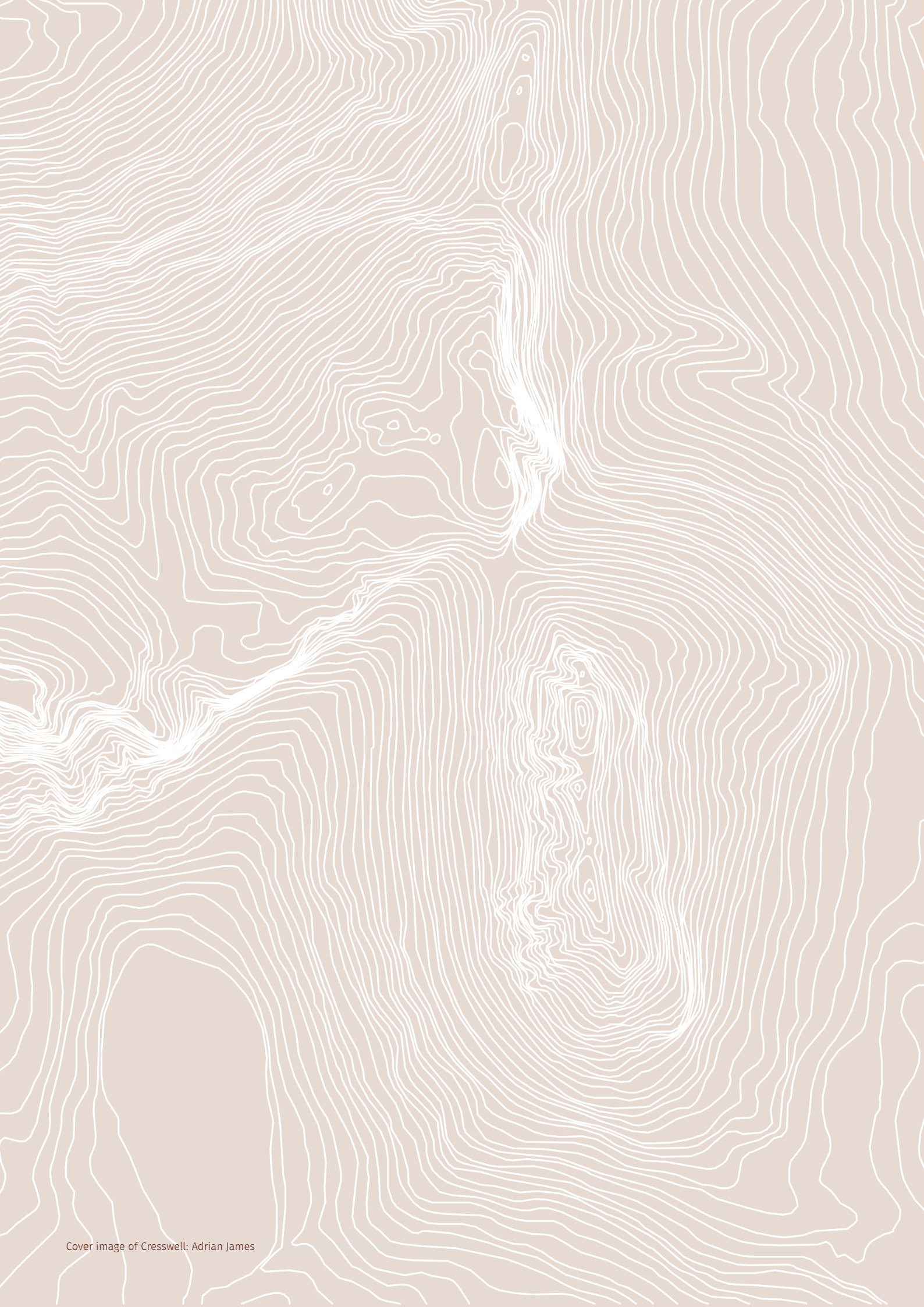
Natural Resource Management

Strategy

Northern Tasmania

2015 –2020



Cover image of Cresswell: Adrian James

Acknowledgements

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Many individuals, organisations, industry leaders and agencies worked with the project team to guide and shape this Strategy. We thank the large number of stakeholder groups, organisations and individual representatives for their valuable feedback and advice. The willingness and generous engagement by the northern Tasmanian community in the development process has helped this Strategy to represent the views and priorities of the region. NRM North was also supported by PDF Management Services and Associates (Resonance Consulting, Climate Planning and Natural Resource Planning) in the development of this Strategy.

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This Strategy was accredited on 23 February 2016.

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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 North.

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

Image: Matthew Butt

Statement to the Tasmanian Aboriginal people from NRM North on behalf of the Northern 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 the islands that make up Tasmania 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.

Contents

About this Strategy

Purpose of the Strategy

The *Natural Resource Management Strategy for Northern Tasmania 2015–2020* (the Strategy) has been developed to establish an integrated framework to facilitate sustainable management of Northern Tasmania's natural resources. Initially launched in 2005, this is the third iteration of the Strategy. It aims to represent the views of the whole community; balance economic, social and environmental objectives; and encourage partnerships between community, industry and government for the betterment of the region's natural resources.

The Strategy does not have statutory power or replace any current mechanism or policy relating to natural resource management, but seeks to build partnerships between stakeholders and develop synergies between planning and management processes. The Strategy identifies the natural, social and economic values of the region's key landscapes and natural resource assets and aims to enable the community to understand the role they can play in natural resource management in Northern Tasmania.

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

Vision

The Vision for natural resource management in Northern Tasmania is:

The Northern Tasmanian community is committed to sustainably managing the region's natural resources for the benefit of present and future generations.

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?

This Strategy uses a 'nested' planning approach to achieve its shared community vision. It takes both a 'top-down' and 'ground-up' approach to considering natural resource issues and identifies how external influences, such as climate change, will influence the management of these.

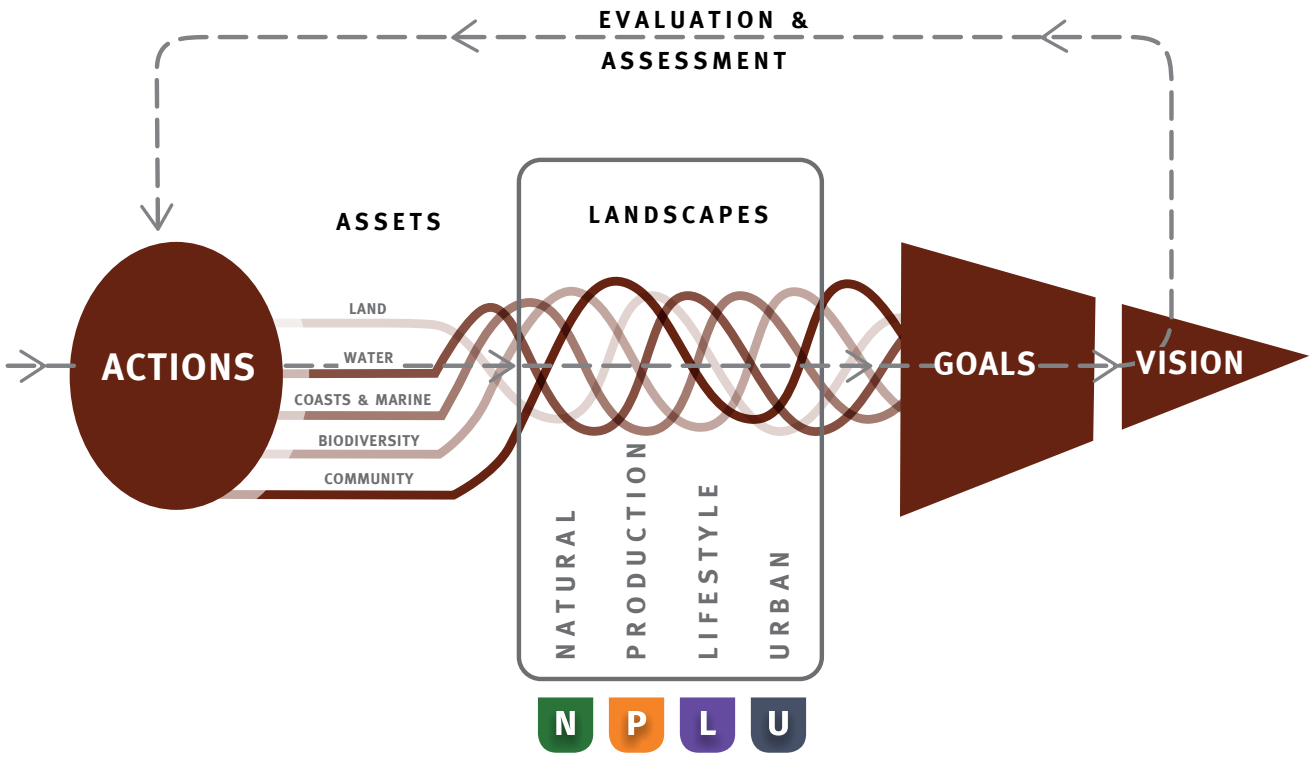
The Strategy takes both a Landscape Approach and an Assets Approach to considering the management of Northern Tasmania's natural resources:

- **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 Northern 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 and work within their regions.

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.

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 Northern 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...
Part 1. Natural Resource Management in Northern Tasmania: Provides context to the Strategy by describing Northern Tasmania's natural resources and the Key Contributors who play a role in managing them.	To gain context about Northern Tasmania's natural resources.
Part 2. Managing Northern Tasmania's Landscapes: 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.	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.
Part 3. Managing Northern Tasmania's Assets: 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.	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.

Parts of the Strategy	Use this section...
Part 4. Targets, Priority Actions and Key Contributors: Sets out the five-year Targets for each asset that are required to realise the long-term goal for each landscape in the region. It identifies Priority Actions that will help achieve each Target and the Key Contributors within the community that have a role to play in achieving this.	To understand how the Landscapes and Assets sections align; to examine and apply the Targets and Priority Actions; and to see the Key Contributors to the management of these actions.
Part 5. Implementation, Assessment, Evaluation and Improvement: Outlines the process for assessing, reviewing and improving the Strategy. This Strategy builds on the achievements of the region's previous strategies, and this section outlines how the Strategy will in turn be reviewed by 2020.	To view and understand how the Strategy can be implemented and how outcomes will be assessed.
Part 6. Strategic Context: Describes how the Strategy was developed including information about previous strategies, consultation and other contextual references.	To gain an understanding of how the Strategy has been developed; how Targets have been derived; and context for the Strategy's development.

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.

What is in this Strategy?

- A Vision for the natural resources and community of the Northern Tasmanian region.
- Descriptions of Northern 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 Targets and Priority Actions.
- Identified Key Contributors required to implement this Strategy.
- How the Strategy will be implemented, assessed, evaluated and improved.
- Consideration and assessment of climate change impacts on the region's assets and landscapes.

What is NOT in this Strategy?

