, B3, C1)	• Identify land of high agricultural significance • Consider management of lime supply areas in all coastal Town Planning Schemes • Ensure increased incorporation of NRM objectives and assessments of land and water resource capability in statutory planning instruments, including regional and local planning strategies and Town Planning Schemes	Regional, priority to coastal LGAs	DPI, DIR, LGAs, DAWA	17a

2.2.5 TRADE-OFFS

The use of land for primary production clearly has impacts on soils, biodiversity and water resources. Primary production also has significant social and economic benefits for the Region. Balancing the benefits and costs will not be easy, but the proposed management actions are intended to improve the recognition of high value production areas, the matching of land uses to land capability, and the management options for improved productivity with reduced environmental costs.

Establishing clear benchmarks and sustainability indicators that are part of assessing the outcomes of either accredited production systems (such as EMS) or recognised industry BMPs will assist to determine the Region's sustainable productive capacity. Investments by industries, land managers and governments in developing these frameworks should lead to improved economic capacity for continued private investment in NRM. Land managers, however, will need to consider the economic lag between the implementation of EMS, BMPs or any other action that proposes a change to the farm system, and increased productivity and profitability.

The assumption is that improved productivity and greater profitability will lead to increased investment in NRM for beneficial environmental outcomes. The need for land managers to be willing to invest a proportion of increased profits in NRM outcomes that may not have a direct financial benefit to them also needs to be considered and addressed.

For some areas, productivity increases may be insufficient to meet environmental costs. In such circumstances, additional measures such as structural adjustment may be necessary. At the very least, a comprehensive review of financial incentives and disincentives to manage natural resources sustainably needs to be undertaken at national and State levels and the results implemented within regions. Subsidies for activities that may exacerbate natural resource degradation could for example be replaced by payments for the provision of ecosystem services (similar to carbon credits, and extended to salinity, water quality and biodiversity credits).

Box 8: South Coast Stories – Peter Luscombe

A CONVERSATION WITH PETER LUSCOMBE

NATIVE SEED PIONEER AND BUSH ADVOCATE

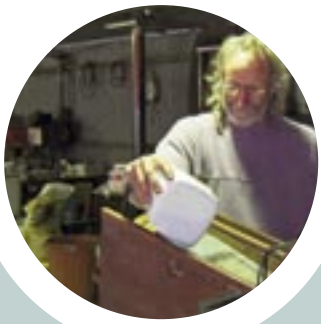
Seeds are pretty amazing when you stop to think about it: to store enough genetic material within that speck to produce a plant that knows when to grow, when to flower, the shape and colour of the flower, and the scent that attracts certain insects … sometimes a double handful of seed is enough to revegetate a hectare, so that's a lot of power in your hand, in that little speck.[i]

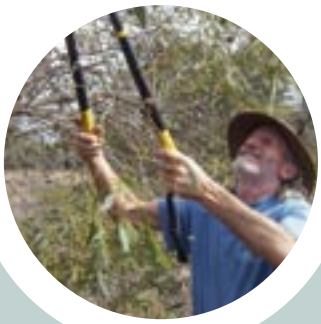
Eucalyptus salmonophloia, the salmon gum, is a huge tree and has extremely fine seed. So in a kilogram of salmon gum seed the potential is for up to half a million trees. The Kennedia's are heavy, solid seeds; we've got the Isopogon … the seeds are light and fluffy, a totally different kettle of fish altogether, and not as easy to handle as some of the other ones.[ii]

At Nindethana[iii] we are handling about 3,000 species and within those species maybe 10 – 15,000 seed batches with separate provenance information. We feel we have an environmental responsibility to retain the local genetics, rather than mix it all up. As far as volume goes, well, that varies from week to week and that would be in the tons, but how many is another thing! Probably 25 percent of all the species that Nindethana handled would be from the South Coast Region. [iv]

Q: "It's always a really nice feeling when you've got all the local seed to make a direct seeding mix. I always like to do a mix of about 50 species – I'd like to call that my minimum, but it's not always the case. We have done mixes of up to 150 species where we have had one to two years to put the mix together." [v]

PETER LUSCOMBE





FROM BARREN LAND TO BIODIVERSITY…

WHAT KNOWLEDGE DO YOU BRING TO THE TASK?

It's experience in the bush: you are always reading the bush … lots of different vegetation types, soil types, climatic areas, and you see a bit of a pattern after a while of how it all works and why species are in the environment and what they do there.[vi]

What makes it all worthwhile is where you have put a lot of effort into a mix, and after one or two years you are seeing the results on the ground -it might be a roadside re-veg or farm job, or a mine site. You start out with a bare site and it looks like a totally barren landscape, and you've created all this biodiversity: you've got wildlife coming into it - you've got birds nesting in it, you've got blue wrens and quail in there, and I've even seen honey possums in direct seeded sites on the flowers.[vii] Taking Albany Highway as an example, we have probably provided seed to revegetate a hundred kilometres either side of the road over the years. That was just one customer.[viii]

WHICH ACHIEVEMENTS STAND OUT FOR YOU?

Just building the seed business up from something that was very small and to have a fairly large network of customers and to have all the information about the collected seed, such as number of plants, soil type and provenance on a database.

I think my best achievement is securing areas of bushland that were destined for the bulldozer or were destined for farming. Some of it was half way there, and to turn that around and establish rare species plantations, to me, feels like an achievement. But I guess the main one was to show that direct seeding a whole range of local species was actually achievable. Getting that off the ground was one of the bigger ones.

It would have been the very early 70s when we started doing that ourselves on my parents' farm and on some roadside areas that were degraded with gravel pits.[ix]

Box 8: South Coast Stories – Peter Luscombe

BUYING & SAVING THE BUSH: *I always give myself goals and the main one with the seed is that it's been a means to an end: I have discovered the only way to save a bit of bush is to actually buy it so Nindethana has really been a vehicle for that. If there is local bush that I like and I can afford it, and if it is available, I'll try and acquire it. Really that is what has driven me. There is no way I would have sat for so long in an office because I am not that sort of person, if it hadn't been for that, and also the fact that now you can see that revegetation is actually a possibility and a means of protecting a lot of species and trying to bring a bit of the country back to what it was.*[xv]

In the end, with conservation and trying to influence people, I basically got on and developed the seed business and the ethics that surrounded it, and tried to be successful in doing that. I think we have arrived at a point where people see us as successful business people, working for the environment.[xvi]

NATIVE PLANTATIONS AND NEW CHALLENGES

At Woogenellup, where I live, we started out with a paddock which was running sheep, and it had been cropped with conventional cereal, and I basically decided to go broad acre with native plants.[x] We currently have around 10-15 hectares growing about 50 species; a number of these were locally extremely rare or almost extinct in[xi] some cases.

About 25 years ago I found what turned out to be a new Dryandra, only about 12 kilometres away. It's now on the rare and endangered list because there was only one site left in the world. I harvested some seed and we sowed some of that seed here… we've probably got about 50 plants going very strongly, and they're just all about to come into flower.[xii] That is what we are about: trying to ensure the survival of the local rare species where possible.[xiii]

Pallinup Gold is an Acacia, very localised to the Pallinup Valley, and about 25 years ago when we first came across it, it wasn't even a named species. It's a brilliant plant… when it flowers it's just a mass of bright yellow or gold, the whole plant, and you can't see any of the foliage. It wasn't readily available. We put it into plantation and have been able to harvest enough seed to put it back into direct seeding work in the Pallinup catchment. It has a secondary use, in that it's good habitat for small marsupials and birds… It's Conservation Code 3, which means normally you wouldn't be able to harvest seed from it, especially from the wild, but because we have it in plantation, we have made a note on our database that it is cultivated seed and it's okay for general sales.[xiv]

The possibilities are huge because we've got the species to draw from. I like to keep having ideas and drawing the species out that I perceive to have potential for one thing or another, whether it's for floraculture, or native flour for bread making, or whether it's the timber, or native grasses or native legumes for pasture -really there is no end to the possibilities. I am just trying to glean out some of the ones that I see as having high potential and proving some of them by growing them myself, and maybe one day down the track they will be something.[xvii]

Somebody once coined the phrase 'money doesn't grow on trees' and that really made me more determined. So I went out and basically proved them wrong.[xviii] Initially my neighbours viewed me as a hippy greenie on the hill. We were suspected of growing marijuana or something like that, because how could we make money in the bush … But now they see me quite differently, seeing that I'm making a go of it … and I'm not that weird.[xix]

Acknowledgements: A contribution by Greening Australia (WA) to the SCRIPT South Coast Regional Strategy for NRM and the Gondwana Link project. Editing by Margaret Robertson and Keith Bradby. Special thanks to Peter Luscombe. Thanks also to Stephen Mattingley for assistance with the text, Amanda Keesing for photo editing, and the Department of Environment and Margi Edwards for preparing the interview transcript.

[i ii v vi vii xiv xvi xvii] This interview excerpt was taken from recordings made for the documentary film 'A Million Acres A Year', which was produced by Snakewood Films in association with SBS Independent, developed with the assistance of the Australian Film Commission and financed with the assistance of the Australian Film Finance Corporation. It is available from Film Australia.

[iii] Peter is the owner of the business Nindethana Seed Service.

[iv viii ix xi xiii xv xvii] P. Luscombe interview with M. Robertson in Albany, 24/05/2004.

[x xii xix] ABC Radio National 'Earthbeat' interview, 4/10/2003.

2.3 WATER

Managing waterways and water supplies sustainably.

In this section, the issues to do with water resources are described and targets and actions are proposed. Water resources include waterways as well as resources for public and private water supplies. The term "waterways" is used to include all rivers, tributaries, estuaries and wetlands. Marine waters are included in the Coastal and Marine section (Section 2.5). There are issues and actions for Biodiversity (Section 2.4) that will also be relevant for protection and management of water resources. Similarly, there are catchment management issues addressed under Land (Section 2.2) that will contribute to the health of waterways and water supplies. These are generally cross-referenced.

Background Paper No 4: Water Resources presents further information and is the source of much of what is summarised in this Section.

2.3.1 WHAT WE KNOW

- The Region includes 107 rivers or major tributaries, 33 estuaries and more than 300 Conservation Category wetlands.
- There is limited information on the rivers. Only 30 have gauging stations and only two have more than one gauging station. Monitoring has focused on rivers within the Princess Royal and Oyster Harbours, Wilson Inlet and Torbay Inlet catchments (for nutrient monitoring) and the Kent and Denmark River catchments (for salinity monitoring).
- Because of the lower rainfall in the east of the Region, only the rivers in the west have year round freshwater. The characteristics of the rivers are very diverse (hydrology, geomorphology, catchment size and vegetation cover and so on; refer to Background Paper No 4: Water Resources) and therefore the management requirements are also likely to differ.
- Knowledge regarding biodiversity of waterways is very limited, but available information suggests that the aquatic biodiversity is likely to exhibit similar species richness and endemism to terrestrial biodiversity.
- The streams of the Region contain 10 species of freshwater fish. Eight of these species only occur in WA and some of these fish are considered to be threatened. Some species including the trout minnow, spotted minnow and salamander fish only occur in the Region.
- Changed hydrology and increased salinity levels due to catchment clearing are the biggest threats to rivers in the Region, and can also be associated with increased erosion, sediment transportation, and altered turbidity and nutrient levels. Other threats include loss of riparian vegetation (including through unmanaged livestock access), nutrient enrichment, unmanaged recreational use, pollution from rural and urban land uses, and over-extraction of limited freshwater and physical alteration to river banks, channels and floodplains.

- The level of clearing in the catchments is used as a general indicator of riverine health. There are 24 rivers in the Region, with more than 89% of their catchments still under native vegetation cover. Three of these (the Deep, St Mary and Dempster) were identified as "Wild Rivers" by the Australian Heritage Commission (now the Australian Heritage Council). The upper catchments of three other rivers (the Oldfield, Young and Lort) are also substantially uncleared, so the upper reaches of these rivers also have high environmental values.
- At the other end of the spectrum, 16 rivers have more than 80% of their catchments cleared, and as a consequence have very substantially modified hydrology often associated with increased sedimentation, erosion and increased turbidity and nutrient levels in their estuaries.
- Many of the Region's rivers have high social and economic values, as a result of their use for water supply, recreation, tourism, fishing or other amenity values. Ten rivers have been classified as having highly significant values (the Frankland, Kent, Styx, Scotsdale, Denmark, Quickup, Marbellup, Lower Kalgan, King and Angove).
- Surveys of around 1218 km of 15 primary rivers and 484 km of secondary creeks have been undertaken. River Action Plans have been prepared for Bremer and Devil's Creek and the Dalyup, West Dalyup and Phillips River. Reports have also been prepared on the state of the Fitzgerald, Lort and Pallinup Rivers and Beaufort Inlet. Reports on the Frankland, Gordon and Jerdacuttup Rivers are in progress.
- Two wetland systems (Lakes Gore and Warden) are listed as Wetlands of International Significance (under the Ramsar Convention). Lake Warden is also a Biodiversity Recovery Catchment and revegetation, monitoring and hydrology studies are underway. An additional 11 wetlands systems are listed on the Directory of Important Wetlands and 15 systems are on the Register of the National Estate. About 300 wetland systems have been identified as being in the Conservation Category (as defined by the Environmental Protection (South Coast Agricultural Zone) Policy 1997) but only broad scale surveys and classifications have been undertaken.
- Monitoring has been undertaken twice yearly in 30 wetlands since 1999 to build better understanding of wetland condition and threats. Two management plans per year have been prepared since that time in a joint project by DoE and Green Skills. There is very little long-term monitoring information, and very limited biodiversity information.
- Changes to hydrology as a result of clearing are the single biggest threat to the Region's wetlands, but there are also impacts from increased salinity levels, continued physical clearing of the wetlands themselves, drainage, nutrient enrichment, invasion by weeds, loss of fringing vegetation through grazing and, particularly for some coastal wetlands in drought years, over-extraction of water for supply purposes.

- Of the Region's 33 estuaries and inlets, only four are permanently open to the Southern Ocean, others opening after heavy rainfall events or high seasonal water levels. Only four small estuaries and their catchments occur entirely within national parks and can thus be considered to be pristine (the Dempster and St Mary within the Fitzgerald River National Park, and Jorndee and Poison Creeks within the Cape Arid National Park).
- Social and economic values of estuaries are high, particularly because of their recreational use, including boating, and the commercial fishing and tourism interests. Estuaries identified as having particularly high social and economic values are the Walpole-Nornalup and Wilson Inlets, Princess Royal and Oyster Harbours, the Waychinicup, Irwin, Hamersley, Stokes and Culham Inlets and Bandy Creek.
- There has been considerable study undertaken on Wilson Inlet, including research under the National Eutrophication Management Program, and monitoring is ongoing. Seagrass decline, algal growth and nutrient sources have been extensively studied for the Albany harbours, especially from 1988 to 1990. Outside these areas, research into the Region's estuaries has been limited, but DoE has been undertaking quarterly monitoring of eight estuaries (the Oldfield, Hamersley, Gordon, Wellstead, Beaufort, Parry, Walpole and Nornalup) since 1998.
- Nutrient management plans have been prepared for Princess Royal and Oyster Harbours and Wilson Inlet and are in preparation for Torbay Inlet and Wellstead estuary. Watershed Torbay is a project funded through the National Rivers Consortium, using the Torbay catchment as a case study in developing community-based approaches to catchment management.
- Some of the western rivers (the Walpole, Quickup, Scotsdale and Denmark Rivers and Angove and Limeburners Creeks) are important water supply resources and others (the Bow River and Marbellup Brook) are potential future sources. Marbellup Brook has been identified as the next major water supply source for Albany.
- The Kent and Denmark Rivers are Public Water Supply Recovery Catchments under the WA Salinity Action Plan and extensive revegetation and high water use farming systems are being implemented to reduce salinity levels in the rivers.
- The Region contains limited fresh groundwater, with the exception of coastal quaternary aquifers (sand dune aquifers), which provide critical supplies for all major towns in the Region. Almost all fresh aquifers are fully allocated. The Region's freshwater supplies are limited and demand is growing beyond the current known resources. There is no licensing of surface water use in the Region, but stream disputes are increasing, as is demand for access to water for public and private water supply. All groundwater aquifers are licensed.
- Schedule 3 to the NHT Bilateral Agreement proposed that Preliminary Environmental Water Requirements (EWRs) for the Albany and Esperance Groundwater Areas would be established by 2001 and Interim Allocation Strategies by June 2003. Allocation plans are currently in preparation. A surface water management plan for the Albany Coast Region was proposed by 2005/6. No EWR studies have yet been completed, with the exception of Angove River.

- Drinking Water Quality Protection plans have not been prepared for all public drinking water source areas. Likely future drinking supplies will come from alienated catchments and protection plans and management is therefore critical.
- The National Water Quality Management Strategy (NWQMS) is a nationally agreed set of policies, processes and guidelines that have been developed as part of the CoAG water reform agenda. The NWQMS consists of 21 guideline documents covering the water quality cycle. The guidelines provide a "comprehensive framework and guidance for the monitoring and reporting of the quality of fresh and marine waters and groundwater" (ANZECC & ARMCANZ, 2000).

2.3.2 CURRENT COMMUNITY CAPACITY

- Understanding and awareness of waterways, their values and management is generally poor. A Waterwatch/Ribbons of Blue program previously underway in the Region was discontinued in 2002 because of funding shortages.
- The main technical support for Rivercare and other community activities comes from DoE, which has offices in Albany and Denmark but no permanent presence in the east of the Region. The level of technical support generally appears to be declining.
- The Watershed Torbay project has increased community capacity in that part of the Region considerably, and has included involvement from both DoE and from CENRM. As the project approaches the implementation phase, increased communication regarding the project to educate other parts of the Region will be needed.
- The DoE/Green Skills wetlands planning and management project has contributed to skills and capacity building for the land managers and community groups involved to date, but only two wetlands per year from the more than 300 in the Region. Considering the degree of threat to wetlands, the rate of coverage in the Region is inadequate.
- Wetlands mapping is inconsistent and has not been undertaken at appropriate scales over the most of the Region to allow adequate assessment of ecological condition or values. While DoE has generally initiated mapping of wetlands, there is also expertise within CALM and several universities on ecological attributes and functions. There is also expertise in management within Green Skills and other organisations that enjoy community participation. A more systematic survey and monitoring of wetlands in association with standardised wetland mapping would considerably increase the Region's capacity to protect and manage its wetlands.
- CALM's Warren Region is presently undertaking a "wetland stratification project" for all wetlands on CALM-managed lands (west of Hay River).

2.3.3 ASPIRATIONAL GOAL, OUTCOMES AND RESOURCE CONDITION TARGETS

Managing Healthy Water Resources

Aspirational Goal:

- Rivers, estuaries, wetlands, groundwater and water supplies are protected and restored.

Outcomes:

- Maintained or improved condition of relatively unmodified ("near pristine") wetlands, waterways and estuaries.
- Protected or improved habitats and biodiversity of rivers, estuaries, wetlands and their foreshores.
- Prevented or minimised degradation (eutrophication, erosion, sedimentation, salinisation and changed hydrological regimes) of waterways.
- Identified and protected regionally, nationally and internationally significant wetlands.
- Improved understanding and awareness of the values, attributes and management needs of wetlands and waterways.
- Maintained or improved quality and quantity of existing and potential future potable water resources.
- Maintained or improved recreational, cultural, commercial (including fishing) and social amenity values of estuaries, rivers and foreshores.
- Protected groundwater aquifers.

Achievable Resource Condition Targets (RCTs):

RCT W1. Achieve no net loss in native vegetation cover from 2004 levels, in "near pristine" (see glossary) river catchments.

RCT W2. Maintain or improve foreshore condition for "near pristine" rivers from 2004 levels, with quantifiable target set by 2006.

RCT W3. Achieve downward trend in nutrient (N and P) levels in priority sub catchments including the Sleeman and Cuppup Rivers (Wilson Inlet) and Torbay waterways by 2010, with quantifiable target set by 2006.

RCT W4. Maintain or improve river condition for priority rivers by 2020, with quantifiable target set by 2006.

RCT W5. Maintain or improve estuarine condition for Wilson and Torbay Inlet (targets set by 2005) and for eight other estuaries by 2020, with quantifiable targets set by 2006.

RCT W6. Maintain or improve extent and condition of internationally, nationally and regionally significant wetlands by 2020, with quantifiable targets set by 2007.

RCT W7. Reduce salinity for the priority rivers:

- Denmark River to be at 500 mg TSS at Mt Lindesay gauging site by 2020.
- Kent River to be reviewed and new target set by 2006.

RCT W8. Maintain water use within proclaimed ground water and surface water areas within sustainable limits (see glossary).

RCT W9. Maintain or improve water quality within public drinking water source areas from 2004.

Other RCTs that relate to Management Actions in the section are:

RCT L5. For agricultural land in priority catchments and areas that contain high value biodiversity (see Section 2.3), water resources (see Section 2.2), infrastructure and agricultural assets (see Background paper No 8):

- Reduce the rate of rise in groundwater levels by 50% by 2025.
- Reduce and/or maintain depth to groundwater below critical levels (>2m) by 2025, with quantifiable target set by 2006.

RCT L6. In the headwaters of priority sub catchments, achieve a downward trend in nutrient levels by 2025, with quantifiable target set by 2006.

RCT B1. Achieve no net loss of native vegetation, with condition maintained or improved, as measured against benchmarks, with quantifiable target set by 2006.

RCT B2. Condition target for significant taxa and associations, and potentially threatened species and ecological communities, set by 2008, after completion of MAT B2.

RCT B3. Maintain or improve extent and condition of significant taxa, threatened species and ecological communities by 2020, with quantifiable target set by 2006.

RCT B4. Reduction in extent and occurrence of ecologically significant invasive species by 2025, with quantifiable target set by 2006.

2.3.4 MANAGEMENT ACTIONS AND TARGETS

Management Action Target (MAT)	Management Action (MA)	Geographical focus	Key responsibility	Priority scores
Benchmarking and monitoring				
MAT W1 Foreshore surveys for priority rivers on private land completed by 2010 (RCT W2, W4, W5)	• Undertake assessments of foreshore vegetation condition for priority rivers and drains on private land	Regional, priority to rivers in Appendix 2, Background Paper No 4: Water Resources	DoE, land managers	24a
MAT W2 Current wetland monitoring maintained and extended to 60 wetlands by 2006 (RCT W6, B3)	• Identify wetland systems for monitoring to improve understanding of water quality, aquatic flora and macroinvertebrate trends and impacts of land use change for representative wetlands • Develop wetland systems RCTs	Lakes Gore and Warden, nationally significant wetlands (see Appendix 2, Background Paper No 4: Water Resources), regionally significant wetlands to be defined	DoE, CALM, SCRIPT, Green Skills, land managers	22a
MAT W3 Current estuary monitoring maintained and extended to five additional estuarine systems by 2006 (RCT W5, B1, B3)	• Identify representative estuarine systems for monitoring to improve understanding of water quality, aquatic flora and macroinvertebrate trends, and impacts of land use change for representative estuaries • Develop estuarine RCTs • Conduct water level monitoring on priority estuaries	Walpole-Nornalup Estuary, Torbay, Wellstead, Oyster Harbour and estuaries with high social and economic values (see Appendix 2, Background Paper No 4: Water Resources)	DoE, CALM, SCRIPT	22a
MAT W4 Regional classification of wetlands completed by 2006 (RCT W6)	• Undertake regional mapping, classification and evaluation of wetlands to individual scale rather than suite	Regional	DoE	19b
MAT W5 Habitat mapping for one priority estuary, river or wetland per year completed by 2009 (RCT W4, W5, W6, B1, B2, B3)	• Identify significant habitats for water dependent fauna, including migratory waterbirds • Identify estuary, river and wetland priorities according to biodiversity values	Regional	CALM, DoE	18b
MAT W6 Hydrological monitoring of waterways maintained and extended by two priority rivers per year to 2010 (RCT W4)	• Establish new gauging stations on priority rivers to improve understanding	Regional, priority to waterways in Appendix 2, Background Paper No 4: Water Resources	DoE	21b

Management Action Target (MAT)	Management Action (MA)	Geographical focus	Key responsibility	Priority scores
On Ground actions				
MAT W7 Fencing program for priority river catchments commenced by 2005 (RCT W1, W2, W3, W4, W5, B1, B3)	• Implement fencing and restoration program to protect riparian zones on private land • Fence riparian zones on private land in "near pristine" rivers	Appendix 2, Background Paper No 4: Water Resources	DoE, land managers	24a
MAT W8 Developed land in priority catchments managed under BMPs by 2010 (RCT W1, W2, L1, L2, L3, L4)	• Manage developed land in priority catchments according to best practices	Appendix 2, Background Paper No 4: Water Resources	DoE, land managers, DAWA	17b
MAT W9 Implementation of nutrient and/or catchment **management** plans for five catchments commenced by 2007 (RCT W3, W4, W5, W6)	• Identify priority catchments for nutrient and/or catchment management plans • Implement nutrient and/or catchment management plans	Priority catchments as identified in Appendix 2, Background Paper 4	DoE, priority catchment committees	24a
MAT W10 Management plans for two regionally significant wetlands per year completed and implementation commenced by 2009 (RCT W3, W4, W5, W6)	• Identify regionally significant wetlands • Implement management plans for regionally significant wetlands	Based on regional wetlands priorities	DoE, Green Skills, SCRIPT, land managers	24a
MAT W11 Denmark Public Water Supply Recovery Catchment program commenced by 2005 (RCT W3, W4, W5, W6, W7)	• Implement actions from Recovery Catchment Plans • Identify Kent water quality targets by 2006 and commence implementation if appropriate	Kent and Denmark River catchments	DoE, Kent Recovery Team	24a
Institutional frameworks, planning and policy				
MAT W12 All waterscape systems that are poorly represented in conservation reserve system identified by 2006 (RCT W4, W5, W6, B1, B3)	• Identify waterscapes that are poorly represented in conservation reserve system and prioritise for incorporation	Regional, with priority to wetland systems identified under Biodiversity Audit	CALM, DoE	22a
MAT W13 Five catchment management plans for priority rivers/estuaries developed by 2006 (RCT W1, W2, W3, W4, W5, W6, B2, B3)	• Complete Wellstead catchment restoration plan • Identify future catchments for management or restoration plan development	Priorities based on identified high values and level of threats (see Appendix 2, Background Paper No 4: Water Resources)	DoE	24a

Management Action Target (MAT)	Management Action (MA)	Geographical focus	Key responsibility	Priority scores
MAT W14 Protection plan prepared for one priority public water source supply area per year by 2010 (RCT W1, W2, W3, W4, W5, W6)	• Prepare and implement protection plans for current and future Public Water Supply Areas	Table 1, current and potential future sources (see Appendix 2, Background Paper No 4: Water Resources)	DoE	22a
MAT W15 Water allocation plans for current sources completed by 2007 and for future sources prior to development (RCT W8)	• Develop and implement revised Albany Subregional Allocation Plan • Develop and implement Marbellup Allocation Plan	Albany coastal supply areas, identified future supply areas and regional coastal ground water aquifers	DoE	21b

2.3.5 TRADE-OFFS

Access to clean water for drinking, stock, rural, urban and industrial uses is a primary concern for most of the community. So is the maintenance of healthy waterways and wetlands with their associated biota and the opportunities they offer for recreation and tourism. The balancing of consumptive water uses with environmental requirements becomes increasingly difficult as development of industry and urban areas proceeds, and statutory planning processes have had to be adapted to provide better mechanisms for achieving the balance.

