

SOUTHERN PROSPECTS

2019-2024



*looking after where we live
communities caring for their environment*

The South Coast Regional Strategy
for Natural Resource Management



Australian Government

BUILDING OUR FUTURE



Acknowledgements

This revision of Southern Prospects was co-funded by the Australian Government's Building Better Regions Fund and South Coast Natural Resource Management.

We are extremely grateful for the contributions of all community members, specialists, groups and agencies who gave support, assistance and insights through the consultation process for this revision. In particular, we acknowledge the valuable contributions of the following employees from South Coast NRM: Penni Hewett, Karen Herlihy, Dylan Gleave, Karl Hansom, David Broadhurst, Kylie Fletcher, Brett Dal Pozzo, Ray Chilton, Christine Painter, Jacqui Foster and Vicki Davies. We further thank staff and participants in the South Coast NRM Capture Nature photographic events who have kindly given permission for the use of their images.

Justin Bellanger

Chief Executive Officer 2018

South Coast Natural Resource Management
www.southcoastnrm.com.au

Graphic Design: Strike Point Graphic Design and Printing, Albany WA

Cover Image: Kylie Fletcher

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chair's foreword

It is with great pleasure that South Coast Natural Resource Management presents the revised Southern Prospects 2019-2024 Natural Resource Management Strategy for the South Coast region.

The comprehensive consultation for this strategy has exceeded previous versions, largely due to the uptake of social media as well as face to face consultations, which has enabled us to get a broad range of feedback.

This once again confirms our belief that the South Coast community is dedicated to looking after where they live by caring for the environment. I would like to acknowledge all of our partners and volunteers whose dedication and commitment drives natural resource management in the region. Without their commitment, much of what has been done in the past could not have been achieved. They are the unsung heroes who work away in the background to make real change.

The current Board of Management is particularly cognisant of the support sub-regional partners (catchment groups, friends-of groups, production groups, NFP entities and others) receive from their employees. South Coast Natural Resource Management is committed to supporting these groups as much possible within the limitations of the funding available and the strategic priorities within the region.

In this age of food and water security, it makes it all the more important to look after our natural environment to support production systems as well as keep our water clean.

Many of our plants, animals, birds, reptiles, aquatic life and insects are environmental indicators of a healthy ecosystem. Ongoing monitoring of these systems will be the key to measuring our progress.

The strategy highlights the community's deep appreciation of our unique beaches, coastline, forests, bushland, lakes, wetlands, water quality, native animals and ocean. This is not only for recreational and tourism pursuits, it goes deeper than that. This fosters mental and physical wellbeing and instils a sense of pride and stewardship for all those who live and work in our region.

The strategy highlights concerns around invasive plants, climate change, feral animals, loss of natural vegetation and Phytophthora dieback. These are not the only issues we have, simply the main ones identified by our community during the consultation.



This strategy will be used by the Board to guide investment over the next five years with the help of our local, regional, state, federal and international partners.

I would like to thank all who have contributed to the strategy and look forward to working with you to implement the strategy to keep the South Coast an exceptional place to live and work.

Carolyn Daniel

Chair, South Coast Natural Resource Management Inc.

Acknowledgement of Traditional Owners and Country

“We acknowledge the Noongar/Nyungar peoples of the South Coast region as the traditional custodians of this land and we pay our respect to their Elders past and present. We recognise their deep connections to land, sea and community.”

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welcome to our future

Welcome to our Future

Welcome to *Southern Prospects* – a strategy to guide investment in natural resource management on the South Coast of Western Australia for the period 2019 – 2024.

Southern Prospects provides a common focus for the communities of the South Coast Natural Resource Management region to work collectively towards the vision of looking after where we live - communities caring for their environment.

South Coast NRM

Natural Resource Management (NRM) is the sustainable management of natural resources, including land, water, marine and biological systems, and underpins social, cultural, economic and environmental well-being for future generations.

South Coast NRM is a community based, independent, not-for-profit organisation that works with the South Coast community to deliver *Southern Prospects* in partnership with government and businesses to improve the region's natural resources. This is achieved through collaboration with the community, government agencies, local government and industry to develop *Southern Prospects 2019-2024*. This framework enables delivery of well-targeted actions to improve the environment by preserving and protecting biodiversity, managing land and waterways sustainably, incorporating traditional ecological knowledge and sharing knowledge and skills in natural resource management.

Southern Prospects 2019-2024 is presented under four biophysical themes; Land, Biodiversity, Water and Coastal and Marine. These themes are supported by the bridging themes of Regional Capacity and Cultural Heritage that build community capacity and knowledge of natural cultural heritage values that support successful delivery of NRM activities. Each of these biophysical and bridging themes outline strategies for the period 2019-2024 and provides clear guidance for funding and resource allocation. The details of specific priorities, measures and activities will be developed in South Coast NRM's Investment and Operational Plans.

South Coast NRM coordinates and administers funding from a variety of sources, including the Australian Government, Government of Western Australia, local government, corporations, businesses and individuals. Additional funding for the region is generated through the South Coast Environment Fund to support sustainable environmental, social, cultural and economic outcomes across the region. There are also significant contributions from project participants, people involved with committees and volunteer groups to support NRM activities within the South Coast region.

Managing natural resources requires a long-term view and this strategy builds on the collective action undertaken to date to define a direction for the next five years of efforts in the region.



Looking after where we live - Communities caring for their environment

The South Coast community faces many challenges in the future management of the region's natural resources. Through working together, history has shown that the dedicated and passionate South Coast community can achieve great things. We do this by employing the following values in all the things we do.

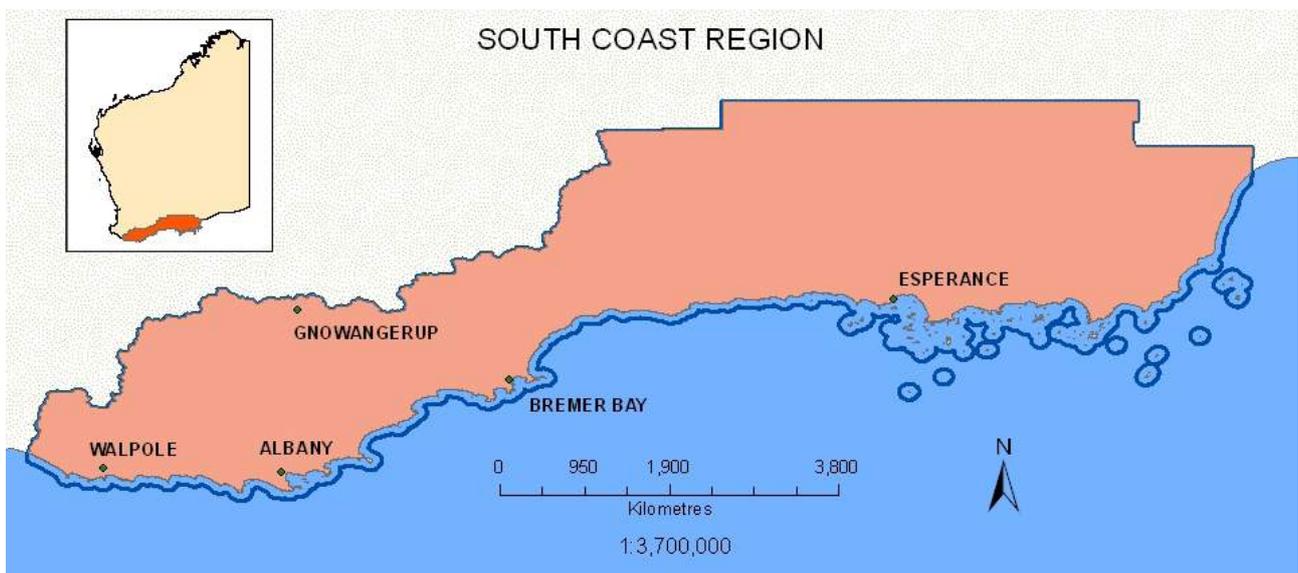
	<h3>Leading by example</h3> <p>Managing natural resources in balance with social and economic development</p>		<h3>Innovation and sustainability</h3> <p>Addressing challenges through innovation and acting sustainably in all that we do</p>
	<h3>Addressing priorities</h3> <p>Strategic approach to protecting, enhancing and sustaining our community, land, biodiversity, water, coastal and marine assets</p>		<h3>Working together</h3> <p>Creating strong community, government and regional partnerships and working on integrated, coordinated and knowledge-based management of urban, rural and natural landscapes</p>

Structure of the Strategy

Southern Prospects 2019-2024 has been developed to provide an overview of the region, the role of South Coast NRM and details of each of the bridging and biophysical themes. A summary of the 25+ year aspirations, 1 to 5 year outcomes and key actions to deliver the Strategy over the next five years are also included. The aspirations, outcomes and actions have been mapped according to a Pathways Approach that visualises the sequencing of these actions, decision and review points against the timeframe of the Strategy.

All South Coast NRM Reference Groups have reviewed these to ensure they align with the community's priorities over the next five years to help guide the focus for investment and collective action.

The vision, aspirations and outcomes included in *Southern Prospects 2019-2024* are brought together to provide a snapshot of the strategy on a page.



2044

Delivery of key actions underpin achievement of aspirations



regional capacity

ASPIRATION: Healthy, resilient and sustainable communities sharing a strong 'sense of place' and accepting a shared responsibility to provide a legacy of healthy, natural environment for future generations

OUTCOMES:

- R1** Improved understanding through state of the environment reporting
- R2** South Coast community supported to be environmentally sustainable
- R3** Improved resilience and increased capability
- R4** Key challenges addressed through facilitated change management
- R5** Improved awareness, recognition, education and training
- R6** Improved community engagement and leadership

2024

Key actions align to NRM outcomes



land

ASPIRATION: Improved and protected land resources through sustainable land use, matched to land capability

OUTCOMES:

- L1** Improved knowledge and understanding of priority land assets
- L2** Improved climate change adaptation and mitigation responses
- L3** Land degradation is reduced through effective on-ground works for soil health
- L4** Impacts of invasive species are reduced
- L5** Integrated land use planning with NRM
- L6** Sustainable industries developed for food, fibre and energy



biodiversity

ASPIRATION: Natural ecosystems, habitats and landscapes support viable and strongly resilient populations of native species and communities

OUTCOMES:

- B1** Improved knowledge and understanding
- B2** Demonstrate improved biodiversity outcomes
- B3** Improved climate change mitigation and adaptation
- B4** Threatened and significant species, communities and habitats are protected
- B5** The area of land restored or protected is increased
- B6** Impacts of invasive species are reduced
- B7** Improved dieback management
- B8** Support appropriate fire management



water

ASPIRATION: South Coast, rivers, estuaries, wetlands and water resources are recognised as precious and are maintained, protected, and/or restored with social, cultural, economic and ecological values

OUTCOMES:

- W1** Improve knowledge and understanding
- W2** Increased knowledge and awareness of climate change mitigation and adaptation
- W3** The condition of impacted and degraded waterways is improved
- W4** Low impacted and pristine waterways are protected
- W5** Ramsar Wetlands are protected
- W6** Sustainable urban and rural water resource management and use



coastal and marine

ASPIRATION: Our Coastal and Marine systems are improved by reducing key threats through a community-led approach that embraces social, cultural, economic and ecological values

OUTCOMES:

- C1** Improved knowledge and understanding
- C2** Marine pests are monitored and managed
- C3** Improved climate change mitigation and adaptation responses
- C4** Improved condition of coastal and marine systems
- C5** Improved coastal and marine partnerships and planning



cultural heritage

ASPIRATION: All NRM actions in the South Coast region recognise and respect natural heritage values. Aboriginal practices, spiritual and cultural values are considered across all NRM themes, to support conservation and protection of our natural environment

OUTCOMES:

- H1** Improved information
- H2** Improved understanding of climate change
- H3** Protection of heritage places
- H4** Sustainable Aboriginal enterprises established
- H5** Improved applications of traditional ecological knowledge
- H6** Improved Aboriginal community capacity
- H7** Improved awareness and education
- H8** Develop agreed protocols

bridging these outcomes

H3 Protection of heritage places

H5 Improved application of traditional ecological knowledge

R5 Improved awareness, recognition, education and training

2019

south coast community participation

Southern Prospects 2019-2024 has been structured as follows:

<p>SECTION 1</p> <p>Southern Prospects Strategy</p>	<p>This section provides an overview of the purpose of the strategy and how it was developed.</p> <p>Read this section for context and history.</p>
<p>SECTION 2</p> <p>Regional Context</p>	<p>This section provides an overview of the region.</p> <p>Read this section for a snapshot of the region.</p>
<p>SECTION 3</p> <p>About South Coast NRM</p>	<p>This section provides an overview of South Coast NRM and its role and purpose.</p> <p>Read this section to understand the role of South Coast NRM and its stakeholders.</p>
<p>SECTION 4</p> <p>Strategic Approach</p>	<p>This section provides information on the strategy aspirations, values, principles and measuring success.</p> <p>Read this section to understand the overarching context of this strategy.</p>
<p>SECTION 5</p> <p>Bridging Themes</p>	<p>This section describes the bridging themes of Regional Capacity and Cultural Heritage.</p> <p>Read this section for information about the Achievements, Aspirations, Outcomes and Key Actions as they relate to the bridging themes of Regional Capacity and Cultural Heritage.</p>
<p>SECTION 6 - 9</p> <p>Four Biophysical Themes</p>	<p>This section describes the four biophysical themes of Land, Water, Coastal and Marine and Biodiversity.</p> <p>Read this section for information about the Achievements, Aspirations, Outcomes and Key Actions as they relate to these four biophysical themes.</p>
<p>SECTION 10</p> <p>Next Steps</p>	<p>This section describes the next steps to support implementation of the <i>Southern Prospects 2019-2024</i>.</p>

Using the Strategy

Any group or individual with an interest in natural resource management in the region can benefit from using *Southern Prospects*. It provides guidance for anyone who wishes to better understand or be involved in natural resource management activities in the region as it sets out what has been achieved and where we are going.

Southern Prospects is supported by:

- South Coast Snapshot that provides a situation statement on the current state and trend of natural resource condition in the South Coast region.
- Southern Prospects 2011-2016.
- various technical reports relevant to the assessment of emerging issues and progress against each of the themes.
- South Coast NRM's Investment and Operational Plans.
- regional and catchment strategies prepared by partner organisations.



1. southern prospects strategy

1.1 Purpose of the Strategy

Southern Prospects 2019-2024 builds upon the previous four Southern Prospects strategies to drive ongoing ambitions to manage natural resources and provide a structured framework for the South Coast region. The 2011-2016 strategy was revisited to ensure that the strategies pursued in the past continue to be relevant given the current state of the environment and changing pressures and that the new strategies are developed to mitigate emerging threats. This is necessary to focus and guide a collective and collaborative response to tackle these emerging threats and maximise opportunities.

The strategy recognises the accomplishments of previous projects that have managed natural resources, identifies the current state of the environment and recognises risks and opportunities whilst providing a revised focus to successfully work towards both short-term goals and long-term ambitions. The success of the strategy is dependent on:

- a collective responsibility that involves the broader South Coast community in partnership with South Coast NRM, government, non-government organisations and industry
- an enabling Investment Plan: determining priorities and clear line of sight actions to outcomes necessary when administering funding
- delivering and evaluating results through monitoring and reporting
- mutual respect, recognition and open communication.

For the past two decades, *Southern Prospects* has provided a platform for collective action and investment for natural resource management in the South Coast region. *Southern Prospects 2019-2024* identifies emerging threats and opportunities based on the combined wisdom of land managers, technical and scientific experts, industry, government and the broader community within the region.

This Strategy plays an important part in setting priorities for action and identifying pathways for responding to more enduring, long-term challenges.

1.2 Development of Southern Prospects 2019-2024

Southern Prospects 2019-2024 has been developed to extend the work achieved by the previous strategy, *Southern Prospects 2011-2016*, to incorporate new information and feedback from the South Coast community. Community workshops were held to seek feedback and identify emerging issues and opportunities within the scope of natural resource management in the region, more specifically within the framework provided by Southern Prospects. There were 278 stakeholders involved in these workshops providing input across all six themes of Southern Prospects.

The *Southern Prospects 2019-2024* strategy has also been informed by a substantial amount of new information, technical studies and strategies which were provided in the following documents:

- *Southern Prospects 2011-2016*
- Climate Adaptation (2016) Addendum to *Southern Prospects 2011-2016*
- South Coast Snapshot, South Coast NRM, June 2016.

Image: Meredith Spencer

1.3 Analysis of Strengths, Weaknesses, Opportunities and Threats

An analysis of the Strengths, Weaknesses, Opportunities and Threats (SWOT) was undertaken to inform the development of the *Southern Prospects 2019-2024*. This analysis was informed by existing material made available by South Coast NRM including the feedback received through the community consultation process, the South Coast NRM Reference Groups and the South Coast Snapshot (2016). Specific feedback and identification of opportunities and challenges for each of the six themes are provided in the relevant thematic sections

of this Strategy. There were several key issues that were identified as being relevant across all themes and these are summarised in the SWOT analysis below (Fig. 1.1).

The importance of collaboration, community participation and regional capacity was recognised as critical to the successful implementation of *Southern Prospects 2019-2024* and achieving the natural resource management outcomes for the South Coast region.



Strengths

- A clear focus and direction.
- Ability to secure funding and community participation.
- Priorities are well documented and activities monitored.
- Successful delivery of on-ground actions and engagement.
- Clear identification of stakeholder education and engagement with purpose.



Weaknesses

- Previous Strategy not readily available to all stakeholders.
- There is a lack of resourcing to monitor the regional trends that underpin the Strategy Aspirations and Outcomes.
- Evaluation of the contribution of project level outputs and actions is required to determine the effectiveness towards achieving the Strategy Outcomes.
- Participation of youth and young adults in NRM activities needs strengthening.
- Lack of data/information limits the ability to influence change and identify (new) systemic threats and opportunities.



Opportunities

- Existing networks not fully utilised.
- Diversify funding base to secure long-term viability and pursue new sources of funding.
- Develop partnerships with private sector.
- Link to tertiary institutions and collaborative research funding.
- Increasing regional population enables opportunities for greater participation in NRM.
- Clean green image promotion into Asian market.
- Niche (high-value) food production.



Threats

- NRM participation and memberships not fully representative of community.
- High reliability on government funding.
- Significant reductions in traditional funding sources and increased competition for funding.
- Ability and capacity to respond to a changing climate that maintains or improves productivity.
- Population growth placing pressure on urban development.
- Retaining corporate knowledge and resources to support delivery.
- Change in climate requires longer term planning, dealing with uncertainty and identifying adaptation pathways that maybe challenging to gain support in the short term.

Figure 1.1. *Southern Prospects* SWOT analysis.

2. regional context

2.1 Extent and Boundaries

The South Coast NRM Region of Western Australia covers an area of approximately 8.6 million hectares which incorporates 8,000 hectares of islands and coastal waters up to three nautical miles seaward (Figure 2.1). The region extends from east of Esperance to Walpole along the coast and further inland by approximately 150 kilometres. The region encapsulates a spectacular and diverse range of landscapes from tall forests in the west, pristine coastlines in the south, all of Southern WA's mountain peaks and many wetlands, waterways and estuaries.

The South Coast NRM boundary is primarily defined by water catchment boundaries which improves the management of issues related to catchment hydrology and its effects on water availability, vegetation and land condition.

The regional NRM boundary also overlaps the Great Southern and Goldfields-Esperance regional development jurisdictions, as well as a number of local government areas. The region is further divided into subregions of Kent Frankland, Albany Hinterland, North Stirlings Pallinup, Fitzgerald Biosphere,

Esperance Mallee and Esperance Sandplain (Figure 2.1). This area includes the major population centres of Albany and Esperance which have populations of approximately 36,000 and 14,000 respectively (Australian Bureau of Statistics, 2016).

Rising regional populations can increase the pressure on the environment. Conversely, with more people in the region there are opportunities for increased participation in activities to preserve the region's natural resources. The City of Albany and the Shire of Esperance are known as the primary business and service areas for the region. The agricultural sector covers around 70% of the region, which puts increased pressure on the preservation of natural resources. However, in recent years there has been a trend to increase the diversity and resilience of land management systems through natural resource management initiatives. The coastal and marine environments contain some of the region's most intact and preserved ecosystems with over 70% of the coastal vegetation corridor under conservation management.



Figure 2.1: South Coast region

2.2 Cultural Heritage

Cultural heritage covers both Aboriginal and non-indigenous cultural assets and values. Cultural values must be recognised, understood and respected to achieve aspirations and to drive positive natural resource management outcomes. Cultural heritage assets significantly influence the management and utilisation of the region. At the national level, the Australian Heritage Council assesses the cultural significance of assets that have been nominated for the National Heritage and the Australian Government Heritage Lists. The Council then provides expert advice to the Minister for the Environment and Heritage with regards to the conservation and protection of listed values. At a state level, Aboriginal cultural heritage sites are managed and protected by the Department of Planning, Lands and Heritage.

The Aboriginal Noongar/Nyungar groups were the first people to occupy the land of the South Coast region. This region contains major Aboriginal cultural heritage assets including the culturally significant natural environments of the Stirling Ranges and the Fitzgerald Biosphere sub-region. The passing of Aboriginal Elders is resulting in a rapid multi-generational loss of Aboriginal knowledge of the South Coast. Projects have commenced to document the oral histories of Aboriginal Elders to provide regional context and preserve their knowledge. Further, projects have been implemented to engage Aboriginal youth, develop career pathways, improve cultural mapping of the region and support sustainable Indigenous enterprises. Expanding on this work is necessary to ensure the preservation and transmission of the cultural heritage of the South Coast region.

2.3 Climate

The South Coast region is subject to a Mediterranean climate featuring cool wet winters and warm dry summers. However, rapid alterations in the climate introduces threats and exacerbates current pressures on the delicate natural resources of the region. Further, climate change can have a significant impact on the region's primary productivity. Issues related to climate change need to be properly planned using evidence-based science to ensure climate resilience of the natural resources.

In recent history, the region's localised climate has undergone significant change. Winter rainfalls have reduced by approximately 17% since the 1960's (CSIRO and BOM, 2014, DOW, 2009). Additionally, since the 1990's sporadic rainfall has caused extensive drying of the region, particularly in autumn and early winter (Hope et al, 2015). It is projected with moderate to high confidence that annual rainfall will continue to decline and that the intensity of the rainfall will increase (Hope et al, 2015). Surface air temperatures of the region have also been significantly affected, increasing by 1.1°C since 1960 with a positive linear projection. Higher minimum, average and maximum temperatures are forecast for future projections, with an expected increase in the frequency of extremely hot days. Alterations in climate have a significant impact on the water resources of the region, which has a knock-on effect to all other aspects including biodiversity, land management and the health of coastal and

marine environments. Rapid alterations in the regions climate also has an impact on the severity and frequency of extreme weather events such as drought, bushfires, heatwaves, storms and flooding.

2.4 Land and Water

European settlement of the region commenced in 1827 with settlement of Albany. Farming was initially not very successful due to a lack of understanding of mineral deficiencies in the soil and the presence of plants poisonous to stock. Areas around Esperance were opened for grazing in 1863 with a rise to prominence of Esperance as a commercial port when the Kalgoorlie gold rush of the 1890s occurred. Farming success increased in 1949 when soils deficient in phosphorus, copper and zinc were treated with superphosphate and trace elements. It is at this stage that large tracts of land were cleared for farming.

Agricultural landscapes now 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. The availability of water in the region is fundamental to the success of these industries.

The South Coast region includes over 50 small, southward flowing rivers that are generally fresh and perennial in the west and more intermittent and saline towards the east and inland. In the South Coast region surface water use is relatively low and few surface water bodies are proclaimed (and licensed). Albany, Denmark and Walpole town water supplies use local surface water. For Albany and Mount Barker surface water supplements the principally groundwater sourced Lower Great Southern Town Water Supply Scheme. Smaller hinterland towns rely on harvested surface water (bitumen or roaded catchments) and may require cartage of water during dry seasons. Some inland towns are connected to the Great Southern town's water supply scheme, which is supplied from Harris Dam, near Collie. Surface water can also be used for irrigation in some areas, however, these are not currently proclaimed (DOW, 2014).

Across the region groundwater resources occur within the Bremer Basin, a narrow and relatively small, layered sedimentary basin. Groundwater quality varies, and is either stable or with slight declining trends, although these fluctuate seasonally. Groundwater abstraction is licensed in proclaimed areas under *Western Australia's Rights in Water and Irrigation Act 1914*.

2.5 Environment and Biodiversity

The South Coast is internationally recognised for its biodiversity, ecological assets, pristine coastal environments, aqua blue marine waters and diverse landscapes. This unique region entices thousands of tourists annually to major attractions such as the Recherché Archipelago, Stirling Range, Fitzgerald Biosphere Reserve (listed as a Biosphere Reserve in 1978 under the UNESCO Man and the Biosphere program), Great Western Woodlands, Valley of the Giants, Walpole Wilderness Area, Tree-top Walk, heritage buildings and wineries. The amenity of the region and its ecological characteristics are a key comparative advantage and underpin economic activity (such as agriculture, viticulture and fisheries), population growth and tourism visitation.

The Region falls within the globally significant South West Biodiversity hotspot and contains a number of national parks, including the Stirling Range, Fitzgerald River and Porongurup National Parks and protected marine ecosystems, together with significant nature reserves which contribute greatly to the area's rich biodiversity. These environments are home to many threatened, endangered and endemic species of flora and fauna, including Bremer Bay which is an area of significance for Killer Whales. The eastern region of the Fitzgerald River National Park is a perfect example of the significance of these environments. It is described as one of the most diverse botanical regions in the world containing over 20% of Western Australia's flora species with more than 1,800 species of flowering plants lichens, mosses and fungi.

The unique biodiversity of the region is threatened by numerous external pressures including habitat loss, invasive species, Phytophthora dieback, degradation of aquatic environments, population increase, rise in tourism, altered fire regimes, soil degradation and erosion and the impacts of climate change with increased seasonal variability. Continuous and improved management of these pressures is essential to the success of this Strategy.

2.6 Emerging Threats and Opportunities

There are numerous threats that can significantly impact on the natural resources of the South Coast region. However, with most of these threats come opportunities if the appropriate knowledge and partnership frameworks are established. While many aspects of these issues are beyond the direct influence of natural resource management, increased awareness of these emerging issues can help prioritise investment and focus effort to minimise negative impacts on the South Coast region.

2.6.1 Urbanisation

One of the major anthropogenic influences on the South Coast is the continued growth of the region's population which places pressure through urban development. Increased urbanisation can have a significant impact on the amount

of land required for development and the potential for concentrated impacts on water and biodiversity. Urbanisation can have a substantial impact on the displacement of native species through clearing of natural vegetation or isolation of habitats leaving behind patchy remnant vegetation. Further, elevated population levels increase urban runoff which causes the contamination of waterways and marine environments through eutrophication and increased wastewater discharge.

On the other hand, urbanisation and growing populations also mean that there are more people in the community that could participate in managing natural resources across the South Coast region. Greater participation may provide opportunities for less represented parts of the community to be engaged (for example youth) and provide a broader opportunity for community knowledge and understanding to be captured and shared. This considered, it is pertinent to note the significant under-representation of the 18-35 year cohort in the demographics of large towns like Albany and Esperance may affect the capacity of young people to contribute to managing natural resources.

2.6.2 Natural Resource Management Funding

The fluctuation of funding cycles and the priorities of government influence the ability to maintain capacity and capability to undertake natural resource management initiatives within the South Coast region. Organisations such as South Coast NRM that are heavily dependent upon government funding experience challenges in maintaining the level of effort necessary to minimise the risks and maximise opportunities for managing natural resources at the regional level. Whilst it is noted that there is a public need to invest in these activities, collaboration with other organisations and industries with complementary objectives can increase leveraging of funding, knowledge, expertise, networks and other resources to achieve social, cultural, environmental and economic outcomes. For example, the collaboration between community groups and South Coast NRM has provided benefits in the form of training, information and support that have helped mitigate the impacts of reduced funding.

It is also noted that reduced government funding has implications for the ability and capacity of the responsible agencies to meet their statutory responsibilities. This can result in the community delivering or supporting activities previously resourced using public funds. A more consistent and appropriate funding model would address some of these issues.

The management of natural resources is heavily reliant upon the ability of the community to participate. The over-arching issues of the financial stability of land owners and their ability to implement changes in practice, together with the relatively low level of community knowledge about the local assets of the region provide additional challenges in the ability to deliver successful natural resource management outcomes.

The variation in year-on-year funding makes long-term and contingency planning difficult. Diversifying the funding base with alternative sources of income will provide new



Image: Meredith Spencer

opportunities for collaboration and delivery models. This approach can ultimately be a strategy to help secure long-term viability of community and not-for-profit organisations responsible for managing natural resources in the South Coast region. Alternative areas for potential funding sources that have been progressed previously and can be expanded include:

- new areas of focus aligned with other funding programs not traditionally accessed by NRM providers
- industry and other private sector partnerships/ collaboration
- the extractive resource sector (mining), including corporate social responsibility investments outside the regions in which they operate to support broader state and national outcomes
- corporate social responsibility programs run by corporations who operate in the region
- collaborative research funding grants
- philanthropic funds
- collaboration with native title groups.

Southern Prospects and the underlying investment plan identifies the priority natural resource management activities within the region; funding will be derived from a variety of sources to achieve these outcomes. Where practical the principle of subsidiarity will be used to maximise the efficacy of activities, recognising that in some circumstances it may be strategically beneficial to adopt a broader approach to maximise funding outcomes for the region.

2.6.3 Mining

The South Coast NRM Region is not a large mineral producer, although there is the potential for significant nickel production in the Ravensthorpe area and haematite (iron) production in the Wellstead area. Some mines extract lithium, tantalum and other materials. Basic raw materials including agricultural lime, gypsum, dolomite, silica sand, spongolite and gravel are significant resources and are extracted at a small scale but from many parts of the region.

Some of the valuable mineral resources within the region exist in landforms that are associated with unique flora and fauna, many of which are highly endemic and have extremely

narrow geographical distributions, such as within the Ravensthorpe range. Mining can be a disruptive to this, and needs to be carefully considered in light of the environmental, social and cultural values that exist.

2.6.4 Climate Change

Significant investment has occurred at the regional, state and national levels to develop information and tools to support climate change adaptation and mitigation planning and responses. At a local level, South Coast NRM has prepared a series of background papers and reports that consider climate change projections and adaptation opportunities across the region and across sectors as part of the 2016 Climate Adaptation Addendum to *Southern Prospects 2011-2016*.