- NRM North's corporate plan or operational plan.
- Comprehensive assessment of local-scale assets.
- Detailed risk and feasibility assessments.
- Detailed resource condition targets.
- Detailed activity planning, budgeting and on-ground works assessment

Strategic context

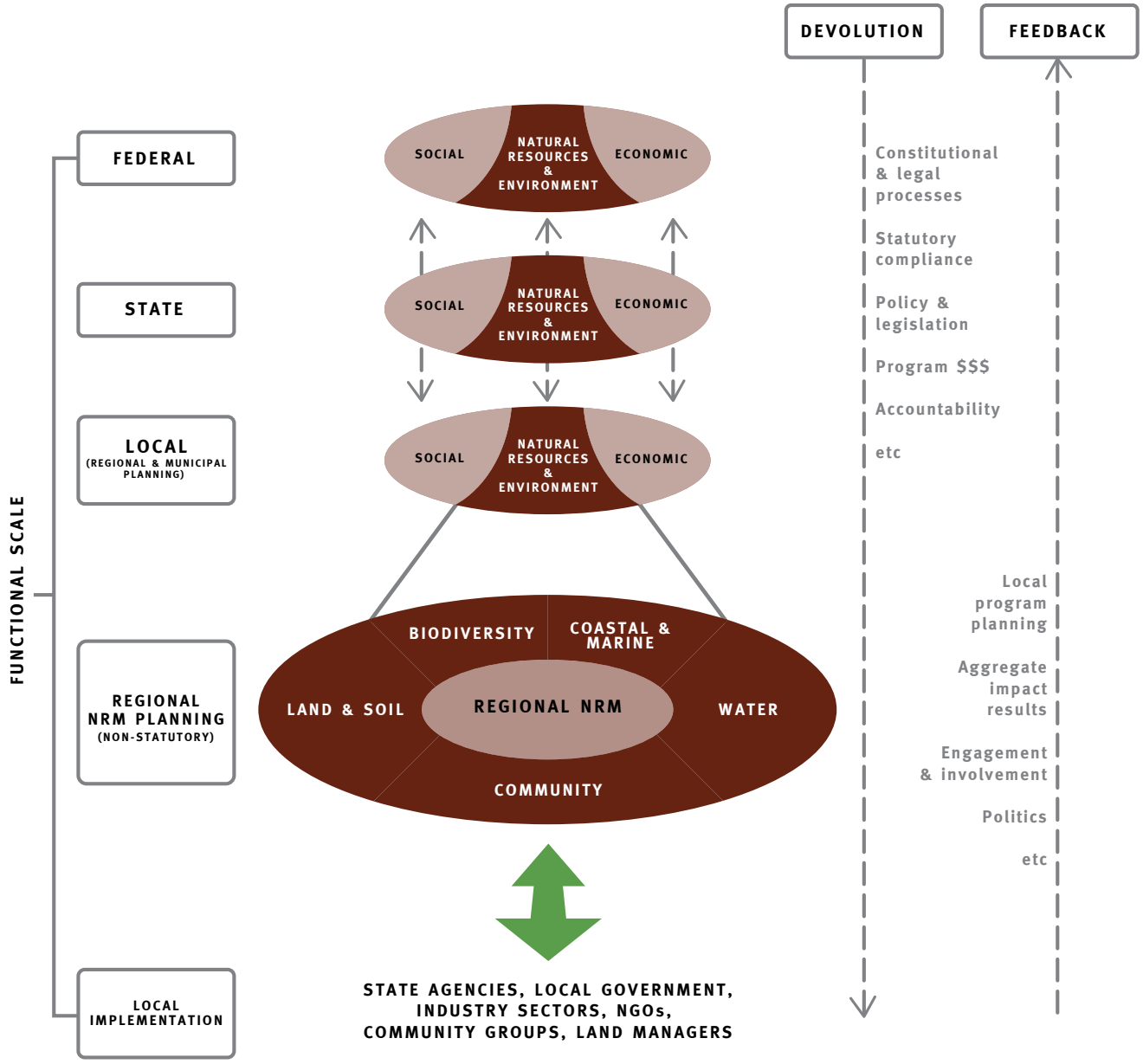
The *Natural Resource Management Strategy for Northern Tasmania 2015–2020* recognises that the health and sustainability of the region's natural environment is highly dependent on its people. It is the people and communities of the region that protect, conserve and provide sustainable management of the region's natural resources—the natural assets on which current and future generations depend for their wellbeing and prosperity.

The Strategy aims to improve the integration of natural resource management across the region, balancing environmental, economic and social objectives, as well as encouraging partnerships between all who seek to achieve this goal.

The figure below (Figure 2) 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.

Image: Duncan Joyce

Figure 2: Strategic context for the Natural Resource Management Strategy for Northern Tasmania 2015–2020[1]



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, viewed 3/8/15 - https://www.academia.edu/974359/10._CIRM_Symposium_Discussion

Image: Joanna Johnston

Natural Resource Management in Northern Tasmania

What is natural resource management?

Natural resource management is the care and management of our land, water, marine, soil and biological systems, with a particular focus on how the management affects the quality of life for both present and future generations. It's about the long-term implications of actions and the social, economic and environmental needs of the future, while supporting immediate needs.

What are Northern Tasmania's natural resources?

The northern region covers 25,200km^2 (approximately 2.5 million hectares) and extends three nautical miles (5.5km) from the coast. It includes the municipalities of Flinders, West Tamar, Launceston, George Town, Dorset, Break O'Day, Northern Midlands and Meander Valley. The southern border of the region is south of the town of Ross, and the western border meets the Cradle Coast region west of Elizabeth Town. The northern region contains a diverse range of significant natural environments and intact ecosystems, and supports numerous industries including agriculture, power generation, mining, forestry, tourism, fishing, aquaculture, recreation and education.

The people of Northern Tasmania are one of its major assets, and the decisions they make contribute to the condition of the region's natural resources. The region's population of approximately 143,000 is concentrated around the Tamar Basin and the city of Launceston, with a number of smaller towns servicing a dispersed rural and coastal community.

Northern Tasmania covers a variety of terrestrial, freshwater, estuarine, coastal and marine habitats, and each contains important flora and fauna species and ecosystems. The region's biodiversity reflects the diversity of landscapes, soils and climate. Terrestrial habitat types include dry forests, woodlands, she-oak forest, wet forests, rainforest, grasslands, and coastal and alpine heathland.

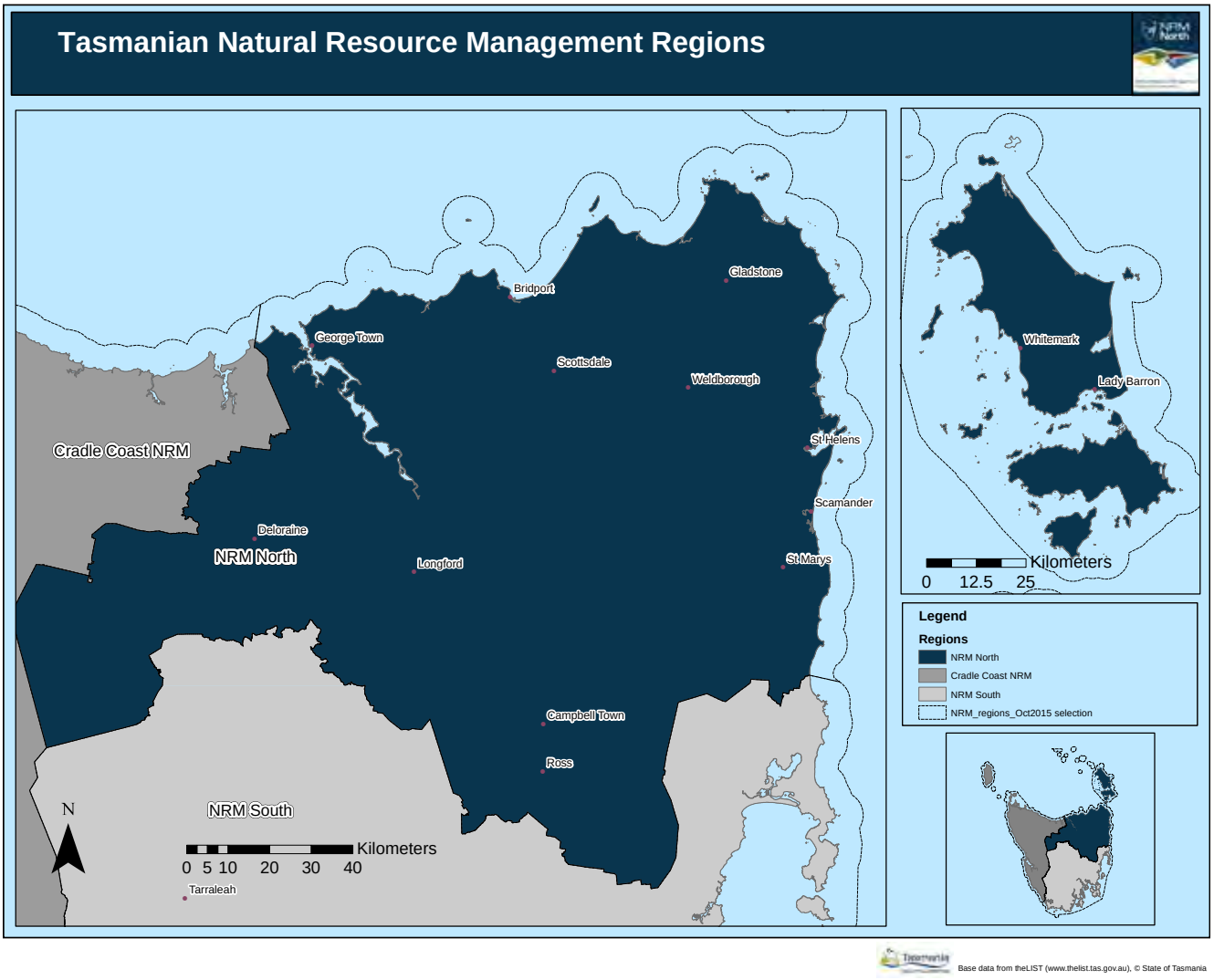
Native vegetation covers approximately 65% of the terrestrial area of the region. Freshwater habitats include the aquatic flora and fauna of inland rivers, streams and wetlands.

The region contains a diverse range of geology, soils and landforms, from the islands of the Furneaux and Kent groups to the karst cave systems around Mole Creek and the rich red soils in Deloraine. The soils of the region provide the basis for much of the land-based primary production and urban settlement. At higher elevations, or on soils with lower fertility, production forestry is frequently the dominant land use. Significant areas of land are held under a number of different reserve types with approximately 3,400km^2 (13.5%) of the region in secure reserves or under conservation covenants, and a further 640km^2 (2.5%) in informal reserves of State Forest.

The coastline of Northern Tasmania extends for over 2,000km and includes offshore islands, low energy beaches, rocky shorelines, sheltered bays and extensive dune systems. Estuarine, coastal and marine habitats support a unique range of important flora and fauna communities including shorebirds and waders, fairy penguins and humpback whales.

Since European settlement, the ecosystems and habitats in the region have been extensively modified, principally by economic activities such as agriculture, urban and industrial development, forestry, mining, hydro developments, fishing and aquaculture, as well as recreational pursuits.

The economic, social and environmental wellbeing of the community is underpinned by the capacity of the natural environment to support our community needs. The diverse range of natural assets presents many unique and challenging opportunities. There is potential for industries such as irrigated agriculture, horticulture, dairy, and tourism, all of which will require careful management in order to maintain a sustainable focus. By working together we can balance economic, social and environmental needs and build a resilient and sustainable future for Northern Tasmania, while maintaining the 'clean green' reputation of the State.



Map 1: Tasmania's Natural Resource Management regions

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.

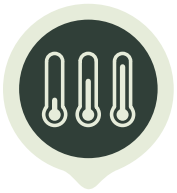
Table 1 (overleaf) summarises climate change projections over the next century under a high emissions scenario. This table has been developed based on the latest climate change projections completed by the CSIRO and the Bureau of Meteorology.[2] It highlights long-term projected trends, although natural variability from year to year is still expected to remain as the dominant factor in the near term.

Additionally, 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 impact resource management, with issues such as free trade agreements shaping how production and urban-based landscapes are managed.

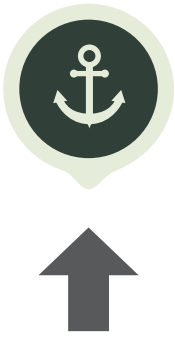
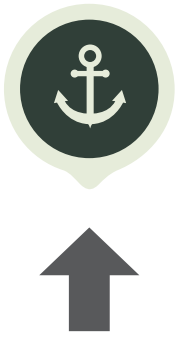
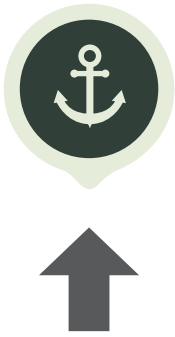
The ability for the community to plan, contribute to and action change is based on capacity, funding and interest in sustainable development and the conservation of key assets. Only through research, education and collaborative action will the regional natural resources of Northern Tasmania be sustainably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

2 Australian Government - http://www.climatechangeinaustralia.gov.au/en/

Table 1: Climate change projections over the next century under a high emissions scenario[3,4]

	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.

3 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 3 relates to the information provided for temperature through to sea level.
4 Poloczanska, ES, Hobday, AJ and Richardson, AJ (Eds), 2012, Marine Climate Change in Australia, Impacts and Adaptation Responses, 2012 Report Card. Please note footnote 4 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 Northern Tasmanian community

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

For many years, activities have been carried out by people who have wanted to resolve the region's natural resource management problems, including some caused by past natural resource management practices and others by the introduction of plants and animals which are now considered pests.

Communities have formed 'care' groups, developed plans and carried out on-ground works to improve the management of the region's natural resources, with the assistance of technical and policy support from local, state and federal government agencies. All of the eight councils in the northern region have undertaken large-scale projects to address natural resource management issues. NRM North acknowledges the value of this work.

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

- Australian, Tasmanian and local government
- NRM North
- 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 North's role

NRM North, through its committee, has legislative responsibilities for planning, delivering, and implementing integrated natural resource management in Northern Tasmania. NRM North was established in March 2003 through a community-driven process in response to the Tasmanian Government's Natural Resource Management Framework and its enabling legislation, the *Tasmanian Natural Resource Management Act 2002*.

