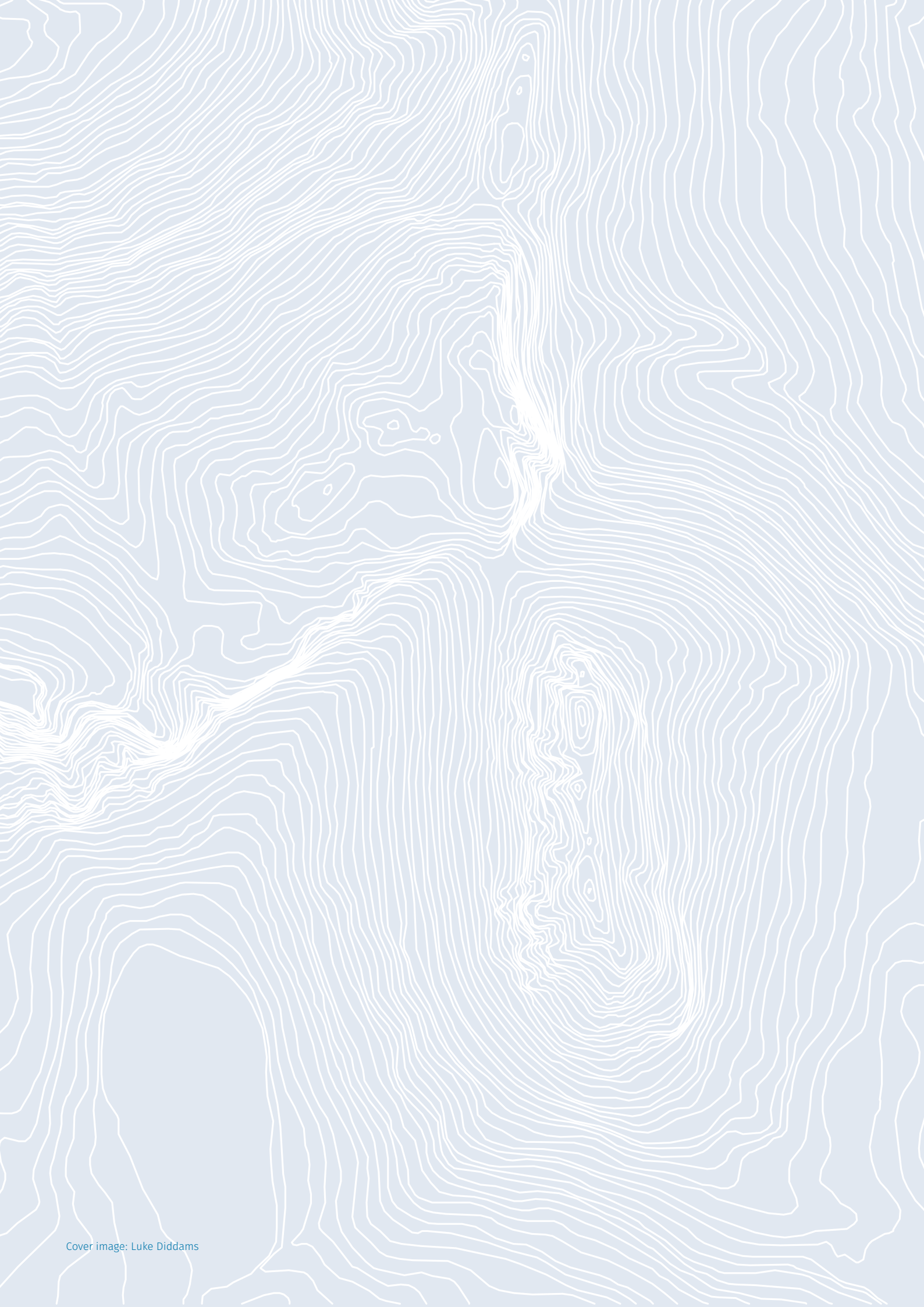


Natural Resource Management
Strategy

Southern
Tasmania

**2015
–2020**





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The NRM South Board appreciates and acknowledges the funding from the Australian Government which realised such a comprehensive review of the 2010 – 2015 regional strategy. Additionally, funding and support for additional resources were provided by the Tasmanian Government, CSIRO, Bureau of Meteorology and the Southern Slopes Climate Change Adaptation Research Partnership.

The Board recognises the efforts of the Southern Tasmanian community in contributing to the development of this Strategy. Many individuals, organisations, industry leaders and agencies worked with the project team to guide and shape this Strategy. NRM South was also supported by PDF Management Services and Associates (Resonance Consulting, Climate Planning and Natural Resource Planning) and Landscape and Social Research in the development of this Strategy.

The participation and support provided by NRM North and Cradle Coast NRM to undertake a collaborative process in the review of all three Regional NRM Strategies for Tasmania has been a significant highlight of the review process. The Board acknowledges the combined efforts and the strong culture of collaboration displayed by the staff and personnel of all three regions throughout the strategy review process.

This Strategy has been accredited by the Tasmanian Government under the *Natural Resource Management Act 2002* and their involvement in the development of this Strategy is gratefully acknowledged.

Photographs displayed within this Strategy have been generously supplied by Luke Diddams, Lyndel Wilson, Paul Gray, Ken Moore, Magali Wright and Anne Gigney.

Finally, the Board would like to acknowledge CEO Donald Coventry and the NRM South staff for their dedication and contribution to the development of this Strategy.

This Strategy was accredited on 23 February 2016.

Disclaimer

In developing this Strategy, every effort has been made to ensure that the information is correct and that the content reflects the combined input from the Southern Tasmanian community. The NRM South Board hopes that this Strategy will assist in guiding and coordinating natural resource management activity throughout Southern Tasmania. Although NRM South is not wholly responsible for implementing the Strategy, it will update information as it becomes available (and resources allow) and encourage commitment from others in Strategy implementation, monitoring and reporting.

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Further information about the Strategy and contact details

Further information about this Strategy and how you or your organisation may be involved in its implementation can be obtained by contacting NRM South.

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This project is supported by NRM South, through funding from the Australian Government.





Statement to the Tasmanian Aboriginal people from NRM South on behalf of the southern NRM region of Tasmania

We acknowledge that the Tasmanian Aboriginal people are the Traditional Owners of the land that we live and work in. We respect and value the strong physical and spiritual links Aboriginal people have with country and acknowledge their custodianship of this island for over 1,600 generations (over 40,000 years).

Many of the patterns we see in the region's natural landscapes have been shaped by Aboriginal water, coast, marine and land-use practices (especially the use of fire) and the region contains globally significant living cultural landscapes. European settlement has resulted in considerable injustice for Aboriginal people, and the introduction of European land management practices has impacted on natural and cultural assets and has left a legacy that we are all working to improve today.

There is a need to increase consideration of Aboriginal cultural heritage and knowledge in natural resource management, and to develop better understanding of the cultural, environmental, social and economic dimensions of the region's natural resources from the perspective of Aboriginal people.

During the development of this Strategy, many NRM stakeholders and members of the wider community articulated that they wanted to see the inclusion of Aboriginal heritage knowledge, protection and conservation in natural resource management. They also wished for a commitment to elevate the capacity of Aboriginal people and Aboriginal heritage and cultural assets. In response to this, the Strategy includes targets focussed on incorporating Aboriginal cultural heritage and knowledge in relation to management of land, water, biodiversity and coastal assets and facilitating the participation of Aboriginal people in natural resource management activities.

We will focus on implementing this Strategy in partnership with Aboriginal people. This will involve building relationships and mutual understanding, providing planning support, utilising and respecting Aboriginal ecological and cultural knowledge, building natural resource management capacity and delivering on-ground activities together.

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About this Strategy

Purpose of the Strategy

The purpose of the *Natural Resource Management Strategy for Southern Tasmania 2015–2020* (the Strategy) is to provide a framework to guide activity that will help manage and improve Southern Tasmania's natural resources.

It is a whole-of-community Strategy that identifies the social, economic and environmental values of the region and outlines how the community can work together to manage and improve the region's condition. The health outcomes of our community are dependent on the maintenance of our natural resources.

The Strategy is one of three in Tasmania and is complemented by the Strategies for Northern Tasmania and the Cradle Coast Region.



Vision

The Vision for natural resource management in Southern Tasmania is:

Southern Tasmania's natural resources will be protected, sustainably managed and improved, while adapting to change, for the shared environmental, social and economic benefit of our region by a collaborative, well-informed, well-resourced and actively committed community.

How the Strategy supports this Vision

The Strategy supports this Vision by:

- > Identifying the value and strength of the natural assets within the region to provide for productive, resilient and healthy socio-economic and environmental landscapes;
- > Encouraging and supporting key agencies, sectors and natural asset managers and regulators to plan strategically and coordinate action;
- > Increasing the community's awareness and capacity to manage natural resources;
- > Maximising return for natural resource management investment through innovative and collaborative solutions; and
- > Fostering collaboration between organisations and individuals that monitor and report on natural resource condition and management activity.

How does the Strategy work?

The Strategy takes both a Landscape Approach and an Assets Approach to considering the management of Southern Tasmania's natural resources:

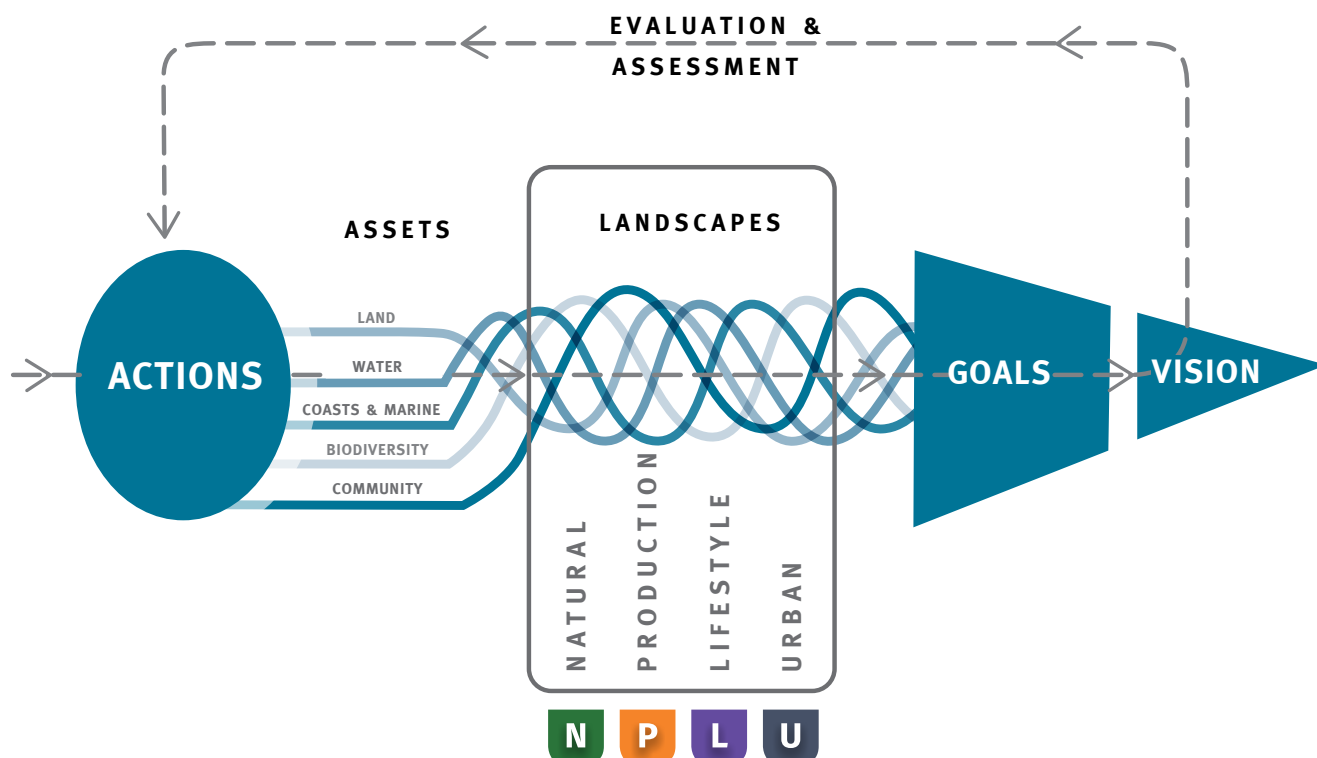
- > **A Landscape Approach:** Categorises the region's landscapes (including seascapes where relevant) by predominant use. It defines the Natural Landscapes, Production Landscapes, Lifestyle Landscapes and Urban Landscapes, identifies their natural, social and economic values, and articulates a focus for action for managing these landscapes.
- > **An Assets Approach:** Details the region's Land Assets, Water Assets, Coasts and Marine Assets, Biodiversity Assets, and Community Assets. It articulates specific threats and opportunities to these assets and outlines Targets and Priority Actions so the Southern Tasmanian community can work together to ensure the ongoing health and resilience of our natural resources.

These two complementary approaches allow for how different people in the community view natural resource management and work within the region.

The Landscape Approach sets out long-term Goals for each Landscape, which are then supported by five-year Targets for each regional asset. Priority Actions and Key Contributors have been identified that will help achieve the Targets.

The Strategy provides a basis for State and local planning processes and investment priorities. It does not aim to replace sub-regional or local assessment and management planning.

Figure 1: A Landscapes and Assets Approach to natural resource management



How to use the Strategy

This Strategy is set out to help those who are involved in natural resource management in Southern Tasmania to achieve a Vision. The Strategy is divided into an Introduction and six key parts (shown below). It articulates how different audiences may be interested to use the Strategy.

Parts of the Strategy	Use this section...
<div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div>Part 1. Natural Resource Management in Southern Tasmania:</div><div>Provides context to the Strategy by describing Southern Tasmania's natural resources and the Key Contributors who play a role in managing them.</div></div></div>	<div>To gain context about Southern Tasmania's natural resources.</div>
<div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div>Part 2. Managing Southern Tasmania's Landscapes:</div><div>Defines the region's Natural Landscapes, Production Landscapes, Lifestyle Landscapes and Urban Landscapes (including seascapes within these) and identifies their natural, social and economic values. It highlights an overall regional goal, key influences of change, and possible futures for the landscapes.</div></div></div>	<div>If you are involved in the management of landscapes; want to gain a picture of the long-term goals for the region; are interested to understand the social, environmental or economic value of each landscape; and to view the possible futures and focus for action of each type of landscape.</div>
<div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div>Part 3. Managing Southern Tasmania's Assets:</div><div>Details the region's Land Assets, Water Assets, Coasts and Marine Assets, Biodiversity Assets and Community Assets. It describes the various attributes of each asset, outlines management elements for focus, and identifies threats and opportunities, including those projected to arise from the effects of climate change.</div></div></div>	<div>If you are interested to see a detailed examination of the region's assets; to better understand the challenges; and to understand the key management elements, threats and opportunities of each type of asset within the region.</div>

What is in this Strategy?

- > A Vision for the natural resources and community of the Southern Tasmanian region.
- > Consideration and assessment of climate change impacts on the region's assets and landscapes.
- > Descriptions of Southern Tasmania's landscapes, their possible futures and long-term goals.
- > Descriptions of the region's biophysical assets—land, water, coasts and marine, biodiversity, and community—and short-term Asset Management Targets and Priority Actions.
- > Identified Key Contributors required to implement this Strategy.
- > How the Strategy will be implemented, assessed, evaluated and improved.

What is NOT in this Strategy?

- > NRM South's corporate plan or operational strategy.
- > Comprehensive assessment of local-scale assets.
- > Detailed risk and feasibility assessments.
- > Detailed activity planning, budgeting and on-ground works assessment.

Strategic context

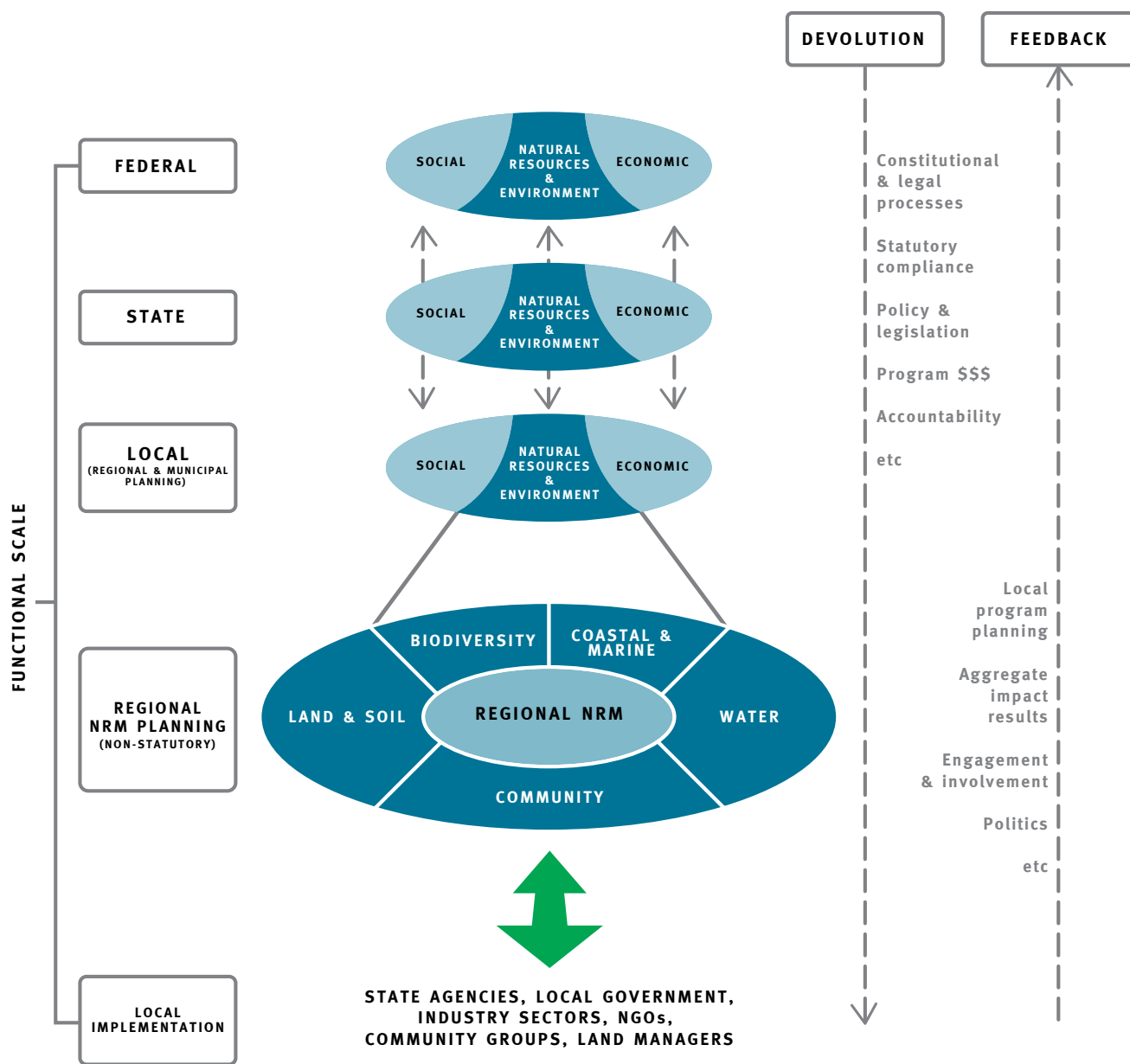
The *Natural Resource Management Strategy for Southern Tasmania 2015–2020* has a biophysical and socio-economic focus. It considers development opportunities, it allows for adaptation to global pressures, it encourages activity that builds and maintains resilient and diverse natural systems and industry, and its implementation relies on successful integration and collaboration. The Strategy has a strong focus on climate change adaptation and is framed by possible futures, as defined by current climate projections and adaptation research.

The Strategy outlines Goals, Targets and Priority Actions to ensure that local issues and opportunities are recognised and incorporated into the considerations of larger-scale state, national and international interests and obligations.

The figure below illustrates the strategic context within which this Strategy will operate. It shows the complexity of balancing social, economic and environmental outcomes in a multi-tiered governance and implementation structure.

Further detail on the strategic context and basis for the development of this Strategy is found in Part 6.

Figure 2: Strategic context for the Natural Resource Management Strategy for Southern Tasmania 2015–2020¹



Review of the Strategy

This Strategy will be reviewed during its five-year life. Learnings from the review will guide the development of future strategies. For more detail, see *Part 5—Implementation, Assessment, Evaluation and Improvement*.

¹ Adapted from Bellamy, J and McDonald, G, 2005, 'Through multi-scaled lenses: A systems approach to evaluating natural resource management policy and planning', in J. Bellamy (ed.), *Regional natural resource management planning: the challenges of evaluation as seen through different lenses*, CIRM Monograph Series, June 2005, The State of Queensland, Department of Natural Resources and Mines, Indooroopilly, pp.3-10 - https://www.academia.edu/974359/10_CIRM_Symposium_Discussion



Image: Anne Gigney

Natural Resource Management in Southern Tasmania

What is natural resource management?

Natural resource management refers to the management of natural resources such as water, land, plants, animals and microorganisms, and the systems they form. Human socio-economic structures are reliant on natural resources to support health and wellbeing. The judicious and wise management of our natural resources is essential to support and preserve the ecosystem services that they provide, as well as our own future prosperity.

What are Southern Tasmania's natural resources?

Southern Tasmania covers 2.5 million hectares, including Hobart, its urban fringes and towns, and supports almost half of Tasmania's 515,000 population². It spans the twelve municipalities of Brighton, Central Highlands, Clarence, Derwent Valley, Glamorgan Spring Bay, Glenorchy, Hobart, Huon Valley, Kingborough, Sorell, Southern Midlands and Tasman, as well as the state and federal electoral divisions of Franklin, Denison and roughly one-third of Lyons.

Its people cover a broad social and demographic spectrum, and they are employed in a variety of industries from aquaculture to government administration, renewable energy to food production. Exports of Tasmania's food and beverage products in 2013-14 were valued at \$576,500,000³ indicating the value that our production land has in supporting our economy. Industries such as agriculture, fisheries, forestry and tourism rely on the region's natural resources for current and future growth.

Southern Tasmanians are energetic volunteers, and research states that volunteers provide nearly \$5 billion benefit to the community and an average return of \$4 for every \$1 spent, making our environmental volunteers arguably our most valuable asset. In Southern Tasmania, there are over one hundred community groups as well as landholder and farmer groups caring for bushland, coastal areas and cultural heritage in the region.

The region is one of the most environmentally diverse areas anywhere in Australia. It features near-pristine river systems and lakes, rich flora and fauna, including many species endemic to Tasmania, a range of complex landscapes, internationally recognised natural icons, and a long and intricate coastline.

It encompasses the World Heritage areas of the Tasmanian Wilderness and Macquarie Island, four internationally recognised Ramsar-listed wetlands, seven national parks, twenty-two marine reserves, and an array of varying ecosystems with high terrestrial, estuarine and marine biodiversity.

Southern Tasmania's wealth of natural resources underpins its economic, social and environmental wellbeing. Managing these valuable assets underpins the success of the key industries on which we rely and the lifestyle we associate with living on the Island State.

² ABS - <http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0>

³ Tasmanian Department of State Growth, Tasmania's International Exports: 2013-2014

What influences natural resource management?

The influences on natural resource management range from global megatrends through to individual property management decisions.

Global megatrends, such as climate change, global population growth, biodiversity decline, social trends, ageing populations, the digital revolution and increasing expectations in consumerism are important external influences that will affect how our natural resources are managed into the future. While they are largely out of the regional community's control, they impact on our ability to plan and manage our local natural resources.

Table 1 (overleaf) summarises climate change projections over the next century under a high emissions scenario. This table has been developed based on the latest climate change projections completed by the CSIRO and the Bureau of Meteorology.⁴ It highlights long-term projected trends, although natural variability from year to year is still expected to remain as the dominant factor in the near term.

Australia's position in the world, ever-changing market trends, and politics are critical influences on how natural resources are managed. Varying demand for goods is also a key driver for change and influences decision-making and industry development. Political change and policy development impact on natural resource management, with issues such as free trade agreements shaping how productive and urban-based landscapes are managed. Additionally, political and policy changes result in funding reallocations and changes in priorities, which in turn affect capacity for action, research and effective planning for natural resource management.











The ability for the community to plan, contribute and action change is based on capacity, funding and interest in sustainable development and the conservation of key assets. Only through research, education and collaborative action will the regional natural resources of Southern Tasmania be sustainably managed into the future whilst supporting our high quality lifestyle.



Image: Luke Diddams













⁴ Australian Government - <http://www.climatechangeinaustralia.gov.au/en/>

Table 1: Climate change projections over the next century under a high emissions scenario^{5,6}

	Temperature	Extreme temperature	Rainfall	Extreme rainfall	Evaporation rate
					
					
Direction of change	Increase	Increase	Decrease	Increase	Increase
Confidence	Very High	Very High	Medium	Medium	High
Overall trends for Southern Australia	Increase in average temperature, with warming by 2090 proportional to emissions.	More frequent hot days, warm spells and heatwaves. Fewer frost-risk days and cold spells.	Generally less rainfall in winter and spring, with regional differences, and less snow.	Increase in intensity of heavy rainfall events.	Increased evaporation rate and reduced soil moisture and runoff.
Tasmanian Detail	Slightly less warming in Tasmania than for the inland of the continent.	Projections under a high emission scenario indicate an increase from 1.6 days over 35°C to up to 4.2 days, and a decrease in days under 2°C from 9.1 to 0.3 days by 2090.	Increase in winter rainfall in western Tasmania and a decrease in spring and summer rainfall, with the exception of the east coast. Changes less certain for autumn.	Increase in extreme rainfall, particularly along east coast in summer and autumn.	Higher decline in soil moisture during summer and autumn in Tasmania.

⁵ Grose, M et al., 2015, Southern Slopes Cluster Report, Climate Change in Australia's Natural Resource Management Regions: Cluster Reports, eds. Ekström, M. et al., CSIRO and Bureau of Meteorology, Australia. Please note footnote 5 relates to the information provided for temperature through to sea level.

⁶ Poloczanska, ES, Hobday, AJ and Richardson, AJ (Eds), 2012, Marine Climate Change in Australia, Impacts and Adaptation Responses, 2012 Report Card. Please note footnote 6 relates to the information provided for ocean temperature and ocean acidification.

Drought	Wind speed	Fire weather	Sea level	Ocean temperature	Ocean acidification
					
					
Increase	Increase	Increase	Increase	Increase	Increase
Medium	Medium	High	Very High	High	Medium
Increased time in drought.	Increase in mean wind speed in winter. Possible increase in extremes.	Fire weather will become harsher, with an increased fire-weather risk.	Sea level will continue to rise, resulting in inundation of coastal areas and coastal recession.	Ocean temperatures will continue to rise.	Rise in ocean acidification will continue to impact on calcification rate in corals and coralline algae species.
Projected decrease in rainfall and increase in evaporation contribute to more time in drought.	Stronger wind speed in winter in western Tasmania, and a decrease in summer wind speed. Possible increase in extremes.	Consistent increases in fire weather projected for Tasmania.	By 2030 between 0.07m and 0.19m rise from 1986-2005 sea levels is projected. By 2090, 0.27m-0.66m under low emission scenario and 0.39-0.89m under high emission scenario.	South-eastern Australia is a hotspot for ocean temperature changes, with projected rise of >3°C under a high emission scenario.	Benthic calcifiers, such as mollusc and deep water coral, will show reduced calcification rates and/or increased dissolution.

Who are the Key Contributors to natural resource management?

The Southern Tasmanian community

The whole community has a critical role to play in natural resource management in Southern Tasmania.

Key contributing groups have legislative, corporate and social responsibilities to oversee ethical and sustainable resource management. They are:

- > Australian, Tasmanian and local government
- > NRM South
- > Land, sea and water managers
- > Industry, and industry bodies
- > Aboriginal community organisations
- > Community groups and volunteers
- > Business
- > Research and education organisations
- > Non-government organisations (NGOs).

These groups require whole of community support to appropriately plan, resource and act on priorities. The broader community can only provide the motivation and support to these core contributors if it has an understanding and appreciation of the importance of the natural assets which create wealth and lifestyle and enable our wellbeing.

This Strategy aims to support the whole community in guiding collaborative and outcome-focussed action. See *Part 4—Targets, Priority Actions and Key Contributors* for detailed information.

NRM South's role

NRM South, through its committee, has legislative responsibilities for natural resource management in Southern Tasmania. This responsibility includes the identification of priorities, development of the region's NRM strategy and evaluation of its implementation.

Building on more than 12 years of work, NRM South will continue to work with and support the key contributing groups. It will also engage and empower the broader Southern Tasmanian community to integrate this Strategy into policy and decision-making and to drive the identified Priority Actions (see *Part 5—Implementation, Assessment, Evaluation and Improvement*).





Managing Southern Tasmania's Landscapes

A landscape management approach

Southern Tasmania's landscapes are diverse and complex systems. They represent the community's connection point to the natural environment and provide for our shared socio-economic wellbeing. Throughout consultation to develop this Strategy, community members highlighted their strong connections to the region's landscapes.

The four broad landscape categories that the community has identified as relevant are:

1. Natural Landscapes

Unmodified or relatively unmodified areas that support native species and communities.



2. Production Landscapes

Areas that have been modified for broader-scale primary production activity, including agriculture, aquaculture and forestry.