The Climate Change in Australia project was funded by the Australian Government and delivered by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) in partnership with the Bureau of Meteorology (www.climatechangeinaustralia.gov.au). The South Coast region was a sub-region of the Climate Change in Australia project that produced climate projections based on the best available information, modelling and research regarding global climate variability and change [www.climatechangeinaustralia.gov.au, 2018].

The main projections concerning the South Coast region (from Hope et al, 2015) are:

- elevated temperatures (0.5-1.2°C) by 2030
- increased frequency of extremely hot days and periods of drought
- decreased annual rainfall especially during winter and early spring
- an increased intensity of rainfall.

To enable appropriate responses to a changing climate, there are some underlying activities that are necessary to guide action including locally specific options analysis, risk assessment of natural, cultural and built assets, a plan that maps actions and timing of decisions, review and evaluation processes, communication and capacity building and developing improved understanding. Further details specific to each of the biophysical themes of Land, Water, Coastal and Marine and Biodiversity are included in the relevant sections of this strategy.

3. about NRM regional stakeholders on the south coast extent and boundaries

3.1 NRM and the Community

Natural Resource Management (NRM) is the sustainable management of natural resources, including land, water, marine and biological systems, that underpins social, cultural, economic and environmental wellbeing for current and future generations.

Involvement with the communities of the South Coast plays an important role in setting strategic directions and ensuring projects and programmes support the preservation and improvements of the unique and valuable landscape in which we live, work and enjoy. The ongoing consultation with and active support of South Coast communities has been a foundation of the way South Coast NRM has continuously operated.

Since inception, more than 3,814 people have been actively involved on a regular basis in projects facilitated by South Coast NRM, while a further 30,901 people have been involved on a less regular basis. This support and guidance has been pivotal in giving State and Federal governments the confidence to invest in natural resource management in the South Coast region.

Community involvement and engagement will continue to be a cornerstone of the way South Coast NRM works. The Western Australian Natural Resource Management Framework 2018 (DPIRD, 2018) emphasises the importance of working collaboratively with community groups, Aboriginal people, technical and scientific experts, industry and government to ensure a balanced approach to managing our natural resources for the long-term. The Framework also recognises the importance of devolving decision-making to the lowest capable level to ensure an adaptive and participatory approach (DPIRD, 2018: p2).

This Strategy has been developed using inputs from community workshops and other engagement platforms to ensure its continuing relevance to the South Coast community. It has considered delivery models that maximise the benefits of collaborative approaches and local knowledge.



Image: Wesley Lawrie



Image: Marion Todd

3.2 South Coast NRM - its role and purpose

South Coast NRM Inc. is a community based, independent, not-for-profit organisation that works with the community and stakeholders to maintain and improve a healthy and productive environment for the long-term benefit of communities within the South Coast region. South Coast NRM is one of a collective of natural resource management organisations covering the whole of Australia that are committed to achieving positive social and economic outcomes and the sustainable long-term management of the natural environment.

South Coast NRM enables projects to address these objectives by coordinating and administering funding from a variety of sources, including the Australian Government, Government of Western Australia, corporations, businesses and individuals for the purposes of natural resource management. Additional funding for the region is generated through the South Coast Environment Fund to support sustainable environmental, social, cultural and economic outcomes across the region. In addition, there are significant in-kind resources (such as time, money, intellectual property) contributed by project participants and volunteers that support delivery of *Southern Prospects* and other environmental services in the region.

The expertise and experience of South Coast NRM and its stakeholders and partners plays a vital role in informing funding and resource decisions and coordinating on-the-ground actions to effect positive change. By bringing together and harnessing the collective expertise and capabilities of the communities of the region, South Coast NRM can play an important role in preserving and protecting the regions unique biodiversity, managing land and waterways sustainably and sharing knowledge and skills in natural resource management.

3.3 South Coast NRM, the community, partners and stakeholders

South Coast NRM is a membership-based organisation open to individuals and groups with an active interest in the management of natural resources. Corporations or other legal entities including Commonwealth, State or Local Government agencies with an interest in, and responsibilities for, sustainable use of natural resources can also become members.

The South Coast region continues to have a high level of capacity and capabilities with 72 groups identified as being involved in natural resource management. These include community and grower groups, industry and local and state governments. The *South Coast Snapshot* (South Coast NRM, 2016) estimated that the combined membership of member groups totalled over 6,100, and that the reach of this network was likely to exceed this through informal and personal connections and a strong general interest in natural resource management outcomes.

South Coast NRM's capacity to bring together organisations and individuals from each of these realms leverages greater effectiveness and increased efficiency through collaborative working for the benefit of all the community. In this it plays a key role in identifying the connections and aligned interests around specific natural resource management issues and brings players together to deliver projects that can ensure solutions that are appropriate for the unique conditions of the South Coast and fit-for-purpose.

Increasingly, South Coast NRM is also playing a role in assisting projects coordinated and funded by other organisations and agencies, tapping into its strong history of linkages into the community and with partner organisations.

A list of major stakeholders in the South Coast region is at Appendix A.

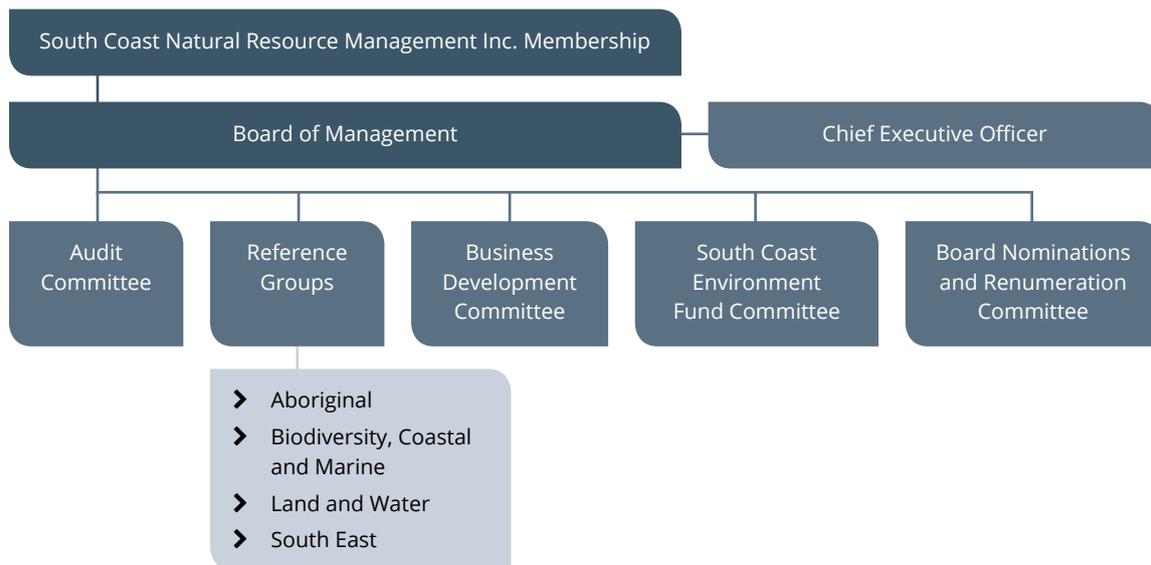


Figure 3.1 South Coast NRM Governance Structure.

3.4 Organisational Structure, Governance and Reference groups

The governance structure of South Coast NRM is designed to reflect the strategic needs of the South Coast region. The governance structure is designed to ensure accountability and transparency and to reduce and manage risks. It ensures other aspects of good corporate governance, such as ensuring the fair distribution of funding and resources and meeting commitments to funding bodies, the regional

community and partners. This structure is supported by appropriate strategies, policies and procedures to ensure effective and efficient governance.

The governance structure is comprised of a skills-based Board that oversees an Audit Committee, the Reference Groups, Business Development Committee, the South Coast Environment Fund Committee and Board Nominations and Remuneration Committee. The current governance structure is presented in Figure 3.1.

Supporting the Board are a suite of Reference Groups. The Reference Groups have been vital in identifying actions and priorities for the *Southern Prospects 2019–2024*. They are a source of specialist knowledge and provide a problem-solving vehicle for new and existing projects including review and adoption of innovation. They also provide a critical link to community by identifying local community issues, concerns and activities related to their respective theme. From time to time, specific skills-based technical groups are formed to assist with the management and coordination of specific projects. The broader aspirations and views of the community will be gathered through biannual forums held in Albany and Esperance. These will enable South Coast NRM to identify emerging threats, to refine the understanding of values, and to confirm where issues may have been resolved or become of less concern to the community.

The governance structure (Fig. 3.1) reflects the importance of South Coast NRM’s close connection to the community. The Board of Management and all committees within the governance structure are chaired by members of the community. The membership is skills-based and ensures appropriate representation by key stakeholders. As far as practical, the membership of committees and groups consists of a majority of community-based representatives.



3.5 Partnerships

The South Coast community has a long history of strong strategic and investment partnerships between government, industry and community stakeholders. Such partnerships are pivotal to lasting and innovative outcomes for the natural environment, social enrichment and economic wellbeing.

South Coast NRM leads partnership arrangements for targeted public investment in protecting or improving the condition of natural resources within the South Coast Region. Partnerships with dedicated community, public and private organisations are paramount in its capacity to coordinate and deliver successful natural resource management projects across the South Coast region and community.

Partnerships and networking are critical to the achievement of long-lasting positive outcomes for land, water, coastal and marine environments and biodiversity. The South Coast region has a record of successful and enterprising groups and individuals engaged in managing natural resources capable of tackling the challenges facing the region.

Major subregional groups within the South Coast region include the Ravensthorpe Agricultural Initiative Network, Fitzgerald Biosphere Community Collective, Wilson Inlet Catchment Committee, Oyster Harbour Catchment Group, Torbay Catchment Group, North Stirlings Pallinup Natural Resources and the Gillamii Centre. An overview of the focus areas and key activities of these groups is provided at Appendix A, together with other major stakeholders in the region.

There are numerous other catchment groups, Friends groups, conservation groups and other organisations that also link into the regional network and provide significant support. Entities that extend across and beyond the region and that represent the interests of the community include the South Coast Management Group, South West Aboriginal Land and Sea Council, Esperance Tjaltjraak Native Title Aboriginal Corporation, Esperance Nyungar Aboriginal Corporation, Gilberts Potoroo Action Group, Friends of the Western Ground Parrot, Bush Heritage Australia, the Nature Conservancy, the Malleefowl Preservation Group, Green Skills, Denmark and Albany Environment Centres, Greening Australia, Gondwana Link Inc. and production groups (e.g. Southern Dirt, Evergreen, Stirlings to Coast, South East Premium Wheat Growers Association), Noongar Land Enterprises and West Australian Landcare Network as well as many others.

All groups work closely with local government and State Government Agencies to deliver consistency with NRM policy frameworks and to ensure synergies between all NRM practitioners.

3.6 Aboriginal groups

There are approximately 20 major Aboriginal groups in the region who need to be involved to ensure cultural practices, languages and culturally important places are recognised, valued and protected. These include the Native Title claimant groups, reference groups, Aboriginal Corporations, Goldfields Land and Sea Council, South West Aboriginal Land and Sea Council, Esperance Tjaltjraak Native Title Aboriginal Corporation, Esperance Nyungar Aboriginal Corporation and Noongar Land Enterprises.

Aboriginal people have a long history in the region and possess deep knowledge of traditional ecological and sustainable land management practises. There is an opportunity to build on the approach to natural resource management with this knowledge and understanding. South Coast NRM maintains an Aboriginal Reference Group to assist and advise on these matters.

3.7 Local Governments

Local government authorities have an important influence on managing natural resources and set local policies and procedures and implement them. Their local responsibilities for land use planning, development approvals and provision of a variety of services including road construction and maintenance, waste management, and pest control, make them an important partner in achieving good land management outcomes. Local governments have an important role to play in issues such as maintenance of roadside vegetation, drainage and infrastructure impacts of changed catchment hydrology, invasive species identification and management, coastal and vegetation planning and management and fire management services.

Local governments are the most visible level of government in regional rural areas and are often made up of the land managers and other people most affected by, and involved in, natural resource management. In the South Coast region the local government areas are Albany, Broomehill-Tambellup, Cranbrook, Denmark, Esperance, Jerramungup, Gnowangerup, Kent, Kojonup, Lake Grace, Manjimup, Plantagenet and Ravensthorpe.

Local governments have had differing levels and methods of involvement in managing natural resources. Most provide some level of support for project officers working for other entities, but based in their areas. Additionally some local governments, such as the City of Albany and Shires of Denmark and Esperance, have officers specifically focused on natural resource management outcomes, with varying levels of integration with other local government functions. Most of the region's local governments have expressed a desire to be more involved in decision making and implementation of managing natural resources within the region, but there is concern about limited and declining resources to do so.

3.8 State Government

Various State Government departments and agencies are directly involved in managing natural resources and other related activities in the region and commit significant resources to those activities. These include the Department of Primary Industries and Regional Development, Department of Water and Environmental Regulation, Department of Biodiversity, Conservation and Attractions, Department of Planning, Lands and Heritage, the Great Southern Development Commission and the Goldfields Esperance Development Commission.

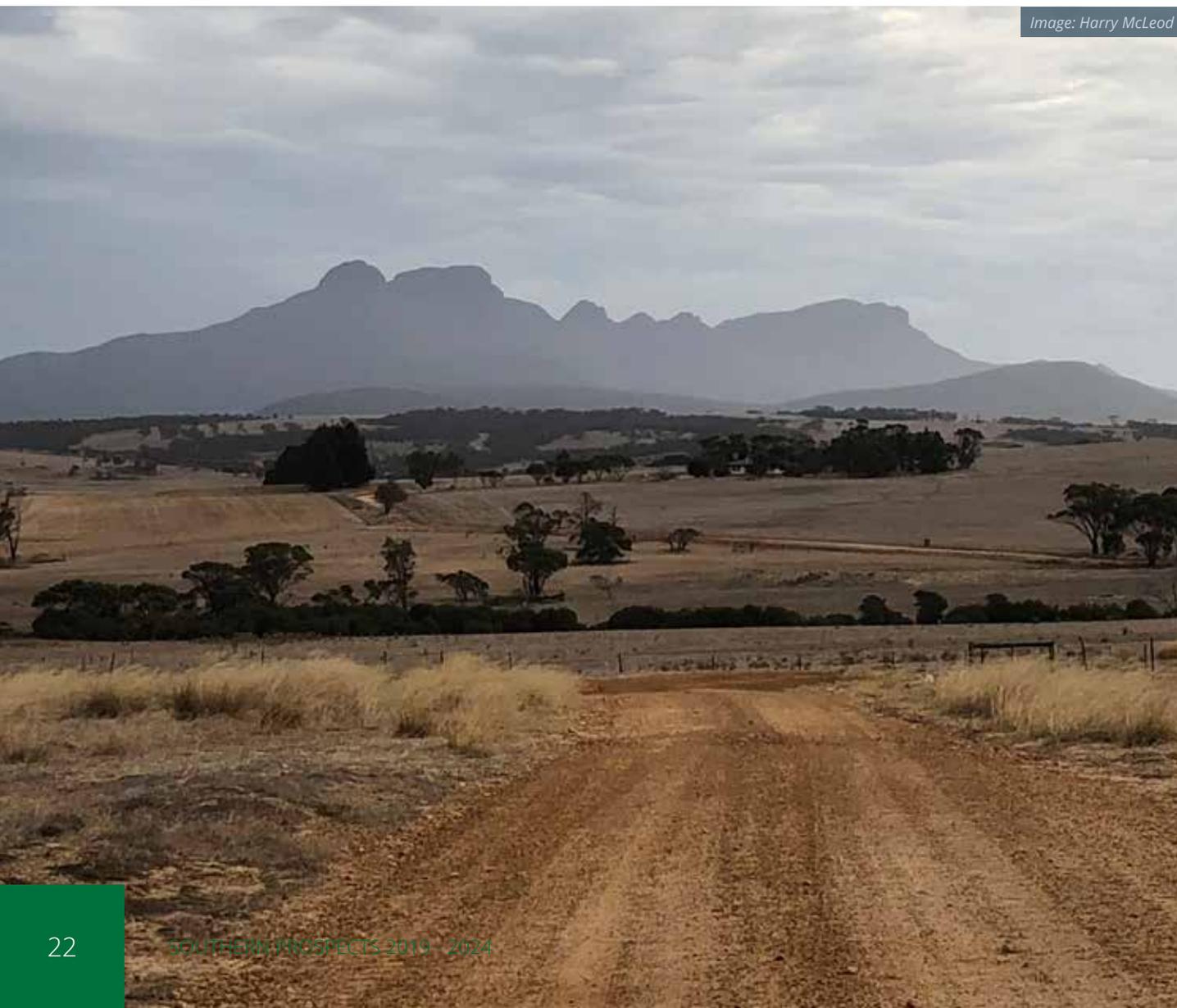
A State Natural Resource Management program administers the delivery of the Western Australian Government's investments made primarily to non-government entities. The program is an important funder of organisations and projects in the South Coast region.

State Government agencies are increasingly seeking to ensure community and local partner involvement in the delivery of projects and programs. This collaboration encourages the development of innovative solutions and supports an adaptive and participatory approach. South Coast NRM plays a leading role in accessing networks and expertise to assist this process in the South Coast region.

3.9 Australian Government

The Australian Government provides high level policy and guidance on matters of national significance and is involved in the delivery of national programs that support local implementation of natural resource management activities. The National Landcare Program is a key part of the Australian Government's commitment to managing natural resources, comprising of a \$1.1 billion dollar program to be delivered over a five year period from June 2018 to June 2023. The Department of Environment and Energy and the Department of Agriculture and Water Resources are responsible for delivery of the program to support natural resource management, sustainable agriculture and to protect biodiversity.

Image: Harry McLeod



3.10 Research Organisations

Research organisations play a lead role in undertaking scientific studies relating to the natural resources, sustainable agriculture and climate change relevant to the South Coast region. The University of Western Australia's Centre of Excellence for NRM (CENRM) in Albany helps to build capability in natural resource management and environmental studies locally. In addition, other educational institutions operating within the region such as Edith Cowan University (ECU), Curtin University of Technology (Centre for Regional Education), Murdoch University, South Regional TAFE and Esperance Community College have undertaken research relevant to assist the region with understanding emerging threats and opportunities. Other organisations such as the Bureau of Meteorology and the Commonwealth Scientific and Industrial Research Organisation (CSIRO) also undertake critical evidence-based research. This research aims to protect and preserve the natural resources of the region and provides improved contextual understanding to inform assessment of current condition and progress towards achieving outcomes. Research is supported through university grants, Australian Research Council and other private sector investments.

3.11 How the Community can engage with South Coast NRM

Changing government approaches to funding are bringing both challenges and opportunities. The need for leaner more efficient services has led governments to recognise the benefits of involving communities, non-government organisations and volunteers in project delivery in ways that make them more cost effective. At the same time these projects gain from enhanced local knowledge, access to local networks and a more continuous presence at the point of delivery.

This approach relies on the capacity of local partners and the strength and effectiveness of their networks and can present organisations such as South Coast NRM with a dilemma. As access to funding becomes increasingly competitive, this can directly impact the ability and opportunity to engage with partners and the community and maintain and strengthen networks.

The effectiveness of engagement with stakeholders, partners and the community is therefore a key success factor in maintaining and building the partnerships and networks that are a key contributor to attract funding. It is vital that organisations such as South Coast NRM, whose strength and effectiveness relies on its networks, partnerships and engagement with local communities ensure that platforms

for engagement are current and relevant. Communication is important to ensure that stakeholders are aware of the opportunities to engage in natural resource management activities in the region. South Coast NRM has developed a variety of platforms that are both accessible and relevant to the diverse South Coast community to communicate information and opportunities to participate in these activities, with an increasing focus on technology and social media platforms (eg. e-news, Facebook and Twitter).

Opportunities to participate in activities such as training, events, monitoring and evaluation (including citizen science programs) and on-ground works are advertised through formal communication channels. All members of the regional community are welcome to connect into the communication channel that suits their preference.

Natural resource management education, training and awareness programs are also delivered through various mechanisms including schools, tertiary institutions and community workshops. Access to relevant training is an important enabler of enhanced regional capacity. Managers and users of natural resources often need training in the planning, technical and management skills needed to participate in managing resources sustainably at property, local and regional levels. The South Coast Snapshot (South Coast NRM, 2016) indicated that most community group members do not have the capacity to self-fund training. As funding bodies increasingly look to local partnerships to assist with delivery of projects, training will be an important factor in the capacity to attract funds and develop these important partnerships.

The development of partnerships is another important aspect of engagement with stakeholders. Increasingly, governments are looking to undertake their work in ways that involve partnerships with local communities and groups. The South Coast community is encouraged to engage with local organisations to further develop strong regional networks and position the region to be competitive applicants in state and national funding programs.

Finally, the collection and sharing of information, local and Aboriginal knowledge and values are important inputs into the identification of regional priorities and review of progress in delivering regional NRM outcomes. Community participation in these activities all contribute to increasing the knowledge base and its use in natural resource management decision-making in the region.

4. southern prospects 2019-2024

Southern Prospects 2019-2024 has been developed based on the best available knowledge and information regarding the current resource condition, emerging threats and opportunities and the achievements delivered through investment under the previous strategy, *Southern Prospects 2011-2016*. Important to this process were the reviews of Aspirations, Outcomes and Actions undertaken by the Reference Groups and the input from the community that was obtained through various mechanisms including workshops and meetings.

Southern Prospects is a community owned document. South Coast NRM plays a role in providing support for its implementation and measuring progress towards the outcomes and aspirations.

4.1 Strategic Framework

Southern Prospects 2019 - 2024 adopts an approach to strategy development which is structured logically from:

- a defined long-term vision
- statements of principles and values
- the definition of strategic long-term aspirations and medium-term outcomes
- the development of measurable actions and their evaluation.

This approach builds on the various iterations of the strategies that preceded it. It adds to this sound foundation by considering the emerging challenges and opportunities that will face natural resource management in the South Coast region over the 5-year period. The focus is on the definition of clear, measurable and achievable actions over the strategy period.

The Strategy provides a framework for all regional stakeholders to identify opportunities to contribute to the delivery of *Southern Prospects 2019-2024*.

4.2 Vision

A continuity of vision is a characteristic of a long-term, enduring and effective strategy. During the development of *Southern Prospects 2019 - 2024* input from the South Coast community was sought regarding the vision for *Southern Prospects* that clearly articulated a singular strategic direction for the strategy, placing the region's community as the central focus.

The following vision has been adopted to guide South Coast NRM through the next strategy period and beyond:

*Looking after where we live -
communities caring for their
environment*

The vision builds on that used to guide the previous 2011 - 2016 strategy, placing empowered and resilient communities at its core.

4.3 Values

Values drive the way in which *Southern Prospects 2019 - 2024* will be delivered to achieve the Vision, Aspirations and Outcomes through the collective actions of the South Coast community and the organisations that support managing natural resources in the region. Figure 4.1 below provides an overview of these values and guide the behaviours and approach for implementation of natural resource management activities.

*sustainable • community focussed • holistic and integrated
collaborative • fit-for-purpose • accessible
transparent and accountable • measured • efficient
resilient • tangible benefits • adaptive*

Figure 4.1: *Southern Prospects 2019-2024* – Values that guide natural resource management delivery



Image: Jade Walker

4.4 Guiding principles

The guiding principles used in the development of *Southern Prospects 2019 – 2024* have their origin in those developed for *Southern Prospects 2004 - 2009* (SCRIPT, 2004) and are consistent with the principles guiding natural resource management in Western Australia as a whole (DPIRD, 2018).

The principles are primarily concerned with the integration of environmental, social, cultural and economic outcomes, ensuring risk-based decisions that are informed by sound science, the importance of partnerships and achieving effective, tangible outcomes.

The overarching principles are:

1. People rely on the functioning of natural assets for all aspects of our life and wellbeing and we strive to protect and enhance those values for ourselves and for future generations.
2. Integrated planning and management of 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 wider community has the expectation to be consulted on decisions and actions that affect them. With this comes the responsibility for the community, land owners and land managers to take the prime responsibility for management of their natural resources.
5. Prevention is better than cure.
6. The underlying causes of threats to natural resources should be addressed wherever possible, rather than the symptoms.
7. Partnerships between and amongst non-government and government bodies based on subsidiarity, equity and accountability provide the best basis for planning and actions.
8. Planning and management of natural resources should be based on the best available information. A precautionary approach is wise but considered action must proceed even where there is only limited information available on prevailing environmental, social and economic circumstances.
9. Public investment in natural resource management must target those actions from which the greatest public benefits will be gained.
10. Investment in improving community capacity and recognising achievement of organisations and individuals is essential.

These principles, as well as the knowledge and experience of government, businesses and the community of the South Coast region, are recognised by all groups and organisations as a guide to support natural resource management actions and decision-making, which ultimately lead to a resilient and sustainable future for natural resource management in the South Coast region.

4.5 Aspirations, Outcomes and Actions

This Strategy modifies the Program Logic approach adopted for the *Southern Prospects 2011 – 2016* in order to make the new Strategy leaner, more accessible, more aligned with funding cycles, and more focussed on delivering effective, tangible outcomes.

The Strategy defines a series of long-term aspirations (25+ years), and medium-term outcomes (1-5 years) that drive and deliver measurable actions. These aspirations, outcomes and key actions have been identified by South Coast NRM, its Reference Groups and the broader community for each of the strategy themes through a series of workshops and stakeholder and community interactions held over the course of 2017-2018.

Aspirations (25 + Years)	<ul style="list-style-type: none"> ➤ Overall Strategy Vision ➤ Aspirations for each theme
Outcomes (1-5 Years)	<ul style="list-style-type: none"> ➤ Developed for each theme ➤ Grouped into categories that identify the bridging themes of Regional Capacity and Cultural Heritage
Key Actions	<ul style="list-style-type: none"> ➤ Priority activities identified necessary to support achievement of Outcomes ➤ Strategy Implementation ➤ Projects, Activities, Programs ➤ Identified in Investment Plan

A key change to the approach has been to remove reference to Goals, defined under the previous strategy as applying to the 10+ years' time horizon. These were considered not to have materially and meaningfully contributed to the defined aspirations and medium-term outcomes (1-5 years) and were considered to more effectively align with funding cycles and with the period of each strategy iteration.

Southern Prospects 2019 – 2024 defines the clear program logic for each of the respective themes and provides a mechanism to identify key actions and timeframes for delivery.

4.6 Adaptation pathways

The Adaptation Pathways process links outcomes and management questions to actions, timeframes and decision points. The concept of Adaptation Pathways and its process has been applied to each theme to identify outcomes, key actions, expected timeframes for delivery and decision points. This logical and stepwise approach of the Adaptation Pathways process lends itself to planning appropriate management responses to achieve regional outcomes through well targeted and coordinated action.

The Adaptation Pathways process involved two key steps:

1. A review of theme outcomes, evaluation of enablers and barriers, and identification of Key Actions for all bridging and biophysical themes was completed. The review process was undertaken in consultation with the Reference Groups.
2. The outcomes of the review process were then mapped into the Adaptation Pathways Framework for each theme. The Adaptation Pathways Framework diagrams are included within each of the relevant sections for each theme.

It should be noted that these actions are those identified as important in achieving outcomes, however, the ability to implement these actions will be dependent upon receiving funding.

The Adaptation Pathways Framework supports the development of the Investment Plan and ongoing review of priorities and opportunities throughout the life of *Southern Prospects 2019-2024*.

Image: Michelle Barnes





Image: Lisa Jackson

4.7 Measuring outcomes and success

Measuring the success and outcomes arising from natural resource management investment has many complexities and significant resourcing challenges. The outcome of investing in managing natural resources is frequently underpinned by assumptions that link a course of action to the protection or improvement of a natural asset. The complexity arises because the investment:

- can require a significant level of scale of action (spatial and/or collective action) before an outcome can be achieved
- there may be other social, economic, biophysical, climatic factors that can influence/confound the desired NRM outcome
- there can be a lag period (years to decades) from action to outcome.

This complexity can apply to investments made for on-ground actions, policies and governance, capability, or capacity and behaviour change.

To improve the demonstration of natural resource management outcomes, the Australian Government has developed a Program Logic framework that documents the assumptions and logically links action and investment to intended outcome (Australian Government, 2009). This approach has been useful for evaluating the progress against an aligned monitoring, evaluation, reporting and improvement (MERI) framework, and has increased the confidence that long-term outcomes will be achieved through investment in managing natural resources.

The implementation of this strategy will include the use of elements of the MERI framework, and build upon existing monitoring programs and project performance reporting

processes, to ensure it meets best practice. Considerable progress has been made in recent years to capture point of investment level information in local databases to support tracking of management actions and program delivery progress. It is intended to build upon the South Coast NRM MERI Framework to more closely align to business reporting and monitoring processes, state and national monitoring programs and the region's community monitoring activities.

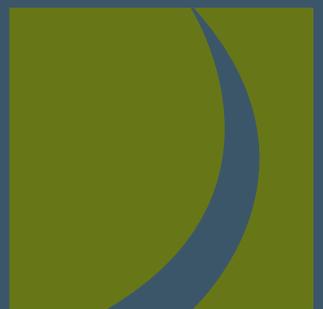
4.8 Theme Structure

The following sections provide the detail of the strategies proposed for each of the bridging and biophysical themes. Each of the themes include a summary of the 25+ year aspirations, 1-5 year outcomes and key actions to deliver the Strategy over the next five years. The aspirations, outcomes and actions have been mapped according to a Pathways Approach that visualises the sequencing of these actions, decision and review points against the timeframe of the Strategy. The South Coast NRM Reference Groups have reviewed these to ensure they align with the priorities over the next five years to help guide the focus for investment and collective action.

Each theme includes information regarding:

- Principles
- Current Context
- Key Achievements
- Future Directions
- Measures and Indicators.





*regional
capacity*

5! regional capacity

Bridging Themes

This section describes the two bridging themes of Regional Capacity and Cultural Heritage that support delivery of the four biophysical themes and are fundamental to achieving the Aspirations and Outcomes of *Southern Prospects 2019-2024*.

The details of these themes build upon the information documented in *Southern Prospects 2011 – 2016, South Coast Snapshot 2017* and consultation with the South Coast community and review by the South Coast NRM Reference Groups and Board. The previous iteration of *Southern Prospects 2011 - 2016* initiated integration of Regional Capacity outcomes across all other themes. This approach has been expanded to also include Cultural Heritage as a bridging theme and now includes outcomes from both Regional Capacity and Cultural Heritage into the Land, Water, Coastal and Marine and Biodiversity themes.