Building on the achievements of the last twelve years, NRM North will continue to work with and support the key contributing groups while engaging and empowering the region's broader community to integrate this Strategy into policy and planning, and support implementation of the Strategy through:

- Providing leadership to ensure the continuation of sound management of the region's natural resources;
- Developing programs that recognise the need to balance the environmental, economic, and social needs of the people of the region; and
- Promoting partnerships with all stakeholders to determine appropriate investment and cost-sharing arrangements including leveraging investment to support implementation from external sources.

Managing Northern Tasmania's Landscapes

A landscape management approach

Northern 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.

The term 'landscapes' refers to the interconnection between our environment, lifestyles and economy. Throughout consultation to develop this Strategy, community members highlighted their strong connections to the region's landscapes.

The four broad landscape categories are:

1. Natural Landscapes

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

N

2. Production Landscapes

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

P

3. Lifestyle Landscapes

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

L

4. Urban Landscapes

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

U

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 provides:

- **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.
- **Values:** 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 landscape 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 minimal, direct human impact.

Within the region, Natural Landscapes range from alpine areas to coastal zones and terrestrial, aquatic and marine habitats. Natural Landscapes are valued for their vegetation communities, wildlife and geological history. The region's vegetation communities include rainforests, wet eucalypt forests, buttongrass plains, alpine moorlands, swamp forests, coastal heathland and saltmarsh. These create habitats for the region's unique range of flora and fauna species.

The region's Natural Landscapes are highly valued by the community for their recreational and tourism values, and more significantly for the sense of place that they instil that characterises the very nature of Tasmania.

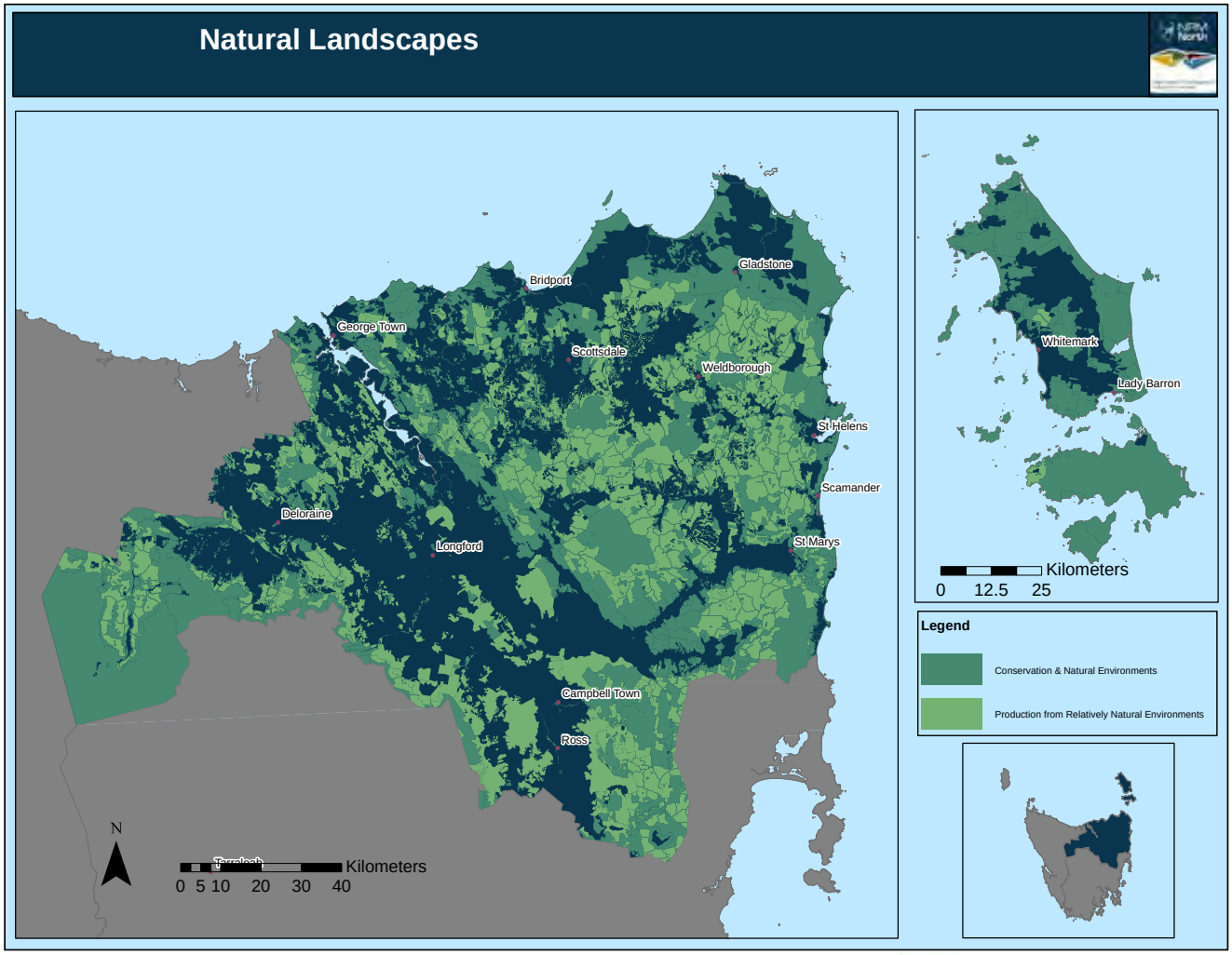
About Northern Tasmania's Natural Landscapes

- The region's Natural Landscapes encompass approximately 60% of the area based on land areas classed as natural or near-natural land uses (Map 2).
- Reserves for conservation on private and public land account for 33% of the region's land area with a further 29,000ha in the Kent Group Marine Reserve.
- Extending more than 2,000km, the region's coastline is predominantly a Natural Landscape with minimal development.
- Natural Landscapes support biodiversity values, ecosystem services, cultural heritage, and geological conservation values that remain intact and are not adversely impacted by development.
- A significant proportion of Natural Landscapes overlap with Production Landscapes due to grazing and forestry activities (approximately 25% of the region).

Image: Leanne Sherriff

GOAL

The character and function of the region's Natural Landscapes are maintained to support the community and ecological values that they provide.



Map 2: Northern Tasmanian Natural Landscapes

Landscape value

Social value

- The region's Natural Landscapes are valued highly by the community for their intrinsic values: the way they characterise the nature of Tasmania and the sense of place that instils.
- There is increasing demand for access to nature-based recreational opportunities, such as mountain bike trails, camping and day-use facilities, game hunting and recreational fishing.
- Tasmanian wilderness and Natural Landscapes have recognised iconic value, symbolising the clean green image that is synonymous with Tasmanian produce.
- Cultural values are found in Indigenous cultural and landscape sites, such as the buttongrass plains, coastal plains and shorelines.
- Tasmanian Aboriginal people have a strong relationship with the land and a spiritual connection with place. Their long custodianship has shaped the Natural Landscape, for example, patterns of vegetation communities have been shaped by the strategic use of fire.[5]

Economic value

- The region's growing tourism sector is based on nature and wilderness experiences supporting economic activity and employment for the region.
- Natural Landscapes contain large areas of the water catchments that support hydropower generation, as well as providing water supplies for urban and irrigation purposes.
- Forestry and grazing activities in Natural Landscapes provide significant economic activity.
- Natural Landscapes are a key marketing point for Tasmanian produce, lifestyles and tourism.

5 DPIPWE, 2013, Natural Heritage Strategy for Tasmania 2013–2030: Securing our natural advantage, Tasmanian Government, Hobart, Tasmania

Landscape value

Conservation value

- Parks and reserves of local, national and international significance cover one-third of the region's land area, extending more than 6,500km.[6]
- Almost 50% of the region's natural vegetation is contained within World Heritage areas, national parks and reserves, and conservation covenants on private land.
- The region contains one of Australia's 15 biodiversity hotspots—the Midlands Biodiversity Hotspot Area (MBHA).[7]
- Offshore islands provide a significant role as biodiversity refuges for terrestrial species, and breeding grounds for seabirds.
- Wetland areas in the region include five Ramsar-listed wetlands (Logan Lagoon, Flyover Lagoon, Jock's Lagoon, Little Waterhouse Lake and the Chimneys), 44 Directory of Important Wetlands Australia (DIWA) wetlands and 94 wetlands that are regarded as important, but are not included on existing listings. The majority of these wetlands or their catchments are located within the region's Natural Landscapes.
- Significant areas of remnant native forest and shrub lands occur on unreserved public and private lands. Much of the region's extensive coastline remains undeveloped and is valued highly for its biodiversity and lifestyle values.
- Natural Landscapes support diverse and significant coastal wildlife, including migratory shorebirds and waders that stop over on Tasmanian wetlands, and shorebird species that nest on more remote beaches.[8] Some of these species are now rarely seen on mainland Australia.
- Significant coastal and marine communities include coastal wetlands and saltmarsh communities, seagrass beds, kelp forests, coral sponge gardens and high numbers of endemic species.

Influences

Habitat loss, modification and condition decline

- The loss of and decline in habitat quality is a clear threat to our Natural Landscapes.
- The impacts of past settlement patterns, clearing, overgrazing, inappropriate timber and flora harvesting, changed fire regimes, and salinity in and around our Natural Landscapes have led to changes to the type and composition of species and ecological communities, and fragmentation of habitat at varying scales.
- Limited recognition of the social and economic values of Natural Landscapes, ecosystem services, and the potential for land management conflicts of surrounding land use in landscape and property planning processes have caused issues.
- Fire management is critical to the condition of the Natural Landscape. Inappropriate use of fire is listed as a generic threat to threatened species,[9] and considered a threat to natural values more widely.

6 ibid.
7 Australian Government - https://www.environment.gov.au/biodiversity/conservation/hotspots/national-biodiversity-hotspots
8 DPIPWE, 2010, Tasmanian Coastal Works Manual: A best practice management guide for changing coastlines
9 DPIPWE, 2013, Natural Heritage Strategy for Tasmania (2013–2030): Securing our natural advantage

Influences

Land-use change and intensification

- Incremental loss of habitat areas contributes to fragmentation of Natural Landscape values, particularly at the local level.
- Key considerations include:
  - Expansion of urban and peri-urban development;
  - Intensification of agriculture, particularly in association with irrigation development and introduction of new agricultural enterprises to areas that were previously considered marginal for cropping;
  - Increased recreational use and development; and
  - Increased tourism visitation and the development of associated infrastructure.

Invasive species and diseases

- The region is host to a wide range of environmental weed species[10] and introduced animals that impact on Natural Landscapes. These include fallow deer, cats and foxes. Impacts include modification of habitat and predation and out-competing of native species.
- Invasive species in the marine environment pose significant threats for the Natural Landscapes such as through translocation of species and pathogens between harbours via boat traffic.
- The root rot fungus *Phytophthora cinnamomi*[11] is a problem in some areas, particularly 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.
- Although Tasmania's island status provides some protection from the incursion of weeds, pests and diseases, the threat of new incursions does exist. Discovery of myrtle rust in 2015 is an example which highlights the region's vulnerability to diseases that may have unknown consequences.

Fire management

- Fire is a natural component of the landscape that has shaped distribution of vegetation communities and influenced some geological processes. The occurrence and management of fire is critical to the condition of the Natural Landscape.
- Inappropriate use of fire is listed as a generic threat to threatened species,[12] and is considered as a threat to natural values more widely, particularly in fragmented landscapes.
- Altered fire regimes outside the bounds under which species and ecosystems evolved are likely to be detrimental to those species and ecosystems.
- Catastrophic loss of vegetation from catchments as a result of wildfire can lead to increased potential for erosion, further impacting landscape and water catchment values and uses.