In the Region, many of the land uses and management practices of the past (clearing, fertiliser application, tillage, etc..) have contributed to sedimentation and eutrophication of waterways. Some of the trade-offs that will have to be considered in managing water resources are similar to those discussed in the Land section, including achieving increased productivity without degrading the environmental values.

Increasing recreational use of the Region's waterways can offer opportunities for increasing community awareness of the values of those resources, but it can also be a major threatening process in itself.

In addressing investment in the Region, a further trade-off is likely to be required between the on ground actions that can be taken now, and the investment in developing better information about the Region's rivers, estuaries and waterways. Programs such as the Watershed Torbay can yield valuable information and experience that can be extended to other areas, but major investment in one or a few catchments will limit the capacity to work in other areas at the same time.

Box 9: Data, Technology, Modelling & Management

APPLICATION OF NRM DATA, SPATIAL TECHNOLOGIES, AND MODELLING TO NUTRIENT MANAGEMENT

The ecology of estuaries on the south coast of Western Australia has been disrupted by increased nutrient and sediment discharge from predominantly rural catchments. Seagrass beds have been replaced by macroalgae, and toxic algal blooms threaten human and animal health, and reduce amenity.

A range of conventional management actions are available to reduce nutrient loss at source, and it is important to evaluate possible nutrient reductions, and implementation and on-going costs, so that limited funds can be targeted to realise the greatest moderation of nutrient loss.

A lumped landuse nutrient generation rate model was developed for four catchments (Wilson Inlet, Oyster Harbour, Torbay Inlet and Princess Royal Harbour) near Albany Western Australia and the output compared with existing monitoring data.

The model was developed using a range of spatial and temporal datasets including:

- a digital elevation model (DEM) from which topographical features influencing nutrient loss (slope) were derived;
- landuse which was developed from satellite imagery, aerial photo interpretation, local government authority records, NLWRA data, and provided the fundamental nutrient generation rate data;
- soil chemical information such as nutrient retention that could modify nutrient generation rates for a specific landuse;
- landuse specific nutrient load monitoring data from The Region;
- local or published experimental results of nutrient loss reduction from the implementation of managements actions and
- economic and other data from practitioners and specialists involved in the implementation of management actions .

The model output was not intended to replace monitoring or experimental programs, but simply to guide management decisions in a relative, rather than an absolute context.

The nutrient moderating effects of five conventional management actions (perennial pastures; vegetated stream buffers; effective fertiliser use; stock control and water management; and effluent management) and their associated costs were implemented at different levels in the model to determine the extent to which these actions could address offsite nutrient pollution, and the cost of doing so.

Management actions were implemented in three major scenarios representing the current nutrient reduction efforts, the maximum feasible implementation of each action and the most cost effective set of actions.

In each catchment dominated by diffuse nutrient sources, current nutrient reduction efforts amounted to about 10%, whilst the highest possible reductions were of the order of 25-30% above this.

In the point source dominated catchment current nutrient reduction efforts amounted to about 40%, with an additional 40% possible.

The most cost effective scenarios reduced nitrogen more than phosphorus. Under the most cost effective scenarios, it was estimated that the net cost of management actions over 10 years was budget positive, resulting in a net benefit to the land managers involved.

There appears therefore to be limited economic barriers to the adoption of these conventional management actions. However, these maximum possible reductions from the implementation of conventional management actions may not be sufficient to achieve water quality targets and arrest estuarine decline.

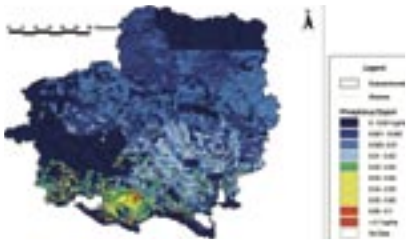


Figure 1: *Modelled phosphorus (P) loss from the catchments of Oyster Harbour, Wilson Inlet, Torbay Inlet and Princess Royal Harbour under average rainfall conditions.*

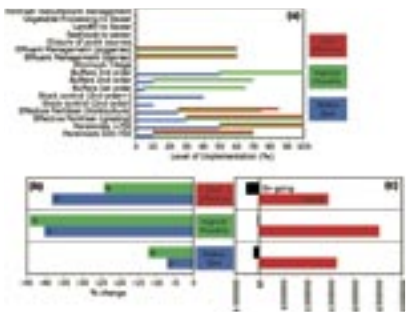


Figure 2: *Modelled (b) changes in phosphorus and nitrogen loss and the (c) expected capital costs and ten year averaged costs or benefits through the (a) implementation of selected management actions to specified levels in three scenarios for the Torbay Inlet catchment.*

2.4 NATURAL BIODIVERSITY

Managing natural ecosystems, species, communities, habitats and landforms

This section deals with the fundamental requirements for managing biodiversity sustainably, with specific actions to manage terrestrial biodiversity in particular. There are cross-references to managing Water Resources (Section 2.2), which also deals with the biodiversity of freshwater and estuarine systems, and with Coastal and Marine Systems (Section 2.4), which also addresses biodiversity within those parts of the Region.

Additional information on the Region's terrestrial biodiversity can be found in *An overview of biodiversity values and threats in the South Coast Region* (Background Paper No 2: Biodiversity). Other sources of information used in developing the Natural Biodiversity strategy include the Australian Terrestrial Biodiversity Assessment (NLWRA, 2002), the *Salinity Investment Framework Interim Report* (Department of Environment, 2003), the *Preliminary Agency Statement of Natural Resource Management Priorities in WA* (November 2003), various State, national and regional databases, and personal contributions from staff of CALM, GAWA and the Gondwana Link partnership, as well as numerous individuals with knowledge and experience of the Region's biodiversity.

In addition, SCRIPT convened several small group workshops throughout the Region to trial the use of The Nature Conservancy's (TNC) Site Conservation Planning approach to landscape planning at an "eco-zone" scale. The summary of these workshops is included as Background Paper No 9: Site Conservation Planning. In response to some of the questions raised by the working sessions, SCRIPT then convened a "Science Forum" at which a wider group of scientists and researchers with direct experience in the Region were invited to address some of the main issues. A list of participants and a summary of the two days of discussion is included as Appendix 7.

2.4.1 WHAT WE KNOW

Significance of the Region's biodiversity

- Myers *et al* (2000) included the South West Botanical Province of WA among the 25 global "hotspots," or areas "featuring exceptional concentrations of endemic species and experiencing exceptional loss of habitat." The South Coast Region is within this Province, and has 4687 known flora taxa (species and subspecies), or more than 60% of the flora of the Province. Of these, around 400 are endemic to the Region. Two of the South West's four Centres of Plant Endemism occur here: the Ravensthorpe Range-Fitzgerald River National Park area (75 plants endemic to the National Park and 17 to the Ravensthorpe Range), and the Stirling Range (82 endemic plant species within the National Park area) (see Maps 8 and 9). Gioia and Hopper (in prep 2003) further describe high plant species diversity in the Walpole, Frankland, Stirlings West, Manypeaks and Stirlings East areas, with another area of richness in the Bremer Bay to Ravensthorpe area (see Background Paper No 2: Biodiversity).

- The high levels of diversity are partly due to the biogeographical complexity in the Region, and to the geological and climatic history (McQuoid, 2003). The Region includes the south west's only "mountain" peaks in the Stirling Range, the Porongurup Range and the peaks of the Barren Ranges within the Fitzgerald River National Park (Barrett and Gillen, 1997). It has a complex drainage system, including a range of riverine and estuarine types, complex freshwater and saline wetlands systems, and large areas of internally drained areas. "Combinations of these systems and processes have provided acute patterning in the flora including extensive endemism, aggregations of closely related species, and significant hybridisation and intergradation" (McQuoid, 2003). Surveys, particularly for non-vascular flora and lower order fauna, are incomplete, and the level of knowledge and awareness of ecological processes and function is very limited.

- Beard described and mapped 122 vegetation associations in the Region. 33 of these associations (27%) are endemic. Parts of the Region were opened up for agriculture during the 1950s and 1960s, reaching a peak, and as recently as the 1980s. This resulted in the removal of 3.4 million hectares of native vegetation and the total (or near-total) removal of 20 of the 122 vegetation associations mapped by Beard. Fortunately, individuals and organisations contributed to some significant parts of the Region being protected within the conservation reserve system, or at least not being released for clearing, so extensive blocks of native vegetation remain (see Map 10). Remnant vegetation, including that protected within the reserve system, totals 2.1 million hectares. However, around 58 associations have less than 15% of their total remaining extent protected in IUCN (World Conservation Union) management reserve categories I-IV, and 10 are not represented at all. This information is summarized in Tables 7 and 8 and detailed in Appendix 4

Table 7: Beard J.S. 'Pre-European and current extent of vegetation associations in the WA south coast region'.

Beard undertook the vegetation mapping of WA during 1974 to 1981. The information in this table reflects the vegetation associations and their known indicator taxa of that time and is still the best information available. Since 1981 considerable taxonomic work has been undertaken and many of the taxa discussed by this table have been reviewed and numerous name changes have occurred. This table has been included here in its original form, and will be reviewed and updated as part of the implementation of the Regional Strategy.

Veg Assoc Code No	Beard Code	Vegetation Association Description	Total original extent in WA (ha)	Total current extent in WA (ha)	% original remaining in WA	Original extent in SC (ha)	Current extent in SC (ha)	% original SC remaining	% current WA total in SC
1	e1Tc	Tall forest; karri (*Eucalyptus diversicolor*)	71469	55859	78	16910	9754	58	17
10	e22Mi	Medium woodland; red mallee group	146565	144121	98	1305	403	31	0
1003	e2,3,5Mc	Medium forest; jarrah, marri & wandoo	20604	8705	42	1212	930	77	11
1004	e5Mr/xZc	Mosaic: Medium open woodland; wandoo / shrub lands; mixed heath	9759	3567	37	8116	1985	24	56
1023	e5,6,8Mi	Medium woodland; York gum, wandoo & salmon gum (*E. salmonophloia*)	1603375	104581	7	7025	517	7	0
1047	e29SZc	Shrub lands; *Eucalyptus incrassata* mallee-heath	221921	189576	85	35203	3181	9	2
1073	e5,64Mi	Medium woodland; wandoo & mallet	18172	6022	33	872	147	17	2
1075	e15,27Si	Shrub lands; mallee scrub, *Eucalyptus eremophila* & black marlock (*E.redunca*)	526786	62610	12	188733	18311	10	29
1077	e2,18Mi	Medium woodland; jarrah & river gum	2531	1204	48	2533	1205	48	100
1085	e5,69Mi	Medium woodland; wandoo & blue mallet (*E. gardneri*)	51804	4629	9	10535	731	7	16
1088	e64,69 Mi	Medium woodland; mallet & blue mallet	396	140	35	193	22	11	16
1094	e6,8Mi/ e15,27Si	Mosaic: Medium woodland; York gum & salmon gum / Shrub lands; mallee scrub *Eucalyptus eremophila* & black marlock	70393	4071	6	177	2	1	0
1095	e6,7,8Mi	Medium woodland; York gum, yate & salmon gum	1939	377	19	1940	378	19	100
1109	agSi	Shrub lands; peppermint scrub, *Agonis flexuosa*	34178	30296	89	47	46	97	0
1113	jZc	Shrub lands; *Jacksonia horrida* heath	7462	6450	86	2331	1870	80	29
1130	e1,68Tc	Tall forest; karri & red tingle (*E. jacksonii*)	1079	973	90	54	38	70	4
1134	e2Mi	Medium woodland; jarrah (south coast)	37411	31223	83	2692	1679	62	5
1139	e1,74Tc	Tall forest; karri & yellow tingle (*E. guilfoyleii*)	15079	14098	93	4851	4085	84	29
1140	e1,75Tc	Tall forest; karri & Rates tingle (*E.brevostylis*)	760	760	100	761	761	100	100

Veg Assoc Code No	Beard Code	Vegetation Association Description	Total original extent in WA (ha)	Total current extent in WA (ha)	% original remaining in WA	Original extent in SC (ha)	Current extent in SC (ha)	% original SC remaining	% current WA total in SC
1144	e1,3Tc	Tall forest; karri & marri (*Corymbus calophylla*)	159886	126868	79	271	271	100	0
1150	e1,68,74Tc	Tall forest; karri, red tingle & yellow tingle	5440	5198	96	4907	4679	95	90
1151	e2,68Mc	Medium forest; jarrah & red tingle	2181	2022	93	1904	1830	96	91
1152	e2,74Mc	Medium forest; jarrah & yellow tingle	7355	7267	99	3755	3672	98	51
1153	e2,75Mc	Medium forest; jarrah & Rates tingle	1179	1029	87	1180	1030	87	100
1157	e2,3,Tc	Tall forest; jarrah & marri	1232	1174	95	211	211	100	18
1158	e2,74Mc/ e2,75Mc	Mosaic: Medium forest; jarrah & yellow tingle / Medium forest; jarrah & Rates tingle	98	97	99	97	97	100	100
1200	e8,9Mi/ e15,27Si	Mosaic: Medium woodland; salmon gum & morrel / Shrub lands; mallee scrub *Eucalyptus eremophila* & black marlock (*E. redunca*)	162837	12875	8	45569	2599	6	20
125	sl	Bare areas; salt lakes	3526286	3249188	92	21306	4785	22	0
126	fl	Bare areas; freshwater lakes	217950	203994	94	8059	3169	39	2
128	r	Bare areas; rock outcrops	324248	276479	85	18113	12551	69	5
129	ds	Bare areas; drift sand	95150	55603	58	18590	7728	42	14
14	e2Lc	Low forest; jarrah	94532	70769	75	93396	69869	75	99
1413	acmSc	Shrub lands; acacia, casuarina & melaleuca thicket	1686185	1252874	74	6884	5834	85	0
142	e6,8Mi	Medium woodland; York gum & salmon gum	711260	187506	26	2662	331	12	0
1516	e27,32Si	Shrub lands; mallee scrub, black marlock & Forrest's marlock	127327	55730	44	88883	21139	24	38
16	e37,38Lc	Low forest; bushy yate (*E. cornuta*) & Bald Is. marlock (E. lehmanni)	2847	349	12	1454	347	24	99
196	a2Sr t3Hi	Hummock grasslands, shrub steppe; kanji over *Triodia wiseana* on hills of dolerite and shale	87633	87633	100	16	16	100	0
1967	e5,7,18Mi	Medium woodland; wandoo, yate & river gum	25517	5588	22	25535	5592	22	100
2016	e37Lc	Low forest; bushy yate	355	0	0	355	0	0	0
2048	x13SZc	Shrub lands; scrub-heath in the Mallee Region	321139	155270	48	6671	5092	76	3
2051	mLc xGc	Sedgeland; sedges with low tree savannah woodland; paperbarks over & various sedges	10431	7377	71	10439	7382	71	100
22	agLi	Low woodland; *Agonis flexuosa*	4032	3049	76	1403	703	50	23
23	e2bLi	Low woodland; jarrah-banksia	41003	31213	76	3766	3350	89	11
27	mLi	Low woodland; paperbark (*Melaleuca sp.*)	130300	94507	73	44845	35765	80	38
3	e2,3Mc	Medium forest; jarrah-marri	2662059	1884029	71	502287	228691	46	12
31	e6Mr m5Sc	Shrub lands; *Melaleuca thyoides* thicket with scattered York gum	2818	738	26	214	202	95	27
3106	e8,14Mi	Medium woodland; salmon gum & Dundas Blackbutt	52961	52042	98	980	239	24	0
352	e6Mi	Medium woodland; York gum	718431	114194	16	24026	6755	28	6
37	mSc	Shrub lands; Teatree thicket	39338	22951	58	332	285	86	1

Veg Assoc Code No	Beard Code	Vegetation Association Description	Total original extent in WA (ha)	Total current extent in WA (ha)	% original remaining in WA	Original extent in SC (ha)	Current extent in SC (ha)	% original SC remaining	% current WA total in SC
38	xSc	Shrub lands; thicket, mixed	2388	2388	100	2360	2360	100	99
380	x3SZc	Shrub lands; scrub-heath on sandplain	580758	305750	53	1815	434	24	0
4	e3,5Mi	Medium woodland; marri & wandoo	1056784	248065	23	95900	15610	16	6
4048	x15SZc	Shrub lands; scrub-heath in the Esperance Plains incl. Mt Ragged scrub-heath	50588	32724	65	39290	21498	55	66
41	mSi	Shrub lands; Teatree scrub	198105	183145	92	11210	5096	45	3
413	a33Sc	Shrub lands; *Acacia neurophylla* & A. species thicket	3462	1619	47	600	599	100	37
42	eaSi	Shrub lands; mallee & acacia scrub on south coastal dunes	313926	300393	96	83467	73708	88	25
423	aSZc	Shrub lands; Acacia scrub-heath unknown spp	27206	22266	82	23493	18550	79	83
47	e26SZc	Shrub lands; tallerack mallee-heath	1034300	368888	36	1002113	353909	35	96
48	xSZc	Shrub lands; scrub-heath	30816	8842	29	9377	1638	17	19
4801	nLr xZc	Shrub lands; heath with scattered *Nuytsia floribunda* on sandplain	58490	8581	15	56054	6449	12	75
482	e11,22Mi	Medium woodland; merrit & red mallee	1642652	1618875	99	52660	32594	62	2
486	e8,22Mi/ e15Si	Mosaic: Medium woodland; salmon gum & red mallee / Shrub lands; mallee scrub *Eucalyptus eremophila*	437993	273547	62	206729	49200	24	18
49	xZc	Shrub lands; mixed heath	50519	23472	46	10213	8962	88	38
50	xZi	Shrub lands; dwarf scrub on granite (South Coast)	6045	4315	71	6043	4313	71	100
5048	blSZc	Shrub lands; banksia and lambertia scrub-heath in the Esperance Plains Region	31930	1590	5	31824	1585	5	100
51	xGc	Sedgeland; reed swamps, occasionally with heath	58743	34549	59	22982	9211	40	27
511	e8,9Mi	Medium woodland; salmon gum & morrel	969576	633023	65	2774	663	24	0
512	e15,32Si	Shrub lands; mallee scrub, *Eucalyptus eremophila* & Forrest's marlock (*E. forrestianna*)	238622	60709	25	236514	59197	25	98
515	e30Si	Shrub lands; mallee scrub, blue mallee (*Eucalyptus socialis*)	741019	739565	100	168	8	5	0
516	e27Si	Shrub lands; mallee scrub, black marlock	554010	293024	53	466153	206699	44	71
519	e15Si	Shrub lands; mallee scrub, *Eucalyptus eremophila*	2339705	1397527	60	401165	213426	53	15
521	e8,22Mi	Medium woodland; salmon gum & red mallee	122768	122241	100	2640	2115	80	2
552	c4Sc	Shrub lands; *Casuarina acutivalvus* & calothamnus (also melaleuca) thicket on greenstone hills	33880	31884	94	15811	14336	91	45
6048	bSZc	Shrub lands; banksia scrub-heath on sandplain in the Esperance Plains Region	114262	17583	15	113742	17500	15	100

Veg Assoc Code No	Beard Code	Vegetation Association Description	Total original extent in WA (ha)	Total current extent in WA (ha)	% original remaining in WA	Original extent in SC (ha)	Current extent in SC (ha)	% original SC remaining	% current WA total in SC
65	tLb a1Gc	Grasslands, tall bunch grass savannah, sparse low tree, terminalia; mitchell grass (*Astrebla pectinata & spp*)	72819	72176	99	61	52	86	0
676	k3Ci	Succulent steppe; samphire	2084073	1977915	95	430	37	9	0
691	edSc	Shrub lands; *Dryandra quercifolia* & *Eucalyptus spp*. thicket	45555	35715	78	35541	34999	98	98
697	x7SZc	Shrub lands; scrub-heath on lateritic sandplain in the southern Geraldton Sandplain Region	187398	53483	29	113800	18581	16	35
7	e5,6Mi	Medium woodland; York gum (*E. loxophleba*) & wandoo	179659	22892	13	343	127	37	1
7048	bSZc	Shrub lands; banksia scrub-heath on coastal plain in the Esperance Plains Region	134589	109941	82	66374	41830	63	38
8	e8,34Mi	Medium woodland; salmon gum & gimlet	696071	330435	47	458	20	4	0
800	e48,49Mi (s2),p3Gc	Grasslands, high grass savannah woodland; stringybark & woolybutt over (upland tall grass &) curly spinifex	41183	40798	99	339	47	14	0
9	e12,13Mi	Medium woodland; coral gum (*E. torquata*) & goldfields blackbutt (*E. le soufii*) (also some e10,11)	241942	241385	100	1336	998	75	0
924	e15,22Si	Shrub lands; mallee scrub, *Eucalyptus eremophila* & red mallee	108509	59258	55	60336	13346	22	23
925	e22Si	Shrub lands; mallee scrub, red mallee	5176	3770	73	4806	3408	71	90
929	e33Lc	Low forest; moort (*E. platypus*)	10813	8145	75	10098	7703	76	95
931	e7Mi	Medium woodland; yate	31273	13396	43	29306	12552	43	94
934	e28Si	Shrub lands; mallee scrub *Eucalyptus nutans*	64930	55111	85	64597	54957	85	100
936	e8Mi	Medium woodland; salmon gum	699498	675915	97	2836	1024	36	0
938	e6,7Mi	Medium woodland; York gum & yate	77692	15849	20	76489	15461	20	98
939	e6Mi mSp k3Ci	Succulent steppe with woodland; yorkgum, sparse Teatree scrub & samphire	118	7	6	118	7	6	93
940	e27Si/ e26SZc	Mosaic: Shrub lands; mallee scrub, black marlock / Shrub lands; tallerack mallee-heath	261578	106890	41	261506	106846	41	100
942	e7Mi/ e27Si	Mosaic: Medium woodland; yate / Shrub lands; mallee scrub, black marlock	33486	8409	25	33484	8408	25	100
963	e7mMi	Medium woodland; yate & paperbark (*Melaleuca spp*)	6093	2285	38	1540	331	21	14
964	e27,67Si	Shrub lands; mallee scrub, black marlock & *Eucalyptus decipiens*	3383	1403	41	3384	1404	41	100
965	e2,3Mi	Medium woodland; jarrah & marri	9206	5053	55	6667	2961	44	59
967	e5,7Mi	Medium woodland; wandoo & yate	102825	12498	12	81536	9867	12	79
968	e2,3,5Mi	Medium woodland; jarrah, marri & wandoo	296427	97696	33	82023	32285	39	33

Veg Assoc Code No	Beard Code	Vegetation Association Description	Total original extent in WA (ha)	Total current extent in WA (ha)	% original remaining in WA	Original extent in SC (ha)	Current extent in SC (ha)	% original SC remaining	% current WA total in SC
969	e2,3Mc/ e2Lc	Mosaic: Medium forest; jarrah-marri / Low forest; jarrah	27649	9660	35	27670	9668	35	100
970	e2,67Lc	Low forest; jarrah & *Eucalyptus decipiens*	1385	1385	100	1386	1386	100	100
971	e67Si	Shrub lands; mallee scrub, *Eucalyptus decipiens*	339	209	62	340	209	61	100
972	e2,3,5,7Mi	Medium woodland; jarrah, marri, wandoo & yate	23376	8604	37	23394	8610	37	100
973	mLc	Low forest; paperbark (*Melaleuca rhaphiophylla*)	4990	1636	33	2207	1323	60	81
974	e6,8,9Mi	Medium woodland; York gum, salmon gum & morrel	7222	590	8	7226	590	8	100
975	e2Li	Low woodland; jarrah	17237	15620	91	12878	11802	92	76
976	mLi k3Ci	Succulent steppe with low woodland; myoporum over samphire	2334	710	30	2336	711	30	100
977	mcLc	Low forest; Teatree & casuarina	262	124	47	263	124	47	100
978	e2,65,c7Lc	Low forest; jarrah, *Eucalyptus staeri* & *Allocasuarina fraseriana*	53433	19902	37	53467	19914	37	100
979	e2,3Mc/ ecLc	Mosaic: Medium forest; jarrah-marri / Low forest; jarrah & casuarina (probably *Allocasuarina fraseriana*)	7723	1143	15	7727	1143	15	100
980	e2SZc	Shrub lands; jarrah mallee-heath	162426	67566	42	162494	67595	42	100
981	e5,6,7Mi	Medium woodland; wandoo, York gum & yate	10541	949	9	10548	950	9	100
982	e67Li	Low woodland; *Eucalyptus decipiens*	1591	745	47	1592	745	47	100
986	enSZc	Shrub lands; mallee-heath (Stirling Ra.)	30464	15472	51	30482	15481	51	100
987	e2,5Mi	Medium woodland; jarrah & wandoo	3610	1306	36	895	791	88	61
989	e65SZc	Shrub lands; Albany blackbutt mallee-heath	9065	7679	85	9069	7683	85	100
990	agLc	Low forest: peppermint (*Agonis flexuosa*)	18355	13526	74	775	583	75	4
991	e5Mi	Medium woodland; small wandoo patches surrounded by e2, 5Mi; e5, 7Mi	311	267	86	311	268	86	100
992	e2,5Mc	Medium forest; jarrah & wandoo (*E. wandoo*)	121908	25792	21	676	676	100	3
993	c5e6Mi	Medium woodland; York gum & *Allocasuarina huegeliana*	2110	609	29	2111	610	29	100
994	e2cLc	Low forest; jarrah & casuarina (probably *Allocasuarina fraseriana*)	16976	4916	29	16985	4919	29	100
995	e37,38Si	Shrub lands; mallee scrub, bushy yate & Bald I. marlock	3193	3091	97	3195	3093	97	100

Source: Adapted from the CAR reserve analysis for WA.