3. Lifestyle Landscapes

Peri-urban, fragmented and generally modified landscapes—these make up the non-income or supplementary income-generating sector of land management.



4. Urban Landscapes

Areas associated with city, rural residential, retail and industrial development.



These landscapes include all seascapes where relevant. Changes in the landscape can be rapid or long-term, specific or broad, depending on the cause. Rapid landscape change may result from fire, invasive species incursion or disease outbreaks, while long-term change is often a result of land use, development and/or climate influences on systems. Specific changes can occur across landscapes through events such as prolonged drought, whereas broad changes can result from sea level rise and its effects on a range of socio-economic and environmental assets.

For each identified landscape, this Strategy outlines:

- > **Description:** Statistics and scope of the importance of each landscape identified by the Australian Bureau of Statistics (ABS), regional geographic analyses and contributions from stakeholder, community and specialist scientific consultation.
- > **Goal:** A longer-term goal for each landscape, providing an outline of the preferred future for the landscape. These goals guided the development of the Asset Management Targets and Priority Actions identified in this Strategy to ensure positive natural resource outcomes.
- > **Value:** A triple bottom-line approach presenting the value of each landscape to the region.
- > **Influences:** Factors that influence change in each landscape identified through stakeholder and community consultation, an independent commissioned report, and scientific research.
- > **Possible futures:** What the future could look like for these landscapes if identified influences, including climate change, are not managed/ adapted to, as recognised by various scientific analyses by the Bureau of Meteorology (BoM), CSIRO, and the Southern Slopes Climate Change Adaptation Research Partnership (SCARP).
- > **Focus for action:** Identified areas of focus for activity, based on spatial analysis, community, stakeholder and specialist advice. They directly link with the Asset Management Targets and Priority Actions in this Strategy.

It is recognised that the various categories of landscapes overlap, are based within broader systems and that there is no absolute definition for each. Natural and community assets (identified in Part 3) are the foundations of landscape health. Appropriate management of the identified assets will support the productivity, health, adaptive capacity and resilience of these landscapes into the future.

1. Natural Landscapes

Definition

Natural Landscapes are those areas that support native species, communities and ecosystems and have experienced no, or limited, direct human impact.

Natural Landscapes are a key marketing point for Tasmanian produce, lifestyles and tourism and in many cases are the areas we have come to associate with the natural image of Southern Tasmania. They play an important role in the enjoyment of living in the region, and their preservation is critical for the health of our ecosystems, including many threatened species and communities.

About Southern Tasmania's Natural Landscapes

Southern Tasmania is recognised globally for its healthy, intact and diverse Natural Landscapes.

Native vegetation covers approximately 76% of Southern Tasmania, a large proportion of which is globally significant, for example the Tasmanian Wilderness World Heritage Area (TWWHA) and Macquarie Island. More than 47% of the region is managed primarily for conservation through the public and private reserve estate.

Southern Tasmania has significant water-related conservation assets, with four internationally significant Ramsar wetlands, 33 rivers containing sections of very high conservation status and 26 undisturbed sub-catchment areas.⁷

Coastal and marine-based Natural Landscapes incorporate a wide variety of coastal landforms, offshore island habitats and nationally significant assets such as saltmarsh and giant kelp forests. Southern Tasmania hosts more than 135,000 hectares of Marine Protected Areas.

Some industries, such as forestry and hydro-electricity power generation, are associated with Natural Landscapes.

GOAL

The region's Natural Landscapes are managed appropriately in order to maintain ecosystem services and biodiversity values, and asset managers are aware of projected climate change effects and, where necessary, facilitate adaptation of species, communities and ecosystems.

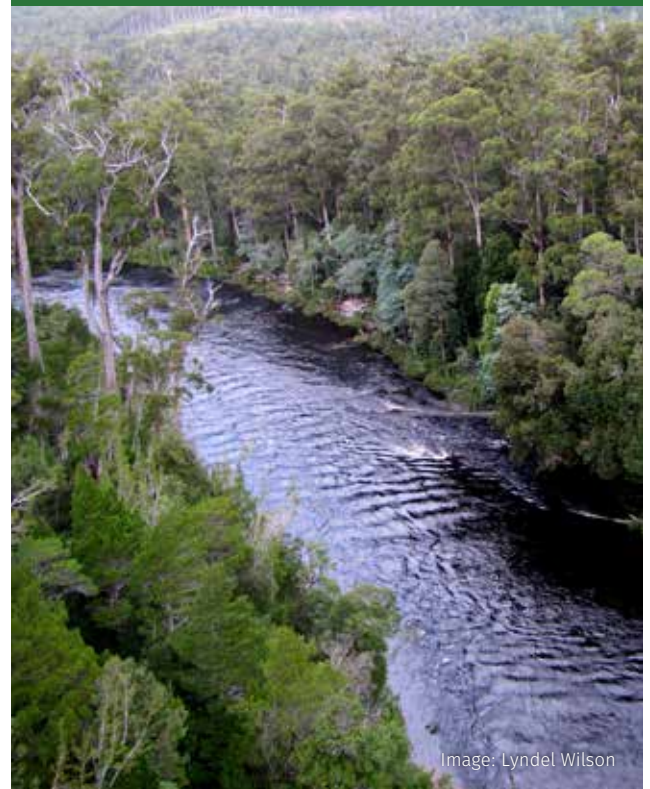


Image: Lyndel Wilson

⁷ State Conservation and Freshwater Ecosystem Values Database - <http://dpiwwe.tas.gov.au/water/water-monitoring-and-assessment/cfev-program>

Landscape value

Social value

- > The region's Natural Landscapes are valued highly by the community for recreation, tourism, ecosystem services that support primary industries, and the way they characterise the nature of Tasmania, the sense of place and the intrinsic value of wilderness.
- > Tasmanian Aboriginal people have a strong relationship with the land and a spiritual connection with place. Their long custodianship has shaped the Natural Landscape e.g. patterns of vegetation communities have been shaped by the strategic use of fire.
- > Recreational fishing is very popular in Southern Tasmania with more than one-third of the population reporting that they fish.⁸

Conservation value

- > World Heritage areas, national parks and reserves, and conservation covenants on private land account for nearly 50% of the region's natural vegetation.
- > Parks and reserves of local, national and international significance cover more than one-third of the region's land area.
- > Significant amounts of remnant native forest and shrub lands exist on unreserved public lands and private land.
- > Much of Southern Tasmania's extensive coastline remains undeveloped and is valued highly for its biodiversity and social criteria.
- > The region contains one of Australia's 15 biodiversity hotspots—the Midlands Biodiversity Hotspot Area (MBHA).⁹
- > These landscapes are valued for their:
 - > Vegetation communities, including rainforests, wet eucalypt forests, buttongrass plains, alpine moorlands, swamp forests, coastal heathland and saltmarsh;
 - > Wildlife, including the Tasmanian devil, Tasmanian bettong, spotted quoll and eastern barred bandicoot;
 - > Freshwater and marine environments as they contain some of the most distinctive flora and fauna in the world in terms of composition and diversity;¹⁰ and
 - > Geological diversity, including dolerite peaks, plateaux and sea cliffs with columnar precipices and distinctive scree slopes, internationally recognised karst formations, and sedimentary layers of sandstone and mudstone.

Economic value

- > The TWWHA in 2008 is estimated to have contributed \$1.4 billion to the Tasmanian economy through tourism and related activities.¹¹
- > Current carbon stocks in Tasmanian forests, plantations and forest soils and debris are estimated at between 3,000 to 4,400 million tonnes of carbon.¹²
- > During the past five years, direct forestry activities generated approximately \$150 million per year.
- > Hydro-electric power generation, which occurs largely within Natural Landscapes, generated approximately \$745 million per year during the past five years.



Influences

Habitat loss, modification and condition decline

- > The loss of and decline in habitat quality is a clear threat to our Natural Landscapes.
- > Past land clearing and development in and around our Natural Landscapes have led to invasive species incursions and changes to the type and composition of species and ecological communities.
- > Other impacts include:
 - > Past settlement patterns, clearing, overgrazing, inappropriate timber and flora harvesting, changed fire regimes, and salinity;
 - > Limited planning to address fragmentation of habitat;
 - > Limited capacity and resources to undertake appropriate property management planning;
 - > Limited recognition of the social and economic values of Natural Landscapes in landscape and property planning resulting in land management conflicts; and
 - > Fire management, which is critical to the condition of the Natural Landscape. Inappropriate use of fire is listed as a generic threat to threatened species¹³, and considered a threat to natural values more widely.

Land-use change and intensification

- > Urban development and the expansion of lifestyle landscape lifestyles may have negative influences on Natural Landscapes.
- > Incremental loss of habitat has contributed to fragmentation of Natural Landscape values, particularly at the local level.
- > Intensification of agriculture, particularly in association with irrigation development and introduction of new agricultural enterprises to areas that were previously considered marginal, also influences our Natural Landscapes.

Invasive species and diseases

- > The region contains a range of pest plant and animal species that impact on Natural Landscapes. Invasive species and diseases contribute by modifying habitat, predating or out-competing native species across land, water, coastal and marine environments.¹⁴
- > Invasive species in the marine environment pose significant threats for the Natural Landscapes such as through translocation of species from the Derwent Estuary to Bathurst Harbour and Port Davey.
- > Invasive animals such as feral cats impact on native birds and small mammals through predation, along with spreading diseases that impact on wildlife.
- > The root rot pathogen *Phytophthora cinnamomi* is a problem in some areas. Changes in rainfall are likely to decrease its activity in areas of low annual rainfall. Higher temperatures may cause disease expression at higher altitudes than at present, mainly in coastal heaths, heathy woodlands and buttongrass moorlands.
- > The chytrid frog fungus is present at the boundaries of the TWWHA and will impact on three endemic frog species if it continues to spread. Additionally, there is risk from didymo introduction especially in higher, cooler waters.
- > Potential for the introduction of other diseases is high with recent incursions of myrtle rust highlighting the region's vulnerability to diseases that may have unknown consequences.

Possible futures

Response to climate change

- > Climate change is predicted to significantly impact on our Natural Landscapes ranging from sea level rise to key changes in species composition as a result of increasing temperatures and variations in rainfall.
- > Projections indicate that although the impact of temperature and rainfall changes on Southern Tasmania will likely be less than that on mainland Australia, alpine and coastal systems will be affected.¹⁵
- > The latest climate change projections indicate confidence that sea levels will continue to rise and ocean temperatures will rise leading to higher acidification.¹⁶ These changes will affect coastal and marine Natural Landscapes, causing physical and geographic changes to habitat and condition. Key examples of this are that shore-nesting birds may be further restricted in available habitat and the impact on saltmarsh communities.
- > The scientific community is also confident that climate change will result in a harsher fire-weather climate, although impacts will depend on seasonal variation and rainfall. This may affect fire management with subsequent impacts on Natural Landscapes.
- > Many species and ecological communities will be impacted by changes to their environmental range, such as in alpine areas and for particular species e.g. the Miena Cider Gum (*Eucalyptus gunnii* subsp. *divaricata*).

People impacting management

- > Further development in and around our Natural Landscapes may exacerbate the impact of other threats. Appropriate consideration of the potential threats and planning for ameliorating these threats in future will be key to minimising them. An example of this is further tourism and public access to Natural Landscapes and expansion of industry developments such as aquaculture and mariculture.

Focus for action (See Part 4 for detailed actions)

- > Maintain biodiversity values and landscape-ecological function, and support implementation of the objectives of the *Natural Heritage Strategy for Tasmania* and key management plans such as the *TWWHA Management Plan*.
- > Monitor the condition and distribution of key species, communities and ecosystems to support adaptive management in response to change.
- > Develop planning instruments that recognise and, where possible, ameliorate threats that impact on environmental values such as threatened species and communities, refugia and landscape ecological function.
- > Undertake works that improve ecological function such as restoration and revegetation of riparian areas, remnant vegetation in fragmented landscapes and application of appropriate fire regimes.
- > Maintain biosecurity and encourage good biosecurity practices and coordinated control of invasive species, pests and pathogens.
- > Continue research, education and building of community capacity including support for volunteers and community groups to continue to support research.
- > Support partnerships for collaborative action to improve outcomes for threatened species and communities, cultural heritage and geo-conservation sites and refugia.

8 Agriculture, Fisheries and Forestry in the South East region of Tasmania, 2015 - <http://www.agricultureg.ov.au/abares/publications/aboutmyregion>

9 Australian Government - <https://www.environment.gov.au/biodiversity/conservation/hotspots/national-biodiversity-hotspots>

10 Southern Tasmania Land Use Strategy Background Report No. 5: Natural Values, 2010 - http://stca.tas.gov.au/rpp/wp-content/uploads/2011/06/Background-Report-No.5_Natural-Values.pdf

11 Tourism Tasmania

12 CO2 Limited, 2012

13 Tasmania's Threatened Species Strategy - <http://dpipwe.tas.gov.au/conservation/threatened-species/threatened-species-strategy>

14 Southern Tasmanian Regional Weed Strategy for more information - <http://stca.tas.gov.au/2011/05/southern-tasmanian-weed-strategy-2011-2016/>

15 Refer to AdaptNRM Biodiversity Module - <http://adaptnrm.csiro.au/biodiversity-options/>

16 Climate Change in Australia - <http://www.climatechangeinaustralia.gov.au/en/>

2. Production Landscapes

Definition

Production Landscapes are those areas that have been modified for broader-scale primary production activities including agriculture, aquaculture, forestry and mining.

The health of Production Landscapes is determined by the underlying condition of the environmental assets including soil, water, vegetation and the surrounding ecological communities.

Production Landscapes underpin key economic activity within Southern Tasmania with more than an estimated \$945 million gross value to the region. These landscapes (whether terrestrial or aquatic) are an important part of the social fabric of the region, with agriculture, fisheries and forestry providing significant employment. The continued health of these landscapes is paramount, particularly as premium and niche food and beverage production is also driving tourism and growth within overseas markets.

About Southern Tasmania's Production Landscapes

Production Landscapes are those where the land, water, coastal and marine environments are used to directly or indirectly provide for production of energy, food, fibre or extractive mineral use.

Sixty-two per cent of stakeholders surveyed during development of this Strategy identified that working in Production Landscapes was part of their core business.

Where agriculture is largely concentrated on the eastern side of the region, forestry (both plantation and native forests) is predominately in the southern forests and along the boundary of the TWWHA.

Spatially, agriculture occurs across approximately 6,450km² (27%) of the south-east region's land area, with dryland grazing (13% of the region's land area) the most common land use, followed by irrigated cropping (0.3% of the region's land area).¹⁷

Agricultural development has generally focussed on lower altitudes (below 400m) resulting in a concentration of activity across the floodplains and valley bottom floors. Higher altitudes are used for grazing of near-natural areas, while forestry and fine wool grazing has left a legacy of bush runs—native grasslands, grassy woodlands and native pastures with variable proportions of native species in varying condition.

Fisheries are harvested in all waters with the exception of marine reserves, and including a concentration of commercial aquaculture in the Huon River and D'Entrecasteaux Channel.¹⁸

Southern Tasmania's Production Landscapes have the capacity to support premium brands to develop and expand by providing credible data and evidence that the produce has been managed in a sustainable way.

GOAL

Terrestrial and aquatic Production Landscapes (including marine-based seascapes) are managed sustainably for the shared environmental, social and economic benefit of the region while responding to change and threats.

¹⁷ DPIPWE, 2009, Land Use Data

¹⁸ Agriculture, Fisheries and Forestry in the South East region of Tasmania, 2015 - <http://www.agriculture.tas.gov.au/abares/publications/aboutmyregion>

Landscape value

Social value

- > Production Landscapes provide a significant contribution to lifestyle and employment in Southern Tasmania.
- > In 2014, 19% of Southern Tasmania's workforce outside the Greater Hobart area was in agriculture, fisheries and forestry. These industries were the south-east region's largest employing sectors.¹⁹
- > Economic activity driven by Production Landscapes has a radiating social value through infrastructure development (regional centres, schools, and health services), business development (allied businesses such as agronomy services) and social support systems.

Conservation value

- > Southern Tasmania's Production Landscapes contain significant areas of high conservation value land, biodiversity, water, coastal and marine assets.
- > Agricultural landscapes contain fragmented, but significant, areas of remnant native and semi-native vegetation, particularly in the Southern Midlands and Derwent Valley areas.

Economic value

- > Agricultural commodities in Southern Tasmania are estimated to have produced in excess of \$250 million in 2012-13.²⁰ There are 1,400 agricultural businesses in the region. While many properties continue to rely on grazing, recent expansion of irrigation development has increased the number of new enterprises based on intensive irrigated cropping or dairy farming.
- > In 2012-13 the gross value of Tasmanian fisheries production was estimated at \$695.9 million: 75% through aquaculture activities and 25% through wild capture fisheries. Tasmania's contribution to Australia's total fisheries production is 29%.²¹



Influences

Poor management practices

- > A fragmented planning system, poor regulatory tools and under-resourced compliance are key threats to our Production Landscapes.
- > Insufficient community and land manager participation, engagement in and awareness of sustainable management practices will lead to poor management outcomes.
- > Soil and water quality degradation through poor practice can occur in a short space of time in terrestrial systems.
- > Over-fishing and poor aquaculture practices lead to resource decline and degradation of the natural resource assets on which production is based.
- > Poor management practices can degrade, damage or destroy Indigenous cultural heritage.
- > The interaction between existing poor management practices, projected reduction in rainfall and greater prevalence of extreme temperatures is likely to worsen rural tree decline in areas such as the Midlands and Derwent Valley. This will put further pressure on native species within these Landscapes.

Invasive species and diseases

- > Invasive species, pests and diseases are key threats to production capacity and resilience.

Unsustainable agricultural, irrigation and aquaculture development

- > Industrial and urban development within Production Landscapes can have deleterious effects, such as loss of agricultural land and increases in point source and diffuse pollution.
- > Intensive agriculture, without careful landscape management, and overuse of pesticides, herbicides and fungicides have long-term negative effects on soils, biodiversity and water quality.
- > Expansion of irrigated agriculture into areas where soils and topography are less suitable or incompatible will have long-term effects on productivity in those areas.
- > Reduction of carbon stores within Production Landscapes is a key threat, and maintenance of vegetative cover and soils management are essential.
- > Aquaculture industry development has the potential to support economic and social aspects of the Production Landscapes, but can have a harmful effect on the natural assets. Further development of this industry will require careful management to balance risks and impacts.

Possible futures

Response to climate change

- > Production Landscapes have huge climate change adaptation and mitigation potential, with some of the highest potential contributions to increase soil carbon, renewable energy generation and tree planting for carbon credits (and other benefits).
- > While the majority of current market-based carbon sequestration opportunities are marginal from a purely economic standpoint, increasing soil and land-based carbon has multiple benefits for Production Landscapes. Consideration of these co-benefits on a site-by-site basis has potential to increase productivity by targeting areas most likely to be successful.
- > Risks associated with changes to rainfall, temperature, frosts and ocean temperature may require primary production systems to be heavily modified, and in some cases current systems may not be sustainable.
- > Rising temperatures will also bring new opportunities to the agricultural sector. A number of industries (e.g. cool climate vineyards) are looking to Tasmania for future production as other places in the world become less suitable.²² It is also predicted that some crop yields will increase in growing-degree days (e.g. wheat).²³
- > Possible niche markets include high-value horticulture crops (e.g. export cherries, truffles, wasabi).
- > Expansion of the viticulture industry and growing demand for aquaculture products are of increasing interest and may benefit further through access to secure irrigation water supplies.
- > The expansion of irrigation, aquaculture and other industries presents strong opportunities for Southern Tasmania. Such industries are well placed and need to demonstrate sustainable practices to benefit the 'clean green' Tasmanian brand.
- > Fisheries are at risk from increased water temperatures and new invasive species.²⁴ The long-spined sea urchin *Centrostephanus* is already impacting on rock lobster fisheries, and future ocean temperature increases are predicted to result in future expansion and damage.²⁵

People and production impacting management

- > Rural communities have been identified as a sector of the population likely to be especially vulnerable to the health impacts of climate change²⁶ with environmental, economic and social changes predicted to impact on the health of these communities.
- > Impacts from increased extreme weather events and projected drought, flooding and fire-risk increases will certainly affect the health of our rural communities through associated loss of income, associated mental health issues and physical stress.

Focus for action (See Part 4 for detailed actions)

- > Maintain and improve returns on primary production through adaptation and exploration of emerging markets and production opportunities.
- > Improve water quality and riparian management practices, increase vegetation cover, and address tree decline in rural areas.
- > Reduce further landscape fragmentation.
- > Increase biosecurity and control of invasive species, pests and diseases.
- > Support the uptake of sustainable practices by small, medium and large-scale commercial agriculture.
- > Raise awareness, increase education opportunities and improve extension services for research outputs to be adopted.
- > Maintain biodiversity and improve recognition of its contribution to productivity.
- > Research and take up technological advances.



19 Agriculture, Fisheries and Forestry in the South East region of Tasmania, 2015 - <http://www.agriculture.tas.gov.au/abares/publications/aboutmyregion>
 20 ABS Data - <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/7503.02012-13?OpenDocument>
 21 Agriculture, Fisheries and Forestry in the South East region of Tasmania, 2015 - <http://www.agriculture.tas.gov.au/abares/publications/aboutmyregion>
 22 Climate Commission, 2011
 23 Holz et al., 2010
 24 Climate Commission, 2011
 25 Pecl et al., 2009
 26 Climate Commission, 2010 - <http://www.climatecouncil.org.au/uploads/1bb6887d6f8cadc5d844fc30b0857931.pdf>

3. Lifestyle Landscapes

Definition

Lifestyle Landscapes are peri-urban, fragmented and generally modified areas. These make up the non-income or supplementary income-generating sector of land management. They include marine protected areas and coastal areas which the community values for recreation.

About Southern Tasmania's Lifestyle Landscapes

Southern Tasmania's Lifestyle Landscapes encompass those within which people develop a close affinity with conservation, hobby farming and tourism-related activity. These areas are primarily within commuting distance of larger Urban Landscapes and are centred in areas such as the Huon Valley and Channel, south of Hobart, and Sorell to the west. Other areas such as Glamorgan Spring Bay on Tasmania's east coast are experiencing an increase in Lifestyle Landscape development from those pursuing a sea change.

Southern Tasmania has become a popular destination for people from mainland Australia, and from other parts of the world, who appreciate the lifestyle benefits that living in the region can bring. The advantage of new people is new ideas and new energy and investment to regional communities, but they may also bring challenges if property owners are absent from purchased land, where there is no previous experience of land and water management, or this knowledge is low.

The Lifestyle Landscape community is diverse and co-exists within the other landscapes described in this Strategy.

GOAL

Southern Tasmania will continue to be an enviable destination for lifestyle options while ensuring development occurs in harmony with surrounding landscapes, minimising detrimental effects on the health of natural and production assets.



Image: Lyndel Wilson

Landscape value

Social value

- > The region's Lifestyle Landscapes are highly valued for their aesthetics, ability to connect people with the natural environment, and proximity to recreational opportunities (such as bushwalking, mountain biking, water sports, diving and fishing).
- > Lifestyle Landscapes support a sole or supplementary income for some community members through small-scale primary production and tourism-related activities.

Conservation value

- > Many areas that constitute Lifestyle Landscapes contain significant portions of fragmented and localised threatened species, communities and key habitat.
- > Many coastal areas are being developed, requiring a focus on important local conservation values such as saltmarsh and beaches.

Economic value

- > Expansion of niche produce resulting from Lifestyle Landscapes supports economic outcomes for the region with particular focus in those areas with higher concentration of opportunities e.g. the Huon Valley and Sorell.
- > Tourism-related income is also supported through Lifestyle Landscapes with development of farm stay and holiday-based accommodation.



Influences

Invasive species and diseases

- > The fragmentation of previously intact and managed areas and the nature of absentee landholders create the potential for increased incursion of invasive species, pests and diseases.
- > New land managers who lack awareness, knowledge and capacity in invasive species management and/or appropriate property management planning are a key threat.

Land-use fragmentation, change and intensification

- > Expansion of Lifestyle Landscapes can lead to incremental loss of habitat areas contributing to fragmentation of Natural Landscape values, particularly at the local level.
- > Intensification of small-scale agricultural and recreational pursuits can lead to negative outcomes for natural assets in Lifestyle Landscapes. Key examples of this are changes or reductions to vegetative cover leading to sediment increases in streams.
- > Land-use intensification, whether production or housing-based, leads to increased sources of both point source and diffuse pollution. These increased sources of pollution pose a threat to natural resource asset health within Lifestyle Landscapes.

People impacts

- > There are significant threats and often conflicts from the landscape change through the management of land, coast and freshwater assets. Inexperienced managers may inadvertently increase risks to natural assets through poor or non-existent management choices. Conversely, well-empowered managers can rehabilitate or improve areas that were poorly managed previously.
- > Research carried out in 2009 investigating riparian zone management in Tasmanian agricultural catchments identified that:
 - > Non-farmers made up a significant although varied proportion of land managers, indicating a Lifestyle Landscape management focus;
 - > These land managers' properties held high conservation values; and
 - > Programs should build knowledge, skills and capacity for these managers.²⁷
- > Fire management is critical to the protection of life and infrastructure. Changes in areas to Lifestyle Landscapes will lead to a need for better coordination of fire management to maintain ecological function of remnant vegetation while protecting lives and properties.



Possible futures

Response to climate change

- > It is now recognised that mean sea level is rising as a consequence of climate change. Planning processes and decisions must take this into account and safeguard natural assets and community assets and interests.
- > Changes to fire regimes, increased drought and landscape fragmentation may lead to increased risk from bushfires for people, property and ecological systems.
- > The introduction and spread of new invasive species and diseases may be further accelerated in these areas given the edge effects associated with fragmented landscapes.
- > Pressures on remnant, isolated and degraded natural values within Lifestyle Landscapes will be exacerbated due to the effects of climate change, such as increasing instances of extreme events.

Land-use change and development

- > Further development of Lifestyle Landscapes will likely see an increase in bushfire risk, invasive species management issues, and the number of land managers' subsequent turnover.
- > There is an increasing focus on smaller scale, niche and input-reduced production and high-value products, which will drive further development of Lifestyle Landscapes, particularly in the Huon Valley.

Focus for action (See Part 4 for detailed actions)

- > Build education, awareness and capacity for new and or inexperienced land, coastal and freshwater managers.
- > Develop and, where required, implement appropriate planning processes to mitigate against further habitat fragmentation, pollution and effects of sea level rise.
- > Improve biosecurity practices, including invasive species and disease control and prevention activity.
- > Improve capacity and resilience to extreme events including bushfire mitigation and fire management education and activity.

4. Urban Landscapes

Definition

Urban Landscapes are those areas associated with city, rural residential, retail and industrial development.

About Southern Tasmania's Urban Landscapes

Southern Tasmania's population is approximately 255,000 with an indicative population growth estimate by 2035 of 327,036.

The Greater Hobart area accounts for 86% of the regional population. It straddles the Derwent Estuary and comprises the five municipal areas of Hobart, Kingborough, Clarence, Glenorchy and Brighton.

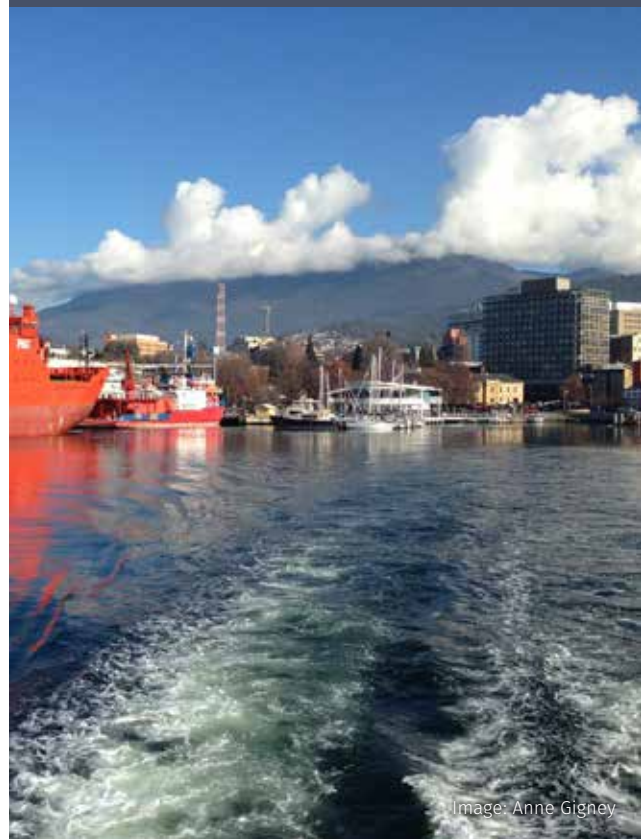
Key urban centres within the region include Huonville, New Norfolk and Sorell. Smaller population centres are scattered throughout and share a close affiliation with Production, Lifestyle and Natural Landscapes.

By the very nature of the density of population in urban centres, the natural resource assets within Urban Landscapes are often largely altered and in varying states of health. This presents both challenges and opportunities, including that impacts can often be significant (e.g. fire impact) and conversely that the concentration of population provides a sizeable resource for positive action to manage impacts.

There are significant opportunities for Urban Landscapes to support regional development and subsequent investment in natural resource management. These opportunities may be through initiatives sourcing local produce and resources, and by securing further industrial and commercial interests and investment.