5.1 Regional Capacity

Regional capacity is defined as the combination of peoples' commitment and skills to build on strengths within the community to address problems and respond to opportunities. Volunteerism is integral in building regional and community capacity. Establishing mechanisms and opportunities for increased participation of new volunteers, particularly those in low represented parts of the community, for example youth and owners of new enterprises emerging in the region, is essential to the ongoing success of delivering regional NRM outcomes.

ASPIRATION: Healthy, resilient and sustainable communities sharing a strong 'sense of place' and accepting a shared responsibility to provide a legacy of a healthy, natural environment for future generations.

5.1.1 Principles

The principles for building community capacity are to:

- consult and engage with the community
- support the community to undertake priority natural resource management activities
- value the resource of community capacity
- celebrate achievements.

Regional capacity is fundamental to achieve the delivery of outcomes across all themes.

This Strategy refers to community as it relates to the broader regional community of individuals, landowners and managers, all levels of government and organisations with an interest in managing natural resources in the South Coast region. South Coast NRM has had strong participation of the broad cross section of its community in events, training and on-ground activities. To foster capacity building as an on-going process of learning and engagement, capacity building principles and activities are built across all South Coast NRM programs to support effective on-ground implementation and uptake of natural resource management practices.

5.1.2 Current Context

South Coast NRM is one of a suite of entities managing regional delivery across Australia, and one of seven similar regional NRM organisations in Western Australia. National and State reviews of the delivery of natural resource management have found that the regional NRM delivery model plays an effective and critical role in supporting delivery achievement of social, cultural, environmental and economic outcomes locally, regionally and nationally (Commonwealth of Australia, 2017; Interparty and Associates et al., 2009).

Regional NRM groups add value in delivering NRM outcomes through:

- integrating National and State policies and translating them into regional plans
- providing a community led and supported platform for natural resource management planning
- integrating scientific and local knowledge to inform natural resource management planning and implementation
- leveraging investment from diverse sources
- driving more coordinated and accountable provision of natural resource management related services
- review and provide feedback for changes to policies to protect the environment
- tackling cross-boundary issues
- accessing and building regional capacity, networks and partnerships.

To inform the development of *Southern Prospects 2019-2024*, community consultation surveys and workshops were convened to seek feedback on *Southern Prospects 2011-2016* and the emerging issues and opportunities facing the South Coast community in relation to natural resource management. Feedback from this process identified strengths from the existence of the Strategy as well as a number of emerging threats and opportunities. These are summarised below (Fig. 5.1).

Integration and coordination across the South Coast region continues to be essential across community, Government and non-government organisations to ensure natural resource management issues, and those of related sectors continue to be complementary, maximise effort and avoid duplication. South Coast NRM provides support to facilitate this coordination and integration and contribute to the community's ability to achieve sustainable natural resource outcomes.

Generational Change

Opportunity

- Promote NRM career pathways.
- Remove barriers to participation.

Challenges

- Succession.
- Need to better engage with youth.

Citizen Science

Opportunity

- Integrate Data management across different organisations.
- Utilise existing Citizen Science initiatives and promote activities.
- Pathway to engage community diversity.

Challenges

- Coordination.
- Avoid burnout.

Linking Community and NRM Groups

Opportunity

- Strategy supports collective action between community and NRM groups.

Challenges

- Ensuring coordination across all levels of government and related issues.

Knowledge Base

Opportunity

- Develop partnerships with research Institutions.
- Create a 'Research Hub'.
- Improve collaboration to share knowledge and data.

Challenges

- Improving NRM education curriculum.

Coordinated Action

Opportunity

- Strategy provides a framework for coordinated action.
- Connect new expertise into region.

Challenges

- Support for groups to avoid burnout and turnover of members.
- Emerging areas of nature tourism and waste management.

Communication

Opportunity

- Keep engagement activities to encourage change in practice.
- Diverse forms of communication being applied.
- Ability to target messages and communication model to different sectors.
- Maximising use of new technology.

Challenges

- Maintaining presence of message in a competitive market.
- Keeping current with technology advances.

Funding

Opportunity

- Diversify funding model with greater stakeholder participation.
- Coordinate with other funding initiatives.
- Build connection with the private sector.

Challenges

- Reduced funding available from traditional NRM sources.

Figure 5.1. Summary of the Regional Capacity emerging threats and opportunities.

Regional Capacity Key Achievements 2011 - 2018

The Key Achievements delivered to build Regional Capacity during 2011-2018 are summarised below.

1	<h3>Developing Regional Capacity</h3> <p>Social and economic targets have been established within an environmental sustainability framework. To support achievement of targets, an education and training framework has been developed that fosters improved community engagement and leadership.</p>
2	<h3>Increasing Skills and Knowledge</h3> <p>Training through workshops, field days, seminars and forums has increased community engagement and developed capacity to improve management of the regions resources. Forums such as the Community Expo night and Women in Biodiversity events have been created to facilitate enhanced community connection. Ongoing support through the establishment of a calendar of events through the South Coast NRM website and development of resources to guide community capacity, engagement and education in the region. Four new important resources developed:</p> <ul style="list-style-type: none"> ➤ Community Engagement Handbook ➤ Education and Training Framework in NRM ➤ Governance Guide for sub regional groups ➤ Volunteer Management Guide.
3	<h3>Community Group Support</h3> <p>Resources have been provided to a wide range of community groups to assist implementation of projects aligned with <i>Southern Prospects 2011-2016</i>.</p>
4	<h3>Report Card</h3> <p>The South Coast NRM Snapshot has been developed to capture and present available information on the condition and trend of key natural assets of the South Coast region and help identify any gaps in knowledge.</p>
5	<h3>Youth, Science and Education</h3> <p>Two key initiatives have been established to better engage with youth including the science career forum Science Rocks and Capture Nature Photography Competition. Catchment, Corridors and Coasts training for environmental educators and the education roadshows for primary schools have also proven effective initiatives to increase awareness, knowledge and skills of educators and students.</p>
6	<h3>Behaviour Change</h3> <p>A number of initiatives have been established including training for project officers, hosting of a behaviour change workshop and establishment of a behaviour change facilitators' network to enable skills and knowledge sharing.</p>
7	<h3>The Regional Landcare Facilitator</h3> <p>Dedicated facilitators work with Landcare groups and individuals across the region to build the skills and knowledge required to achieve on-ground outcomes. This has enabled expansion of the Community Small Grants Program to two rounds per year.</p>
8	<h3>Good Governance</h3> <p>Governance training and support has been offered to NRM community groups including how to run your group, effective meetings, complying with Associations Act changes and assistance with constitution updates. Training was well received and attended with groups gaining confidence and increased knowledge in governance and practical skills.</p>
9	<h3>Social Media</h3> <p>Improving the social media presence of South Coast NRM has been a focus with the increased availability and accessibility of social media platforms to broaden community reach and promote natural resource management messages, such as Landcare. South Coast NRM continues to produce a fortnightly E-news that is distributed via e-mail to 600 subscribers. Across the region social media training events along with a social media toolkit have enabled NRM community groups to reach a wider audience.</p>

5.1.3 Future Directions

The future directions contained in this strategy and presented as the 25 year aspirations, five year outcomes and key actions are based on the review processes conducted by South Coast NRM and its Regional Capacity Reference Group. The Adaptation Pathways process has been applied to the revised Regional Capacity outcomes (Fig. 5.2) that includes key actions to be considered in implementation of the strategy and indicative timeframes.

The modifications to outcomes and the corresponding key actions recognise and respond to the emerging issues and opportunities identified through investigations instigated by South Coast NRM including the Climate Adaptation Addendum (2016), South Coast Snapshot (2016) and community feedback. These emerging issues and opportunities identified in the development of this Strategy are detailed in Section 2 – Regional Overview.

A process involving the Reference Group evaluates the regional emerging issues and opportunities annually, and develops proposed management responses through an iterative process where warranted. This key action is included in the Adaption Pathways process represented in Figure 5.2.

The emerging issues and opportunities within the specific scope and mandate of the Regional Capacity theme include:

- Increasing representation and participation across all parts of the community, but with a particular focus on encouraging youth participation.
- Increased population through urban growth presents an opportunity to engage with potential new community participants in natural resource management.
- Supporting succession planning and retaining corporate knowledge and capability to support delivery of the Strategy.
- The need for common and consistent messaging regarding natural resource management, its values, career pathways and climate science.
- Development of new collaborations that maximise benefit of existing investment for the community, create new partnerships that enable development of capability and capacity and collaboration with other entities such as the formation of native title groups.

The Adaptation Pathways framework will support the preparation of the Investment Plan by South Coast NRM and help focus investment towards priority actions. It is intended that the key actions be reviewed by South Coast NRM and the Reference Groups to ensure the Strategy continues to be responsive to emerging issues and opportunities, whilst delivering against the regional natural resource management priorities within the resourcing, capability and capacity available.

The symbols applied in the Adaptation Pathway aim to describe the enabling process for the key actions. These include whether the action is a review process, requires a decision to proceed, connects to other actions, is in a position to commence if funding and resources are available, and when actions are likely to be completed. The shading indicates the proposed commencement and duration of the key actions and provides a guide to phasing and sequencing of these actions.

Aspiration (25+ Years)

Healthy, resilient and sustainable communities sharing a strong 'sense of place' and accepting a shared responsibility to provide a legacy of a healthy, natural environment for future generations.

- Community awareness and valuing of the region's natural resources and understanding of management required.
- Community with capacity, resilience and willingness to adapt to change, and with confidence in their future.
- Diverse range of people, groups and organisations informed and engaged in natural resource management activities through collaboration and strong partnerships and with appropriate support systems.
- Education and an accessible knowledge base available for all and equitable decision making that considers all stakeholders.



Outcome	Key Actions	2019	2020	2021	2022	2023	2024
R1. Improved understanding through state of the environment reporting: A clear and transparent reporting process that enables reporting to stakeholders and community on progress against Southern Prospects outcomes and changes in resource condition change, with a report card to be prepared every 5 years.	1. Prepare a reporting framework.	?	▽				
	2. Set, monitor and evaluate measurable indicators for capacity and engagement.	?	▽				
	3. Coordinate regular reporting on progress.		⇒				
	4. Prepare of a report card.					⇒	
R2. South coast community supported to be environmentally sustainable: Identify and support community groups, businesses, local and state government agencies to incorporate environmental sustainability into their practices (National Industry Standards, Environmental Management Systems) and encourage quadruple bottom line reporting.	1. Identify, support and promote the business sectors uptake of current QA/EMS Systems supported by the chamber of commerces.		⇒	☰	☰	☰	☰
	2. Support the development of sustainability strategies for community groups, local and state governments agencies.		⇒	☰	☰	☰	☰
	3. Identify, support and promote sustainable practices for the south coast community.	☰	☰	☰	☰	☰	☰
R3. Improved resilience and increased capability: Provide continued support for sub-regional and community NRM Groups to ensure a network of highly capable organisations across the South Coast.	1. Support existing community Landcare groups across South Coast NRM Region. Support includes governance, risk management, funding opportunities, administration, insurance, human resource management and executive support.	☰	☰	☰	☰	☰	☰
	2. Deliver tailored training for sub-regional and community NRM Groups.	☰	☰	☰	☰	☰	☰
R4. Key challenges addressed through facilitated change management: Assist South Coast community to identify, plan and implement changes to address key challenges.	1. Assess current emerging issues and opportunities.	?					
	2. Prepare a plan to respond to relevant emerging issues and opportunities.		?				
	3. Continuous review of emerging issues and opportunities.			△	△	△	△
R5. Improved awareness, recognition, education and training: Support opportunities to ensure that there is access to locally relevant information and knowledge to support, inspire and energise existing education programs.	1. Continue the annual South Coast NRM training calendar.	☰	☰	☰	☰	☰	☰
	2. Review existing and potential programs and activities in environmental education and identify gaps.		?	▽	?	▽	
	3. Continue to explore opportunities to support and enhance environmental and NRM education programs in schools.	☰	☰	☰	☰	☰	☰
R6. Improved community engagement and leadership: Demonstrate and support leadership, increase awareness and involvement of key audiences including youth, seniors, rural, urban and peri urban landholders, business owners and Aboriginal communities reviewed annually.	1. Review and implement South Coast NRM's communication and engagement strategy.	?					
	2. Support leadership and inclusion initiatives	☰	☰	☰	☰	☰	☰

LEGEND: ? Decision Point ☰ Review ✓ Complete ⇒ Commence ▽ Linking Action

Figure 5.2. Adaptation Pathways – Regional Capacity

5.1.4 Measures and Indicators

A series of potential indicators and measures were recommended by *Southern Prospects 2011-2016* (Table 5.1). These continue to be relevant and act as a guide to assist in setting targets for projects and programs and allow for standard approaches to measurement. Indicators should be selected according to the principles of cost, simplicity, consistency, practicality and capacity to deliver information across the region. These measures will form the base inputs for monitoring and assessing performance for review by South Coast NRM as part of its normal financial and business reporting processes and support annual reporting of Strategy achievements.

Table 5.1 Potential Indicators – Regional Capacity

Asset	Indicator	Measure
NRM capacity - individuals and communities	1. Capacity of individuals and communities to change and adopt sustainable management practices.	<ul style="list-style-type: none"> ➤ Survey to identify change in aspirations of resource managers. ➤ Capacity of regional decision makers. ➤ Attributes of management practices. ➤ Regional livelihood context. ➤ Extent and type of enhanced capacity of resource managers to undertake sustainable resource management practices. ➤ Level of resource managers skills and knowledge to promote sustainable natural resource management. ➤ Extent of adoption of recommended sustainable natural resource management practices by resource managers. ➤ Number of sub regional groups. ➤ Number of members of groups. ➤ Number of people attending events. ➤ Number of people receiving South Coast NRM E-news letter. ➤ Number of events held to recognise achievements of individuals or groups for projects or best practice in natural resource management. ➤ Annual community attitudinal survey.
NRM capacity - institutions and organisations	2. NRM capacity in institutions and organisations to change and adopt sustainable management practices.	<ul style="list-style-type: none"> ➤ Number of educational institutions with educational or training programs that incorporate NRM themes. ➤ Best practice business management (capacity). ➤ Number of partnerships (engagement). ➤ Extent of leverage (partnerships/recognition). ➤ Quality of partnerships between parties to NRM program agreements. ➤ Number of resource managers accessing NRM programs. ➤ Effectiveness of knowledge distribution systems. ➤ Number of Aboriginal organisations accessing natural resource management opportunities.
Sustainable Industries	3. NRM capacity in Industry and Business sectors to change and adopt sustainable management practices.	<ul style="list-style-type: none"> ➤ Industry awareness of natural resource management issues and sustainable practices. ➤ Extent of adoption of sustainable natural resource management practices. ➤ Level of productivity of resource industries.

case study

Volunteering on the South Coast Building capacity in the community

Volunteers play a vital role in the management of natural resources on the South Coast of Western Australia. Their skills, local and specialised knowledge and community spirit provide resources that are not available through any other channels. Volunteers help to protect our unique natural environment, build knowledge of our plants and wildlife and promote more sustainable environmental activities in our community.

South Coast NRM is committed to building volunteer capacity across the region by raising awareness, providing information and sharing knowledge through training, facilitation and support. Volunteers contribute to environmental recovery activities and foster community appreciation of our natural environment.

Following the 2014 bushfire that destroyed the Lake Monjingu Reserve and the Merivale fires of November 2015, many local residents enquired about volunteering to assist in a hands-on recovery program. South Coast NRM undertook to develop a volunteer management guide for all organisations across the region who engage volunteers to achieve environmental outcomes. The volunteer management guide helps agencies and local organisations implement appropriate processes to ensure volunteer work is undertaken safely, fairly and lawfully.

Volunteers contribute through many different outdoor activities which support the sustainability of the region including tree planting, seed collection, removing weeds, helping with flora and fauna surveys, environmental monitoring and data collection, feral pest control, coastal dune and beach protection, track building and maintenance, responding to natural disasters or unforeseen events and helping with educational or community activities.

Volunteers also give freely of their time to assist with administrative tasks, serving on committees and the running of special interest groups, writing newsletters and fund-raising for their group's environmental protection projects.

Volunteering provides an avenue to make a difference and meet like-minded people who share the same passion, to learn more about

the South Coast region, and to get outdoors and stay fit. As an ongoing legacy South Coast NRM is developing a database of key organisations and environmental programs across the South Coast where volunteers can find an activity and cause that meets their interests. This information and the volunteer management guidelines will be available for download from the website.

Social media has proved to be a valuable and effective communication tool to promote activities and is embraced by the volunteer groups to attract attention to their specific interest and increase their membership.

In conjunction with the Esperance Volunteer Resource Centre, South Coast NRM has a strong relationship with the Esperance Bird Observers Group who dedicate time and expertise to monitoring resident and migratory bird populations in the region. They provide expert local bird knowledge and embrace an active role in educating the local community on the role birds play in the environment and their locations.

A leading member of the group is Jen Ford, who often assists with educational activities in schools and in the field. She is one of the many volunteers across the region who selflessly devote their time to making the South Coast a better place to live.



volunteer profile

Jen Ford

Esperance Bird Observers Group

Profile of a South Coast volunteer:

Jen says:

In 2005 my husband and I retired to Esperance and volunteering became a major part of my life. I joined Birdlife Australia and had time to be part of the Esperance Bird Observers Group, as well as Rotary, the Esperance Regional Forum, other nature groups, the Royal Flying Doctor Service and I volunteered at the Museum where I could pass on my archival skills. As a volunteer birdwatcher I am a member of the Technical Advisory Group for Lake Warden and Lake Gore and I get involved with shorebird surveys, Hooded Plover surveys, the Great Cocky Count and the Starling Watch.

I have chosen to volunteer in the natural resource management field because of my love of nature and I like making a commitment to something that has a real purpose and value.

I am a list maker so I love the scientific side and particularly enjoy volunteering for survey work and tasks needing a detailed and careful eye. I enjoy being part of a diverse group of different ages, backgrounds interests in the wide variety of aspects of being a volunteer. Some people join because they are a "people-person" and enjoy the social interaction, others like to get out and about to appreciate nature and people like me get a lot of satisfaction from collecting and collating important data to form part of national databases to guide future strategies.

It makes me feel useful and appreciated when I get feedback on how the data I collect is being used and it gives me better insights into how my skills can be used to the best advantage.

I want to continue to share my skills built up over a lifetime and am a great supporter of educational programs and NRM education kits. I am always thrilled when high school students remember being inspired by talks I gave them in primary school. I intend to continue my work with the Esperance Bird Observer's group to share knowledge with the next generation and continue to get involved in radio broadcasts, seminars and workshops. I would like to continue working on the guardianship of Lake Warden with the Bird Group and work to encourage some additional younger tech-savvy people to get involved to safeguard this important wetland.







Image: Tyler & Kaiden Simpson



*cultural
heritage*

5.2 cultural heritage

ASPIRATION: All natural resource management actions in the South Coast region recognise and respect natural cultural heritage values. Aboriginal practices, spiritual and cultural values are considered across all themes, to support conservation and protection of our natural environment.

The Cultural Heritage theme has focussed primarily on developing the capacity of Aboriginal people within the region to manage priority natural resource sites of cultural significance. Aboriginal involvement in natural resource management has greatly expanded with active engagement of Aboriginal communities across the region. The Aboriginal Reference Group has been important in guiding implementation of the previous Strategy and formation of *Southern Prospects 2019-2024*. With their guidance, Cultural Heritage is now recognised as a bridging theme with two consistent outcomes included across each of the biophysical themes of Land, Water, Coastal and Marine and Biodiversity.

5.2.1 Principles

The principles which guide our approach to cultural heritage are:

- recognition of the value of cultural knowledge
- respectful involvement and use of information

- building capacity for culturally appropriate processes
- identification of areas of key interest
- communication using agreed protocols, with openness and transparency.

Sustainable and responsible management of natural resources can only be achieved through acknowledgement and understanding of the region's cultural heritage. For the purpose of the strategy, cultural heritage will cover both Aboriginal and non-indigenous assets and values and the threats from degrading processes identified in other theme areas. The cultural heritage values of significant places can influence the use and conservation of environmental assets in these areas. Aspects relating to Aboriginal culture are highlighted in some places as consideration of this aspect has been identified as a gap in the past.

5.2.2 Current context

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 on conserving and protecting listed values.

The Department of Planning, Lands and Heritage is the WA State agency responsible for administering legislation that affects the well-being of Aboriginal people. Amongst the





legislation administered by the Department is the Aboriginal Heritage Act 1972, which details specific responsibilities related to the management and protection of heritage sites.

There are more than 600 registered sites of Aboriginal 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.

Through the Australian Heritage Commission Register of National Estate, the Heritage Council of WA and the Department of Planning, Lands and Heritage, sites can be nominated to be included on the relevant cultural heritage databases. 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.

Aboriginal people hold generational knowledge of significance sites that are both recorded and unrecorded. Unregistered cultural or archaeological 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.

Aboriginal cultural heritage exists throughout the lands and waters of Australia and all aspects of the landscape are important to Aboriginal people. The rights and interests of Aboriginal 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 Aboriginal people. Maintaining Aboriginal heritage will ensure a continuous role for anyone interested in caring for country which is beneficial to everyone. Prioritisation of cultural heritage assets and actions requires additional consultation with Aboriginal groups. This will happen through the development of funded projects and continue with the implementation of *Southern Prospects*.

Aboriginal communities and their organisations often have limited resources to directly manage natural resources because generally their focus is on meeting more immediate and different local priorities such as maintenance of community infrastructure, overcoming housing shortages and health issues. The integration of cultural needs within all natural resource management projects therefore provides a useful way to ensure that activities are culturally appropriate and that the learnings of traditional ecological knowledge are applied.

The natural land and 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, while different to Aboriginal connection, also needs appropriate consideration given both are forms of attachment affected by the same degrading processes.

A variety of issues, problems and circumstances have been identified that affect Aboriginal communities and land managers participating in natural resource management. These include:

- In many areas the passing of Aboriginal Elders is resulting in the loss of traditional knowledge.
- There is often a lack of the necessary time and resources required to carry out meaningful involvement and consultation with Aboriginal stakeholders.
- There is often a lack of community awareness, skills and capacity to deal with existing new and emerging problems.
- There is a perception in the Aboriginal community that when consultation for natural resource management issues occurs the recommendations made by the Aboriginal community are not always acted on. This has a negative impact on future involvement managing natural resources.
- There is limited commercial base to support natural resource management. Traditional owners and managers need funding and other resources to deal with these issues.

To inform the development of *Southern Prospects 2019-2024*, community consultation surveys and workshops were convened during 2018 to seek feedback on *Southern Prospects 2011-2016* and the emerging issues and opportunities facing the south coast community in relation to natural resource management. Feedback from this process identified key enablers and barriers to achieving the Strategy outcomes. These are summarised in Figure 5.3 below.

Heritage Places

Enablers

- 40 plus Cultural Heritage surveys and site visit reports for cultural heritage locations and ongoing consultation with Aboriginal community.
- A desire for sites to be protected.

Barriers

- Not all sites are registered through State Government.
- Access to private land/national parks.
- Lack of Indigenous Protected Areas.

Sustainable Enterprises

Enablers

- National and State Indigenous Procurement Policy
- Establishment of the Noongar Chamber of Commerce.
- Indigenous Business Australia limited support.
- Commitment from South Coast NRM to develop and support enterprises with Aboriginal people.

Barriers

- Lack of funding in NRM.
- Lack of community capacity.
- Big expectation on the Aboriginal community.
- Concerns about the loss of intellectual property.

Traditional Ecological Knowledge

Enablers

- Noongar/Nyungar family field trips are continuing.
- Aboriginal corporations and native title groups are recording traditional knowledge.
- Protection and restoration of sites continues.
- Desire from the NRM community to integrate traditional ecological knowledge into managing land.
- Joint management from State Govt. and Aboriginal community.

Barriers

- Lack of resources.
- Some Aboriginal people reluctant to share knowledge.
- Loss of traditional knowledge.

Capacity

Enablers

- Native Title settlements in the eastern part of the region.
- Aboriginal Rangers in east and west of the region.
- Desire by Aboriginal community to be involved in NRM but at the beginning of projects and as partners (design and delivery) not just consulted.

Barriers

- Lack of capacity and funding.
- Limited job opportunities.
- No Native Title settlement in the western part of the region.
- Short funding cycles for Ranger programs.
- Lack of capacity of Aboriginal organisations to partner in projects.
- Inability to access Commonwealth Working on Country ranger program.

Engagement

Enablers

- Strengthen relationships and trust via consultation.
- Native Title work.
- Review of Heritage Act.
- Support of NAIDOC week.
- Aboriginal youth programs.
- Cultural awareness programs.
- Willingness of the Aboriginal community to develop protocols.
- Aboriginal Engagement Guidelines developed for South Coast NRM and partners.

Barriers

- Reluctance to disclose information.
- Lack of funding and agency support.
- Capacity to facilitate.
- Conflicts within the community.
- Noongar/Nyungar community cautious to engage.

Figure 5.3. Summary of key enablers and barriers identified by the Aboriginal Reference Group.

Cultural Heritage Key Achievements 2011-2018:

The Key Achievements delivered to support Cultural Heritage during 2011-2018 are summarised below.

1 Engaging Aboriginal people in NRM

Aboriginal people have been engaged in a range of activities across the broad spectrum of natural resource management issues and priorities identified in *Southern Prospects*. Examples include:

- Cultural awareness events delivered and supported in partnership with the Noongar/Nyungar community and a Cultural Heritage Field Guide publication developed.
- Dual naming project delivered through research, validation and communication of Noongar place names of landscape features in the western part of the region. The Noongar place names and their significance were explored, communicated and promoted to the wider community through a weaving project and documentary produced by Aboriginal Youth.
- Development and installation of interpretive signage at Point Possession, Oyster Harbour Fish Traps and Walitj Meil Walk Trail has helped to raise awareness of cultural values at these important locations.
- Noongar family field trips have been facilitated at Two People's Bay, Stirling Range National Park, Lake Pleasant View and Twin Creeks Nature Reserve engaging Aboriginal people in partnership with Department of Biodiversity, Conservation and Attractions.
- Strong & Proud *Wumbudin koul-yee-rah* after school recreation program engaged Aboriginal youth and assisted them to connect with community, culture and country.
- Noongar Kaartijin in Schools program facilitated Noongar Elders and educators to visit schools and lead excursions sharing personal history, bush foods and medicine, artefacts, creation stories, sites of significance and Noongar respect for the environment.
- Kalgan Hall Menang Complex is one of the oldest continuous occupation sites in the world. Oral histories of eight Elders were recorded, which provided background for the Kalgan River Crossing Interpretation Concept plan.

2 Protection and Restoration of Cultural Locations

The protection and restoration works have been guided by the Cultural Heritage Land and Sea Management Plan, an interactive on-line map developed through consultation with Traditional Owners and Elders. An Aboriginal works team and Aboriginal Green Army teams have been engaged to carry out much of the recovery works including:

- Invasive weed control to protect cultural sites of significance.
- On-ground works using traditional ecological knowledge at Lake Warden.
- Protection and restoration works delivered at 9 culturally significant locations to protect several EPBC species.

3 Training

Training has been provided to Aboriginal people to achieve accreditation in chemical use and safe handling, chainsaw operation and maintenance, tree felling, senior first aid and mentoring. In addition, three Aboriginal School Based Trainees were supported to gain a Certificate II in Business. The two all Aboriginal Green Army teams hosted by South Coast NRM have provided employment opportunities and a career pathway in NRM for eleven young Aboriginal men.

4 Sustainable Indigenous Enterprises

Indigenous enterprises based on NRM have been supported and mentored through:

- An Aboriginal business forum was held in 2015 which identified three business streams within the natural resource management context, environment services, cultural tourism and bush products. This was followed by an Aboriginal business forum and bush food industry field day in 2017.
- 4 Aboriginal enterprises have been supported with training, business mentoring and advice, capacity building and financial help for infrastructure, equipment, study tours and business planning and setup. Other individuals considering starting a business have also been given advice and early support with the intention of their business ideas coming to fruition at a later date.
- 10 Aboriginal people have received tour guide and hospitality training and many others that have learnt more through attending familiarisation tours, workshops and one-on-one advice.

5.2.3 Future Directions

The future directions contained in this strategy and presented as the 25-year aspirations, five-year outcomes and key actions, are based on the review processes conducted by South Coast NRM and its Aboriginal Reference Group with input through regional community consultation processes. The Aboriginal Reference Group modified the Outcomes from the previous *Southern Prospects Strategy* and identified Key Actions to initiate that support delivery of these outcomes over the five-year horizon of this Strategy. These changes are in response to the issues regarding loss of traditional knowledge, loss of cultural heritage and identity, opportunities for establishing profitable new enterprises (eg. Tourism), creating employment and career pathways and engaging with young Aboriginal people.

The Adaptation Pathways process has been applied to these revised Cultural Heritage outcomes (Fig. 5.4) that include key actions to be considered in implementation of the strategy and indicative timeframes. Note that two outcomes, Improved Application of Traditional Ecological Knowledge and Protection of Heritage Places, are now also included in each of the four biophysical themes to encourage further integration across all themes.

The Adaptation Pathways framework will support the preparation of the Investment Plan by South Coast NRM and help focus investment towards priority actions. It is intended that the key actions be reviewed by South Coast NRM and the Reference Groups to ensure the Strategy continues to be responsive to emerging issues and opportunities, whilst

delivering against the regional natural resource management priorities within the resourcing, capability and capacity available.

The symbols applied in the Adaptation Pathway aim to describe the enabling process for the key actions. These include whether the action is a review process, requires a decision to proceed, connects to other actions, is in a position to commence if funding and resources are available, and when actions are likely to be completed. The shading indicates the proposed commencement and duration of the key actions and provides a guide to phasing and sequencing of these actions.

Aspiration (25+ Years)

All natural resource management actions in the South Coast region recognise and respect natural cultural heritage values. Aboriginal practices, spiritual and cultural values are considered across all themes, to support conservation and protection of our natural environment.

- Protected natural cultural heritage places in partnership with the Aboriginal community.
- Community recognises, values and incorporates Aboriginal traditional ecological knowledge, land management practices and connection to country.
- Aboriginal community with capacity to engage in all areas of NRM including managing country.