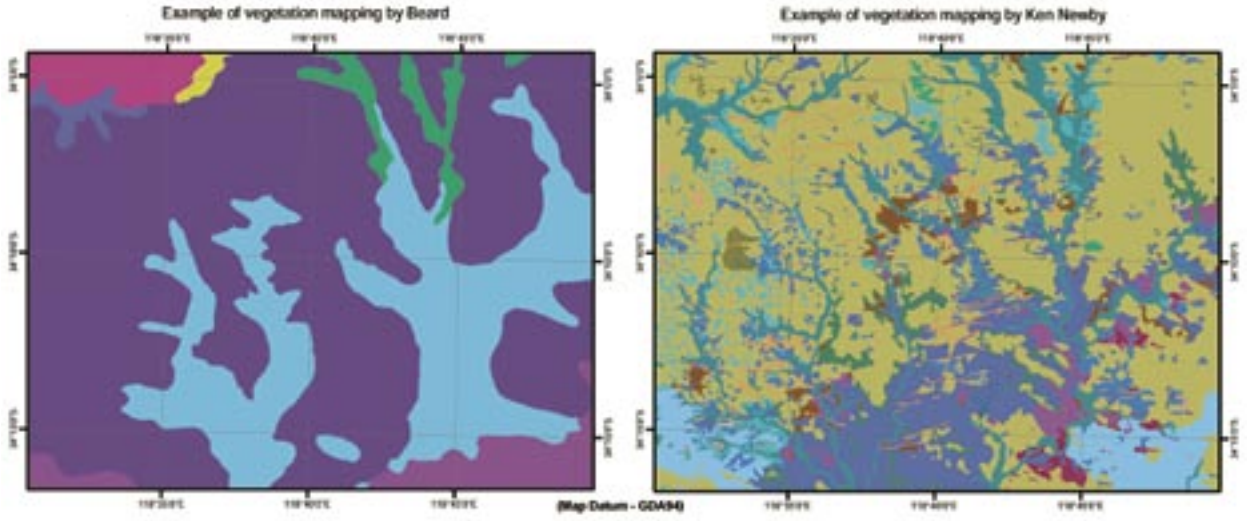
Table 8: Vegetation associations with less than 30%, less than 10% or less than 2000 ha current extent.

Veg Assoc Code No	Beard Code	Vegetation Association Description	Less than 2000ha left in WA	Less than 10% left in WA	Less than 30% left in WA	Percent of current extent in SCRIPT	Percent of original extent in SCRIPT
1023	e5,6,8Mi	Medium woodland; York gum, wandoo & salmon gum (*E. salmonophloia*)		X		<1	<1
1075	e15,27Si	Shrub lands; mallee scrub, *Eucalyptus eremophila* & black marlock (*E. redunca*)			X	29	36
1077	e2,18Mi	Medium woodland; jarrah & river gum	X			100	100
1085	e5,69Mi	Medium woodland; wandoo & blue mallet (*E. gardneri*)		X		16	20
1088	e64,69 Mi	Medium woodland; mallet & blue mallet	X			16	49
1094	e6,8Mi/ e15,27Si	Mosaic: Medium woodland; York gum & salmon gum / Shrub lands; mallee scrub *Eucalyptus eremophila* & black marlock		X		<1	<1
1095	e6,7,8Mi	Medium woodland; York gum, yate & salmon gum	X		X	100	100
1130	e1,68Tc	Tall forest; karri & red tingle (*E. jacksonii*)	X			4	5
1140	e1,75Tc	Tall forest; karri & Rates tingle (*E.brevostylis*)	X			100	100
1153	e2,75Mc	Medium forest; jarrah & Rates tingle	X			100	100
1157	e2,3,Tc	Tall forest; jarrah & marri	X			18	17
1158	e2,74Mc/ e2,75Mc	Mosaic: Medium forest; jarrah & yellow tingle / Medium forest; jarrah & Rates tingle	X			100	99
1200	e8,9Mi/ e15,27Si	Mosaic: Medium woodland; salmon gum & morrel / Shrub lands; mallee scrub *Eucalyptus eremophila* & black marlock (*E. redunca*)		X		20	28
142	e6,8Mi	Medium woodland; York gum & salmon gum			X	<1	<1
16	e37,38Lc	Low forest; bushy yate (*E. cornuta*) & Bald Is. marlock (*E. lehmanni*)	X		X	99	51
1967	e5,7,18Mi	Medium woodland; wandoo, yate & river gum			X	100	100
2016	e37Lc	Low forest; bushy yate	X	X		0	100
31	e6Mr m5Sc	Shrub lands; *Melaleuca thyoides* thicket with scattered York gum	X		X	27	7
352	e6Mi	Medium woodland; York gum			X	6	3
4	e3,5Mi	Medium woodland; marri & wandoo			X	6	9
413	a33Sc	Shrub lands; *Acacia neurophylla* & A. species thicket	X			37	17
48	xSZc	Shrub lands; scrub-heath			X	19	30
4801	nLr xZc	Shrub lands; heath with scattered *Nuytsia floribunda* on sandplain			X	75	96
5048	blSZc	Shrub lands; banksia and lambertia scrub-heath in the Esperance Plains Region	X	X		100	100
512	e15,32Si	Shrub lands; mallee scrub, *Eucalyptus eremophila* & Forrest's marlock (*E. forrestianna*)			X	98	99
6048	bSZc	Shrub lands; banksia scrub-heath on sandplain in the Esperance Plains Region			X	100	99
697	x7SZc	Shrub lands; scrub-heath on lateritic sandplain in the southern Geraldton Sandplain Region			X	35	61
7	e5,6Mi	Medium woodland; York gum (*E. loxophleba*) & wandoo			X	1	<1

Veg Assoc Code No	Beard Code	Vegetation Association Description	Less than 2000ha left in WA	Less than 10% left in WA	Less than 30% left in WA	Percent of current extent in SCRIPT	Percent of original extent in SCRIPT
938	e6,7Mi	Medium woodland; York gum & yate			X	98	98
939	e6Mi mSp k3Ci	Succulent steppe with woodland; yorkgum, sparse Teatree scrub & samphire	X	X		100	100
942	e7Mi/ e27Si	Mosaic: Medium woodland; yate / Shrub lands; mallee scrub, black marlock			X	100	100
964	e27,67Si	Shrub lands; mallee scrub, black marlock & *Eucalyptus decipiens*	X			100	100
967	e5,7Mi	Medium woodland; wandoo & yate			X	79	79
970	e2,67Lc	Low forest; jarrah & *Eucalyptus decipiens*	X			100	100
971	e67Si	Shrub lands; mallee scrub, *Eucalyptus decipiens*	X			100	100
973	mLc	Low forest; paperbark (*Melaleuca rhaphiophylla*)	X			81	44
974	e6,8,9Mi	Medium woodland; York gum, salmon gum & morrel	X	X		100	100
976	mLi k3Ci	Succulent steppe with low woodland; *Myoporum* over samphire	X		X	100	100
977	mcLc	Low forest; Teatree & casuarina	X			100	100
979	e2,3Mc/ ecLc	Mosaic: Medium forest; jarrah-marri / Low forest; jarrah & casuarina (probably *Allocasuarina fraseriana*)	X		X	100	100
981	e5,6,7Mi	Medium woodland; wandoo, York gum & yate	X	X		100	100
982	e67Li	Low woodland; *Eucalyptus decipiens*	X			100	100
987	e2,5Mi	Medium woodland; jarrah & wandoo	X			61	25
991	e5Mi	Medium woodland; small wandoo patches surrounded by e2, 5Mi; e5, 7Mi	X			100	100
992	e2,5Mc	Medium forest; jarrah & wandoo (*E. wandoo*)			X	3	<1
993	c5e6Mi	Medium woodland; York gum & *Allocasuarina huegeliana*	X		X	100	100
994	e2cLc	Low forest; jarrah & casuarina (probably *Allocasuarina fraseriana*)			X	100	100
Total number of vegetation associations with less than 2000 ha total extent in WA and occurrences within South Coast Region (NB includes Association Number 2016 that was only present in South Coast Region originally and is now not represented at all)			27				
Total number of vegetation associations with less than 10% of their pre-European coverage remaining in the State, and significant (>20%) of remaining occurrences within South Coast Region				5			
Total number of vegetation associations with less than 10% of their pre-European coverage remaining in the State, and minor (<20% of remaining occurrences) within South Coast Region (NB includes veg assoc 2016)				4			
Total number of vegetation associations with 10-30% of their pre-European extent remaining in the State, and significant (>20%) of remaining occurrences within the Region					16		
Total number of vegetation associations with 10-30% of their pre-European extent remaining in the State, and minor (<20%) of remaining occurrences within the Region					6		
Source: Adapted from the CAR reserve analysis for WA.							

- The description and mapping of vegetation associations by Beard (Hopkins et al 2001) is often used as a surrogate for ecological communities but the scale of the mapping (1:250,000) and the reliance primarily on the main structural components of the vegetation to define the associations does not adequately describe the complexity of communities within some associations. A finer scale (1:40,000) was used by Ken Newbey in mapping soils of the central South Coast and these have now been digitised (Mercer, 2003). An example of the difference in the level of information available from the two mapping systems is shown in Figure 1. Moreover, while mapping of vegetation associations may be adequate for comparisons of the extent of cover, it does not provide any information on the condition of the vegetation. However the Beard mapping is the only vegetation mapping available of a suitable scale and extent for the purpose of regional vegetation analysis (see point in Reserves System section for discussion of CAR analysis). Agreed indicators for condition, regular monitoring of reference sites, as well as mapping at a scale that allows communities to be clearly identified, are all needed for adequate management of biodiversity.
- Existing and potential regional "macro corridors"[8] linking major areas of native vegetation were identified through an NHT-funded project by CALM in 1999 (Watson and Wilkins, 1999). A map of the corridors that were identified is included in Background Paper No 2: Biodiversity. These indicate priority areas for protection or restoration of native vegetation to maximise the connections between native vegetation and ecological communities across the entire Region. The Gondwana Link partnership is working to restore connections across large areas of the landscape, with an emphasis currently on the area between the Fitzgerald River and the Stirling Range National Parks, coinciding with one of the macro corridor links.

Figure 1: Comparison between Beard and Newbey vegetation mapping



[8] A macro corridor is defined as "a linear assemblage of mainly continuous vegetation, functioning as a conduit for wildlife movement between protected areas and as habitat (non-continuous "stepping stone" vegetation may also be included)" (Watson and Wilkins, 1999).

- While the Region includes all of two IBRA subregions and parts of another five (see Background Paper No 2: Biodiversity), this classification is of limited use at a regional scale for identifying priorities for landscape protection and management, because biodiversity data for the subregions cannot be divided to fit the areas which lie within the South Coast Region. Building on work undertaken by the Gondwana Link partnership with TNC, SCRIPT convened a number of working groups to identify "eco-zones" based on geomorphology, soils, climate, vegetation and drainage (see Background Paper No 9: Site Conservation Planning). These proved a useful means to concentrate the workshops on identifying conservation "targets"[9] and threats at a landscape scale through application of TNC's Site Conservation Planning framework. This has been used as a check on the other analyses of information used to develop priorities for biodiversity protection and management in recognition that many of the datasets available in the development of the Strategy were incomplete, or limited in scale and geographic coverage. The workshop participants included CALM ecologists, regionally based ecological consultants and some of the Region's many "amateur" naturalists who have contributed over many years to the Region's inventory and understanding of its biodiversity.
- The Natural Resource Management Ministerial Council (NRMMC) developed a National Framework for the Management and Monitoring of Australia's Native Vegetation (NRMMC, 2001) that provides a structure for regional vegetation management strategies. Preliminary work on developing a regional vegetation strategy for the Region was undertaken in 2000/01, but was discontinued for lack of dedicated resources. A regional vegetation strategy, developed within the guidelines of the national framework, would provide a more detailed long-term management and monitoring approach to the Region's native vegetation and assist the integration of on- and off-reserve management. With the recent amendments to WA's ***Environmental Protection Act*** (1986) likely to require vegetation management plans to be prepared by local governments and with other developments including:
    - the establishment of the WA Native Vegetation Trust.
    - completion of regional vegetation summaries by the Bushcare Support Officers (Greening Australia WA, 2003).
    - completion of the Macro Corridor project.
    - preliminary work undertaken as part of the Strategy to develop resource condition targets.
    - increased experience nationally and regionally with a range of incentive mechanisms and private sector approaches to conservation. Early completion of the Regional vegetation strategy would provide a clear framework for implementation of restoration, protection and management activities across the Region.

[9] The Site Conservation Planning framework uses the term "conservation target" to identify the ecosystems or communities that are the focus for protection or management in order to maintain ecological functioning and intact systems. In this sense, they are similar to what is termed "assets" under the State and national NRM frameworks. The Site Conservation Planning approach then identifies various "attributes" that contribute to the health or functioning of the conservation target. For each attribute, an indicator is chosen (based on best available science knowledge) and ratings of poor, fair, good or very good are identified for each indicator. More information on the approach can be found at http://www.consci.org/scp/ and a summary of the use of the approach in the South Coast Region is given in Background Paper No 9.

Reserves (Protected Areas) system

- The full reserves system comprises protected areas/reserves vested in the Conservation Commission of Western Australia and managed by CALM primarily for conservation under the ***Conservation and Land Management Act (1984)***, as well as reserves managed by LGAs and other departments (e.g. water reserves managed by DoE). Since 2003, CALM has also been responsible for managing the main conservation aspects (such as fire management, feral animal control and weed eradication) of Unallocated Crown Land (UCL) and Unmanaged Crown Land outside townsites, adding 447,218ha to the area of responsibility in the Region. The CALM managed estate in the Region is summarised in Background Paper No 2: Biodiversity and is shown in Map 10.

- "The reserves system plays a pivotal role in conserving WA's biodiversity" (Department of Conservation and Land Management, 2003). This is because these areas are, for the most part large, contain a high proportion of the remaining vegetation, their biodiversity values are better known and they are managed – in some cases with resident park rangers, and also generally well connected through buffer zones, 'stepping stone' reserves and corridors. Many also have detailed management plans directed towards maintaining biological diversity and community values such as low key recreation. Reserves with high visitor numbers are a focus for biodiversity information and education.

- To effectively conserve the biodiversity of the Region, a conservation reserve system needs to be comprehensive, adequate and representative (CAR) as outlined by national Department of Environment and Heritage guidelines (http://www.deh.gov.au/parks/nrs/sciguide/nrsgui-prt1.html). This requires the establishment and maintenance of a network of reserves, both terrestrial and marine, that includes representatives of all the ecosystems of the Region in areas of sufficient size and diversity to ensure their viability. The establishment of a CAR reserve system is a key function and priority of CALM. It is a legislated responsibility and is reflected in CALM's corporate plan (Department of Conservation and Land Management, 2003). A CAR analysis of the terrestrial reserves system has been conducted for WA by CALM using the mapping of vegetation associations by Beard (Hopkins et al, 2001) and has been summarised for the Region in Appendix 4.

- There are a small but increasing number of areas that are privately owned and managed for conservation purposes. The Gondwana Link partnership has facilitated the purchase of properties in the Corackerup area, and the Friends of the Porongurups last year purchased the Twin Creeks reserve area, providing a "stepping stone" between the Porongurup and Stirling Range National Parks. While some of the purchases have been assisted by NHT funding, they represent a considerable investment of private funds and voluntary management activity on the part of the groups involved. The contribution of private land management for conservation could be improved by more flexible subdivision processes and by reconsideration of the taxes and other costs incurred in transfer of properties and their ongoing management.

- The Fitzgerald River National Park Biosphere Reserve was declared in 1978 under UNESCO Man and the Biosphere Programme and is one of only two such reserves in WA. Biosphere Reserves are "areas of terrestrial and coastal ecosystems, promoting solutions to reconcile the conservation of biodiversity with its sustainable use" (http://www.unesco.org/mab). The MAB Program has also developed the Seville Strategy (http://www.unesco.org/mab/docs/stry-5.htm), which provides guidance for the management of effective Biosphere Reserves. The EPBC (1999) contains provision for the management of Biosphere Reserves, including reference to their particular functions in:
    - conserving genetic resources, species, ecosystems and landscapes.
    - fostering sustainable economic and human development.
    - supporting demonstration projects, environmental education and training, and research and monitoring related to local, national and global issues of conservation and development.

  Biosphere Reserves should ideally include a core area (in this case, the Fitzgerald River National Park), a "buffer" of other publicly owned land, and the "zone of cooperation" in which sustainable economic and human development are encouraged. The FBG, RAIN, FBMA and Shires of Jerramungup and Ravensthorpe are all exploring ways to further promote the Biosphere concept and make it a working model for other Regions.

  A proposal by Green Skills for a second Biosphere Reserve in the west of the Region, including the Irwin, Parry, Wilson and Torbay catchments, is currently under discussion among the community. The area would include a "core" of existing and proposed reserves, a buffer of other public land including forest conservation areas, and a "zone of cooperation" similar to the Fitzgerald Biosphere. Having two Biosphere Reserves within the Region could potentially improve the Region's capacity for long-term monitoring of biophysical impacts such as climate change as well as for social and economic impacts, such as changing community attitudes to sustainable development.

- The WA Government committed to the development of a 363,000 ha Walpole Wilderness Area as part of its "Protecting our old-growth forests" policy and it's "Eco-tourism Strategy." A Community Advisory Committee has been appointed and development of a management plan is currently underway. The Wilderness Area will comprise four new national parks (including Mt Lindesay), three existing national parks and areas of State forest, and extend across the South West and South Coast NRM Regions. The WA Minister for the Environment has recently reaffirmed that the WA Government intends to nominate the Walpole Wilderness Area for World Heritage listing (letter from the Hon Judy Edwards to ***Walpole Weekly***, 20 Jan 2004). Having a World Heritage area within the Region would improve tourism opportunities.

- The protected areas system contributes to the Region's growing nature based tourism industry. The Tree Top Walk near Walpole is already one of the most attractive features for visitors and residents of the Region, and this is likely to increase in future as new features, including the Walpole Wilderness Discovery Centre, are opened. Further east, the Stirling Range and Fitzgerald River National Parks are popular destinations, and the coastal parks near Esperance and the islands of the Recherche Archipelago are receiving increasing numbers of visitors. A Draft Nature-Based Tourism Strategy for the Shires of Esperance, Ravensthorpe and Jerramungup was prepared in May 2003 based on a forum for local government members, GEDC, Department of Industry and Resources and the WA Tourism Commission. The need for environmental management plans for tourism developments was recognised.

Threatened species and communities

- Background Paper No 2: Biodiversity shows that the Region has 4687 recorded taxa of flora, including 400 that are endemic. Of these, one is known to be extinct already and a further 94 are classed as Threatened (26 Critically Endangered, 33 Endangered, 35 Vulnerable. *Galaxias truttaceous* (Trout Minnow) is likely to be Southwest Australia's most threatened freshwater fish.). Another 547 taxa are listed as Priority species (numbers refer to listings under the ***Conservation and Land Management Act (1984)***. In the SCRIPT region 46.85 % of threatened flora species are found only in national parks or nature reserves. Some threatened flora species occur both within and outside of these protected areas, so that in total 75.5% of threatened flora species has at least one occurrence within protected areas. It is very important to keep in mind that this means that almost a quarter (24.5%) of threatened flora species occur only outside of these reserves.
- Threatened terrestrial fauna includes 26 taxa. Gilbert's Potoroo is currently listed as Critically Endangered. Listed as Endangered are Carnaby's Black Cockatoo, Western Long-billed (Muir's) Corella, the Dibbler, Red-tailed Phascogale, the Stirling Range Rhytidid Snail (Undescribed), the Stirling Range Moggridgea Spider, the Tingle Trapdoor Spider, the Western Ground Parrot and the WA Pill Millipede. Of the 23 species of threatened marine fauna (including birds, mammals, reptiles and fish), one is Critical, five Endangered and the remainder are Vulnerable. Together, the 49 threatened species that occur in the Region account for 33% of the State total.
- Three Threatened Ecological Communities (TEC) are State listed for the Region, including the Critically Endangered Montane thicket of the Eastern Stirling Range, and a further 8 ecological communities are priority listed by CALM. *Phytophthora cinnamomi* is a major threatening process, with climate change a further threat to the survival of this isolated community.

- There is little known about the non-vascular flora, but Syme (2004) has listed 504 named species of fungi (with numerous other species yet to be described) from the Region (see Background Paper No 3: Fungi of the South Coast). Most of the collection effort for fungi has been voluntary and opportunistic, and a systematic survey would undoubtedly considerably increase the species numbers and diversity. Little is known of the detailed ecology of the individual species, but it is clear that fungi play important roles in ecosystem functioning and plant health. Several mammal species, including the Critically Endangered Gilbert's Potoroo, depend on hypogeous (underground) fungi for food. No fungi species from the Region have as yet been listed as threatened, but this is likely to reflect the poor state of knowledge of their occurrence here and throughout Australia, rather than indicating that the conservation status is secure. See Background Paper No 3: Fungi of the South Coast for a discussion of the knowledge available on fungi distribution and the threats that are likely to be affecting their survival.
- Recovery Plans and Recovery Teams are current for most of the threatened species and communities (See Background Paper 2). The South Coast Region has recently been identified as the pilot for a regional approach to threatened species recovery management. The project is being managed by CALM on behalf of the Department of Environment and Heritage, with SCRIPT participating on the Steering Committee.

Threatening processes

- *Phytophthora cinnamomi* may be the most serious threat to the biodiversity of the Region because of the number of species susceptible, including those in the *Proteaceae*, *Myrtacae*, *Papilionaceae*, *Epacridaceae* and *Dilleniaceae* families. Shearer and Tippett (1989) attributed the high incidence of *P. cinnamomi* within the jarrah forests partly to historical factors relating to human activity, but the incidence in the Region includes major infestations in the Stirling Range National Park, as well as the Walpole-Nornalup National Park, West Cape Howe, Two Peoples Bay, the Fitzgerald River National Park, Cape Arid National Park (Shearer, 1994) and other areas where access has been a prolonged human activity (see Map 11). Apart from that which has been carried out on CALM-managed lands, survey and mapping has not been conducted systematically within the Region and the potential for further spread is significant. The potential interactions of *P. cinnamomi* with inappropriate burning regimes and salinity are not well understood and could severely increase the level of risk.
- Other plant diseases include rusts, Armillaria, and stem cankers, including the Cryptodiaporthe canker that infects the Scarlet Banksia, *Banksia coccinea*, throughout its geographic range (Shearer, 1994). Tree decline is apparent in many parts of the Region and appears to often be associated with insect herbivory following other stresses. These can include rising groundwater and/or salinity, but may also be associated with other soil and land conditions. It has been observed for example that in areas where other wandoo and yate are in serious decline (associated with waterlogging and salinity), healthy wandoo occur where native rushes and sedges still occur within the understorey (Wendy Bradshaw, pers comm). The loss of native fauna, including birds and small ground dwelling mammals, is also associated with increased insect damage.