GOAL

That Southern Tasmania's Urban Landscapes are increasingly recognised for efficient resource use, sustainable development, an active community, and well-informed and effective climate change mitigation and adaptation activities.



Landscape value

Community values

- Urban Landscapes are the areas where the vast majority of people live, shop, work, learn, play and interact, and they form the basis for the wellbeing of those that live within them.
- The community consultation processes for this Strategy highlighted that the region's urban communities place value on living in close proximity to Natural Landscapes.

Conservation values

- Urban Landscapes encompass a number of key estuaries, rivers and remnant native bushland in the form of 'green spaces' among and adjacent to residential, commercial and industrial development.
- Some animal species, such as the eastern barred bandicoot, persist well within some Urban Landscapes providing for a modified habitat.
- Many Urban Landscapes within the region are based along the coastal zone that provides for recreational, aesthetic and employment-based activity.

Economic value

- Urban Landscapes are key economic activity centres within the region and provide the majority of employment and economy-supporting industries and activities.



Image: Luke Diddams

Influences

Habitat loss, modification and condition decline

- > Remnant habitat destruction and fragmentation in Urban Landscapes lead to increased pressures on species and communities.
- > Expansion of Urban Landscapes exacerbates threats to remaining natural assets such as threatened species.
- > Incremental loss of habitat and the pollution associated with development contribute to the decline of local and regional natural resource assets. An example of this is found in areas containing significant habitat for threatened species (e.g. the swift and orange-bellied parrots) which continue to be impacted.
- > Management of bushland within and adjoining Urban Landscapes is critical to both the natural assets within them and the bushfire risks to people and property.
- > Loss or modification of natural waterways and drainage lines occurs due to pipe works, straightening, channel hardening and altered hydrology.

Invasive species and diseases

- > Urban Landscapes contribute to an increase in invasive species, pests and diseases through modification of natural areas and introduction of species not previously present, such as escaped garden plants and pets, and pet interactions with wildlife.

People impacts

- > Urban land use, like any other land use, can influence and transform the natural environment. Key to this influence is the concentration of activity in Urban Landscapes. Elevated nutrient, pollutant and sediment loads from a range of sources—heavily influenced by storm water, sewage treatment, industry and residential development activities—can result in significant deterioration of water quality.
- > Urban expansion poses a threat to the region's Production and Natural Landscapes. Areas at risk of urban encroachment include those around major urban centres within the Greater Hobart area, Sorell, Huonville and coastal areas undergoing development (such as the Glamorgan Spring Bay municipality).
- > Coastal and marine assets are threatened by increased urbanisation, pollution, recreation and use of these assets.



Possible futures

Response to climate change

- Projected sea level rise will impact on particular urban localities into the future. Key areas that will see an impact include parts of Kingborough, Clarence, Sorell and Hobart municipalities.
- A harsher fire-weather climate is projected in the future and will exacerbate impact on those parts of Urban Landscapes that are already living with fire risk. With a focus on protection of lives and infrastructure, fire-management strategies may, through increasing or decreasing fire intervals, be in conflict with the needs of natural values.
- Increasing climate change-induced stresses in other parts of Australia may lead to increased population pressures within Southern Tasmania's Urban Landscapes, leading to further expansion into other landscapes.

Urban growth

- The urban-based population is projected to increase, particularly in the Greater Hobart area. This indicates further need to provide for water consumption, power generation and other local and regional resource use, with resultant pressures on land use and intensification.

Focus for action (See Part 4 for detailed actions)

- Further integrate consistent natural resource management principles and climate change into land-use planning and decision-making to ensure that trade-offs between further development, natural, production and cultural assets are recognised and accounted for.
- Build education, awareness and capacity to increase participation and community value in natural resource management initiatives and behaviour change.
- Build on existing collaborative partnerships to support collective planning and action to manage natural assets within Urban Landscapes and mitigate risks and extreme events such as bushfire.



Managing Southern Tasmania's Natural Resource Assets

An asset management approach

Southern Tasmania's assets provide for the economic productivity and environmental health of our landscapes which in turn support our social economic and economic wellbeing.

For the purposes of this Strategy, these assets have been classified to provide direction and a focus for activity.²⁸ They are classified as:

1. Land Assets

Southern Tasmania's Land Assets encompass topography and the soils that support agriculture, plantation forestry and native ecosystems; the vegetation that covers and protects these soils; geo-conservation; and cultural heritage values.



2. Water Assets

These include surface and groundwater resources and freshwater ecosystems within the region, including rivers, lakes, wetlands and aquifers.



3. Coasts and Marine Assets

These are the region's coastal and marine zones, including all areas influenced by the sea or potentially affected by coastal flooding or sea level rise.



4. Biodiversity Assets

Southern Tasmania's biodiversity assets encompass the region's terrestrial native species and the complex ecological communities they form.



5. Community Assets

These are the people and organisations that represent the regional community: individuals; community groups and volunteers; local governments and State Government; business and industry; and non-government organisations. People play a critical role in the management and use of our natural resources and are in themselves a key asset.



Our biophysical assets (1-4 above) also include migratory (terrestrial, air and water-based) species.

The health or status of one asset can impact others. For example, the loss or deterioration of vegetation condition can lead to soil loss that then affects water quality.

The Priority Actions identified for each asset in Part 4 of this Strategy aim to attain multiple benefits from single actions where possible.

For each of the assets identified above, this Strategy outlines:

- > **Description:** A regional snapshot of the asset and its interactions with other assets and our socio-economic system.
- > **Key management elements:** Specific focus elements for the management of each asset.
- > **Threats and opportunities:** An analysis of the region's drivers for change including projected climate change impacts.

The Targets, Priority Actions and Key Contributors for each of these assets are outlined in Part 4.

²⁸ This classification is based on the region's previous strategies; community and stakeholder consultation; cross-regional considerations; and expert scientific advice. Appropriate management of the assets underlying each landscape type will support these areas' productivity, ecosystem health and adaptive capacity into the future.



1. Land Assets

Definition

Southern Tasmania's Land Assets encompass the topography and soils that support agriculture, plantation forestry and native ecosystems; the vegetation that covers and protects these soils; geo-conservation; and cultural heritage values.

This section focuses on soils, vegetation cover, geodiversity and cultural heritage.

About Southern Tasmania's Land Assets

The region's Land Assets cover 25 million hectares (about 38% of the State) and include offshore islands such as Bruny Island, Maria Island and Macquarie Island.

Given its size, varied topography and underlying geology and rainfall gradient (up to 3,000mm in western areas to just 300mm in some eastern parts) the region supports very diverse soils, vegetation and geologic features and supports many different land uses.

Current land uses in the region include:

- > Agriculture and aquaculture
- > Residential and industrial
- > Conservation
- > Tourism and recreation
- > Forestry
- > Mining.

When compared to other areas in Tasmania and Australia, the region contains a large proportion of native vegetation cover representing 76% of the total region. Approximately 17% of the region is agricultural area. Public versus private land ownership is relatively even within the region.

A notable trend surrounding land clearance and development is its concentration in valley bottom floors, waterway corridors and surrounding estuaries, while the headwaters of many catchments remain largely intact.

Areas that have been largely modified include the Derwent Valley, Southern Midlands, Coal River Valley, Huon Valley and scattered areas on the region's eastern and southern parts.

The Land Assets interact with all other assets within the region to provide economic, social and environmental outcomes. As a result, they require careful management to ensure degradation is minimised and positive outcomes continue to add to their prosperity and lead to increased long-term sustainability.





Key management elements

Soils

- Soils play a key role in being able to sustainably manage our land resources. We rely on our soils to maintain overall land structure, produce food and fibre, and support healthy vegetation and ecosystems. Agricultural pursuits and lifestyle in the region are reliant on ongoing maintenance of soil resources.
- The considerable diversity of soil types within the region is a result of a range of bedrock types, a dramatic climate gradient, a range of parent material, and the variation in biological activity that influences soil development.
- Notably, less than 3% of the State's prime agricultural land is found in Southern Tasmania, with that which does exist found near Kingston, Grove, Margate and south of Bream Creek. Areas on the east coast, the Coal River Valley and limited areas around Bothwell and the Upper Derwent Valley have good soil but are limited in their production capacity by low rainfall.
- The region's most valuable soil carbon stocks are contained largely within reserved areas of the south-west. Areas with less soil carbon stock are mainly within the settled agriculture-based land areas that will benefit from management practices that support or increase this current stock (see Figure 3).

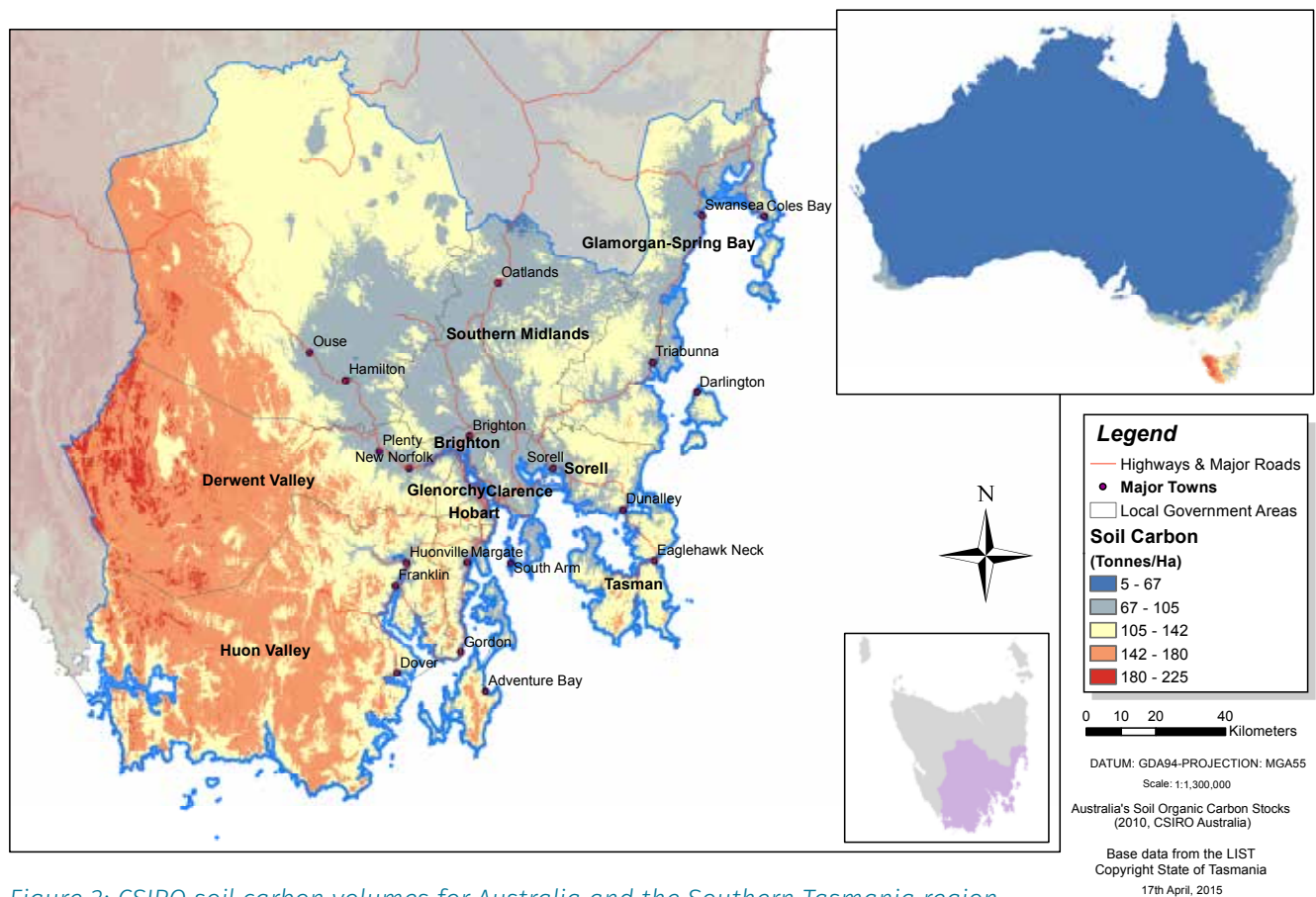


Figure 3: CSIRO soil carbon volumes for Australia and the Southern Tasmania region



Vegetation cover

- > The region represents a broad variety of vegetation types due to its varied topography (alpine to coastal), geology, soils, and the breadth of the steep rainfall gradient running from west to east. There are dramatic changes across the gradient, and the region contains vegetation communities including:
 - > Alpine vegetation
 - > Rainforests
 - > Eucalyptus forests and woodlands
 - > Non-eucalyptus forests and woodlands
 - > Heath
 - > Scrub
 - > Buttongrass plains and moorland
 - > Wetland and swamp vegetation
 - > Saltmarsh
 - > Grasslands.
- > Thirty-eight per cent of the region's land area is managed primarily for nature conservation. When areas with other minimal use and managed resource protection are included, the proportion becomes 61%.²⁹
- > The region's terrestrial landscapes contain 138 different native vegetation communities.³⁰
- > Maintenance of vegetative groundcover in agricultural areas is a key issue to minimise the likelihood of soil erosion, particularly in the Derwent Valley, Southern Midlands, east coast and Coal River Valley areas. Land managers need to adapt their practices now and into the future, as these will become increasingly important with projected climate change effects.
- > The region's abundant wildlife, water quality, tourism, recreation and agricultural pursuits all rely on the health and maintenance of vegetation condition and structure.

Geodiversity

- > The region has a remarkably varied geology and a range of landforms, including:
 - > Dolerite peaks, plateaux and sea cliffs, with their columnar precipices and distinctive scree slopes;
 - > Sedimentary layers of sandstone and mudstone;
 - > The distinctive craggy granite peaks of the Freycinet Peninsula; and
 - > Older metamorphic rocks such as schists and quartzite in the south-west.
- > Coastal and marine action has created a range of coastal landforms, while terrestrial karst processes, such as in the Hastings and Mount Field areas, have created important cave systems.
- > Key geo-conservation features vulnerable to land-use activities are those belonging to aeolian and karst systems. Aeolian soils are those that have been deposited by the wind and include dunes, lunettes (lake-side dunes), sand sheets and deflation basins from which aeolian material has been eroded.³¹

Cultural heritage

- > Sites of cultural significance are found across the region with concentrations on the coast and along river valleys that provided pathways to coastal resources for the region's Traditional Owners. Sites of significance include middens, quarries and rock art.
- > These heritage places provide valuable information about one of the world's oldest living cultures and a spiritual connection for Tasmanian Aboriginal people.
- > There is also a rich diversity of historical heritage sites dating from early European occupation. Well-preserved sites at Maria Island, Mount Field and Port Arthur have significant community value and are also major tourist attractions.

²⁹ DPIPWE Land Use Data, 2009 - <http://maps.thelist.tas.gov.au/listmap/app/list/map>

³⁰ <http://dipwwe.tas.gov.au/conservation/development-planning-conservation-assessment/tools/tasmanian-reserve-estate-spatial-layer>

³¹ PDF Management Services Pty Ltd, 2015, Environmental, Strategic and Institutional Scans Report: A report prepared to assist NRM North and NRM South in the preparation of their regional NRM strategies



Threats and opportunities

Projected climate change impacts

- > Predicting the impact of the changing climate on soil health, soil carbon storage, and vegetation cover is difficult, as human management of these elements will vary greatly and also have considerable impact.
- > Research has identified that, over time, Land Assets will change due to various pressures such as temperature increases, rainfall variability and extremes in weather patterns.³² Recognition of this change is paramount to future management of Land Assets, and the focus needs to move from preservation of the status quo to one of true adaptive management.
- > Agricultural productivity may increase or decrease through climate change, depending on location. In topographically variable regions where farm businesses use mixed systems, climate change-related risks may be less than in areas that rely on a single or dual enterprise.³³
- > Both drought and extreme rainfall events are projected to increase. This could result in extended periods of exposed soils in dryland grazing systems. Reduced vegetation cover leads to increased risk of soil erosion and nutrient loss. Key areas of focus for drought are the Derwent Valley and the Southern Midlands, while the Tasman Peninsula is a focus for more severe rainfall events.
- > Predicted changes to geo-conservation values with a changing climate will be incremental rather than critical, threshold-based change, which will lead to a loss of local values over time.³⁴ Those most at risk are the geo-conservation values linked with rivers, wetlands, lakes, and coastal and estuarine systems.

- > The region's alpine areas will also likely see reduced snow and frost events, altering vegetation species and communities in these locations with a potential altitudinal increase in diseases such as *Phytophthora cinnamomi*.
- > Increased soil erosion through increased flooding, extreme rainfall events and drought could lead to exposure, damage and, in some cases, loss of Aboriginal cultural heritage sites.

Threats

- > The health of our soils is a very complex subject and is threatened by many factors including poor agricultural practices, loss of vegetation cover and changes in land use.
- > Soil carbon storage is at risk of decline through land-use change and inappropriate land management practices. The region is relatively high in soil carbon in comparison to the soils of mainland Australia. Land management practices that maintain and support soil carbon are of chief importance to preserve these levels.
- > Aeolian soils without vegetation cover are highly susceptible to wind erosion. The region's important aeolian soils are found largely in agricultural landscapes. Vegetation management on these soils is therefore very important to maintaining the integrity of these soils and avoiding erosion.
- > Expansion of irrigation may lead to longer periods of reduced vegetative cover in some areas because of an increased focus on cropping. Additionally, areas that may support irrigation enterprises will increase pressure on soil health and structure such as waterlogging, salinity and pugging on irrigated dairy pastures.
- > Clearance of native vegetation, land-use change, and rural tree decline in agricultural and non-agricultural areas remain a threat.

³² AdaptNRM Modules - <http://adaptnrm.csiro.au/>

³³ Southern Slopes Information Portal Report 2015 - <https://terranova.org.au/repository/southern-slopes-nrm-collection>

³⁴ DPIPW, 2010, Vulnerability of Tasmania's Natural Environment to Climate Change - <http://dpiwwe.tas.gov.au/Documents/Vulnerability-of-Tasmanias-Natural-Environment-to-Climate-Change---An-Overview.pdf>



- Land fragmentation was raised as being a threat to Land Assets throughout consultation for this Strategy. Subdivision of agricultural land was seen as a risk to economic development of agricultural produce and also to increased risk from weeds, pests, diseases and fire management issues.
- Limited consideration of geo-conservation and cultural heritage during development applications and major works can lead to loss or damage of these values at the local level.
- Fire management continues to be a key risk to Land Assets. The frequency and intensity of fire determine the regeneration of particular species and communities, but fire management must also aim to protect the region's property and people.
- New and existing invasive weeds, pests and diseases pose a significant risk to all aspects of Land Assets. Risks include the loss of agricultural productivity, increased expenditure on management, and risks associated with decline and loss of native species and ecological community composition. Recent examples of this threat include the biosecurity incursions of myrtle and blueberry rusts.

Opportunities

- Minimum temperatures have risen and will continue to rise with climate change providing for more favourable growing conditions for many enterprises located in cool-climate areas such as our region.³⁵
- Expansion of irrigation will provide greater reliability of soil moisture required for crops, pasture and horticulture, which are higher-value industries than broad-acre dryland grazing and cropping.
- The largest soil organic carbon stores per hectare occur in cooler temperate zones, which have higher rainfall and extensive eucalypt forest and rainforest. The region's extensive conservation estate means these stores will likely become increasingly valued, and appropriate stewardship of these areas is important. It has been recognised that an important challenge for regions in south-eastern Australia will be maintenance of existing carbon stocks in vegetation and soils.³⁶
- The uptake, integration and review of standardised Vegetation Condition Assessments will provide for improved monitoring of change and evidence-based decision-making and policy development as recognised in the *Tasmanian Native Vegetation Monitoring Strategy*.³⁷
- There are opportunities to increase recreational and tourism outcomes through wise management of the region's vegetation. Conservation of forest reserves, including iconic old growth forests, is one example where anthropogenic value is high.
- Enterprise suitability maps for some areas of Tasmania have been developed by the Department of Primary Industries, Parks, Water and Environment (DPIPWE).³⁸ The Department is currently working on similar mapping products for the whole Tasmanian agricultural area and will incorporate climate change projections. These tools will highlight local opportunities for enterprise change and adaptation.

³⁵ Southern Slopes Information Portal Report 2015 - <https://terranova.org.au/repository/southern-slopes-nrm-collection>

³⁶ Southern Slopes Information Portal Report 2015 - <https://terranova.org.au/repository/southern-slopes-nrm-collection>

³⁷ Tasmanian Native Vegetation Monitoring Strategy 2011 - <http://dipwe.tas.gov.au/Documents/Native-Vegetation-Monitoring-Strategy.pdf>

³⁸ Online DPIPWE - <http://dipwe.tas.gov.au/agriculture/investing-in-irrigation/enterprise-suitability-toolkit>



- Planting trees for carbon sequestration and storage may provide some limited opportunities in Southern Tasmania. Unfortunately, many of the areas within the region that could provide for tree plantings, such as cleared Production Landscapes, lie in lower rainfall areas that are not particularly suitable. Ultimately, the uptake of planting opportunities lies directly with the landholder and would be a trade-off between lost future productivity and return from planting investment.
- Encouraging the uptake of regenerative agriculture techniques, such as planned grazing³⁹ and pasture cropping, has the dual benefit of potentially increasing soil carbon and reducing carbon emission through reducing farm inputs such as fertiliser.
- SCARP identified that geographic prioritisation can be as much about avoiding unintended negative consequences as it is about creating benefits,⁴⁰ and the multiple-purpose benefit of any carbon-based plantings would lie with the location, project design and priorities.
- Areas that were identified through a statewide analysis completed by Cradle Coast NRM on behalf of the three regional NRM bodies indicated that regional opportunities exist in settled agricultural areas that would benefit from soil improvement and protection.⁴¹
- AdaptNRM also developed modelling for revegetation for multiple benefits in Tasmania. This modelling was based primarily on biodiversity, vegetation and freshwater ecosystem benefits. The areas highlighted for future benefits from revegetation included the cleared agricultural areas within the region.⁴²



Image: Lyndel Wilson

³⁹ Guide to Planned Grazing - <http://www.nrmsouth.org.au/wp-content/uploads/2014/10/Planned-Grazing-Guide.pdf>

⁴⁰ Means-to-an-end: A process guide to participatory spatial prioritisation in Australian natural resource management - <https://terranova.org.au/repository/southern-slopes-nrm-collection>

⁴¹ See Appendix 2: Carbon planting spatial prioritisation

⁴² See Appendix 2: Carbon planting spatial prioritisation



2. Water Assets

Definition

Water Assets are those inland water resources present throughout the region upstream of the high tide mark and represented by riverine systems, lakes, wetlands and groundwater.

This section focuses on surface water and groundwater quantity and quality and freshwater ecosystems.

About Southern Tasmania's Water Assets

Southern Tasmania's Water Assets are essential to clean drinking water, biodiversity, supporting aquatic ecosystem health (freshwater, wetlands, estuarine, marine), irrigation for agricultural production, industrial use, aquaculture and fisheries production, recreation and tourism.

Land-use activities that have impacted on freshwater systems include:

- > Flow regulation through watercourse development and use;
- > Vegetation clearance for agricultural, lifestyle and urban pursuits;
- > River channel alterations; and
- > Converted wetlands.⁴³

Surface and groundwater quality refers to the chemical, physical and biological characteristics of water and varies greatly across the region.

Water quality issues are generally related to excess nutrients leaching into groundwater, nutrient run-off to surface water, and in-water activities that produce nutrients and are not adequately filtered. Increased salinity in freshwater sources is another significant water quality issue.

Aspects of the Water Assets support all other assets identified in this Strategy and across all landscapes. Changes in water resource health and supply have ramifications for health and ecosystem services across the region.

Although much of its data requires updating, studies and consultation carried out to inform this Strategy suggest the State's Conservation of Freshwater Ecosystem Values Database remains the key information source of values related to the Water Assets.⁴⁴

Water management plans currently exist for Lake Sorell and Lake Crescent, River Clyde and Little Swanport.⁴⁵ A water quality statement, which is an abridged version of a water quality improvement plan, is being drafted for the Derwent Catchment (as at August 2015).

Key management elements

Surface water

- > The region's surface water resources consist of numerous rivers, lakes and wetlands.
- > There are two major river systems wholly within the region (Derwent and Huon) with numerous smaller and coastal catchments (such as the Coal and Little Swanport rivers), as well as part of the north-flowing Macquarie and Esk rivers and part of the west-flowing Gordon River.
- > The region contains some of the few southern Australian examples of entire pristine catchments, such as the New River.
- > A large number of Tasmania's lakes, both natural and dammed, are also found within the region, including Lake Gordon, Lake Pedder, Lake St Clair, Great Lake, Lake Sorell and Lake Crescent.
- > Historical impacts on the region's lakes have been extensive with impoundment, introduction of exotic species, irrigation diversions and hydro-electric production flow management regimes.

⁴³ DPIWE, 2010, Vulnerability of Tasmania's Natural Environment to Climate Change - <http://dpiwe.tas.gov.au/Documents/Vulnerability-of-Tasmanias-Natural-Environment-to-Climate-Change---An-Overview.pdf>

⁴⁴ Tasmanian Conservation of Freshwater Ecosystem Values Database - <http://dpiwe.tas.gov.au/water/water-monitoring-and-assessment/cfev-program>

⁴⁵ DPIWE Water Management Planning - <http://dpiwe.tas.gov.au/water/water-management-plans/adopted-water-management-plans>



- > Most of the region's larger water bodies have robust management systems in place.
- > Surface water in the region also includes stormwater, treated waste water, and water contaminated such as by industrial use.
- > The region contains four Ramsar-listed wetlands of international significance: Pittwater-Orielton Lagoon, Moulting Lagoon, Apsley Marshes and the north-west corner of Lake Crescent.
- > Thirty of the region's wetlands are listed in the Directory of Important Wetlands in Australia.⁴⁶ Important wetland features include naturally saline as well as freshwater wetlands, especially in the southern part of the Midlands Biodiversity Hotspot Area (MBHA).⁴⁷

Groundwater

- > Groundwater is water found underground in the spaces between soil, sand and rock. Groundwater systems are the larger scale features of groundwater related to its storage, movement and composition.
- > Groundwater is present throughout the region and 12 groundwater flow systems have been identified. Groundwater varies in quantity and quality depending on the type of rocks and soils present, the hydrogeological setting, the amount of rainfall and land-use practices.
- > Groundwater-dependent ecosystems occur across the region, including the species and communities within subsurface streams, warm and cool springs, and mound springs. There is limited information on these systems.
- > Some areas where groundwater extraction is intensifying include Lifestyle and Urban Landscapes such as the Sorell, Huonville and selected coastal development areas.
- > There is very limited knowledge of either groundwater or surface water connectivity and groundwater quantity and usage.

Freshwater ecosystems

- > Freshwater ecosystem health is represented by the aspects of water quality, flow regimes and site and catchment characteristics that contribute to maintenance of in-stream biota and biotic communities.⁴⁸
- > It is recognised broadly that locations with less disturbance from human activities generally display better freshwater ecosystem health.
- > Riparian vegetation is often used as an indicator of river system health. The retention, maintenance and revegetation of riparian areas has been a focus of natural resource management and other land and water management programs for many years; it is still recommended as a Priority Action in this Strategy.
- > Recent research identified many climate change adaptation options to support freshwater ecosystems. Several of these are highly relevant to the region, including invasive species management, riparian zone management, development of environmental flows, monitoring, and ecosystem habitat and refuge enhancement.⁴⁹
- > The margins of productive freshwater ecosystems are hotspots for Aboriginal cultural heritage sites, and rivers provided key movement pathways between inland and coastal resources.



Image: Lyndel Wilson

⁴⁶ Directory of Important Wetlands in Australia - <http://www.environment.gov.au/topics/water/water-our-environment/wetlands/australian-wetlands-database/directory-important>

⁴⁷ Australian Government - <https://www.environment.gov.au/biodiversity/conservation/hotspots/national-biodiversity-hotspots>

⁴⁸ PDF, 2015, ESI Scan Report

⁴⁹ Barmuta et al., 2012 - <http://apo.org.au/files/Resource/Barmuta-2013-hydrology-freshwater-ecosystem-adaptation-WEB.pdf>



Threats and opportunities

Projected climate change impacts

- > In the near future, natural variability is projected to be the dominant factor for rainfall patterns within the southern slopes region that includes Tasmania. However, longer-term projections indicate a general reduction in rainfall, particularly in winter and spring,⁵⁰ that will invariably impact Water Assets.
- > Reductions in rainfall, while recognising that there will be large regional and local differences, may place pressure on regulated production systems, dryland agriculture, freshwater ecosystems and water security for various purposes including urban water supply.
- > Higher intensity rainfall events will lead to greater turbidity, as erosion and subsequent sediment loads would be expected to increase. This may also include introduction of pollutants and nutrients from nearby agricultural areas.⁵¹
- > Climate change has the potential to affect freshwater organisms through changes in the timing of life cycle events including growth, respiration and reproduction. These impacts are not likely to be spread evenly across all species and would then lead to whole ecological community and species composition changes.⁵²
- > Wetlands within the region will display varying responses to climate change, depending on their type and location, but they will likely include salinisation from increased temperature and reduced water input.⁵³

Threats

- > Heavily cleared areas within the region represent locations within which aquatic ecosystem health is under pressure due to excess nutrients and increasing salinity.
- > Loss of riparian vegetation, weed invasion, erosion of river banks, and livestock accessing waterways are serious threats to the health of these systems.
- > Pollution sources, both point source and diffused, will impact on the health of Water Assets. Land-use change and intensification are key drivers of increased pollution, while contamination from some industry and mining remains a threat.
- > Some expanding land uses, such as dairying under irrigation, have the potential to affect water quality by increasing nutrients, particularly nitrates and phosphorous, to water bodies.⁵⁴
- > Increasing river regulation and stream-flow management for irrigation and other purposes has the potential to adversely affect water quality and ecosystem health and will require appropriate planning and regulation.
- > A lack of recognition of the impact of cumulative development is a key threat. Identifying a systems-based approach is required to account for environmental flows, interbasin transfers, land-use changes and other influences.
- > Irrigation scheme areas within the region may impact further on the urban water supply and may pose further threats within key Urban and Production Landscapes including Greater Hobart, Coal Valley, Bothwell-Clyde Area and the Swan Valley if not appropriately managed.
- > Use of inappropriate methods of riparian and wetland restoration may impact on hydrology and lead to damage or loss of Aboriginal heritage sites.