Outcome	Key Actions	2019	2020	2021	2022	2023	2024
H1. Improved information: Support the retention of traditional ecological knowledge and land management practices with respect for intellectual property.	1. Review and develop intellectual property rights.	?			☰		
	2. Identify and record traditional ecological knowledge and integrate into property management plans.	➡			☰		
	3. Update existing cultural heritage land and sea management plan.	☰	☰	☰	☰	☰	☰
H2. Improved understanding of Climate Change: Identify current and potential Aboriginal cultural sites at risk of climate change impacts.	1. Undertake desktop review of sites to identify risks associated with Climate Change.			➡	▽	?	
	2. Develop adaptation/mitigation plans for high risk sites.					➡	
H3. Protection of heritage places: Identification and protection of significant cultural natural heritage places in partnership with the Aboriginal community.	1. Identify priority sites and develop and implement management plans.		?	➡			
	2. Identify and map opportunities for landscape scale projects and activities in consultation with the Aboriginal community.		➡				
	3. Develop a demonstration project to raise awareness of the significance of cultural heritage and promote opportunities to replicate the approach.				➡		
	4. Support the progression of joint management in Parks and Wildlife managed lands and local government reserves.	➡					



Outcome	Key Actions	2019	2020	2021	2022	2023	2024
H4. Sustainable Aboriginal enterprises established: Support the establishment of sustainable Aboriginal enterprises based on NRM principles by Aboriginal communities.	1. Continue to support the development of sustainable business in areas of cultural tourism, environmental services and bush food production.	➡					
	2. Support the development of a Chapter of Noongar Chamber of Commerce within the South Coast.		➡				
	3. Host a business forum to promote opportunities.			➡			
H5. Improved application of traditional ecological knowledge: Apply the use of traditional ecological knowledge (TEK) to South Coast community projects with respect for intellectual property.	1. Consult with other themes to advise opportunities to integrate TEK.	➡					
	2. Support and improve community capacity to integrate TEK into land management practices and projects.	⬆	➡				
	3. Improve the capacity of the community to engage.	➡					
H6. Improved Aboriginal community capacity: The Aboriginal community has the capacity to be actively involved in NRM across the region.	1. Improving knowledge and capacity of young Aboriginal people.	➡					
	2. Support Aboriginal ranger programs across the region and support careers and employment in NRM for Aboriginal people.	➡					
	3. Support native title groups to build capacity to get back on country and manage their land.	➡					
	4. Build the capacity of the community to engage people in NRM.	📋	➡				
H7. Improved awareness and education: The wider community understands, respects and is involved in Aboriginal cultural heritage.	1. Support the Aboriginal community to be actively involved in sharing knowledge to increase cultural awareness.	➡					
	2. Provide opportunities to improve the understanding of cultural heritage asset values and their management by the community, land managers and NRM practitioners.	➡					
	3. Support the adoption of dual naming across the region.	📋					
H8. Develop agreed protocols: Protocols continue to be established for Aboriginal engagement and partnerships in NRM.	1. Ongoing review and development of Protocols.	📋	➡				
	2. Develop MOUs with Native Title groups and Aboriginal Corporations.	➡					

LEGEND: ? Decision Point 📋 Review ✓ Complete ➡ Commence ⬆ Linking Action

Figure 5.4. Adaptation Pathways - Cultural Heritage Measures and Indicators

5.2.4 Measures and Indicators

A series of potential indicators and measures were recommended by *Southern Prospects 2011-2016* (Table 5.2). These continue to be relevant and act as a guide to assist in setting targets for projects and programs and allow for standard approaches to measurement. Indicators should be selected according to the principles of cost, simplicity, consistency, practicality and capacity to deliver information across the region. These measures will form the base inputs for monitoring and assessing performance for review by South Coast NRM as part of its normal financial and business reporting processes and support annual reporting of Strategy achievements.

Table. 5.2. Potential Indicators – Cultural Heritage

Asset	Indicator	Measure
Aboriginal Cultural Heritage (knowledge and places)	1. Aboriginal cultural heritage considered and incorporated into NRM planning and projects.	<ul style="list-style-type: none"> ➤ Number of Aboriginal people and organisations consulted and involved in natural resource management activities. ➤ Number of cultural projects, training sessions undertaken. ➤ Number of jointly managed areas. ➤ Number of Aboriginal enterprises based on NRM supported. ➤ Number of Aboriginal people receiving training and employment in natural resource management.
Other Cultural Heritage (knowledge and places)	2. Other cultural heritage considered and incorporated into NRM planning and projects.	Number of people and organisations: <ul style="list-style-type: none"> ➤ Consulted and involved natural resource management activities. ➤ Number of cultural projects, training sessions undertaken.





case study

Strong and Proud - *Wumbudin koul-ye-rah*

Targeted program for Aboriginal youth

The Strong & Proud '*Wumbudin koul-ye-rah*', after school program provides Aboriginal youth, between the ages of 12-17 years old, with culturally appropriate activities that connect them to their culture and country. The program is built on the foundation that being strong in culture and connection to country assists Aboriginal youth to have pride in themselves and their community.



Program successes

- Pre and post program surveys and evaluations showed all students increased their cultural awareness and environmental knowledge.
- High achieving participants have gone on to become a mentor for subsequent programs
- A significant change in anti-social behaviour and improved attitudes to work/schooling was recorded by project officers, mentors, parents and teachers.
- Career pathways have been developed by participants

Enduring outcomes have been achieved by carefully matching expertise with local knowledge through strong partnerships, mentoring and peer networking. A collaborative approach, underpinned by strong project management, has delivered better community-supported outcomes for the Region.

Culture and connection

Ongoing community consultations identified the need for a targeted program for at risk disengaged Aboriginal youth in Albany WA to:

- Learn about culture and connection to country which can be lacking in families experiencing difficulties.
- Build leadership skills and confidence to deal with the mainstream world.
- Increase physical activity and achieve improved health outcomes.
- Access active and positive after school sport and recreation that connect them to the community.
- Prevent Aboriginal youth from dropping out of school and engaging in anti-social behaviour.
- Improve school attendance through incentives.

Partnering for results

The Cultural team within South Coast NRM coordinated the program in partnership with key organisations including Southern Aboriginal Corporation (SAC), Department of Education (DET), Great Southern Employment Development Committee (GSEDC), Wanslea Family Services Great Southern and Wirrpanda Foundation.

- Program duration: 2014 - 2018 (pilot program and continuing).
- Program content: 8 weeks of after school activity per semester, residential workshop and weekend challenges.
- Location: Albany, Western Australia.
- Annual Participation rate: 88 students (2016).

A project steering group was made up of representatives from the partner organisations, Albany Senior High School (ASHS) and North Albany Senior High School (NASHS) to provide strategic advice and ensure the project achieved its aims. The Cultural team comprised Aboriginal employees, senior staff with teaching experience and project officers experienced in the delivery of similar projects. Community sport and active recreation groups led the sport and recreation activities and the Aboriginal community assisted with the sharing of cultural heritage knowledge and values at the activity locations. Environmental organisations provided restoration and protection activities at the locations where possible. Two Aboriginal mentors supported the participants throughout the program and helped with identify and mitigate issues.



Activities

The Strong & Proud program was developed around Noongar seasons and runs during school semesters. It involves Aboriginal youth, Noongar Elders, families and community on country in 8 weeks of after-school activities, a mid-semester Noongar family residential workshop, a weekend activity challenge and a wrap up and awards session.

The program is built around relevant youth engagement activities for the Noongar Seasons and the following strategies:

After school activities – Aboriginal youth can only attend if they have attended school that day. They are picked up from school and dropped home and provided with a healthy afternoon tea. The program of activities is a 'taste test' of environmental, cultural and recreational activities led by experts. They are provided with cultural knowledge and practices to assist with building self-esteem and providing a positive and culturally accepting environment. Team building elements are incorporated in all activities to assist with developing interpersonal and leadership skills.

A Noongar family camp – Aboriginal youth who demonstrate improved school attendance and behaviour are invited to attend the camp, providing positive inter-generational and cultural experiences. They learn about their culture and country through positive activities and experiences in the environment and are involved in active recreation and team building activities. Separate activities are provided to allow for men's and women's business guided by the Elders.

Weekend activity challenge – As a culminating activity, Aboriginal youth are challenged in one of the recreation activities e.g. Munda Biddi mountain bike ride.

Noongar seasons

Birak (December - January) The hot easterly winds blow during the day. Noongars would burn scrubland to force animals into the open for hunting.

Bunuru (February - March) It is very dry during this season. Noongars moved to the coast and estuaries as fish was a large part of their seasonal diet.

Coastal activities: surfing, stand-up paddle-boarding, fishing, snorkelling and bush walking.

Djeran (April - May) The weather becomes cooler with winds from the south-west. Noongars continued to fish and collect plant bulbs and seeds.

Makuru (June - July) During this time, Noongars moved inland to hunt once rain had replenished inland water resources.

Inland activities: mountain biking, planting, fauna surveys, identifying Indigenous artefacts, orienteering and bush survival skills.

Djilba (August - September) The weather becomes warmer. Traditionally roots were collected and emus, possums and kangaroos were hunted.

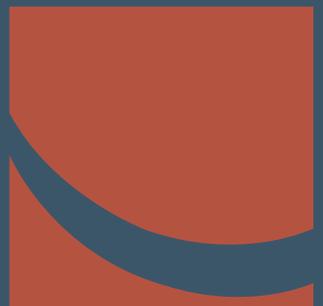
Kambarang (October - November) Noongars moved onto the coastal plains where frogs, tortoises and freshwater crayfish were caught.

Waterways activities: canoeing, fishing, seed collection, water monitoring, sailing and learning about fish traps.





Image: Murray Wells



land

6. land

Sustainable and regenerative management of land resources

The section describes the importance of land-based assets in the management of natural resources and the principles that guide the management and delivery to achieve the desired outcomes and aspirations.

ASPIRATION: *Our region is recognised for its best-practice sustainable land-use, with farming closely aligned to the land's capability and supported by improved and protected base resources (soil, air, biodiversity, water).*

6.1 Principles

The principles which guide our approach to land management include:

- land use should be within its capabilities, to avoid degrading processes
- support for an intergenerational approach to land use and planning that enables land managers to continue as key custodians of much of the region's land area
- publicly funded actions taken to mitigate threats need to benefit the broader community
- natural resource management is inexpensive 'insurance' against accelerated decline of precious assets
- integration of natural resource management as early as possible into land use planning processes (e.g. regional strategies, local planning strategies, local planning schemes and amendments).

The sustainable and regenerative management of land resources is critical in ensuring improved primary productivity, enhanced soil health, climate resilience whilst minimising the impact of invasive species such as feral animals and weeds. Land management has a significant influence on the other biophysical themes, for example the management of erosion on farms reduces sedimentation and nutrient export into waterways and coastal environments and the management of agricultural pests can also reduce the threat to native species.



6.2 Current Context

The South Coast region covers approximately 8.6 million ha, 70% of which is classified as agricultural land. There is also a significant pastoral/rangelands area in the eastern portion of the region. Healthy soils are essential to support the regions primary growth, biodiversity and to minimise the impact of erosion, salinity, soil acidity, nutrient export and sedimentation to waterways and the marine environment. Primary production, such as agriculture, fisheries and forestry, contribute significantly towards the region's economic and community structure. Ongoing efforts are required to continually improve and adapt practices to incorporate new knowledge, techniques and responses to threats that benefit soil health and productivity and the other theme areas. It is important to structure natural resource management investment to support the agriculture sector manage risk and change in the short to medium term recognising that many risks will cause a decline in resource condition and productivity in the longer term if no action is taken. The cost of remediation, lost productivity and loss of natural resource and environmental assets far outweighs the investment required to build capacity, support implementation of improved practice and protect these important agricultural, cultural, social and environmental assets.

The threats to sustainable land use have been well documented in *Southern Prospects 2011-2016* and the *South Coast Snapshot (2016)*, with the latter being informed by the Report Card on sustainable natural resource use in agriculture (DAFWA, 2013). The key threats identified include hydrological change resulting from land-clearing, salinity risk, subsurface acidity, water repellence and phosphorous export, with lower rated risks being wind erosion, waterlogging, structural decline and subsurface compaction.

Climate variability is an ongoing challenge for land managers. The Climate Change in Australia Project prepared an analysis of climate science and developed future climate projections across Australia, grouping the NRM regions into eight clusters. The South Coast NRM region lies within the Southern and South West Flatlands (SSWF). The Southern and South-western flatlands cluster report provides the details regarding future climate projections for the region. A summary of the climate projections relevant to the Land theme for the SSWF are provided below (Fig 6.1.). Access to detailed information and data regarding the projections to 2030 and 2090 for the region can be accessed at www.climatechangeinaustralia.gov.au.



Temperature

- › Average temperatures will continue to increase across all seasons.
- › There will be an increase in the temperature reached on hot days, an increase in the number of hot days and an increase in the duration of warm spells.
- › Frost risk days (minimum temperatures under 2 °C) are expected to decrease.



Rainfall

- › A continuation of the trend of decreasing winter rainfall.
- › Decrease in spring rainfall.
- › Changes to rainfall in autumn and summer are unclear.
- › Increased intensity of heavy rainfall events.
- › Drought duration expected to increase.
- › Increased evaporation rates and reduced soil moisture and runoff.



Fire Risk

- › A harsher fire-weather climate in the future.
- › The magnitude of the change is strongly dependent on the summer rainfall projection.

Figure 6.1. Future Climate Projections relevant for the Land Theme [Hope et al., 2015; CSIRO and Bureau of Meteorology, Climate Change in Australia website (<http://www.climatechangeinaustralia.gov.au/>), cited 2018]

These future climate projections suggest with high confidence that there will be increasing variability in climate, which is likely to be a major factor impacting on the land resource in the South Coast region in the near future. There has already been a strong trend to warmer temperatures and lower rainfall in parts of the region. The Climate Addendum (2016) identified the interactions of these climate projections against the key threats to 2030. This analysis has been adapted to compare against the present situation in Figure 6.2.

The region's farmers are already skilled in adapting to variable seasons, but there is strong evidence that climate variability is increasing and this will require even greater flexibility and strategies for resilience. The region's wide range of rainfall also provides excellent opportunities for farmer-to-farmer sharing from those that have already experienced low rainfall outcomes. Providing there are no climate shocks and the change in climate follows the current projections to 2030, there are available options and capacity for most South Coast farmers to respond and adapt. However, if there is no

mitigation and greenhouse gases continue to rise, adaptation beyond 2030 will be a much greater challenge.

With these challenges it is important to continue efforts in developing capacity, new knowledge and provision of technical advice and support to land owners. To underpin this action, coordination across all relevant organisations is required as is a common and consistent information base to support communication and response to the latest, credible information to support the agriculture sector to respond effectively and efficiently.

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 advisors (e.g. agricultural consultants). South Coast NRM and its partners continue to be well placed to be key promoters of integrated farm and land use planning and delivery of training and technical support within the region.

Issue	Problem Definition (Southern Prospects 2011-2016)	Current Status (South Coast Snapshot, 2017 and DAFWA, 2013)	Interactions with Climate Change to 2030 (Climate Addendum, 2016)
Soil Acidity	Subsurface acidity is a significant threat to agricultural land condition within the region due to the low buffering capacity and inherently low pH of the sandy top soils. Addition of acidic fertilisers, removal of produce and nitrogen leaching is generally acidifying and occurs extensively.	The trend in soil acidification is that of a static or worsening condition.	Sub-soil acidity reduces water use efficiency, which will become increasingly important in dry seasons. Projections of lower rainfall may reduce leaching in the soil profile and potentially improve soil acidity.
Water Repellence	Water repellence is considered to be a high risk to agriculture, especially in areas with sandy topsoils such as the Esperance Sandplain, Albany Hinterland and Fitzgerald Biosphere sub-regions. The impact from water repellence can include reduced water infiltration, which can exacerbate other risks, including nutrient and chemical loss in run-off and water erosion.	The trend in water repellence is mostly stable across the region, noting that the condition ranges from poor to very poor, with a slight decline in the western part of the region.	Management of water repellence will become more important with an increase in dry seasons. Measures, such as stubble and other biomass retention, which increase soil carbon and reduce erosion risk, also increase water repellence. Recent research showed an increase in water infiltration under stubble retention overrode the water repellence effects on soil moisture (Roper et al. 2013).
Wind Erosion	Loss of top soil reduces productivity and can have off-site impacts that affect the community, environment and waterways.	Wind erosion is a seasonal hazard and the trend is variable.	Climate variability and a drying climate will increase wind erosion hazard without improved management practices. Maintaining groundcover will be important.
Water Erosion	Water erosion has increased predominantly where lands have been cleared for agriculture and other purposes. Sediments are mobilised during rain events.	The trend in water erosion continues to gradually decline across the region although the level of hazard has diminished during the growing season because of declining winter rains, increased stubble retention and adoption of reduced tillage practices.	Declining winter rains predicted with a changing climate will reduce the hazard of water erosion. However, the projected increase in intensity of heavy rainfall events may counteract this.
Salinity and Groundwater trends	Salinity causes reductions in crop yield, area of arable land and land capability. Salinity also physically and financially impacts rural infrastructure, public and private water resources and biodiversity. Salinity is a state-wide issue and is managed under the State Salinity Strategy (2000). The strategy was reviewed in 2012, which recommended continuation of the Strategy with a watching brief on key catchments at risk, including the Denmark River.	Despite a decline in rainfall most water tables in areas cleared for agriculture continue to rise and present a moderate to very high risk within the region.	Risks are different in different hydrozones (DAFWA, 2013). The impact of rainfall on salinity is uncertain in the zone of ancient drainage. Salinity equilibrium may be delayed because of lower rainfall (DAFWA, 2013). Some areas, such as the North Stirlings, are approaching equilibrium. With less rainfall, there is potential long-term for less flushing of salinity in high rainfall, high slope areas. There are risks for increased stream salinity in western areas and areas that have not reached equilibrium.

Issue	Problem Definition (Southern Prospects 2011-2016)	Current Status (South Coast Snapshot, 2017 and DAFWA, 2013)	Interactions with Climate Change to 2030 (Climate Addendum, 2016)
Phosphorous Export	Phosphorus export has been assessed as a high risk for soils in the Albany Hinterland and Kent Frankland sub-regions, largely due to the low relief landscape. 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. This has been observed in Wilson Inlet, Torbay Inlet and Oyster Harbour, which have a significant level of eutrophication.	Soil P fertility in excess of optimal range. This could change to well in excess with continued P application, however ceasing P application would see P levels very slowly decrease to optimal levels. Most of the nutrient loads originate from diffuse agricultural sources including grazing, cropping and some farm forestry.	Not considered.

Figure 6.2. Summary of Land key threats, current status and projections under 2030 climate scenarios.

Image: Adrian Elsner



Land Key Achievements 2011-2018

The Key Achievements delivered to achieve the Land outcomes during 2011-2018 are summarised below.

1 NRM Planning for Climate Change

This project updated regional NRM plans to incorporate climate change impacts and adaptation approaches. This engaged over 300 people at numerous meetings and events. The outcomes included the production of a climate adaptation addendum to *Southern Prospects 2011-2016*, maps and several thematic background papers.

2 The Royalties for Region Carbon Farming Project

This project was designed to build capacity of land managers to increase awareness and enable uptake of carbon farming opportunities as they arise and hence to grow prosperity through diversification of land management activities. Completion of this project resulted in 37 meetings and field days that engaged with 1,849 attendees and 9 partner organisations, 12 fact sheets, how-to-guides and case studies and 13 media releases.

3 Southern Soils

The Southern Soils project aimed to develop sustainable land management practices through priority setting, benchmarking of soil quality and land condition to increase understanding of local soil conditions and promoting best management practices. This project allowed for the completion of numerous soil health monitoring sites and several projects aimed at remediating soil acidity and wind erosion. Innovative trials were supported to investigate the effects of perennial fodders for soil erosion stabilisation, non-wetting soils, biological fertilisers to reduce nutrient leaching and biological agents to improve soil biology and soil carbon.

4 Climate Action on Farms

This project was implemented to increase carbon sequestration and mitigate loss by encouraging farmers to adopt simple practices to make their enterprises more profitable and sustainable. The Climate Action on Farms project empowered farmers to adopt behaviour change strategies in a rapidly evolving carbon economy. This project allowed for the:

- comparison of soil carbon profiles of perennial, annual and cropping land management systems
- comparison of the sequestration of soil carbon from these land management systems were then assessed
- measurement and monitoring of the sequestration of soil carbon with increasing establishment time
- restoration of a degraded site to demonstrate carbon sequestration and mitigation on marginal farmland
- cropping of an existing perennial pasture to show the integration of carbon in an annual production system
- integration of alley farming in a traditional system to show the benefit of carbon sequestration
- trial of herbicides to determine the impact on re-establishment of perennial species in annual cropping systems.

5 Southern Soils – best practice for sustainable farms in the South Coast of WA

This project developed sustainable land management practices working with landholders across 504 ha, by developing increased understanding of local soil conditions and long term management options for different agricultural enterprises. The project achieved practice change working with 412 farm entities. Southern Soils established a series of demonstrations and trials to build industry and community awareness, knowledge and skills. The project prioritised marginal farm land vulnerable to environmental degradation (erosion, soil acidity) and directly invested into on-ground works to ameliorate these impacts. All demonstration and trial works are associated with improving existing knowledge and skills.

The project also improved the adaptive capacity of 418 land managers to protect land resources from a changing climate. This was achieved by broadening knowledge and skills through events, training, reviews and on ground demonstration activities. Most land managers are adopting good practices to maintain production and make their farms more weather resilient (e.g. improved decision timing management for stock) and have added evidence based practices to holistic farming. The project also improved the adaptive capability of Local Government Authorities to amend and administer policies to address climate change.

6.3 Future Directions

The future directions contained in this strategy and presented as the 25-year aspirations, five-year outcomes and key actions, are based on the review processes conducted by South Coast NRM, the Land Reference Group and community workshops. The Land outcomes have been modified from *Southern Prospects 2011-2016* to reflect the feedback through the consultation process as well as to include those outcomes identified in developing the Climate Adaption Addendum (2016). The Adaptation Pathways process has been applied to the revised Land outcomes (Fig. 6.3) that includes key actions to be considered in implementation of the strategy and indicative timeframes.

Issues identified include improving the resilience of the farm system, creating value-add industries for farm products and ensuring existing risks of groundwater, salinity and soil health continue to be managed and the consideration of off-grid energy options. The assessments undertaken to identify locations for agroforestry in response to climate are also useful to determine suitability of plantings for carbon abatement and other purposes (for example biodiversity, tree farming, biomass production). These frame the potential adaptation and mitigation measures that could reasonably

and feasibly be implemented across the region. Consideration of alternative approaches to support implementation of such programs that involve youth and Aboriginal employment schemes would have benefits in social outcomes beyond mainstream natural resource management.

The Adaptation Pathways framework will support the preparation of the Investment Plan by South Coast NRM and help focus investment towards the priority actions. It is intended that the key actions be reviewed by South Coast NRM and the Reference Groups to ensure the Strategy continues to be responsive to emerging issues and opportunities, whilst delivering against the regional natural resource management priorities within the resourcing, capability and capacity available.

The symbols applied in the Adaptation Pathway aim to describe the enabling process for the key actions. These include whether the action is a review process, requires a decision to proceed, connects to other actions, is in a position to commence if funding and resources are available and when actions are likely to be completed. The shading indicates the proposed commencement and duration of the key actions and provides a guide to phasing and sequencing of these actions.

Aspiration (25+)

1 Improved landscape resilience will be achieved through:

- Better water balance via developing and implementing appropriate management options for containment, adaptation or restoration of hydrological systems in priority catchments.
- Better nutrient and chemical control by minimising nutrient and chemical export from primary production.
- Reducing threats from declared pest plants and animal species and diseases while maintaining ecological balance.
- Adoption of initiatives to improve the consideration between energy and carbon production that also benefit agricultural systems.
- Improved social, environmental, economic and cultural outcomes contribute to managing natural resources at a landscape scale.
- Demonstrating the high levels of custodianship used by land managers to the broader public to address incorrect perceptions of land management.

2 Improved and protected land resources will be achieved through:

- Land managers and other partners developing best-practice sustainable and profitable production systems with a long-term perspective on the condition of the resource base.
- Improving the information-base for stakeholders that manage soils and land and by monitoring the effectiveness of different management practices. This will be supported by improving the understanding of the information-base, including the human elements such as how individuals, communities and businesses are influenced and what the impact of knowledge-drain is having on land management practices.
- Increased the use of best-management practices that improve soil health, reduce offsite impacts and address biosecurity/environmental pests.
- Ensuring primary production systems and practices are appropriately matched to land capability.
- Increasing the range of commercial land use options with beneficial environmental values.
- Value-adding opportunities that decrease reliance on single commodity and enhance the financial capacity of land managers to proactively manage their natural resources.
- Increasing the capacity to predict and manage change (including climate change, market change, international relationships, technology, and resource changes).
- Improving our understanding of the relative private and public benefits generated through public investment and communicating this to key stakeholders.

Outcome	Key Actions	2019	2020	2021	2022	2023	2024
L1. Improved knowledge and understanding of priority land assets: Review and establish South Coast community's focus for priority land assets and condition measures and increase understanding of land assets management by maintaining, supporting and where appropriate expanding, adaptive management, land asset research and monitoring programs with benchmarks in priority areas.	1. Review and identify priorities.						
	2. Review and collate existing datasets and develop and maintain existing monitoring sites to measure and assess changes in land assets.						
	3. Facilitate and/or support workshops and community NRM planning sessions to promote understanding of soil health issues, management responses and new research and knowledge for priority land assets.						
	4. Support community groups, grower groups and land managers to use indicators to measure improvement and review benchmarks.						
L2. Improved climate change adaptation and mitigation responses: Develop and implement adaptive responses to climate change in priority areas, in partnership with industry and land managers.	1. Build upon the NRM Climate Change information and identify mitigation and adaptive opportunities for land managers and industry.						
	2. Climate predictions, risk and vulnerability analyses completed for South Coast region and priority land assets that are reviewed regularly.						
	3. Improve knowledge and awareness of climate drivers and incorporating key climate triggers and indicators to inform management decisions.						
L3. Land degradation is reduced through effective on-ground works for soil health: Contain/reduce land degradation risks, with a focus on the key issues of salinity, acidity and water balance, for priority land assets by implementing effective management.	1. Implement the Regional Agriculture Landcare Facilitator project.						
	2. Develop information, tools and demonstration sites.						
	3. Conduct workshops and training for community groups and land managers.						
	4. Support on-ground activities to ameliorate identified soil threats.						
L4. Impacts of invasive species are reduced: Identify, prioritise and control/reduce invasive species that impact land resources with quantifiable targets for sub-regions that support integrated management.	1. Develop invasive species regional strategy.						
	2. Support on-ground works to address invasive flora and fauna species risks.						
	3. Communicate and develop knowledge and skills of the community and land managers to manage invasive species.						
L5. Integrated land use planning with NRM: Facilitate the integration of NRM principles (e.g. matching land capability to land use) into land planning processes via local planning strategies and local planning schemes.	1. Incorporate NRM values by using available planning tools to inform policies.						
	2. Matching land use planning with land capability and increase awareness of NRM principles with managers and policy makers.						
	3. Encourage succession planning and integration of generational knowledge into contemporary farm management.						
L6. Sustainable industries developed for food, fibre and energy: Review, prioritise and facilitate future sustainable food, fibre and energy production industries.	1. Identify existing and new industry opportunities.						

LEGEND: Decision Point Review Complete Commence Linking Action

Outcome	Key Actions	2019	2020	2021	2022	2023	2024
Bridging Theme Outcomes							
H3. Protection of heritage places: Identification and protection of significant cultural natural heritage places in partnership with the Aboriginal community.	1. Develop a process to identify and acknowledge protection of heritage places.	⇒					
H5. Improved application of traditional ecological knowledge: Apply the use of traditional ecological knowledge (TEK) to South Coast community projects with respect for intellectual property.	1. Consult with the Aboriginal Reference Group and Aboriginal native title groups to seek advise on opportunities to integrate TEK in project development and implementation.	⇒					
	2. Support the application of TEK to new bush food markets and building skills and capacity within the Aboriginal community to develop a commercial market.	⇒					
R5. Improved awareness, recognition, education and training: Build upon the NRM knowledge and skills of land managers and the associated services sector to implement best management practices with a key focus on the issues of salinity, acidity and water balance for priority land assets and increase awareness of the value of land asset management.	1. Support training, information and networking sessions on key issues and current best practice.	⇒					
	2. Deliver on-farm consultation.	⇒					
	3. Identify common regional themes an promote and communicate key messages regarding sustainable agriculture through the community, industry and in schools and to influence decision making.	⇒					

LEGEND: Decision Point Review Complete Commence Linking Action

Figure 6.3. Adaptation Pathways - Land Theme

6.4 Measures and Indicators

A series of potential indicators and measures were recommended by *Southern Prospects 2011-2016* (Table 6.1). These continue to be relevant and act as a guide to assist in setting targets for projects and programs and allow for standard approaches to measurement. Indicators should be selected according to the principles of cost, simplicity, consistency, practicality and capacity to deliver information across the region. These measures will form the base inputs for monitoring and assessing performance for review by South Coast NRM as part of its normal financial and business reporting processes and support annual reporting of Strategy achievements.

Table 6.1. Potential Indicators – Land Theme

Asset	Indicator	Measure
Soil	Area of land threatened by shallow or rising water tables	<ul style="list-style-type: none"> ➤ Depth to groundwater. ➤ Groundwater salinity. ➤ Base flow salinity.
	Soil condition	<ul style="list-style-type: none"> ➤ Location, size and intensity of salt affected areas. ➤ Soil acidification. ➤ Soil erosion - water. ➤ Soil erosion - wind. ➤ Soil carbon content. ➤ Soil biodiversity.
	Adoption	<ul style="list-style-type: none"> ➤ Implementation of farm plans. ➤ Adoption of improved soil management practices.
Land Managers	Land Use	<ul style="list-style-type: none"> ➤ Number of local planning strategies and local planning schemes that integrate natural resource management into land use planning. ➤ Number of local governments assisted to integrate natural resource management into land use planning.

case study

Biological farming

Farmers investing in their greatest asset, their soils.

Stephen and Kerry Frost's farm at Narrikup, located approximately half-way between Albany and Mt Barker in Western Australia. Biological farming principles changed their practices, mindset, sustainability and profitability. The Frosts hold the firm belief that when actively engaging in conservation practices and striving to increase biodiversity in a whole-of-farm management system, not only does the productivity improve, but so too does the profit. Stonemeal Farm is now a highly profitable Merino enterprise producing prime lambs and wool.

- The Frosts' lambing percentages are well above average and the property has much higher stocking rates compared to district average, with significantly less overheads.
- Since using both mineral fertilisers to remineralize the soil and soil microbial inputs, farm overheads have reduced considerably.
- There is almost no requirement for broad-acre pesticides, and very little nitrogen inputs for fodder crops, less requirement for liming to maintain and improve production, no requirement for stock mineral supplements, and reduced veterinary intervention.
- The farm is primarily self-sustaining in fodder production, and has moved to direct drilling of perennial grasses into established pasture without the use of herbicides.
- The reduction of pesticide use has seen an increase in dung beetles and beneficial predatory insect species.