- Habitat loss and predation by pest vertebrates, including cats and foxes, threaten the survival of native fauna on- and off-reserve. Coordinated baiting programs (e.g. as part of the Western Shield program which baits one million hectares in the Region four times per year) are required and will have benefits to agricultural production as well as biodiversity.
- The ***State Weed Plan*** (Department of Agriculture, 2001) lists a number of actions to address weeds of national significance and those declared under the ***Agriculture and Related Resources Act (1976)***. Those occurring in the Region include Gorse, Blackberry, Bridal Creeper, Skeleton weed and 3-cornered bed straw (see Table 9). Other environmental weeds that are a threat to biodiversity include Victorian Tea-tree, which is often well established along roadsides. Some subregions and local groups have developed weed plans as part of their catchment or other local planning strategies. CALM's reserve management plans also include weed management activities.
- Environmental weeds threaten natural diversity through their ability to invade natural areas (e.g. bush land, coastal dunes and waterways) often following disturbance, where they can alter the natural structure and composition of the area. Environmental weeds compete vigorously with native plants, often becoming the dominant vegetation system in an area. As a result the natural structure of the vegetation community can alter significantly. The diversity of plant species in an area can also reduce significantly, with environmental weeds dominating and altering the ecology to make it unsuitable for native plant systems to exist, often to the extent that areas become a monoculture of weed species. These structural and compositional changes can lead to increased flammability and unsuitability as habitat. An integrated approach to environmental weed management was developed in the Environmental Weed Strategy for WA (CALM, 1999). As part of the Strategy, environmental weeds are rated in terms of their impact on biodiversity.

Table 9: Declared Weeds and Weeds of National Significance (WONS) for the Region.

COMMON NAME	SPECIES	ARRPA Declaration		WONS
Apple of Sodom	*Solanum linnaeanum*	DP-MOST SHIRES	P1P2P3	
Artichoke thistle	*Cynara cardunculus*	DP	P1P2	
Arum lily	*Zantedeschia aethiopica*	DP -SOME SHIRES	P1P4	
Bathurst burr	*Xanthium spinosum*	DP	P1P2	
Blackberry	*Rubus fruticosus*	DP	P1P2P4	WONS
Bridal Creeper	*Asparagus asparagoides*			WONS
Cape Tulip (one leaf)	*Moraea flaccida*	DP	P1P3P4	
Cleavers	*Galium aparine*	DP	P1P2	
Cotton bush	*Gomphocarpus fruticosus*	DP	P1P3P4	
Devils Claw	*Proboscidea louisianica*	DP	P1P2	
Doublegee	*Emex australis*	DP-MOST SHIRES	P1P3P4P5	
Field bindweed	*Convolvulus arvensis*	DP	P1P3	
Glaucous star thistle	*Carthamus leucocaulos*	DP-SOME SHIRES	P1P3P4	
Golden dodder	*Cuscuta campestris*	DP	P1P2P4	
Gorse	*Ulex europaeus*	DP	P1P2P3	WONS
Heliotrope	*Heliotropium europaeum*	DP-SOME SHIRES	P1P3P4	
Hoary cress	*Cardaria draba*	DP	P1P2	
Horehound	*Marrubium vulgare*	DP	P1P2P3P4	
Kochia	*Kochia scoparia*	DP	P1P2	
Noogoora burr	*Xanthium occidentale*	DP	P1P2	
Patersons curse	*Echium plantagineum*	DP	P1P3P4	
Saffron thistle	*Carthamus lanatus*	DP	P1P3P4	
Sagittaria	*Sagittaria platyphylla*	DP	P1P2	
Salvinia	*Salvinia molesta*	DP	P1P2	WONS
Skeleton weed	*Chondrilla juncea*	DP	P1P2	
St. John's wort	*Hypericum perforatum*	DP	P1P2	
Stemless thistle	*Onopordum acaulon*	DP	P1P2P3P4	
Thornapple	*Datura spp.*	DP	P1P3P4	
Three-horned bedstraw	*Galium tricornutum*	DP	P1P2	
Variegated thistle	*Silybum marianum*	DP	P1P2P3P4	
Water hyacinth	*Eichhornia crassipes*	DP	P1P2	
Yellow burr weed	*Amsinckia lycopsoides*	DP	P1P2	

KEY:
P1 = Prohibits movement | P2 = Eradicate infestation | P3 = Control infestation by reducing area and/or density of infestation | P4 = Prevent infestation spreading beyond existing boundaries of infestation | P5 = Infestations on public lands must be controlled

NB: Declared Plants (DP) (Agricultural and Related Resource Protection Act, 1976) are listed with a coded definition of the requirements for control (P1, P2, P3, P4 or P5). Details on the standard meaning of these codes are provided. WONS weeds are those that have been listed through the implementation of the National Weeds Strategy.

- Fragmentation of habitat is one of the most limiting factors in ensuring continued species and community survival, and will become an increasingly significant threat as the impacts of climate change through human-induced global warming increase. Protecting remaining examples of native communities and species and restoring the links between them where possible will help to increase their resilience to other threats.

- Fire can increase habitat fragmentation if it is not managed appropriately. The specific fire regimes required for the maintenance of the Region's biodiversity are not well understood and require more community-specific information on ecological impacts of fire prevention and fire management. Fire regimes suited to eastern parts of the Region are particularly needed. The inclusion of ecologists on CALM's fire management teams is a start towards increased awareness, but there are few ecologists employed within the Region.
- With recent amendments to the ***Environmental Protection Act (1986)***, further broad scale clearing of native vegetation is unlikely. "Passive" clearing through low levels of regeneration or the gradual loss of vegetation through changes to catchment hydrology, grazing and other processes listed above, is still occurring. Understanding the causes of continued vegetation loss is essential to developing the right approaches to managing and reversing the trend. Under the proposed Regional Vegetation Management Strategy, condition assessments and standardised long-term monitoring of reference sites should be established. This should also assist land managers, some of whom have expressed concern at the prospect of ***Environmental Protection Act (1986)*** regulations being applied to these situations and who do not have the capacity to manage vegetation decline at a property level.
- Salinity and waterlogging are highly threatening for parts of the Esperance Sandplain, including the Ramsar-listed Lake Warden, and for parts of the Fitzgerald Biosphere subregion. The level of threat for some communities, such as the naturally saline or brackish wetlands north and north east of Esperance is not well understood, as the biological inventory for this part of the Region is very limited.
- Climate change is a threat to the viability of many communities, none more so probably than the already threatened Montane thicket community of the East Stirling Range. The small habitat niche it occupies will disappear if temperatures increase and rainfall decreases by the amounts commonly predicted. The nature and scale of the risk to biodiversity is a strong argument for expanding the survey effort, for establishing thorough monitoring processes on public and private land, and for identifying actions to compensate for or adapt to changes.
- While one of the important values of the protected areas, and other areas of natural diversity, is the provision of suitable public recreation and education, public recreation can also present a threat to natural diversity (e.g. unauthorized tracks, spread of *Phytophthora cinnamomi*, spread of weeds, etc.).
- Perhaps one of the most insidious threats is the lack of knowledge and awareness of what occurs in the Region, how it functions ecologically, and what processes are being disrupted. Added to this is a generally low awareness of environmental values in the broad community both within and outside the Region. Fortunately, there are also some good examples of actions being taken to improve awareness and knowledge, including some of the examples featured throughout the Strategy as "South Coast Stories" (see South Coast Stories).

What we are doing:

- CALM manages a protected area system of 800,000 ha of land in the Region for biodiversity and landscape conservation, including the management of threatened species and communities, fire management, fox control, scientific research and monitoring, as well as visitor access, sustainable tourism and public education. CALM also contributes significantly by its responsibilities for weed and feral animal control and fire management on unallocated Crown land and unvested reserves covering approximately 27% of the terrestrial part of the Region. A key process CALM undertakes is the development and implementation of regional and area management plans. Other reserves, such as water reserves and local government reserves, receive varying degrees of management.
- The Gondwana Link partnership includes the Australian Bush Heritage Fund, FBG, Friends of the Fitzgerald, GAWA, MPG, and The Wilderness Society (WA). The partnership aims to protect and restore ecological function through the application of a range of mechanisms, and to demonstrate responses, actions and opportunities for conservation. Activities include purchasing and/or covenanting areas of bush, rehabilitating degraded bush, and restoring habitat in critical areas for maintaining functions or increasing poorly represented vegetation associations. The project is also developing compatible economic enterprises and lifestyle opportunities and is currently working mostly in the Corackerup-Chereninup area between the Fitzgerald River and Stirling Range National Parks.
- As well as the direct benefits to conservation in the project areas, the Gondwana Link partners have exposed the South Coast and other Regions to alternative approaches to conservation through some of their other supporter groups, such as The Nature Conservancy (TNC). People from TNC have visited and worked in the Region for periods of weeks to months, bringing their experience in philanthropic funding, marketing and other business skills, and in the use of TNC's Site Conservation Planning approach to landscape conservation. This approach has been used on a trial basis in the Region (see Background Paper No 9: Site Conservation Planning) and was well received by participants (including government agency planning staff) at a series of workshops held during the past year.
- GAWA has teamed up with Shell to undertake a project called "Reconnections" which involves large-scale revegetation of native plants between the Stirling Range and Fitzgerald River National Parks. This work involves extensive revegetation for multiple outcomes including biodiversity, wildlife habitat and potential native-plant based industries, and supports the work of Greening Australia in the Gondwana Link partnership. In addition, and with the assistance from the CRC for Greenhouse Accounting, the project will investigate the carbon sequestration potential of revegetation in low rainfall areas using a diversity of native plants.

- Property purchases for conservation, such as those through the Gondwana Link partnership, and others such as the Twin Creeks Reserve (Friends of the Porongurups) have highlighted the disincentives to private purchase. These can include difficulties in getting subdivisional approvals, the costs associated with subdivision, and the taxation system not differentiating a "public good" purpose from a commercial business. Schemes such as the Bush Bank Revolving Fund (National Trust) can assist potential purchasers, but as yet the full benefits of harnessing private funds for conservation purchases have not been realised.

- Apart from property purchase, there are various schemes for covenanting or otherwise dedicating land for conservation purchases and management support available. In WA, Land For Wildlife (LFW), a program operated by CALM, has 1300 members to date, covering more than 700,000 ha. In the Region, there are more than 150 registrations, most of which are on private property. There are also three registrations from school properties and thirteen registrations from properties owned by timber plantation companies. This has resulted in the documentation of about 45,000 ha of land, of which approximately 5500 ha of bush land were selected as LFW sites where nature conservation is the primary focus. Detailed landscape documentation for this bush land includes soil type, site aspect, description of vegetation community structure, flora lists, plant health and condition. Relevant advice is given to the land managers on management issues like fire, weeds, habitat rehabilitation, wildlife corridors, salinity and dieback.

- Some large scale revegetation or protection projects have been undertaken within the Region, including the Albany Hinterland Bushcare projects and Enhancing the Fitzgerald to Magenta Bush Corridor. Since 2002, the Southern Incentive (Strategic Actions) NHT project has encouraged the protection or revegetation of native vegetation through incentives for fencing, replanting and other protective actions. While the incentive scheme has become more targeted, consideration of a sliding scale of incentives for various activities could allow more flexibility and more gearing of public funds to the highest value outcomes. Examples of alternative delivery mechanisms include, for example, the range of incentives proposed by the Murray Catchment.

- There is increasing interest and action on developing native plant based commercial enterprises that have a biodiversity outcome, such as sandalwood, broombush, mallet poles and native tubers. GAWA has been leading the on ground action, with the CENRM recently becoming involved in the research aspects and several Indigenous organisations expressing strong interest in taking up the industries in land they manage. Commercial success of these industries will encourage their greater use in areas that buffer conservation areas and in rehabilitation of land degraded or under threat from altered hydrology.

- As part of the Recovery Plan for the Stirling Range Montane thicket community, phosphite is being applied in an attempt to combat the impacts of *Phytophthora cinnamomi* upon susceptible plants, especially critically endangered species. Additional methods for the containment of *Phytophthora cinnamomi* are urgently needed.

- A project to identify and map areas of high value that are likely to be at risk of *Phytophthora cinnamomi* dieback was approved for funding in the November 2003 Regional Competitive Component of NHT. The project, to be managed by SCRIPT, will also include community education and training. The Shire of Denmark is also proactive in the management of *Phytophthora sp.* through the development of a Town Planning Scheme policy on Dieback.
- A number of high profile threatened species recovery projects, managed by CALM, are being conducted within the Region, including the Stirling Range Dryandra, the small-flowered snottygobble, the Noisy Scrub-bird and Gilbert's Potoroo, Australia's most critically endangered marsupial. Additional recovery plans need to be written for other threatened flora and fauna species, and ecological communities. The recovery process involves the writing of a recovery plan for the species or a group of species and the formation of a recovery team to oversee the implementation of the plan. In addition, the Threatened Species Network brings together science with community needs, on-the-ground grunt with Australia's decision-makers, and national issues with local concerns to help protect threatened species.
- Nine threatened species recovery teams function within the Region, for both threatened flora and fauna.
- To complement on-site or area management of native vegetation, ex situ conservation of threatened, endemic, relictual disjunct and other significant flora is being conducted in the Region as part of a Global Strategy for Plant Conservation.

2.4.2 CURRENT COMMUNITY CAPACITY

- Understanding and awareness of biodiversity values and management is very inconsistent throughout the Region outside of some protected areas. Management for conservation is not well linked with other land management practices and the trial of a program like Living Landscapes (a GAWA project) may assist to increase land managers' skills in identifying and managing ways to protect and increase the biodiversity values on farms.
- As indicated in section 2.4.4 the major management of biodiversity throughout the Region is provided by CALM through its role in managing protected areas and responsibilities for the ***Wildlife Conservation Act (1950)*** throughout the landscape. Staff are located at a regional office in Albany, District Offices in Esperance, Katanning and Walpole, and a network of outstations including several national park rangers across the Region.
- Inventory and understanding of ecological functions and processes is poor, particularly in the east of the Region.

- Local governments have different capacities for managing their reserves and roadsides for biodiversity. Only the City of Albany employs a biodiversity (Bushcare) Officer, although others contribute to the employment of NRM Coordinators who manage biodiversity projects. The Shire of Denmark has developed a good model for use of planning mechanisms to protect native vegetation, which could be used to develop similar approaches in other LGAs.
- There are large areas of Unallocated Crown Land, particularly in the northeast of the Region. The management responsibility for nature conservation aspects of UCL has recently been devolved to CALM but there is very limited capacity to do this effectively.
- A number of "Friends" groups operate within the Region, either within the reserves system (e.g. Friends of the Fitzgerald) or supporting Recovery Programs and Teams for threatened species. A Bushcare Group is active in the City of Albany.
- There is some on ground support for management for biodiversity through two GAWA Biodiversity Extension Officers, but none in the east of the Region. Two part time Land for Wildlife Officers are employed by CALM, one based in Albany and one in Ravensthorpe. Rangers and other CALM-based officers have an extension role but demand for service usually exceeds capacity as their primary focus is management of the protected areas system.
- Volunteers play an important role through assistance in delivery of biodiversity protection, particularly for the support of Recovery projects for threatened species. This assistance is highly valued and appreciated. It is, however, a two way relationship. Volunteers get the experience of working with experts in the field and are given the opportunity to visit areas to which the general public would not normally be allowed to access.
- The growing interest in private investment in land for conservation (purchase and management) includes interest from national and international organisations. This is sometimes best achieved through subdividing properties so that the purchaser can acquire those parts of the original property that can be managed for conservation of biodiversity. The vendor receives sufficient capital investment to be able to move to more sustainable farming practices or to restructure. However, there are institutional impediments to this process including town planning legislation that makes subdivision difficult and punitive taxation measures on non-resident landowners.
- Noongar people have a strong interest in increasing their involvement in management for biodiversity, through land traineeships, on ground enterprises or project work. This is discussed in Background Paper No 1: Noongar Culture and in Section 2.5.

2.4.3 ASPIRATIONAL GOAL, OUTCOMES AND RESOURCE CONDITION TARGETS

MANAGING NATURAL BIODIVERSITY

Aspirational Goals:

- Natural ecosystems, habitats and landscapes are conserved, restored, linked and managed to provide increased viability for native species and communities.

Outcomes:

- Effective protection and management regimes for ecosystems.
- Protected and recovered significant taxa, species and ecological communities, including those currently threatened.
- Minimised impacts of threats on native ecosystems.
- Maintained or improved extent, quality and connectivity of native vegetation and ecological communities.
- Protected significant landscapes.
- Maintained or improved recreational, cultural, commercial and social amenity values of public lands.
- Expanded, linked and created buffer zones, and re-established native vegetation.
- Increased awareness and understanding of values (including social and economic) of biodiversity, ecosystems and their functions, impacts of threats, degrading processes and possible management responses.
- Improved ability and willingness of local governments to participate in NRM, including through use of statutory planning mechanisms.
- Regional monitoring systems assessing trends in condition, impacts of threats and effectiveness of management actions, with monitored outcomes readily available to wider community and influencing management actions.
- Comprehensive information base on natural ecosystems, habitats and landscapes.
- Improved understanding of potential impacts of climate change on biodiversity and appropriate management responses.

Achievable Resource Condition Targets (RCTs):

The following targets are proposed as Interim RCTs until finalisation of the WA Monitoring and Evaluation Implementation Plan and the identification of agreed State-wide indicators. Some RCTs will also require additional monitoring and benchmarking before finalising. Additional RCTs are likely to be set as some of the inventories and other actions are progressed.

RCT B1. Achieve no net loss of native vegetation, with condition maintained or improved, as measured against benchmarks, with quantifiable target to be set by 2006.

RCT B2. Condition target for significant taxa and associations, and potentially threatened species and ecological communities, set by 2008, after completion of MAT B2.

RCT B3. Maintain or improve extent and condition of significant taxa, threatened species and ecological communities by 2020, with quantifiable target set by 2006.

RCT B4. Reduction in extent and occurrence of ecologically significant invasive species by 2025, with quantifiable target set by 2006.

MANAGING NATURAL BIODIVERSITY

Other RCTs that relate to Management Actions in the section are:

RCT W1. Achieve no net loss in native vegetation cover from 2004 levels, in "near pristine" (see glossary) river catchments.

RCT W3. Achieve downward trend in nutrient (N and P) levels in priority sub catchments including the Sleeman and Cuppup Rivers (Wilson Inlet) and Torbay waterways by 2010, with quantifiable target set by 2006.

RCT W4. Maintain or improve river condition for priority rivers by 2020, with quantifiable target set by 2006.

RCT W5. Maintain or improve estuarine condition for Wilson and Torbay Inlet (targets set by 2005) and for eight other estuaries by 2020, with quantifiable targets set by 2006.

RCT W6. Maintain or improve extent and condition of internationally, nationally and regionally significant wetlands by 2020, with quantifiable targets set by 2007.

RCT L1. Achieve 300,000 ha of Albany and Esperance Sandplains with subsoil (10-20 cm) pH 5.0 or higher by 2020, as measured at identified representative sites.

RCT L2. Reduce water repellence over 120,000 ha (10%) of sandy surfaced soils currently identified as high risk of water repellence by 2010, as measured at identified representative sites.

RCT L3. Reduce subsurface compaction on 150,000 ha (30%) of soils in high risk areas by 2025, as measured at identified representative sites.

RCT L4. Achieve 3.5 million ha (95% of properties) at or above 50% ground cover by 2020 (to reduce wind erosion) by 2020.

RCT L5. For agricultural land in priority catchments and areas that contain high value biodiversity (see Section 2.3), water resources (see Section 2.2), infrastructure and agricultural assets (see Background paper No 8):

- Reduce the rate of rise in groundwater levels by 50% by 2025.
- Reduce and/or maintain depth to groundwater below critical levels (>2m) by 2025, with quantifiable target set by 2006.

RCT L6. In the headwaters of priority sub catchments, achieve a downward trend in nutrient levels by 2025, with quantifiable target set by 2006.

2.4.4 MANAGEMENT ACTIONS AND TARGETS

Management Action Target (MAT)	Management Action (MA)	Geographical focus	Key responsibility	Priority score
Benchmarking and monitoring				
MAT B1 Vegetation and ecosystem health indicators identified by 2006 *(RCT B1, B2, W1)*	• Identify vegetation and ecosystem health indicator reference sites and areas across all tenures as appropriate • Set benchmarks and implement monitoring of extent, condition and connectivity of native vegetation and ecological communities	Regional	CALM, DoE, GAWA	23a
MAT B2 Regional monitoring system for significant taxa and associations, potentially threatened species and ecological communities established by 2006 *(RCT B3)*	• Identify criteria for significant taxa • Review priority flora list to consider need for monitoring and ongoing conservation management of taxa with very narrow range and/or disjunctions in distribution • Identify and monitor numbers and extent of significant taxa and associations, potentially threatened species and ecological communities and processes limiting their viability	Regional	CALM, GAWA, Wildflower Societies	21b
MAT B3 Three regional scale threat/incident assessment maps/databases to identify high risk priority areas for threats to biodiversity developed by 2006 *(RCT B2, B3, B4,W1)*	• Develop preliminary regional *Phytophthora* threat assessment map • Identify and digitise in a common database threats for all tenures, including weed and pest occurrences • See also MAT B14	Regional	SCRIPT, CALM, LGAs	23a
MAT B4 Risk assessment of impacts and priority actions for climate change developed by 2008 *(RCT B1, B2, B3, B4, L1, L2, L3, L4, L5, W1, W3, W4)*	• Define climate change monitoring sites, indicators and methodology • Assess impacts on biodiversity from climate change • Support research on impacts of climate change	Regional, with emphasis on flora and fauna with presently restricted or marginal climatic ranges	CALM, DoE, DAWA	14b

Management Action Target (MAT)	Management Action (MA)	Geographical focus	Key responsibility	Priority score
MAT B5 Regional database documenting terrestrial and aquatic biodiversity developed by 2006 *(RCT B1, B2, B3, W1 and MA C1, C2 and MA W1, W2, W3, W4)*	• Develop and commence regional biodiversity inventory program including native vegetation and its ecological condition, and lower order flora and fauna including fungi, bryophytes and invertebrates, including roles, ecological functions and requirements • Conduct systematic survey of fungi, bryophytes and terrestrial and aquatic invertebrates • Investigate and identify fungi species that should be included under EPBC Act (1999) or State legislation as threatened, endangered, etc. • Map areas of high flora species richness, centres of endemic flora, centres of relictual flora and centres of disjunct flora through targeted survey and collection effort, and maintain and extend databases of significant flora values	Regional	CALM, SCRIPT, DoE, GAWA, universities	7b
On Ground actions				
MAT B6 Revegetation/ restoration increased to 3000 ha per year by 2007 (RCT B2, L4, L5, W4, W1)	• Initiate strategic revegetation and regeneration works, focusing on Macro Corridors, priority vegetation associations, Gondwana Link areas, estuarine and river floodplains, priority recharge areas for maintenance of hydrological balance, Public Drinking Water Supply areas and priority wetlands and rivers catchments	Identified priority areas (in Strategy Background Papers and maps)	SCRIPT, GAWA, DoE, CALM, land managers	24a

Management Action Target (MAT)	Management Action (MA)	Geographical focus	Key responsibility	Priority score
MAT B7 Area of privately owned native vegetation under management for conservation increased by 25% by 2010 *(RCT B1, B2, B3, W1)*	• Fence native vegetation on privately owned land • Investigate other opportunities for conservation management agreements for private land, similar to Land for Wildlife • Review effectiveness of existing native vegetation landholder incentives • Review existing conservation management agreement programs for private land, for example Land for Wildlife, National Trust Covenanting programs and Gondwana Link • Maintain and expand support programs for management of native ecosystems on private land, including technical and practical advice, and access to labour resources • Communicate successful examples of properties combining improved productivity with conservation of soil biota and beneficial native fauna, including invertebrates, birds and reptiles • Review range of financial and taxation incentives for managing land for conservation and remove disincentives • Develop information package in liaison with local real estate industry to explain opportunities and protocols for purchase or management of land for conservation purposes	Identified priority areas (in Strategy Background Papers and maps), Regional corridors and "stepping stones"	SCRIPT, GAWA, CALM, DoE, WWF, Gondwana Link Partners	22a
MAT B8 Catchment management plans implementation for internationally and nationally significant wetlands commenced by 2006 *(RCT B1, B3, W4, W5, W6, L5, L6)*	• Achieve wetlands protection through catchment management initiatives targeting areas of high nature conservation value	Lake Warden Recovery Catchment, internationally and nationally significant wetlands	CALM, DoE, DAWA	21a