⁵⁰ Climate Change in Australia - <http://www.climatechangeinaustralia.gov.au/en/>

⁵¹ Southern Slopes Information Portal Report 2015 - <https://terranova.org.au/repository/southern-slopes-nrm-collection>

⁵² Southern Slopes Information Portal Report 2015 - <https://terranova.org.au/repository/southern-slopes-nrm-collection>

⁵³ James et al., 2009 - <http://waterscience.com.au/wp-content/uploads/2013/01/James-2009-MFRpdf.pdf>

⁵⁴ PDF, 2015, ESI Scan Report



Opportunities

- > Irrigation and dairy industry expansion may provide for further socio-economic enterprise diversification. Expansion in these primary industries must be managed holistically to ensure that negative outcomes to water quality, soil health and ecosystems are avoided. This is particularly relevant for the Derwent Valley and areas that may be able to access water from newly developed irrigation schemes.
- > Water quality improvement is a key opportunity for the region to improve the health not only of Water Assets, but also for other Land, Coastal and Marine Assets.
- > There are significant opportunities for water quality improvement through improved fertiliser management on farms, efficient irrigation, fencing and revegetating riparian areas, and diverting effluent and pollutants from water courses.
- > The further research, development and implementation of environmental flows for regulated catchments represent an opportunity to ensure long-term ecosystem health.
- > There are opportunities to better reuse stormwater and treated waste water within the hydrological system.
- > Further integration of riparian-related issues, both natural and cultural, into property and landscape management planning will yield positive results for riverine health, freshwater ecosystems and water quality outcomes.



Image: Luke Diddams



3. Coasts and Marine Assets

Definition

These are the coastal and marine zones within the region, including all areas influenced by the sea or potentially affected by coastal flooding or sea level rise, which varies across the region.

This section includes the region's shorelines, estuaries and marine-related matters, including those species and communities dependent on these areas as habitat.

About Southern Tasmania's Coasts and Marine Assets

The region has a total coastline of 3,263km, including estuaries up to freshwater, and all islands and islets. This constitutes 39% of the Tasmanian coastline and is longer than the coastline of New South Wales (2,137km) and Victoria (2,512km).

Coasts and estuaries are the focal points of many of the region's Urban Landscapes and some Lifestyle Landscapes. Social and economic activities based on the coast play an integral role in community life in the region, and the health of our coastal and marine environments continues to be highly valued.

Key features of this asset are the three coastal Ramsar sites with the extensive saltmarsh vegetation and diversity of migratory birds they support; the dramatic sea cliffs of the Tasman Peninsula; Bruny and Maria islands; the Derwent and Huon estuaries and their convergence in the D'Entrecasteaux Channel; and the dramatic, undeveloped coast of the south-west wilderness and Macquarie Island.

The wide-ranging climatic, geological and oceanographic regimes and interaction of terrestrial, estuarine and marine ecosystems support a wealth of biodiversity.

Numerous significant flora and fauna species occur, including migratory marine species such as sperm and humpback whales and migratory birds that travel along Australia's eastern seaboard. Many of these marine and bird species are protected by international environmental conventions.

Coastal and marine areas contain significant habitat for both shorebirds and seabirds.

Maintaining the estuarine, coastal and marine asset in prime condition is critical to the region's Production Landscapes and future economic and social sustainability. The region's wild fisheries and aquaculture, particularly in the Huon River and D'Entrecasteaux Channel, make an important contribution to the State's economy.

The region's coastal areas are hotspots for Aboriginal cultural heritage sites including artefacts and middens.

Current management of the estuarine, coastal and marine assets in Southern Tasmania is the shared obligation of local communities, industries and businesses, and all levels of government.



Image: Paul Gray



Key management elements

Shorelines

- > The region's coast has a number of unique features including sandy beaches and dune systems that are highly sensitive to human disturbance (e.g. Tasman Peninsula). There are also large expanses of undeveloped coastline backed by largely unmodified catchments in the south-west, and this area is recognised as the most pristine catchment to coast in Australia (New River and coast between Cockle Creek and Macquarie Harbour).⁵⁵
- > There are numerous offshore islands, including the World Heritage listed sub-Antarctic Macquarie Island.
- > Coastal landforms are among the most dynamic and rapidly changing landforms on earth, and these active processes (dune and beach mobility, shoreline erosion, or sea-cliff slumping) are sensitive to disturbances that can quickly cause them to change in ways that significantly modify natural processes.
- > Conservation of these landforms and ongoing land forming (geomorphic) processes are considered significant for a variety of reasons including the integral role they play in maintaining the broader natural values of coasts.

Consideration of Aboriginal cultural heritage is essential when working to conserve or restore shoreline values in the region.

Estuaries and coastal wetlands

- > The region's 39 estuaries vary dramatically in condition, level of disturbance and conservation status:⁵⁶
 - > Five are of 'critical' conservation significance (Bryans Lagoon, Southport Lagoon, New River Lagoon, Bathurst Harbour and Payne Bay);
 - > Nine are of 'high' conservation significance (in particular Great Swanport and Cloudy Bay Lagoon);
 - > Fifteen are 'near pristine' (mostly on the south and west coasts);
 - > Three are 'largely unmodified';
 - > Seventeen are 'modified' (including the Huon Estuary); and
 - > Four are 'severely modified' (Derwent, Pitt Water, Browns and North West Bay estuaries).
- > The Derwent River runs through the heart of the Hobart metropolitan area and has approximately 40% of Tasmania's population living around its margins. It is used widely for recreation, boating, fishing, marine transport and industry. Further upstream, the Derwent River supplies the majority of the region's drinking water supply and is a major source of hydro-electric power.
- > Three of the region's coastal wetlands are of international significance: Moulting Lagoon, Apsley Marshes and Pittwater-Orielton Ramsar-listed sites.
- > Recently, coastal saltmarsh communities were protected under national legislation. The saltmarsh wetlands were mapped recently, with extensive areas identified in varying condition, some with and some without retreat pathways in the face of projected sea level rise.
- > Coastal estuaries and wetlands provide essential links between terrestrial and marine environments, as they host key ecosystem services and processes, including nitrogen and carbon cycling, breeding zones and

⁵⁵ DPIPWE, 2010, Vulnerability of Tasmania's Natural Environment to Climate Change - <http://dpiipwe.tas.gov.au/Documents/Vulnerability-of-Tasmanias-Natural-Environment-to-Climate-Change---An-Overview.pdf>

⁵⁶ National Land and Water Resources Audit - <http://lwa.gov.au/programs/national-land-and-water-resources-audit>



Coasts and Marine Assets

nurseries for marine species. Each zone of the interface between the terrestrial and marine environments (terrestrial vegetation, intertidal vegetation including saltmarsh, marine including sea grass and rocky reefs) contributes to these processes and cannot be considered in isolation from the remainder of the estuarine or wetland system.

- Estuaries and coastal wetlands rely on healthy environmental flows from upper catchments to trigger, support and maintain physical, chemical and biological processes important to their ecosystem services.
- Productive estuaries, such as Moulting Lagoon and Pittwater-Orielton Lagoon, are important places for Aboriginal people and hotspots for cultural heritage sites and artefacts.

Marine

- Our Marine Assets are characterised by cool to cold temperate waters, and the species and ecological communities found within them are in a state of constant flux.
- Southern Tasmania's marine environment encompasses four distinct marine regions: Bruny, Davey, Macquarie and Freycinet. The Bruny bioregion has the highest level of marine endemism in Tasmania and contains all but one of Tasmania's Marine Protected Areas.
- Important migratory marine species, such as whales, pass through waters within the southern region en route to breeding or feeding grounds. An estimated 100,000 species of marine invertebrates occur in Australian and Tasmanian waters.⁵⁷ Additionally, there are six marine and two estuarine species of seagrass, and the diversity and endemism of the marine coral and macro flora in the State are among the highest in the world with about 125 species of green algae, 225 species of brown algae and 800 species of red algae.

- Although the region contains known marine habitats of significance at state, national and international levels, and supports a wide diversity of known species, only limited information is available on marine and estuarine environments.
- Marine habitats, including seagrass beds, and rocky-reef kelp habitats which support productive marine communities may be in decline.⁵⁸ However, it is difficult to distinguish any long-term decline from natural variability due to uncertainties in baseline information and insufficient long-term data records.

Threats and opportunities

Projected climate change impacts

- Shorelines will be impacted by climate change in many ways, increasing the impact of hazards that are already present. Issues such as coastal flooding, erosion and recession will all be influenced by factors including rising mean sea level, storm surges and changes in rainfall.^{59, 60, 61}
- Coastal wetlands are particularly vulnerable to climate change impacts because they are low lying and relatively shallow—attributes that are easily influenced by changes in sea level, rainfall and more frequent or intense extreme weather events (heatwaves, droughts, storms and floods).⁶²
- Coastal erosion and inundation will result in the loss or migration of saltmarshes, wetlands, dune fields and intertidal sand flats. Coastal wetlands (particularly saltmarshes) and seagrass communities are significant carbon stores. Loss of these communities will not only reduce carbon sequestration, but potentially result in the net release of carbon and sediments. Maintaining condition of these communities and those adjacent to them buffers negative impacts and allows for landward retreat, which will be required for maintenance of these assets and the biodiversity they support.

⁵⁷ Bureau of Rural Science, 2007, Characteristics of the Australian Marine Environment. Australian Museum, 2002, Overview of the Conservation of Australian Marine Invertebrates

⁵⁸ Tasmanian Planning Commission, State of The Environment Tasmania 2009

⁵⁹ Southern Slopes Information Portal Report 2015 - <https://terranova.org.au/repository/southern-slopes-nrm-collection>

⁶⁰ Climate Futures for Tasmania Technical Report: Extreme Tide and Sea Level-Events - http://www.dpac.tas.gov.au/__data/assets/pdf_file/0009/184797/ACE_CFT_-_Extreme_Tides_and_Sea-Level_Events_final.pdf

⁶¹ Tasmanian Coastal Adaptation Pathways Project Reports - http://www.dpac.tas.gov.au/divisions/climatechange/adapting/tasmanian_coastal_adaptation_pathways_project/tcap_2011-12

⁶² Southern Slopes Information Portal Report 2015 - <https://terranova.org.au/repository/southern-slopes-nrm-collection>



- > South-east Australia is a marine global warming hotspot. The warm East Australian Current is extending southward, leading to fast-warming ocean temperatures.⁶³
- > Warming of ocean temperatures is already resulting in movement and range shifts of marine species, and these changes are predicted to continue. Southward range extensions have been documented for seaweeds, phytoplankton, zooplankton, and demersal and pelagic fishes. Declining recruitment for rock lobster has been observed.⁶⁴ This movement includes range extensions for invasive species and retreat of keystone and endemic species. Fisheries and aquaculture businesses are already adapting to these changes.
- > Ocean acidification is predicted to result in reduced calcification rates in zooplankton, which is expected to reduce the abundance of key groups (pteropods and foram), that could, in turn, impact on fish, seabirds and the marine mammals that feed on them by reorganising food webs in time and space.⁶⁵
- > Sea level rise will also impact Aboriginal cultural heritage sites, as the coastal zone is a hotspot for sites such as middens.
- > Introduced pest plants and animals (including domestic pets) threaten coastal and marine environments through predation, habitat modification, disturbance and displacement of native species. They can also contribute to a decrease in land and marine economic productivity.
- > Elevated nutrient, pollutant and sediment loads from a range of sources in coastal catchments, including primary industries, urban and other industrial activities, can result in significant deterioration of estuarine, coastal and marine water quality.
- > Recreational activities have also resulted in the formation of 4WD tracks, bike tracks, walking tracks and horse riding tracks in some sensitive areas of coastal vegetation and along beaches.
- > Three of the region's four Ramsar wetlands are coastal and vulnerable to sea level rise, saltwater intrusion into freshwater systems, and effect of storm surges. Coastal erosion and inundation will likely result in the loss or migration of saltmarshes, wetlands, dune fields and intertidal sand flats. These changes need to be incorporated into long-term infrastructure and land-use planning.

Threats

- > In some areas there has been loss and modification of coastal and marine habitat as a result of a range of pressures including tourism, recreational, residential, primary industries and other industrial use and development. Key hotspots are the Greater Hobart area, including significant areas of the Hobart, Kingborough, Clarence, Sorell and Glenorchy municipalities.
- > These modifications include alteration of drainage and fire regimes, weed and/or pest invasions, and nutrient and sediment pollution in run-off. While many of the causes of these impacts originate away from the coast, their impact on this asset is very significant.
- > Pollution, contaminants and refuse increasingly impact the marine environment. Marine debris harms marine animals through ingestion or entanglement and, while the most commonly collected items result from fishing, a significant amount of debris arriving on Tasmanian beaches is remnant debris.⁶⁶
- > A fundamental problem in addressing issues of decline in the condition of Coasts and Marine Assets is the complexity of the management setting for these environments. There are numerous land managers with diverse and sometimes overlapping roles and responsibilities. The lack of an integrated approach to coastal and marine management has at times resulted in lack of action and inconsistent and/or ill-informed decision-making.

⁶³ Poloczanska, ES, Hobday, AJ and Richardson, AJ (Eds), 2012, Marine Climate Change in Australia, Impacts and Adaptation Responses, 2012 Report Card

⁶⁴ Poloczanska et al., 2012

⁶⁵ Poloczanska et al., 2012

⁶⁶ Hardesty, BD and Wilcox, C, 2011, Marine Debris in Australian Waters, Final Report - <http://www.environment.gov.au/system/files/pages/8ff786ed-42cf-4a50-866e-13a4d231422b/files/marine-debris-sources.pdf>



Coasts and Marine Assets

- The further expansion of agriculture and aquaculture industries may pose a threat to water quality and the health of coastal, estuarine and marine-based ecosystems, if not monitored and managed appropriately. Planning for further development requires a holistic and integrated approach to account for incremental impacts and whole-of-system influences.

Opportunities

- Coastal ecosystems, in particular tidal influenced wetlands and seagrass beds, are important carbon sinks.
- Restoring and/or protecting coastal wetlands from degradation has the potential to:
 - Stop draining-induced releases of carbon and reactive carbon sequestration;
 - Be a more economically viable way to store carbon than the terrestrial carbon storage alternative;
 - Enhance industries such as fisheries and tourism; and
 - Enhance water quality, flood and storm surge mitigation.⁶⁷
- Increases in ocean temperature may provide new opportunities for non-traditional fisheries development.⁶⁸
- Tasmanian Government initiatives support climate adaptation planning for coastal communities.⁶⁹
- State planning reform currently underway provides an opportunity to ensure environmental values are considered.
- The coastal zone is a key area for increasing knowledge sharing and the value placed on cultural heritage by Aboriginal people and others working in natural resource management.
- With better waste water treatment plant operations and water sensitive urban design there are opportunities to minimise pollution release and support positive water quality outcomes.
- Further research into the region's coastal, estuarine and marine values will provide a stronger base on which to inform decisions regarding land use, water extraction and marine-based industry development and expansion.



Image: Luke Diddams

⁶⁷ Southern Slopes Information Portal Report 2015 - <https://terranova.org.au/repository/southern-slopes-nrm-collection>

⁶⁸ Southern Slopes Information Portal Report 2015 - <https://terranova.org.au/repository/southern-slopes-nrm-collection>

⁶⁹ Tasmanian Coastal Adaptation Decision Pathways Project - www.dpac.tas.gov.au/divisions/climatechange/adapting/tasmanian_coastal_adaptation_pathways_project



4. Biodiversity Assets

Definition

Biodiversity Assets encompass the full variety of life found in our region. This includes all species of plants, animals, cryptic and microorganisms and the ecosystems within which they live and interact. By protecting and conserving biodiversity we are aiming to maintain the diversity of genes, species, communities and ecosystems in our region. In practice, the most common units of measurement for the maintenance of biodiversity are species and vegetation communities.

This section focuses on the biodiversity of terrestrial environments. Coastal and marine-dependent biodiversity can be found in the section Coast and Marine Assets, and aquatic-dependent biodiversity in Water Assets.

About Southern Tasmania's Biodiversity Assets

There are 138 different vegetation communities in the region,⁷⁰ including those found in the following broad native vegetation types: alpine vegetation, rainforests, eucalypt forest and woodland, non-eucalypt forest and woodland, heath, scrub, buttongrass plains, moorland, wetland, swamp vegetation and grasslands.

The region's native flora includes 16 species of eucalypt endemic to Tasmania, plants that have survived from the last glacial times (glacial relicts) such as native conifers in the genus *Podocarpus*, a diversity of endemic heath species and incredible diversity of bryophytes (mosses, liverworts and hornworts) in the wet forests.⁷¹

The region's native fauna includes iconic species such as the Tasmanian devil and wedge-tailed eagle; a significant number of species of small marsupials such as the New Holland mouse, the eastern barred bandicoot, potoroos and bettongs; a number of migratory birds and animals; 14 of Tasmania's 18 lizards; all eight Tasmanian bats; and all 12 of Tasmania's endemic bird species.⁷²

In the region, the Southern Midlands and part of the Derwent Valley and Central Highlands are considered part of the nationally-recognised Midlands Biodiversity Hotspot Area (MBHA).

The region's publicly reserved terrestrial area is 1,152,097 hectares (45%) of the land area and includes the large areas of the TWWHA (excluding offshore islands including Macquarie Island).

In addition to public reserves there are formally protected areas on private land. More than 50,000 hectares have been reserved formally through the protected areas on private land program⁷³ and similar initiatives. These programs have enabled approximately 250 of the region's landholders to secure conservation covenants that contribute significantly to biodiversity conservation.

Key management elements

Ecologically functioning systems

- Ecologically functioning systems are those that can maintain their biodiversity and their ecological processes e.g. nutrient cycling, water cycling, and soil formation and retention. A highly functioning ecosystem can support the full complement of its biodiversity and have the potential to contribute to a range of ecosystem services. A poorly functioning system will lose biodiversity and other resources such as soil, water and nutrients, e.g. rainfall events leading to soil erosion, and land clearance leading to local extinction of species.
- There are benefits to managing for ecological function to maintain biodiversity in a world characterised by change. A highly functional system is more resilient and has a greater capacity to adapt to change while maintaining similar function, structure and composition.
- Rural tree decline, an issue across large areas of the region including the Southern Midlands and Central Highlands, is a stark symptom of poor ecological function and is predicted to result in further biodiversity losses.⁷⁴ There are many and

⁷⁰ <http://dpi.pwe.tas.gov.au/conservation/development-planning-conservation-assessment/tools/tasmanian-reserve-estate-spatial-layer>

⁷¹ Southern NRM Regional Committee, Natural Resource Management Strategy for Southern Tasmania 2005, Hobart Tasmania

⁷² Southern NRM Regional Committee, Natural Resource Management Strategy for Southern Tasmania 2005, Hobart Tasmania

⁷³ The Protected Areas on Private Land Program is a partnership between the Tasmanian Land Conservancy and the Tasmanian Department of Primary Industries, Parks, Water and the Environment and represents one of the longest running private land conservation partnerships between government and an NGO in Australia.

⁷⁴ Fischer, J, Zerger, A, Gibbons, P, Stott, J and Law, BS, 2010, Tree decline and the future of Australian farmland biodiversity PNAS: 107 (45) 19597-19602



complex causes; however, common elements include climate extremes and/or opportunistic pests and pathogens affecting trees in areas where ecological function has been altered by poor management practices. Examples include over-grazing leading to soil compaction and nutrient loading, inefficient irrigation leading to rising soil salinity and sodicity, and land clearance leading to increased edge effects.

- Riparian areas have an important role in ecosystem function and the maintenance of biodiversity. They are the interface between the terrestrial and aquatic systems, and are key landscape features with substantial regulatory control on overall landscape health. They also support a much higher level of biodiversity than non-riparian areas, e.g. a higher diversity and abundance of birds in riparian areas in both wet⁷⁵ and dry forests.⁷⁶
- Southern Tasmania has a rich diversity of resident and migratory bird species, many of which are threatened primarily through loss of habitat for breeding and foraging. Birds are recognised as valuable indicators of changes in biodiversity and ecological health. They have a resonance and connection with people and their lives, making them useful for citizen science programs.
- Appropriate fire regimes are key to maintaining a number of ecological systems in the region. The history of Aboriginal firing practices has created the patterns in vegetation communities we see today, and large ecosystems, e.g. buttongrass plains, are recognised as cultural landscapes created by Aboriginal fire. Decline in the condition of a number of vegetation communities is linked to inappropriate fire regimes, both too few and too frequent, or lack of fire.

Flora, fauna and other organisms

- Biodiversity is a measure of the variety of genes, species, communities and ecosystems in a defined area. All have inherent value, even though the value of some elements of a biodiverse ecosystem may be much more apparent than others. For example, the benefit of native predatory animals in integrated pest management systems is clear, as are the roles of pollinators and keystone species such as top-order predators.
- Threatened species are those that are currently under threat of extinction in their natural habitat. These species are often impacted by localised threats that need to be mitigated on the local as well as landscape scale. Generally, these species are listed by state and/or national legislation to support their protection.
- Of the threatened species, there are subsets of the 'most-dependent' species. Most-dependent species are only found in (are endemic to) a limited area in Tasmania. Tasmania can provide refuge from threats that a species experiences in other areas of their distribution; for example, the eastern barred bandicoot is threatened by foxes on mainland Australia.
- Another set of species is limited in their distribution due to the availability of specialised habitats such as hollows in old eucalypts and caves. The maintenance and the planning for the protection of their habitat within the landscape are key to maintaining these aspects of biodiversity.
- Some species that are common and widespread now are likely to be the threatened species of the future. A past example is the Tasmanian devil, which was widespread and common in the early 1990s and is now threatened because of a facial tumour disease. Future candidates include common woodland birds such as robins, the Tasmanian tree frog, the eastern quoll and a range of alpine species. It is important to understand distribution and abundance of common species in order to identify major population declines before they become irreversible.

⁷⁵ Palmer, GC and Bennet, AF, 2006, Riparian zones provide for distinct bird assemblages in forest mosaics of south-eastern Australia. *Biological Conservation*: 130(3), 447-457

⁷⁶ Mac Nally, Soderquist, TR and Tzaros, C., 2000, The conservation value of mesic gullies in dry forest landscapes: Avian assemblages in the box-ironbark ecosystem of southern Australia. *Biological Conservation*: 93 (3), 293-302



- There are some groups of organisms that are rarely considered in biodiversity conservation but play essential roles in ecosystem function. These include fungi, terrestrial invertebrates, mosses, lichens (fungal-algal symbioses) and bacteria. These often cryptic or microscopic organisms are generally managed by default through the surrogacy of the vegetation communities they support.
- Vegetation communities are groups of plants found growing together in many places with a given species composition and sometimes geology. These are most often described by the dominant species or group of species.
- The region has a diverse array of vegetation communities of which 36 are threatened. A key initiative that shaped the region's reserve estate is the comprehensive, adequate and representative (CAR) reserve system, which aimed to maintain viable examples of each forest vegetation community throughout their range. More recently, the CAR principles have been applied to non-forest vegetation. For example, grassland communities have been a focus of reservation and stewardship programs on private land.
- While using vegetation communities as the units for conservation has been shown to be a good surrogate for many species,^{77, 78} they may not represent the best model for conservation of biodiversity in response to climate change. For example, vegetation communities are predicted to respond differently from communities of mammals, reptiles and amphibians to changing climate.⁷⁹
- Even in highly functioning systems, there are some changes to which individual species or communities cannot adapt. The maintenance of areas that act as refugia, or places of shelter, protection and safety from threats, from which components of biodiversity can potentially expand from in the future, is important.
- Refugia come in many different types and need to be classified both in terms of what they protect, and from what threats they protect these values from. An example is the refugia that undisturbed catchments in the TWWHA provide for endemic frog species from the threat of the invasive chytrid fungus.

Threats and opportunities

Projected climate change impacts

- Recent research has identified that:⁸⁰
 - Changing climatic conditions will impact on some species and not others. Species will either be unaffected, cope, adapt within the place they currently live or within their current distribution, move or evolve (possibly with a reduced abundance and range);
 - New species will colonise from elsewhere, some altering habitat and species interactions, possibly contributing to reductions in the abundance and range of resident species;
 - Composition of existing vegetation communities will likely change, leading to the establishment of novel communities which currently do not exist and the disappearance of others for which similar ecological environments will no longer exist, e.g. mountain tops in alpine areas;
 - Changes in the relative abundance or dominance of species lead to change in habitat structure, potentially resulting in a simplification of habitat or changes in composition and function; and
 - Changes in ecological function occur, such as loss in net primary productivity of a system, due to changes in environmental potential or abundance of key producer species and food-web interactions.

⁷⁷ Panzer, R and Schwartz, MW, 1998, Effectiveness of a vegetation-based approach to insect conservation. *Conservation Biology*: 12 (3) 1523-1739

⁷⁸ McMullan-Fisher, SJ, Kirkpatrick, JB, May, TW and Pharo, EJ, 2010, Surrogates for macrofungi and mosses in reservation planning. *Biodiversity Conservation*: 24 (3) 1523-1739

⁷⁹ Adapt NRM, Biodiversity module

⁸⁰ Dunlop, M, Parris, H, Ryan, P and Kroon, F, 2013, Climate-ready conservation objectives: A scoping study, National Climate Change Adaptation Research Facility, Gold Coast, 102pp.



- Many projected climate change impacts involve interaction and exacerbation of current threats and pressures:
 - Movement and establishment of invasive species and particularly disease in new areas may occur due to changing environmental conditions. The change effectiveness of control mechanisms, especially for weeds, may be affected;⁸¹
 - Loss of riparian vegetation is expected to increase under climate change, particularly due to desiccation during drought and alteration to groundwater distribution and flows;
 - Tree decline, given the link with historic extreme climatic events, is likely to increase with the projected increase in frequency of extreme climatic events;
 - The projected increase of fire weather increases the risk of losing fire-sensitive species and communities; and
 - Intensification and expansion of land use in response to climate change impacts on Urban, Lifestyle and Production Landscapes may lead to a less hospitable environment for elements of our biodiversity.
- Climate change poses significant problems for traditional concepts of the reserve system because of the change in the distribution of communities, the potential emergence of 'novel' communities and the disappearance of others.⁸²
- One of the important implications of climate change is that Tasmania is expected to experience an increase in numbers of resident species and become a refuge for them.^{83, 84}

Threats

- Past and present land clearance has caused the fragmentation and associated decline in condition of resulting remnants, loss of ecological function, and reduction in habitat area and biodiversity.
- Poor management practices and resource use impact on ecological function and include overgrazing, inefficient irrigation, and removal of coarse woody debris for firewood.
- Invasive species and diseases, both new and existing incursions, can be a threat. Feral cats spread disease and kill wildlife; diseases such as *Phytophthora cinnamomi*, chytridomycosis (a fungal disease of amphibians) and devil facial tumour disease impact on native flora and fauna populations; and environmental weeds, e.g. willows, compete with native plants and can modify ecosystems, which impacts on ecological function.
- Inappropriate fire regimes change the condition and composition of vegetation communities and exclude some species.
- Drought and other extreme climatic events can cause loss of ecological function through loss of vegetation cover and resources, such as soil, nutrients and water, and can result in tree decline.
- Development in Urban, Production and Lifestyle Landscapes can cause further decline of threatened species, communities and specialised habitat.

⁸¹ Adapt NRM, Weeds module

⁸² Hobbs, RJ, Higgs, E and Harris JA, 2009, Novel ecosystems: Implications for conservation and restoration. *Trends in Ecology and Evolution*: 24 (11) 599-605

⁸³ Reside, AE, van der Wal, J, Phillips, B, Shoo, LP, Rosauer, DF, Anderson, BA, Welbergen, J, Moritz, C, Ferrier, S, Harwood, TD, Williams, KJ, Mackey, B, Hugh, S and Williams, SE, 2013, Climate change refugia for terrestrial biodiversity: Defining areas that promote species persistence & ecosystem resilience in the face of global climate change. National Climate Change Adaptation Research Facility, Gold Coast, Australia

⁸⁴ Adapt NRM, Biodiversity module: Helping biodiversity adapt



Opportunities

- > Current planning reforms in Tasmania at state and local government levels provide opportunities to improve integration of biodiversity outcomes into planning and management processes.
- > Maintaining large connected areas is the best way to support biodiversity values. The highest density of patches of remnant vegetation are concentrated in fragmented catchments used for agriculture and settlements. Significant potential exists to secure, buffer and connect patches in the Southern Midlands, eastern Central Highlands, Huon and Coal River valleys, and south-east coastal catchments.
- > Maintaining water quality and restoring riparian habitats can provide significant outcomes for the Biodiversity Assets while also supporting outcomes for Land and Water Assets.
- > Offshore islands and peninsulas provide opportunity to establish or reinforce existing biodiversity refuges.
- > Some of the projected climate shifts could have beneficial impacts on communities. For example, rather than decreasing the area available to reptiles in Southern Tasmania, modelling suggests an increase in habitat area in broad river valleys.⁸⁵ When past land clearance is considered, it is evident that while there is an increase in climatic suitability of these areas, there is very little habitat available as the majority has been removed. There are, however, increased opportunities for reptiles through restoration works in these areas.