Farm profile

Farmers: Stephen and Kerry Frost

Location: Stonemeal Farm, Narrikup, WA

Average annual rainfall: 692 mm

Enterprise: 100% livestock (wool and prime lamb production)

Property size: 275 ha, including 40 ha of protected and managed remnant vegetation and 57ha of blue gum plantation in second rotation

Soil type: Sandy duplex

The Frosts have been farming at Stonemeal Farm in Narrikup since 1979. Land clearing was standard practice since the 1960's and the Frost's observed distinct differences appearing between new land and established pasture:

- Stock health was better on the new land.
- Salinity was rapidly developing on some of the new land.
- Clover growth was significant on new land, while the older land had decreasing clover in well-established pastures.
- Pasture disease was prevalent on the old land. (red-legged earth mite, pasture scorch and powdery mildew).
- Fecundity of ewes was lower on the older land.
- Wool from ewes aged five and a half years and older, was found to be going off (yellowing and excess greasiness) on the older land.



Image: Johanna Tomlinson



Image: Johanna Tomlinson

The conventional approach to tackling these issues required a growing reliance on chemicals, increasing input costs and the development of an increasingly complicated and stressful (personally and environmentally) farming system. This was not the approach the Frosts determined would improve the health of their land, or suit their personal, family and environmental goals. So, in the mid-1990s, the Frosts decided that “a living soil was their number one priority, their greatest asset” and they set about making changes to their management principles and practices, based around biological farming ideals.

Stephen and Kerry moved away from traditional practices of high input, high cost synthetic chemicals that only treated the symptoms. To bring their vision to reality, they set out to improve their knowledge and skills and Stephen worked free of charge on other farms to research different methods they could adopt to reinvigorate their own farm. Minerals and microbes were reintroduced back into the soils. Fire resistant fodder trees and perennial pasture species were planted, improving soil organic carbon. Riparian and remnant vegetation was protected and alternative land uses such as commercial native cut flowers were adopted.

The Frosts’ focus is on high lambing percentages and utilising the full reproductive age of their ewes.

In 2015 this mob of nine and a half year old ewes lambed and were marked in August at 141% lambing (best lambing rate on Stonemeal for that season).

- Ordinary white tag straight merinos were marked at 127 per cent lambing with the flock average for 2015 being 133% lambing across all mobs at Stonemeal.
- The Frosts’ lamb selling percentage for 2014 was 126% (with the family’s annual lamb supply held back) indicating a high proportion of multiples. In mid-May 2015, when most mobs were lambing, Stonemeal Farm was carrying “three ewes per acre” (7.41 ewes/ha).

- When accounting for the lactating ewes and the prominence of twinning, the dry sheep equivalent (DSE) at Stonemeal Farm at that time was between approximately 17 and 20 DSE (DPI, 1997), well above the long-term district average stocking rate for Mt Barker of between eight and 10 DSE/ha (Hyder et al, 2002 and MLA, 2008).

Across the ancient landscapes of the South Coast, many minerals only occur naturally at very low concentrations and this is particularly so in the sandy soils of Stonemeal Farm. Such was the Frost’s conviction in mineral fertilisers to improve soil health, they founded Australian Mineral Fertilisers in Tenterden and produce mineral based fertilisers as an alternative to synthetic acid based fertiliser. To prove the efficacy of reincorporating minerals back into the soil and enhancing soil biology, they have been involved with over 30 independent evidence based trial sites across WA.

Since 2011, the Frosts have hosted over 511 farmers, students and research scientists at Stonemeal Farm to share these farming practices. They have hosted many events demonstrating the importance of soil biology and minerals to plant production, animal nutrition, soil carbon and fodder quality. The Frosts have partnered with and welcomed scrutiny from independent researchers and have presented at many local, regional and state events to thousands of participants.

Today, more and more farmers are seeking information and adopting regenerative farming practices with a view to developing healthier farms and improved farm-gate returns.

Stephen and Kerry Frost were the winners of the 2017 Australian Government Excellence in Sustainable Farm Practices Award and are currently finalists in the National 2018 Australian Government Excellence in Sustainable Farm Practices Award.

case study

Growing perennials on marginal lands

Triple bottom line results for resilience and productivity

Environmental benefits

- ▶ Perennial systems in marginal farming have environmental benefits from better ground water management including increased ground cover, reduced runoff and the potential for carbon sequestration.
- ▶ Saltbush with a perennial understorey suits waterlogged land.

Economic benefits

- ▶ Grazing perennial shrubs enabled sheep to gain weight in summer/autumn and helped get them to market weight quicker compared to sheep that grazed stubbles.
- ▶ The production benefits are due to a better nutritional balance as shrubs provide higher protein, higher digestibility and improve feed conversion efficiency.
- ▶ Inclusion of perennial shrubs on marginal lands gives farmers the ability to be more opportunistic and make farming systems more robust against future climate variability.
- ▶ Perennial shrubs as part of the farming system can make a major contribution to increasing livestock productivity while lowering methane emission intensity.

How perennials fit the farming system

Two farmers, with adjoining properties, found perennials to be the answer to waterlogging and salinity problems.

Social benefits

“We needed to change the way we managed the farm. Lots of people wouldn't think you could produce off this land but we've been farming it sustainably for two generations. And we plan on keeping it that way.”

Ian Walsh Cranbrook, WA, 2017.

Farm profile

Farmers: The Lehmann families
Location: Cranbrook WA
Property size: 2000 hectares
Soil type: Sandy duplex (yellow sands Uc5.22)
Average annual rainfall: 400-425 mm
Enterprise mix: Livestock (sheep) and cropping (canola and barley)

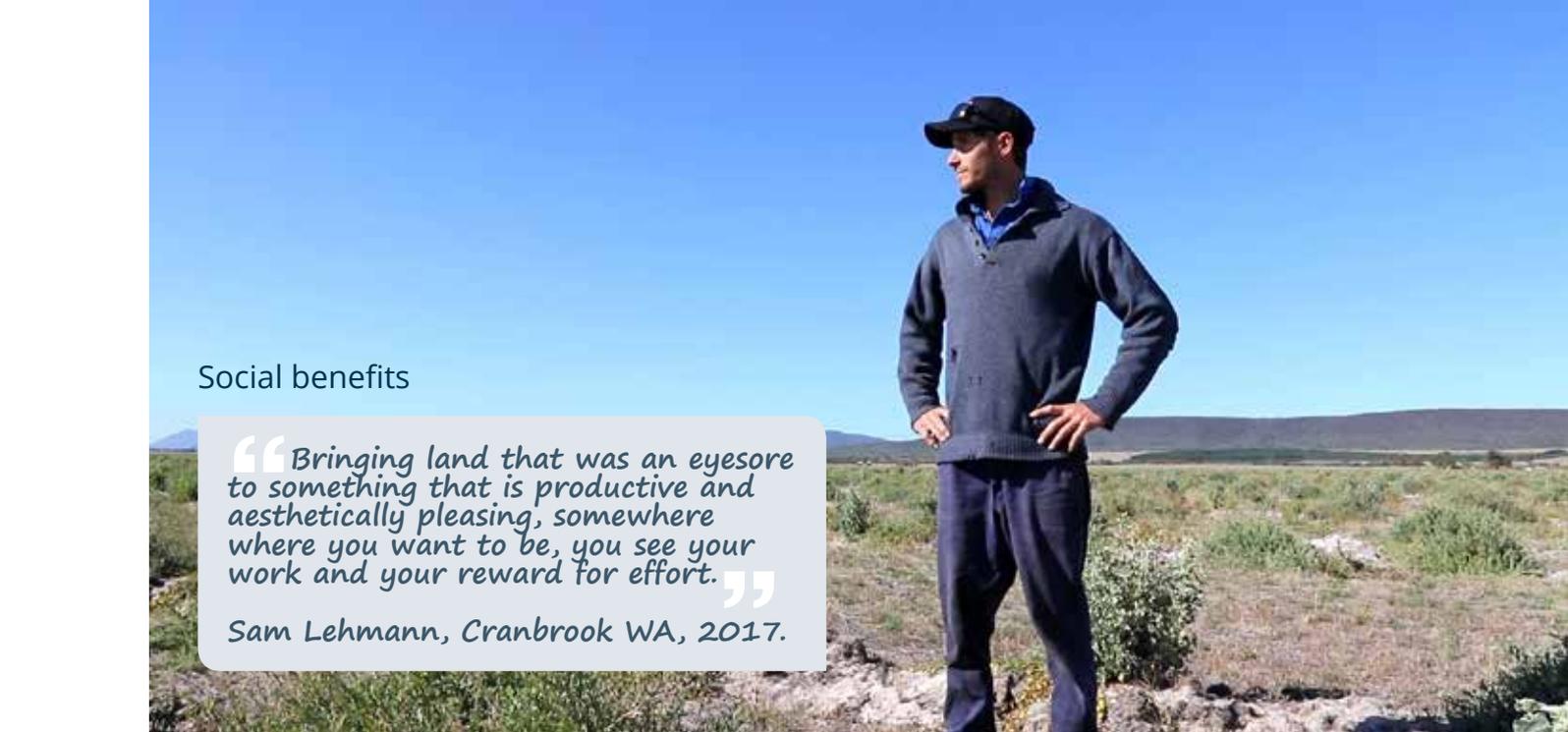
Farm profile

Farmers: The Walsh families
Location: Cranbrook WA
Property size: 1600 hectares
Soil type: Sandy duplex (yellow sands Uc5.22)
Average annual rainfall: 400-425 mm
Enterprise mix: Livestock (sheep) and cropping (canola, barley and oats)

The Lehmann and Walsh families are farming in a unique environment where ground water moves very slowly. The landscape has no natural drainage system and is dominated by lakes and evaporation ponds. The land is susceptible to waterlogging and salinity issues.

By incorporating perennials, both farmers have seen significant improvements in the area of productive land with increased sheep carrying capacity. Both farmers have experimented with various perennials and have found that the right combination of plants is the key to success.





Social benefits

“Bringing land that was an eyesore to something that is productive and aesthetically pleasing, somewhere where you want to be, you see your work and your reward for effort.”

Sam Lehmann, Cranbrook WA, 2017.

The Walsh Farm

Establishing saltbush and salt tolerant perennial grasses was a breakthrough for Ian Walsh. The Cranbrook property had a critical water problem with a shallow water table. Ian worked to convert this saline land into a productive component of his farm. Saltbush and other salt tolerant perennial forages provide green feed in autumn and have increased the sheep carrying capacity, while he still maintained the cropping area.

He worked closely with CSIRO and South Coast NRM to improve the nutritional management of livestock using saltbush and to find out how saltbush reduced methane emission intensity for more efficient productivity. The key to the success of their strategy is the complementarity of the saltbush with the available pasture understorey. Alone neither one can support good livestock growth. Saltbush has low fibre and high crude protein with high salt and sulphur content, which are essential for wool growth. Under arid and saline environments, saltbush accumulates minerals and produces a range of secondary compounds such as Vitamin E which is vital for animal health.

In a 35 day study, sheep grazing the shrub plots were 2.5kg heavier with almost a 3 fold difference in the rate of growth relative to the sheep grazing the stubble. Peak methane emission intensity was almost 39% lower for the shrub group compared to the stubble group.

The Lehmann Farm

Sam Lehmann is a third generation farmer, always looking for new farming options. With his parents, Ian and Sandy, Sam found the kikuyu on lighter soils has worked well and on the more waterlogged soil they have had good success with saltbush and an understorey of tall wheat grass and puccinellia.

Sam is now keen to include a legume understorey that grows on saline and waterlogged soils and increase the protein content of the understorey (e.g. Neptune messina, Department of Primary Industries and Regional Development, 2017). The area of farm under perennials is now approximately 27% and has successfully changed the way Sam farms, with the added bonus of increasing his stocking rate. He also noted that perennials used up excess water and stopped any erosion from occurring.

Kikuyu has brought a big change to his farming structure. Not only has it stabilised the country, it has provided a good profit both in winter and summer. Sam has also planted millet with kikuyu and found it has been very useful in providing some early feed. He can graze sheep in lush pastures at a time when feed is tight elsewhere.

Sam has also trialled a new saltbush variety. AnamekaTM was developed through the Enrich Project by the Future Farm Industries Cooperative Research Centre (CRC). Sam experienced an immediate positive result of 10 DSE from what was bare land. He noticed AnamekaTM saltbush seemed to be very palatable and showed a relatively quick recovery from grazing.

Although perennial pasture species have a higher establishment cost compared to annual pastures, the ongoing management costs are relatively low and allow him to run stock through the summer without solely relying on supplementary feeding. Looking at the performance of these perennials, Sam feels his farming system has the resilience to ride out tough conditions.





biodiversity

7. biodiversity

Conserve and recover biodiversity

This section describes the importance of biodiversity assets in the management of natural resources and the principles that guide the management and delivery to achieve the desired outcomes and aspirations. This section deals with the fundamental requirements for managing biodiversity sustainably, with specific actions to manage terrestrial biodiversity. There are cross-references to managing water resources in the Water theme section, which incorporates actions relating to the biodiversity of freshwater and estuarine systems. The theme area for coastal and marine systems also includes consideration of the coastal zone and marine biodiversity.

ASPIRATION: Healthy natural ecosystems, habitats and landscapes support viable and strongly resilient populations of native species and communities

7.1 Principles

The principles for management of biodiversity include:

- clearly identifying and understanding the approaches to protecting key biodiversity assets
- minimising the incremental loss of native vegetation, with a goal of offsetting by progressive restoration of important ecosystems and linkages between remnant vegetation

- directly reducing threatening processes to restore and maintain healthy, resilient ecosystems
- planning and managing natural ecosystems, species, communities, habitats and landforms at a landscape scale
- using strategic information to support actions
- ensuring that the control of invasive species is focused on biodiversity outcomes ensuring that public investment to control of invasive species is prioritised towards maximising biodiversity values before social (aesthetic) or economic values.

7.2 Current Context

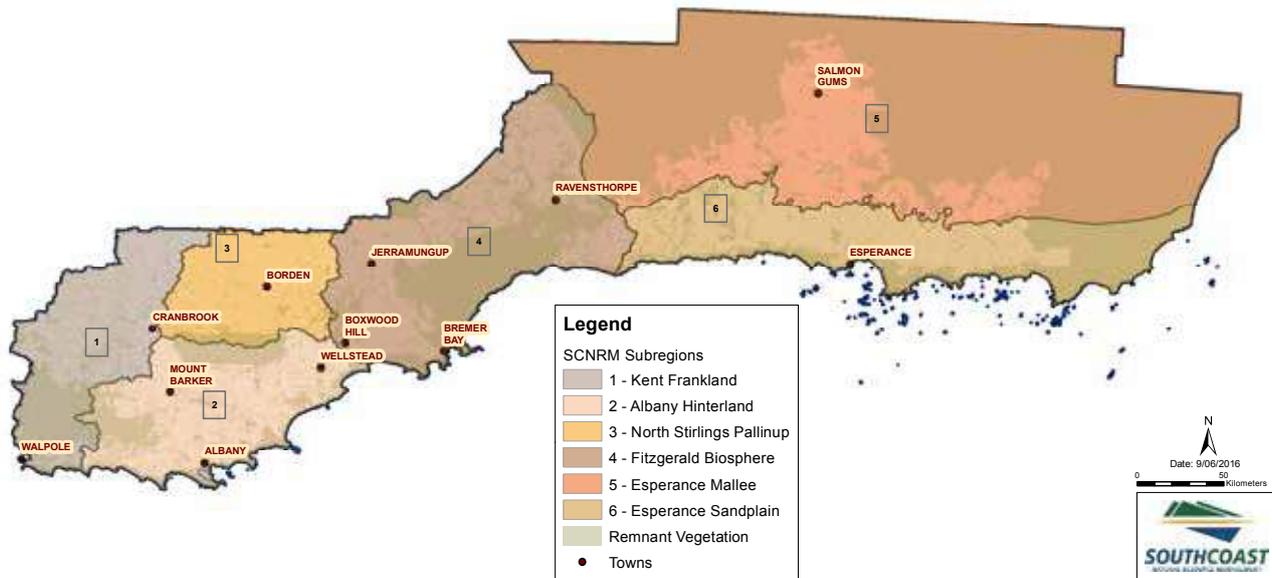
The South Coast region of Western Australia is a biodiversity hotspot. A biodiversity hotspot is defined as an area that is considered to be of international significance that supports a high diversity of species, a high number of endemic species and high levels of threat to biodiversity (Myers, 2003; Mittermeier et al., 1999; SWAEI, 2006). Scientists have identified 36 'biodiversity hotspots' in the world. The South West Botanical Province of WA, defined by a line from Shark Bay to Israelite Bay, is one of these 36 'hotspots' and is one of two in Australia, with the other being the forests of the east coast.

The South Coast region occupies the south eastern part of the South West Botanical Province and contributes significantly to its biodiversity values. Within the region there are 5472 known flora taxa (species and subspecies). This is more than 60% of the flora of the Province. Of these, around 694 are endemic to the region. Two of four Centres of Plant Endemism in the South West of WA occur here. The Ravensthorpe Range-Fitzgerald River National Park



Image: Catherine Scott

Figure 7.1 Extent of native vegetation



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) are key areas for plant endemism. Gioia and Hopper (2004) 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. The high levels of diversity are partly due to the bio-geographical complexity in the region and to the geological and climatic history.

Biodiversity contributes to the economy and provides ecological processes such as water and air purification and pollination of food crops. It is intrinsically valuable for the health and well-being of the community and contributes to tourism and the natural beauty of the region. However, the preservation of biodiversity in the region is impacted by numerous key threats including habitat loss, habitat fragmentation, introduction of plant diseases such as *Phytophthora dieback*, introduction of invasive animal and plant species, alternate and inappropriate fire regimes, rising soil salinity and acidification and altered hydrological regimes through change in land use which has significantly altered ecological processes.



Image: Meredith Spencer

Climate change and seasonal variability will exacerbate the current threats to biodiversity within the region. The climate change section of the South Coast Threatened Species & Ecological Communities Regional Strategic Management Plan, Coffey (2009) and Dunlop et al. (2012) provides a detailed discussion about potential and known impacts of climate change on biodiversity. A summary of the projected climatic conditions and implications for biodiversity are provided in Figure 7.2. While there are likely risks to biodiversity resulting from changing climatic conditions, there are also management options that can continue to be delivered through *Southern Prospects* to support adaptation and resilience. These include revegetation, re-establishment of significant robust corridors of native vegetation, protection of refuges, establishing migration corridors, fire management and protection of important wetlands.

Continued effort to increase community awareness of the value of biodiversity and conservation is still as important as ever, as is the need to better link with other land management practices and cultural heritage to develop a shared appreciation and collective action. Aboriginal people have a strong interest in increasing their involvement in management for biodiversity, through land traineeships, on-ground enterprises, sharing of traditional ecological knowledge and project work.



Temperature

- › The average minimum and maximum temperatures are projected to increase.
- › Extreme temperatures are projected to increase in magnitude, in frequency and the duration of warm spells.
- › The number of frost risk days are expected to decrease.
- › Changes in temperature may negatively impact on recruitment of local flora and may increase the recruitment and growth of invasive species.
- › Refugia are important to provide protection from high temperatures in the short term and enable pathways for migration in the longer term.
- › Increased temperature in waterways is likely to cause stress to flora and fauna species and possible extinction if they are not able to move to new locations.



Rainfall

- › Mean rainfall is projected to decrease in the region.
- › An increase in intensity of extreme rainfall events is projected to increase.
- › Drought periods are projected to become more frequent and of increasing duration.
- › A decrease in rainfall may impact on important rainfall-fed refugia.
- › Short range endemic invertebrates are potentially at risk under a drier climate due to the reduced availability of moist refugia.
- › Reduced rainfall presents a risk to wetlands and the ecosystem services they provide.
- › Reduced inflows to waterways will reduce connectivity and floodplain inundation, important to sustain ecosystem process and supporting food-energy webs.



Drought

- › Drought duration expected to increase, placing further stress on limited water supplies, ecosystems, water reliant industries and the agricultural sector.
- › Some widespread eucalypts may have the capacity to adjust to a changing climate as they already grow under a range of climatic conditions.
- › Increasing temperature and drought may make some plant species more vulnerable to some diseases.
- › Threatened species that are not well adapted or resilient to drier and warmer climates will be more susceptible to increased occurrence and duration of drought.



Fire Risk

- › A harsher fire-weather climate in the future that will need to be considered in fire management plans to maintain biodiversity.
- › Increased prevalence and impact of fire (in frequency, extent and intensity).
- › Decreased recovery of species following fire due to lower rainfall impacting on physiological processes.

Figure 7.2 . Summary of the biodiversity risks to projected future climate (Hope et al, 2015; and CCA Biodiversity, 2016). Access to detailed information and data regarding the projections to 2030 and 2090 for the region can be accessed at www.climatechangeinaustralia.gov.au

Funding and resources to monitor and manage biodiversity to meet state, national and international commitments continue to remain a challenge and emphasise the importance of partnerships to deliver these functions together with the consideration of new technology solutions to improve efficiency and effectiveness of activities such as monitoring programs. At the core is the participation of the region's community to successfully tackle the challenges faced by biodiversity and conservation. Integration of activities, such as citizen science, is being recognised more as a valid and effective way to supplement formal monitoring and research activities undertaken by governments and research institutions.

Volunteers play an essential role in the delivery of biodiversity protection, particularly for the support of recovery projects for threatened species. This assistance is highly valued and appreciated. Volunteers benefit too, by getting the experience of working with experts in the field and are given the opportunity to visit areas where people rarely go.

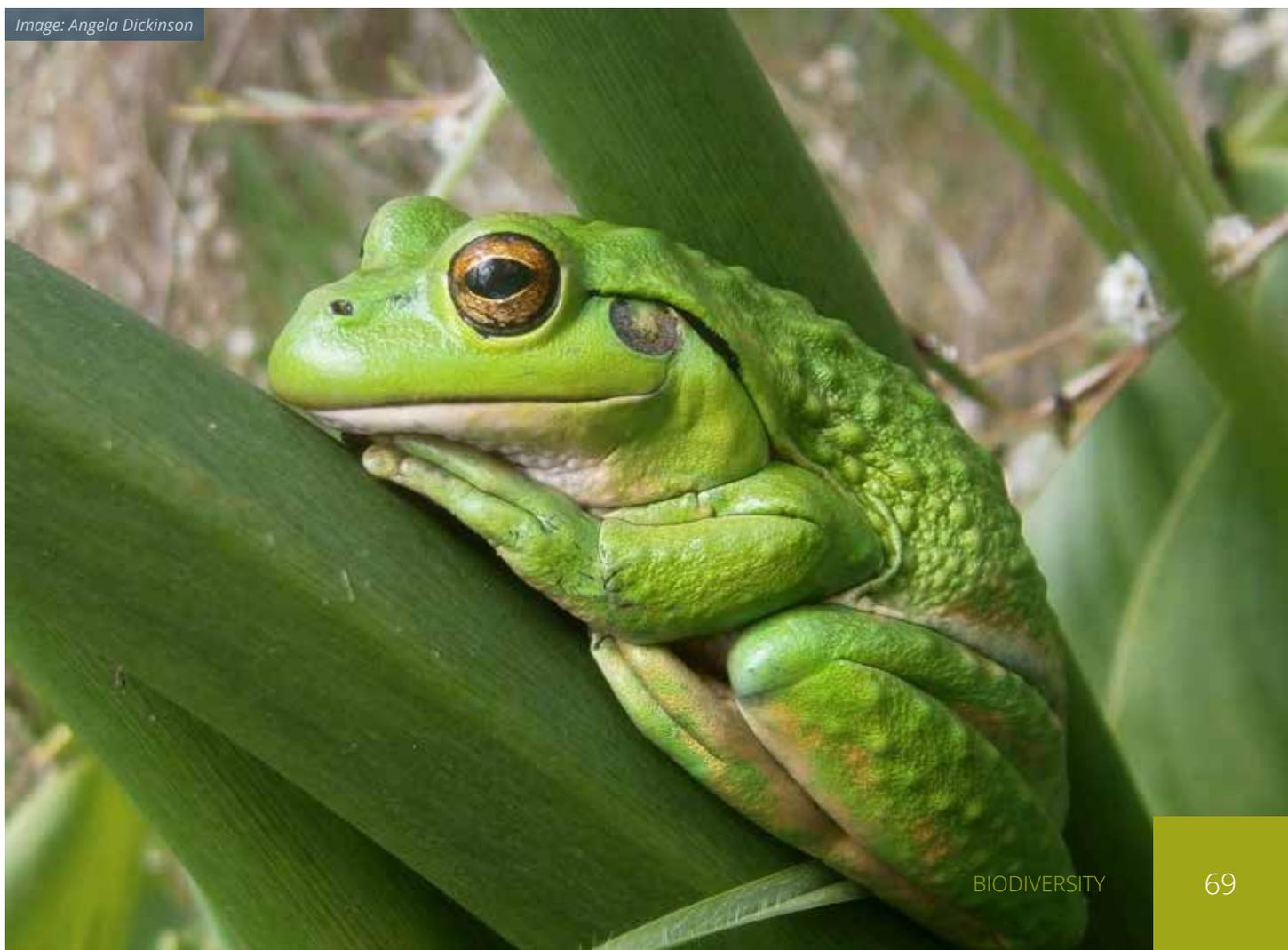
There are also legal frameworks that provide for management and protection of fauna and flora species and ecological communities. They include the Federal EPBC Act and the Wildlife Conservation Act at a State level. Listing a species provides it legal protection under the relevant legislation.

The International Union for Conservation of Nature and Natural Resources (IUCN) produces a list of threatened species (IUCN 2008). Although this Red List does not provide

any legislative protection for a species in Australia, the categories and criteria used for the Red List are used as a framework for the listing of species at both a Federal and State level. The various national and international agreements and legislation that can assist in the conservation of biodiversity include the:

- Environmental Protection Act, 1986.
- Wildlife Conservation Act, 1950.
- Environment Protection and Biodiversity Conservation Act, 1999.
- National Strategy for the Conservation of Australia's Biological Diversity.
- Conservation and Land Management Act, 1984.
- IUCN International Convention on Biological Diversity, 1992.
- Convention on the conservation of Migratory Species of Wild Animals, 1979 (the Bonn Convention).
- Agreement between the Government of Australia and the Government of the Peoples Republic of China for the Protection of Migratory Birds and their Environment (CAMBA).
- Agreement between the Government of Japan and the Government of Australia for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment (JAMBA).
- Ramsar Convention (an agreement to protect important wetlands).

Image: Angela Dickinson



Biodiversity Key Achievements 2011-2018

The Key Achievements of the Biodiversity outcomes during 2011-2018 are summarised below.

1 State NRM Project Dieback

Development of a State Dieback Management and Investment Framework and resulting partnerships enabled a unified approach to dieback control across the State. This work was completed alongside the development of a risk reduction plan for 59 of the indicative top 100 Priority Protection Areas. Priority on ground works were developed and implemented across several hundred thousand hectares of land within the Priority Protection Areas and coastal corridors. The installation of signage, hygiene stations, and access controls were implemented, backed by on ground interpretation to increase awareness and reduce the spread of Dieback. Further, the Dieback Information Database Management System (DIDMS) was revamped in 2014 enabling more uptake and improved planning.

2 Biodiversity Fund - Restoring Gondwana Project

The aim of this landscape scale project was to focus on restoring connectivity in the Forest to Fitzgerald corridor area through the implementation of strategic actions to protect 60,767 hectares of high value habitat, improving connectivity and reducing threats. This was achieved by the completion of strategic revegetation and remnant protection works, installation of wallaby gates and permanent nest boxes for Carnaby's Black Cockatoos and innovations such as large-scale vegetation monitoring with drones.

3 Invasive species

Feral animal culling programs provided assistance to purchase baits and traps, attracting a substantial uptake of applicants in 2012-2015. Trials of a new feral cat baiting program are showing positive results in three separate locations known to contain high diversity of threatened fauna. An Invasive Species Management Framework was also developed to inform a regional approach to managing invasive species. This has been used for ongoing management of Blackberry, Gorse and African boxthorn protecting high value assets.

4 Protecting South Coast Environment Protection and Biodiversity Conservation (EPBC) listed species

A multi-species landscape approach was used to conserve nationally and regionally significant ecosystems and species. Community groups have partnered to deliver projects to improve habitat and manage threats to priority species. Survey and monitoring of 8 threatened fauna species and 32 declared rare flora has been completed as part of the South Coast Integrated Threatened Species Recovery Plan. Translocation and monitoring of threatened flora and critically endangered fauna including Gilbert's potoroo and Western Ground Parrot have highlighted successful partnership components of this project.

5 Education and partnership

Numerous community education and training activities involving the community as well as priority stakeholders in NRM have resulted in increased engagement across all sectors. One outstanding success was the collaborative effort of the Fitzgerald Biosphere Community Collective in successfully campaigning for the renomination of the Fitzgerald Biosphere in late 2017.

Critical success factors in South Coast NRM's work are the partnerships developed with multiple organisations and individuals across the region. This has led to an effective delivery strategy where sub regional partners are able to work directly with landholders and smaller Landcare groups to contribute to regionally important outcomes.

7.3 Future Directions

The future directions contained in this strategy are presented as the 25-year aspirations, five-year outcomes and key actions, are based on the review processes conducted by South Coast NRM, the Biodiversity Reference Group and community workshops. The Biodiversity outcomes have been modified from *Southern Prospects 2011-2016* to reflect the feedback through the consultation process as well as to include those outcomes identified in developing the Climate Adaption Addendum (2016). The Adaptation Pathways process has been applied to the revised Biodiversity Outcomes (Fig. 7.3) that includes key actions to be considered in implementation of the strategy and indicative timeframes.

There were a broad range of issues identified that align with supporting continued effort in existing programs and direction of activities. These included:

- Maintain remnant vegetation and revegetation and fencing of waterways.
- Greater engagement with citizen science programs.
- Aim for no further loss of biodiversity.
- Further roll out of the South Coast NRM Dieback Management model, and fully interpret and utilise the information collected through the Phytophthora dieback mapping project to assess catchment risk.

- Greater focus on measuring outcomes from natural resource management investments/actions.
- Improve use of fire management as a tool to support biodiversity management.
- Identify and protect corridors to help build a resilient ecosystem that enables adaptation to climate change.
- Partner with local universities and institutes to undertake well targeted and South Coast relevant research.