Management Action Target (MAT)	Management Action (MA)	Geographical focus	Key responsibility	Priority score
MAT B9 Management plans/ agreements for all public lands (including UCL) of biodiversity values commenced by 2009 (RCT B1, B3, B4,)	• Manage all public lands with biodiversity values in accordance with management plans/agreements to minimise damage to native vegetation and ecological communities by threats such as wildfire, plant disease, weeds and feral animals, and impacts from recreational use	Conservation reserves managed by CALM, Shire reserves, Unallocated Crown Lands	CALM, LGAs, DoE, DLI	24a
MAT B10 Management programs for 100% of priority invasive species implemented by 2010 (RCT B1, B4, MA L14, L22)	• Identify and review regional, local and patch priorities • Establish coordinated regional weed management actions • Establish coordinated regional fox baiting program on public and private land • Initiate trials for at least one new approach to treatment of localised occurrence of *Phytophthora* infections, for example impermeable barriers to root contact spread • Develop and implement regional protocol on introduction of native and non-native species to waterways • Survey incidence of tree decline, determine causes and develop appropriate management responses • Manage impacts of invasive or introduced organisms, particularly through implementation of programs, such as State Weed Plan, Western Shield baiting program, and *Phytophthora* management programs	Regional, priority areas for conservation of species	CALM, DAWA, subRegional NRM groups	24a
MAT B11 Success criteria of existing and proposed flora, fauna and threatened ecological community recovery plans met by 2010 *(RCT B1, B2, B3, B4)*	• Implement recovery plans for all critically endangered, endangered and vulnerable flora and fauna species and ecological communities	Regional	CALM	24a
MAT B12 Regional native vegetation management strategy implementation commenced by 2007 *(RCT B1, B3, W1, W4, W5, W6, L4, L5)*	• Implement native vegetation management and monitoring strategy	Regional	CALM, GAWA, LGAs, DoE	23a

Management Action Target (MAT)	Management Action (MA)	Geographical focus	Key responsibility	Priority score
Capacity building				
MAT B13 Strategic regional approach to threatened species and communities management developed by 2005 *(RCT B1, B2, B3, B4)*	• Develop strategic regional recovery and threat abatement plan for threatened species and communities in the Region • See also MAT B14	Regional	CALM, Regional Threatened Species pilot steering group	24a
MAT B14 Appropriate fire management regimes developed and implemented to protect and maintain high priority ecosystems by 2008 *(RCT B2, B3, B4)*	• Develop partnerships between fire planning and control organisations and ecologists • Develop appropriate fire management regimes to protect and maintain high priority ecosystems • Develop and implement regional plan to provide overview for fire management (including covering research, strategic operational and monitoring needs for biodiversity conservation. (See also MAT B3 and B13)	Regional, remnant and connecting native vegetation	CALM, FESA, LGAs	21a
MAT B15 Biodiversity values education and promotion package developed by 2006 (*RCT B1, B2, B3, B4)*	• Increase education and awareness raising to improve understanding of biodiversity values and threats, targeting schools, rural land managers, local governments and urban residents	Regional	CALM, SCRIPT, GAWA, DoE	22a
Institutional frameworks, planning and policy				
MAT B16 Regional native vegetation management strategy developed by 2006 *(RCT B1, B2, B3, B4, W1)*	• Develop regional vegetation management strategy in accordance with NRMMC National Framework • Link regional vegetation management strategy to statutory planning schemes and vegetation planning required by local governments under amendments to Environmental Protection Act (1986) • Ensure LGAs participate in development of regional vegetation management strategy	Regional	CALM, DoE, LGAs, DPI	23a

Management Action Target (MAT)	Management Action (MA)	Geographical focus	Key responsibility	Priority score
MAT B17 Most appropriate management response (protection of remnant vegetation on private land, expansion of conservation reserve system via CAR analysis) for ecosystems with less than 15% in conservation estate, identified by 2010. *(RCT B1, B2, B3)*	• Use CAR analysis to drive incorporation of poorly represented terrestrial ecosystems in reserves systems where possible, supplementing with other management approaches • See also MAT B7	Ecosystems identified in Biodiversity Audit	CALM	20a
MAT B18 Five management plans/arrangements developed for public lands (including UCL) of high biodiversity value by 2009 (*RCT B1, B2, B3, B4)*	• Develop management plans for priority public lands	Regional	CALM, LGAs, DoE, DLI	23a
MAT B19 Recovery plans for all threatened and priority flora and fauna species and ecological communities completed and implementation commenced by 2009 *(RCT B3)*	• Develop recovery plans for all threatened and priority flora and fauna species and ecological communities • Incorporate recovery actions for threatened species and ecological communities into catchment and other Regional NRM plans	Regional	CALM, SCRIPT, GAWA, WWF, LGAs, FESA	23a
MAT B20 Regional dieback management plan developed by 2007 *(RCT B4)*	• Develop *Phytophthora* management plan and incorporate into operational activities for all government utilities, local government and fire management services • Incorporate *Phytophthora* management responses for different threat levels into LGA and other operational plans	Regional, with priority to areas identified under SCRIPT managed 2004-05 NHT cross-regional project	SCRIPT, CALM, Dieback Consultative Council, local governments	22b

5.5.5 TRADE-OFFS

Achieving a balance between conservation and the sustainable use of natural resources is one of the great challenges for all communities and has been the subject of endless reports, studies and debate. The economic benefits of commercial enterprises are more readily accounted than the more altruistic benefits arising from conservation of species. The "sense of place" that the native plants, animals, communities and landscapes of the Region provide is part of the legacy that can be handed on to other generations. So, too, is the clean water, rich soils and fresh air that are supported by healthy ecosystems.

Some of the trade-offs that need to be considered within the suite of potential management actions that have been proposed include the investment in resource inventory and accumulation of knowledge against investment in on ground actions (e.g. fencing, planting, eradicating pest species). Both types of actions are needed in the right balance so that future effectiveness is improved but valuable assets are not lost now.

Similarly, while the NHT, NAPSWQ and *Salinity Investment Framework* principles favour investment in highly strategic, high value assets, focusing too much on a few areas could result in loss of momentum, skills and experience in other parts of the Region and could also exacerbate current degradation processes.

Public and private land actions are also potential trade-off areas. The dedicated conservation reserve system is generally considered to be the most secure conservation option, but reservation is clearly not the only means to ensure species and communities are maintained. The public costs of maintaining the reserve system also need to be considered and supplementary measures on private land supported where possible. Investing in compatible land uses that may deliver both biodiversity and commercial outcomes such as native plant based industries offers another choice.

Possible trade-offs between areas, types of actions and outcomes will need to be explored further during the consultation phase of the Strategy development and as part of the Investment Plan.

Box 10: South Coast Stories – Ken Newbey

A CONVERSATION ABOUT KEN NEWBEY

FARMER, PLANT ECOLOGIST AND CONSERVATIONIST 1936-1988

Peter Luscombe[ii] marvels at the extent of Ken's plant knowledge: 'Other than the James Drummonds[iii] and the like in the very early days, I think Ken Newbey was the real ground-breaker as far as bringing to light the number of species in the south coast region. He made many forays into the Fitzgerald, Corackerup and Ravensthorpe areas, which are extremely rich. If I brought in a bundle of specimens, Ken could put names on any that had names and he could tell you the others that were known but didn't have names. Basically he knew where everything sat.'[iv] Nathan McQuoid from the Friends of the Fitzgerald River National Park says Ken 'must have had a memory like 20 elephants.'[v]

Others shared this respect for Ken's abilities. For Bill Loneragan from the University of WA Botany Department 'his knowledge was second to none', a view supported by Roger Hnatiuk: 'His knowledge of the plants in the Fitzgerald region and the southern "goldfields" was unrivalled.'[vi] Kevin Kenneally, also a botanist, describes Ken as 'one of the most respected authorities on the plant life and ecology of the State's southwest'.[vii] In recognition of his contributions, several plant species have been named after Ken.

In his view, knowledge was useless unless shared. Ken Newbey's legacy to Australian systematic botany and conservation includes his critically collected plant specimens, writings and observations. But, perhaps more importantly, he is remembered for the appreciation he generated among the rural community for the native flora and its conservation.[i]

A LIFELONG COMMITMENT TO NATIVE PLANTS

Steve Newbey recalls the 1960s, when his father became very interested in botany, 'was when all the land was being developed around here and suddenly there were roads going everywhere in the bush and it was very easy to get to a lot of places that the early botanists would have had a great deal of difficulty getting to.'

Steve describes Ken's collecting method: 'We never drove through … we used to drive along until he saw something and we'd stop. He would disappear in the bush for five minutes and then we would drive along slowly for the next five kilometres. Then he would stop, look in the bush again, and this would go on for some time whenever we were going somewhere or coming back … He had an eye for things he hadn't seen before, and he was generally looking for plants that he didn't know, something that was a bit different'.[viii]

How Ken's passion for plants developed is an important part of his story. Steve says, 'I was always told that interest came from when he was a kid and my grandmother used to take him for walks down to the creek to look at the orchids.'[ix]

Ornithologist Brenda Newbey, who married Ken in 1979, explains: 'Ken was born in Katanning in 1936. When he was two the family moved to the farm which his parents had purchased at Ongerup, where Ken lived for the rest of his life. He left school at 15 after completing the Junior Certificate, eager to be a farmer. By the time he was 21 his farming ideas had been so often crushed by his father (appropriately in some instances he later admitted) that he was seeking other outlets and enthusiasms.

He was an avid reader. In his early twenties, with a young family, he found a way to make a bit of off-farm money to spend on books – seed collecting. The species wanted were some of the few that he knew then. Soon he became interested in other plants and contacted the herbarium. Great interest was expressed in one of his first batch of specimens, the lifelong relationship with the herbarium and its staff was established, and Ken was launched into the study of native flora.'[x]

Brenda and botanist Bruce Maslin estimate that 'Over his 29 years as a collector/botanist, Ken made about 12,000 plant collections', which are deposited at the Western Australian Herbarium. 'This collection is an excellent representation of the vascular flora of the south coast between Albany and Esperance … Ken was a most discerning collector, he had an excellent memory for plants and an eye for the unexpected. Consequently, his collection includes many rare and unnamed species.'[xi]

Box 10: South Coast Stories – Ken Newbey (cont'd)

A LASTING LEGACY

His contributions to conservation are equally notable. Kaye Vaux and Keith Bradby wrote, 'In 1970, Ken played a major part in forming the Ongerup Conservation Organisation.

During the next few years, Ken's vast knowledge of the Fitzgerald flora and his untiring devotion to saving the area, was a major factor in halting mining and having the area gazetted in 1973 as an "A" class National Park … In 1980, at the instigation of Ken, the Fitzgerald River National Park Association was [re]formed with the aim of studying, enjoying and protecting the Park … As an indication of the scale of Ken's contribution, in the past ten years [to 1988] he has taken the number of known plants from the Fitzgerald from 600 to 1,750.'[xiv]

Ken's botanical focus had increased during the 1970s. 'After a life-threatening heart virus struck when he was 35, he could no longer do as much physical farm work. He found that Murdoch University offered post-graduate opportunities not dependant on past formal course work.

After matriculating he was accepted as a Masters student in the field of plant ecology.'[xv] Steve Newbey recalls that Ken decided to study after he tried to get a job at the herbarium, but found his lack of formal education stood in the way, despite his experience and knowledge.[xvi]

With the aid of a CSIRO grant, 'he launched into an enormous ecological study to map and describe plant associations, incorporating geology, geomorphology and soils as well as detailed plant information, covering 2,500 square miles between Ongerup and Ravensthorpe.'

This project was incorporated into his Masters degree, which he was awarded in 1980. 'Ken then undertook contract work as a plant ecologist and as a botanist, notably in the goldfields, south coast and Pilbara areas.'[xvii]

Land clearing was another issue within Ken's ambit. Kevin Kenneally described his role as 'a tireless worker for raising the conservation ethic in the farming community and for attempting to initiate a responsible approach by government to the release of new land for agriculture.

It was Ken's farming background that gave credibility to his concerted efforts to focus attention on what was happening to the agricultural lands of the southwest.'[xviii]

That Ken's interests extended well beyond plants is stated in his application for a Churchill Fellowship, awarded in 1987: 'My major interest is land use planning and management in southern Western Australia. Other interests include rural sociology, and communication between rural people, scientists and administrators.'

While undertaking the Churchill Fellowship, Ken had severe heart problems again. He returned to Australia for further treatment.

In his last diary entry, written one day before he died, a spirited Ken wrote 'I have so much to live for: Brenda and at least completing writing up my data and information. If time permits, I (we) would like to start a few small projects different to our normal activities to add diversity to our lives together. The FBP [Fitzgerald Biosphere Project] is very important as the group's approach is building a new concept in a practical manner. In Australia at least, only the FBP has the ability to carry this out successfully.'[xix]

INSPIRING MENTOR: *Inspiring others was a feature of Ken's work. Peter Luscombe found Ken to be a good mentor and his 'incredible knowledge' to be 'quite inspiring for somebody like me, just an 18-19 year old in the 1970s, cruising the country and interested in plants.'[xii] Ken's influence was felt much further afield too: 'We still recall the excitement with which seed and cuttings were received by Society for Growing Australian Plants members in Victoria, from Ken, in the early 1960s.'[xiii] In the late '60s Ken's knowledge of cultivating WA flora culminated in SGAP publishing Part 1 of his West Australian Plants for Horticulture, followed by a second volume in 1972.*

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[i] [xi] [xvii] B. Newbey & B. R. Maslin, 'Kenneth Raymond Newbey 1936 -1988', Kingia, vol. 1, no. 2, 1990, pp. 135-139.
[ii] [xii] See Peter's story in this document.
[iii] One of the original Swan River colonists who began collecting botanical specimens in the 1830s.
[iv] P. Luscombe, interview with M. Robertson, 24/05/2004.
[v] [xviii] N. McQuoid, interview with M. Robertson, 24/05/2004.
[vi] [ix] Pers. comm. to B. Newbey, 1988.
[vii] K. F. Kenneally, 'Obituary Ken Newbey (1936-1988)', WA Naturalist, October, 1988.
[viii] [xv] S. Newbey interview with F. Rijavec & K. Bradby for A Million Acres A Year documentary, 2000.
[x] B. Newbey, email to M. Robertson, 10/06/2004
[xiii] G. & R. Elliot, pers. comm. to B. Newbey, 1988.
[xiv] The Gnowangerup Star, 11/08/1988.
[xvi] S. Newbey, pers. comm. to M. Robertson, August 2004.
[xix] K. Newbey, diary entry, 22/07/1988.

2.5 COASTAL AND MARINE SYSTEMS

Managing coastal and marine systems sustainably.

This section outlines the goals and actions for the coastal portion of the Region and for the marine areas to the three nautical mile limit. Estuaries have generally been considered in Section 2.2 (Water). Actions and targets in Section 2.3 (Natural Biodiversity) will also address many issues for coastal zones and are not repeated here.

Most of the information in this section is drawn from Background Paper No 5: Coastal Zone and Background Paper No 6: Marine Biodiversity.

2.5.1 WHAT WE KNOW

- The Region includes approximately 1000 km of coastline, and the coastal settlements of Albany, Esperance, Denmark, Bremer Bay, Hopetoun and Walpole support about 75% 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 conservation estate with the majority of the remainder being vested to Local Government for recreation.
- The marine component of the Region extends from the coastline out to the three nautical mile limit, including waters to three nautical miles off the coast of offshore islands. This comprises a substantial area of State NRM responsibility (around 1 million ha; see Map 1), and over 1000 km of marine/coastal interface (the "coastline"). 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 swell regimes.
- Coastline and marine management must address a high level of recreational usage and impact, often in highly fragile and dynamic landforms such as coastal dunes, and with very high community and amenity values.
- The coastal population is growing annually, whilst inland areas of the Region are experiencing declining populations.
- Annually, more than 800 000 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.

- 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 results in the coastal corridor being the major east-west links in the Region's macro corridor network (see Background Paper No 2: Biodiversity). The coastal corridor is only broken at the major towns of Albany and Denmark, and to a lesser extent at Esperance and Hopetoun.
- The coastal terrestrial reserves, in particular east of Albany (Two Peoples Bay) and Fitzgerald River National Park, represent very significant habitat refuges for threatened indigenous fauna, such as the Gilbert's Potoroo (*Potorous gilbertii*) (Critically Endangered), the Dibbler (*Parantechinus apicalis*) (Endangered), the Western Ground Parrot (*Pezoporus wallicus*) (Critically Endangered) and the Western Whipbird (*Psophodes nigrogularis*) (Endangered).
- The coastal Lake Warden wetland system of Esperance and nearby Lake Gore are registered as Ramsar sites, due to their high significance as a major refuge for migrant and resident waterbirds of the Region during the dry season. Lake Gore is the single most important wetland for resident waterbirds including the Hooded Plover (*Charadrius rubricollis*).
- The estuaries, perhaps more than any other water resource of the Region, are an integral part of the Region's environment and lifestyle experience. The estuaries were described in Section 2.2 and in Background Paper No 4: Water Resources.
- The 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). Nature based tourism and visitor pressure on offshore islands is currently increasing.
- The marine environment of the Region is generally poorly understood, as is its significance for biodiversity at national and global levels. A scientific survey is currently underway for fish and macroinvertebrate biodiversity and benthic habitat mapping research in Recherche Archipelago and Bremer Bay. It is expected that endemism will be high, particularly amongst invertebrates such as sponges, and new species are still being described.
- At present there are no marine protected areas in the south coast marine bioregion although a selection process undertaken by the Marine Parks and Reserves Selection Working Group in 1994 (CALM, 1994) has identified nine areas, which may potentially be declared as Marine Protected Areas under WA legislation. CALM 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 Walpole-Nornalup Estuarine System is currently proposed for Marine Conservation Reserve status, and the public consultation process is currently well progressed.

- 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. However, a small commercial fishing sector has developed over many years. The commercial fishing fleet within the south coast marine bioregion consists mainly of: South Coast Rock Lobster Fishery, Abalone Managed Fishery, WA Salmon Fishery, Australian Herring Fishery, South Coast Purse Seine Fishery, Demersal Gillnet and Demersal Longline Fisheries. Commercial fishing for deep-sea crabs occurs within the Rock Lobster Fishery and a small fishery exists for scallops. Commercial fishing also takes place under State and/or Australian Government licensing with some vessels involved in local fisheries having home bases elsewhere in the country.
- All commercial fisheries of the Region are subject to, and currently are, under review by the Australian Government Department of Environment and Heritage (DEH) fishery assessment process, which considers both exploitation rates and possible impacts on the marine ecosystem.
- Abalone fisheries represent the economically most important single species fisheries of the Region. These fisheries are managed using both output controls (Area Catch) and minimum sizes. Commercial abalone fisheries are managed by an approved management plan with stringent rules concerning individual and area catch allocations and size limits. The Western Australian Abalone industry has drafted an environmental code of practice. A licence is required by recreational fishers to take any species of abalone.
- A small Marine Aquarium Fisheries (MAF) exists in the Region and is regulated by the Dept. of Fisheries, according to a Marine Aquarium Fish Management Plan (DoF 1995).
- Recreational fishing participation for the south coast of Western Australia, between the Augusta and WA/SA border, is estimated at around 96,000 anglers per year resulting in 330,000 fishing days. There are also 23 fishing charter licences and 4 ecotourism licences that have been issued for the south coast marine bioregion. A review of recreational fishing in The Region commenced in 2002/03, and has resulted in the production of the draft 5-year strategy for management of recreational fishing in the Region (Department of Fisheries, 2004: Fisheries Management Paper No. 182).
- Fishing off the coast has traditionally been practised by Noongar people for countless generations and remains an important subsistence activity.
- A number of marine cetaceans are resident or migrants to the Region. The Humpback and Southern Right Whales calve and mate in the waters off the coast. Shore and boat-based whale watching are an important tourism drawcard during winter months.

- Coastal and marine aquaculture is a growing industrial sector for the Region, the main species being abalone, mussels and oysters. Sea-cage tuna fish farming, similar to the established industry of Port Lincoln in South Australia, is currently being investigated by a commercial proponent for development in the Recherche Archipelago. The South Coast Management Group developed local Government land-based marine aquaculture development guidelines for the Region in consultation with relevant stakeholders in 2002 and an Aquaculture Plan for the Recherche Archipelago (Fisheries Management Paper no. 140, 2000) have been prepared.
- Albany and Esperance are major ports of the Region, and shipping is essential for the export of agricultural produce and the large-scale transport of goods. The Port of Albany has recently become an important exit point for wood chips produced from the blue gum plantation industry and provides an opportunity for the development of a new industry that has strong overseas markets. Similarly, the Port of Esperance provides the exit point for iron ore and nickel produced in the remote Goldfields region of the State.
- Smaller boat harbours are at Bremer Bay, Hopetoun and Bandy Creek (Esperance). Some offshore islands have safe anchorage including Middle Island, Woody Island and Sandy Hook Island, but as these are nature reserves, there are restrictions on certain island activities.
- Introduced marine pests (IMPs) are now considered to be one of the major threats to the marine environment throughout the world. There are a number of IMPs established in the south east of Australia and nearby countries that have the potential to devastate the marine environment of the Region.
- A regional coastal management strategy has been prepared for the Region by the South Coast Management Group, ***Southern Shores: 2001-2021***. Regionally and locally specific management actions are identified in the document. Numerous coastal planning and management documents have been developed for local government areas and are detailed in Southern Shores, with all having been recently updated or renewed. A number of coastal reserve management plans have been developed for local government coastal reserves (e.g. Lowlands) and CALM managed reserves (for example Walpole-Nornalup, West Cape Howe and Fitzgerald River national parks and Two Peoples Bay Nature Reserve).
- One of the issues identified in ***Southern Shores: 2001-2021*** is the uncontrolled use of off road vehicles (ORV) on beaches and coastal land. There is State legislation to control, license and restrict ORV use, but this is poorly enforced. ORVs have been prohibited on popular swimming beaches in Esperance and Albany.
- Nationally, a regional marine planning process is underway, coordinated by the National Oceans Office (see http://www.oceans.gov.au/regional_marine_plan_overview.jsp). Regional marine planning considers large marine ecosystem planning and management from the three to the 200 nautical mile limit. This has been completed for the south-east Region and currently underway for the northern region of Australia. The process for developing a marine plan has commenced for the south west Commonwealth marine waters from Perth to west of Kangaroo Island (South Australia).

- At State level, a Bioregional Marine Planning (BMP) process is underway, initiated by the Department of Premier and Cabinet, which aims to provide for a more integrated, ecosystem based approach to planning and management of State marine and coastal environments. It is proposed that BMP will be piloted in the Region. It is envisaged that the State coordinated process of development of a Bioregional Marine Plan for the south coast marine waters to the 3 nautical mile offshore boundary will be done concurrently and cooperatively over the next five years with the development of a large ecosystem regional marine plan for the south west and south coast federal marine waters to the 200 nautical mile offshore boundary.
- State policy for the sustainable management and planning in coastal and near shore marine environments is defined in the WA State Coastal Planning Policy (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.

2.5.2 CURRENT COMMUNITY CAPACITY

- The high value attached by the community to coastal recreational areas and popular fishing spots means that coastal management is high on local government priorities. The five coastal LGAs within the Region, and the Shire of Dundas, support and are members of the South Coast Management Group, the peak coastal local government and community group in the Region since the mid 1990s.
- Most coastal towns have had some community group involvement in coastal management, either through State-wide and national initiatives such as Coastcare or NHT funding, or in partnership programs run by local authority and state agencies.
- The increasing demand for urban expansion in coastal settlements has pre-empted the development of urban management plans, and the need for a regular review of these documents is well appreciated by local land managers. In addition, state agencies (CALM and DPI) are currently in the process of reviewing Regional coastal reserve and land use planning strategies.

- Volunteer dive and marine observational work has greatly increased local knowledge of marine environments. The Recherche Advisory Group (RAG) has developed the current research program being undertaken in the Recherche Archipelago at Esperance which will greatly increase the knowledge base for marine management of the Archipelago. Identification of critical fish nursery areas and important benthic habitat for the broader Region is still required.
- Knowledge of marine fauna species population dynamics and trophic interactions, and marine fauna inventory and baseline information on species richness is very poor.
- There is an increasing capacity for enforcement of fisheries legislation with an increased number of Fisheries Officers recently being deployed in the Region. However, resources are limited for capacity building and expansion of community based compliancy programs such as the Volunteer Fisheries Liaison Officer Program.

2.5.3 ASPIRATIONAL GOAL, OUTCOMES AND RESOURCE CONDITION TARGETS

MANAGING COASTAL AND MARINE SYSTEMS

Aspirational Goals:

- Coastal and marine systems are maintained or improved.

Outcomes:

- Maintained or improved biodiversity values in near shore marine habitats (seagrass meadows, shallow reef habitats).
- Identified and understood marine habitats, their values and management priorities.
- Identified, understood and prevented or minimised threats to marine habitats.
- Marine reserves system with representative habitat examples linked where possible with terrestrial reserves.
- Maintained or improved near shore marine water quality.
- Sustainably managed recreational and commercial fisheries.
- Sustainably managed coastal ecosystems integrated with both catchment and marine management.
- Increased awareness and understanding throughout the community of coastal and marine values and management.