Image: Magali Wright

⁸⁵ Adapt NRM, Biodiversity module: Implications for biodiversity



5. Community Assets

Definition

The region's community is represented by individuals, community groups and volunteers; local and Tasmanian Government; business and industry; non-government organisations; and the general public.

This is the only asset that is not classified as biophysical.

About Southern Tasmania's Community Assets

The region's community plays an integral role in management of the landscapes and assets on which its economy, lifestyle and wellbeing depend.

Many different groups are involved in natural resource management, from farmers to policymakers and planners. They all need to work collaboratively to improve the management of natural resources in the face of ongoing change.⁸⁶

Community Assets include everyone who lives and works within the region, as well as people who visit and those for whom the region holds intrinsic value.

The region's Community Assets can be divided into three broad categories:

- Key organisations, agencies and land, sea and water managers that have roles in and responsibilities for managing natural resources;
- The broader natural resource management community that supports these organisations, agencies and managers, including researchers, volunteers, care groups, individuals and other non-government organisations; and
- The general public.

Community Assets are the centre-point of natural resource management, as they are the ones who use, consume and develop the resources. They are also responsible for stewardship, funding and efforts to manage threats and adapt to change.

It is through partnership and collaborative effort that economic, social and physical resources can be combined to facilitate activity from a policy and governance position and through on-ground works.

Key management elements

Capacity

- The capacity of the region's Community Assets to engage in natural resource management and appropriately manage resources is based on their skills, knowledge base, funding and physical resources. These are directly and indirectly influenced by research, government policies and priorities, and the broader community's values and motivations.
- The United Nations Intergovernmental Panel on Climate Change defines adaptation as "the process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human invention may facilitate adjustment to expected climate and its effects".⁸⁷ It is clear that the capacity and resources of the region's Community Assets play a key role in how successfully the region adapts to challenges such as climate change.
- Capacity building involves continuous dialogue between resource managers and resource users to engender support for, and genuine involvement in, adaptive management and long-term sustainable resource management.
- The need to build community capacity to deliver required natural resource management outcomes reflects comments received from the public consultation process. While capacity building has been underway in the region for more than a decade, continued efforts are required to ensure the region's stakeholders are able to meet their responsibilities and deliver this Strategy's outcomes.

⁸⁶ SCARP Adaptive capacity guide - <https://terrano.org.au/repository/southern-slopes-nrm-collection>
⁸⁷ IPCC, Climate Change 2014 - <http://www.ipcc.ch/report/ar5/syr/>



- > Research plays a fundamental role in developing information, knowledge and tools to support the region's Community Assets to better manage natural resources.
- > Priority Actions identified in this Strategy build on the considerable strengths, knowledge, resources and capacity that exist in the region.
- > Changes in community, landholder and corporate behaviour occur over long periods of time, and for that reason it is imperative that capacity building is viewed as an investment in both funds and time.

Aboriginal engagement and participation

- > On behalf of the region, NRM South acknowledges that the Tasmanian Aboriginal people are the Traditional Owners of the land on which we live and work. We respect and value the strong physical and spiritual links Aboriginal people have with country and their custodianship of this region for more than 40,000 years.
- > Many of the patterns we see in the region's natural landscapes have been shaped by Aboriginal practices, and the region contains globally significant, living cultural landscapes.
- > The introduction of European land management practices has impacted on natural and cultural assets.
- > There is a need to increase consideration of Aboriginal cultural heritage and knowledge in natural resource management, and to develop better understanding of the cultural, environmental, social and economic dimensions of the region's natural resources from the perspectives of Aboriginal people.
- > There is also a clear need to work towards the consistent incorporation of Aboriginal cultural heritage and knowledge into management of land, water, biodiversity and coastal assets and facilitate the participation of Aboriginal people in natural resource management activities.

Governance, policy and integrated planning

- > Several key organisations and agencies are responsible for management and regulation of the majority of natural resources in the region. These include the Tasmanian Government, local government, key industries and landholders.
- > This Strategy does not intend to duplicate or supersede other state, regional or local planning processes, but to support and nest priorities and information on which industries, governments and communities can base future planning and immediate investment.
- > This Strategy ensures local issues and opportunities are recognised and incorporated into the considerations of larger-scale state and national interests and obligations.
- > Local governments play an essential role in identifying and managing community needs and prioritising on-ground action. Local government's strategic direction to identify and support natural resource management is necessary to realise multiple benefits from planning and policy decisions and to strive for sustainable outcomes.
- > Both state and local government have a major influence on the condition of our natural resources through their policy settings, funding allocations and direct land management activities. They are essential to decision-making, on-ground activity and community support for management of beaches, roadsides, reserves, Crown land and production areas.
- > The broader natural resource management community and general public also hold a very powerful role within the region. It is their values and votes that determine the outcome of elections and subsequent policy development, both of which impact on the region's resources.
- > Government policies and priorities, funding and in-kind support are all essential to enabling community-based natural resource management activities in the region. Changes in these areas can have detrimental or very positive effects on the broader regional community's engagement in natural resource management activities and their ultimate results.



Community Assets

Research

- > Research is an essential component of natural resource management and will continue to support the monitoring, evaluation and improvement of physical natural resource assets.
- > Research is playing an increasing role in measuring and valuing social and economic change.
- > Basing decisions on the best available information is key to successful natural resource management programs. Sources of data and information are constantly increasing, especially in relation to climate change, and it can be hard for land managers and natural resource management professionals to keep abreast of new information in a time and resource-restricted environment.
- > In order to effectively apply research findings, it is important that the design of natural resource management-focussed applied research projects considers the needs and capacity of end-users, including presentation of findings and tools in an accessible format. Much of the work by the National Environmental Research Program, Landscapes and Policy Hub, and National Climate Change Adaptation Research Facility (NCCARF) has been focussed on informing decision-makers; the need for researchers to act as knowledge brokers and communicate findings to end-users is emphasised in program design.
- > Applied research that has informed the development of this strategy includes AdaptNRM and SCARP (both climate projections and adaptive capacity research). Both of these research projects exercised an iterative and user-focussed approach.

Community involvement and engagement

- > Southern Tasmania has more than 170 active volunteer groups working in Landcare, Coastcare, Bushcare and Wildcare, as well as schools, agricultural groups and networks (Figure 4). It is the passion, skills and efforts of the individuals within these groups that support activity, advocacy and overall positive outcomes for our region's natural assets and, in turn, the associated socio-economic benefits.
- > Volunteers and community groups contribute to natural resource management outcomes in a range of ways. They manage and control weeds, rehabilitate riparian vegetation, protect coastline, remove litter and marine debris, monitor and survey for plants and animals, propagate native plants, revegetate degraded areas and raise awareness of the values and threats in their local area.
- > Volunteers and community groups play an important role in protecting their local areas, as well as contributing to the protection of high conservation areas through advocacy, lobbying and activism.
- > While most volunteers want to contribute 100% of their volunteered time to positive, on-the-ground action,⁸⁸ key individuals in many community groups spend a lot of time applying for funding, administering funded projects, organising events, planning, reporting and recruiting new members.

88 Skabo, R, 2014, Friends of Punchbowl Reserve, The Tasmanian Field Naturalist

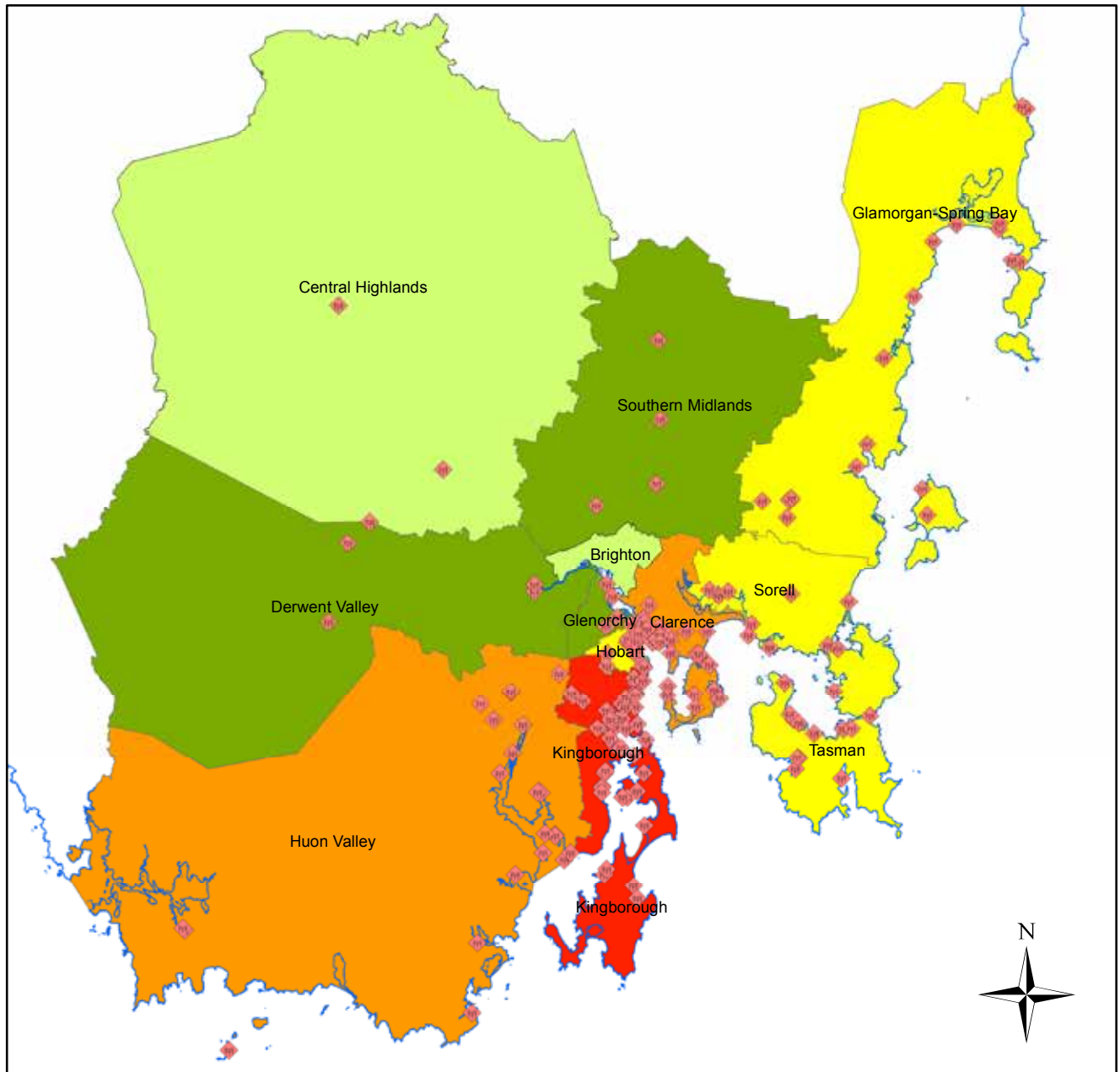
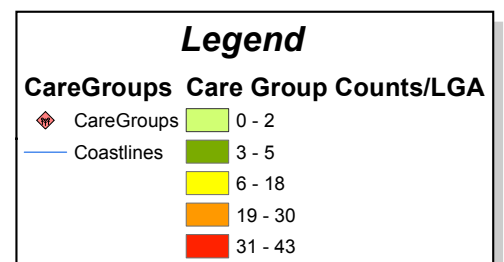


Figure 4: Care groups across Southern Tasmania



Data source: SCAT, Landcare Tasmania, NRM South
Base data from the LIST
Copyright State of Tasmania



Community Assets

- > The significant efforts of volunteers and community groups are assisted by the Australian, Tasmanian and local governments as well as not-for-profit organisations that support community groups through a range of mechanisms and models of engagement. Some types of support are:
 - > Funding through community grant programs;
 - > Training opportunities;
 - > Information on best practice;
 - > Assistance with group formation;
 - > Group networking events; and
 - > Provision of bulk insurance.
- > Partnerships and collaborative initiatives between agencies, volunteer support organisations and community groups contribute to effective and efficient natural resource management programs. One successful Tasmanian example is Wildcare. This group works in close partnership with government agencies and undertakes a range of environmental projects from threatened species recovery to remote weed control. With a membership base of approximately 6,000, the value of an organisation such as Wildcare to land managers and government agencies in carrying out their responsibilities is considerable.

Threats and opportunities

Projected climate change impacts

- > Rural communities are identified as vulnerable to climate change⁸⁹ with environmental, economic and social changes predicted to impact on their health. Rural communities in Southern Tasmania are predicted to experience less environmental change compared to other areas in Australia; however, these communities are predicted to be those with the highest fall in farm cash returns.⁹⁰
- > The movement of people from interstate to Tasmania as climate refugees is likely to increase because of the relatively lower environmental change predicted compared to areas of mainland Australia.
- > Sea level rise will impact on property and transport infrastructure for many people living in the region, as many people live within the coastal zone. This will affect the capacity of local government and infrastructure providers within the coastal zone, as they will need to focus resources on climate change adaptation and mitigation of disruption to essential services such as transport, water and electricity delivery. This could also influence the amount of time and other resources people have for environmental volunteering.
- > Sea level rise will also affect Aboriginal cultural heritage sites, as the coastal zone is a hotspot for cultural sites.

⁸⁹ Climate Commission, 2010, The Critical Decade: Tasmanian impacts and opportunities. Climate Commission Technical Report, Department of Climate Change and Energy Efficiency, Canberra, ACT

⁹⁰ Nelson, R, Kocic, P, Crimp, S, Martin, P, Meinke, H, Howden, SM, de Voil, P and Nidumolu, P, 2010, The vulnerability of Australian rural communities to climate variability and change: Part II – Integrating impacts with adaptive capacity. Environmental Science and Policy 13: 18-27



Threats

- > Limited involvement and engagement of the broader community in natural resource management and climate change initiatives would give rise to negative outcomes. If the broader community does not see natural resource management and climate change as important, it will impact on the availability of dedicated resources and funding.
- > Limited capacity, resources and knowledge within some local government areas may affect decisions made through development applications, leading to detrimental effects on cultural and environmental assets.
- > Burnout of key individuals who are involved in coordination and administration of community groups can be a challenge. Many groups that stop working together do so because of the difficulty of succession planning for more time-consuming roles.
- > Limited consideration of Aboriginal knowledge and heritage in natural resource management programs and on-ground works can have considerable negative impact on natural and cultural assets, including loss or damage of cultural sites and further impact on the engagement and participation of Aboriginal people in natural resource management.
- > Organisational restructures and cost-saving measures can result in loss of staff from roles that coordinate and guide volunteer effort. These roles help take administrative pressure off community groups and can help to focus and align volunteer input strategically for increased natural resource management outcomes.
- > The disconnect that often occurs between researchers and end-users can cause useful data, information and tools to be overlooked due to lack of accessibility and poor linkages.

Opportunities

- > Increasing community awareness, knowledge, skills and funding opportunities for natural resource management has a proven, direct influence on the capacity and outputs of activity. This places further emphasis on those activities that support advocacy and consideration of natural resource management in governance and planning as well as on-ground works.
- > An influx of people moving to Southern Tasmania for lifestyle reasons will bring new ideas, energy, and income bases for local government.
- > Increased collaboration and partnerships between organisations and groups that support volunteer input improve knowledge sharing and may contribute to efficient use of limited resources.
- > Incorporation of Aboriginal economic, cultural and environmental perspectives into natural resource management planning and implementation will further increase engagement and participation of Aboriginal people in natural resource management initiatives.
- > This Strategy highlights important regional foci: through local prioritisation and planning, relevant community-based activity can be realised. Tools such as the SCARP current issues assessment tool template can be used to prioritise values, understanding, capacity and urgency in relation to local issues and form the basis for prioritisation.



Targets, Priority Actions and Key Contributors

Statewide Targets, Priority Actions and Key Contributors

To achieve the Landscape Goals identified in Part 2 of this Strategy there are a number of higher-level Targets and Priority Actions at a statewide level. These Targets reflect the fact that integrated and effective management for many natural resource assets crosses regional boundaries. It is also recognised that statewide collaboration is a more efficient use of resources for Key Contributors who operate statewide, such as the Tasmanian Government, as well as many industries and non-government organisations (NGOs).

An external review of natural resource management in Southern Tasmania made recommendations surrounding governance and planning that require statewide action, including:

- > Further integration of the three regional NRM strategies into local, regional and statewide planning; and
- > Development of further theme or sector-based reference groups to support leadership, ownership and investment for implementation of regional strategy targets and activities.

Statewide Management Targets (SMT) (5 Year)	Statewide Priority Actions (SPA)	Key Contributors
SMT1 This Strategy, climate change adaptation and the State's NRM Principles, will be increasingly referred to and prioritised in local, regional and statewide stakeholder strategic plans and strategies (compared to the 2015 baseline).	SPA1 Enhance stakeholder knowledge of legislative principles, roles and responsibilities, and support mechanisms for effective natural resource management across the region and the State.	<ul style="list-style-type: none"> > Australian Government > Tasmanian Government (DPAC and DPIPWE) > Local government > NRM bodies
	SPA2 Provide direction for the incorporation of NRM principles into local government strategic plans and support the review and development of natural resource management-related legislation, planning and policy that affects NRM outcomes.	<ul style="list-style-type: none"> > Local government > NRM bodies > Tasmanian Government (DPAC, DPIPWE and State Growth)
	SPA3 Facilitate investment and knowledge and information resource development to build capacity, education levels and awareness.	<ul style="list-style-type: none"> > Australian Government > Tasmanian Government (DPAC and DPIPWE) > Researchers > Local government > NRM bodies
SMT2 An increasing number of asset theme or industry sector-based reference groups will be developed (compared to the 2015 baseline) to support the regional strategy (strategies) implementation in areas of institutional, policy and on-ground initiatives including climate change adaptation and capacity development.	SPA4 Complete a needs analysis of existing and proposed groups and prioritise mechanisms to commence and/or continue consultation.	<ul style="list-style-type: none"> > NRM bodies > Tasmanian Government > Local government > Industry sector bodies
	SPA5 Collaboratively develop the terms of reference, processes and methodologies for management and governance of theme and/or sector-based reference groups.	<ul style="list-style-type: none"> > All stakeholders
	SPA6 Maximise and coordinate funding opportunities to support implementation of reference group recommendations.	<ul style="list-style-type: none"> > All stakeholders
	SPA7 Implement a program for the ongoing collation, management, integration, and sharing of data, particularly providing access to spatial (GIS) information to ensure cross-jurisdictional compatibility and comparability and application to planning and management processes at all spatial scales (state to local).	<ul style="list-style-type: none"> > NRM bodies > State Government > Local government > Industry sector bodies > Researchers

Regional Targets, Priority Actions and Key Contributors

Regionally specific Targets and Priority Actions for each asset have been identified to provide guidance to the regional community for prioritising investment and activity. These Targets and Priority Actions are directly linked to the ability of the regional community to achieve the identified outcomes for each landscape. This ensures we are on track to realise our longer-term vision.

Asset Management Targets and Resource Condition Targets

This section of the Strategy details regional Asset Management Targets for each asset. For the four biophysical assets (Community Assets is excluded) it identifies how these Asset Management Targets contribute to Resource Condition Targets. This is in recognition of the degree to which changes in management, policy and planning reflect climate change resilience and adaptation capacity and are the keys to maintaining or improving the condition of our natural resources. Resource Condition Targets have been informed by the environmental, strategic and institutional scan. They have been carried over and, where necessary, modified from past strategies to build on previous stakeholder and community efforts.

Priority Actions

This section identifies the relative importance and focus of the Priority Actions in relation to each of the four Landscape Goals. These provide guidance about the priority of activities and those that will provide best value within Southern Tasmania. The relevance of each Priority Action to each Landscape Goal is represented as major, by a large tick, or minor, by a smaller tick, in the following tables.

Key Contributors

Implementation of the Strategy is a collaborative effort that will require input and support from many different agencies, organisations and groups. This Strategy identifies Key Contributors who have roles and responsibilities in natural resource management and who are in a position to support the implementation activities associated with the Priority Actions. Importantly, all tiers of government are involved in the management of our natural resources given their legislative roles and responsibilities. However, capacity restraints must be recognised and clear roles for supporting contributors must be articulated. All sectors of the community may contribute to Priority Actions even when not specifically identified.

The development of theme or sector-based reference groups has been identified throughout this Strategy as a key institutional mechanism to coordinate resources, activity and knowledge for natural resource management. Collaborative responsibility and coordinated activity are cornerstones of efficient implementation. Some of these reference groups will take a theme approach, for example biodiversity or water quality, while others will be formed to respond to a sector issue such as aquaculture or irrigation.

In some cases, these reference groups are already established (for example, Derwent Estuary Program, Regional Climate Change Initiative) while others will need to be formed in response to either the Priority Actions outlined in this Strategy or other identified needs. It is envisioned that leaders will be established to drive these groups through implementation planning with Key Contributors. NRM South will lead the formation and establishment of some groups but ultimately will play a facilitator or supporting role. The leadership from agencies and sectors is vital in order to build ownership for implementation of this Strategy.

Reference groups will come in many shapes and forms and will be based on policy, planning or legislation development or alternatively more focussed on practical on-ground works. These groups will be instrumental in fostering effective communications between stakeholders and the community; monitoring and assessing Asset Management Targets and Priority Actions; and ensuring credibility and capability in implementation. These groups will be driven by end-users to ensure that they are outcome-focussed and not process-focussed.

The Key Contributors to this Strategy are identified in the following Target and Priority Action tables. They are:

- > Tasmanian Government (various departments)
- > Local government (individually and through STCA and LGAT)
- > Regional NRM body
- > Land/sea/water managers
- > Industry (government enterprises, peak bodies, sector representatives)
- > Community groups and volunteers (Landcare, individuals, care groups, not-for-profit groups)
- > Business (small, medium and large business enterprises using natural assets)
- > Research
- > Aboriginal community organisations
- > Non-government organisations (NGOs)
- > Australian Government
- > All stakeholders.



Image: Lyndel Wilson



1. Land Asset Targets, Priority Actions and Key Contributors

Land Asset Management Targets (LMT) and the Land Resource Condition Targets (LCT) they contribute to (5 Year)	Land Asset Priority Actions (LPA)	Alignment with Landscape Goals				Key Contributors
		Natural N	Production P	Lifestyle L	Urban U	
Management Target: LMT1 Further capacity (funding, knowledge products, extension and research) and coordinated activity are built and carried out to improve the management of soil health. Contributing to Resource Condition Target: LCT1 Soil condition is maintained within desirable SCEAM ⁹¹ condition ranges for important soil and land-use combinations.	LPA1 Support land managers and industry in the design, promotion and adoption of property management plans and environmental management systems, which include adaptive actions to land asset responses, changing markets and climate.					> Tasmanian Government (DPIPWE) > Local government > NRM body
	LPA2 Encourage appropriate stewardship and adoption of sustainable practices which maintain carbon, health, vegetative cover and ecological function of soils, especially in the Southern Midlands, Derwent, Coal River and Huon valleys.					> Tasmanian Government (DPIPWE) > Local government > NRM body
	LPA3 Continue land suitability assessment mapping for 100% of the agricultural areas and support dissemination of knowledge tools and decision support for key sector groups.					> Tasmanian Government (DPIPWE) > Researchers
	LPA4 Support agricultural development using techniques and systems which improve both soil health and structure, and avoid short, mid or long-term detrimental impacts.					> Tasmanian Government (DPIPWE) > Industry > Business > NRM body > Land and water managers

⁹¹ SCEAM – Soil Condition Evaluation Assessment and Monitoring



1. Land Asset Targets, Priority Actions and Key Contributors continued

Part 4



Land Asset Management Targets (LMT) and the Land Resource Condition Targets (LCT) they contribute to (5 Year)	Land Asset Priority Actions (LPA)	Alignment with Landscape Goals				Key Contributors
		Natural	Production	Lifestyle	Urban	
		N	P	L	U	
Management Target: LMT2 Activities and adaptation opportunities are enhanced to improve management of vegetation (native and modified) with an emphasis on improving condition, cover and ecological function. Contributing to Resource Condition Target: LCT2 No net loss in the extent of vegetation cover (both native and modified) measured by land cover mapping.	LPA5 Where practicable, protect and restore remnant vegetation and support communities to consider carbon-sensitive land management activities, especially around Oatlands, Kempton, lower Coal River Valley and scattered areas in the Derwent Valley.					<ul style="list-style-type: none"> > Land managers > NRM body > NGOs
	LPA6 Monitor, maintain and, where prioritised, improve vegetation condition and cover, especially across cleared areas, in riparian areas and in and around wetlands.					<ul style="list-style-type: none"> > Researchers > Tasmanian Government (DPIPWE) > Local government > Land managers > NRM body
	LPA7 Consider cumulative vegetation loss and vegetation condition in planning and development assessment processes.					<ul style="list-style-type: none"> > Tasmanian Government (DPIPWE) > Local government > NRM body
Management Target: LMT3 Recognition, conservation and protection of key areas of geo-conservation significance and cultural heritage are further considered in land management and planning activities and take account of projected climate change impacts. Contributing to Resource Condition Target: LCT3 No net loss to the condition of the region's listed geo-conservation sites and values.	LPA8 Enhance understanding of climate change impacts on geo-conservation values.					<ul style="list-style-type: none"> > Researchers
	LPA9 Incorporate geo-conservation-related issues such as burning of peat soils into fire management plans, especially in remote alpine areas.					<ul style="list-style-type: none"> > Tasmanian Government (DPIPWE and PWS) > Industry (Hydro Tasmania)
	LPA10 Consider riverine and coastal related geo-conservation impacts in planning decisions.					<ul style="list-style-type: none"> > Tasmanian Government (DPAC, State Growth and DPIPWE) > Local government
	LPA11 Further incorporate Aboriginal cultural heritage and knowledge into the management of land assets.					<ul style="list-style-type: none"> > Aboriginal community organisations > Tasmanian Government (DPIPWE, State Growth, DPAC) > Local government > NRM body



1. Land Asset Targets, Priority Actions and Key Contributors continued

Land Asset Management Targets (LMT) and the Land Resource Condition Targets (LCT) they contribute to (5 Year)	Land Asset Priority Actions (LPA)	Alignment with Landscape Goals				Key Contributors
		Natural N	Production P	Lifestyle L	Urban U	
Management Target: LMT4 Response to new and existing agricultural and environmental weed, pest and disease incursions is actively coordinated. Contributing to Resource Condition Target: LCT4 Some reduction in current extent of identified weeds and pest animals, with no new high threat weeds, pests and diseases established.	LPA12 Develop and support existing theme-based reference groups for invasive species management for both policy and planning-related activities and also on-ground management and implementation. ⁹²					> Researchers > Tasmanian Government (DPIPWE—Biosecurity Tasmania and PWS, State Growth) > Local government > NRM body > NGOs
	LPA13 Build capacity in prevention and response activities that recognise that climate change will have a varying influence on effectiveness of control methods and natural species movement.					> Researchers > Tasmanian Government (DPIPWE—Biosecurity Tasmania and PWS, State Growth) > Local government > NRM body > NGOs
	LPA14 Provide educational opportunities and resources to key industry groups, land managers and the broader community in biosecurity, hygiene and invasive species management.					> Tasmanian Government (DPIPWE) > Local government > NRM body
	LPA15 Coordinate adaptive control of new and existing high threat incursions to prevent further spread.					> Tasmanian Government (DPIPWE—Biosecurity Tasmania)

⁹² Currently the Invasive Species Community Partnership (ISCP) operates at a statewide level. Further investigation is required to ascertain whether a regional group is required or amendments to the terms of reference of the ISCP to support this target.