The Adaptation Pathways framework will support the preparation of the Investment Plan by South Coast NRM and help focus investment towards the priority actions. It is intended that the key actions be reviewed by South Coast NRM and the Reference Groups to ensure the Strategy continues to be responsive to emerging issues and opportunities, whilst delivering against the regional natural resource management priorities within the resourcing, capability and capacity available.

The symbols applied in the Adaptation Pathway aim to describe the enabling process for the key actions. These include whether the action is a review process, requires a decision to proceed, connects to other actions, is in a position to commence if funding and resources are available, and when actions are likely to be completed. The shading indicates the proposed commencement and duration of the key actions and provides a guide to phasing and sequencing of these actions.

Aspiration (25+)

Healthy natural ecosystems, habitats and landscapes support viable and strongly resilient populations of native species and communities.

This will be achieved through:

- Recovering and protecting significant species and ecological communities, including those currently threatened.
- Minimising the threats on native ecosystems.
- Improving and maintaining the extent, quality and connectivity of native vegetation and ecological communities including regionally significant landscapes.
- Expanding, linking and creating buffer zones and re-established native vegetation.
- Increasing the awareness and understanding of social, cultural and economic values of biodiversity, eco-systems and their functions, the threats from degrading processes and the possible management responses.
- Improving the ability and willingness of local governments and land managers to participate in managing natural resources, including through the use of statutory planning mechanisms and international agreements.
- Improving and maintaining the recreational, cultural, commercial and social amenity values of public lands.
- Undertaking regional monitoring to assess trends in condition, impacts of threats and effectiveness of management actions and provide the outcomes to wider community.
- Using the best available science on natural ecosystems, habitats and landscapes to determine management actions.
- Improved understanding of potential impacts of climate change on biodiversity and appropriate management responses.

Figure 7.3. Adaptation Pathways – Biodiversity Theme

Outcome	Key Actions	2019	2020	2021	2022	2023	2024
B1. Improved knowledge and understanding: Collect and map baseline data for identified gaps in knowledge and collate and improve accessibility and communication of existing data/information by 2020.	1. Maintain existing datasets and access to information.						
	2. Set priority monitoring activities informed by evaluation of existing data, gaps, community preference and existing prioritisation processes.						
B2. Demonstrate improved biodiversity outcomes: Maintain, support and/or expand a biodiversity monitoring program at priority areas to inform management, using appropriate protocols and indicators by 2024.	1. Identify cost-effective methods for condition monitoring that are repeatable.						
	2. Identify reference condition sites for biodiversity values to guide the implementation and monitoring of revegetation and restoration of priorities sites by 2022.						
B3. Improved climate change mitigation and adaptation responses: Identify biodiversity assets most at risk from the effects of climate change and associated threats and develop adaptation strategies and actions for these assets.	1. Determine climate change monitoring priorities and protocols for communities and ecosystems using appropriate indicator species that inform the management of climate change impacts on species and ecological communities.						
	2. Encourage and prioritise targeted research to inform the management of climate change impacts.						
	3. Identify potential impact of climate change on threatened flora and fauna species and threatened ecological communities.						
	4. Manage existing remnant vegetation, increasing connectivity to allow distributional changes and identifying and managing climatically determined refugia and refuges.						
B4. Threatened and significant species, communities and habitats are protected: Support the implementation of 80% of recovery plans by 2024 that incorporate potential interactions of climate change to protect threatened and significant species, communities and habitats.	1. Develop, implement and review recovery plans as appropriate.						
	2. Protect significant vegetation and habitat for threatened species and communities through land use planning.						
B5. The area of land restored or protected is increased: Through effective on-ground works and improved management practices implement the restoration of 10,000 ha of cleared land in priority areas and increase the area of privately owned native vegetation managed for conservation by 5000 Ha.	1. Collate existing information relating to areas defined by regional prioritisation.						
	2. Target on-ground works with partner organisations.						
	3. Establish voluntary management agreements on private land.						
	4. Develop management plans for specific sites that includes consideration of dieback best practice and Traditional Ecological Knowledge.						

Outcome	Key Actions	2019	2020	2021	2022	2023	2024
B6. Impacts of invasive species are reduced: Manage the impacts of priority invasive species and prevent the occurrence and spread of emerging invasive species through training, early identification and on-ground works by 2020.	1. Set regional priorities and associated activities for invasive species management.	?					
	2. Develop and maintain spatial datasets for past and current investment and existing invasive species information.	→					
	3. Review and develop mapping for priority invasive species.	☰	→				
B7. Improved dieback management: Protect priority areas by implementing identified subprogram projects in the delivery framework of the State Phytophthora Dieback Management and Investment Framework 2014.	1. Develop a monitoring program to evaluate the effectiveness of interventions.	?					
	2. Undertake a review of the program and effectiveness of works against the State Phytophthora Dieback Management and Investment Framework 2014.	☰	▽				
	3. Develop innovative techniques and treatments to dieback management.		→				
B8. Support appropriate fire management: Facilitate appropriate fire management for biodiversity conservation informed by the Identification and Conservation of Fire Sensitive Ecosystems and Species of the South Coast Natural Resource Management Region document, conduct critical research and influence key stakeholders to ensure conservation is considered by 2024.	1. Review the recommendations from the Identification and Conservation of Fire Sensitive Ecosystems and Species of the South Coast Natural Resource Management Region.	☰					

Outcome	Key Actions	2019	2020	2021	2022	2023	2024
Bridging Theme Outcomes							
H3. Protection of heritage places: Identification and protection of significant cultural natural heritage places in partnership with the Aboriginal community.	1. Develop a process to identify and acknowledge protection of heritage places.	→					
H5. Application of traditional ecological knowledge: Apply the use of traditional ecological knowledge(TEK) to South Coast community projects with respect for intellectual property.	1. Ensure that community input including TEK is incorporated into planning for biodiversity outcomes in all plans and programs across the region.	→					
R5. Improved awareness, recognition, education and training: Increase ownership, knowledge and awareness of the value of and threats to biodiversity assets across the region in and inform local, state, national and international policy frameworks.	1. Continue to deliver the school based biodiversity education programs and activities.	→					
	2. Continue to deliver community based education forums and activities.	→					
	3. Support and build capability of local government agencies to protect remnant vegetation.	→					

LEGEND: ? Decision Point ☰ Review ✓ Complete → Commence ▽ Linking Action

Figure 7.3. Adaptation Pathways - Biodiversity Theme



Image: Tim Gamblin



Image: Tim Gamblin

7.4 Measures and Indicators

A series of potential indicators and measures were recommended by *Southern Prospects 2011-2016* (Table 7.1). These continue to be relevant and act as a guide to assist in setting targets for projects and programs and allow for standard approaches to measurement. Indicators should be selected according to the principles of cost, simplicity, consistency, practicality and capacity to deliver information across the region. These measures will form the base inputs for monitoring and assessing performance for review by South Coast NRM as part of its normal financial and business reporting processes and support annual reporting of Strategy achievements.

Table 7.1. Potential Indicators for the Biodiversity Theme.

Asset	Indicator	Measure
Specific native species and ecological communities	1. Selected significant native species and ecological communities extent and distribution	<ul style="list-style-type: none"> ➤ Invertebrates in aquatic systems ➤ Abundance and distribution of key flora and fauna species ➤ Abundance and distribution of threatened or significant species ➤ Ecological community indicators (such as health of Banksia and Heath communities) at a site-specific level.
	2. Selected ecologically significant invasive species extent and impact	<ul style="list-style-type: none"> ➤ Distribution and abundance of significant invasive species ➤ Impacts of significant invasive species.
Native vegetation	3. Native vegetation extent and distribution	<ul style="list-style-type: none"> ➤ The extent of each priority native vegetation type by IBRA subregion measured in hectares ➤ The extent of each present native vegetation type by IBRA subregion measured in hectares ➤ The proportion remaining of each native vegetation type by IBRA subregion measured as a percentage of the pre-European extent.
	4. Native vegetation condition	<ul style="list-style-type: none"> ➤ The proportion of each native vegetation type in each IBRA subregion that is estimated to be in specified condition classes based on a selected set of attributes.

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



case study

Connectivity Conservation Revegetation and Protection of a Biodiversity Hotspot

The South Coast of Western Australia has an extremely rich natural heritage and is recognised internationally as a significant biodiversity hotspot. Working with a network of regional partners over the past decade, South Coast NRM has successfully implemented over 7,300 ha of targeted revegetation to improve the connectivity of fragmented natural landscapes.

These restoration works support the Gondwana Link project which aims to reconnect remnant vegetation from Margaret River to the edge of the Nullarbor Plain. Conserving the integrity and diversity of nature by reconnecting landscapes plays a major part in conservation efforts and is called **Connectivity Conservation**. It improves the distribution of native species, genetic diversity and the ability of species to respond to changing conditions due to climate change.

These outcomes have contributed to federal, state and local government strategies for biodiversity conservation, including the Australian Government's National Corridors Plan (2012), the Australian Biodiversity Conservation Strategy 2010-2030 and the National Threatened Species Strategy 2015.



A strategic approach

The innovative West Australian South Coast Macro Corridor Network developed in 2006 provided cutting edge, regional scale direction for strategic revegetation works in key coastal and Gondwana Link corridor areas. South Coast NRM has further refined targeted planning documents including Southern Prospects, the regional strategy for natural resource management and the Biodiversity Prioritisation and Biosequestration Modelling and Analysis to guide biodiversity outcomes.

Strong partnerships are a vital part of this success, and importantly provide the opportunity for community involvement in the conservation of threatened species and ecological habitats.

Honey Possum: In 2016 Bush Heritage Australia ecologists were thrilled to discover Honey Possums (*Tarsipes rostratus*) in their 2012 revegetation. These creatures are truly unique, being the only nectar feeding marsupial in the world and endemic to the south west. Bush Heritage Australia has shown that after just a few years of returning paddocks back to bush, the animals too are returning.

Birds: Monitoring surveys, undertaken at 20 sites over four catchment areas, found that bird species richness increased with the time since revegetation and was also influenced by the extent and quality of adjoining natural vegetation. Even degraded natural remnant bush was found to be valuable habitat when tree cover and woody ground debris were maintained, with the exciting discovery of the habitat-sensitive Western Whipbird within revegetation close to remnant bushland.

Mallee Fowl: At another Bush Heritage Australia site, there was a further significant discovery with the sighting of a new Malleefowl (*Leipoa ocellata*) nest within the 2012 restoration. These unique mound building birds are listed as vulnerable nationally and on the IUCN Red List of Threatened Species.

Black-gloved wallaby: Black-gloved wallabies (*Macropus irma*) are WA Priority Fauna. They are the second largest endemic mammal species in the region and rely on intact habitat with understorey and connectivity. In 2016 South Coast NRM developed a standard protocol to assist local catchment groups to monitor wallabies in revegetated and remnant bushland. Specialised "wallaby gates" were designed and installed to assist wildlife movement through the landscape.

Innovation

South Coast NRM continue to use the latest technology and concepts to benefit biodiversity outcomes. In 2016, South Coast NRM created the first spatial GIS dataset of known historic revegetation works across the region. Building on that, South Coast NRM then worked collaboratively to utilise a new online Geographic Reporting Information Database (GRID) that allows the immediate capture of key on ground works being undertaken by community and stakeholders across the region.

Traditional methods of monitoring vegetation structure and extent involve on-ground assessments and can be resource intensive. Drone technologies were trialled to assess vegetation extent, cover and health using remote sensing. The data collected shows the potential of drone technology to capture precise and repeatable assessment data to measure revegetation success over time.

Partnerships and community

Working together across the south coast region of Western Australia over the past 23 years, our community partners include local and state government, universities, catchment groups and non-profit organisations.

South Coast NRM projects support implementation of Conservation Action Plans (CAPS) which are implemented by catchment groups to guide on ground conservation efforts by the development of focused strategies and measures of success. By using local expertise, many solutions and co-operative activities can be successfully achieved, including broadening of programs and wildlife monitoring, both of which are enhanced by local and scientific knowledge and volunteer assistance.



case study

The Fitzgerald Biosphere Community Collective

A success story for community driven sustainability

The WA Government proclaimed Fitzgerald River National Park in 1973. It is the largest single national park in the south-west of Western Australia and home to 12 threatened fauna and 39 threatened flora species, and contains about 20 per cent of WA's described plant species, many of which are found nowhere else in the world.

In 1978, the United Nations Educational, Scientific and Cultural Organisation (UNESCO) listed it as a Biosphere Reserve as part of their Man and Biosphere (MAB) Programme.

Biosphere Reserves are defined as sites across the world established to promote sustainable development based on local community efforts and sound science. They include both land and water elements, and are specifically for the purpose of reconciling the conservation of biological and cultural diversity and economic and social development.

Changes to the Biosphere rules under the Seville Strategy in 1996 prescribed that Biosphere Reserves must be zoned, with a core natural protected area, a *buffer* zone contiguous around the core, and a *transition* zone where the majority of economic enterprise and development occurs. As the



Image: Christine Painter

Fitzgerald National Park no longer met the criteria, a community decision was made in 2010 to renominate with an extended biosphere reserve as a result of strong community support.

A report on the progress of Fitzgerald Biosphere was undertaken by Dr Julia Fry of the University of Western Australia's Centre for Excellence in Natural Resource Management (CENRM) in Albany, entitled *The Fitzgerald River Biosphere Reserve: An Assessment of the Current Situation*. Recommendations included that renomination included the three zone concept including a marine component, together with extensive consultation with Aboriginal people and pursuing increased education, research and monitoring opportunities and interactions with other 669 Biosphere Reserves throughout the world in 2017.

In 2010 a gathering of interested parties was held in Bremer Bay to assess interest and address how to proceed with maintaining Fitzgerald River Biosphere Reserve. Interest was significant and the Biosphere Implementation Group (BIG) was formed to steward the process.

The BIG consisted of:

- Fitzgerald Biosphere Group (FBG)
- Ravensthorpe Agricultural Initiative Network (RAIN)
- Shire of Jerramungup
- Shire of Ravensthorpe
- Department of Parks and Wildlife
- Department of Agriculture and Food
- South West Aboriginal Land and Sea Council (SWALSC) and local Noongar representatives.

Supported by:

- Great Southern Development Commission (GSDC)
- Goldfields Esperance Development Commission (GEDC)
- South Coast Natural Resource Management (South Coast NRM)

The renomination development process was complex and lengthy, involving very significant consultation with a range of local and stakeholder groups, including state agencies, fishing peak bodies, Indigenous people, local authorities and many others.

The process resulted in a renomination application and maps for an expanded and renamed Fitzgerald Biosphere as it was locally best known, which now included a marine component and with adjustments made to the draft buffer zone to remove any natural bushland areas subject to mineral lease.

However, UNESCO recommended the redesign of the buffer zone to make it contiguous around the Fitzgerald River National Park core, in line with the zone definition, requiring further consultation and an amended renomination application which was ultimately successful.

On receiving the news, The Fitzgerald Biosphere Launch project was implemented to promote and celebrate the successful achievement of the 2017 relisting and the renaming of the Fitzgerald Biosphere under the UNESCO Man and the Biosphere Program, as well as the 40-year anniversary of the inception of the Fitzgerald Biosphere. Members of the BIG undertook strategic planning and a marketing campaign. Underpinning the successful launch was the highly effective management and promotion by Clear South. The promotion of the biosphere in general was a critical step in increasing community understanding of and engagement with the Fitzgerald Biosphere and the opportunities it presents.

The celebration of the Biosphere Launch on Friday 23rd March marked the culmination of many years of effort. Gathered together in Hopetoun were over 200 people from varied walks of life - local government, conservation, farming, older generations, school children, the Noongar community and politicians to celebrate this momentous occasion.

With the renomination phase completed, the BIG is now known as the Fitzgerald Biosphere Community Collective (FBCC). The collective membership is: Fitzgerald Biosphere Group (FBG), Ravensthorpe Agricultural Initiative Network (RAIN), Shire of Jerramungup, Shire of Ravensthorpe, Department of Biodiversity, Conservation and Attractions, Department of Primary Industries and Regional Development, local Noongar representatives, Great Southern Development Commission (GSDC), and South Coast Natural Resource Management (South Coast NRM).

The brand and character of the Fitzgerald Biosphere is of great economic and cultural value locally, regionally, for WA and nationally, with the potential to develop opportunities to further realise that value. Visitation to Fitzgerald Biosphere is the current focus of attention, alongside the traditional agriculture, fisheries, landcare and nature conservation activities that have defined the cause to date.



Image: Mitchell Bell



Image: Peter Daw

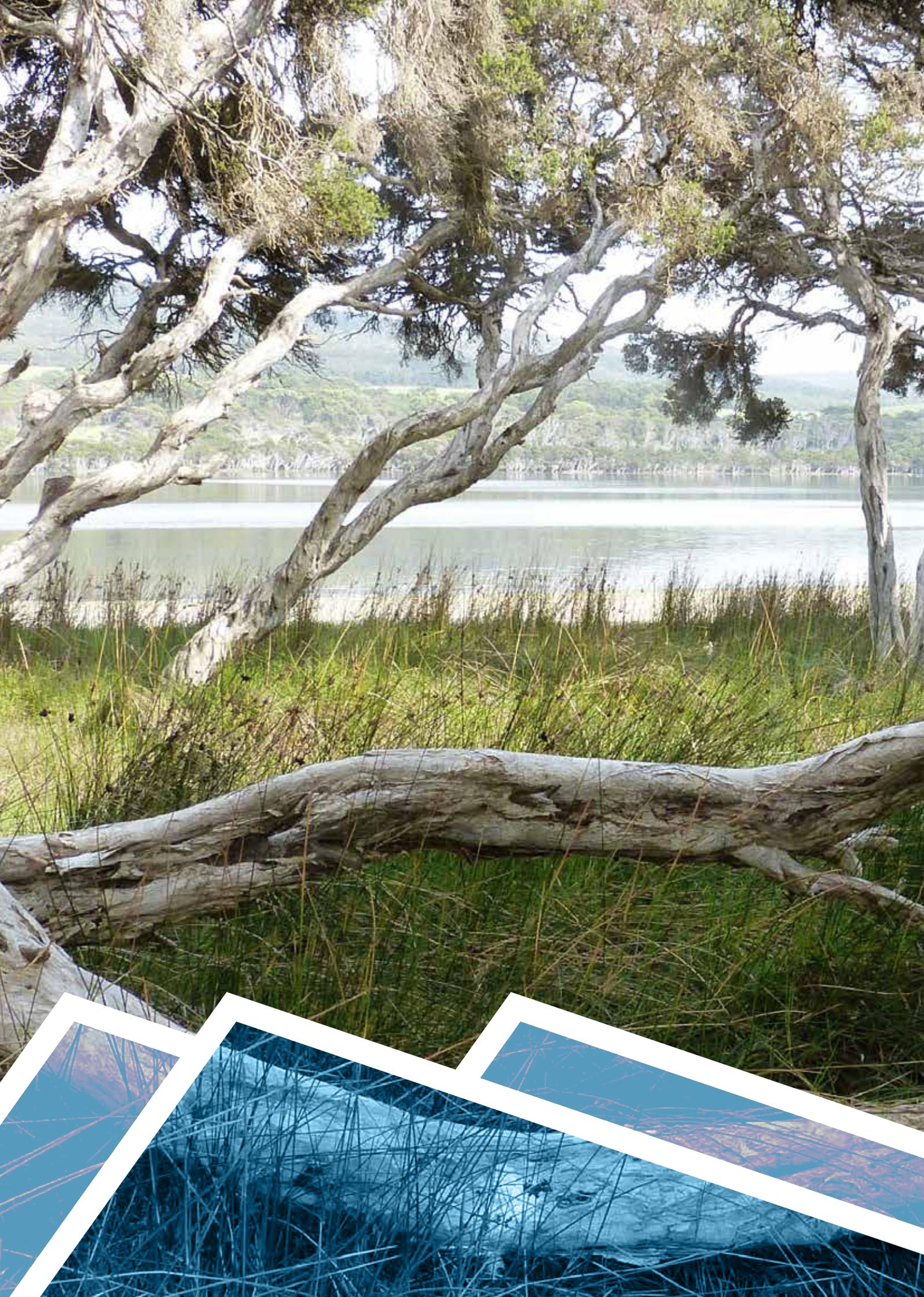




Image: Angus Spencer



water

8. water

Maintain and enhance water assets

This section describes the importance of water assets in the management of natural resources and the principles that guide the management and delivery to achieve the desired outcomes and aspirations. The term 'waterways' includes all rivers, tributaries, estuaries and wetlands. Marine waters are included in the Coastal and Marine theme. There are issues and actions that relate to the Biodiversity theme that will also be relevant for protection and management of water resources. Similarly, there are catchment management issues addressed under the Land theme that will contribute to the health of waterways and water supplies.

ASPIRATION: South Coast rivers, estuaries, wetlands and water resources are precious and will be restored, maintained and protected so that their social, cultural, economic and ecological values can be recognised and embraced.

8.1 Principles

The principles which guide our approach to management of water resources include:

- ▶ achieving sustainable and efficient use of water resources that balances the needs of our community and the environment
- ▶ the condition of rivers, estuaries and wetlands improved and/or maintained through best management practices based on the available science
- ▶ our water resources are comparatively limited and under threat from a changing climate; actions beyond the region that address this are important and necessary to protect them.



Image: Jeremy Spencer

Waterways management is a shared responsibility. It requires cooperative relationships between landowners, land managers, catchment groups, State Government Agencies, and local governments. The Department of Water and Environmental Regulation is the lead agency for the protection and regulation of the State's environment and water resources. The Department undertakes water planning and licensing to provide sustainable water allocation for public water supply and other users, as well protecting environmental values. It also measures and monitors rivers, estuaries and groundwater. This is complemented by the Department's role in preparing policies and plans to protect water resources and provides water resource advice to State and local government, developers and the community.

The Department of Water and Environmental Regulation also regulates industries and activities that can potentially impact upon the environment. Clearing of native vegetation, industry licensing, pollution response and waste management, as well as developing policies and community education programs to reduce impact on the environment are all functions of the agency.

8.2 Current Context

Waterways are extremely significant features of the region, being integral to ecological, social and economic values for the community and of cultural significance for Aboriginal people. The Region includes 107 rivers or major tributaries, 33 estuaries and more than 300 Conservation Category wetlands. Groundwater resources also play a significant role in essential ecological services and the provision of a safe drinking water supply for human consumption. Waterways are of central importance to Aboriginal spirituality, culture and identity, being an intricate part of the landscape used and valued in many interrelated ways.

There are 24 rivers with more than 89% of their catchments still under native vegetation cover. Three of these (Forth, Saint Mary and Dempster Rivers) have been identified as Priority One 'Wild Rivers'. Blackwater Creek, Deep River and Inlet River have been assigned a Priority Two rating (Department of Water, 2009). The upper catchments of three other rivers (Oldfield, Young and Lort) are also substantially uncleared and 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, turbidity and nutrient levels in their estuaries.

The region's water resources and waterways are highly modified through clearing of native vegetation for agriculture use and urban settlement. Vegetation clearing has resulted in increased recharge to the groundwater systems, causing groundwater levels to rise and altering the hydrological regime thereby mobilising salt stored in the soil profile and discharge of saline groundwater. These changes have



Image: Alex Burrows

resulted in areas of land salinisation, increased discharge of water and salts to waterways and higher and/or prolonged water levels in wetlands.

Other land use activities, such as forestry, intercept rainfall and can lower groundwater levels resulting in reduced streamflow and less recharge to groundwater systems compared to annual agricultural crops. The beneficial effects of tree plantations on water levels are also observed in salt affected catchments. Computer modelling has predicted streamflow and salt load reductions under various land use regimes (including plantations) in the Denmark catchment and monitoring data has confirmed the predicted salinity reductions (Department of Water, 2004). Salinity concentrations in the Denmark River have been reduced through regulation and catchment practices to a level that allows the river to be used as a public drinking water source again. Department of Water (2011) Denmark River water resource recovery plan (Report No. SLUI 40). Farm dams and other infrastructure such as interception drains also reduce runoff and diminish streamflow.

With the potential increased for perennial vegetation in relation to carbon farming and sequestration, it continues to be necessary to understand the relative impact and interactions between the different land uses across a catchment on the quantity and quality of water resource under current conditions and future climate scenarios to inform land management and water planning.

In terms of water supply, the most significant resource issue is identifying and securing future public water sources for public drinking water supplies, industry and agriculture without detrimental impact on the environment. There is significant predicted growth in demand in the region for future public water supply. The Department of Water and Environmental Regulation and the Water Corporation are

planning for this growth. Strategies for securing drinking water are outlined in Water Forever: Lower Great Southern (Water Corporation 2010) and the Great Southern regional water supply strategy (Department of Water, 2014). Strategies include improved water efficiency measures, expansion of existing sources and planning for new sources. Secure supplies for water are being confirmed with long term resource investigation and allocation planning by the Department of Water and Environmental Regulation which considers the environmental water needs of dependent ecosystems and the effects of climate change on availability. Water Corporation is undertaking the required water source planning. As such, future supplies have been identified and will be brought on line to meet future demand.

To support decision-making regarding future water supplies, it is necessary to have improved understanding and data regarding the water resource systems, social and cultural values, ecosystem requirements and future use and demands. This knowledge, with community consultation will provide a sound basis for public water planning for the short, medium and long-term.

The challenge for the whole region is to provide water for people and the environment in an even drier climate, with an increased population and with less environmental impact. To meet these challenges, government agencies need to work with the community to reduce water use, increase water recycling (including grey water use) and develop new water sources. Drinking water source protection plans have been prepared for most drinking water sources in the South Coast region. Plans are reviewed and updated as required.



In relation to the aquatic ecosystems there are two broad aquatic bioregions have been identified for river systems in the South Coast region:

- Western South Coast, from Gardner River in the west to Bluff River; and
- Eastern South Coast, from the Pallinup River through to the Thomas River in the east, based on a hierarchical classification using a comparative assessment of the ecological values of selected rivers across the region (Cook et al., 2008).

Rivers belonging to the eastern South Coast aquatic bioregion receive less rainfall, are significantly more saline, slightly more alkaline, and have higher levels of total nitrogen than those belonging to the Western South Coast aquatic bioregion (Cook et al., 2008). Rivers of both aquatic bioregions have similar levels of turbidity, dissolved oxygen and total phosphorus levels. The diverse river characteristics (e.g. hydrology, geomorphology, catchment size and vegetation cover) reflect the different management requirements across the region.

The South Coast region's waterways are home to number of endemic species found only in southern WA, including rare species that have narrow distribution ranges. Special macro invertebrate fauna include amphipods, freshwater crayfish, mayflies, stoneflies, caddis flies, dragonflies, freshwater mussels and fresh-water limpets. Ten species of native freshwater fish have been found in the South Coast region. The rarest include Western Trout (or Spotted) Minnow, Salamander fish, Balston's Pygmy Perch and a new undescribed species of Pygmy Perch from the Mitchell River near Denmark.

Wetlands of International Significance (under the Ramsar Convention) in the region include Lakes Gore and Warden and part of the Lake Muir system. Lake Warden

is a Biodiversity Recovery Catchment and revegetation, monitoring and hydrology studies have been undertaken. An additional 11 wetlands systems are listed in the Directory of Important Wetlands in Australia (Environment Australia, 2001) 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). In addition detailed wetland mapping, evaluation and classification has been undertaken in the urban and peri-urban areas of Albany, Hopetoun and Esperance by the former Department of Water.

Of the region's 33 estuaries and inlets, most are generally closed and only open to the Southern Ocean after heavy rainfall events or high seasonal water levels. Only four small estuaries and their catchments occur entirely within national parks and can be considered 'pristine' (the Dempster and Saint Mary within the Fitzgerald River National Park, and Jorndee and Poison Creeks within the Cape Arid National Park).

Seagrass decline, algal growth and nutrient sources have been extensively studied for the Albany harbours. Regular seagrass mapping between 1962 and 2006 has shown the decline and recovery of the seagrass meadows in both Oyster and Princess Royal Harbour, since industry regulation and catchment protection strategies were introduced in the 1990's. This is the first system in Australia to document recovery of seagrass ecosystems.

Climate change scenarios predict a rise in height of wave-dominated estuary bars, less frequent openings and shallower estuaries with greater sediment movement. There are also predictions of less river flow and possibly more erratic delivery of flow, stronger salt wedge further upstream, increased low oxygen events, increased productivity therefore increased algae bloom events and fish kill events.



Rainfall

- › A continuation of the trend of decreasing winter rainfall and wetting of the soil profile important in generating runoff critical for stream flow and filling major town and regional water storages
- › Decrease in spring rainfall
- › Changes to rainfall in autumn and summer are unclear
- › Changes in rainfall frequency and intensity combined with increasing temperatures may have implications for water quality, such as increased occurrence of algal blooms



Storms

- › Increased intensity of heavy rainfall events that can increase erosion, turbidity and nutrient loads in waterways with potential impacts for estuaries



Drought

- › Drought duration expected to increase, placing further stress on limited water supplies, ecosystems, water reliant industries and the agricultural sector
- › Increased evaporation rates and reduced soil moisture may require application of more water unless more resilient crops are planted or drought hardy variations developed

Figure 8.1. Future Climate Projections relevant for the Water Theme [Hope et al., 2015; CSIRO and Bureau of Meteorology, Climate Change in Australia website (<http://www.climatechangeinaustralia.gov.au/>), cited 2018]

Cutting across all of the values and assets related to water are the issues of climate variability and change. The Climate Change in Australia project (CSIRO and BoM, 2015) prepared an analysis of climate science and developed future climate projections across Australia, grouping the 56 NRM regions into eight clusters. The South Coast NRM region lies within the Southern and South West Flatlands (SSWF). The Southern and South-western flatlands cluster report provides the details regarding future climate projections for the region. A summary of the climate projections relevant to the Water theme for the SSWF are provided below (Fig. 8.1.). Access to detailed information and data regarding the projections to 2030 and 2090 for the region can be accessed at www.climatechangeinaustralia.gov.au

These projections have significant implications for the regions social, cultural, environmental and economic activities. It is critical to ensure coordination across the different tiers of government and regional organisations in developing plans and responding to climate. More importantly effective stakeholder engagement and communication is required to support these processes and to ensure that community values are well represented in decision making. South Coast NRM can play a pivotal role in supporting a participatory approach to these challenges and offer integrated solutions.

Water Key Achievements 2011-2018

The Key Achievements delivered to achieve the Water outcomes during 2011-2018 are summarised below.