10 Cronin, SJ, 2004, Weed Management Strategy: Northern Natural Resource Management Region Tasmania, updated 2012
11 *Phythophthora* spreads via soil and water. People spread *Phytophthora* when they move infected soil or root material into an area. For example, infected material could be on: earthworking machinery, boots and clothing worn by walkers and other people going to an area, the tyres and body of vehicles, and stock and wildlife.
12 DPIPWE, 2010, Vulnerability of Tasmania's Natural Environment to Climate Change: An overview

Possible futures

Response to climate change

- Climate change is predicted to have a significant impact on our Natural Landscapes including effects from sea level rise and key changes to species type and composition.
- Modelled responses of terrestrial vegetation to climate change indicate that, while the degree of change expected in Tasmania is less in comparison to much of Australia, changes to the composition of our Natural Landscapes are still expected.
- Projected rise in sea level and changes in the marine environment relating to temperature and acidification will affect the coastal and marine components of Natural Landscapes. Loss of habitat for shorebirds through inundation from sea level rise and storm surges, accelerated coastal erosion and increasing prevalence of warm water species in the marine environment are some of the potential impacts.
- There is high confidence that climate change will result in a harsher fire weather climate in the future, although the impacts will depend on seasonal variation and rainfall. This will amplify fire management concerns and may lead to:
  - More areas burnt annually by wildfires resulting from an increased frequency of severe fire weather days;
  - More areas burnt in systems that have a low tolerance of fire, such as rainforest, alpine vegetation and organic soils;
  - Reduced inter-fire intervals in fire-adapted vegetation such as dry forest and heathland, as a result of the increased total area burnt, and increased frequency; and
  - A reduced period for land managers to conduct fuel reduction burns in safe conditions.
- There is high confidence that climate change will result in a general shift southward of suitable ranges for invasive species at a national scale. This will increase potential for new introductions to the region (and State) to become established. At a state scale, modelling[13] has identified a general trend of weed ranges expanding to inland areas and higher altitudes as temperature conditions warm into the future.
- An increase in extreme events influenced by climate change (e.g. fire, drought and flood) may favour establishment of invasive pests.
- Changes in rainfall are likely to decrease *Phytophora* prevalence in areas of lower annual rainfall. Higher temperatures may cause disease expression at higher altitudes than at present.
- The combined impacts of climate change on Natural Landscapes will bring potential for changes to the composition and distribution of the ecological communities they contain. Impacts of climate change on Natural Landscapes are subject to a high degree of uncertainty, but are expected to see the expansion of some, retraction of others and the emergence of new 'novel' ecological communities over time.
- Greatest areas of expected change include: alpine areas; the north-eastern corner of the region including the Furneaux Islands and Natural Landscapes in the Dorset and Break O'Day municipalities; and the coastal shorelines and associated wetlands and estuaries impacted by inundation and accelerated erosion.

13 Refer to AdaptNRM Weed Module - http://adaptnrm.csiro.au

Possible futures

Development pressure

- Further development in and around our Natural Landscapes may exacerbate the threats imposed in those areas.
- Intensification of uses for social and economic outcomes is expected to continue in Natural Landscapes. The region's north-east has seen significant investment in development of recreation and tourism infrastructure (bike and tourist trails) and increasing interest in capitalising on tourism opportunities presented by the natural values of the region.
- A key to minimising these impacts is through appropriate consideration of the resulting threats and planning for ameliorating these.

Focus for action

- Strengthen partnerships for collaborative management of Natural Landscapes at a landscape scale.
- Implement management plans for the Natural Landscapes such as the TWWHA Management Plan and Reserve Management Plans.
- Prioritise actions to maintain or enhance the biodiversity refuge value and integrity of seabird breeding on islands.
- Support continued development of landscape planning protocols for forestry and whole-farm-planning processes in the grazing sector that incorporate management of natural values.
- Promote development and implementation of monitoring mechanisms for native species and ecological communities. Monitoring species composition and change will become increasingly significant to identify adaptation options and respond to new pressures. Areas of greatest expected change should receive focussed attention.
- Ensure planning instruments recognise and, where possible, ameliorate potential threats to Natural Landscapes' values.
- Support planning and policy frameworks and collaborative approaches for management of invasive pests and pathogens.
- Manage the impacts of significant vertebrate pest animals through implementation of programs such as the Fox Eradication program, Gambusia Eradication program and establishing appropriate programs for cat management.
- Support the implementation and dissemination of hygiene protocols to prevent incursion and spread of invasive pests and pathogens.
- Build community awareness (including that of land managers, tourism operators, and recreational users) about Natural Landscape values and appropriate use and management (including cultural heritage assets).
- Reduce barriers to appropriately manage Aboriginal heritage values, such as through facilitating identification and supporting actions to avoid damage.
- Ensure fire management planning processes and prescriptions support maintenance of biodiversity values, while protecting community safety, built assets and geodiversity values.

P

2. Production Landscapes

Definition

Production Landscapes are those areas that have been modified for broader-scale primary production 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.

The region's Production Landscapes are a key economic driver within Northern Tasmania. Agricultural production in the region contributes approximately 38% of the total value of Tasmanian agriculture and provided $446 million to the local economy in 2012-13.

Agricultural production is the predominant land use in the region occupying 25% of the region (495,600ha). While many properties continue to rely principally on grazing, expansion of irrigation over recent years has increased the number of new enterprises based on intensive irrigated cropping or dairy farming. High value viticulture and horticulture are also expanding.

Forestry, including native and plantation forestry on private and crown land, occupies 16% (315,000ha) of the region's land use and is a significant contributor to the region's economy. Horticulture and viticulture are well established in the region with thriving orchard and viticulture enterprises. Hydro-electric power generation is significant, while wind farm development is currently underway in the north-east of the region.

About Northern Tasmania's Production Landscapes

Production Landscapes dominate the region, accounting for approximately 62% of the region's land area (Map 3). The region supports industries focussed on agriculture, forestry, aquaculture and fisheries, mining and quarrying, and renewable energy generation. Production Landscapes overlap significantly with other landscapes, particularly Natural Landscapes, with grazing and production forestry from near-natural environments accounting for a quarter of the region's land use.

The region's soils provide the basis for much of its land-based primary production and have influenced urban settlement patterns. At higher elevations, or on soils with lower fertility, production forestry is frequently the dominant land use, particularly in the eastern half of the region and the slopes of the Great Western Tiers. Land-based Production Landscapes are established on a mosaic of soils ranging from the rich red soils used for intensive agriculture in areas such as Deloraine and Scottsdale, to the stony, dolerite hill soils commonly supporting native pastures and fine-wool production.

There are 1,400 agricultural businesses in the region.[14] While many properties continue to rely on grazing, expansion of irrigation development during recent years has increased the number of new enterprises based on intensive irrigated cropping or dairy farming, which traditionally occurred predominantly in higher rainfall areas. Development of high value and niche markets including horticulture crops (e.g. export cherries, truffles, wasabi), expansion of the viticulture industry, and growing demand for aquaculture products have been of increasing interest in recent years and may benefit further from access to secure irrigation supplies.

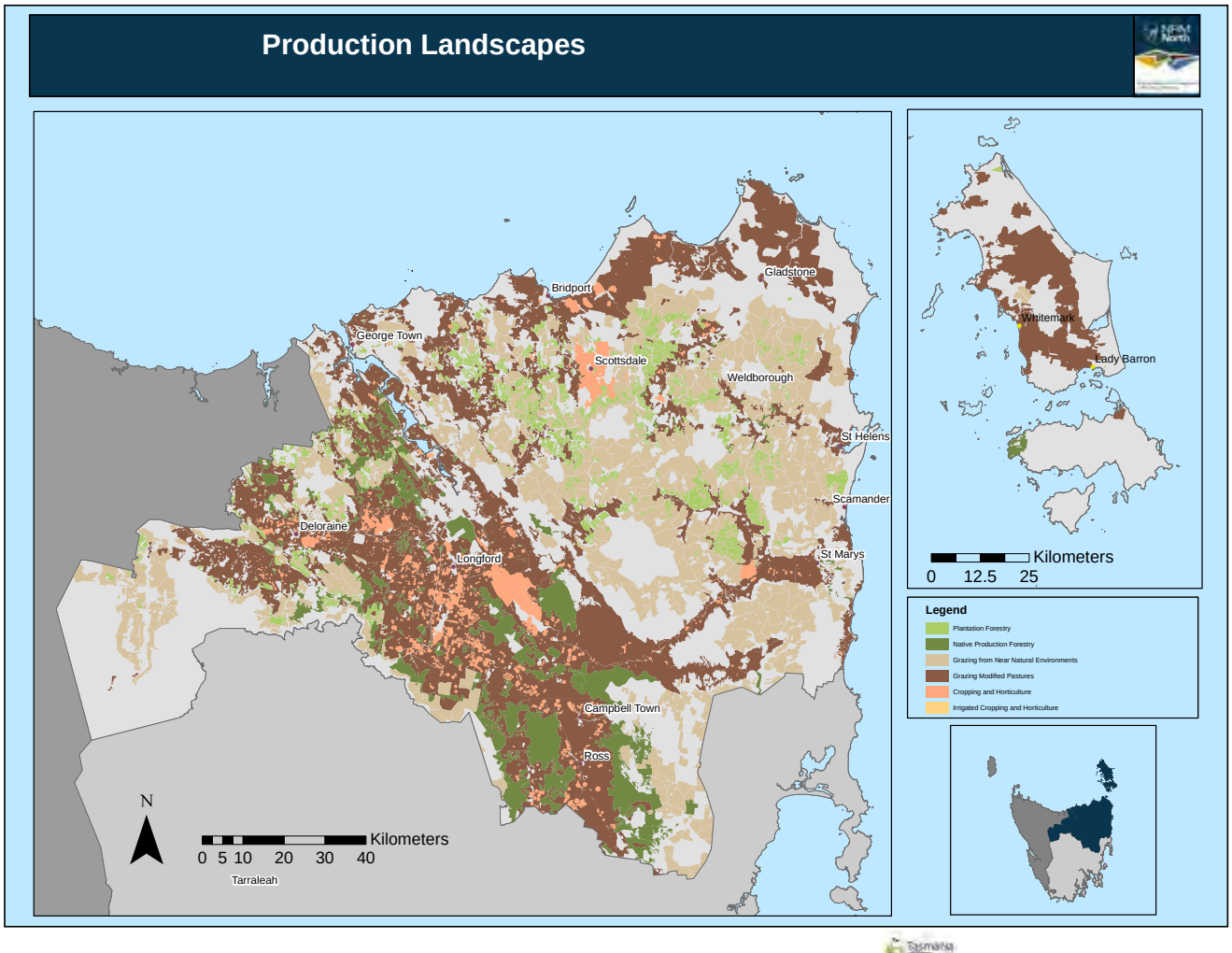
14 Australian Bureau of Statistics, Sept 2013, 71210DO003_201112 Agricultural Commodities, Australia, 2011-12

Forestry is a significant industry in the region, consisting of native forest wood production, plantation eucalypt, plantation softwood and smaller quantities of speciality timbers. As such, forestry occurs in landscapes ranging from highly modified agricultural production areas to near-natural landscapes.

Tasmania is Australia's largest aquaculture producer, with 45% of Australia's total production. The region contributes significantly to Tasmania's aquaculture with shellfish production the predominant enterprise.

GOAL

To maintain healthy Production Landscapes and seascapes, which underpin the region's productive economic values, while recognising the need to ensure sustainable development and intergenerational equity for the future.



Map 3: Production land use of the northern region

P

Landscape value

Social value

- The region's Production Landscapes contribute significantly to the region's lifestyle and employment.
- Primary production and related downstream processing and support industries are major employment sectors within the region. Food and agribusinesses in the region contribute to 29% of the State's total employment in these sectors.[15]
- Many of the region's urban centres have strong traditional ties to primary production (agriculture, forestry and fishing) that was established over generations and is a key reason for their settlement.
- Cultural landscapes demonstrate the change in landscape management practices over time, ranging from buttongrass plains evolved through the management practices of Indigenous Tasmanians to European pastoral landscapes found in the Northern Midlands.
- Activity within the Production Landscape provides social and economic value to regional communities through infrastructure development (regional centres, schools, health services), business development (allied businesses such as agronomy and agricultural service industries) and direct employment opportunities.

Conservation value

- The region's Production Landscapes have significant areas of high conservation value land, biodiversity, water and coastal assets. The landscapes within this category range from near-Natural Landscapes used for grazing and forestry to highly fragmented areas where land is farmed intensively (usually in valleys and lowlands).
- The Northern Midlands is recognised as a biodiversity hotspot due to the high levels of endemism and species diversity within native grasslands and woodlands, many of which are used for agricultural production.
- There are sites of geo-conservation significance across the region including karst and aeolian landscapes and groundwater-dependent ecosystems.

Economic value

- Forestry remains a significant component of the region's economy. Tasmanian forest-based industries contribute to the economy through forestry operations and related processing.
- In 2012-13 the gross value of Tasmanian fisheries production was estimated at $695.9m: 75% through aquaculture activities and 25% through wild capture fisheries. Tasmania contributes 29% to Australia's total fisheries production.[16]
- The gross value of agriculture production in the region for 2011-12 was $468.9m, approximately 38% of the State total.[17]
- Related downstream processing and support industries further contribute to economic activity.

15 Department of State Growth, 2014, Sector Summary 2014: Food & agriculture
16 Department of Agriculture, 2015, Agriculture, Fisheries and Forestry in the South East region of Tasmania
17 ABS, 2013, 75030DO003_201112 Value of Agricultural Commodities Produced, Australia, 2011-12

Influences

Land-use change and intensification

- Soil health fundamentally underpins much of the region's agricultural production and is also important for aspects of biodiversity and carbon sequestration and storage.
- Production land uses, particularly intensive uses which are increasing in the region, have the potential to adversely affect soil assets and the services they provide; these land uses need to be carefully managed and monitored.
- Management of vegetative cover is a significant issue due to its important role in a wide range of soil and land issues. These relate particularly to its role in preventing soil erosion and land degradation, catchment-scale impact on hydrology, maintaining soil health and productive capacity, and as a key tool in managing and restoring areas subject to past damage. Vegetation cover will also be important in helping manage extreme events such as drought or rainfall events, irrespective of whether they arise from 'natural' causes or as a result of climate change.
- Management of freshwater systems was identified through consultation as a key management issue, with a particular focus on water quality. Land management practices are an important part of improving water quality both at a total catchment scale and in individual sub-catchments. Restricting stock access to waterways and maintaining effective vegetated buffers can address some of these issues while also benefiting biodiversity values.
- Poor and inappropriate management practices can degrade, damage or destroy Indigenous cultural heritage values.