2. Water Asset Targets, Priority Actions and Key Contributors

Part 4



Water Asset Management Targets (WMT) and the Water Resource Condition Targets (WCT) they contribute to (5 Year)	Water Asset Priority Actions (WPA)	Alignment with Landscape Goals				Key Contributors
		Natural	Production	Lifestyle	Urban	
		N	P	L	U	
Management Target: WMT1 Knowledge and management of water allocation and environmental values and flows are improved for key priority catchments, recognising climate change and development pressures. Contributing to Resource Condition Target: WCT1 Current levels of river conservation value identified under CFEV are maintained or improved.	WPA1 Develop and implement appropriate policies and operational plans, including water management plans, water quality improvement plans and stormwater management plans, to ensure water quality and quantity are managed strategically rather than reactively.					> Water managers > Researchers > Tasmanian Government (DEP, DPIPWE, IFS) > Local government > Industry > NRM body
	WPA2 Improve access to and delivery of knowledge and capacity-building products ⁹³ and resources to key water user groups including the agricultural, government and industry sectors.					> Researchers > Tasmanian Government (DEP, DPIPWE, IFS) > Local government > NRM body > Industry > NGOs
Management Target: WMT2 Response to new and existing aquatic weed, pest and disease incursions is actively coordinated and incursions monitored. Contributing to Resource Condition Target: WCT2 A reduction in current extent of identified aquatic weeds and pest animals, with no new high threat weeds, pests and diseases established.	WPA3 Develop, and support existing, theme-based reference groups for invasive species management for both policy and planning-related activities and on-ground management and implementation.					> Water managers > Researchers > Tasmanian Government > Local government > NRM body > NGOs
	WPA4 Build capacity in prevention and response activities that recognise that climate change will have a varying influence on effectiveness of control methods and natural species movement.					> Researchers > Tasmanian Government (DPIPWE—Biosecurity Tasmania and PWS, State Growth) > Local government > NRM body > NGOs
	WPA5 Provide training or educational opportunities and resources to key industry groups, land managers and the broader community in biosecurity, hygiene and invasive species management.					> Researchers > Tasmanian Government (IFS, DEP, DPIPWE) > Local government > NRM body
	WPA6 Coordinate and control new and existing high-threat aquatic incursions to prevent further spread.					> Tasmanian Government (DPIPWE—Biosecurity Tasmania)

⁹³ Data, fact sheets, mapping, extension services etc.



2. Water Asset Targets, Priority Actions and Key Contributors continued

Water Asset Management Targets (WMT) and the Water Resource Condition Targets (WCT) they contribute to (5 Year)	Water Asset Priority Actions (WPA)	Alignment with Landscape Goals				Key Contributors
		Natural N	Production P	Lifestyle L	Urban U	
Management Target: WMT3 An increase in water quality monitoring, data collection and knowledge to increase capacity and develop resources for communities to undertake positive actions.	WPA7 Support development of water quality-based reference groups at a local or regional level.					> Water managers > Researchers > Tasmanian Government (DEP, DPIPWE, IFS) > Local government > NRM body > Industry (TasWater)
Contributing to Resource Condition Targets: WCT3 Nutrient loads in key catchments are maintained / reduced. WCT4 Turbidity levels in key catchments are maintained / reduced. WCT5 Bacteriological and toxicants levels are maintained / reduced. WCT6 Surface water salt loads in key catchments are maintained.	WPA8 Use coordinated water quality monitoring data to inform further refinement of policies and operational plans, and guide evidence-based development decision-making.					> Water managers > Researchers > Tasmanian Government (DEP, DPIPWE) > NRM body > Industry (TasWater)



2. Water Asset Targets, Priority Actions and Key Contributors continued

Part 4



Water Asset Management Targets (WMT) and the Water Resource Condition Targets (WCT) they contribute to (5 Year)	Water Asset Priority Actions (WPA)	Alignment with Landscape Goals				Key Contributors
		Natural	Production	Lifestyle	Urban	
		N	P	L	U	
Management Target: WMT4 Appropriate management regimes and conservation activities are developed to optimise water ecosystem health with an emphasis on rivers, water bodies, sites with rich Aboriginal heritage values and priority freshwater conservation areas such as freshwater Ramsar-listed sites. Contributing to Resource Condition Targets: WCT7 Overall stream condition within the region is maintained and improved where feasible, as measured at key AUSRIVAS sites (or subsequently used Tasmanian River Condition Index sites). WCT8 The areal extent and condition of individual, regionally significant wetlands identified in the Directory of Important Wetlands, and those identified as priority wetlands/water bodies in the Atlas of Tasmanian Wetlands, are maintained or improved above the 2006 baseline levels. WCT9 The ecological condition of Ramsar wetlands are maintained or improved above baselines established in ecological character descriptions. WCT10 Aboriginal cultural heritage sites, where identified, are maintained and their protection improved.	WPA9 Use available data and tools to assess priority areas to identify locations of potential climate change refugia for freshwater-dependent species and communities.					<ul style="list-style-type: none"> > Water managers > Researchers > Tasmanian Government (DEP, DPIPW, IFS) > NRM body
	WPA10 Develop, review and implement management plans for freshwater Ramsar sites and priority freshwater conservation areas including on-ground works and research activities.					<ul style="list-style-type: none"> > Water and land managers > Australian Government > Tasmanian Government (DPIPW, IFS) > Local government > NRM body > NGOs > Aboriginal community organisations > Community groups and volunteers
	WPA11 Incorporate Aboriginal cultural heritage and knowledge into management of water assets.					<ul style="list-style-type: none"> > Aboriginal community organisations > Tasmanian Government (DPIPW, State Growth, DPAC) > Local government > NRM body
	WPA12 Support and undertake activity to improve ecosystem health for rivers, water bodies and freshwater, including surface and groundwater, dependent ecosystems.					<ul style="list-style-type: none"> > Water and land managers > NRM body > Community groups and volunteers > Local government > Aboriginal community organisations



2. Water Asset Targets, Priority Actions and Key Contributors continued

Water Asset Management Targets (WMT) and the Water Resource Condition Targets (WCT) they contribute to (5 Year)	Water Asset Priority Actions (WPA)	Alignment with Landscape Goals				Key Contributors
		Natural N	Production P	Lifestyle L	Urban U	
Management Target: WMT5 Groundwater resources are managed sustainably to ensure that consumptive use and environmental flows are balanced with groundwater-dependent ecosystems and connectivity to surface waters. Contributing to Resource Condition Target: WCT11 The extent of groundwater-dependent ecosystems is maintained or improved.	WPA13 Incorporate assessment and impacts on groundwater resources into water resource planning and operations.					<ul style="list-style-type: none"> > Researchers > Land and water managers > Tasmanian Government (DPIPWE) > Industry (TasWater and Hydro Tasmania⁹⁴) > Local government

⁹⁴ Although not currently engaged in groundwater management, surface water managers will need to be engaged in whole-of-system approaches.



3. Coast and Marine Asset Targets, Priority Actions and Key Contributors

Part 4



Coast and Marine Asset Management Targets (CMMT) and the Coast and Marine Resource Condition Targets (CMCT) they contribute to (5 Year)	Coast and Marine Asset Priority Actions (CMPA)	Alignment with Landscape Goals				Key Contributors
		Natural N	Production P	Lifestyle L	Urban U	
Management Target: CMMT1 Shoreline, estuarine and marine-dependent species and ecosystems, and the processes that support them, are recognised, conserved and protected within planning systems. Contributing to Resource Condition Targets: CMCT1 The condition of marine and estuarine habitats in the region is maintained and improved. CMCT2 The condition of coastal and estuarine terrestrial habitats in the region is maintained and improved, as measured at representative sites.	CMPA1 Undertake collaborative identification and vulnerability assessment of marine and coastal assets including prioritisation of adaptation actions including habitat retreat pathways.					> Researchers > Tasmanian Government (DPIPWE) > Local government > NRM body > Community groups > Industry (aquaculture and fisheries)
	CMPA2 Recognise the links between the impacts of sea level rise and coastal inundation on people and property and the impacts on species and ecosystems in planning and development assessment processes, particularly in development hotspots in the Kingborough, Hobart, Sorell and Clarence municipalities.					> Tasmanian Government (DPAC and DPIPWE) > Local government
	CMPA3 Support and undertake on-ground adaptation activities to conserve and protect shoreline, estuarine and marine-dependent species and ecosystems.					> Tasmanian Government (DPIPWE—PWS, DEP) > Local government > NRM body > Community groups



3. Coast and Marine Asset Targets, Priority Actions and Key Contributors continued

Coast and Marine Asset Management Targets (CMMT) and the Coast and Marine Resource Condition Targets (CMCT) they contribute to (5 Year)	Coast and Marine Asset Priority Actions (CMPA)	Alignment with Landscape Goals				Key Contributors
		Natural	Production	Lifestyle	Urban	
		N	P	L	U	
Management Target: CMMT2 Capacity will be developed and coordinated action undertaken to improve management and mitigation of specific threats, including exposure of acid sulphate soil, marine debris and pollution, disturbance or damage to Aboriginal cultural heritage sites, coastal erosion, coastal inundation, and facilitation of retreat pathways. Contributing to Resource Condition Targets: CMCT3 The condition of marine and estuarine habitats in the region is maintained and improved. CMCT4 The condition of coastal and estuarine terrestrial habitats in the region is maintained and improved, as measured at representative sites. CMCT5 Retreat pathways for key coastal ecosystems, where identified, are maintained and improved. CMCT6 Aboriginal cultural heritage sites, where identified, are maintained and their protection improved.	CMPA4 Continue and build further capacity to undertake threat mitigation and improved management along shorelines, in estuaries and the marine environment, with a focus on hotspots for coastal development, coastal Ramsar sites, other areas of sensitive coastal habitat and marine areas used for aquaculture.					<ul style="list-style-type: none"> > Tasmanian Government (DPIPWE—PWS, DEP) > Local government > NRM body > Industry (aquaculture and fisheries)
	CMPA5 Continue to establish, support and build the coordinating capacity of coastal and marine working groups with representation from industry and local government such as the Derwent Estuary Program.					<ul style="list-style-type: none"> > Tasmanian Government (DPIPWE—PWS, DEP) > Local government > NRM body > Industry (Hydro Tas, TasWater, aquaculture and fisheries)
	CMPA6 Incorporate Aboriginal cultural heritage and knowledge into management of coastal and marine assets.					<ul style="list-style-type: none"> > Aboriginal community organisations > Tasmanian Government (DPIPWE, State Growth, DPAC) > Local government > NRM body



3. Coast and Marine Asset Targets, Priority Actions and Key Contributors continued

Part 4



Coast and Marine Asset Management Targets (CMMT) and the Coast and Marine Resource Condition Targets (CMCT) they contribute to (5 Year)	Coast and Marine Asset Priority Actions (CMPA)	Alignment with Landscape Goals				Key Contributors
		Natural	Production	Lifestyle	Urban	
		N	P	L	U	
Management Target: CMMT3 Targeted invasive species research, management and appropriate hygiene planning and activity are implemented by agencies and industry, recognising the impact of climate change. Contributing to Resource Condition Target: CMCT7 A reduction in current extent of identified coastal weeds and pest animals, with no new high threat weeds, pests and diseases established in coastal and marine environments.	CMPA7 Conduct research to enhance understanding of coastal and marine values including threats posed by weeds, pests and diseases.					> Researchers > NRM body > Australian Government > Tasmanian Government > NGOs
	CMPA8 Build capacity in prevention and response activities that recognise that climate change will have a varying influence on effectiveness of control methods and natural species movement.					> Researchers > Tasmanian Government (DPIPWE—Biosecurity Tasmania and PWS, State Growth) > Local government > NRM body > NGOs
	CMPA9 Support adoption of best-practice biosecurity measures with business and industry including recreational fisheries.					> Business > Industry (aquaculture and fisheries) > NRM body > Tasmanian Government (DPIPWE) > Australian Government (Department of Agriculture) > Local government



4. Biodiversity Asset Targets, Priority Actions and Key Contributors

Biodiversity Asset Management Targets (BMT) and the Biodiversity Resource Condition Targets (BCT) they contribute to (5 Year)	Biodiversity Asset Priority Actions (BPA)	Alignment with Landscape Goals				Key Contributors
		Natural	Production	Lifestyle	Urban	
		N	P	L	U	
Management Target: BMT1 Biodiversity and ecological function are recognised and supported in planning processes and implementation, including a focus on riparian vegetation and establishing appropriate fire regimes. Contributing to Resource Condition Targets: BCT1 Appropriate fire regimes are established, where possible utilising Aboriginal ecological and cultural knowledge, in representative sites for fire-evolved vegetation communities. BCT2 A net increase in the extent and condition of riparian native vegetation across the region.	BPA1 Raise awareness and uptake of conservation management practices that promote ecological function.					<ul style="list-style-type: none"> > NRM body > Researchers > Tasmanian Government (DPIPWE) > Local government
	BPA2 Increase the extent and condition of habitat, working with and supported by land managers, through the development and implementation of management plans for properties, parks and reserves.					<ul style="list-style-type: none"> > Tasmanian Government (DPIPWE—PWS and PAPL) > Local government > Land managers (Forestry Tasmania) > NRM body > Local government > NGOs (TLC)
	BPA3 Work with and support land managers on priority works to: <ul style="list-style-type: none"> > increase the extent of and restore existing riparian vegetation; > establish appropriate fire regimes; and > address the loss of biodiversity habitat caused by tree decline and the interactions between these. 					<ul style="list-style-type: none"> > Tasmanian Government (DPIPWE) > Local government > Land managers > NRM body > NGOs > Aboriginal community organisations > Industry (TFGA)
	BPA4 Build understanding and capacity of adaptation activities that increase resilience to extreme events.					<ul style="list-style-type: none"> > Researchers > Tasmanian Government (DPAC and DPIPWE) > Local government > NRM body



4. Biodiversity Asset Targets, Priority Actions and Key Contributors continued

Part 4



Biodiversity Asset Management Targets (BMT) and the Biodiversity Resource Condition Targets (BCT) they contribute to (5 Year)	Biodiversity Asset Priority Actions (BPA)	Alignment with Landscape Goals				Key Contributors
		Natural	Production	Lifestyle	Urban	
		N	P	L	U	
Management Target: BMT2 Biodiversity-focussed activity recognises, builds knowledge of and conserves threatened species and vegetation communities, including the region's most-dependent species, those with specific Aboriginal cultural values, and those that require specialised habitats and refugia, and is responsive to pressures such as climate change, land-use change and development. Contributing to Resource Condition Targets: BCT3 NRM communities work together to achieve full CAR representation of vegetation communities managed primarily for conservation at a bioregional scale. BCT4 The extent, condition and connectivity of critical habitats and the status of threatened and vulnerable species and communities are improved. BCT5 No new known species or vegetation communities are listed as threatened as a result of human disturbance of their habitat within the southern NRM region. BCT6 Aboriginal cultural heritage sites, where identified, are maintained and their protection improved. BCT7 Refugia, where identified, are maintained and improved.	BPA5 Continue to plan, prioritise and undertake activity to mitigate local and landscape-scale threats to threatened species, communities and specialised habitats with a focus on establishing effective stakeholder and community coordination mechanisms.					<ul style="list-style-type: none"> > Tasmanian Government (PWS, DPIPWE, State Growth) > Local government > Land managers (Forestry Tasmania) > NRM body > Local government > NGOs
	BPA6 Plan for and prioritise the conservation of habitat refugia for known threatening processes that impact on biodiversity, such as sea level rise, increasing temperatures and extreme events.					<ul style="list-style-type: none"> > Researchers > Tasmanian Government (DPIPWE and State Growth) > Local government > NRM body > Industry
	BPA7 Undertake research to improve the understanding of diversity and extent of, and thus appropriate conservation measures for, cryptic species such as fungi, invertebrates, bryophytes and lichens.					<ul style="list-style-type: none"> > Researchers > Tasmanian Government (DPIPWE) > NRM body
	BPA8 Support ongoing, and establish further, capacity to monitor species, community distribution and change, with a focus on building understanding of the impact of climate change, land-use change and development pressures and the capacity to undertake effective adaptation activity.					<ul style="list-style-type: none"> > Researchers > Tasmanian Government (DPIPWE, DPAC, State Growth) > Local government > NRM body > Aboriginal community organisations
	BPA9 Support development of biodiversity-based reference groups at a local or regional level.					<ul style="list-style-type: none"> > Tasmanian Government (DPIPWE and PWS) > Local government > NRM body > Industry (Hydro Tasmania) > Land managers (Forestry Tasmania) > NGOs (TLC)
	BPA10 Incorporate Aboriginal cultural heritage and knowledge into management of biodiversity assets.					<ul style="list-style-type: none"> > Aboriginal community organisations > Tasmanian Government (DPIPWE, State Growth, DPAC) > Local government > NRM body



4. Biodiversity Asset Targets, Priority Actions and Key Contributors continued

Biodiversity Asset Management Targets (BMT) and the Biodiversity Resource Condition Targets (BCT) they contribute to (5 Year)	Biodiversity Asset Priority Actions (BPA)	Alignment with Landscape Goals				Key Contributors
		Natural	Production	Lifestyle	Urban	
		N	P	L	U	
Management Target: BMT3 Active monitoring, prevention and control of new and existing invasive species and disease incursions that impact on biodiversity are coordinated. Contributing to Resource Condition Target: BCT8 A reduction in current extent of identified weeds and pest animals, with no new high threat weeds, pests and diseases established.	BPA11 Continue to plan, prioritise and undertake activity to control and monitor new and existing weed, pest and disease incursions and further refine coordination mechanisms to enable rapid response to new incursions.					<ul style="list-style-type: none"> > Tasmanian Government (DPIPWE—Biosecurity Tasmania)
	BPA12 Build capacity in prevention and response activities that recognise that climate change will have a varying influence on effectiveness of control methods and natural species movement.					<ul style="list-style-type: none"> > Researchers > Tasmanian Government (DPIPWE—Biosecurity Tasmania and PWS, State Growth) > Local government > NRM body > NGOs
	BPA13 Promote the uptake and build capacity for appropriate biosecurity activities.					<ul style="list-style-type: none"> > Tasmanian Government (DPIPWE, State Growth and Tourism Tasmania) > Local government > Business (tourism operators) > Industry > NRM body



5. Community Asset Targets, Priority Actions and Key Contributors

Part 4



Community Asset Management Targets ⁹⁵ (CMT) (5 Year)	Community Asset Priority Actions (CPA)	Alignment with Landscape Goals				Key Contributors
		Natural	Production	Lifestyle	Urban	
		N	P	L	U	
CMT1 The Southern Tasmania community is increasingly involved in natural resource management policy, planning, action and research.	CPA1 Raise community awareness and understanding of the impact of human activities and climate change on natural resources.					<ul style="list-style-type: none"> > Tasmanian Government (DPIPWE) > Local government > NRM body > NGOs
	CPA2 Facilitate the interaction and collaboration between experts undertaking research, community members interested in natural resource research, and research end-users.					<ul style="list-style-type: none"> > Researchers > Australian Government (Departments of Agriculture and Environment) > Tasmanian Government (DPIPWE, State Growth) > NRM body
	CPA3 Increase the interaction between researchers and volunteers, and support growth in the volunteer workforce and community interaction with natural resources.					<ul style="list-style-type: none"> > Researchers > NRM body > NGOs > Community groups and volunteers
	CPA4 Encourage the participation of community in the review and development of new, and the understanding of existing, natural resource management policy, legislation and planning.					<ul style="list-style-type: none"> > Tasmanian Government (DPIPWE and DPAC) > Local government > NRM body > NGOs
CMT2 The natural resource management community is well-informed, well-resourced and has the capacity to develop and implement effective climate change adaptation and mitigation programs for the conservation and sustainable use of natural resources.	CPA5 Support and encourage a volunteer community that is informed, safe, inspired and effective in a changing climate, with volunteer coordination and support organisations collaborating to maximise efficient use of resources and facilitate knowledge sharing.					<ul style="list-style-type: none"> > Tasmanian Government (DPIPWE and TFS) > Local government > NRM body
	CPA6 Undertake activities to help build community adaptive capacity in natural resource use and conservation activities with a focus on industry, rural communities and conservation land managers.					<ul style="list-style-type: none"> > Tasmanian Government (DPIPWE) > Local government > NRM body > NGOs > Researchers
	CPA7 Further develop capacity-building support mechanisms to educate natural resource managers to balance production and profitability with sustainable outcomes.					<ul style="list-style-type: none"> > Tasmanian Government (DPIPWE) > NRM Body > NGOs
	CPA8 Support key agencies, organisations and industry bodies to include natural resource management and climate change					<ul style="list-style-type: none"> > Tasmanian Government > Local government > NRM body



5. Community Asset Targets, Priority Actions and Key Contributors continued

Community Asset Management Targets ⁹⁵ (CMT) (5 Year)	Community Asset Priority Actions (CPA)	Alignment with Landscape Goals				Key Contributors
		Natural	Production	Lifestyle	Urban	
		N	P	L	U	
CMT3 The engagement and participation of Aboriginal people in natural resource management activities from planning to implementation is enhanced across all assets.	CPA9 Support the natural resource management community in Southern Tasmania in building relationships and mutual understanding with Aboriginal people, and utilising and respecting Aboriginal ecological and cultural knowledge in natural resource management activities.					<ul style="list-style-type: none"> > Aboriginal community organisations > Tasmanian Government > NRM body
	CPA10 Further incorporate Aboriginal cultural heritage and knowledge into management and planning of natural resource assets.					<ul style="list-style-type: none"> > Aboriginal community organisations > Tasmanian Government (DPIPWE, State Growth, DPAC) > Local government > NRM body
	CPA11 Provide planning support and build natural resource management capacity, funding and resources to deliver on-ground activities in partnership with Aboriginal people.					<ul style="list-style-type: none"> > Aboriginal community organisations > Australian Government > Tasmanian Government > Local government > NRM body
	CPA12 Incorporate the cultural, environmental and economic perspectives of Aboriginal people in the implementation of this Strategy, and in the development of the next Regional Natural Resource Management Strategy.					<ul style="list-style-type: none"> > Aboriginal community organisations > Australian Government > Tasmanian Government > Local government > NRM body

⁹⁵ Note: Resource Condition Targets are not relevant to Community Assets for the purpose of this Strategy.

Implementation, Assessment, Evaluation and Improvement

Implementation

For this Strategy to succeed, it requires the regional community to actively engage in and take ownership of it. Underpinning the Strategy is the principle of continuous improvement or adaptive management, which enables the community to evaluate its activities and progress towards achieving Targets, and to make changes where necessary. The Strategy is intended to be a living document—open to ongoing community input and improvement as new information comes to hand.

This Strategy belongs to the Southern Tasmanian community. During development of the Strategy, community and stakeholder research highlighted the importance of a Collaborative Responsibility Model. This model or way of working recognises that partnerships and collaborative planning, action and evaluation are critical to successful long-term natural resource management outcomes. Part 4 of this Strategy identified the Key Contributors who have a critical role in supporting the Priority Actions that underpin this Strategy.

Due to funding and policy constraints and other community priorities, implementing this Strategy will not be a linear or sequential process. Many Priority Actions have already commenced and many will be ongoing as resources allow. It is envisaged that some Priority Actions may be revised during the implementation phase to better respond to the operational and resourcing constraints of the Key Contributors. The significant ingredient to successful implementation will be coordinating collaborative action within limitations and by pooling resources.

Where Priority Actions are common to the three Tasmanian regions, investment and activity will be most efficient through statewide programs. The three Tasmanian regional NRM committees will establish mechanisms to identify and jointly manage such programs in partnership with Key Contributors.

Part 4 presented Management Targets for each Asset, along with the Resource Condition Targets they have been developed to support for the four biophysical Assets. During Implementation, Assessment, Evaluation and Improvement of this Strategy, the focus will be on measuring progress towards the Management Targets. Efforts towards measuring progress toward the Resource Condition Targets will be made, where possible, through collaboration with Key Contributors by building on existing monitoring programs.

NRM South's role in implementation

NRM South is not a land, coastal, marine or water manager, nor is it a regulator. NRM South's responsibility is to:

- > Support the community to effectively and strategically engage in improved practices to manage the region's resources;
- > Identify priorities;
- > Develop the regional Strategy; and
- > Facilitate implementation of the Strategy.

NRM South will, within its capacity, support implementation of this Strategy through:

- > Leading development and implementation of an ongoing monitoring system to quantify collective effort, implementation and the process to evaluate this Strategy's implementation and (minimum) biennial reporting structure;
- > Supporting Key Contributors and the community to implement this Strategy both strategically through management plans, legislation and strategic plans, and through operational and on-ground activities;

- > Monitoring and supporting uptake of climate change adaptation and mitigation measures within stakeholder organisation plans and strategies. Key measurable points may include:
 - > The extent that stakeholders have a formal policy or process for climate change;
 - > Resource allocation for the management of climate change issues; and
 - > The extent of climate change risk assessments or adaptation planning, including the development of adaptation pathways⁹⁶ for key areas of concern;
- > Further developing stakeholder and community relationships to engage, coordinate and support ownership of this Strategy and further empower the community;
- > Working with local government, industry, Landcare and other Key Contributors to develop targeted engagement models which will better service individual sectors;
- > Engaging further with Aboriginal people to determine cultural contexts, interests and priorities for natural resource management in Southern Tasmania and support increased participation;
- > Further developing and maintaining the Knowledge Gateways as an important resource for Key Contributors and the broader community;
- > Establishing and facilitating sector-based or themed reference groups to build Key Contributor ownership and stakeholder involvement; and
- > Continuing the local facilitation network in conjunction with local governments across the region. NRM South will continue to support and enhance this framework as a means of linking state and regional priorities with local issues and opportunities.

Assessment

This Strategy identifies three levels of headline indicator that provide a guide for systematic reporting on the progress of implementation and the effectiveness of this Strategy, as well as the collaborative planning, action and evaluation undertaken by Key Contributors. They are:


1. **Foundational indicators:** Allow measurement of the awareness, involvement and capacity of the community to undertake natural resource management activities.
2. **Asset Management Target indicators:** Allow measurement of progress towards the Asset Management Targets.
3. **Implementation indicators:** Allow measurement of the Collaborative Responsibility Model, and how well this model is working toward the implementation of this Strategy and its Vision.


These are detailed in Table 2.


⁹⁶ Adaptation pathways provide more detail for uncertain futures with decision points being identified, contingencies and modified approaches to activity based on prevailing landscape and asset changes. An adaptation pathways approach is recommended to be taken within the existing and proposed theme and sector-based groups for implementation of this Strategy. The development of adaptation pathways will provide these groups with the ability to respond to the various changes in natural resources. The SCARP team has developed a series of resources to assist, including the Adaptation Pathways Playbook and associated Current Issues Assessment Tool Template - <https://terranoa.org.au/repository/southern-slopes-nrm-collection>


Table 2: Headline indicators

Level	Indicator	Measure	Baseline
Foundational Level	<ul style="list-style-type: none"> > Increased level of community understanding of <i>Natural Resource Management Act 2002</i>. 	<ul style="list-style-type: none"> > Proportion of respondents answering "I have a very good understanding". 	<ul style="list-style-type: none"> > PDF Scans Report and Data – survey Question 4.
	<ul style="list-style-type: none"> > Community confidence in ability to plan for climate change in natural resource management. 	<ul style="list-style-type: none"> > Proportion of respondents answering "able to do it without assistance". 	<ul style="list-style-type: none"> > PDF Scans Report and Data – survey Question 25.
	<ul style="list-style-type: none"> > Sector or theme-based reference groups are established and/or maintained. 	<ul style="list-style-type: none"> > Number of groups established and/or maintained. > Number of sectors or themes covered. 	<ul style="list-style-type: none"> > Develop list of existing theme-based reference groups as part of implementation planning with Key Contributors.
	<ul style="list-style-type: none"> > Aboriginal community organisations and individuals are involved in implementation planning and in reporting and review of this Strategy. 	<ul style="list-style-type: none"> > Number of Aboriginal community organisations involved/ supported. 	<ul style="list-style-type: none"> > Develop list as part of implementation planning with Key Contributors.
	<ul style="list-style-type: none"> > Natural resource management and climate change adaptation are referenced and supported through local government strategic plans. 	<ul style="list-style-type: none"> > Number of local government strategic plans that feature natural resource management and climate change adaptation and mitigation objectives and actions. 	<ul style="list-style-type: none"> > PDF Scans Report. > Develop list as part of implementation planning with Key Contributors.


Level	Indicator	Measure	Baseline
Asset Management Target level			
 Land	> The community is contributing to actions toward achievement of Land Asset Management Targets.	> Number of Key Contributors undertaking Priority Actions, or those revised during implementation planning.	> Develop list as part of implementation planning and evaluation with Key Contributors.
		> Changes in native and modified vegetative cover.	> TASVEG, land-use and land-cover mapping.
		> Geo-conservation and cultural heritage sites are reflected within land-use planning and policy.	> State Planning Scheme. > Review of changes in land-use policy and planning.
		> Increased resources available and coordination groups and partnerships to support management practices that promote soil health.	> Develop list as part of implementation planning and evaluation with Key Contributors.
		> Number of groups and partnerships towards coordinated invasive species management established and/or maintained.	> Develop list as part of implementation planning and evaluation with Key Contributors.

Level	Indicator	Measure	Baseline
Asset Management Target level			
 Water	<ul style="list-style-type: none"> > The community is contributing to actions toward achievement of Water Asset Management Targets. 	<ul style="list-style-type: none"> > Number of Key Contributors undertaking Priority Actions, or those revised during implementation planning. 	<ul style="list-style-type: none"> > Develop list as part of implementation planning and evaluation with Key Contributors.
		<ul style="list-style-type: none"> > Water quality measures maintained or improved in key waterways. 	<ul style="list-style-type: none"> > Water quality monitoring Report Cards and State of the Derwent Reports. > The Water Information System of Tasmania. > Tasmanian River Condition Index.
		<ul style="list-style-type: none"> > Impacts on freshwater ecosystems are reflected in land-use policy and planning. 	<ul style="list-style-type: none"> > Review of changes in water-use policy and planning.
		<ul style="list-style-type: none"> > Increase in resources available and coordination groups and partnerships to support management practices that promote water quality and sustainable use. 	<ul style="list-style-type: none"> > Develop list as part of implementation planning and evaluation with Key Contributors.
		<ul style="list-style-type: none"> > Groups and partnerships towards coordinated invasive aquatic species management established and/or maintained. 	<ul style="list-style-type: none"> > Develop list as part of implementation planning and evaluation with Key Contributors.