1 Water Asset Protection and Rehabilitation

Numerous water asset protection and rehabilitation projects were completed during *Southern Prospects 2011-2016*. These projects included:

- the completion of the first revegetation project for the Yakamia Creek Living Stream project
- the development and implementation of management plans and actions to protect priority water assets
- continued implementation of the Wellstead Estuary, Culham Inlet and Stokes Inlet estuary management plans
- plantation of more than 17,000 reeds, sedges and shrubs over 5 community planting days
- invasive species control and riparian restoration activities around Wilson Inlet and the Denmark River.

2 Ramsar Wetlands

The Lake Warden and Lake Gore Ramsar project has successfully implemented on ground rehabilitation and habitat protection works in the catchments of the Lake Warden and Lake Gore Ramsar Wetlands. The wetlands provide habitat for a significant and diverse number of migratory and residential shorebirds and water birds for the region as recorded in the annual Shorebird 2020 surveys for 2016 to 2018. These sites included the Ramsar wetlands and several beach locations. The surveys were made possible by a huge volunteer effort from the Esperance Bird Observers Group that covered 39 individual locations across 255 km of coastline and at least 8 private property wetlands locations.

3 Capacity Building, Raising Awareness, Education

Water asset education and monitoring activities have continued with school children, community groups and individuals through numerous events, workshops field days and catchment tours across the region. An aquatic macro invertebrate field guide was developed to assist schools and community with waterways monitoring and education on the south coast.

4 Bringing the Oysters Back to Oyster Harbour Project

The Nature Conservancy Australia partnered with the University of WA, Recfishwest and South Coast NRM to assess the feasibility of restoring native Angasi oyster reefs in Oyster Harbour delivering stage 1 of the project. Key knowledge gaps were addressed including the ecological viability of restoring oyster reefs, logistical processes and financial resourcing and community and industry support. The results indicate that a full-scale shellfish reef restoration project is feasible in Oyster Harbour.

5 South Coast Fish Friendly Farms Project

Successful completion of the pilot project of the Fish Friendly Farms program in WA. Two on-farm demonstration sites were developed to showcase the implementation of environmental restoration and protection works to help restore ecosystem function for the benefit of native fish and the aquatic environment. Landholders, project partners and the community were engaged through project workshops, field days and communication activities to improve landholder and stakeholder knowledge of the native fish, local waterways and natural resource management issues and activities to protect and improve the aquatic environment.

6 Regional Estuaries Initiative

The Regional Estuaries Initiative (REI) is a Department of Water and Environmental Regulation project. The works in the Oyster Harbour and Wilson Inlet catchment are being undertaken by the respective catchment groups, through direct funding from DWER. South Coast NRM is a partner organisation implementing an REI project in the Yakamia Creek catchment.

8.3 Future Directions

The future directions contained in this strategy and presented as the 25-year aspirations, five-year outcomes and key actions, are based on the review processes conducted by South Coast NRM, the Water and Marine Reference Group and community workshops. The Water outcomes have been modified from *Southern Prospects 2011-2016* to reflect the feedback through the consultation process as well as to include those outcomes identified in developing the Climate Adaption Addendum (2016). The Adaptation Pathways process has been applied to the revised Water outcomes (Fig. 8.2) that includes key actions to be considered in implementation of the strategy and indicative timeframes.

Given the long history of water planning and management, the emerging issues that were identified are just as relevant to most other themes, for example the management of plastic waste, prevention of illegal discharge into waterways, ensuring ongoing review of threats to wetlands and management of Ramsar listed wetlands and ensuring protection of waterways with perennial vegetation. These issues and appropriate responses will be considered in the context of resourcing and funding available.

The Adaptation Pathways framework will support the preparation of the Investment Plan by South Coast NRM and help focus investment towards the priority actions. It is intended that the key actions be reviewed by South Coast NRM and the Reference Groups to ensure the Strategy continues to be responsive to emerging issues and opportunities, whilst delivering against the regional natural resource management priorities within the resourcing, capability and capacity available.

The symbols applied in the Adaptation Pathway aim to describe the enabling process for the key actions. These include whether the action is a review process, requires a decision to proceed, connects to other actions, is in a position to commence if funding and resources are available, and when actions are likely to be completed. The shading indicates the proposed commencement and duration of the key actions and provides a guide to phasing and sequencing of these actions.

Aspiration (25+)

South Coast rivers, estuaries, wetlands and water resources are precious and will be restored, maintained and protected so that their social, cultural, economic and ecological values can be recognised and embraced.

This will be achieved by:

- improving and maintaining the water quality of low impacted ('near pristine') and impacted ('degraded') wetlands, waterways and estuaries
- improving and protecting the biotic aspects of rivers, estuaries and our regionally, nationally and internationally significant wetlands, including their foreshores, other habitats, ecological functions and biodiversity
- improving the understanding and awareness of the values, attributes and management needs of wetlands and waterways in a changing climate
- ensuring improved sustainable and efficient use of water resources and improving and maintaining the quality and quantity of water in a changing climate
- improving and maintaining the recreational, cultural, commercial (including fishing) and social amenity values of estuaries, rivers and their foreshores.

Outcome	Key Actions	2019	2020	2021	2022	2023	2024
W1. Improved knowledge and understanding: Increased understanding of a regional water assets and sustainable management.	1. In partnership with Department of Water and Environmental Regulation identify existing monitoring data to support evaluation of resource condition trends.						
	2. Increase the understanding of recreational, cultural, commercial and social amenity values of estuaries, rivers and foreshores and the application of these values to sustainable management actions.						
W2. Increased knowledge and awareness of climate change mitigation and adaptation: Increase knowledge and awareness of potential impacts and adaptive management responses to climate change and other stressors on priority water assets for the South Coast region.	1. Model extreme events and other climate change projection information to inform a risk assessment of water assets.						
	2. Undertake an assessment of the resilience of the regions water assets to climate change and identify the threats and opportunities and the capacity to manage these.						
	3. In partnership with Department of Water and Environmental Regulation consider floodplain mapping for priority areas.						
W3. The condition of impacted and degraded waterways is improved: Maintain and/or improve condition of priority threatened rivers, estuaries and wetlands with management planning and implementation of best management practices and on ground works including invasive species management at 25% priority and/or representative systems by 2024.	1. Undertake prioritisation with Reference Group.						
	2. Review priorities and NRM activities based on resource condition, threats (including invasive species), climate change and resource availability for NRM activities.						
	3. Conduct appropriate and targeted activities that protect and enhance degraded waterways and catchments.						
	4. Implement well targeted on-ground action and awareness of the management actions to control invasive species.						
W4. Low impacted and pristine waterways are protected: Maintain and/or improve condition of high value, less threatened rivers, estuaries and wetlands with management planning and implementation of best management practices and/or on ground works at 25% priority and/or representative systems by 2024.	1. Undertake prioritisation with Reference Group.						
	2. Review priorities and NRM activities based on resource condition, threats, climate change and resource availability for NRM activities.						
	3. Conduct appropriate activities that protect and enhance low impacted and pristine waterways and catchments.						
W5. Ramsar Wetlands are protected: Maintain and/or improve the value, level of protection and condition of internationally significant Ramsar wetlands, with quantifiable targets set based on ecological character descriptions.	1. Continue works to protect and address priority threats, including climate change, to RAMSAR wetlands.						
	2. Improve knowledge, skills and awareness of wetlands within the community.						
W6. Sustainable urban and rural water resource management and use: Sustainably manage urban and rural water assets for positive natural resource management outcomes and natural water asset protection and the provision of environmental water and ecosystem services.	1. Provide technical support to agencies and water/land managers to promote water use efficiency measures and water recycling.						
	2. Undertake floodplain mapping for priority areas.						
	3. Engage in the regions urban and rural water management and planning processes.						



Outcome	Key Actions	2019	2020	2021	2022	2023	2024
Bridging Theme Outcomes							
H3. Protection of heritage places: Identification and protection of significant cultural natural heritage places in partnership with the Aboriginal community.	1. Develop a process to identify and acknowledge protection of heritage places.	➡					
	2. Apply best practice techniques related to protection and conservation of Aboriginal artefacts and heritage when working in riparian zones.	➡					
H5. Improved application of traditional ecological knowledge: Apply the use of traditional ecological knowledge (TEK) to South Coast community projects with respect for intellectual property.	1. Ensure that Aboriginal community's input including TEK is incorporated into planning for water outcomes across the region.	➡					
	2. Consult with the Aboriginal Reference Group to advise opportunities to integrate TEK in project development and implementation.	➡					
R5. Improved awareness, recognition, education and training: Increase knowledge and appreciation of water asset values and threats through the development and implementation of water resource partnerships, a regional water asset education program, and training and knowledge retention initiatives.	1. Develop a water education and extension program that supports delivery of priority messages, such as climate change and whole-of-asset system, and education at a regional scale.	?					
	2. Communicate and extend water asset report cards, research activities and monitoring.	➡					
	3. Support a water and NRM training and extension program for landholders in priority water asset areas.	➡					
	4. Deliver an annual South Coast Regional Water Forum.	📄	📄	📄	📄	📄	📄

LEGEND: ? Decision Point 📄 Review ✓ Complete ➡ Commence ▾ Linking Action

Figure 8.2. Adaptation Pathways – Water Theme

8.4 Measures and Indicators

A series of potential indicators and measures were recommended by *Southern Prospects 2011-2016* (Table 8.1). These continue to be relevant and act as a guide to assist in setting targets for projects and programs and allow for standard approaches to measurement. Indicators should be selected according to the principles of cost, simplicity, consistency, practicality and capacity to deliver information across the region. These measures will form the base inputs for monitoring and assessing performance for review by South Coast NRM as part of its normal financial and business reporting processes and support annual reporting of Strategy achievements.

Table 8.1. Potential Indicators for the Water Theme.

Asset	Indicator	Measure
Inland aquatic ecosystems	River conditions	<p>Critical indicators</p> <ul style="list-style-type: none"> ➤ Benthic macro invertebrates. ➤ Fish. ➤ Riverine or catchment vegetation. <p>Contextual indicators</p> <ul style="list-style-type: none"> ➤ Hydrology. ➤ Water quality. ➤ Physical form. ➤ Drivers (catchment condition). ➤ Foreshore surveys can be conducted periodically to measure changes in river condition.
	Wetland ecosystem condition	<p>Catchment disturbance</p> <ul style="list-style-type: none"> ➤ Disturbance in the catchment. <p>Physical form and processes</p> <ul style="list-style-type: none"> ➤ Area of wetland – change in area. ➤ Wetland topography. ➤ Soil disturbance. <p>Hydrological disturbance</p> <ul style="list-style-type: none"> ➤ Physical modification to hydrology. ➤ Changes to water regime. <p>Water and soil quality</p> <ul style="list-style-type: none"> ➤ Turbidity regime. ➤ Salinity regime. ➤ Change in pH. ➤ Soil properties. <p>Buffer zone</p> <ul style="list-style-type: none"> ➤ Change in fringing vegetation. <p>Biota</p> <ul style="list-style-type: none"> ➤ Change in wetland vegetation. ➤ Change in invertebrates. ➤ Change in vertebrates. ➤ Change in introduced species. ➤ Change in algae.



Image: Andrea Deegan

Asset	Indicator	Measure
Aquatic environments	Nutrients in aquatic environments	<ul style="list-style-type: none"> ➤ Total nitrogen concentrations and loads leaving sub catchments or whole catchment. ➤ Total phosphorus concentrations and loads leaving sub catchment or whole catchment.
	Turbidity, suspended particulate matter in aquatic environments	<ul style="list-style-type: none"> ➤ Turbidity. ➤ Total suspended solids (TSS) and flow.
	Salinity in freshwater aquatic environments	<ul style="list-style-type: none"> ➤ Total dissolved solids (TDS) and flow. ➤ Electrical conductivity (EC) and flow.
Water resources	Allocation of water resources Water conservation Wastewater recycling	<ul style="list-style-type: none"> ➤ Volume of water used per person per year. ➤ Percentage reduction or reuse of water. ➤ % of potable scheme water used for non-potable uses (e.g. public open space, industry).

case study

Hard work by Landholders paying off for Pallinup River Survey shows rehabilitation work improves river condition

The focus of the 2017 River Floodway Condition Survey was the Middle Pallinup River, between the Gnowangerup-Tambellup and Chester Pass Roads, approximately 43 kilometres, following the main channel of the river. The Survey was part of a larger project developed & implemented by North Stirlings Pallinup Natural Resources (NSPNR), funded by the State NRM office and undertaken by waterways consultants Geraldine and Steve Janicke.

The survey was completed 16 years after the last assessment and a critical question was posed; have rehabilitation efforts in the catchment made a positive difference to the state of the river? A secondary aim was to repeat the 2001 riparian assessment to produce a more accurate assessment of water condition.

Key findings highlight the positive results of action on the ground undertaken by the local catchment group, NSPNR and landholders.

- Although the Pallinup is a degraded river system, it shows signs of stabilising and this implies that rehabilitation efforts have helped enhance the condition of the river.
- The basic channel structure has remained much the same at most sites over the previous 16 years and bank, bed and terrace erosion only increased minimally.
- Sediment deposition has increased and fresh sediment is still being mobilised into the river. Some of these sediments are entering the main river from tributaries, but it is movement of existing sediment deposits that appears to be the greatest problem. Sediment infill has made the river pools shallow, which in turn increases river temperatures and algae growth, and impacts habitat for river fauna.
- Just over half of the main river tributaries appear to have a reasonable cover of remnant vegetation or re-vegetation and, in principle, this has improved the biodiversity and habitat characteristics of the river system.
- There is natural regeneration of Swamp sheoak and Jam wattles, but little natural regeneration of Eucalypts. Flooded gums show the greatest decline in health and rising saline groundwater levels are likely to be the main cause.
- Stock exclusion is a critical factor in stabilising and improving the Middle Pallinup River, enabling the establishment of vegetation which contributes to floodway stability and water condition.

Overview

The Middle Pallinup experiences most of the environmental pressures that typically characterise the waterways in the wider catchment. Community actions to help protect the riparian environment of the Pallinup River gained momentum in the 1990s.

Water condition is a broader concept than basic water chemistry measures. It is a product of riparian attributes such as the structure of the river channel, in-stream and fringing vegetation, water depth, shading, habitat types, water quality and the diversity of the aquatic and terrestrial biota that rely on the water. For this reason, data describing these features also describes water condition from an ecological perspective, that is for the flora and fauna that depend on the river for survival.

Periods of more than 10 years are required to monitor progressive changes. This is due to annual and seasonal variability in impacts which require sufficient information about what the conditions were before rehabilitation efforts were commenced. A comprehensive photo point audit undertaken in 2001 enabled an examination of floodway changes at 155 geo-referenced sites spread along the entire survey area.





The report describes the character of the river and the changes that have taken place at the representative sites over a sixteen-year period. These changes reflect both the seasonal and landscape pressures acting on the river and the impacts of extreme flood events. Fortuitously, a major flood in February 2017, while perhaps obscuring the effects of progressive pressures, also provided a means to examine the resilience of the river to a flood comparable with the 1955 summer flood.

The degree to which on-ground works have contributed to stabilising the river could not be conclusively determined, however, the finding that the floodway appears relatively stable is important for justifying rehabilitation efforts. In an unstable situation on-ground works can easily be overwhelmed and undone.

The conclusion therefore is that the rehabilitation work is a significant contributor to improving the condition of the river system and should be ongoing. A feasible goal is to have 90 - 100% of the main arteries protected with adequate riparian vegetation cover as well as improving cover on many of the smaller streams wherever possible. Additional re-vegetation and encouragement of regeneration of native shrub and ground cover species within the river floodway would also help to halt degradation processes.

Future Directions

The 2017 survey suggested that two levels of management focus are required for enhancing and maintaining the environmental values of the Pallinup River.

Firstly, there is the need to strengthen long term community commitment to looking after the river, including its extensive network of tributaries. This will mean articulating a clear vision for what the community would like the river to be like in the coming decades. It should be appreciated that the river in its degraded state can no longer 'look after itself'.

The second level of river management is the development and implementation of a river rehabilitation methodology. This specifies the what, where and how of on-ground works required to halt further degradation and to reinstate desirable ecological characteristics in the river system.

The mainstay of rehabilitation efforts for several decades has been a jig-saw of scattered and often disconnected on-ground works. Opportunities need to be found to link these works to improve continuity of stream form.

The full report of the Middle Pallinup Floodway Condition Survey 2017 can be downloaded from the North Stirlings Pallinup Natural Resources Inc. website or the South Coast NRM website.





*coastal
and marine*

9. coastal and marine

Protect and enhance the marine and coastal environment

This section describes the importance of the coastal and marine assets in the management of natural resources and the principles that guide management including the aspirations; desired outcomes; and key actions identified for the coastal zone of the South Coast region. It should be noted that estuaries have generally been considered by the Water theme and that the outcomes in the Biodiversity theme will also contribute to those of the coastal zone.

ASPIRATION: Our coastal and marine environments are improved by reducing key threats through a community-led approach that embraces social, cultural, economic and ecological values.

9.1 Principles

The principles for managing coastal and marine resources include:

- the need for a high level of community involvement given the public nature of the assets.
- the need to integrate planning and actions across multiple land managers (local and State Government, private, Aboriginal corporations) to have landscape scale outcomes.
- the need to reduce access and usage conflicts between stakeholders through engagement, collaboration and consultation.
- the coastal area of the Region is the most intact and contiguous environment and is a priority for protection.
- adaptive management and best practice methods for on-ground works to maintain the functional integrity and health of coastal and marine systems.

9.2 Current Context

The region includes approximately 1000 kilometres of coastline. The coastal settlements of Albany, Esperance, Denmark, Bremer Bay, Hopetoun and Walpole support the majority of the region's population. The coastline is spectacular and diverse, alternating between sandy beaches, granite headlands, limestone cliffs, vegetated coastal dunes and includes numerous inlets and over 500 offshore islands, shoals and bombies. The Recherche Archipelago contains the majority of these features and is an important marine and terrestrial environment in WA.

About 70% of the terrestrial coastal environment is contained in the conservation estate with the majority of the remainder

being either managed by local government for recreation or is unmanaged crown land. A regional coastal management strategy, Southern Shores 2009-2030, outlines regional objectives, management actions and opportunities for collaboration between stakeholders to better manage the coast.

The almost continuous strip of intact coastal native vegetation along the south coast is a very high priority east-west corridor that provides links between areas of high conservation value. The coastal terrestrial reserves of Fitzgerald River National Park, Cape Arid and Two Peoples Bay Nature Reserve represent significant habitat refuges for a high number of endemic and threatened species and communities, such as Gilbert's potoroo, the dibbler, western ground parrot and western whippbird. Threats to the continued existence and integrity of the habitat corridor include *Phytophthora* dieback, other diseases such as aerial canker and root rot, degradation arising from recreational use, grazing, inappropriate fire regimes, mining, changes to hydrology and exotic plant and animal species.

The marine component of the region extends from the coastline out to the three nautical mile State limit, including waters to three nautical miles off the coast of offshore islands. This extends in places to approximately 70 km off the mainland around Esperance and at a broad scale includes a range of major benthic habitats within the continental shelf.

Offshore islands provide critical habitat, breeding and resting sites for many species of seabirds including albatross, petrels, shearwaters, penguins, the endangered Cape Barren goose and marine mammals. The region's offshore islands have high cultural values, from both Aboriginal and European perspectives. Nature based tourism and visitor pressure on offshore islands is currently increasing, providing both an economic opportunity for the region and potential pressure on this critical habitat.

South Coast marine waters are directly influenced by large scale ocean currents such as the Leeuwin Current, localised hydrological variations and inputs (e.g. river mouths), global and local climatic conditions and Southern Ocean currents and swell regimes. The predicted impacts of climate change include sea level rise, ocean acidification, warming ocean and impacts on currents, change in species distribution, storms and storm surges. These are summarised in Figure 9.1.

More than 800,000 local people and tourists visit the region's coastal national parks and conservation reserves annually and contribute to the economic stability of the region. People also visit reserves managed by local government and unmanaged crown land. In some areas the level of management and available facilities are limited. Under these circumstances, these areas are sometimes unable to sustainably cater for the influx of locals and visitors. When the effects arising from climate change become more apparent at a local scale, some areas may not be able to support the current level of visitation (especially during peak periods).



Sea Level Rise

- › 4.6mm sea level rise at Esperance (1990-2010)
- › Possible impacts include saltwater intrusion into groundwater and freshwater bodies and on low-lying infrastructure, coastal foreshores and ecosystem assets
- › Improved sea level monitoring by the National Tidal Centre will help inform planning



Acidification[^]

- › Acidification is increasing:
- › pre-industrial pH was 8.29
- › current average pH is 8.110
- › it is expected to drop to 7.8 by 2100 under 'business as usual' CO2 emissions.
- › Acidification reduces the shell-forming ability of marine life, such as plankton and corals, that are important food sources in the food web



Climate Shift[#]

- › Average climate zones have shifted south by 100-200 km along north-eastern and north-western Australia
- › It is highly likely that pelagics such as sharks, tuna and bill fish will increase their habitat range and move further south
- › Poleward movements are also expected for WA coastal fish species
- › Uncertainty in the impacts of species overlap



Ocean Warming and Currents^{*}

- › The Leeuwin current runs along the west and south coast of Australia and is important in transporting marine species, warm water and nutrients
- › The strength of the current is influenced by ENSO
- › In the summer of 2010/2011 a strong Leeuwin current caused fish deaths, coral bleaching and migration of local species to cooler waters in the south
- › These heatwaves are likely to reoccur, but there is a general weakening trend of the current



Storms and Storm Surges^{*}

- › Sea-level rise and the occurrence of extreme storm events are likely to exacerbate erosion, inundation and damage to existing infrastructure
- › The combination of king tides, storm swells and rainfall can create severe flooding conditions in low-lying areas
- › South coast at less risk than other coasts

Figure 9.1 Future Climate Projections relevant for the Coastal and Marine Theme.

[^] ACECRC 2016 Southern Ocean Acidification report Card and Feely et al (2009)

^{*}Climate Adaptation Addendum 2016

[#]IPCC 2014

Fishing along the coast has traditionally been practised by Aboriginal people for countless generations and remains an important cultural activity.

As much of the region is remote or difficult to access, recreational beach and boat fishing tends to be concentrated around main population and holiday centres. Major target species for beach and rock anglers are salmon, herring, whiting and trevally, while boat anglers target pink snapper, queen snapper, bight redfish, several shark species, samson fish and King George whiting.

A small commercial fishing sector fleet within the South Coast marine bioregion consists of Abalone Fishery, South Coast Purse Seine Fishery, Demersal Gillnet and Longline Fisheries, Australian Salmon Fisheries, Australian Herring Fishery, South Coast Crustacean Fisheries, South Coast Trawl Fishery, South Coast Estuarine Fisheries Octopus Fishery and a South Coast Scalefish Fishery. Small State-wide Marine Aquarium Fish Fishery and Specimen Shell Fishery also exist in the region.

From 1 January 2019, the Aquatic Resources Management Act 2016 will become the primary legislation used to manage the fishing, aquaculture, pearling and aquatic resources in Western Australia. It will replace the Fish Resources Management Act 1994 and the Pearling Act 1990 to provide integrated fisheries and aquatic resource management. State Government has also initiated a voluntary program to provide all of the State's commercial fisheries with the opportunity to achieve external sustainability certification through the Marine Stewardship Council international accreditation program in partnership with WA Fishing Council and Recfishwest.

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

been developed for this fishery and the Australian Salmon Fisheries. The South Coast Purse Seine Fishery has invested in projects to reduce by-catch of shearwaters and adapted fishing practices to suit.

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

The high value attached by the community to coastal areas and corresponding pressure from recreational use, means that management of coastal reserves is high on local government natural resource management priorities. The five coastal local governments within the region support and are members of the South Coast Management Group, a regional local government and community group formed in the mid-1990s. The Group brings together people, organisations and information, so that communities in the South Coast region can work in partnership to improve the quality of the coastal and marine environment, resulting in environmental, social and economic sustainability (southcoastmanagementgroup.org.au).

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

Image: Paul Cunningham





Image: Ian Tanner

Coastal and Marine Key Achievements 2011-2018

The Key Achievements delivered to achieve the Coastal and Marine theme outcomes during 2011-2018 are summarised below. This project included activities improving the condition and protection of coastal habitats, education and awareness programs, citizen science monitoring and initiatives to reduce the impact of threats on our fragile coastal environments.

1 Revegetation of the coastal corridor

South Coast NRM's coastal team implemented and provided technical support in the delivery of 32 coastal protection and erosion management projects to protect and rehabilitate coastal environments in collaboration with community partners and coastal land managers. The project has also worked closely with the Esperance Tjaltjraak Native Title Aboriginal Corporation (ETNTAC) Aboriginal Rangers to implement coastal projects to protect coastal environments and cultural sites in the Esperance coastal corridor.

2 Managing recreation impacts on our coastline

Recognised as one of the key threats contributing to the decline in the condition of our coastal environments the impacts of recreation were addressed through both implementing on-ground activities and creating increased positive behaviours amongst coastal users. Works included controlling vehicle access to fragile coastal habitats, addressing the spread of Phytophthora dieback, rehabilitating eroded coastal areas, improving the infrastructure and management of coastal campsites. South Coast NRM worked closely with South Coast Management Group and land managers to maintain a consistent approach to managing recreational use of our coastline. Engagement of coastal users highlights include the development and distribution of the Code Off-Road 4WD users guide, hosting responsible 4WD training courses, developing improved coastal signage and hosting community volunteer events throughout the region.

3 Salty Summer coastal education activities

Salty Summer coastal education activities were held annually across the South Coast region over the summer months with around 2,000 people enjoying approximately 120 free events and activities. The focus of the program was on engaging youth, families and recreational beach users through interactive activities at coastal locations across the South Coast region. Beach investigators activities identified and explored the marine flora and fauna species. Bird walks focussed on documenting and protecting beach-nesting shorebirds, including Red-capped Plovers and Hooded Plovers. Outdoor screenings of the South Coast documentary "Remote & Rugged" were popular events held at a number of holiday locations.



9.3 Future Directions

The future directions contained in this strategy and presented as the 25-year aspirations, five-year outcomes and key actions, are based on the review processes conducted by South Coast NRM, the Water and Marine Reference Group and community workshops. The Coastal and Marine outcomes have been modified from *Southern Prospects 2011-2016* to reflect the feedback through the consultation process as well as to include those outcomes identified in developing the Climate Adaptation Addendum (2016). The Adaptation Pathways process has been applied to the revised Coastal and Marine outcomes (Fig. 9.2) that includes key actions to be considered in implementation of the strategy and indicative timeframes.

Some of the key actions identified relate to existing gaps, for example resourcing for monitoring, or building capacity to respond to such large-scale and uncertain risks like a changing climate. Opportunities to build and enhance citizen science programs could have multiple benefits that include cost-effective collection of data and information, engages with community and stakeholders and enhances their understanding of the environment and participants may be more inclined to promote natural resource management and to be leaders within their community.

There are also a number of new actions addressing climate risk, understanding the short-medium-long term responses and options available to respond and to build improved

understanding by all stakeholders, in particular land managers and the community. These are framed around the following concepts:

- vulnerability assessment of high value assets or strategic locations
- prioritising on-ground actions with consideration of the breadth of feasible response options, including planned retreat
- identify and engage with stakeholders
- evaluation via report cards/state of the environment reporting
- consideration of other connected risks, such as the increased potential health risks associated with the predicted increase in mosquito breeding habitats resulting from climate change.

The Adaptation Pathways framework will support the preparation of the Investment Plan by South Coast NRM and help focus investment towards the priority actions. It is intended that the key actions be reviewed by South Coast NRM and the Reference Groups to ensure the Strategy continues to be responsive to emerging issues and opportunities, whilst delivering against the regional natural resource management priorities within the resourcing, capability and capacity available.

The symbols applied in the Adaptation Pathway aim to describe the enabling process for the key actions. These include whether the action is a review process, requires a decision to proceed, connects to other actions, is in a position to commence if funding and resources are available, and when actions are likely to be completed. The shading indicates the proposed commencement and duration of the key actions and provides a guide to phasing and sequencing of these actions.

Aspiration (25+)

Our Coastal and Marine systems are improved by reducing key threats through a community-led approach that embraces social, cultural, economic and ecological values.

This will be achieved through:

- a better understanding of coastal and marine habitats, including their biodiversity, social, cultural and economic values and the impact of a changing climate
- greater integrity of the landscape linkages in Coastal Corridor, through better protection and improved condition, complemented by integrated coastal and marine zone management linked to catchment restoration and biodiversity conservation
- established coastal and marine reserves and protected areas to preserve representative habitat and other social, cultural, economic and ecological values
- sustainably managed recreational, commercial and traditional Aboriginal fisheries
- increased awareness, understanding and appreciation by the community of coastal and marine assets, values and management with education activities focused around behaviour change for sustainable use and protection of coastal and marine assets.

Outcome	Key Actions	2019	2020	2021	2022	2023	2024
C1.Improved knowledge and understanding: Establish community and agency based monitoring programs and increase research activity to inform baseline setting and detect changes in coastal and marine ecosystems from current and potential threats, including climate change.	1. Identify existing gaps to prioritise monitoring needs and evaluate against existing programs and opportunities for citizen science and other community participation.						
	2. Further development of methodologies and training to support new and existing monitoring programs.						
	3. Analysis of monitoring data.						
	4. Determine research priorities and potential partnerships.						
C2. Marine pests are monitored and managed: Contribute to the management of introduced coastal and marine pests and diseases at the local level through vigilance and monitoring by community and industry with implementation of effective risk management protocols and responses.	1. Continue current monitoring and ongoing risk assessment.						
C3. Improved climate change mitigation and adaptation responses: Priority coastal and marine assets at risk from effects of climate change, sea level rise, storm surge and associated threats are identified and appropriate strategies applied by the implementation of adaptive management responses by 2020 in cooperation with key stakeholders and other regions.	1. Identify and prioritise environmental coastal and marine assets at risk from climate change and identify mitigation and adaptive opportunities.						
	2. Identify key stakeholders and sectors that are a priority to engage in coastal climate change adaptation and response planning.						
	3. Work with and support agencies and key partners(eg. Department of Transport and WAPC) in developing a consistent regional climate change adaptation information to support adaptation and response planning.						
C4. Improved condition of coastal and marine systems: Coastal and marine systems are maintained and/or improved in a changing climate by implementing coastal protection, rehabilitation and restoration projects at a local and regional scale based on implementing priority actions identified in Southern Shores 2009 - 2030 (South Coast Management Group 2009) by 2024.	1. Identify key threats and targeted works at a regional scale.						
	2. Ensure collaboration of technical expertise at a regional level through the Biodiversity, Coastal and Marine Reference Group.						
	3. Support on-ground activities and targeted works facilitated by the South Coast Management Group.						
	4. Support implementation of coastal management plans at both a local and regional scale.						
C5. Improved coastal and marine partnerships and planning: Integrated coastal and marine management capacity increased by continuing integrated regional and local planning involving key stakeholders by 2020.	1. Identify partnerships and funding opportunities for coastal management.						
	2. Support integrated coastal zone planning with coastal land managers and key stakeholders to protect the integrity of the coastal macro corridor.						
	3. Develop a regional coastal and marine database, with shared, validated, reviewed and up to date information applied to coastal and marine planning and management.						