Economic development

- Production Landscapes have been created as a result of the conversion of natural resource assets to commodities and products of a tradable value. The focus of production continues to fluctuate on the basis of demand and capacity to supply.
- The reputation of high quality produce and the 'clean, green' image synonymous with Tasmanian produce provide significant competitive advantage to the region, making it reliant on maintenance of those natural resource assets that support production.
- Improving economic capacity is a key agenda for Production Landscapes, with significant investment from government and industry supporting expansion in irrigation development.

Invasive pests and pathogens

- The region is host to a wide range of weed species and introduced animals that impact on Production Landscapes.
- The potential for introduction of other pathogens is high with recent incursions of blueberry rust highlighting the region's vulnerability to diseases.
- Pest vertebrate species in the region contribute to loss of production by contributing to grazing pressure (e.g. deer, rabbits), spreading diseases (e.g. cats), and damaging crops.
- The potential for introduction of new invertebrate pests remains high with threats such as Queensland fruit fly a high risk to the region's production systems.

P

Possible futures

Response to climate change

- Risks to some aspects of soil function are increased by climate change, particularly erosion and soil carbon reduction under extreme conditions.
- The threat of extreme climatic events has the potential to greatly influence Production Landscapes. Flooding from intense rainfall events at a local and regional level is a recognised risk that may increase under changing climate and rising sea levels.[18]
- There may be increased potential for agricultural production in some areas as temperatures change, with opportunities for new crops that prefer a warmer climate, resulting in land-use change or intensification in those areas.
- Establishment of carbon markets may provide for carbon sequestration opportunities focussed on soil and vegetation. 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 in Production Landscapes. Consideration of these benefits on a site-by-site basis has the potential to increase productivity.
- Rising temperatures are a concern for some commodities. Atlantic salmon are already cultured at the upper end of their temperature tolerance in the region. Prolonged hot periods have caused problems in the past and exemplify the industry's vulnerability to rising water temperatures.
- 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.

Opportunities

- Currently there is limited scope for agricultural expansion as agricultural production already occupies a majority of the highly productive soils. Warmer temperatures may increase the area of land that is suitable for agricultural production.
- The State's wild fisheries resources are fully utilised. Fishing activities are highly regulated and management plans are already in place for Tasmania's major wild fisheries.
- All areas of marine and estuarine waters available for marine farming are currently developed, or have plans in place for future development. Three marine farming development plans are currently operating within the region: Tamar Estuary, Georges Bay and Furneaux Islands.
- Tasmania's forestry sector has faced challenges from a high Australian dollar and changes in forest product markets. These challenges are ongoing and the Tasmanian Government is committed to rebuilding the industry.
- Increasing demand for sustainably-produced food (both globally and domestically) and shifting consumer preferences for regionally-identifiable food can capitalise on the region's environmental credentials.
- Greater water security through irrigation development will enable access to areas where water availability was the limiting factor to agricultural production, intensification and diversification.

18 The Antarctic Climate & Ecosystems Cooperative Research Centre, 2010, Impacts on Agriculture

Possible futures

Opportunities continued

- Opportunities may arise from carbon farming through soil carbon management, re-afforestation, opportunities in processing of woody biomass (including biofuels and bioenergy) and greater acknowledgement of the role the forestry industry can play in carbon sequestration.
- Potential improvements in farming management practices including crop and pasture selection, nutrient application, soil-tillage practices and irrigation can result in significant economic efficiencies in addition to providing environmental outcomes.
- Periods of land-use and land-practice change provide opportunities to incorporate and strengthen natural resource management principles as part of planning and management processes.

Focus for action

- Build on planning and community capacity to take advantage of emerging markets and production opportunities.
- Build on and support programs and initiatives aimed at improving productivity, profitability and increasing adoption of best-practice environmental management in Production Landscapes.
- Build on existing collaborative partnerships to support collective planning and action to manage natural assets in Production Landscapes.
- Increase adoption of sustainable management practices with a particular focus on riparian and land management practices, water quality and ecosystem health, both at a total catchment scale and in individual sub-catchments.
- Raise awareness, increase education opportunities and improve extension services for research outputs to be adopted.
- Reduce barriers to appropriately manage Aboriginal heritage values, such as through facilitating identification and supporting actions to avoid damage.
- Integrate natural resource management principles and climate change into land-use planning and decision-making to ensure that trade-offs between further development and natural assets are recognised and accounted for.

L

3. Lifestyle Landscapes

Definition

Lifestyle Landscapes are peri-urban, fragmented and generally modified areas. They make up the non-income or supplementary income-generating sector of land management and are dominated by peri-urban and rural residential developments.

About Northern Tasmania's Lifestyle Landscapes

Lifestyle Landscapes are those land areas where the landscape has in general a high proportion of small (1ha) to medium size (200ha) properties. Land management may have orientation towards production or conservation, with a primary focus on the 'lifestyle' preferences of the landowners.

Reliance on off-farm income is typical of Lifestyle Landscapes, although the spectrum may include agricultural activity at the sub-commercial or hobby scale to no agricultural activity.

Lifestyle Landscapes tend to be concentrated within daily commuting distance to urban centres with a large contingent in the Tamar Valley and in the near surrounds of the region's rural centres. There are also numerous communities beyond typical commuting distances that identify themselves as lifestyle land users, including concentrations of 'shacks' and weekend blocks in many of the region's coastal areas and inland lakes.

Lifestyle Landscapes are primarily within private ownership and intersect with all other landscapes.

Northern Tasmania has become a popular destination for people undertaking tree-change/sea-change lifestyle moves. High property turnover and a lack of previous land management experience are common features of the landscape that pose significant challenges in maintaining land manager knowledge and capacity to undertake relevant land management practices.

GOAL

The region's Lifestyle Landscapes will maintain the values for which they were settled.

Landscape value

Social values

- Social values within Lifestyle Landscapes vary widely. Common elements include solitude, strong community affiliations, tranquillity, self-sufficiency and sense of place. These landscapes are valued highly as refuges from the hustle and bustle of the urban environment, with an emphasis on 'living to work', rather than 'working to live'.
- Land management practices are varied and driven largely by landholder preferences ranging from conservation to small-scale production and self-sufficiency.

Conservation values

- Many Lifestyle Landscapes contain significant conservation values that vary, largely depending on their location and previous land use. Some areas have retained many of their natural values while others are highly degraded.
- Vegetation retention in Lifestyle Landscapes is variable, ranging from contiguous to highly fragmented. Retained vegetation provides significant landscape value as links between Natural Landscapes and habitat for a wide range of species.
- Many coastal areas are being developed and require focus to maintain important local conservation values such as saltmarsh and coastal habitats that support priority species and plant communities.
- Retention of riparian vegetation in many areas has maintained ecosystem services, biodiversity, water quality and ecosystem health.

Economic values

- The expansion of smaller niche production systems in Lifestyle Landscapes supports economic outcomes for the region with particular focus in those areas with higher concentration of opportunity such as the Tamar Valley food and wine trail.
- Tourism-related income is also supported in Lifestyle Landscapes through the development of farm stay and holiday-based accommodation.
- Increased demand for land for lifestyle (amenity) reasons can increase the value of the land above that which can be paid for purely agriculture.

L

Influences

Land-use 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.
- Catchment studies in 2009 found that high proportions of landowners surveyed in what were traditionally agricultural landscapes did not identify themselves as farmers, suggesting a lifestyle focus. The proportion of non-farmers varied from 85% in Quamby Brook catchment to 24% in the Macquarie catchment.[19]
- Land-use intensification, whether production-based or housing, leads to increased point source and diffuse sources of pollution which pose threats to the health of natural resource assets within Lifestyle Landscapes.
- Incremental loss through 'parkland' development of small acreages and vegetation modification for bushfire protection can contribute to further potentially irreversible landscape fragmentation and loss of habitat values.
- Expansion of the Lifestyle Landscape can lead to conflict with surrounding land uses e.g. some typical farming and forestry management practices are perceived as inappropriate in more densely populated areas (e.g. weed spraying, forestry burn-offs).

Management practice

- Lifestyle Landscapes are characterised by a unique and complex set of interacting factors, which increase the difficulty of meaningfully engaging and building capacity in natural resource management. These factors include population growth, development over smaller lot sizes, increased diversity of landholders (interests, values, environmental awareness and capacity) and relatively short property turnover periods.
- Lifestyle landowners balance property management responsibilities against the time required to commute to work, their work commitments, and a host of family, social and recreational choices. Time and financial resources to undertake property management tasks, and time to gain the necessary knowledge of natural resource management, are often impaired.
- Expansion of Lifestyle Landscapes and rapid turnover of landownership have contributed to insufficient experience, skills and knowledge for land managers. As a result, they are not able to undertake appropriate planning and management for natural resource management, leading to adverse outcomes.
- Conversely, many landowners in these landscapes, particularly new landowners, have a strong sustainability focus and a willingness to dedicate their own resources to improving the condition of natural resources on their land, if provided with appropriate information and support.
- Human life and property protection are priorities in fire management. These can affect amenity values of Lifestyle Landscapes and conflict with management ideals for natural values.
- Lifestyle Landscapes are subject to impacts of invasive species, pests and diseases through the modification of natural areas and the introduction of species not previously present, such as escaped pets and garden plants. Practices such as movement of stock and hay, which may occur in a more ad-hoc manner than is the case for commercial agricultural entities, may contribute to the spread of pests and diseases.
- Intensification of small-scale agriculture and recreational pursuits can lead to negative outcomes for natural assets. A key example of this is loss of ground cover through grazing practices.

19 Landscape Logic, 2009, Managing Riparian Zones in Tasmanian Agricultural Catchments, Technical Report 11

Possible futures

Response to climate change

- An increase in the potential for extreme events influenced by climate change (e.g. fire, flood, coastal inundation) is likely to induce management strategies focussed on protection strategies for human life and property protection.
- Projected sea level rise will impact on some components of the Lifestyle Landscape into the future. Key areas will include impacts on estuaries and low-lying coastal areas subject to inundation.
- Introduction of invasive species and diseases may be further accelerated in these landscapes due to the existing fragmentation of native vegetation, and the presence of degraded areas which are more susceptible to invasion by pests, weeds and diseases.
- The effects of climate change will further exacerbate pressures on natural values.

Land-use change and development

- An increasing focus on small-scale production systems supporting local food markets and high value niche markets is anticipated.
- Further expansion of the landscape is expected in the Tamar Valley and surrounding many of the region's urban centres and coastal areas.

Focus for action

- Build on education, awareness and capacity for new and/or inexperienced land, coastal and freshwater managers.
- Further integrate natural resource management and climate change adaptation principles into land-use planning and management decision-making processes to ensure that trade-offs between further development and natural assets are recognised and accounted for.
- Develop, where required, and implement improved planning processes to mitigate further fragmentation of threatened species, communities and pollution management.
- Support land manager capacity to undertake appropriate management practices, including land and soil management, invasive species control and management of habitat values.

U

4. Urban Landscapes

Definition

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

About Northern Tasmania's Urban Landscapes

The Urban Landscapes of the northern region are our cities, towns and neighbourhoods. Apart from being residential centres, they also see concentrations of manufacture, industry and community services. They include places we think of as natural, such as green open space, rivers and estuaries, which have been heavily influenced by urban development.

The region's population of approximately 143,000 is concentrated around the Tamar Basin and Launceston (the greater Launceston area), with a number of smaller centres servicing a dispersed rural and coastal community. The greater Launceston area is home to more than 103,000 people. The area's natural environment, landscape, amenities and housing stock make it one of Australia's most liveable cities.[20]

Smaller population centres are scattered within the region and share a close affiliation with Production, Lifestyle and Natural Landscapes. These include St Helens, Scottsdale, Bridport, Deloraine, Westbury, Longford, Campbell Town, and Whitemark.

By the very nature of the density of population in urban centres, the natural resource assets within Urban Landscapes are often significantly altered and in a degraded state; however, they may still provide important habitat values within backyards and 'green spaces'.

Many of the region's urban centres are renowned for their heritage values, including picturesque colonial villages such as Ross and Evandale, and frontier mining and forestry villages such as Miana and Beaconsfield.