Level	Indicator	Measure	Baseline
Asset Management Target level			
 Coasts and Marine	<ul style="list-style-type: none"> > The community is contributing to actions toward achievement of Coasts and Marine Asset Management Targets. 	<ul style="list-style-type: none"> > Number of Key Contributors undertaking biodiversity priority actions, or those revised during implementation planning. 	<ul style="list-style-type: none"> > Develop list as part of implementation planning and evaluation with Key Contributors.
		<ul style="list-style-type: none"> > Coastal and marine values that are identified and mapped are reflected within the planning system. 	<ul style="list-style-type: none"> > Marine Values Atlas further developed. > SEAMAP. > Coastal and foreshore values and condition data.
		<ul style="list-style-type: none"> > Impacts of sea level rise on natural and cultural values are effectively considered in land-use policy and planning. 	<ul style="list-style-type: none"> > Review of changes in coastal land-use policy and planning.
		<ul style="list-style-type: none"> > Increase in resources available and coordination groups and partnerships to support management practices that mitigate threats to coastal and marine ecosystems. 	<ul style="list-style-type: none"> > Develop list as part of implementation planning and evaluation with Key Contributors.
		<ul style="list-style-type: none"> > Groups and partnerships towards coordinated invasive marine and coastal species management established and/or maintained. 	<ul style="list-style-type: none"> > Develop list as part of implementation planning and evaluation with Key Contributors.

Level	Indicator	Measure	Baseline
Asset Management Target level			
 Biodiversity	<ul style="list-style-type: none"> > The community is contributing to actions toward achievement of Biodiversity Asset Management Targets. 	<ul style="list-style-type: none"> > Number of Key Contributors undertaking biodiversity priority actions, or those revised during implementation planning. 	<ul style="list-style-type: none"> > Develop list as part of implementation planning and evaluation with Key Contributors.
		<ul style="list-style-type: none"> > Change in representation of threatened communities, or vegetation communities that support threatened species, in reserve estate or under stewardship agreements. 	<ul style="list-style-type: none"> > DPIPWE vegetation reports, number of management agreements and private land covenants.
		<ul style="list-style-type: none"> > Number of threatened species recovery actions undertaken. 	<ul style="list-style-type: none"> > DPIPWE Threatened Species Section reporting and/or implementation review of Prioritisation of Threatened Flora and Fauna 2010.⁹⁷
		<ul style="list-style-type: none"> > Impacts of development on biodiversity values are considered consistently and within a cumulative impact approach in land-use policy and planning. 	<ul style="list-style-type: none"> > Review of changes in land-use policy and planning.
		<ul style="list-style-type: none"> > Increase in resources available and coordination groups and partnerships to support management practices that promote ecosystem function. 	<ul style="list-style-type: none"> > Develop list as part of implementation planning and evaluation with Key Contributors.
		<ul style="list-style-type: none"> > Groups and partnerships towards coordinated invasive species management established and/or maintained. 	<ul style="list-style-type: none"> > Develop list as part of implementation planning and evaluation with Key Contributors.

⁹⁷ DPIPWE, 2010, Prioritisation of Threatened Flora and Fauna

Level	Indicator	Measure	Baseline
Asset Management Target level			
 Community	<ul style="list-style-type: none"> > Awareness and involvement of natural resource management planning and implementation by the community, including how the community values protection of Aboriginal cultural heritage. 	<ul style="list-style-type: none"> > Number of people involved in natural resource management activities. > Number of people aware of natural resource management issues. > Increase in community value of protecting Aboriginal cultural heritage in Tasmanian landscapes. 	<ul style="list-style-type: none"> > NRM South Social Research Final Report and Data 2014.
Implementation level	<ul style="list-style-type: none"> > Key Contributors are supported to develop implementation plans referencing this Strategy and/or climate change adaptation and natural resource management. 	<ul style="list-style-type: none"> > Number of Key Contributors involved/ supported. 	<ul style="list-style-type: none"> > Develop list as part of implementation planning with Key Contributors.
	<ul style="list-style-type: none"> > Aboriginal environmental, cultural and economic perspectives are incorporated in implementation planning. 	<ul style="list-style-type: none"> > Number of Aboriginal community organisations involved/ supported. > Number of Key Contributors incorporating Aboriginal perspectives in implementation planning and action. 	<ul style="list-style-type: none"> > Develop list as part of implementation planning with Key Contributors.
	<ul style="list-style-type: none"> > Community is undertaking priority actions or revised actions, to increase their operational alignment during implementation planning. 	<ul style="list-style-type: none"> > Number of Priority Actions or linked actions undertaken. > Number of Key Contributors undertaking actions. 	<ul style="list-style-type: none"> > Develop list as part of implementation planning with Key Contributors.
	<ul style="list-style-type: none"> > Community is building relationships and linkages to coordinate implementation of this Strategy. 	<ul style="list-style-type: none"> > Number and composition of theme-based reference groups. 	<ul style="list-style-type: none"> > Develop list of existing theme-based reference groups as part of implementation planning with Key Contributors.

Evaluation

NRM South recognises the importance of implementing effective systems of monitoring and evaluation to enable adaptive management, and to ensure the region is accountable and complies with the requirements of major investors such as the Australian and Tasmanian Governments. Monitoring and evaluation will ensure the region:

- Provides data that is useful and accountable to partners investing in natural resource management;
- Learns about the effectiveness of actions undertaken so they can be continually improved through adaptive management; and
- Achieves the Vision, Goals and Asset Management Targets for landscapes and natural resource assets outlined in this Strategy.

A range of monitoring, evaluation and reporting activities will focus on the implementation of management initiatives guided by the Priority Actions. These will be undertaken in conjunction with the specific activities that relate to the biophysical condition and trends of the natural resource assets identified in the Strategy. Where possible, monitoring and evaluation will leverage existing resources and programs, and will be undertaken in partnership with other organisations at state and regional levels. Key Contributors for the implementation of these actions will be negotiated and specified in implementation processes involved with the delivery of specific programs supported by the Strategy.

Evaluating and reporting on measures of headline indicators will link as much as possible to existing programs and reporting by Key Contributors (e.g. DPIPW's vegetation reporting, Derwent River water quality monitoring) to support the continuation and utility of these data sources to assist in assessing progress towards Asset Management Targets and to provide accurate, cost-effective and timely natural resource management information.

In evaluating this Strategy, NRM South will prepare:

- **Biennial Performance Reports:** To track progress on the actions of the community and their contribution towards Priority Actions, which will allow for a regular and consistent method of performance reporting to investors from the region; and
- **Annual Reports:** To report to investors about outputs achieved and progress towards regional Asset Management Targets in which NRM South is directly involved.

A more formal review of the Strategy will occur at least every five years as determined by the State Minister for Environment, Parks and Heritage, in line with the *Natural Resource Management Act 2002* or other relevant policy or act. Key Contributors will continue to be engaged in reviewing and updating the Strategy throughout its implementation.

Improvement

Key improvements within this Strategy are represented by the strong cross-regional collaboration that has been a foundation of its development; the meaningful incorporation of climate change using the best available and most up-to-date science; and the renewed focus on appropriate and meaningful engagement.

NRM South is responsible for reviewing this Strategy in accordance with the *Natural Resource Management Act 2002* or other relevant policy or act. Just as this Strategy has considered, and built upon, the first and second strategies for Southern Tasmania, so will any future reviews.

NRM South continually strives to support the Southern Tasmanian community to engage in and manage our natural resources. The Key Contributors identified for the implementation of Priority Actions will be instrumental to the implementation, monitoring and review of this Strategy and will continue to be a centre-point for consultation and improvement for any further iteration of this Strategy.



Strategic Context

Our approach to developing the Strategy

This Strategy has been informed by:

1. The two previous regional NRM strategies and the Collective Effort Report;
2. An Environmental, Strategic and Institutional Scan undertaken by an independent third party;
3. Consultation at a statewide, regional and local level;
4. Climate change-specific research;
5. Consideration of the legislative and policy framework impacting natural resource management in Southern Tasmania;
6. Tasmanian natural resource management principles; and
7. Tasmanian Resource Management and Planning System objectives.

The Strategy aims to balance the three essential structural elements for natural resource management—the environment, the economy and the community—for the overall benefit of Southern Tasmania.

It recognises the need to work in harmony with state and local government, industry, primary producers and the wider community to balance these elements against development opportunities and to find solutions to existing problems, leading to an improved and sustainable environment.

It acknowledges the need for a triple bottom line approach and for continuous dialogue between resource managers and resource users to engender support for, and genuine involvement in, adaptive management.

Many of the improved environmental outcomes arising from adoption of sound natural resource management practices come at a social and economic cost, so this Strategy recognises that this burden on natural resource managers needs to be shared, and supports collaborative approaches that assist with this.

Our approach to developing this Strategy was to ensure it:

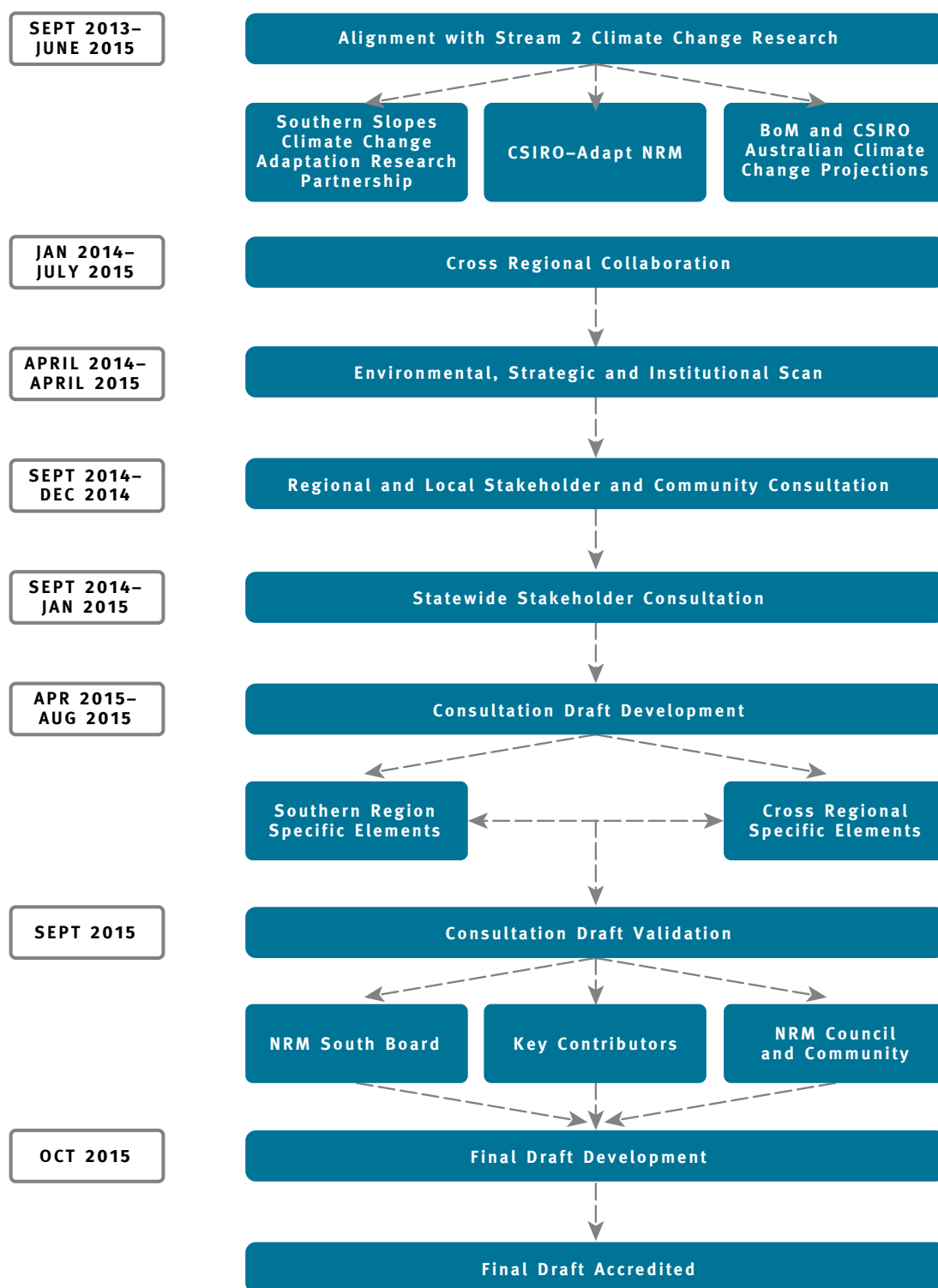
- > Has a biophysical focus and is mindful of current and future development opportunities;
- > Supports diversification, recognising that businesses, communities and ecosystems that are diverse are better able to respond to change and are more productive;
- > Encourages activity to build and maintain resilient and diverse natural, economic and social systems;
- > Allows for ongoing economic development;
- > Allows for future adaptation to pressures from economic, social and natural drivers;
- > Builds on other plans, strategies and policy; and
- > Focuses on integration and collaboration between natural resource managers and community stakeholders.

Developing the Strategy involved the coordination of agencies, researchers and natural resource management groups across Tasmania. Selected engagement and consultation activities were undertaken at the statewide level. This coordinated approach has been well supported and has led to key Targets and Priority Actions in this Strategy being adopted across the State.

Integration of resources, tools and community values has provided for a holistic approach to strategy development and is a core focus for implementation prioritisation.

Many Asset Management Targets and Priority Actions identified in this Strategy build on the *Tasmanian Natural Heritage Strategy 2013–2030* (Natural Heritage Strategy). The Natural Heritage Strategy outlines in long-term action 34 the need to promote the incorporation of the objectives and actions into natural resource planning. Content within this Strategy demonstrates this linkage and nested support.

Figure 5: Development process for the Strategy



1. What we've learned from previous strategies

This Strategy is the third regional strategy for Southern Tasmania and builds on the knowledge base, community desires and regional priorities previously identified. A key process in the development of this Strategy was a revision of the previous strategies' content, and an analysis of ongoing relevance of biophysical aspects and community aspirations.

An independent scan of environmental, strategic and institutional factors surrounding natural resource management in Southern Tasmania that was undertaken to inform the Strategy identified that the focus of previous strategies remains largely relevant.⁹⁸

> NRM Strategy for Southern Tasmania 2000–2005

The 2000–2005 strategy was the first for Southern Tasmania and represented a deep analysis of the biophysical and community assets of the region. This Strategy was highly descriptive and prescriptive in nature and provided clear guidance on the priorities for the region.

> NRM Strategy for Southern Tasmania 2005–2010

The second regional strategy for Southern Tasmania was a higher level strategic document. The priorities were articulated so that an increasing number of stakeholders could participate in its implementation. This Strategy provided for increased flexibility in implementation of natural resource management activity, which was then measured through the Collective Effort Report, led by NRM South.

> Collective Effort Report

The Collective Effort Report was completed by NRM South to document and celebrate the broad regional achievements in the implementation of the 2005–2010 NRM Strategy for Southern Tasmania. Information was gathered from 34 organisations involved in natural resource management in the region and provided an insight into the range of action and progress, an appreciation of how work is undertaken, and the types of results that have been achieved.

A principal finding of this report was that direct investment in natural resource management in Southern Tasmania has been in excess of \$100 million each year over the past two years with funding coming from all three levels of government, business and philanthropy. Partnerships maximised return on investment by leveraging funds and in-kind contributions across organisations, as well as by making effective use of skills and non-financial resources. Volunteers particularly make a significant contribution, with estimates of the value of volunteer contributions up to seven times the amount invested by funders.

2. Environmental, Strategic and Institutional Scan

An independent environmental, strategic and institutional scan was carried out by NRM South to examine the various aspects of the natural resource management model and to provide recommendations for developing the Strategy. This scan comprised:

- > **Environmental Scan**—assessment of the biophysical features and assets of each region, including an assessment and review of the impacts of climate change and other processes, and the associated risks and opportunities.
- > **Strategic Scan**—a review of the two previous regional Strategies to understand the achievements, limitations and constraints of these strategies, as well as to recognise the volume of NRM implementation achieved through these strategies.
- > **Institutional Scan**—a review of regional capacity and the model, to identify opportunities and mechanisms to improve integration with other planning and decision-making processes that influence natural resource management at a state or regional scale. The scan also identifies potential indicators of success.

In undertaking these scans, the project has also included significant amounts of stakeholder engagement in order to provide perspective and inputs across the three elements.⁹⁹

⁹⁸ PDF, 2015, ESI Scan Report
⁹⁹ PDF, 2015, ESI Scan Report

3. Consultation

Consultation was central to the development of this Strategy, with involvement of key stakeholders and the broader community used to ascertain values, priorities, concerns and preferences for the region's landscapes and assets. Several consultation methods were used for greatest regional input and to ensure that regional perspectives were represented in the Strategy.

Table 3: Participants and organisations represented according to consultation method

Method of consultation		No. of participants
Draft Strategy Development	Quantitative telephone survey	408
	Online survey	120
	Regional workshop	30
	Regional engagement – written surveys and consultation sessions	50
	Statewide workshop	26
	Targeted stakeholder interviews	42
Draft Strategy Validation	Bang the Table online consultation platform	
	> Site visitors	175
	> Strategy downloads	116
	> Submissions received	9
Draft Strategy Consultation total submissions received		23

Statewide stakeholder consultation

A statewide stakeholder consultation process was completed by the three Tasmanian NRM regional bodies to recognise the need for many stakeholders to work across the State and to minimise consultation fatigue. The consultation process was managed by an independent third party to facilitate a transparent and unbiased approach to information gathering and analysis.

The statewide engagement process was completed via a comprehensive online survey, a forum and targeted interview process. These elements were completed sequentially so the outcomes of one element could feed into the next.

The results of the consultation process provided clear feedback that the three regional strategies should be more aligned in structure and substance to facilitate uptake and implementation. This has been acknowledged through the close working relationship of the regional bodies to support development of more similar strategy structures, while ensuring the regional focus on content.

Regional and local stakeholder and community consultation

Regional stakeholder and community consultation was conducted through a number of processes.

A quantitative telephone survey was conducted whereby 408 people living and working in Southern Tasmania were contacted. These people rated a range of natural resource management issues nearly as highly as other socio-economic concerns like health, education and employment.

There was a series of opportunities for the community to engage face-to-face at selected fora around the region and provide feedback and complete paper-based or digital surveys.

Traditional means of consultation were also undertaken such as attending rural shows and invitations to presentations and consultation on the process, as well as online mediums such as Twitter, Facebook, newsletters and network email contacts.

Key outcomes from this work have indicated that, from an assets point of view, the community see all assets as being of near equal importance. Regarding threatening processes, the community recognised that the key issues were:

- > Weeds, pests and diseases
- > Development pressures
- > Climate change
- > Fire
- > Land clearance
- > Water quality
- > Research.

All of these issues have been identified through Priority Actions in this Strategy. Most of these issues have already been recognised through the previous strategies and represent long-term and ongoing management elements for the region.

4. Climate change-specific scientific research

A suite of climate change-focussed research supported by the Australian Government has also been undertaken, specifically designed to inform this Strategy. Central to the development of this Strategy was to work iteratively with the respective researchers and to incorporate relevant findings.

The specific research programs, known as Stream 2, included:

- > The Southern Slopes Climate Adaptation Research Partnership (SCARP), which focussed on developing tools and guides through iterative research to support natural resource management planning;¹⁰⁰
- > The CSIRO's AdaptNRM national initiative, which developed a series of modules (Adaptation, Weeds, Biodiversity and Shared Learning) and datasets based on the latest climate change literature, research and modelling;¹⁰¹ and
- > The joint CSIRO and Bureau of Meteorology Climate Change in Australia program, completing downscaled climate change projection models and developing tools to explore the implications for Australian regions.¹⁰²

Additionally, the development of this Strategy is supported by the Climate Futures for Tasmania technical reports. These reports used dynamic downscaling of a number of global circulation models (IPCC 4) to generate fine scale climate models at approximately 10km resolution. These were interpreted for a number of natural resource management issues in a range of technical reports.¹⁰³

5. Legislative and policy framework

It is not the intent of this Strategy to duplicate or supersede other state, regional or local planning processes. Its intent is to provide a base for the community's future planning and immediate investment.

¹⁰⁰ <https://terranoa.org.au/repository/southern-slopes-nrm-collection>

¹⁰¹ <http://adaptnrm.csiro.au>

¹⁰² <http://www.climatechangeinaustralia.gov.au/en/>

¹⁰³ http://www.dpac.tas.gov.au/divisions/climatechange/adapting/climate_futures

The regional focus of this Strategy ensures that local issues and opportunities are recognised and incorporated into the considerations of larger scale state, national and international interests and obligations.

International

Australia is a party to a range of international conventions and treaties that incorporate resource management and environmental values. Examples include the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Convention on Wetlands (Ramsar, Iran, 1971), the Japan/Australia and China/Australia migratory bird agreements (JAMBA and CAMBA respectively), the Convention on Migratory Species, the Convention to Combat Desertification, the Commission for Sustainable Development and the United Nations Environment Programme.

To date Australia has contributed significantly to the implementation of international conventions, treaties and agreements that help preserve biodiversity. Australia also has a good track record in participation, and progress is being made in the areas of migratory species, albatross, and wetlands conservation, trade in endangered species and climate change.

National

Although the management of environmental matters is not specifically dealt with in the Australian constitution, the Australian Government has a significant role in the management of natural resources. This includes responsibilities to meet agreed obligations under international treaties and conventions. To clarify the role between state and federal environmental powers, and to ensure that international environmental obligations are being met, the *Environment Protection and Biodiversity Conservation Act 1999* details the Australian Government responsibility for developments with the potential to impact upon “matters of national environmental significance”.

These include:

- > World Heritage areas
- > Wetlands of international significance (known as ‘Ramsar wetlands’)
- > National heritage places
- > Nationally listed threatened species and ecological communities
- > Nuclear actions
- > Migratory species (including birds and cetaceans, such as whales)
- > Commonwealth marine areas.

The Australian Government is also responsible for any development and management on land it owns (e.g. defence facilities and airports), fishing and development in waters outside the state government limits, and climate change laws.

The acknowledgement of climate change has seen an increasing international effort to address the causes and assist communities to adapt to the potential impacts. The Australian Government, through the NRM Planning for Climate Change Fund, has supported the revision of regional natural resource management planning, including this Strategy, to accommodate recent information on the impacts resulting from climate change on the region’s natural assets.

Considerable investment, through programs such as the National Landcare Program, provides support from the Australian Government to assist sharing the burden of environmental management through direct assistance for communities. By investing in local and regional projects that deliver against the program’s strategic objectives and outcomes, the Australian Government recognises the important contribution of local communities and regional natural resource management organisations in assisting Australia to meet its national and international obligations.

State

State Government (the Tasmanian Government) plays a significant role in the management of natural resources, with over 100 Acts of Parliament that relate to environmental control in some way. At the centre of these, the Resource Management and Planning System of Tasmania (RMPS), established to achieve sustainable outcomes from the use and development of the State's natural and physical resources, requires state and local government bodies to further sustainable development in their planning and assessments of proposed developments, and provides opportunities for community participation.

Legislative documents and supporting policy that contribute to the RMPS share a common set of objectives aimed at promoting the sustainable development of the resources of air, water and land. State and local government agencies that administer these Acts are required to further these objectives when making decisions under those Acts, specifically:

- To promote sustainable development and to maintain ecological processes and genetic diversity;
- To provide for the fair, orderly and sustainable use and development of air, land and water;
- To encourage public involvement in resource management and planning;
- To facilitate economic development in accordance with these objectives; and
- To promote the sharing of responsibility for resource management and planning between the different spheres of government, the community and industry in the State.

The *Natural Resource Management Act 2002* (the Act) and the supporting Tasmanian Natural Resource Management Framework (the Framework) encompass the Tasmanian Government's approach to capacity building and commitment to actions that assist in education, communication and coordination of natural resource management.

The Act provides the legislative head of power for the:

- Establishment of the statewide Tasmanian Natural Resource Management Council to advise the relevant Minister on natural resource management issues and to increase the effectiveness of management approaches; and
- Provision for three regional committees in the north, north-west and south (NRM North, Cradle Coast NRM and NRM South) of the State. Each committee is responsible for preparing a natural resource management strategy for its region and facilitating its implementation.

The Framework provides a platform for the organisation and integration of activities by the range of entities that are involved. The Framework complements, but does not replace, the formal systems that the Tasmanian Government currently uses to regulate natural resource management, including the RMPS. The Framework helps integrate the elements of the RMPS with other policies and legislation.

Regional

For the purposes of this Strategy, municipalities in Tasmania have been grouped into three regions: Cradle Coast, Southern and Northern Tasmania.

Regional land-use planning

In 2010, amendments to the *Land Use Planning and Approvals Act 1993* took effect, which aimed to ensure more strategic and consistent planning between councils within a region through the development of regional land-use strategies.¹⁰⁴ The strategies identify resource issues and management objectives in the region; appropriate urban growth boundaries; and key constraints and opportunities for regional development. The Southern Tasmanian Councils Authority developed the Southern Tasmania Land Use Strategy 2010–2035 to guide, facilitate and manage change, growth and development in the region.

¹⁰⁴ Land Use Planning and Approvals Act 1993, Part 3, Division 1A

Regional natural resource management

Since the formation of NRM South in 2003, one of 56 regional NRM organisations nationally, many valuable and effective relationships have been formed both locally within the region, between the other Tasmanian regions, and with the state and Australian governments. This Strategy emphasises the importance of these networks and recognises that collaborative and coordinated action results in greater outcomes for the region's community and natural resources.

For over a decade, a large number of landowners, land managers, resource managers, members of Landcare and municipal-based natural resource management groups and facilitators, local, state and Australian government bodies, and businesses have been working together to improve the management of Southern Tasmania's natural resources.

Our region has benefited from programs such as property management planning, covenanting of private land, environmental incentive schemes, Land for Wildlife and devolved grants programs. As a result, there have been substantial improvements in the community's capacity to undertake natural resource management.

In this context, the positive achievements of community groups, landholders and primary producers over the past 20 years, since Landcare and other similar 'care' programs were introduced, are to be applauded, as are the actions of individual landholders across the region.

Local

Natural resource management implementation, whilst strategically driven by the Natural Resource Management Strategy for Southern Tasmania and investment planning, is dependent on sub-regional processes for much of its coordination. In particular, the role of local government and sub-regional NRM bodies is pivotal in providing local direction to issue identification, resource condition monitoring, work programs and stakeholder liaison.

The Act aims to provide a conduit between natural resource matters at a state and local scale.

Stakeholder and community consultation conducted to support the development of this Strategy highlighted the importance of local governments as a key custodian and deliverer of programs which will support positive natural resource management outcomes.

Local governments are generally the first point of contact for those affected by a development activity or a local environmental problem. Councils are generally responsible for:

- Developing planning schemes to set standards such as building heights, siting of developments near sensitive areas, setbacks from waterways etc.;
- Assessing development proposals;
- Developing by-laws to deal with specific issues;
- Imposing conditions to regulate pollution (including dust, smoke, noise and liquid emissions); and
- Taking enforcement action where permit conditions are not complied with.

Since 2003, a number of local governments in the region have partnered with NRM South to establish and manage a highly successful local facilitator network to assist community engagement in the strategy development process. This has enabled the fostering of close relationships with key stakeholders, the establishment of collaborative partnership programs, and locally-relevant implementation of the Strategy.

Local government strategic plans, as outlined in the *Local Government Act 1993*, have considerable significance as they direct councils' long-term plans for financial and asset management. These plans provide for local development which, if looked at in isolation, may lead to negative natural resource outcomes. It is therefore very important that local government strategic plans are consistent with the Act and, as an extension, consider this regional strategy.

6. Tasmanian natural resource management principles

The Strategy has been developed in accordance with the *Natural Resource Management Act 2002* and aligns with the Tasmanian NRM Framework's Principles for Natural Resource Management and the Tasmanian Resource Management and Planning System Objectives, to ensure continuity with previous regional strategies and state legislation, policies and strategies. This alignment is outlined in Table 4 below.

Table 4: Tasmanian NRM Framework's principles for natural resource management

NRM Principle	
Ecosystem approach	Using landscapes as the primary units for long-term objectives and the strong focus on ecosystem function
Balanced decisions	A focus on environmental, social and economic benefits gained from our natural resources, and the need to balance decision-making with a mind to all three
Integrated management	Close alignment with other Tasmanian NRM bodies
Priority based	Integration of the best available natural resource management and climate change information
Prevention is better than cure	A focus on adaptive proactive management
Partnership; and We are all responsible	A strong focus on collaborative actions, and supporting community involvement in planning and actions.

For more details on the Tasmanian Principles for Natural Resource Management see the NRM Final Report.¹⁰⁵

7. Tasmanian Resource Management and Planning System objectives

The Tasmanian Resource Management and Planning System objectives¹⁰⁶ support the Strategy's focus on awareness raising, community engagement and participation (encouraging public involvement in natural resource management), consideration of climate change adaptation (sustaining the potential of natural and physical resources to meet needs of future generations) and focussing on promoting sustainable economic development and use of our natural resource to all facets of our regional community.