Achievable Resource Condition Targets (RCTs):

Resource Condition Indicators are difficult to set with the current level of information available. The following are therefore proposed as interim RCTs until marine inventory is more complete.

RCT C1. Maintain and improve condition of coastal ecosystems, as determined at representative sites within each subregion, by 2020, with quantifiable target set by 2006.

RCT C2. Maintain and improve condition and diversity of marine habitats, as determined at representative sites, by 2020, with quantifiable target set by 2006.

RCT C3. Maintain and improve condition of marine fauna, as determined at representative sites, by 2025, with quantifiable target set by 2006.

Other RCTs that relate to Management Actions (MAs) in the section are:

RCT B1. Achieve no net loss of native vegetation, with condition maintained or improved, as measured against benchmarks, with quantifiable target to be set by 2006.

RCT B2. Condition target for significant taxa and associations, and potentially threatened species and ecological communities, set by 2008, after completion of MAT B2.

RCT B3. Maintain or improve extent and condition of significant taxa, threatened species and ecological communities by 2020, with quantifiable target set by 2006.

RCT B4. Reduction in extent and occurrence of ecologically significant invasive species by 2025, with quantifiable target set by 2006.

RCT W4. Maintain or improve river condition for priority rivers by 2020, with quantifiable target set by 2006.

RCT W5. Maintain or improve estuarine condition for Wilson and Torbay Inlet (targets set by 2005) and for eight other estuaries by 2020, with quantifiable targets set by 2006.

2.5.4 MANAGEMENT ACTIONS AND TARGETS

Management Action Target (MAT)	Management Action (MA)	Geographical focus	Key responsibility	Priority score
Benchmarking and monitoring				
MAT C1 Marine habitat and water quality monitoring program established by 2009 *(RCT C1, C2, B3, W5)*	• Establish marine monitoring reference sites • Establish marine habitat and water quality monitoring program • Establish threatened marine species monitoring program	Regional	CALM, DoF, DoE	18a
MAT C2 Regional database established documenting marine biodiversity by 2007 *(RCT C1, C2, B3)*	• Extend current inventory programs (Recherche and Walpole-Nornalup) to additional priority areas	Regional	CALM, DoE, DoF, Universities	21b
MAT C3 All habitats potentially at risk from Introduced Marine Pests identified by 2008 *(RCT C3, B3)*	• Identify potential sources and areas at risk from Introduced Marine Pests	Albany and Esperance Harbours	DoE, Port Authorities, CALM, DoF	19b
On Ground actions				
MAT C4 40% of priority actions from *Southern Shores* (South Coast Management Group, 2001) implemented by 2009 *(RCT C3, B3, B4)*	• Review high priority actions of *Southern Shores* (South Coast Management Group, 2001) • Support wider community involvement in on ground coastal conservation, monitoring and implementation of conservation programs for threatened species and ecosystems • Implement priority actions from *Southern Shores* (South Coast Management Group, 2001)	Regional, high use beaches, estuaries, inlets and islands	LGAs, CALM, SCMG, DoF, LGAs, CALM	20b
(see MA B11 and MATs L31, L41-45, B19-22) *(RCT B5, B6)*	• Protect coastal vegetation systems and ecological communities from invasive plants and pest species	Areas of infection, biodiversity priorities	LGAs, subregional groups, CALM, DAWA	21b
Capacity building				
MAT C5 Regional framework established to support sustainable marine/ aquaculture resource management by 2007 (RCT C1, C2, C3, B1, B3, L5, L6)	• Establish marine resources working groups to assist development of framework to support sustainable resource management • Establish aquaculture reference group to assist development of framework to support sustainable resource management	Regional	DoF, SCMG, CALM, DoE, LGAs, DIA, DPI	18b

Management Action Target (MAT)	Management Action (MA)	Geographical focus	Key responsibility	Priority score
MAT C6 All NRM assets at high risk from effects of climate change and global sea level rise identified by 2008 See MAT B7 *(RCT C1, C2, C3, B1, B2, B3)*	• Develop climate change and global sea-level change models to anticipate coastal changes predicted and incorporate into planning	Regional focus	DPI, LGAs (for incorporation into planning)	18b
MAT C7 Three educational programs on value of marine resources and coastal biodiversity established by 2006 *(RCT C3)*	• Raise community awareness and understanding of marine reserves, purpose and management • Increase awareness and appreciation of marine and coastal biodiversity values and functions in recreational and commercial sectors • Educate off road vehicle users and control off road vehicle use on beaches and coastal dunes	Regional, priority to high use areas	CALM, DoF, LGAs, SCMG	18b
Institutional frameworks, planning and policy				
MAT C8 Regional integrated coastal management planning framework in place by 2010 *(RCT C1, C2, C3, B1, B3)*	• Integrate coastal and marine planning with catchment planning and statutory planning frameworks • Support *State Coastal Planning Process (2003)* • Support Bioregional Marine Planning process	Regional	DPI, LGAs	21a
MAT C9 Marine reserve areas identified using CAR analysis by 2006 and marine conservation reserve system establishment commenced by 2010 *See MAT C2* *(RCT C1, C2, C3, B1, B2, B3)*	• Support marine reserve planning and implementation • Work with broad community to facilitate creation of appropriate marine conservation reserve system.	Walpole-Nornalup Estuarine System, William Bay, Cape Vancouver to Bald Island, Fitzgerald Biosphere, Recherche Archipelago, West Cape Howe, King George Sound, Stokes Inlet	CALM	22a

2.5.5 TRADE-OFFS

The marine and coastal region is an environmentally, economically, socially and culturally important asset to the community of the Region. Pressures on coastal and marine environments are becoming numerous and are ever increasing in their severity. 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.

As in Section 2.3, 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 and preservation 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.

Some of the issues outlined in the Biodiversity Section 2.3 can be equally applied to threats to coastal and marine assets and values.

Box 11: South Coast Stories – Craig Lebens

A CONVERSATION WITH CRAIG LEBENS

DIVER AND DRAGON FIEND

I was born in the mid-west of the US, Minnesota, the Great Lakes region, which is mainly fresh water and pine forests. It is known as the land of 10,000 lakes so there is more water than land. When I was 17 I went to Europe and then came on to Australia. I started out at Wagin working in a shearing team and stayed for about 18 years. I had always been diving over this period and I came to Bremer Bay because of my interest in sea dragons. One of the first dives that I did down here I found this Weedy sea dragon, so that pretty well clinched it. Kirsty and I came down here eight years ago and opened the dive shop. Our main thing is the sea dragons, which we brought into focus. They are icon species because they are only found off southern Australia – nowhere else in the world.

Q: "I never learned to swim till I was about 15 because all I wanted to do was get in the water and dive underneath and stay down there for as long as I could. All my teachers at swimming classes used to be really frustrated because I would no sooner hit the water than I would be gone and they would see this little trail of bubbles heading off into the distance and say, 'there goes bloody Lebens again'."

CRAIG LEBENS

MEMORABLE MOMENTS IN A MARINE ENVIRONMENT

At mating time both the Leafy and Weedy sea dragons actually pair up. They don't stay together for life but they will pair up for a pregnancy and when they get together, generally in the evening, they do this little dance. They come along and swim parallel to each other about a foot or so apart and they put their heads down and their tails up in the air and they swim along like that very slowly, just kind of floating in the water. Then they slowly rise back up on to a horizontal plane and the male curls its tail and goes shooting over to the female and they take their abdomens and kind of slap them together and then the heads peel apart, virtually like a tulip, and they sit like that for a couple of seconds and then they slowly pull apart. It's ballet. It's just magic to watch.

Just today we were doing our safety stop on the five metre bar and a Southern Right whale came over to have a look at us -curious, like virtually all the animals. It eyed us off for probably about 30 seconds, maybe 60 seconds, and just went on its way.

WHAT'S SPECIAL ABOUT THIS MARINE ENVIRONMENT?

The area is unique because it is relatively untouched by human pressure. There is a professional fishing operation run out of here and a few long liners, but basically it is untouched. We do have a lot of fishermen that come in from further afield, who tend to make a mess of the place, but generally the locals look after it pretty well. We have such a small population and the Fitzgerald Park and all the Crown land, particularly between Bremer and Cape Riche, has very limited access -all that country is absolutely pristine. That is the magic of this area; that is what brings people down here.

It's temperate water here so the number of fish species that you can see in just one dive – 60, 70 species – is unbelievable. Most people think the tropics is where all the diving is because it is all colourful fish and lovely warm water, whereas down here, okay you don't have the huge schools, but you have the species diversity and that is the big difference - not only the fish, but invertebrates and seaweeds and seagrasses.

We have huge areas of plate coral, which once again most people don't associate with the south coast. There is virtually no breakage of our plate coral down here at all. Using a Coastcare grant to the dive club, we put in a permanent mooring on one of our main dive sites, which is about half an acre of plate coral, so anybody -a recreational fisherman or a dive boat - can simply tie onto the mooring. That stops people dropping their anchor right on top of the coral.

Box 11: South Coast Stories – Craig Lebens (cont'd)

GETTING EXCITED: *I really love this blue stuff. Without that blue stuff out there our planet doesn't survive. Even though the vast majority of it is salt water, it creates the fresh water by bringing the rain clouds and the ocean produces far more oxygen than all those green trees in the Amazon and Indonesia and everywhere else. With the dragons - my little boast now - I have probably done more with the dragons than anybody else in Australia as far as researching them. I have spent hours and hours and hours and days and days and days underwater, sitting there twiddling my thumbs, watching them, whether it be going through the breeding cycle or just simply following them.*

TAKING THE MARINE INTO THE PUBLIC DOMAIN

I haven't as yet been able to pass that knowledge on to anyone. I was totally fascinated when I first came down here because there was so little known about the sea dragon. People knew vaguely where they were found and a few other bits and pieces, but very little about their ecology. A few people knew a bit, but a lot of it was aquarium based, which bears no resemblance to what happens in the wild, or it had been researched over a 12-month period and they were only there for a couple of days at a time, whereas for me, it has been every day of the week.

Over the years I have documented that a lot of what's taken for granted as being the correct information, is exactly the opposite. I would like to get it out there in the public domain so that people know and understand more about the sea dragon and, even beyond the sea dragon, just underwater in general.

WHO SUPPORTS ALL THIS WORK?

I think the dive club has done a huge amount with Coastcare/Coastwest grants. We are doing a monitoring programme on two dive sites here, which won runner-up in the 2003 WA Landcare awards in the marine conservation category. You take a metre-by-metre square and toss that on the bottom and identify everything in it. We started it three years ago and now everybody wants to do the quadrats because they can really start looking at things. And for the first time we have baseline information of what's here.

We have also made a video, and I did a little educational programme that I took around to the schools inland from here, about dragons and the Bremer Bay area, but also the south coast and temperate waters. Pretty well all the schools are our catchment area for people that holiday here. It gave those kids a better idea of what their dads are doing out there with their boats, fishing.

A lot of the local people here support me and the dive club with our monitoring and everything. Beyond that no, there's not a great deal of support. As part of the Coastcare grants we made this information available to everybody but no one has shown any interest.

In fact we put in for another grant and were told 'all the information that you have gathered is effectively useless because it hasn't been done in a scientific, quantitative way.' Yet government agencies push this 'you beaut' idea of the community getting involved.

WHAT KEEPS YOU GOING?

Salt water. If I spend too long out of it my gills get dry. Just that I love the water because on every single dive you will see something new, something different, something someone more than likely has never ever seen, never ever will see.

Note: The text is drawn from an interview recorded by M. Robertson at Bremer Bay on 4/08/2004.

Acknowledgements: A contribution by Greening Australia (WA) to the SCRIPT South Coast Regional Strategy for NRM and the Gondwana Link project. Editing by Margaret Robertson and Keith Bradby. Special thanks to Craig Lebens for surfacing long enough to record an interview. Thanks also to Stephen Mattingley for proof-reading, and the Department of Environment and Margi Edwards for preparing the interview transcript.

2.6 CULTURAL HERITAGE

Sustainable and responsible NRM can only be achieved though acknowledgement and understanding of the Region's cultural heritage. For the purpose of the Strategy, Cultural Heritage will cover both Indigenous and non-Indigenous assets and values and the threats from degrading processes identified in previous sections. The cultural heritage values of significant places can influence the use and conservation of environmental assets in these areas. Management actions that relate to cultural heritage values and sustainable use of the natural environment have been identified in Sections 2.1 – 2.4

* Information incorporated into the Strategy is from the ***Noongar Background Paper No 1***.

2.6.1 WHAT WE KNOW

- Indigenous cultural heritage exists throughout the lands and waters of Australia and all aspects of the landscape are important to Indigenous people. The rights and interests of Indigenous people arise in their heritage through their spirituality, customary law, languages, original ownership, custodianship, developing traditions and recent history. The effective protection and conservation of this heritage is an important asset in maintaining our Australian identity, and the health and wellbeing of Indigenous people. Maintaining Indigenous heritage will ensure a continuous role for anyone interested in caring for country, and this is beneficial to everyone. It should be noted that, whilst Noongar people are recognised as the Traditional Owners of the country, there may be other Aboriginal people who also have certain links and cultural responsibilities in the Region which need to be respected.
- The natural land/waterscapes of the Region have a high significance for non-Indigenous cultural practices. The use of these natural assets is an important part of the lifestyle for both people living and visiting the Region. The cultural attachment to the natural and built environment for non-Indigenous Australians, whilst different to Indigenous connections, should not be excluded. Both are affected by the same degrading processes.
    - Under the ***Heritage Act of Western Australia (1990)***, the Heritage Council of WA was set up as an advisory body on heritage matters for the WA Government. The main functions of the Council are to establish and maintain the State Register of Heritage Places, to ensure that any development of heritage places is in harmony with cultural values and to promote awareness and knowledge of our cultural heritage.
- The Department of Indigenous Affairs (DIA) is the WA State agency responsible for administering legislation that affects the well being of Indigenous people. Amongst the legislation administered by DIA is the ***Aboriginal Heritage Act (1972)***, which details specific responsibilities related to the management and protection of heritage sites.

- At a national level, the Australian Heritage Council is an independent body of heritage experts established through the ***Australian Heritage Council Act (2003)***. The Council's role is to assess the values of places nominated for the National Heritage List and the Australian Government Heritage List, and to advise the Australian Government Minister for the Environment and Heritage on conserving and protecting listed values. Appendix 6 records the sites listed on the Register of National Estate for the Region.
- As of April 2004, there were 610 registered sites (data supplied by DIA) of Indigenous cultural heritage in the Region. Land tenure for these sites varies from private freehold to public land held for reserves, national parks and the like. Unregistered sites are still being found, documented and registered on both private and public land.
- As of March 2004, there were 285 cultural heritage sites recorded on the Register of National Estate (http://www.ahc.gov.au/register/).
- Through the Australian Heritage Commission Register of National Estate, the Heritage Council of WA and DIA, sites can be nominated to be included on the relevant cultural heritage databases.
- Noongar people hold generational knowledge of significance sites that are both recorded and unrecorded. Unregistered sites are not officially registered for reasons of cultural importance and integrity and remain known only to the custodians. It is therefore important not to confine the management frameworks to sites and areas "registered" with State and Australian Government databases.
    - A cross-regional project, 'Restoring Connections between people and land,' has been initiated and largely developed through the Indigenous NRM Facilitators of SCRIPT and SWCC NRM Regions, with substantial consultation with SWALSC and GLASC, DIA, training institutions and a number of other organisations and individuals within the two Regions. This project will address both cross-regional and cross-cultural needs and be fundamental in strengthening the capacity for Indigenous people to increase their role in culturally appropriate NRM. While this project will initially benefit south western Australia, it is intended to develop approaches and elements that have application in adjacent Regions.
    - Prioritisation of cultural heritage assets and actions requires additional consultation with Indigenous groups. This will happen through the development of the Investment Plan and continue into the implementation of the Strategy.
    - Actions identified in Sections 2.1 – 2.4 will also go towards protecting cultural heritage sites in the Region. Actions that facilitate greater Indigenous involvement in NRM can be found in Section 2.7 – Regional Capacity.

Cultural Heritage
Aspirational Goal: • To be developed through further consultation
Outcomes: • Protected cultural heritage places. • Recognised, valued and protected Noongar traditional ecological knowledge and land management practices.
Targets: • To be developed through further consultation

2.6.3 MANAGEMENT ACTIONS AND TARGETS

Management Action (MA)	Management Action Target (MAT)	Geographical focus	Key responsibility
Benchmarking and Monitoring			
MAT H1 All registered cultural heritage sites and locations at risk from degrading processes identified by 2006	• Using existing cultural heritage databases, identify and prioritise registered sites at risk from threatening processes identified in this Strategy	Regional, State	DIA, WA Heritage Council, Australian Heritage Council
Capacity Building			
MAT H2 Culturally sensitive database of Noongar traditional ecological knowledge and land management practices developed by 2008	• Develop culturally sensitive database of Noongar traditional ecological knowledge and land management practices	Regional	DIA, Gondwana Link, SWALSC, GLSC, CALM, Indigenous corporations
Institutional frameworks, planning and policy			
MAT H3 Protocols for recognition of Noongar intellectual property developed, with sign off by Noongar groups by 2005	• Develop and implement protocols for recognition of Noongar intellectual property	Regional	DIA, SWALSC, GLSC, Indigenous corporations
MAT H4 NRM management framework developed for sites of high cultural heritage as listed in State and national databases, including Indigenous sites of significance and value, by 2006	• Establish appropriate partnerships that facilitate NRM outcomes whilst achieving heritage protection • Develop NRM management framework for sites of high cultural heritage, linking framework to existing NRM plans	Regional	DIA, WA Heritage Council, Australian Heritage Council, SWALSC, GLSC

2.6.4 TRADE-OFFS

There is a diversity of cultural heritage sites, both Indigenous and non-Indigenous, across the Region. To date Indigenous involvement in NRM has been limited for a variety of reasons. For increased involvement, projects resulting from the Strategy need to be culturally aware when it comes to Indigenous issues, which may impact on project timing and actions. No known survey has been conducted on the risk to culturally significant sites from degrading processes, and as a result many sites may already be highly threatened. Actions to protect these sites could be seen as addressing symptoms of the threats as opposed to causes, and hence may be prioritised lower than actions that address causes of threats. Due to the significance of cultural heritage sites, the possibility of addressing symptoms of threats rather than causes of threats needs to be considered carefully.

Significant social and economic implications would result from the loss to degrading processes of cultural heritage sites, knowledge and connections to country. Consideration will need to be given to where and/or how cultural heritage assets fit in the scheme of NRM within the Region.

Box 12: South Coast Stories – Jack Williams & Averil Dean

CONVERSATION WITH JACK WILLIAMS & AVERIL DEAN

STORIES ABOUT COUNTRY

Averil: It is a privilege to talk to you and to let you not only hear just what the land means to us, but to feel it as well. That to me is one of the most important things: if you feel what's in our hearts, about our love and our heritage and our feeling for country.

Jack: I feel that there is strength and power in the land, especially the Stirlings. Every time I come down here I am feeling sick, you know, after I had that stroke, the moment I land here it is like a new life to me again and it's the spirits. I couldn't explain in words just how powerful it is to me, like the Anderson Lake and the ochres and the colours – you've got to see it to believe it, it is so beautiful.

Q: "We never ask for much; we don't go around destroying anything. We just want to keep alive the ability to pass on our culture and we can only do that through the bush – pass on our culture to our youth and for them to pass that on to theirs."

AVERIL DEAN

SPIRITUALITY: EMBEDDED IN LAND AND NATURE

Averil: The Aboriginal culture is based on spirituality. We believe very strongly in the spirits and our connection with the spirits. Bluff Knoll to me and to my family is one of the most important sites in the whole of Noongar country.

In our culture we were taught to believe that when any of our Noongar people in the whole of Noongar country died, their spirits come back to Bluff Knoll to the master spirit, and from there they pass on to the great beyond. Whenever there's a heavy cloud sitting on the Bluff, Noongars always said that was when somebody was going to die within the Noongar community and they never used to come near this area – only special people used to come, like the 'clever people'.

Bluff Knoll's Noongar name is Bula Meela. Meela is your eye and it means place of many faces and eyes are looking at you, and if you look at the rocks you can sort of work out the facial features of the rocks. Once you know about that and you get there and you look, then you start to not only see, you start to feel.

This is the sort of thing that Jack and I try to get people to experience a feeling of because that is what is in our hearts and that is where we come from, that is our life. Our being is feeling the feelings of love for country, and we have a special relationship with the birds. Traditional stories say that it was the birds that made a path through the Stirlings and connected to the Porongurups.

Jack: There is another hill there, Mubarnup. The 'clever' Noongars used to go there for their power. The one opposite is Warrenup – that's no good to go there. That is what they believe.

'Clever people': this is the doctor man. He had special stones, little black stones that they rub into their body: give it one rub and it's gone, give another rub and they will come out. They used to sing for the rain, the 'clever' ones, and there wasn't too many of them around and they are special people.

Averil: Our grandfather was one and he would be sitting on the side of you and you could hear this tick, tick, tick, tick.

Jack: 'My old grandfather Eddie used to tell us many, many stories when we were young and out hunting with him. At night he would be sitting around a big fire and we would all sit around the fire with him and he would be telling us stories about where we had been and what had happened that day. He would tell the story in song.

All the kids would be sitting around in a big circle when it just started to get dark, but the later it got at night, the closer we got around him, because we were frightened of spirits.'[i]

POTTED LIFE HISTORY: *Jack and Averil are brothers and sister. Jack was born in Gnowangerup in 1933; Averil in 1939. At about age five or six, while living on the Gnowangerup Mission, Jack 'had the privilege of seeing the last corroboree ever performed in the Southern Region by Noongar people.'* [vi] *Jack lived and worked in the Tambellup area for over 40 years and now lives in Albany. Averil also lived on the Gnowangerup Mission before moving to Tambellup. She went to high school in Perth and completed Nursing Aide training, which took her to Broome. Averil lived in Cranbrook for 12 years before moving to Albany over 20 years ago. Their grandfather went through traditional law in the Corackerup Creek area.*

Notes: The text is largely drawn from a talk recorded at the SCRIPT Regional Forum at the Stirling Range Retreat, 6/04/04. For further history and stories recorded by Jack Williams and Averil Dean, see ***Ngulak Ngarnk Nidja Boodja; our mother our land*** (2000), published by the UWA Centre for Indigenous History and the Arts. Jack's insights are also available in ***Changing Channels: Reflections on the Frankland Gordon River*** (2004), published by the Frankland Gordon Catchment Management Group.
Acknowledgements: A contribution by Greening Australia (WA) to the SCRIPT South Coast Regional Strategy for NRM and the Gondwana Link project. Editing by Margaret Robertson and Keith Bradby. Special thanks to Jack Williams and Averil Dean for sharing their stories, and to Kelly Flugge for his assistance. Thanks also to Stephen Mattingley for proof-reading, and the Department of Environment and Margi Edwards for preparing the interview transcript.

Box 12: South Coast Stories – Jack Williams & Averil Dean

SIGNS IN NATURE...

SEAMLESS BOND MAKES US ALL PART OF THE WHOLE

Averil: Nightwell used to be one of those places where the water only came at night.[ii]

Jack: At daylight breaking the next day the water would disappear. My grandfather would tell us there is a spiritual snake, they call it the mardjit.

Well, he put a curse on the tribe and people were dying all around and the old bobtail, uren we call him, he went looking for the mardjit and he brought him back to the watering hole and he forced him in there.

When he got him in there, he put a rock in behind him to lock him in there and that is why the water only comes at night: when he moved his tail trying to get back, he let the water through.

Averil: We are here to pass on some of those stories to just let you know that this to us is very important. We would like to share it with you to have you help us care for it and to make sure it is kept there for everybody to enjoy.

Nature tells us everything that we want to know about when food is ready to be harvested and when animals are at the prime time to be killed, like when the sheoak tree is in bloom with the brown blossoms, then it is time to go out and hunt the kangaroo because that is the time when they are fat.

Jack: At Christmas time when the Christmas tree blossoms, when it flowers, the tammar and brush wallaby are fat.

According to the animals, the time they get fat, that's the six seasons I am talking about.

'Noongars never used to eat anything out of season.'[iii] 'They'd move around in a cycle sort of according to the seasons. They never stayed in one place.'[iv]

'The fish used to get fat when the blossom on the paperbark comes out, then you'd know the mullet fish were fat and ready to catch.

The blossom on the paperbark was called yaurll in Noongar language. When the white flower on the paperbark (it is the same colour as the fat on the mullet) blossoms, then it's time ... Fish traps used to be used for the mullet and this was done down on the King and Kalgan Rivers, where those rivers join up together.'[v]

You knew the salmon was running when in March you'd see like a cloudy, smoky sky and that is when the salmon are ready.

Aboriginal people used to train the porpoise to bring the salmon into shore.

One man, he was a 'clever man' and he used to sit out there on the beach and sing, he'd have a fire going, and sing 'choork, choork', and you would see the porpoise start to work, he would come around the school of salmon till he beached them and then he would say 'come along, collect your harvest' and they used to go and collect so much salmon and let the rest go.