GOAL

The region's Urban Landscapes support healthy, vibrant communities that are connected and aware of the region's natural values.

20 Geographia, 2012, Greater Launceston Plan: Resource analysis

Landscape value

Social values

> Urban Landscapes are the areas where the vast majority of people live, shop, work, learn, play and interact; they form the basis for the wellbeing of those that live within them.

> The community consultation processes for this Strategy highlighted the value urban communities place on living within close proximity to Natural Landscapes.

> Heritage buildings and streetscapes are a common and highly-valued feature of the region's urban areas.

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.

> Many of the region's Urban Landscapes are based along the coastal zone and provide for recreational, aesthetic and employment-based activity.

Economic value

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

> Industrial and manufacturing sectors contribute significantly to the state and regional economies.

> Proximity to a wide range of natural environments, including coasts and mountains, provides the region with a competitive advantage that attracts new residents and investment.[21]

21 Geographia, 2012, Greater Launceston Plan: Resource analysis

Influences

Land-use change and development

- Incremental loss of habitat areas and pollution associated with development contribute to the decline of local and regional natural resource assets.
- Loss or modification of natural waterways and drainage lines occurs due to pipe works, straightening, channel hardening and through altered hydrology.
- Concentrated development of Urban Landscapes has elevated nutrient, pollutant and sediment loads from a range of sources heavily influenced by storm water, sewage treatment, industry and residential development. This can result in significant deterioration of water quality.
- Urban expansion is a stressor to the region's Production, Lifestyle and Natural Landscapes. Areas experiencing urban encroachment include those around the greater Launceston area and coastal urban centres undergoing development.

Invasive species and diseases

- Urban Landscapes contribute to an increase in invasive species and diseases chiefly through modification of natural areas and introduction of species not previously present, including pets and introduced garden plants that can escape into adjoining landscapes.

People impacts

- Increasing demand for recreational opportunities has seen greater use of urban green spaces and waterways. Communities expect that these environments can meet their recreational needs. Conflict and community concern arise when environmental conditions fall to a level where suitability for recreation is not achieved. Ongoing community concern and media coverage of water quality issues in the Tamar Estuary impacting on aesthetics, sporting activities and health are key issues for the region.
- Air quality has the potential to impact on the health, liveability and aesthetics of Urban Landscapes. Key identified contributors include wood heaters and open fireplaces, backyard burning, vehicle traffic, rural sources and industrial inputs.
- Natural environmental risks such as acid sulphate and salinity can shorten the life of urban infrastructure such as houses, buildings, roads, and water and sewage pipes. This leads to costly maintenance and repair by homeowners, business and councils.
- Ageing infrastructure, population growth, and increased/more rigorous environmental standards pose significant challenges for the sewerage system in the Greater Launceston area to address threats to the environmental and social values of the region's waterways with a particular focus on the Tamar Estuary.
- Social issues include growing inequity, an ageing population, high levels of car dependency, and infrastructure inefficiencies. Economic uncertainty related to the viability of some major employers and industries has added to these pressures.

Possible futures

Response to climate change

- Sea level rises projected to occur through climate change will impact on many of the region's urban centres. Hazard assessment mapping indicates that inundation from sea level rise and storm surge events, plus accelerated coastal erosion, poses significant risk to property and urban infrastructure and services. The design of mitigation structures such as sea walls and levees, and the planning for ongoing urban development, will need to balance the protection of assets with the environmental and social values that may be impacted by such developments.
- Many of the region's urban areas have a close connection to Natural Landscapes. Fire management objectives aimed at protecting property and lives may conflict with protection of natural values.
- Flooding from intense rainfall events at local and regional levels is a recognised risk that may increase under changing climate and be further exacerbated by rising sea levels. In response to increasing flood risks and community concerns, the Launceston levee system was upgraded recently and the Longford township is now also protected by levee infrastructure.
- Increasing climate change-induced stresses in other parts of Australia may lead to increased migration to the region, adding to pressures within Urban Landscapes and leading to further expansion into other landscapes.

Urban growth

- Population and economic growth in the region is moderate at present, but growth opportunities are actively being sought. Recent planning in the Launceston area identified university expansion, improvements to Bell Bay, new migrants, the National Broadband Network, renewable energy, health services, community-based enterprises, skills development and investment in value-added primary production as potential growth opportunities.[22]
- Land-use change in degraded areas as a result of urban growth provides an opportunity to implement land and soil management practices that improve natural resource conditions and ecosystem services.

Focus for action

- Further integrate 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.
- Ensure stormwater management is focussed on adoption of water-sensitive urban design and sediment and erosion control.
- Build on education, awareness and capacity to increase participation and community value in natural resource management-based 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.

22 Geographia, 2012, Greater Launceston Plan: Resource analysis

Managing Northern Tasmania's Natural Resource Assets

An asset management approach

The northern region is host to a wealth of natural resource assets that require careful and integrated management to provide for healthy landscapes into the future. The economic and environmental productivity of our landscapes supports our social and economic wellbeing and is fundamental to the health of our natural and cultural assets.

For the purposes of this Strategy, these assets have been classified to provide direction and a focus for activity.[23] Assets are classified as:

1. Land Assets

Northern 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

These encompass the region's terrestrial native species and the complex ecological communities they form.

5. Community Assets

These are the individuals; community groups and volunteers; state and local government; business and industry; and non-government organisations that represent the regional community. These 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) also include migratory (terrestrial, air and water-based) species.

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

For each of the assets above, this Strategy provides:

- **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.

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

23 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

Northern Tasmania's Land Assets encompass the soils that support agriculture, plantation forestry and native ecosystems; the vegetation that covers and protects these soils; and the region's geological features.

This section focuses on soils, vegetation and groundcover, and geological features.

About Northern Tasmania's Land Assets

The region contains a diverse range of geology, soils and landforms. Landscapes include the islands of the Furneaux and Kent groups, coastlines, dune fields, broad coastal plains, valleys, mountains and karst cave systems.

Land Assets provide a variety of social, economic and environmental services to the region including:

- Native habitat
- Land for urban development
- Forestry
- Places of intrinsic or aesthetic value
- Recreation
- Agriculture and grazing land.

Agriculture is the main production land use, dominated by grazing. Plantation and native forestry production account for 15% of the region's production land use.

Land Assets interact with all of the region's other assets and landscapes, underpinning economic, social and environmental values and requiring careful management to ensure the prosperity of the region as a whole is sustainable in the long term.

The region contains a higher proportion of privately-owned land that is used for agriculture in comparison to other land uses. The contribution of private landowners is therefore critical to sustainable management of the region's Land Assets.

Image: Richard Johnston

Key management elements

Soils

- The region contains a wide range and complex pattern of soil types as a result of the topographic diversity of the region, from coastal sand plains to some of the highest mountain summits in the State, together with a similar diversity of climate, geology and vegetation cover. Key soil types and their values include:
  - Highly fertile red soils of the areas around Deloraine, Ringarooma and Scottsdale that can support intensive cropping and dairying;
  - Other soil types (including dermosols, sodosols, vertosols) which support extensive livestock production, broad-acre cropping and, following recent irrigation developments, more intensive agricultural production;
  - Stony soils of the high mountains and hilly country that support native grasslands and provide for fine wool production;
  - Sandy soils, both in coastal areas such as Waterhouse and in Panshanger in the midlands, that can support agriculture;
  - Soils at higher elevations, or with less natural fertility, where production forestry dominates, particularly in the hill ranges in the eastern half of the region and the slopes of the Great Western Tiers; and
  - The soils with the least versatility of use due to poor fertility, poor drainage or climatic restrictions; these are more frequently placed in parks or reserves, such as the Ben Lomond and Mt William national parks, and the Waterhouse Conservation Area.
- Improved access to water, particularly through investment in irrigation schemes, has enabled the diversification of land use and an increase in the frequency of cropping and expansion of dairy activities in some areas.
- Care is needed to ensure increases in agricultural output are achieved sustainably, without a decline in soil condition that would ultimately lead to a decrease in agricultural productivity and declining profit.

Vegetation and groundcover

- Vegetation and groundcover include native, exotic and mixed vegetation types that may be permanent (e.g. forest, perennial pastures) or impermanent (e.g. crops and crop stubble). Vegetation cover has an important role in limiting soil erosion and maintaining soil health.
- Vegetation cover in the region is generally high, and retained native vegetation alone covers approximately 65% of the region's terrestrial area.
- Significant changes occur in soil systems when vegetation is cleared or the soils are cultivated. The impacts of such change are often severe, leading to loss of biodiversity and landscape values, or the loss of ecosystem services such as clean drinking water and continued productivity.
- Maintaining adequate levels of groundcover is an effective way to minimise run-off and erosion. By reducing erosion, soil, nutrients and organic matter are retained in place, and siltation problems and other impacts on the region's waterways can be minimised.
- Managing vegetative cover will also be important in helping manage extreme events such as drought or rainfall events, irrespective of whether they arise from 'natural' causes or as a result of climate change.

Geologic features

- Although small in area compared to mainland Australia, Tasmania has a remarkably varied geology and a wide range of landforms.
- It has a significant range of rock types representing the majority of geological periods ranging from 1,000-million-year-old rocky outcrops south of Badgers Head to the relatively young basalts of the north coast that are just 10-13 million years old.
- Some geological sites, such as Mt Victoria, are robust and do not need active management, while others like the karst around Mole Creek and many of the sand dunes in the north-east and east require careful management and protection.
- Other sensitive sites include fossil sites or sub-fossil sites (e.g. whale bones in the Flinders Island area), restricted geological outcrops (e.g. Dianas Basin folds), wetlands and riverine environments.
- Many sites of geo-conservation significance have values in their own right but are also very important tourist sites. For example, the tourist caves in the region include Maracoopa and King Solomon's Caves, which receive large numbers of tourists each year.
- Geological features are typically one-off, or develop so slowly over time that degradation is permanent. Destruction or extinction of an important site can be immediate, such as the passing of a bulldozer blade or the removal of specimens by collectors, or over extended periods through inappropriate land management practices.

Threats and opportunities

Projected climate change impacts

- Increases in temperature, rainfall variability and extremes in weather patterns will impact Land Assets separately or in combination with land management practices to exacerbate the risks that are known to impact the condition of the asset.
- As the climate changes, opportunities for new land uses may open and result in changing land management practices.
- Coastal areas will be further subject to inundation, storm and tide surge, and changes to coastal groundwater are likely to further accentuate some soil and groundwater management issues including salinity and acid sulphate soils.

Threats

- Threats to soil resources:
  - Soil erosion by wind and water resulting in productivity losses and off-site impacts;
  - Soil structure decline and compaction under cropping and possibly intensive grazing;
  - Organic matter decline under annual cropping rotations;
  - Nutrient balances and management (including contaminants);
  - Waterlogging and wet soils;
  - Increasing intensity of land use in agriculture (using land beyond its capability), resulting in increased potential for soil degradation; and
  - Salinity.
- Threats to vegetation cover:
  - Vegetation conversion: conversion of natural vegetation for development;
  - Groundcover: inappropriate grazing regimes and cropping practices; and
  - Impacts from extreme events, including extreme rainfall and flooding, drought and fire.

- Threats to geological features:
  - Depending on the nature of the feature, threats to geological features vary greatly in spatial scale and temporal impact. They range from removal and collection through to management practices at a landscape scale. Some geological features are not static (e.g. meandering river systems, coastal dunes), and management practices which result in modification of the geomorphic (natural) processes need to be considered.

Opportunities

- There is limited scope for expansion of production land-use area. Agricultural production already occupies a majority of the more productive soils, wild fisheries allocations are currently considered to be at the maximum, and the extent of forestry land use is currently stable.
- Opportunities may arise from carbon farming through expanded tree planting on private land and a greater acknowledgement of the role the forestry industry can play in carbon sequestration. Opportunities may also arise through processing of woody biomass including biofuels and bioenergy.
- Greater water security through irrigation development will enable access to areas where water availability was the limiting factor to agricultural production, resulting in intensification and diversification of agricultural practices.
- 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 regions such as Tasmania.[24]
- The largest soil organic carbon stores per hectare occur in cooler temperate zones, which have higher rainfall and extensive eucalyptus forest and rainforest. The region's extensive conservation estate will likely become increasingly valued, and appropriate stewardship of these areas is key. It has been recognised that an important challenge for regions in south-eastern Australia will be to maintain existing stocks of carbon in vegetation and soils.[25]
- Opportunities exist to increase recreational and tourism outcomes through wise management of the region's vegetation. The conservation of forest reserves, including 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). 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.
- Planting trees for carbon sequestration and storage may provide some limited opportunities in the region. Unfortunately, many of the areas within the region that could provide for tree plantings such as cleared Production Landscapes lie in lower rainfall areas, which 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. See Appendix 2 for further information.
- SCARP identified that geographic prioritisation can be as much about avoiding unintended negative consequences as it is about creating benefits,[26] and the multiple-purpose benefit of any carbon-based plantings would lie with the project.