For more details on the Tasmanian Resource Management and Planning System Objectives, see the Environmental Protection Agency's website.¹⁰⁷

¹⁰⁵ Review of the Tasmanian NRM Framework Final Report, 2008 - <http://dpiwwe.tas.gov.au/Documents/Review-Tas-NRM-Framework---Legislation-Final-Report-2008.pdf>

¹⁰⁶ The Tasmanian Resource Management and Planning System - <http://epa.tas.gov.au/policy/the-rmps>

¹⁰⁷ The Tasmanian Resource Management and Planning System - <http://epa.tas.gov.au/policy/the-rmps>

Glossary and Abbreviations

Glossary

Adaptive capacity	The capacity of a system to adapt to its changing environment. It is applied to ecological systems and human social systems.
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 that shares similar environmental, physical and climatic conditions and which contains characteristic ecosystems of plants and animals. Tasmania is divided into nine land bioregions and nine coastal and marine 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 and planning. 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 to reduce the vulnerability of natural and human systems to 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 their sources or by increasing their sinks.
Coastal	Any area 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. (In the draft State Coastal Policy 2010, the coastal zone is defined as State waters and all land to a distance of 1km inland from the high water mark.)
Community	Community is used as an inclusive term to include everyone in Southern Tasmania, 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.

Glossary

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 Tasmanian endemic species is found only in Tasmania.
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.
Fragmentation	Fragmentation is used in this Strategy to describe the result of removal (usually by clearing) of large parts of a natural area, resulting in the retention of only small parts (fragments or remnants) of habitat. Fragmentation is an issue for marine and other aquatic environments as well as terrestrial environments. ¹⁰⁸
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.
Land use	Land use describes the activities that occur on land, such as agriculture, energy production, human settlements, transport, forestry, mining and conservation.
Marine	Areas where the environment is more strongly influenced by the oceans than by the main landmass of Tasmania 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.
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, and employment).

¹⁰⁸ Tasmanian Natural Heritage Strategy - <http://dpiwwe.tas.gov.au/Documents/NaturalHeritageStrategy2013.pdf>

Glossary

Plantations	Intensively managed trees, of either native forest or exotic species, created by the regular placements of seedlings or seed.
Ramsar	The Ramsar Convention is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.
Refugia	Plural of refugium or refuge: Places and/or habitats in a landscape that support populations of species when changing environmental conditions, due to phenomena such as drought, fire and climate change, in the surrounding landscape make it unfavourable for the species to persist. ¹⁰⁹
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 disturbances, or the ability to recover from or adjust easily to misfortune or change. Resilience can refer to natural systems (whole ecosystems or individual species) and socioeconomic systems.
Salinity	The accumulation of excessive salts in land and water at sufficient levels to have an impact on human and natural resources (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 Southern Tasmania's natural resources.
Sustainable development	<p>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 wellbeing and for their health and safety while:</p> <ul style="list-style-type: none"> > 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; > avoiding, remedying or mitigating any adverse effects of activities on the environment.
Tasmanian Natural Resource Management Council	A Council established under the <i>Tasmanian Natural Resource Management Act 2002</i> to advise the Minister on natural resource management issues (such as priorities, accreditation of the regional strategy, consistency and coordination matters). See www.austlii.edu.au/au/legis/tas/consol_act/nrma2002280/
Threatened species	Flora or fauna that is listed in Schedule 3, 4 or 5 of the <i>Threatened Species Protection Act 1995</i> . That is, species or subspecies listed as extinct, endangered, vulnerable or rare.

¹⁰⁹ Tasmanian Natural Heritage Strategy - <http://dpipwe.tas.gov.au/Documents/NaturalHeritageStrategy2013.pdf>

Glossary

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.



Image: Luke Diddams

Abbreviations

ABS	Australian Bureau of Statistics
AdaptNRM	Joint CSIRO and NCCARF project to investigate climate change adaptation implications for regional NRM planning
AUSRIVAS	Australian River Assessment Scheme
BoM	The Australian Bureau of Meteorology
CAMBA	China Australia Migratory Bird Agreement
CAR	Comprehensive, adequate and representative reserve system
CFEV	Conservation Fresh Water Ecosystem Values (a database managed by DPIPW)
CITES	Convention on International Trade in Endangered Species (of Wild Fauna and Flora)
CSIRO	The Commonwealth Scientific and Industry Research Organisation
DEP	Derwent Estuary Program (a regional partnership)
DPAC	Tasmanian Department of Premier and Cabinet
DPIPWE	Tasmanian Department of Primary Industries, Parks, Water and the Environment
IFS	Inland Fisheries Service
IPCC	Intergovernmental Panel on Climate Change
JAMBA	Japan Australia Migratory Bird Agreement
MBHA	Midlands Biodiversity Hotspot Area
NCCARF	National Climate Change Adaptation Research Partnership
NGO	Non-governmental organisation
NRM	Natural Resource Management
PAPL	Protected Areas on Private Land Program
PWS	Tasmanian Parks and Wildlife Service
RMPS	Resource Management and Planning System of Tasmania
SCARP	The Southern Slopes Climate Change Adaptation Research Partnership
TCAP	Tasmanian Coastal Adaptation Pathways
TLC	Tasmanian Land Conservancy
TRMC	Tasmanian Resource Management Council
TWWHA	Tasmanian Wilderness World Heritage Area

Appendices

Note, there are two appendices to this Strategy:

- > **Appendix 1** – An Assets Based Knowledge Gateway
- > **Appendix 2** – Carbon Planting Spatial Prioritisation

Given that this information is likely to be updated during the life of this Strategy these appendices have also been made available as separate documents available on the NRM South website at www.nrmsouth.org.au

Appendix 1. An Assets Based Knowledge Gateway

A selective assets-based knowledge gateway will support the Southern Tasmanian community to be informed, aware of legislation and policy, and have the tools and information to plan for local, regional and statewide implementation of this Strategy. This represents a resource which will grow, evolve and be increasingly inclusive of ongoing work to provide a resource to planners, decision-makers and on-ground practitioners.

Additionally, specific research programs to support regional natural resource management planning were carried out in parallel to the development of this Strategy. They represent excellent reference information and tools for implementation planning by Key Contributors and the broader community. The research programs include:

- > **The Southern Slopes Climate Adaptation Research Partnership (SCARP)**, a consortium of researchers led by the University of Tasmania that focussed on developing tools and guides through iterative research to support natural resource management planning - <https://terranova.org.au/repository/southern-slopes-nrm-collection>;
- > The CSIRO's **AdaptNRM** national initiative, which developed a series of Modules (Adaptation Planning, Weeds, Biodiversity, and Shared Learning) and datasets based on the latest climate change literature, research and modelling - <http://adaptnrm.csiro.au/>; and
- > The joint CSIRO and Bureau of Meteorology **Climate Change in Australia** program, which completed downscaled climate change projection models and developed tools to explore the implications for Australian regions - <http://www.climatechangeinaustralia.gov.au/en/>



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Tasmanian Property Management Planning Framework and supporting modules - <http://www.tfga.com.au/policies/projects/>

A Review of Carbon Sequestration in Vegetation and Soils: Options, opportunities and barriers for the southern slopes cluster NRM organisations - <https://terranova.org.au/repository/southern-slopes-nrm-collection>

Land Information System of Tasmania - <https://www.thelist.tas.gov.au/app/content/home>

Planned Grazing Guide - <http://www.nrmsouth.org.au/publications/brochures-publications/>

Property Planning Guides - <http://www.nrmsouth.org.au/publications/brochures-publications/>

Tasmanian Bushcare Toolkit - <http://dipwe.tas.gov.au/conservation/conservation-on-private-land/bush-information-management/tasmanian-bushcare-toolkit>



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Irrigation Tasmania - <http://www.irrigationtas.com.au/>

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State Policy on Water Quality Management 1997 - <http://epa.tas.gov.au/policy/water-quality-policy>

Water Management Plans - <http://dpiipwe.tas.gov.au/water/water-management-plans>

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Tasmanian Salinity Strategy - <http://dpiipwe.tas.gov.au/agriculture/land-management-soils/salinity/tasmanian-salinity-strategy>

State Stormwater Strategy - <http://epa.tas.gov.au/epa/state-stormwater-strategy>

Tools and resources for implementation planning and activity

Conservation and Freshwater Ecosystem Values - www.dpiipwe.tas.gov.au/water/water-monitoring-and-assessment/cfev-program

DPIPWE, Wetlands and Waterways Works Manuals - <http://dpiipwe.tas.gov.au/conservation/flora-of-tasmania/tasmanian-vegetation-types/about-tasmanias-wetlands/wetlands-waterways-works-manual>

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Ozcoasts - <http://www.ozcoasts.gov.au/index.jsp>

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Tools and resources for implementation planning and activity

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DPIPWE, Property Management Planning: Biodiversity Module Toolkit - <http://dipwwe.tas.gov.au/conservation/conservation-on-private-land/property-management-planning-biodiversity-toolkit>

Commonwealth of Australia, 1997, Nationally Agreed Criteria for the Establishment of a Comprehensive, Adequate and Representative Reserve System for Forests in Australia - <https://cdn.forestrytasmania.com.au/uploads/File/pdf/pdf2014/janis.pdf>

TFGA, Tasmanian Property Management Planning Framework and supporting modules - <http://www.tfga.com.au/policies/projects/>

DPIPWE, Conservation Information System - <http://dipwwe.tas.gov.au/conservation/development-planning-conservation-assessment/tools/conservation-information-system>

Life at Large (regional biodiversity assessment tools) - <http://www.lifeatlarge.edu.au>

Regional Ecosystem Model - <http://www.naturalresourceplanning.com.au/rem/>

GAP CLoSR - <http://www.nerplandscapes.edu.au/publication/assessing-connectivity-dispersal-guilds>

Keeping it Clean manual - http://www.nrmsouth.org.au/wp-content/uploads/2014/10/keeping_it_clean.pdf



Sources of Information

Climate Change in Australia - <http://www.climatechangeinaustralia.gov.au/en/>

Climate Commission, 2011, The Critical Decade: Climate change and health - <http://www.climatecouncil.org.au/uploads/1bb6887d6f8cacad5d844fc30b0857931.pdf>

NRM South - www.nrmsouth.org.au

Landcare Tasmania - <http://www.landcaretas.org.au/>

Volunteering Tasmania - <http://www.volunteeringtas.org.au/>

Australian Government NRM - <http://www.nrm.gov.au/>

Tasmanian Government NRM - <http://dpiwwe.tas.gov.au/conservation/natural-resource-management>

Department of State Growth - <http://www.stategrowth.tas.gov.au/>

Tasmanian Climate change Office - <http://www.climatechange.tas.gov.au/>

Southern Tasmanian Councils Authority - <http://stca.tas.gov.au/>

Plans, strategies and relevant legislation

Tasmanian Natural Resource Management Act 2002 - <http://www.thelaw.tas.gov.au>

DPIPWE, Natural Heritage Strategy for Tasmania 2013–2030 - [http://dpiwwe.tas.gov.au/conservation/natural-heritage-strategy-\(2013-2030\)](http://dpiwwe.tas.gov.au/conservation/natural-heritage-strategy-(2013-2030))

Tasmanian NRM Framework - <http://dpiwwe.tas.gov.au/Documents/ReportNoPics.pdf>

Environmental Defenders Office, The Environmental Law Handbook - <http://www.edotas.org.au/resources/information/publications/>

Natural Resource Management Policy and Planning in Australia - https://crawford.anu.edu.au/public_policy_community/research/nrm/NRM_Ref_Group_Combined.pdf

Tools and resources for implementation planning and activity

SCARP Current issue assessment tool template - <https://terranova.org.au/repository/southern-slopes-nrm-collection/current-issues-assessment-tool-template>

AdaptNRM Modules - <http://adaptnrm.csiro.au/>

Climate Change in Australia - <http://www.climatechangeinaustralia.gov.au/en/>

Public Participation Toolbox - http://www.citizenshandbook.org/participation_toolbox.pdf

DPAC, Engaging with the Tasmanian Aboriginal Community - http://www.dpac.tas.gov.au/divisions/csrt/grants_and_community_engagement/framework_for_community_engagement/community_engagement_guides/engaging_with_the_tasmanian_aboriginal_community

Invasive Animals CRC, 2015, Behaviourally Effective Communications for Invasive Animals Management - <http://www.pestsmart.org.au/behaviourally-effective-communications-for-invasive-animals-management/>

Natural Values Atlas (authoritative, comprehensive information on Tasmania's natural values) - <https://www.naturalvaluesatlas.tas.gov.au/>

Prober, SM et al., 2015, Helping Biodiversity Adapt: Supporting climate-adaptation planning using a community-level modelling approach - <http://adaptnrm.csiro.au/biodiversity-options/>

Appendix 2. Carbon planting spatial prioritisation

In support of this Strategy's development and implementation, work was undertaken to spatially identify locations in the region that could be available and realise multiple benefits for carbon-based vegetation planting programs.

Three distinct projects were completed:

1. **Cradle Coast NRM—Carbon Planting Priorities—Results of statewide analysis;**
2. **CSIRO AdaptNRM Module 4 Helping Biodiversity Adapt—Revegetation for multiple benefits in Tasmania; and**
3. **The Southern Slopes Climate Change Adaptation Research Partnership: *A means to an end: a process guide for participatory spatial prioritisation in Australian natural resource management.***

Southern Tasmania still has very high vegetation cover across much of its area with the exception of specific sections that have been cleared for agricultural development. Apart from this, areas available for carbon-based vegetation planting programs are limited and will require significant consultation in order to proceed. The three projects are outlined in greater detail below.

1. Cradle Coast NRM—Carbon Planting Priorities—Results of a statewide analysis

Tasmania's three NRM regions jointly funded this project to spatially prioritise and assess potential priority areas that could form a focus for implementation of future vegetation-based carbon planting programs. This assessment investigated:

- > Existing carbon values;
- > Potential biodiversity values;
- > Soil protection and amelioration priorities; and
- > Probability of landholder uptake in low-use agricultural areas.

The assessment indicated that Tasmania has significant carbon sequestration reserves in the south-west, but also has important areas for soil amelioration and biodiversity hotspots within and adjacent to over-cleared areas, particularly in the midlands. Focus areas were identified as riparian areas and also cleared Production Landscapes for the multiple benefit of soil improvement and protection (Figure A1).

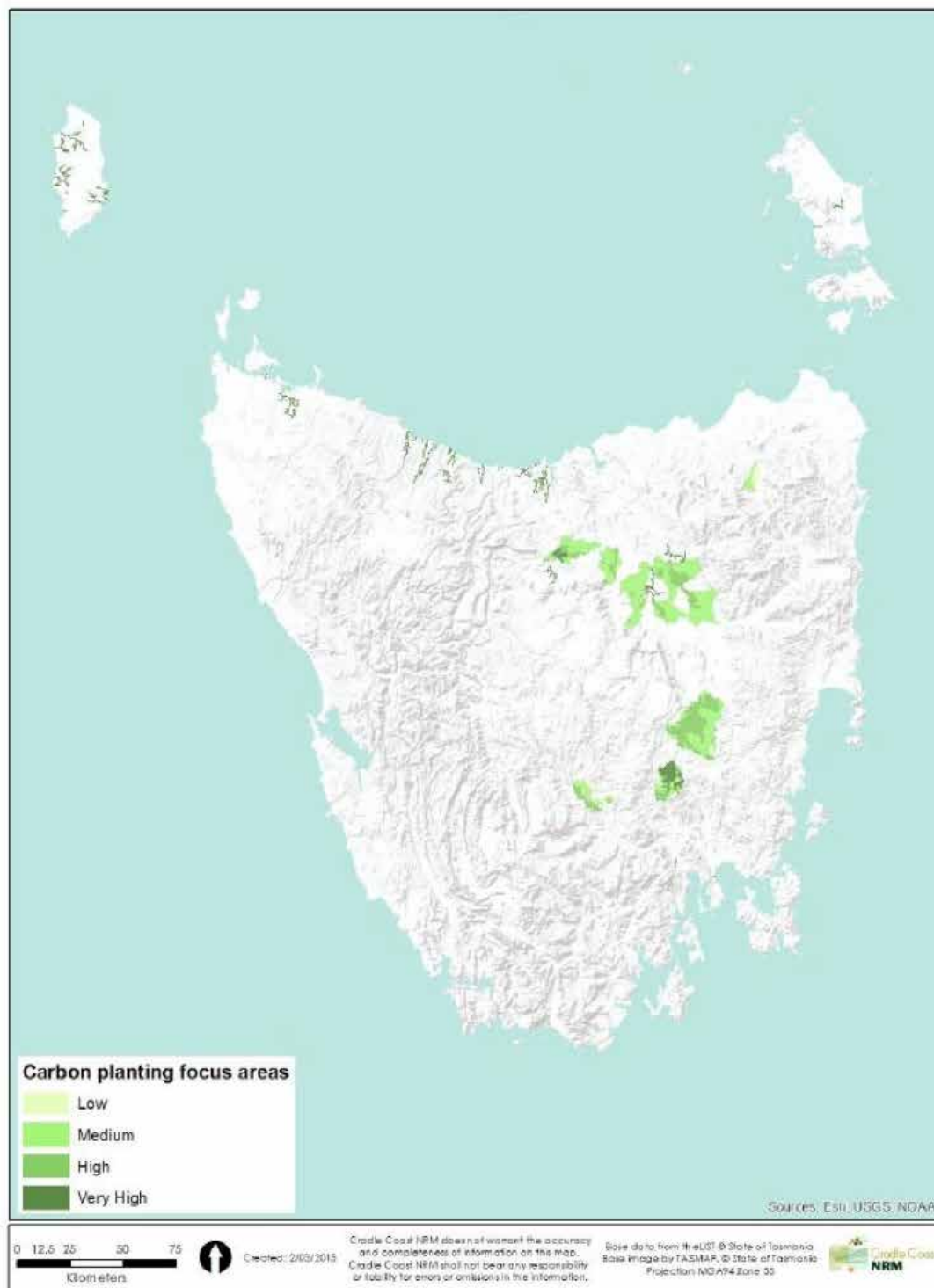


Figure A1: Carbon planting focus areas

2. CSIRO AdaptNRM Module 4—Helping Biodiversity Adapt—Revegetation for multiple benefits in Tasmania¹¹⁰

Revegetation is usually conducted with multiple aims in mind, so our revegetation benefit measure will almost always need to be combined with other information to guide priorities for placement of revegetation in the landscape. At the moment, most prioritisations incorporate some measure of current biodiversity benefits. Our measure of revegetation benefit estimates benefits for biodiversity of the baseline climate (1990) under future climate scenarios. This could substitute for current benefit layers to explore how priority areas might shift. Because revegetated areas will take decades to mature and begin to provide the full biodiversity benefits intended, prioritising areas that will continue to benefit biodiversity into the future is particularly critical.

For example, the NRM regions in Tasmania (NRM North, NRM South and Cradle Coast NRM) have collaborated to produce a multi-criteria analysis of where revegetation might best serve multiple purposes within the State. They considered carbon sequestration, soil protection and amelioration, and current biodiversity benefits in their analysis, as well as areas where the greatest opportunities may exist due to minimal agricultural use. To include biodiversity benefits, they used an analysis of biodiversity hotspots produced by the Tasmanian Resource Management Council (TRMC). Specifically, the spatial layer was a single metric that summed ratings according to eight criteria:

- > Biogeographic distinctiveness
- > Distinctiveness of areas of threatened and uncommon plants
- > Conservation and reservation status of vegetation communities
- > Native vegetation in bioregions with <10% in the reserve system
- > Fire and disease refugia
- > Glacial refugia
- > Important bird habitat
- > Freshwater ecosystems.

Note that the first two of these criteria place importance on areas that are currently distinctive, particularly in terms of plants, as these areas may disproportionately contribute to state or national scale biodiversity. Our revegetation benefit measure is based on the same principle but under a changing climate. It places importance on revegetating areas that will be rare and distinctive in the future to best support the full range of national diversity in the long term. To adjust the existing Tasmanian analysis to plan for future biodiversity benefits, the TRMC biodiversity metric could be disaggregated and revegetation benefit for vascular plants substituted for the first two criteria. Further, revegetation benefit for mammals, reptiles, and amphibians could be incorporated as measures of future importance for faunal habitat.

¹¹⁰ This is taken directly from the original CSIRO work - http://adaptnrm.csiro.au/wp-content/uploads/2015/06/AdaptNRM_M4_BiodiversityAdaption_screen.pdf

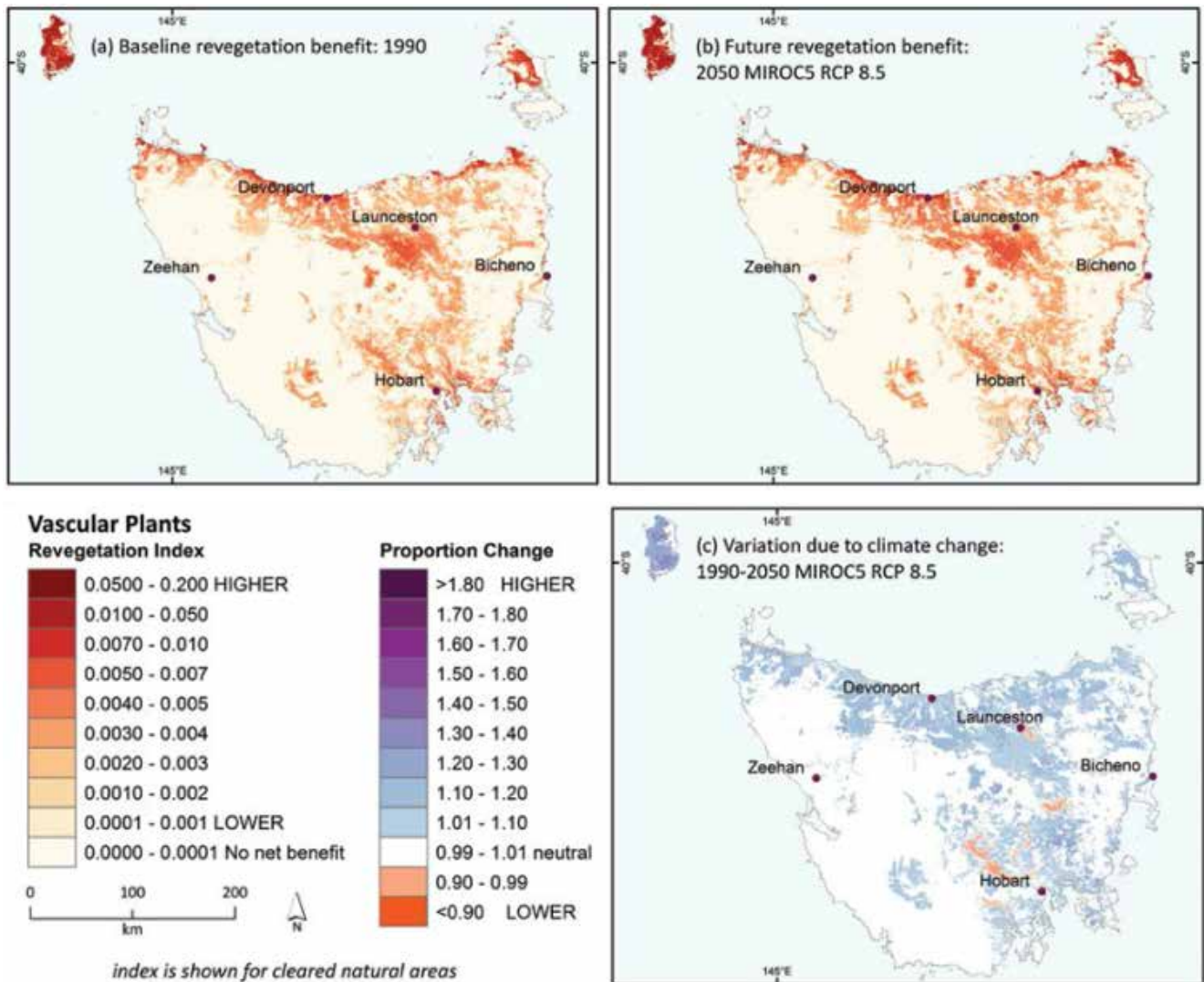


Figure A2: Revegetation benefits in Tasmania

As this is only one component of a multi-criteria analysis that incorporates many different spatial layers, it would be reasonable to think that updating the existing analysis with these new revegetation benefit layers might not yield very different results. However, an exploration of the layers along with an understanding of how the multi-criteria results will generally be used suggests that adding future revegetation benefit could make a small but significant difference.

The original Tasmanian analysis identified limited opportunities for revegetation—riparian buffers in the north-west and a few more substantial areas in the midlands around the margins of irrigation pivots. But our analysis of revegetation benefit for vascular plants, shown below under the high emissions mild MIROC5 climate scenario, suggests that some of the best opportunities for biodiversity benefits in the future exist along most of the north coast. These areas are more important in the future than at present (Figure A2, panel (c)), and the existing Tasmanian analysis suggests there are also localised opportunities for change due to patches of minimal agricultural use and potential for carbon benefits and soil improvement as well.

The NRM groups plan to use the analysis to identify focal areas for more detailed regional analysis, including evaluation of potential landholder uptake of revegetation opportunities. The addition of our future revegetation benefit layer in a revised version of the analysis could help identify additional focal areas worthy of further exploration, like the north coast east of Bridport.

Finally, as these multi-criteria analyses are often constructed using means-ends diagrams, it is worth considering new principles for biodiversity conservation (Section 2 of Module 4) in the context of defining the ‘ends’, and then working backwards to define the means to map/ model them. The Tasmanian approach in general and the specific use of revegetation benefit aligns primarily with the potential new principle of minimising species loss nationally, through prioritising ‘distinctiveness’. If additional new principles are adopted, they should be considered as ‘ends’ and might result in different approaches to a revegetation analysis. For example, if new principles adopted include optimising ecological processes and maintaining key services, additional layers representing landscape connectivity to support species’ movements and ecosystem services beyond soil protection could be incorporated. Explicitly recognising the principles underlying the ‘ends’ can lead to greater clarity about the means needed to perform such analyses to actually benefit biodiversity into the future.

3. Southern Slopes Climate Change Adaptation Research Partnership: A means to an end: a process guide for participatory spatial prioritisation in Australian natural resource management¹¹¹

This project was funded through the Australian Government’s Stream 2 NRM Planning for Climate Change Fund to support NRM planning and implementation. Spatial prioritisation for NRM in Australia aims to support decisions about where scarce resources should be invested to create the best possible outcomes. Many NRM objectives or goals require identification of regions and then localities for such investment. This guide was developed through action research with Tasmanian NRM organisations to help address these types of ‘where’ questions. The report is intended to be a working document for ongoing adaptation and refinement, as the process of spatial prioritisation is an evolving part of NRM planning and implementation. This report is not the final answer, but a waypoint that lays out progress thus far in a key task in adaptive management: knowing where to invest to achieve the best outcomes towards goals.

This guide outlines a process to enable potential use of the Multi Criteria Analysis Shell (MCAS-S) software developed by the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) in prioritising the ‘Where in the landscape’ questions related to natural resource management.

This project identified that it is essential to recognise that spatial analyses are only the start of a much larger process to enable on-ground action in areas of NRM including land management decision-making and environmental projects. Spatial analysis is the starting point from which to start a much larger discussion around priorities, possibility for action and the crucial step of engaging with relevant stakeholders to realise an opportunity for action.¹¹²

It was recognised that the spatial prioritisation process may be implemented for various needs and outcomes that will vary for each assessment and project. The uptake of action, though, ultimately relies on people’s willingness to engage through consultation and negotiation (Figure A3).

¹¹¹ <https://terranova.org.au/repository/southern-slopes-nrm-collection/means-to-an-end-a-process-guide-for-participatory-spatial-prioritisation-in-australian-natural-resource-management>
¹¹² Jacobs et al., 2015, An Adaptive Capacity Guide Book: Assessing, building and evaluating the capacity of communities to adapt in a changing climate. Southern Slopes Climate Change Adaptation Research Partnership (SCARP): UTS, University of Tasmania

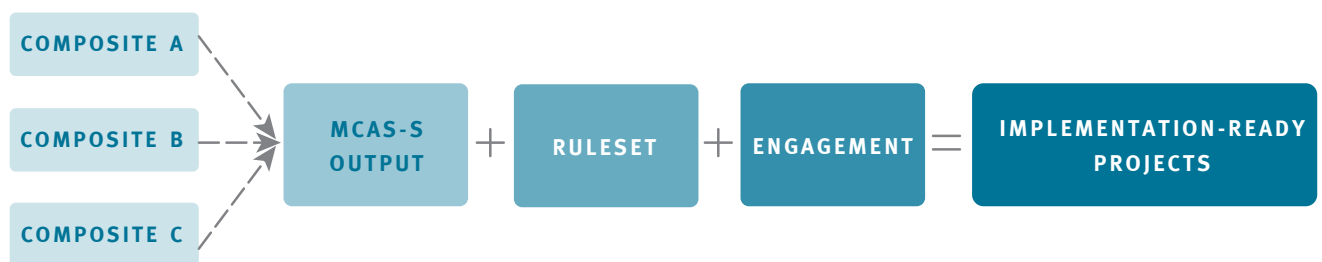


Figure A3: The linkages between key components in spatial assessment

[illegible]

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