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[i] [iii] [v] [vi] Leonard (Jack) Williams in Ngulak Ngarnk Nidja Boodja; our mother our land, UWA Centre for Indigenous History and the Arts, Perth, 2000.
[ii] Nightwell is north-east of Borden.
[iv] Jack Williams in Changing Channels: reflections on the Frankland Gordon River, Frankland Gordon Catchment Management Group, Cranbrook, 2004, p. 7.

2.7 REGIONAL CAPACITY

The previous Sections 2.1 – 2.4 have identified specific capacity-building actions that are needed to address the threats to Land, Water, Natural Biodiversity, Coastal and Marine Systems and Cultural Heritage assets. Section 1.8 summarised what is meant by Regional Capacity. As a result the following headings have been used to identify actions to ensure the capacity of the Region to meet the NRM targets set in this Strategy

- Indigenous Involvement
- Target development
- Integration and coordination
- Local governments
- Knowledge and skills
- Support networks
- Community involvement
- Governance
- Innovation

These categories are inter-dependent and complementary, and need to be considered together in developing an over-all strategy for improving the Region's capacity for NRM.

2.7.1 INDIGENOUS INVOLVEMENT

In the context of natural resource management in this Region the utilisation of Noongar knowledge of land and cultural landscapes is imperative to the overall maintenance of all themes within this strategy and opens opportunities for Noongar involvement in NRM. The continued contribution of Indigenous people in NRM will be vital to the cultural identity of Western Australia and therefore needs to be nurtured through its early stages and constantly reviewed to track its progress successes and failures. Rather than compartmentalise the Indigenous management actions, they have been inserted throughout the Regional capacity section under the headings that they are best suited. These actions will facilitate the building of greater Indigenous involvement in NRM in the Region.

Indigenous involvement in NRM has been limited to date and there is a clear need to engage the Indigenous communities of the Region in NRM activities. A range of policy initiatives, legislation and regulations in the area of Indigenous Affairs are designed to provide opportunities for members of the Indigenous community to pursue economic, social, cultural, linguistic and environmental benefits of land-associated activities. Mainstream government programs also provide land and NRM opportunities, particularly in the areas of agriculture, environmental restoration and conservation. Examples of WA Government commitments to the involvement of Indigenous people in NRM include:

- Moves by CALM towards the joint management of protected areas (including the establishment of Demonstration National Park Councils) and Memorandums of Understanding with regional Aboriginal Land and Sea Councils.
- The active development and delivery of traineeship programs by the WA Departments of Agriculture, Environment and CALM.

Prior to the consultation period for the Strategy, SCRIPT made every endeavour to extend the opportunities for participation by Noongar people in order to determine further actions and targets for inclusion in the Strategy. Emphasis was given to building the basic foundations for future collaboration and shared approaches. The time frame and the process for development of the Strategy have been largely driven by the NHT and NAPSWQ program demands and have not been readily adaptable to the Noongar needs for consultation and participation. In recognition of this, an agreed regional Indigenous consultation framework should be developed that will foster closer partnerships between Noongar and Wadgela people in caring for country. It is essential that Noongar involvement is driven by Noongar people and be reflective of the holistic nature of Noongar culture and values in relation to all natural resources and as such development of the framework should follow this ethos. Consultation of the Indigenous community will therefore need to be ongoing throughout the implementation of the Strategy.

Through building the capacity of the Indigenous community to engage in NRM and the work of the Indigenous NRM Facilitators, it is envisaged that Indigenous land managers, members of community based organizations and individuals will have a greater role in the on ground actions across all themes (Land, Water, Biodiversity, Coastal and Marine). There are currently five Indigenous Land Corporation (ILC) properties of less than 10,000 ha in the Region, and nine Aboriginal Lands Trust (ALT) properties of between 10 ha and 10,000 ha in the Region that can have a significant contribution to achieving resource condition targets. The Indigenous NRM Facilitators will engage key stakeholders such as Land and Sea Councils, together with managers of Aboriginal lands, and State agencies with indigenous interests or responsibilities. Most importantly, within this process partnerships will be coordinated with Landcare groups throughout the Region. The implementation of the Regional Indigenous consultation framework will expand the existing cultural knowledge within regional communities and therefore enhance NRM within the Region.

Nationally it is demonstrated that Indigenous outcomes improve when Indigenous representation is involved in the decision making that will affect the lives of their people and the lives of non-Indigenous people. Effective Indigenous participation is dependent on the capacity to engage and negotiate to effect these decisions. It is recognised that Noongar representation in resource management structures is not reflective of the diversity of Noongar people in the Region. However, recent amendments to the SCRIPT constitution (SCRIPT Annual General Meeting, 2004) now allow for Indigenous representation on the SCRIPT Management Committee, which begins to address this issue. The Indigenous NRM Facilitators will drive the process of ensuring appropriate people are involved in this process.

There are a variety of issues, problems and circumstances that affect Indigenous land managers participating in NRM. These include:

- In many areas the passing of old people is resulting in the loss of traditional ecological knowledge at an alarming rate.
- There is often a lack of community awareness, skills and capacity to deal with these new and emerging problems.
- There is a perception in the Noongar community that when consultation for NRM issues occurs the recommendations made by the Noongar community are not acted on. This has a negative impact on any future involvement in NRM.
- There is limited commercial base to support NRM. Traditional owners and managers need money and other resources to deal with these problems.
- Indigenous communities and their organisations have limited resources to undertake NRM because their generally scarce resources are focused on meeting more immediate and other local priorities (such as maintenance of community infrastructure, overcoming housing shortages and environmental health).

SCRIPT Indigenous Employment Initiative

An Indigenous NRM Facilitator is employed by SCRIPT and is actively engaged in the strategy development and investment planning processes. This includes reviewing the community comments relating to the cultural heritage component of the strategy.

A short-term position, the Indigenous Women's Liaison Officer is being utilised to enable the essential scope to gather information regarding issues relating to women's knowledge about country. Funding for a second Indigenous NRM Facilitator position based in the eastern part of the Region has been allocated and this position will be filled in the near future.

These positions are responsible for:

- Involving Noongar people in planning and management of natural resources.
- Building linkages between Indigenous groups and SCRIPT, government agencies and local governments.
- Encouraging and assisting Indigenous people to implement sustainable land use practices on Indigenous properties, including through the incorporation of traditional practices and the further development of industries based on bush products.
- Developing training opportunities for Indigenous land managers to increase their land management skills.

The Indigenous NRM Facilitators will be able to use the management actions identified in the Strategy to assist the Region's Indigenous communities engage in NRM.

2.7.2 TARGET DEVELOPMENT

Social and economic indicators were to have been developed under the State and National Frameworks. These may, when defined, provide appropriate medium to long-term targets for Regional Capacity. However, in the absence of agreed indicators for the wider community, it is proposed that a Regional Target be developed, based on an annual survey of the various stakeholders within and external to the Region and with an interest in NRM within the Region. The survey would need to be developed by a qualified social scientist and in consultation with SCRIPT and others in the Region. The survey would be developed to track perceptions and actual achievements in the areas of:

- Attitudes to NRM.
- Understanding and awareness of natural resources and their values.
- Understanding and awareness of NRM networks and responsibilities.
- Involvement in NRM activities in voluntary or paid capacities.
- Availability of information and required support.
- Barriers to involvement or action.
- Perceptions of trends in natural resource conditions and their relationship to social and economic conditions.
- Diversity of funding sources accessed for NRM activities.

2.7.3 INTEGRATION AND COORDINATION

- Effective integration and coordination across and within sectors (government, non-government) is essential to ensure activities of the different sectors do not conflict and that duplication of effort is avoided. The evolution of SCRIPT as a coordinating body within the Region has assisted in this to some degree but still requires further development to ensure effective processes for engagement, representation and ability to deliver on expectations from the community.
- A Memorandum of Understanding has been signed between the State Government and each of the State's six Regional NRM Groups. This needs to be further developed as an agreement within the Region so that each of the parties is clear about its roles and responsibilities, the support they can offer to other parties and the communication and consultation that is required. Consideration needs to be given to making another or a similar agreement inclusive of all local governments and subRegional NRM groups.

- Integration and coordination will also be required across regional boundaries. The six Regional NRM Groups have good communication and interaction on an informal basis and through the formal mechanism of the Regional Chairs Group. A number of cross-regional projects have already been developed between Regions. As all Regional Strategies are accredited and investment plans prepared, SCRIPT will need to establish firm arrangements with the South West Catchments Council, the Avon Catchment Council and the Rangelands NRM Coordinating Group to ensure compatible management is in place and to ensure that land managers and local governments near the Regional boundaries have a clear understanding of the arrangements.
- The most challenging task is to improve integration across the whole spectrum of community and regional services and infrastructure. Many comments made during the consultation sessions for the development of the Strategy related to broader community concerns on community health, education, provision of power and other services, employment and transport. It proved beyond the scope and resources of SCRIPT to be able to adequately deal with those issues in the Strategy, but this is not to diminish their importance in contributing to the community's ability to achieve sustainable natural resources outcomes.

A framework for addressing those other related issues further may be the *State Sustainability Strategy* (2003), which includes the "Sustainability and Community" vision:

> *Western Australian communities in cities and in regions have a strong sense of place, are inclusive of all citizens and have supportive networks receptive to local needs, and through this can respond uniquely to the sustainability agenda.*

This is supported by the goal:

> *"Support communities to fully participate in achieving a sustainable future."*

The ***State Sustainability Strategy*** has identified an Action Plan that includes the development of Regional Sustainability Strategies. There is a danger that the community may already be approaching "plan/strategy overload" and may prefer to see some action rather than more planning. The Region also has the resources of UWA which has launched a Sustainability Foundation to promote research into sustainability issues for WA, and The Denmark Education and Innovation Centre which has been instrumental in developing the Centre for Sustainable Living in Denmark and other regional initiatives towards sustainable futures.

With contributions from these and other regional organisations and individuals, the development of some future scenarios for the Region through a series of public forums and commissioned work, could assist in the development of a Regional Sustainability Strategy and address some of the issues raised in this Strategy.

2.7.4 LOCAL GOVERNMENTS

- Through their local planning responsibilities, local governments have the ability to influence NRM outcomes at least as much as the other tiers of government. Moreover, they are the most visible level of government in regional rural areas, and councils are often made up of the land managers and other people most affected by and involved in NRM.
- With some exceptions, most of the Region's LGAs have decreasing populations and large areas to service (e.g. Shire of Jerramungup in 2001 had 1,208 people and covers an area of 650,534 ha; the Shire of Ravensthorpe had 1,419 people and covers 1,354,626 ha. The Shire of Ravensthorpe has some mining activity, including a laterised nickel operation recently announced by BHP-Billiton, which increases the potential for additional revenue).
- The WA Local Government Association (WALGA) has a zone system where LGAs at a subregional level come together to discuss their business. The South Coast Region has two zones, the Great Southern Zone and the Eastern Goldfields – Esperance Zone. SCRIPT has a local government representative elected by the Great Southern Zone on its Management Committee. The Shire of Esperance is the only LGA within the Region that is not represented. Cross-reporting between the zones could be improved to ensure all LGAs are represented. WALGA has employed two Australian Government-funded NRM Coordinators at State level to assist in increasing engagement by local governments in the Regional NRM delivery processes.
- Local governments have had differing levels and methods of involvement in NRM. Most provide some level of support for NRM Coordinators based in their areas. The City of Albany employs a Bushcare Officer. Few LGAs employ full-time Environmental Officers, and the integration of NRM with other local government functions is variable.
- Most of the Region's local governments have expressed a desire to be more involved in decision making and implementation of NRM within the Region, but are wary of being given additional responsibilities without the corresponding resources. There are possibilities for sharing of personnel and other resources between some local governments (e.g. this has already been canvassed for the Shires of Jerramungup and Ravensthorpe in the Central South Coast Strategic Analysis commissioned by GSDC and DAWA).
- WALGA has commenced a State level assessment of local government issues and needs, but a more specific regional review is required to identify the abilities, requirements and responsibilities, particularly in relation to maintenance of roadside vegetation, ability to meet any additional responsibilities under amendments to the ***Environmental Protection Act (1986)***; drainage and infrastructure impacts of changed catchment hydrology; *Phytophthora cinnamomi* identification and management, coastal planning and management, fire management services, and information needs, access and technical analysis.

2.7.5 SUPPORT NETWORKS

- Over the past 12 or more years, a number of coordinators have been employed throughout the Region. Those employed through Land Conservation District Committees (LCDCs) were generally known as Community Landcare Coordinators (CLCs), but the general term Community Support Officers, was also used and included Bushcare Support Officers, Regional Bushcare Facilitators, Land for Wildlife Officers, Indigenous Land/NRM Facilitators, Rivercare Officers and Waterways Officers (Department Agriculture and Soil and Land Conservation Council, 2000). More recently, with the development of the State and national NRM frameworks and the emphasis on integrating across land, water, biodiversity and coastal management, the term NRM Coordinators is being used.
- Most of the NRM Coordinators employed within the Region in the past years have been employed through voluntary community organisations and are strongly dependent on NHT funding for both salaries and operating costs, although local governments and State government departments provide funds or in-kind support at various levels. For the past three years, funding has been only on a twelve month basis and each year the funding approvals for the subsequent year have only been obtained a matter of weeks before employment contracts terminated. The result has been:
    - Inequities in employment conditions and salaries across the Region and between Regions.
    - An uneven spread of Coordinator positions within the Region.
    - Loss of skills and experience as people have moved away from the Region or into more reliable employment.
    - Difficulties in recruiting skilled and highly qualified people into positions, particularly in smaller centres.

  There has been almost 50% turnover in the community group-based NRM Coordinator positions within the past twelve months, as well as some turnover in the agency-based positions also.
- Despite the difficulties, the NRM Coordinators remain among the most highly valued assets within the Region and an essential part of the delivery of Regional NRM outcomes.
- The Australian Government has recently funded the appointment of a Regional NRM Facilitator within each Region under a three year contract to ensure that Australian Government and State policies and programs are communicated within the Region and to provide some coordination of the training and support needs for the NRM Coordinators. The Regional NRM Facilitator for the Region is employed through SCRIPT.
- The future regional delivery model will be reliant on a core team of NRM Coordinators based throughout the Region, and with generalist knowledge and skills across the spectrum of NRM activities (land, water, biodiversity and, for coastal areas, coastal and marine management). The proposed outputs of these positions will include:

- Delivery of capacity building activities within the subregions.
- Management or assistance with delivery of projects identified under the Strategy and Investment Plan.
- Assistance with meeting regional M&E requirements as appropriate.
- Development and delivery of Envirofund and other projects within the subregions.

These positions will need to be funded as a regional project, on minimum three year contracts, and with standardised employment conditions. They will, however, continue to be employed and managed under contract to subRegional NRM groups or local governments.

- The NRM Coordinators will be supplemented with a team of more specialised community support positions, although these positions are likely to be funded through specific projects addressing the Regional priorities, particularly on private land. These are likely to be mostly regionally based, but may include specific positions to cover identified parts of the Region for all or part of the life of the projects (e.g. western Region, eastern Region focus). The skills focus will include:
  - Sustainable primary production (including agriculture, forestry/tree cropping, development and implementation of alternative industries).
  - Waterways and wetlands management.
  - Biodiversity management (including management and restoration of native vegetation; management of species and ecological communities; management of threatening processes).
  - Indigenous involvement in NRM.
  - Coastal and marine systems management support.
- In addition, the Region requires on-going provision of scientific and technical support to land managers and subregions and extension through State government departments and other organisations for:
  - Hydrological monitoring and interpretation.
  - Soils, agronomy, livestock, and farming systems (including tree cropping and alternative land uses) advice.
  - Water quality and water use options, including surface water management options.
  - Ecological requirements for species and communities and their management in a landscape context.
  - Ecological requirements for marine species and communities and their management.

- The support required to meet the NRM Coordinator and Community Support positions will be defined in the first Investment Plan. However, a regional needs assessment conducted in 2002 identified that another two positions were likely to be required to meet identified needs at that time. Experience since then has indicated that some positions that have been lost over the past two to three years may also need to be reinstated if the Strategy outcomes are to be delivered.
- There are existing support networks in place that can be utilised to increase Indigenous involvement in NRM. Currently there are 19 Indigenous corporations in the Region which is expected to increase to more than 25 corporations over the next ten years, as more Indigenous groups move towards land acquisition

2.7.6 COMMUNITY INVOLVEMENT

- Community involvement is central to the achievement of all other NRM outcomes, but will only occur if the community[10] members feel genuinely concerned about the place they live in or visit, and that their involvement in NRM will make a difference to the outcomes for those places.
- Consultation and active participation in planning and decision making is necessary for the community to be involved in NRM. This needs to be balanced however with a respect for the time and financial costs to individuals who are involved in a voluntary capacity, and the tendency for a small number of people to take on a large proportion of the consultative roles.
- Communication networks are vital to information and knowledge exchange (covered in the next section) and can increase community ability to participate. Too much information supplied in inappropriate formats or language can also be off-putting for many individuals.
- The introduction of increased accountability, legislative requirements and workplace regulations has increased the administrative workloads for many voluntary, not for profit organisations. The secondary effect is an increasing difficulty for such organisations to recruit office bearers, particularly chairpersons and treasurers. The prospect of sharing some resources (particularly financial management systems and staff management procedures) across the Region has been raised by several subregional groups. A regional model for sharing resources while respecting subregional and local group autonomy is needed.

[10] See Section 1.2 for notes on what is meant by "community". Note too that "community" can have different meanings for different people, and that people may identify with different communities in different circumstances. For example, a land manager may identify with the community of farmers throughout the State, and at the same time also identify with her or his local community of neighbours or fellow farmers within a sub catchment, and with the community of recreational users of beaches and estuaries for fishing.

2.7.7 KNOWLEDGE AND SKILLS

- Earlier sections (2.1 – 2.5) included many management actions to increase the information base so that the condition, trends and effectiveness of management of land, water, biodiversity and marine systems could be better understood. Knowledge is accumulated in more than the formal collection and interpretation of data. Some of the "South Coast Stories" contained within the Strategy have demonstrated that there is a wealth of knowledge contained within the experience and stories of individuals and groups within the Region. A huge amount of intricate knowledge is encompassed by the Noongar culture. DoE, the Denmark Environment Centre and the Gondwana Link partners have all either produced collections or are in the process of collecting oral histories and stories of people's experiences and recollections of living in the Region.
- Recognising, valuing and learning to use these sources of knowledge in combination with the more formal scientific and technical sources of knowledge is really the basis for "locally adaptive management." Incorporation of "told stories" as part of a longer term monitoring of people's perceptions of country and its management needs to be considered as part of the Regional M&E framework (see Section 3).
- The SCRIPT Indigenous NRM Facilitators Unit will deliver Cross Cultural Awareness Workshops to all government agencies and community based organisations in the Region who are working in NRM.

2.7.9 GOVERNANCE

- While the unique nature and evolving structure of each Regional NRM Group is a strength as it reflects increasing involvement of stakeholders within each region, the management structure and function must ensure accountability and transparency in meeting the responsibilities specified in the Bilateral Agreements and in the Memorandum between the State and the Regional NRM Groups signed in June 2003, as well as the commitments to the Regional community.
- Corporate governance training has been conducted for members of the SCRIPT Management Committee. Strategies to address aspects of good corporate governance, including numerous mechanisms to ensure risk management, accountability and transparency, have been specified in the Regional NRM Group's organisational and operational planning and are being put in place through policies and procedures.
- While the Australian Government's announcement of the NAPSWQ and the extension of the NHT, and the State Government's commitment to a State Sustainability Strategy, indicate awareness and some political commitment to addressing the state of our land and water, the timelines for addressing natural resource threats are such that a national cultural shift in thinking is required. This Strategy will guide Investment Plans for three to five years, yet uncertainty and scepticism on the likely life of the programs may continue at Regional levels.

- Variations in seasonal and annual cycles within Regions at times impact on the ability to meet scheduled milestones or administrative deadlines for funding for NRM. The move to Investment Plans that allow for some forward planning is a start, but there still needs to be recognition within the reporting systems of the variability in climates that affects the ability to plant according to a rigid timetable. At the same time, groups implementing projects within the Region need to consider in advance the effects that late or early seasonal breaks may have on their ability to deliver project outputs and consider how to manage these risks at the commencement of project planning.

2.7.10 INNOVATION

- A common theme in the initial consultation period for the development of the Strategy was the need to find new ways of thinking and new solutions for the problems affecting natural resources. This might include looking at sources of solutions to problems in other sectors (including business, the arts and academia), other regions or other cultures. It could also include facilitating events within the Region to encourage more creative or lateral thinking amongst the Regional community generally and natural resource managers in particular.
- Alternative land uses, mostly based on the commercial use of locally-native plant species, is being explored by GAWA and CENRM under projects funded by both NHT (through SCRIPT) and the WA Regional Initiatives Scheme (WARIS). High value-adding ventures under trial in parts of the Region include truffle farming, inland aquaculture and commercial sawlog production for specialised uses (e.g. furniture making). Developing the business and entrepreneurial skills to identify industry and market potential is as important as developing the technical skills required for the particular land or water use and management.
- The Steering Group on Incentives for Private Conservation, a coalition of the Australian Bush Heritage Fund, Greening Australia and the Trust for Nature (Victoria) commissioned The Allen Consulting Group in 2002 to produce a discussion paper, Building a Stronger Social Coalition: a discussion paper proposing measures to encourage increased philanthropy to benefit the environment and create a stronger civic culture in Australia. The paper was partly commissioned in response to the Federal Coalition's announcement in 2001 that it would investigate further tax options in the current Parliament to promote philanthropy, including "living bequests."

2.7.11 ASPIRATIONAL GOAL, OUTCOMES AND TARGETS

MANAGING REGIONAL CAPACITY
Aspirational Goal: • Healthy communities are sharing a strong "sense of place" and accepting a shared responsibility to provide a legacy of healthy country and seas to future generations.
Outcomes: • Awareness of the Region's natural resources and their values, with an increased understanding of their related management requirements. • Community with capacity, resilience and willingness to adapt to change, and with confidence in their future. • Informed and involved local governments. • Diverse range of people and groups engaged in NRM activities through strong partnerships and support systems. • Increased knowledge base shared between all involved people and organisations. • Equitable decision making. • Indigenous community with capacity to engage in all areas of NRM.
Targets: • The terminology "Resource Condition Target" is inappropriate here. The Regional Capacity Actions are needed to meet the RCTs under Sections 2.1 – 2.6.