24 Wallis, PJ, Harwood, A, Leith, P, Hamilton, L, Bosomworth, K, Turner, SL, Harris, RMB and Bridle, K, 2015, Southern Slopes Information Portal Report: Climate change adaptation information for natural resource planning and implementation. Southern Slopes Climate Change Adaptation Research Partnership (SCARP), Monash University, University of Tasmania, RMIT University.
25 ibid.
26 Leith, P, Harris, RMB, Bridle, K, Kemmerer, E, Baldwin, A and Diddams, L, 2015, Means-to-an-end: A process guide to participatory spatial prioritisation in Australian natural resource management, Southern Slopes Climate Change Adaptation Research Partnership (SCARP), University of Tasmania, Hobart, Tasmania

2. Water Assets

Definition

The region's Water Assets include inland surface waters, all rivers, lakes and wetlands, and groundwater.

This section focuses on river systems/waterways, wetlands, and groundwater.

About Northern Tasmania's Water Assets

The region's surface water resources encompass an array of lakes, rivers and streams across 17 major catchments. These include large rivers such as the North and South Esk rivers, short steep coastal rivers such as the Douglas and Scamander rivers, and the rivers and streams of the Furneaux Group and Kent Group islands.

Water Assets are essential to provide clean drinking water and biodiversity, and to support aquatic ecosystem health (freshwater, wetlands, estuarine, marine), irrigation for agricultural production, industrial use, aquaculture and fisheries production, and 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.[27]

The region's groundwater resources are less known, but remain an important source for stock watering and irrigation as well as town water supply in areas such as St Marys and Flinders Island.

Aspects of the Water Assets support all other asset areas in this Strategy and across all landscapes.

Although updating would be beneficial, studies and consultation carried out to inform this Strategy suggest the State's Conservation of Freshwater Ecosystem Values Database (CFEV) remains the key source of values related to Water Assets.

Key management elements

River systems/waterways

- Changes in flow regime, loss of shade and changes in water quality are key causes of river health decline.
- Changes to the flow regime are caused by modified catchment land use impacting on surface run-off and groundwater discharge; water harvesting, such as diversion works, pump stations, dams; regulation such as power supply, harvesting, temporary and permanent modifications to the channel; and return drainage from agricultural, urban and industrial land uses.
- Changes in catchment land use, return drainage (agricultural, urban and industrial) and groundwater discharge impact on water quality. In turn, water quality and quantity also impact on the health of the region's estuaries.
- The integrity of riparian vegetation has a close association with water quality and stream health. The removal of riparian vegetation or its decline in condition through inappropriate management reduces shading of waterways, stability of stream banks and capacity to intercept overland flow. As a result, pollutants including sediments, nutrients and pesticides in run-off can enter waterways and affect the health of stream reaches.
- While some of the region's rivers are in a relatively undisturbed condition, they are often vulnerable to a range of threats, such as inappropriate land management practices (including on adjoining waterways), a lack of coordinated management, ineffective arrangements and inadequate knowledge relating to the use and appropriate management of rivers.

27 DPIPWE, 2010, Vulnerability of Tasmania's Natural Environment to Climate Change

- Water Assets are affected by activity that takes place on land as well as through our actions in abstracting, using and returning water to rivers. Catchments are the natural scale to consider this aspect of the environment. Coordinated action is preferable at the catchment level or at the landscape level (e.g. catchment to coast) by all those who use water or influence land management. This requires greater engagement and delivery by stakeholders at the catchment as well as the local level and is particularly important when trying to address the significant pressures placed on the water environment by diffuse pollution from agricultural and urban sources and widespread, historical alterations to the natural form of channels.
- Poor water quality has the potential to affect stock and irrigation, along with domestic, industrial, recreational and environmental uses of Water Assets. Future management in the region is therefore centred on addressing localised pollutant issues and developing a regional framework to ensure continued good water quality in the region.
- An assessment of the conservation management priorities of all freshwater ecosystems throughout the State was undertaken. Development of the Conservation of Freshwater Ecosystems Values (CFEV) database used existing environmental data to identify where aquatic values exist and their overall priority for conservation management.[28]

Wetlands

- The region contains a number of significant and unique wetlands. These include naturally saline, freshwater and lunette wetland systems.
- In particular, the World Heritage Area within the region encompasses a diversity of lakes and freshwater environments that are recognised both nationally and internationally. The ecological and geomorphic processes that characterise these environments are acknowledged as significant on a world scale.
- The region contains ecologically significant wetland conservation areas, including five Ramsar-listed wetlands (Logan Lagoon, Flyover Lagoon, Jock's Lagoon, Little Waterhouse Lake and the Chimneys) and 44 Directory of Important Wetlands Australia (DIWA) wetlands. A further 94 wetlands are regarded as important, but not included on existing listings.
- Wetlands have significant biodiversity values that are threatened by habitat loss and modification.

Groundwater

- Groundwater is an integral part of the hydrological cycle and needs to be considered as part of surface water and land-use management strategies.
- Groundwater is an important source of water in many parts of the region for drinking, stock and domestic use, and irrigation. Flinders Island communities rely predominantly on groundwater.
- Groundwater supports ecosystems both above and below the ground's surface, providing important ecosystem services such as base flow to rivers and streams during the dry summer months.
- The region contains 13 groundwater flow systems including the only Tasmanian regional groundwater flow system.
- Our knowledge of groundwater systems is poor but the importance of this asset and its relationship to salinity have been recognised.
- The Tasmanian Salinity Strategy contains a broad assessment of groundwater.
- There is a collaborative partnership between local governments to extend research and assessment under the Salinity Management Plan to the greater Launceston area.

28 DPIPWE, 2014, Summary of the CFEV Assessment Framework, v1.3 Conservation of Freshwater Ecosystem Values Program

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, which includes Tasmania; however, longer-term projections indicate a general reduction in rainfall, particularly in winter and spring,[29] which will invariably impact Water Assets.
- Reductions in rainfall may place pressure on regulated production systems, dry land agriculture, freshwater ecosystems and water security for various purposes including urban water supply.
- Higher intensity rainfall events may 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.[30]
- 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 would likely not be spread evenly across all species and might lead to changes to ecological community and species composition.[31]
- The region's wetlands will display varying responses to climate change depending on their type and location, but will likely include salinisation from increased temperature and reduced water input.[32] Actions to minimise warming might include preservation or restoration of riparian vegetation cover, increasing groundwater.
- Allowing for environmental flows that maintain permanent water bodies (e.g. deep pools) and provide opportunities for species movement between refuges and habitat will promote connectivity and hydraulic variability.

Threats

- Pollution sources, both point and diffuse, will impact on the health of Water Assets. Land-use change and intensification are key drivers of increased pollution.
- Intensification of land use such as dairying under irrigation has the potential to affect water quality by increasing nutrients, particularly nitrates and phosphorous, to water bodies.[33] Higher pathogen loads from dairy expansion and/or intensification are also potential threats.
- Modification for other land uses, such as drainage of wetlands, stream hardening, and riparian clearing can impact hydrological processes and aquatic values.
- While large quantities of salt occur naturally in the region, salt mobilisation into water resources can be exacerbated by activities such as irrigation development and land clearing.
- Increasing river regulation and stream-flow management for irrigation have the potential to adversely affect water quality and ecosystem health and will require appropriate planning and regulation.
- Sedimentation is a significant threat to natural values and can result in loss of amenity values and restrictions on economic values associated with Water Assets. Sediment and erosion problems occur throughout the entire region, with the majority of sediment coming from cleared agricultural land within rural areas, although urban areas contribute proportionally more per hectare than any other land use. Turbidity and sedimentation risks are associated with groundcover management and rainfall run-off.

29 Climate Change in Australia - http://www.climatechangeinaustralia.gov.au/en/
30 Wallis, PJ, Harwood, A, Leith, P, Hamilton, L, Bosomworth, K, Turner, SL, Harris, RMB and Bridle, K, 2015, Southern Slopes Information Portal Report: Climate change adaptation information for natural resource planning and implementation. Southern Slopes Climate Change Adaptation Research Partnership (SCARP), Monash University, University of Tasmania, RMIT University
31 ibid.
32 James et al., 2009, Impact of Secondary Salinisation on Freshwater Ecosystems: Effect of experimentally increased salinity on an intermittent floodplain wetland - http://waterscience.com.au/wp-content/uploads/2013/01/James-2009-MFRpdf.pdf
33 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

- Temperature increases and decreases can both adversely impact on aquatic ecology. Lower water temperatures can be caused by release of water from deeper layers held in dams during summer, while higher temperatures can result from lack of flow and/or from clearing of vegetation at the edges of rivers, creeks and lakes.
- Use of inappropriate methods of riparian and wetland restoration may impact on hydrology and lead to damage or loss of Aboriginal heritage sites.
- Addressing water issues often requires whole-of-catchment planning and interventions, involving multiple jurisdictions, management authorities and stakeholders. This can pose significant challenges for planning and coordination.

Opportunities

- Irrigation and dairy industry expansion may provide for further diversification of production systems. Expansion in these primary industries must be managed holistically to ensure that potential negative outcomes to water quality, soil health and ecosystems are avoided. This is particularly relevant for the areas that may be able to access water from newly developed irrigation schemes.
- Further integration of riparian-related natural and cultural values into property and landscape management planning will yield positive results for riverine health, freshwater ecosystems and water quality outcomes.
- Collaborative planning and management arrangements have been established in the region including:
  - Tamar Estuary and Esk Rivers Partnership – a regional partnership between the agencies responsible for management of the Tamar Estuary and Esk Rivers (TEER) waterways. The TEER program aims to provide a coordinated approach to management; and
  - Northern Tasmanian Storm Water program – this is a regional partnership between NRM North, TasWater and all eight councils in Tasmania's northern region. Through the program, a stormwater officer is employed who works with program partners to improve stormwater quality management across the region.
- Water quality improvement plans are currently in development for greater TEER catchment (North Esk, South Esk, Meander, Macquarie, Lake/Brumbys, Tamar catchments), Brid, George, and Mersey catchments; these will identify priority works to address water quality issues.
- Current and recent research focussed on aquatic systems is providing new information that can supplement existing knowledge resources and planning support tools such as CFEV, water quality improvement plans, and development and implementation of environmental flows for regulated catchments.

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.

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

About Northern Tasmania's Coasts and Marine Assets

The region boasts more than 2,000km of coastline, including estuaries, beaches and rocky shorelines, islands, dune fields, wetlands and lagoons, and marine habitats. Estuaries and coastal wetlands link the inland environment with coastal and marine systems. Our coastal zone and catchments support unique ecological values and threatened species. Extensive shallow waters sustain seagrass beds, and rocky reef kelp habitat promotes productive marine communities.

Key features of the region's Coasts and Marine Assets are the Furneaux Islands, including Flinders Island in Bass Strait, the eastern granite coast fronting the Tasman Sea, the northern coastline on Bass Strait and the Tamar River Estuary around which Launceston, the region's main population centre, is located.

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.

Of Tasmania's 43 species of breeding and migratory shorebirds, 12 are resident and breed locally while 31 migrate annually to the region from other parts of the world. Coastal habitats, including spits, estuaries, river mouths, tidal mudflats, saltmarsh, saline wetlands, sand dunes and sandy beaches, coastal sheets and sand ridges, are used by beach-nesting and migratory shorebirds. Some species like the hooded plover are now only found in low numbers in other areas of Australia.

Maintaining Coasts and Marine Assets in prime condition is critical to the region's future economic and social sustainability. The region's wild fisheries, particularly the valuable rock lobster and abalone fisheries on the east coast and around the Furneaux area, make an important contribution to the State's economy.

Management of the region's Coasts and Marine Assets is the shared obligation of local communities, industries and businesses, and all levels of government.

Image: Matthew Butt

Key management elements

Shorelines

- The region's coast is dominated by sandy shorelines that are commonly interrupted by rocky headlands.
- 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 landforms and ongoing land forming (geomorphic) processes are considered significant for a variety of reasons including their integral role in maintaining the coasts' broader natural values.
- Cultural heritage sites, including Aboriginal middens, can be found along many of the region's shorelines.[34] These sites hold ancient cultural knowledge, information and insight into past ways of life, and they provide a spiritual link for Aboriginal people to their tradition, culture and roots. The region's coastlines continue to support traditional cultural practices including birding and collection of coastal resources for traditional uses.