Outcome	Key Actions	2019	2020	2021	2022	2023	2024
Bridging Theme Outcomes							
H3. Protection of heritage places: Identification and protection of significant cultural natural heritage places in partnership with the Aboriginal community.	1. Develop a process to identify and acknowledge protection of heritage places.	⇨					
H5. Improved application of traditional ecological knowledge: Apply the use of traditional ecological knowledge (TEK) to South Coast community projects with respect for intellectual property.	1. Consult with the Aboriginal Reference Group and Aboriginal native title groups to seek advice on opportunities to integrate TEK into project development and implementation.	⇨					
R5. Improved awareness, recognition, education and training: Engage coastal users (e.g. off road vehicle users, youth and recreational coastal users) to enhance knowledge and appreciation of coastal and marine asset values and promote behavioural change through the development and implementation of a regional coastal and marine education and awareness program by 2024.	1. Design an education and awareness program to enhance the knowledge and appreciation of risks and adaptive strategies related to coastal and marine climate change threats.	⇨					
	2. Support a regional approach and consistency to coastal and marine education and awareness.	⇨					

LEGEND: Decision Point Review Complete Commence Linking Action

Figure 9.2. Adaptation Pathways – Coastal and Marine

9.4 Measures and Indicators

A series of potential indicators and measures were recommended by *Southern Prospects 2011-2016* (Table 9.1). These continue to be relevant and act as a guide to assist in setting targets for projects and programs and allow for standard approaches to measurement. Indicators should be selected according to the principles of cost, simplicity, consistency, practicality and capacity to deliver information across the region. These measures will form the base inputs for monitoring and assessing performance for review by South Coast NRM as part of its normal financial and business reporting processes and support annual reporting of Strategy achievements.

Table 9.1. Potential Indicators for the Coastal and Marine Theme.

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

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

case study

The Coastscapes Coastal Corridor

Improving the connectivity, quality and resilience of the 512 km WA coastal corridor

The South West Botanical Province of Western Australia is a recognised biodiversity hotspot. This province contains the Coastal Macro Corridor, noted for its exceptional biological value, significant spatial scale, the number of protected areas that it links and its potential to create linkages of bioregional proportions.

Overview

The Coastscapes project identified priority areas for landscape scale biodiversity planting of native habitat to build resilience and connectivity. The project involved over 20 project partners, led by South Coast Natural Resource Management Inc. delivering targeted strategic works across 33,848 ha along the 512 km coastal corridor from Two Peoples Bay near Albany to Cape Arid on the edge of the Nullarbor Plain.

The project focussed on thickening and strengthening the coastal corridor and building the resilience of the remnant vegetation reserves. It enhanced areas where there were breaks in the vegetation corridor to protect flora and fauna from threats such as invasive weed species, dieback and unintentional damage caused by people.

Project achievements

- The project delivered 33,848 ha of strategic works to enhance and protect the coastal corridor.
- Established 361 ha of revegetation via direct seeding and seedlings, including a protective 167 ha of revegetation adjacent to the vulnerable Jerdacuttup Lakes.
- Completed 147 km of access control fencing which collectively protect 59,983 ha of the coastal corridor.
- Undertook 986 ha of primary and follow up invasive species control, with a focus on Victorian Tea Tree.
- Undertook 32,500 ha of Phytophthora Dieback mapping and planning.
- Built community capacity to deliver best practice rehabilitation and protection works through strategic planning, technical support, skills and training.



Lake Gore RAMSAR wetland system

Community engagement

The project partners included local government, state government agencies, subcontractors, private landholders, traditional owners, community groups, coastal users groups. These provided over 100 volunteer opportunities, 12 coastal field days across the region trained and supported community members and engaged with stakeholders along the coast.

A highly successful engagement program - The Salty Summers Coastal Education Program - was rolled out across the region with 18 individual events in 5 coastal locations. Educational programs were conducted with primary and high schools through marine science programs and the Bay Monitoring project.

Coastal erosion and beach protection

Accompanying this revegetation work, significant progress was made in addressing coastal erosion and dune protection. Working with State and local governments, 24 coastal erosion control projects were undertaken, protecting 37 ha of coastline, together with 23 ha of dune revegetation and 20km of fencing to protect a further 53 ha. The work also supports the protection of beach nesting and migratory shorebird habitats.

Internationally significant RAMSAR wetlands

The Coastal Corridor includes international significance RAMSAR wetlands of, Lake Warden and Lake Gore. Located north of Esperance town site, each year the wetlands are teeming with thousands of migratory birds from all over the world coming to rest and feed in the mudflats of the wetlands. These wetlands support one per cent of global population of Hooded Plover and the chestnut teal.

The Ramsar wetlands project has brought community together to work in partnership (local land managers, community groups and government agencies) to address threats to the Ramsar wetlands and threatened (EPBC-listed) species. Project activities are guided and supported by a team of professionals in natural resource management via the Lake Warden and Lake Gore Ramsar Technical Advisory Group (TAG). The group



Image: Meredith Spencer

ensures that all management activities maintain and enhance the ecological character of the Ramsar Wetlands.

During 2015-2018 the Ramsar project has delivered rehabilitation activities (fencing, revegetation and weed control) in across 92.4 ha of the Lake Warden and Lake Gore Catchments resulting in 391 ha of shorebird habitat protection. The revegetation programme engaged 38 private landholders planting 59.4 ha of native vegetation to address altered hydrology and provide habitat for fauna species like the Hooded Plover and Carnaby's Black Cockatoos. Invasive weeds were controlled over a total of 43 ha.

In addition the Ramsar project has enabled community to participate in citizen science by locally supporting an annual shorebird survey, part of the national monitoring program, The Shorebird 2020 Program, coordinated by Birdlife Australia. A substantial volunteer effort has enabled the survey of 39 individual sites including the Ramsar wetlands across 255 km of coastline and 8 private property wetlands 30 km inland.

Image: Tim Gamblin







next steps

10. Next steps

Effective management of the natural resources of the South Coast region will require action from land and water managers, the broader regional community, industry, local, state and national governments. To enable this engagement *Southern Prospects* will be supplemented with an Investment Plan and Monitoring and Evaluation plan that South Coast NRM will implement and use as a basis to seek support to undertake these activities.

10.1 Investment Plan

The development of an Investment Plan that accompanies this strategy will ensure early engagement with stakeholders and the community to make sure that their interests and concerns are considered. The Investment Plan will include sufficient information to allow potential investors, including the state and federal governments, to assess alignment with their priorities and level of funding. The Investment Plan will include:

- proposed sources of investment
- detailed project proposals
- proposed project budgets
- prioritisation: urgency, significance or critical nature of the action
- risk factors and management plans
- timelines, milestones and performance indicators.

To determine the level of priority for each activity identified as necessary to deliver *Southern Prospects*, consideration of numerous factors will be included, such as:

- Does the activity protect or restore a high value asset?
- Does the activity remove a high value threat?
- Is the action feasible?
- Does the action contribute to the improvement of an asset?
- Is the action supported by strong evidence or experience?
- Is there a risk associated with the action that may have an impact on short-term outcomes or long-term aspirations?
- Is the action supported by the community?
- Will the activity contribute to the reduction of the causes or symptoms of threats?

Several steps are designed to guide planning, implementation, and measurement of success of natural resource management projects. These cyclical steps are summarised in Figure 10.1.

Image: Ross Ramm



Figure 10.1. Representative Steps in the NRM Planning Process.

10.2 Monitoring, evaluation, reporting and improvement

South Coast NRM will utilise the Monitoring, Evaluation, Reporting and Improvement (MERI) framework to develop its monitoring and evaluation plan. The MERI framework provides a structured approach for monitoring, evaluating, reporting and improving the management of key assets. The key assets include human, social, cultural, natural, physical and financial assets. Monitoring, evaluation, reporting and improvement are essential components of NRM programs and provide methods to assess their appropriateness, effectiveness, efficiency, impact and legacy. The MERI framework also:

- Enables the South Coast community to integrate the monitoring activities being undertaken.
- Ensures that the data generated is suitable for national and state reporting.
- Identifies roles, responsibilities, tasks and timelines for delivery.
- Makes appropriate data available to the community.

The setting of goals and targets for the condition of natural assets, and the effective management of reporting are also essential components of the MERI framework. The assigning of targets using previously agreed upon indicators and associated protocols for effective monitoring and reporting is necessary. This will promote consistency in setting and measuring progress towards targets and longer-term ambitions as well as promoting consistent data collection. A more consistent approach to effective management and reporting will allow for streamlined comparison of program achievements with assessments of conditions or trends in natural assets. This will also facilitate a learning environment that allows managers and participants to adapt practices, strategies and investment plans for continuous improvement. The MERI strategy represents an opportunity to create clarity and set the direction to create and disseminate valuable information that does more than meet obligations of funding bodies.

10.3 Information Sharing

South Coast NRM is committed to providing information to the community through an information storage and management system, which will comprise:

- Annual reporting of progress.
- South Coast Document Management System.
- Natural resource management based media.
- South Coast electronic library (website based electronic documents).
- South Coast data directory (metadata library describing the nature and availability of asset condition data).

Additionally, the information regarding projects and achievements of the South Coast NRM will be shared through numerous community events and workshops.

10.4 Reviewing Southern Prospects 2019-2024

The *Southern Prospects 2019-2024* strategy provides the framework for a 5-year period. It is a requirement that this strategy is a dynamic document that can be fine-tuned through the existing governance processes when necessary to ensure success of managing our natural resources. A formal review of this strategy will be undertaken in 2023 to inform the development of the next iteration of *Southern Prospects*.

acronyms

4WD	Four Wheel Drive
ABS	Australian Bureau of Statistics
ACCI	Australian Chamber of Commerce and Industry
ACECRC	Antarctic Climate and Ecosystem Cooperative Research Centre
AEH	Albany Eastern Hinterland
AGM	Annual General Meeting
ARMA	Aquatic Resources Management Act
BoM	Bureau of Meteorology
BRUVs	Baited Remote Underwater Videos
CAMBA	China-Australia Migratory Bird Agreement
CENRM	Centre of Excellence in Natural Resource Management
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DAFWA	Department of Agriculture and Food, WA
DBCA	Department of Biodiversity and Conservation WA
DIDMS	Dieback Information Database Management System
DPIRD	Department of Primary Industries and Regional Development
DPLH	The Department of Planning, Lands and Heritage
DWER	Department of Water and Environmental Regulation
EC	Electrical Conductivity

ECU	Edith Cowen University
EMS	Environmental Management Systems
ENSO	El Niño-Southern Oscillation
EPBC	Environmental Protection and Biodiversity Conservation
FBCC	Fitzgerald Biosphere Community Collective
FBG	Fitzgerald Biosphere Group
FPC	Forest Products Commission
GEDC	Goldfields Esperance Development Commission
GIS	Geographical Information Systems
GLSC	Goldfields Land and Sea Council
GSDC	Great Southern Development Commission
ha	Hectare
IBRA	Interim Biogeographic Regionalisation for Australia
ILUA	Indigenous Land Use Agreements
IPCC	International Panel on Climate Change
IPP	Indigenous Procurement Policy
IUCN	International Union for Conservation of Nature
JAMBA	Japan Australia Migratory Birds Agreement
km	Kilometres
KPI	Key Performance Indicator
LGAs	Local Government Authorities

M&E	Monitoring and Evaluation
MERI	Monitoring, Evaluation, Reporting and Improvement
MPG	Malleefowl Preservation Group
MRWA	Main Roads Western Australia
NAIDOC	National Aborigines and Islanders Day Observance Committee
NGO	Non-Governmental Organisation
NLE	Noongar Land Enterprises
NLP	National Landcare Program
NRM	Natural Resource Management
NSPNR	North Stirlings Pallinup Natural Resources Inc
OHCG	Oyster Harbour Catchment Group
PPA	Priority Protection Areas
QA	Quality Assurance
R&D	Research and Development
RAIN	Ravensthorpe Agricultural Initiative Network
RDA	Regional Development Australia
RDAGS	Regional Development Australia – Great Southern
RLP	Regional Land Partnerships
SCEF	South Coast Estuarine Fishery
SCF	Stirlings to Coast Farmer Group

SCMG	South Coast Management Group
SCNRM	South Coast Natural Resource Management Inc.
SCRIPT	South Coast Regional Initiative Planning Team
SCUBA	Self-contained Underwater Breathing Apparatus
SEPWA	South East Premium Wheat Growers Association
SSWF	Southern and South West Flatlands
SWALSC	South West Aboriginal Land and Sea Council
SWOT	Strengths Weaknesses, Opportunities and Threats
TCG	Torbay Catchment Group
TDS	Total Dissolved Solids
TEC	Threatened Ecological Communities
TEK	Traditional Ecological Knowledge
TSS	Total Suspended Solids
UCL	Unallocated Crown Land
UWA	University of Western Australia
WA	Western Australia
WALN	Western Australian Landcare Network
WICC	Wilson Inlet Catchment Committee Inc

glossary

ACTIVITY noun (plural activities) 1. The state of action; doing. 2. The quality of acting promptly; energy. 3. a specific deed or action; sphere of action.

ADAPTIVE CAPACITY The capacity of a system to adapt to its changing environment. It is applied to ecological systems and human social systems.

AGRO-ECOSYSTEM A model for the functioning of an agricultural system, with all inputs and outputs.

ASPIRATION noun 1. The act of aspiring; lofty or ambitious desire. 2. Something aspired to; an ambition.

ASSET A useful thing or quality; something that has a value. In natural resource management, assets are classified as human capital, social capital, natural capital, physical capital and financial capital.

BASELINE DATA Measurement of the resource condition, attitudes and behaviours at the beginning. Setting targets requires the identification of a baseline – the level against which progress will be measured.

BIODIVERSITY HOTSPOT An area with a significant reservoir of biodiversity that is under threat from human impact.

BIOREGION An area of land which shares similar environmental, physical and climatic conditions and which contains characteristic ecosystems of plants and animals. Western Australia is divided into 26 land bioregions.

CAPACITY The knowledge, skills, attitudes and resources needed to address natural resource management challenges. Community capacity building is about putting in place the necessary support mechanisms to achieve effective natural resource management.

CAPACITY BUILDING An activity or activities designed to enhance natural resource management planning and management. This includes providing stakeholders with access to data and information; enhancing knowledge, skills and abilities; research and development; and market based approaches.

CARBON SEQUESTRATION The removal and storage of carbon from the atmosphere in carbon sinks (such as oceans, forests or soils) through physical or biological processes.

CATCHMENT The land area which drains into a particular watercourse (river, stream or creek) and which is a natural topographic division of the landscape. It includes 'end of catchment', that is, where catchments join other rivers or estuaries.

CLIMATE CHANGE ADAPTATION Initiatives and measures to reduce the vulnerability of natural and human systems against actual or expected climate change effects.

CLIMATE CHANGE MITIGATION Mitigation involves acting to minimise the effects of global warming. Most often, mitigations involve reductions in the concentrations of greenhouse gases, either by reducing sources or by increasing sinks.

COASTAL Any part of the region within sight of, or directly impacted by, the sea, or potentially affected by coastal flooding or sea-level rise. The 'coastal zone' will therefore vary, depending on local topography.

COMMUNITY Community is used as an inclusive term to include everyone in the South Coast NRM region, in both their public and their private capacity. Community will therefore include state and local governments, industries and public land managers, as well as individuals and groups sharing an interest in natural resource management.

COMMUNITY CAPACITY Community capacity is the combination of building people's commitment and skills to build on strengths within the community to address problems and react to potential opportunities.

ECOLOGICAL PROCESSES The biological, chemical and physical processes that take place within an ecosystem (e.g. carbon cycling, nutrient assimilation).

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

ENDEMIC Confined to a particular area. For example, a South Coast endemic species is found only in the South Coast region of WA.

ESTUARINE A semi-enclosed or periodically closed coastal body of water in which the aquatic environment is affected by the physical and chemical characteristics of both fluvial (freshwater) and marine systems.

EVALUATION The systematic review of a program, project, strategy or other activity to determine whether it is working as intended, what impacts it is producing, whether it is being implemented cost-effectively, and the reasons why it is producing the identified impacts. Evaluation involves collecting and analysing information to make judgements and recommendations for future action.

GEODIVERSITY The range or diversity of geological (bedrock), geomorphological (landform) and soil features, assemblages, systems and processes.

INDICATOR A measurement that can be repeated over time to track changes in the condition of a resource or environmental asset, a management practice, or a social or economic process. A surrogate indicator is a measure developed to monitor the performance of an activity where asset condition monitoring is non-existent or not appropriate.

INTEGRATED NATURAL RESOURCE MANAGEMENT Natural resource management is complex, spanning multiple issues. An integrated approach addresses natural resource management issues holistically, with coordination across different agencies and organisations, and across different land tenures and geographical areas. Integrated natural resource management should deliver more coordinated, efficient and effective outcomes.

LAND USE Land use describes the activities that occur on land, such as agriculture, energy production, human settlements, transport, forestry, mining and conservation.

MANAGEMENT ACTIONS Activities to be undertaken to improve the condition of the region's natural resources.

MARINE Areas where the environment is more strongly influenced by the oceans than by the main landmass of Western Australia and its rivers. Mostly refers to the seabed, open waters and more remote offshore islands.

MONITORING The regular gathering of information in a consistent manner. It may be to keep track of and observe the progress of a project or program. Environmental monitoring is a valuable tool to determine whether the condition of a resource is stable, improving or declining.

NATURAL RESOURCE MANAGEMENT The management of any activity that uses, develops or conserves 'natural resources'.

NATURAL RESOURCES The water, land (including soils), air, plants, animals and microorganisms, and the systems they form.

OUTCOME Noun that which results from something; the consequence or issue. The result or impact of a number of management outcomes.

PARTICIPATION As a concept, participation refers to the number of people engaged in an activity (e.g. public meetings, local governance, landcare groups, adult education, employment).

PERI-URBAN Immediately adjoining an urban area; between the suburbs and the countryside. City fringe (i.e. low density or semi urban).

PLANTATIONS Intensively managed trees, of either native forest or exotic species, created by the regular placements of seedlings or seed.

QUADRUPLE BOTTOM LINE REPORTING Quadruple bottom line reporting uses the idea that the condition of economic, social, environmental and wellbeing/health/spiritual factors should be taken into account. This allows for a more holistic consideration of the well being of systems.

RENEWABLE ENERGY Any source of energy that can be used without depleting its reserves.

RESERVES Areas of protected landscapes or ecosystems. Reserves can be marine or terrestrial, informal or formal (dedicated statutory reserves).

RESILIENCE The ability to absorb the impacts of disturbances, or the ability to recover from or adjust easily to misfortune or change. Resilience can refer to natural systems (i.e. ecosystems or individual species) and human social systems (e.g. local salinity communities).

SALINITY The accumulation of excessive salts in land and water at sufficient levels to have an impact on human and natural assets (plants, animals, aquatic ecosystems, water supplies, agriculture or infrastructure).

SECTOR A specific section of the community, such as state government, local government, industry, public land managers, the 'care' community, the Aboriginal community.

STAKEHOLDERS Agencies, organisations and individuals responsible for managing the region's natural resources.

SUSTAINABLE DEVELOPMENT Managing the use, development and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic and cultural well-being and for their health and safety while: sustaining the potential of natural and physical resources to meet the reasonably foreseeable needs of future generations; safeguarding the life-supporting capacity of air, water, soil and ecosystems; and avoiding, remedying or mitigating any adverse effects of activities on the environment.

TARGET A "target" is defined as an agreed endpoint, desired outcome or a specific level of performance to be achieved within a specified period of time, for a particular objective. Targets are policy tools, but have a scientific base. They are the measurable or quantifiable component towards achieving desired policy visions, objectives and goals (which in themselves tend to be qualitative, conceptual or general statements of intent).

TRIPLE BOTTOM LINE REPORTING Triple bottom line reporting considers the condition of economic, social and environmental factors.

THREATENED SPECIES Flora or fauna that is listed in Wildlife Conservation Act EPBC Act. That is, species or subspecies listed as extinct, endangered, vulnerable or rare.

VULNERABLE Where threatening processes have caused loss or significant decline in species that play a major role within the ecosystem; or a significant alteration to ecosystem processes.

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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. These stakeholders hold the key to action and on-ground achievements.

Regional Community

Partnerships and networking with the regional community are critical to the achievement of good outcomes for our land, water, biodiversity, cultural heritage and regional capacity. Significant numbers of active voluntary 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 Catchment, Bushcare, Coastcare, Friends of, Cultural, Landcare and Weed Action Groups.

Major Subregional Groups

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 the environment.

Gillamii Centre, Cranbrook

The Gillamii Centre aims to lead and inspire the agricultural community and the community at large to be involved with sustainable land use through training, education and knowledge. They aim to encourage and lead in the efficient use of resources across the community while protecting and enhancing the natural environment.

Noongar Land Enterprises (NLE)

The Noongar Land Enterprises is a grower group that comprises of eight Indigenous land management groups involved in managing agricultural land across the State's south west. The purpose of NLE is to develop and expand the scope of business enterprises managed on our land which will provide more opportunities for participation of Aboriginal people in these businesses. NLE is developing land based businesses such as Bush Foods, Honey, Tourism, Sandalwood, and Mainstream Agriculture for socioeconomic outcomes.

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 sub-region 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 examples of the benefits accruing from sustainable management of the region's natural resources.

Oyster Harbour Catchment Group Inc (OHCG)

OHCG aims to increase community participation in NRM within the catchment and encourage the incorporation of NRM concerns within planning strategies at all government levels. 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 local government-based 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 a vision that communities of the region will 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.

South East Premium Wheat Growers Association (SEPWA)

SEPWA is a non-profit grower group that was started in 1993 and has an active membership of 270 farming entities which represents some of the most progressive growers in the region and makes SEPWA one of the largest grower groups within Western Australia. SEPWA's role is to improve profitability and sustainability of Esperance Port Zone grain growers through providing research, development and extension activities.

Southern Biosecurity Group

The Southern Biosecurity Group is part of the Ravensthorpe Declared Species Group (RDSG) which was established in 2003. It now operates as a subcommittee of the Ravensthorpe Agriculture Initiative Network (RAIN). The Ravensthorpe Declared Species Group is currently exploring the transition to a Regional Biosecurity Group which may widen the focus from what has primarily been wild dog activities to a broader focus on declared pest management. The Ravensthorpe Declared Species Group is playing a key role in assisting land managers to manage and control high risk plant and animal pests in the shire.

Stirling to Coast Farmers

Stirling to Coast Farmers (SCF) is a local research development and extension (RD&E) group for cropping and livestock farmers in the southern Albany Port Zone. The main purpose of the group is to support its members through the delivery of locally relevant high quality RD&E activities. SCF's role is to help its members adapt to a changing operating environment with the objective of achieving a more prosperous and sustainable agricultural industry.

Torbay Catchment Group

The Torbay Catchment Group is a community-based volunteer organisation, whose primary focus is on protecting and restoring the health of the lands and waterways within the greater Torbay catchment and supporting a prosperous and sustainable community within the area.

Wilson Inlet Catchment Committee Inc (WICC)

WICC is the peak community based organisation within the Wilson Inlet catchment. WICC is involved in all areas of integrated catchment and natural resource management, achieving on-ground results with land managers and owners.

South Coast Natural Resource Management Inc (South Coast NRM)

South Coast NRM is the peak regional body that brings people, organisations and information together so that the regional community can drive sustainable management of natural resources with positive social and economic outcomes. It is an incorporated body, managed by a Board. South Coast NRM is responsible for coordinating the development of *Southern Prospects* and associated Investment Plan and for subsequent reporting on investment outcomes.

Local Government

Local Governments have an important influence on NRM through their responsibilities for land use planning, development approvals, and provision of a variety of services, such as road construction and maintenance, waste management, and pest control. Local governments also own and/ or manage large areas of land. Councils with jurisdiction across the South Coast region are Albany, Broomehill - Tambellup, Cranbrook, Denmark, Esperance, Jerramungup, Gnowangerup, Kent, Kojonup, Lake Grace, Manjimup, Plantagenet and Ravensthorpe.

Other Non-Government Organisations (NGOs)

NGOs cover a broad field of activities. NGO's roles and responsibilities include on-ground actions, policy development and promotion, and representation of particular interest groups. These include the Malleefowl Preservation Group (MPG), Gondwana Link Inc., Green Skills, Greening Australia (WA), Progress Associations, Denmark and Albany Environment Centres and Centre for Sustainable Living (Denmark).

Educational Institutions

University of WA (UWA) Albany Centre, Edith Cowan University (ECU), Curtin University of Technology (Centre for Regional Education), South Regional 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 the Grower Group Alliance, Southern Dirt, Evergreen, Stirlings to Coast, South East Premium Wheat Growers Association, Pastoralists and Graziers Association, Western Australia No-Till Farmers Association, WA Farmers Federation, Oil Mallee Association and private agricultural consultants.

Aboriginal Groups

Aboriginal people have a long history in the region and possess intricate knowledge of traditional ecological and sustainable land management practises. Their knowledge needs to be recognised, valued and protected. There are approximately 20 major Aboriginal groups in the region who need to be involved more broadly to ensure preservation of cultural practices, languages and culturally important places. These include the Native Title claimant groups, reference groups, Aboriginal Corporations, Goldfields Land And Sea Council (GLSC), Noongar Land Enterprises (NLE), Esperance Tjaltjraak Native Title Aboriginal Corporation (ETNTAC) and South West Aboriginal Land and Sea Council (SWALSC).

Government Agencies

The Australian Government provides high level policy and guidance on matters which have national significance and is involved in the delivery of Australian Government programs. Key Australian Government Agencies involved with NRM matters are the Department of Agriculture and Water Resources, Department of Environment and Energy and Regional Development Australia Great Southern WA Inc.

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 are listed below.

Department of Primary Industries and Regional Development (DPIRD)

DPIRD brings together the responsibilities for Agriculture and Food, Fisheries and Regions to ensure that Western Australia's primary industries and regions are vital drivers to the State's economy and prosperity. The Department has three goals:

- To manage and provide for sustainable use of our natural resources and soils, and to protect Western Australia's brand and reputation as a reliable producer of premium, clean and safe food, products and services.
- To enable the primary industries sector and regions to increase international competitiveness, and grow in value and social amenity, strengthening these key pillars of the State's economy.
- To support a culture of scientific inquiry, innovation and adaptation across primary industries and regions to boost industry transformation, economic growth and employment.

Department of Biodiversity, Conservation and Attractions (DBCA)

DBCA 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, DBCA manages national parks, nature reserves, conservation parks, State forests and timber reserves. In addition, on behalf of the Marine Parks and Reserves Authority, DBCA manages marine parks and marine nature reserves. DBCA also has some responsibility for weeds, introduced animals and pre-suppression fire activities on unallocated crown land outside of town-sites. DBCA contributes to the conservation of cultural heritage and to national and international programmes including the IUCN (the World Conservation Union) and international conservation treaties. DBCA has an important role in tourism and recreation as the conservation estate attracts thousands of visitors every year.

Department of Water and Environmental Regulation (DWER)

DWER is responsible for the management of water resources to meet the environmental, social and economic needs of the community. Water resources include groundwater, rivers and estuaries. DWER licences abstraction in proclaimed areas, plans and protects public water sources, provides information on water resources and facilitates the management of priority rivers and estuaries.

DWER also regulates industries and activities that can potentially impact upon the environment. Clearing of native vegetation, industry licensing, pollution response and waste management, as well as developing policies and community education programs to reduce impact on the environment are all functions of the agency.

Department of Planning, Lands and Heritage (DPLH)

The Department of Planning, Lands and Heritage is responsible for planning Western Australia's communities and managing our land and heritage assets. The department is an amalgamation of the former departments of Planning, Lands, the State Heritage Office and the land and heritage functions of the Department of Aboriginal Affairs. The Department is responsible for:

- Managing Aboriginal lands and heritage.
- Administering Western Australia's crown land.
- Land use planning in Western Australia.
- Managing the State Register of Heritage Places.

Forest Products Commission (FPC)

FPC is the WA Government trading enterprise for plantation management and commercial production from renewable timber resources.

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 (MRWA)

MRWA is responsible for the management of transport related services and infrastructure (e.g. roads). MRWA works in conjunction with Local Government and its local road network in order to create an integrated transport network.

Regional Development Australia – Great Southern (RDA)

The RDA network has been established throughout Australia to provide a strategic framework for economic growth in each region. The key roles of the national network of RDA committees are to advise, consult and undertake community engagement, to contribute to regional planning, to be the first point of contact of Australian Government activities, to promote government programs and to facilitate community development.

WA Museum

The Museum is the State's premier cultural organisation, housing WA's scientific and cultural collection. For over 120 years the Museum has been making the State's natural and social heritage accessible and engaging through research, exhibitions and public programs.

Research Organisations

Research organisations play a lead role in undertaking scientific studies relating to the natural resources, sustainable agriculture and climate change relevant to the South Coast region. These include the local Western Australian Universities and other organisations such as the Bureau of Meteorology (BoM) and the Commonwealth Scientific and Industrial Research Organisation (CSIRO).

Western Australian Universities

Regional organisations involved in research and development (R&D) include the University of Western Australia's Centre of Excellence for NRM (CENRM) and the other Western Australian universities of Murdoch, Edith Cowan and Curtin. These are important bodies that deliver research and expertise to fill information gaps across the region. Research outcomes and expertise are accessible to a variety of groups.

The Commonwealth Scientific and Industrial Research Organisation (CSIRO)

Since its formation in 1916, CSIRO has been the leading research and innovation centre in Australia. Key research interests include animals and plants, farming and food production, renewables and energy, environment and mining and manufacturing.

The Bureau of Meteorology (BoM)

The BoM is Australia's national weather, climate and water agency, providing expert advice through regular forecasts, warnings and long-term monitoring. The Bureau also undertakes research that supports key decision making relating to scientific and environmental issues.



land



biodiversity



water



coastal
and marine



regional
capacity



cultural
heritage