2.7.12 MANAGEMENT ACTIONS AND TARGETS

Management Action Target (MAT) / Performance Indicator	Management Action (MA)	Geographical focus	Key responsibility
Target Development			
MAT R1 10% of assets identified within six months of official confirmation of boundary changes	• Identify additional assets to be considered in the Strategy as a result of changes to South Coast boundary	Regional	CALM, DoE, DoF, DAWA, SCRIPT
MAT R2 Regional social and economic targets developed by 2005	• Develop regional social and economic targets based on annual survey of various stakeholders within and external to the Region and with interest in NRM within the Region	Regional	SCRIPT, regional managers of State agencies, LGAs
Integration and coordination			
MAT R3 Five partnership agreements and/or Memorandums of Understanding between SCRIPT, regional offices of State Government agencies, LGAs, Regional Development Commissions (RDCs), Indigenous land managers and other regional organisations outlining roles, responsibilities, processes for consultation and integration of planning outcomes signed by 2006	• Strengthen partnerships to increase cooperation between NRM groups and agencies, RDCs , LGAs, Indigenous land managers and other regional organisations	Regional	SCRIPT, regional managers of State agencies, LGAs, CALM
MAT R4 A review conducted of all management plans for Aboriginal Lands Trust (ALT) and Indigenous Land Council (ILC) vested lands by 2006	• Ensure NRM principles are incorporated into lands managed through ALT and ILC, including lands managed under Indigenous Protected Areas program	Regional	DIA, ALT, ILC
MAT R5 Register of planning processes being undertaken and details of community participation opportunities online by 2006	• Ensure opportunities for real community participation in all planning processes	Regional	All agencies and regional organisations; SCRIC
MAT R6 Indigenous Consultation framework developed and finalised by 2005	• Develop agreed framework for consultation with Noongar people in regional and other planning relevant to NRM	Regional	DIA, SWALSC, GLSC, Indigenous corporations, CALM
MAT R7 Noongar groups involved in ten projects, (two per year) by 2010	• Increase Indigenous involvement in NRM through MoUs, partnerships and or joint management agreements	Regional	SCRIPT, SWALSC, GLSC, CALM
MAT R8 Steps identified to support development of Regional Sustainability Strategy and development commenced by 2005	• Support development of Regional Sustainability Strategy driven from within the Region and including development and discussion of future scenarios (through community visioning)	Regional	All regional partners

Management Action Target (MAT) / Performance Indicator	Management Action (MA)	Geographical focus	Key responsibility
Support networks			
MAT R9 Contracts in place for NRM Coordinators for three years by 2005	• Maintain a stable network of community-employed NRM Coordinators throughout the Region. • Provide practical support for building involvement of indigenous people in NRM through the employment of indigenous NRM facilitators	Regional	SCRIPT
MAT R11 Review of technical support needs and State Government resources conducted by 2005.	• Ensure access to technical support in western, central and eastern parts of the Region	Regional	SCRIPT, regional State government offices
MAT R12 Range of funding options identified by 2005	• Expand funding sources for community groups and coordinators to lessen dependency on NHT and NAPSWQ funding	Regional	SCRIPT, subregional groups, LGAs
Local governments			
MAT R13 Review conducted with LGAs assessing their planning needs and options for integrating NRM strategies by 2006	• Review with LGAs to determine planning needs and options for integrating NRM strategies	Regional	SCRIPT, subregional groups, LGAs
MAT R14 Needs assessment for all LGAs to identify NRM dedicated technical support and staff requirements completed by 2006	• Review LGA needs for technical support and staff dedicated to NRM	Regional	LGAs, SCRIPT, State agencies
MAT R15 Review conducted with all LGAs to determine technical and spatial information support needs for NRM by 2006	• Identify LGA technical and spatial information support services needs to manage native vegetation, roadsides, drainage and other NRM issues	Regional	LGAs, SCRIPT, State agencies
Community involvement			
MAT R16 Specific activities that would attract target groups identified, and communication and marketing approach developed to increase numbers involved by 2007 *(Step 2: Develop specific targets for numbers involved in the identified activities)*	• Broaden the participation in NRM activities, particularly amongst youth and urban residents through identification of target groups and development of communication and marketing approach and targets	Regional	SCRIPT
MAT R17 Total resources for NRM being directed into administration reduced to less than 10% by 2010	• Reduce administrative burden for community groups, including sharing resources such as financial and secretarial services and IT	Regional	SCRIPT, State and Australian governments
MAT R18 Training and skills development plan for leadership and succession planning, mentoring, project management and staff management skills developed by 2005	• Assist community groups with leadership and succession planning, mentoring, project management and staff management skills	Regional	SCRIPT, subregional groups, RDCs
MAT R19 Community organisations secured with adequate and affordable public liability and volunteer insurance cover by 2006	• Lobby State and Australian governments to address public liability insurance issues for community organisations and volunteers	Regional	SCRIPT, subregional groups, State and Australian governments

Management Action Target (MAT) / Performance Indicator	Management Action (MA)	Geographical focus	Key responsibility
MAT R20 Volunteer achievements acknowledged through at least three SCRIPT newsletter articles ("Dob in a Doer" series), local media articles or events per year by 2007	• Value volunteers through acknowledgement, awards and celebrating successes	Regional	SCRIPT, subregional groups
Knowledge and skills			
(see MATs for Sections 2.1–2.5)	• Build and maintain knowledge and skills base	Regional	(see relevant MATs)
MAT R21 Living database of local knowledge sources developed by 2006	• Recognise and value local knowledge sources	Regional	SCRIPT (SCRIC), Gondwana Link partners
MAT R22 NRM is taught in every school and educational institution by 2010	• Ensure NRM is part of primary and secondary schools curriculum, and is included in post-secondary education institutions	Regional	State Government, NRM Council
MAT R23 SCRIPT website with links to information and knowledge sources revised by 2006	• Maintain and expand the SCRIC as vehicle for sharing access to technical information, scientific research and experiential knowledge (including the "community stories"), linking with other regional and State information bases, including regional State agencies and Gondwana Link	Regional	SCRIPT (SCRIC) in consultation with regional partners, Gondwana Link
MAT R24 Six cross cultural awareness workshops delivered by 2005	• Increase awareness of Indigenous culture within regional State agencies and community based organisations • Develop Indigenous NRM resource packages targeting educational institutions, NGOs and LGAs	Regional	SCRIPT
Governance			
See MATs R14, R16, R23	• Expand opportunities for community participation in decision making	Regional	State and Australian government departments, SCRIPT, LGAs
MAT R26 Structure and functions of SCRIPT reviewed before 2005 AGM	• Review SCRIPT structure and functions in accordance with the MoU between the State and the Regional NRM Groups, with particular reference to local governments, Indigenous people, industry groups, research and training providers, and achieving appropriate mix of skills-based and representative membership	Regional	SCRIPT

Management Action Target (MAT) / Performance Indicator	Management Action (MA)	Geographical focus	Key responsibility
Innovation			
MAT R27 Solutions through Creative and Lateral Thinking seminar or workshop hosted one per year by 2007	• Encourage creative and lateral thinking to develop solutions and alternative options for resource management and sustainable development	Regional	SCRIPT, subregional groups
MAT R28 New commercial industries for alternative land and water uses identified with at least three being implemented by 2010	• Continue and expand support for the identification and development of alternative land and water uses that can provide commercially viable and sustainable industries	Regional	SCRIPT, State government departments, RDCs, universities, research organisations, industries, GAWA
MA R29 New industries development training event conducted one per year from 2006 to 2010	• Identify training needs and providers for the development of new industries • Identify and support training and development in business and marketing skills necessary for development of new industries	Regional	SCRIPT, State government departments, RDCs, universities, research organisations, industries, GAWA

2.7.13 TRADE-OFFS

Coordination and integration are essential, but require that time and resources are spent on communication and on planning across sectors and geographical areas. As the complexity of issues increases and more people and organisations become involved in NRM, the time spent in coordinating and integrating their efforts can become overwhelming and lead to the perception that these activities are an end in themselves. The Strategy has identified proposed actions under the categories Benchmarking and monitoring, On ground actions, Capacity building, and Institutional frameworks, planning and policy, so that conscious decisions can be made about the relative effort that is made in each area. A balance between types of activities, and particularly between planning and on ground management, needs to be addressed during the consultation period, and kept under review during implementation of the Strategy.

Box 13: Lake Warden EMS

DEVELOPING AN ENVIRONMENTAL MANAGEMENT SYSTEM FOR THE LAKE WARDEN CATCHMENT

PREPARED BY TILO MASSENBAUER AND ANGELA ALDERMAN,
DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT, 19TH OF APRIL 2004.

When investing public or private funds for salinity management, setting measurable targets is important for quantifying success and return on investment.

The Department of Conservation and Land Management (CALM) is developing an Environmental Management System (EMS) to define measurable and achievable objectives for managing assets in the Lake Warden Catchment (LWC).

The LWC is located in the eastern portion of the South Coast region of Western Australia and has been recognised since 1997 as a Biological Recovery Catchment under the State Salinity Strategy.

The LWC contains the internationally significant, Ramsar-listed Lake Warden Wetlands (LWW) and encompasses the Esperance townsite.

Eighty per cent of the 172,000 ha catchment is agricultural land and 95% of this area is cleared.

The extensive clearing and current farming practices have placed the LWW at risk from salinity, inundation, sedimentation and eutrophication.

Q: "The action plan will identify investment priority areas to maximise recovery benefits to the Lake Warden Wetlands."

TILO MASSENBAUER

PERENNIALS RESEARCH PAVES WAY FOR EMS DEVELOPMENT IN LAKE WARDEN CATCHMENT

An EMS is being developed partly because of research conducted by Short etal (2000) found using economically viable perennial options to recover catchment hydrology had a high likelihood of success. To develop the EMS, it was necessary to determine and understand the underlying processes impacting on the asset, i.e. the LWW. For the LWC, these processes all relate to water, both above and below the ground surface and questions such as the following needed answering:

- What is the current condition of the catchment's values?
- What is the current state of the catchment hydrology?
- Where, when and how will hydrological equilibrium be reached and what are the projected impacts?
- What are the hydrological thresholds required to recover catchment values?

After defining the problem, data about the asset itself required collection to enable the condition of the asset to be assessed, and trends and ecosystem thresholds to be determined. CALM has been gathering this baseline data through a number of research activities including:

- drilling programs to establish a groundwater monitoring bore network around the LWW
- bathymetry mapping of lakebeds to determine storage volumes and overflows
- automated stream gauging throughout the catchment to determine run-off volumes
- regular groundwater and surface water sampling
- geophysical surveys of hydrogeology to determine groundwater storage volumes
- lakebed sediment sampling to assess pre-clearing hydrology
- vegetation change mapping using airborne multispectral imaging.

Box 13: Lake Warden EMS (cont'd)

DATA, LAND USE PRACTICES, TARGETS AND MAPPING

The data gathered from these activities is used to determine water use targets, which outline what needs to be achieved in order to minimise or remove the impact of the problems from the asset.

For example, a target may outline w hat, where and how much area of land use change is required to conserve the catchment values.

Another component of the EMS involves ascertaining the current and proposed land use practices and in 2004, 120 farm businesses in the LWC were surveyed.

This data is stored on a Geographic Information System (GIS) and in a Microsoft Access database system and are analysed to gauge current and potential social, economic and environmental momentum towards land use change, and therefore water use change, across the LWC.

This survey data combined with readily accessible landscape data, such as soils, terrain and rainfall, will be used for developing a simple catchment run-off and recharge model.

The model will use the Department of Agriculture's run-off and recharge calculation tools in association with ArcView GIS Spatial Analyst software, to determine water use capabilities of the different land uses and landscapes in the LWC.

The model will produce maps that define areas and quantities of run-off and recharge.

These spatial run-off and recharge maps and water use targets will then be used to develop measurable and achievable objectives relating to recovering, adapting and/or containing the impacts of the threats.

Once the EMS objectives have been defined, a Catchment Water Use Action Plan containing strategic, economically viable and sustainable land use scenarios ranging from perennial vegetation options to engineering options, can be developed.

The action plan will identify investment priority areas to maximise recovery benefits to the LWW.

During the implementation of the action plan, asset condition and thresholds, and the spatial run-off and recharge maps will be monitored and evaluated spatially and temporally to ensure the EMS objectives remain realistic and achievable.

The EMS being developed for the LWC is designed to be transferable to other South Coast catchments. The neighbouring Ramsar-listed Lake Gore Wetlands and its catchment are currently being used as a pilot catchment for implementing the EMS framework.

Reference
Short et al, 2000, "*Assessment of Salinity Management Options for the Lake Warden Catchments, Esperance, WA: Groundwater and Crop Water Balance Modelling*", CSIRO Land and Water Technical Report 20/00.

Map 4: Agro-ecological Zones of the South Coast

Map 5: South Coast Salinity 2000

Map 6: South Coast Projected Salinity 2020

Map 7: South Coast Projected Salinity 2050

Map 8: Plant Endemism

Map 9: Average Isoflor Map and Hotspot Associations

Map 10: South Coast Reserves and Remaining Vegetation

Map 11: Known Pc Occurrence

SECTION THREE

Strategic IMPLEMENTATION

IMPLEMENTATION

3.1 INTRODUCTION

The effective implementation of the Strategy will require effective partnerships with clearly defined roles and responsibilities. It will also rely heavily on the management actions outlined in Section 2.6 (Regional Capacity) and to some extent Section 2.5 (Cultural Heritage). These management actions will become part of the framework for the Regional delivery of the prioritised programs/actions outlined in sections 2.1 to 2.4, along with the Regional Facilitators and Coordinators positions that have been identified through the development of the Strategy and the subsequent Investment Plan.

Once implementation has begun, monitoring of the management actions against the respective management action targets will begin, the requirements for which are outlined in the NAPSWQ/NHT2 Bilateral agreements and State and Australian Government M&E Frameworks (Commonwealth Government, 2003a & 2002; Government of Western Australia, 2004; Commonwealth Government, 2003b). Evaluations will also need to be undertaken "...for the purpose of ongoing improvement, accountability or to inform decision making including the allocation of funds" (Government of Western Australia, 2004).

IMPLEMENTATION

3.2 ROLES AND RESPONSIBILITIES

For the successful implementation of the Strategy, all stakeholders need a clear description of their roles and responsibilities. These roles and responsibilities extend through the entire process, from the development of the Strategy, to the implementation of prioritised management actions, the monitoring and evaluation of the impact of the management action and the subsequent reporting of results to the Australian and State Governments and to the broader NRM community.

For the development and implementation of the Strategy, the Australian and State Governments' and the Regional NRM Groups' roles and responsibilities have been outlined in the NAPSWQ and NHT2 Bilateral Agreements (Commonwealth Government, 2002 and 2003a). The M&E Implementation Plan for NAPSWQ and NHT2 in WA (Appendix 12) further describes these roles and responsibilities. As shown in section 1.8.3, there is a broad spectrum of stakeholders interested in NRM in the Region, in addition to the State and Australian Government, and these should also be included when determining roles and responsibilities for implementation of the Strategy.

Careful consideration, however, needs to be given to the burden placed upon, and the amount of support given to, community groups when determining roles and responsibilities. Roles and responsibilities for stakeholders with regards to specific projects are to be negotiated with each project proposal.

3.3 PARTNERSHIPS

The successful implementation of the Strategy will rely heavily on strong and effective partnerships between the three tiers of government[11] and their relevant agencies, industry and the Regional NRM community, including NGOs and educational institutions, which will best achieve NRM outcomes. They will ensure that the issues identified in this Strategy can be addressed through programs resulting from the prioritisation of the management actions at a strategic, regional level, and in doing so meet the needs at the local, State and national level.

Partnerships with industry groups need to be pursued vigorously with a view to securing either financial or in kind support for resulting programs that are of particular importance to them. The Gondwana Link partnership and the partnership between Greening Australia and Shell (see Section 2.3) are fine examples of how successful these agreements can be. Partnerships such as these, as well as developing partnerships that link the three tiers of government with industry and the local community, enable working towards a shared NRM vision. Using this Strategy and the subsequent Investment Plan as a guide, strategic and effective management of natural resources can be achieved.

Other stakeholders in NRM in the Region include educational institutions (E.g. University of WA through CENRM and Edith Cowan University) and NGOs (e.g. Green Skills). Partnerships with these groups will be essential as part of the Regional delivery model. Educational institutions have a role to play in the implementation of the Strategy through their research capacity. NGOs such as Greenskills, who are engaged in NRM can provide a link to the community through their activities and thus augment the implementation of the Strategy.

Partnerships with other Regional NRM Groups also serve as an example of strategic enterprises. Sharing a boundary with the South West, Avon and Rangelands NRM Regions, SCRIPT has been involved in collaborative development of a number of cross-regional project proposals. As well, a MoU is being developed with the other Regional NRM Groups that will formalise each Region's roles and responsibilities for cross boundary cooperation.

SCRIPT has proposed a number of Facilitator and Coordinator positions likely to be identified as priorities for investment in the Investment Plan. The hosting of these positions will require significant partnerships between SCRIPT, subRegional NRM groups, LGAs, NGOs and the relevant State agencies that together provide the expert advice needed to achieve a comprehensive NRM team. These partnerships will ensure the effective management of the positions and guide the maintenance of the relevant skills and expertise needed to deliver outcomes.

[11] The three tiers of government are the Australian Government, State and Local governments.

3.4 INVESTMENT PLAN

The development of the Investment Plan to accompany the Strategy will build on the community[12] consultation conducted in the course of the development of the Strategy. Management actions have been given a preliminary prioritisation by the Regional Strategy Subcommittee and will need to be further prioritised and cross-referenced across themes in order to strategically allocate NAPSWQ/NHT2 funds in the Region.

The Investment Plan will continue to be developed during the consultation and accreditation period to identify proposed investments by the State and Australian Governments and other potential sources. The Investment Plan will need to include sufficient information to allow potential investors, including the Governments, to determine their contributions. Minimum requirements for the Investment Plan are:

- Detail of the specific actions or projects proposed to be undertaken.
- Costings of the actions and proposed sources of investment.
- Details of the proposed monitoring and evaluation strategy for individual actions.
- Expected return on investments – in particular, a summary of what the proposed actions will deliver in relation to the targets outlined in the accredited Regional Strategy.
- Identification of the primary beneficiaries of the investment and proposed cost sharing arrangements (i.e. assessment of public versus private good).
- Urgency, significance or critical nature of the action, and the consequences of not undertaking it.
- Relationship with existing government policies or programs.
- Risk factors and how these will be managed.
- Assumptions for chosen actions.
- Timelines, milestones and performance indicators for each action.

The Investment Plan will require additional consultation and will present an indicative program of actions that will be used to achieve aspirational goals and outcomes identified in the Strategy and identify the funding required for implementation through to the 2006/2007 financial year. The plan will ensure due consideration is given to the investment principles of the NAPSWQ and NHT2 Bilateral Agreements, as well as the State's Coastal Planning Investment Principles.

Through the grouping of the management actions into Benchmarking and monitoring, On ground actions, Community capacity and Institutional frameworks, planning and policy, programs will be able to be incorporated into the Investment Plan that follow a logical progression in order to achieve outcomes and result in a positive impact on resource condition.

While SCRIPT will develop the Investment Plan (with community consultation) and submit it, the implementation of actions or projects arising from the Plan is likely to be undertaken by various organisations including community groups, government departments, NGOs and education, training or research organisations.

[12] See Appendix 1 for the definition of community used in this document.

3.5 REGIONAL DELIVERY

As mentioned in Section 3.4, through consultation with the Regional Strategy Subcommittee and the SCRIPT Management Committee and the expertise inherent within these groups, SCRIPT has identified a core group of Facilitator and Coordinator positions required to achieve a coordinated regional delivery of the Strategy. As such, these positions will be included in the Investment Plan.

The strategic NRM Coordinators will respond to subregional priorities, which will direct the theme of each position, and provide the on ground link between communities implementing projects and the State agencies, NGOs or subRegional NRM groups driving a particular project.

Local and subRegional NRM groups will need to adjust to the change in the way NRM funding is delivered between NHT1 and NAPSWQ/NHT2 and the move to a more strategic focus of the NRM Coordinators. In order to achieve this change without either losing valuable expertise or disengaging some regional communities, a Community Change Liaison Officer has been proposed to help manage the significant adjustment that will be required in the transitional phase pre- and post-accreditation. This one-year position will join regional level information and communication positions identified as necessary to meet critical interim gaps, roll out the Investment Plan and fulfil reporting requirements.

Strategic theme facilitators (Land, Water, Biodiversity and Coastal/marine) will provide the expertise needed to ensure the effective implementation of the Strategy and an essential whole-of-landscape approach to NRM planning and integration. Coupled with these positions are implementation officers, who will work closely with the NRM Coordinator network to deliver effective on ground outcomes.

In addition to the themes of land, water, biodiversity and coastal/marine, the Strategy has identified the need to ensure community capacity to manage natural resources and achieve NRM objectives. This includes awareness, information, skills and training, and facilitation and support to ensure the continued ability necessary within the Region. As a result an M&E Coordinator, Projects Manager and information technician services have been identified to meet these needs. These positions will ensure that the M&E component of the Strategy is managed accordingly and that data and information collected through the life of projects is done in a manner that can augment State and national datasets and programs.

SCRIPT continues its commitment to Indigenous involvement in NRM with an extra Indigenous NRM Facilitator position being identified to fulfil the need to bolster involvement in the eastern part of the Region. The initial role of these positions will be to coordinate the development of the Indigenous consultation process to suit the Indigenous community of the Region. The Indigenous NRM Facilitators will provide the link between the Indigenous community and the outputs from the Strategy.

Regional Group operations are addressed through core SCRIPT staff, who will undertake coordination of all key functions of SCRIPT, and are foundation tasks required to implement the Strategy. Activities include administering funding arrangements for the prioritised projects, ensuring delivery on input and outputs required, coordinating the reporting to the State and Australian Governments, communicating activities outcomes to the broader community, and managing the liaison between State and Australian Governments and Regional stakeholders.

Specific delivery mechanisms will cover a range of scales from localised to subregional, regional and cross-regional projects, and as a result partnerships as described in Section 3.4 will need to be developed. The prioritisation of the actions and programs for the Investment Plan will result in projects that are integrated across themes (Biodiversity, Water, Land, Coastal and Marine) or theme specific projects to deal with specific high priority assets and threats.

3.6 MONITORING AND EVALUATION

This strategy presents proposed RCTs, Management Actions and Management Action Targets. Information is required to ensure that the prioritised actions funded through implementation of the Strategy and subsequent Investment Plan are working to achieve the desired outcomes. These management actions need to be **effective, efficient and appropriate** and will require a coordinated effort from all stakeholders across the Region.

The M&E requirements for this Strategy will follow the State M&E Framework (see Appendix 12), which has been developed by the JSC in accordance with the NAPSWQ/NHT2 Bilateral Agreements and in line with the National M&E Framework (Appendix 13). The present version of the State M&E Framework was approved in March 2004. It provides an overview of arrangements for monitoring, evaluation and reporting. It is a living document and will need to be further developed and updated as final details of reporting content and timelines are still being negotiated. In recognition of this, an M&E Coordinator for the Region will continue the development of an M&E framework in line with the evolution of the State document.

3.7 INFORMATION MANAGEMENT AND REPORTING

Whilst this Strategy has been developed for the Region, it must fit within a State and Australian Government framework. In order to accomplish this, data and information will need to be collected in such a way as to be easily aggregated from a regional to a State and national scale. As such, the collection of data for specific projects will need to be carefully considered.

In complying with State and Australian Government standards for data exchange, the Australian and New Zealand Land Information Council (ANZLIC) metadata standard will be used. This will guide the collection of data to a standard that will allow meaningful interpretation over time.

On completion and approval of the Investment Plan, careful consideration will be given to the M&E data requirements of the proposed programs to ensure duplication is avoided and data is collected that will allow M&E of more than one project. Where possible, State and Australian Government data sources will be used. However, it is recognised that often data at these scales are not suitable at a regional level.

The Region has a history of information management through the establishment of SCRIC in 1999. SCRIC has a dedicated web site used to disseminate data and information to the Region's NRM community (http://www.scric.org). The SCRIC framework will contribute to the coordinating mechanism for data and information, providing the link between the State and local levels and ensuring that data is fed back up to the State level in a useful format and to agreed standards, as well as disseminating data at the local level.

Regional Group reporting responsibilities on progress in achieving management actions and the resource condition targets are clearly outlined in the State M&E Framework (see Appendix 12). The framework also outlines the reporting roles and responsibilities of the State and Australian Governments.

SECTION FOUR

Strategy

REFERENCES

REFERENCES

REFERENCES

ACRONYMS

AEH	Albany Eastern Hinterland
AFFA	Department of Agriculture, Fisheries and Forestry Australia
AHC	Australian Heritage Commission
ALT	Aboriginal Lands Trust
ANZLIC	Australia and New Zealand Land Information Council
BMP	Best Management Practice
CALM	Department of Conservation and Land Management
CENRM	Centre of Excellence in Natural Resource Management
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DAWA	Department of Agriculture, Western Australia
DEM	Digital Elevation Model
DIA	Department of Indigenous Affairs
DoE	Department of Environment
DoF	Department of Fisheries
DPI	Department of Planning and Infrastructure
ECU	Edith Cowan University
EMS	Environmental Management System
ENSO	El Nino Southern Oscillation
EPBC	Environment Protection and Biodiversity Conservation
ERF	Esperance Regional Forum
ESD	Ecologically Sustainable Development
EWR	Environmental Water Requirement
FBG	Fitzgerald Biosphere Group
FBMA	Fitzgerald Biosphere Marketing Association
FESA	Fire and Emergency Services Authority
FGCMG	Frankland Gordon Catchment Management Committee
FPC	Forest Products Commission
GAWA	Greening Australia Western Australia
GEDC	Goldfields Esperance Development Commission
GIS	Geographical Information System
GLSC	Goldfields Land And Sea Council
GSDC	Great Southern Development Commission
GSRMA	Great Southern Region Marketing Association
GSWPA	Great Southern Wine Producers Association
GVAP	Gross Value of Agricultural Production
IBRA	Interim Bioregional Regionalisation for Australia
ILC	Indigenous Land Council
IMCRA	Interim Marine and Coastal Regionalisation for Australia
JSC	Joint Steering Committee (Australia Government and Western Australia Government)
LCDC	Land Conservation District Committee
LFW	Land for Wildlife
LGA	Local Government Authority
MA	Management Action

MAB	Man and the Biosphere
MAT	Management Action Target
MPG	Malleefowl Preservation Group
NAPSWQ	National Action Plan for Salinity and Water Quality
NGO	Non-Government Organisations
NHT	Natural Heritage Trust
NLP	National Landcare Program
NLWRA	National Land and Water Resources Audit
NRM	Natural Resource Management
NSPNR	North Stirlings Pallinup Natural Resources
OHCG	Oyster Harbour Catchment Group
ORV	Off Road Vehicle
QA	Quality Assurance
PGA	Pastoralists and Graziers Association
PURSL	Productive Use and Rehabilitation of Saline Land (commonly used as a term for the best management practice of saline land; PURSL is also a nationally branded term used to represent an interim network of people interested in progressing the best management practice use of saline land)
R&D	Research and Development
RAIN	Ravensthorpe Agricultural Initiative Network research and development
RAP	Regional Assessment Panel
RCT	Resource Condition Target
SCMG	South Coast Management Group
SCRIC	South Coast Regional Information Centre
SCRIPT	South Coast Regional Initiative Planning Team
SEFF	South East Forest Foundation
SWALSC	South West Aboriginal Land and Sea Council
SWCC	South West Catchments Council
UNESCO	United Nations Educational, Scientific and Cultural Organization
UWA	University of Western Australia
WA	Western Australia
WALGA	Western Australia Local Government Authority
WATC	Western Australian Tourism Commission
WC	Water Corporation
WICC	Wilson Inlet Catchment Committee
WONS	Weeds of National Significance
WWF	World Wildlife Fund

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