Estuaries and coastal wetlands (including lagoons and embayments)

- While the region's estuarine assets are in good health in some areas, other areas are subject to a number of threatening processes that are having impacts at varying levels.
- Of the 111 estuaries recognised in Tasmania, 34 occur within the region. The population centres of the greater Launceston area (Tamar), Bridport (Brid/Great Forester) and St Helens (Georges Bay) are centred around estuaries, providing port facilities, recreation opportunities and a scenic focus.
- Three estuaries in the region—the Tamar River, North East Inlet and Thirsty Lagoon—were determined as having critical conservation significance. A further 16 estuaries are considered to be of high conservation significance, in particular Boobyalla Inlet (Ringarooma River). A concentration of high conservation significance is situated on Flinders and Cape Barren islands.[35] The five Ramsar-listed wetlands in the region are all associated with the coastal zone.
- Recently, temperate coastal saltmarsh communities were protected under national legislation and mapping of the saltmarsh wetlands was undertaken with extensive areas identified in varying conditions.
- Coastal estuaries and wetlands provide essential links between terrestrial and marine environments as they provide key ecosystem services and processes including nitrogen and carbon cycling, breeding zones and nurseries for marine species. Each zone of the interface between the terrestrial and marine environments (terrestrial vegetation, intertidal vegetation including saltmarsh, marine including seagrass 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.

Marine

- 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.
- Although the region contains several marine and coastal habitats of significant value at state, national and international scales, information on marine and estuarine environments across the region is limited.

34 Page, L and Thorp, V, 2010, Tasmanian Coastal Works Manual: A best practice management guide for changing coastlines
35 Edgar et al., 1999, A Classification of Tasmanian Estuaries and Assessment of their Conservation Significance using Ecological and Physical Attributes, Population and Land Use

- Marine habitats include seagrass beds and rocky reef kelp habitat that support productive marine communities. These may be in decline,[36] but it is difficult to distinguish any long-term decline from natural variability due to uncertainties in baseline information and insufficient long-term data records.
- Marine environments near and around the Kent Group of islands in Bass Strait contain an especially high diversity of reef fish species. These areas are managed as a marine reserve, yet even these are suffering loss of habitat due to *Centrostephanus rodgersii* grazing.
- At least 30 species of whale and dolphin use Tasmanian waters on a regular basis.[37] An estimated 100,000 species of marine invertebrates occur in Australian and Tasmanian waters.[38] In addition, there are six marine and two estuarine species of seagrass, and the diversity and endemism of the State's marine coral and macroflora 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.
- Mapping available through SeaMap allows identification of environmentally critical and 'keystone' habitats, enabling establishment of appropriate management arrangements. Habitats identified as part of this mapping program may be critical for a variety of reasons, such as they may be fundamental to the sustainability of an ecosystem or relatively pristine or remnant communities.

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.[39,40,41]
- Coastal erosion and inundation will result in loss or migration of saltmarshes, wetlands, dune fields and intertidal sand flats. Coastal wetlands (particularly saltmarshes) and seagrass communities are significant carbon stores, and loss of these through threatening processes, especially development and catchment activities, will not only reduce carbon sequestration but potentially release carbon and sediments into the atmosphere and marine environment. Maintaining condition to buffer climate change and existing impacts, and allow for landward retreat, will be required for maintenance of these assets and supported biodiversity values.
- Waters off the east coast of Tasmania have increased in temperature by more than 1°C since the 1940s and this is expected to continue. It is predicted that the Tasman Sea will see some of the most significant temperature gains as a result of strengthening of the East Australian Current. Impacts on marine ecosystems are already being seen, with southerly migration of long spine sea urchins posing significant threat to seaweed habitats.
- Increasing atmospheric CO^2 has also led to increasing ocean acidification.

36 Tasmanian Planning Commission, 2009, State of The Environment Tasmania 2009
37 DPIPWE, 2009, Whales and Dolphins
38 Bureau of Rural Science, 2007, Characteristics of the Australian Marine Environment. Australian Museum, 2002, Overview of the Conservation of Australian Marine Invertebrates
39 Southern Slopes Information Portal Report 2015 - https://terranova.org.au/repository/southern-slopes-nrm-collection
40 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
41 Tasmanian Coastal Adaptation Pathways Project Reports http://www.dpac.tas.gov.au/divisions/climatechange/adapting/tasmanian_coastal_adaptation_pathways_project/tcap_2011-12

- Ecological modelling indicates that there is a higher potential for ecological change in the region's north-east including the Furneaux Islands. Change in species composition and structure of vegetation and communities are likely to occur, and vulnerability to existing threats, such as invasive species, is likely to be amplified.

Threats

- Loss and modification of coastal and marine habitat can result from a range of pressures including tourism, recreational, residential and industrial use and development. Alteration of drainage and fire regimes, weed/pest invasions, nutrient and sediment run-off are some of the reasons for this loss and modification. While many of these originate away from the coast and estuarine and marine environments, their impact on this asset is very significant.
- 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 their catchments including agricultural, urban and industrial activities can result in significant deterioration of estuarine, coastal and marine water quality.
- Recreational activities have also resulted in formation of 4WD tracks, bike tracks, walking tracks and horseriding tracks in some sensitive areas of coastal vegetation and along beaches.
- A fundamental problem in addressing issues of decline in condition of the asset is the complexity of the management setting for coastal and marine environments. A large number of land managers have diverse and sometimes overlapping roles and responsibilities. Lack of an integrated approach to coastal and marine management has resulted in lack of action and inconsistent and/or ill-informed decision-making at times.
- Marine pollution and contaminants, including impacts from catchments, plastics, and boat waste, impact on water quality (estuarine, near shore and marine) and are direct threats to marine species and shorebirds as a result of ingestion of plastics.

Opportunities

- State planning reform currently underway provides an opportunity to ensure environmental values are considered.
- The Tasmanian Government initiative to support climate adaptation planning for coastal communities (TCAP – see Knowledge Gateway in Appendix 1) is an opportunity to align natural resource and community planning at the local scale.
- The coastal zone is a key area for increasing knowledge sharing and the value placed on cultural heritage between Aboriginal people and others working in natural resource management.
- Further research into the coastal, estuarine and particularly marine values within the region will provide a stronger base upon which to inform decisions regarding land use and marine-based industry development and expansion.
- Increases in the ocean temperature may provide new opportunities for non-traditional fisheries development.[42]
- Better waste water treatment plant operations and water sensitive urban design hold key opportunities to minimise pollution release and support positive water quality outcomes.
- Water Quality Improvement Plans currently in development and collaborative planning/management arrangements such as the TEER provide a collaborative base for future management and planning.

42 Wallis, PJ, Harwood, A, Leith, P, Hamilton, L, Bosomworth, K, Turner, SL, Harris, RMB and Bridle, K, 2015, Southern Slopes Information Portal Report: Climate change adaptation information for natural resource planning and implementation. Southern Slopes Climate Change Adaptation Research Partnership (SCARP), Monash University, University of Tasmania, RMIT University

4. Biodiversity Assets

Definition

Biodiversity Assets encompass the ecological ecosystems and the native flora, fauna and other organisms that they contain.

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

About Northern Tasmania's Biodiversity Assets

The region's biodiversity reflects the diversity of landscapes, soils and climate. Terrestrial habitat types include dry forests, woodlands, she-oak forest, wet forests, rainforest, grasslands and coastal and alpine heathland. Freshwater habitats include the aquatic flora and fauna of inland rivers, streams and wetlands, and each contains important flora and fauna species and ecosystems.

Native vegetation covers approximately 65% of the region's terrestrial area, with more than 120 ecological vegetation communities across ten native vegetation groups. Ecological function is relatively intact across the region.

There are 119 nationally-listed threatened species found in the region (see Appendix 3). These include wedge-tailed eagles, Tasmanian devils, forty-spotted pardalotes and swift parrots, burrowing crayfish and stag beetles.

In addition, many of the region's 28 indigenous mammals have undergone substantial decline in extent (range) since European settlement. For example, the forester kangaroo has experienced a 90% reduction in its range.

These facets of the region's Biodiversity Assets are significant at local, regional, national and international scales. The region has:

- Some of the most significant native grasslands remaining in south-eastern Australia;
- Many threatened species and threatened ecological vegetation communities (see Appendix 3);
- A high degree of endemism (species only found here);
- Five of Tasmania's ten internationally-listed Ramsar wetlands, and 44 nationally listed DIWA wetlands; and
- Breeding habitat for some of the most significant migratory seabird colonies in Australia (see Appendix 3).

The region includes several hotspots of species diversity, including:

- Local hotspots for invertebrates in the Cataract Gorge and the north-east forests, such as stag beetle habitat in Goulds Country and velvet worms in the St Marys area;
- A Northern Midlands biodiversity hotspot;
- Some of the most significant native grasslands remaining in south-eastern Australia; and
- The Furneaux Island group, home to some of the most significant seabird colonies in Australia, including extensive shearwater rookeries and breeding sites for Cape Barren geese and white-fronted terns.

Key management elements

Ecologically functioning systems

- Ecologically functioning systems are those that can maintain their biodiversity and their ecological processes, such as nutrient cycling, water cycling, and soil formation and retention. A highly functioning ecosystem can support the full complement of biodiversity and have the potential to contribute to a wide range of ecosystem services. A poorly functioning system will lose biodiversity and other resources such as soil, water and nutrients, for example, rainfall events leading to soil erosion and land clearance leading to local extinction of species.
- Past and present land clearance has a large impact on biodiversity and the ecological function of landscapes that support this biodiversity. Heavily cleared landscapes have reduced landscape functions, limiting their ability to perform ecosystem services and maintain species biodiversity.
- Riparian areas have an important role in ecosystem function and 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, for example, a higher diversity and abundance of birds in riparian areas in both wet[43] and dry forests.[44]
- Tasmania has a rich diversity of resident and migratory bird species of which many 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 the maintenance of a number of ecological systems in Tasmania. The history of Aboriginal firing practices has created the patterns in vegetation communities we see today, and large ecosystems, for example 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 or lack of fire.

Native flora, fauna and other organisms

- The maintenance and persistence of the region's species diversity are reliant on a number of key features:
  - Maintenance of suitable habitat to support their individual species needs;
  - Management of threats such as invasive pest species and impacts from surrounding land uses; and
  - Maintenance of viable, connected and genetically diverse populations.
- Maintaining suitable habitat is best achieved through conserving examples of the full range of ecological environments to accommodate the widest possible range of species. This approach is well supported in the region through establishment of national parks and other reserves that contribute to the national reserves system that is built on the comprehensive, adequate and representative (CAR) reserve design principles.
- Tasmania's national parks system, the World Heritage Area and various other types of reserves proclaimed on public and private land contribute to this goal and include approximately 50% of the region's natural vegetation. However, this does not represent all vegetation communities in the region, with a majority of under-represented ecological communities restricted to areas on private land.

43 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
44 Mac N, 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

- Ongoing management of the reserve system for conservation outcomes is of utmost importance if the region's Biodiversity Assets are to be maintained. Supporting the development and implementation of management plans for the region's reserves to ensure that these areas remain the keystone for the region's Biodiversity Assets will be vital for the assets' long-term maintenance.
- While using vegetation communities as the units for conservation has been shown to be a good surrogate for many species,[45,46] it will not favour all; further attention may be required for those species needing specialised habitat, being threatened and/or other important species (regionally significant and iconic species).
- Threatened species prioritisation was undertaken for Tasmania as a joint exercise between the State Government and the three NRM regional bodies. Prioritisation was carried out on a cost-benefit basis considering all species listed as threatened at a state level with the aim of maintaining viable populations. Management prescriptions established through this process provide a basis for planning, collaborating and coordinating action on some of the region's most threatened assets. These species often require site-specific management to mitigate threats at a local level.
- Maintaining viable, connected populations will require avoiding further fragmentation and, in some cases, remedial actions to restore connectivity through rehabilitation and revegetation. Incorporating biodiversity conservation principles planning at multiple scales, from paddock and property levels through to regional and state planning frameworks, will assist.
- Areas that act as refugia (or places of shelter, protection and safety from threats) need to be considered in the context of their surrounding landscapes, and can provide additional insurance values for species diversity if maintained.
- Support to improve management capacity of biodiversity will require attention to address key threats to habitat values and vegetation condition. These may be specific to a particular species or site, or generic threats that can impact on much of the region. Inappropriate fire regimes and management of biosecurity risks are recognised as issues for threatened species and more widely for biodiversity values in general.
- Supporting the development and refinement of fire management practices that support biodiversity values and continuation of ecosystem process, while addressing threats to property and life, is a specific need.
- Addressing biosecurity threats at all scales (property, through to regional and state) is essential. Management of existing and potential biosecurity risks will require close attention to priority areas under threat, requiring implementation of effective hygiene practices and vigilant surveillance processes.


Image: Monte Boville

45 Panzer, R and Schwartz, MW, 1998, Effectiveness of a vegetation-based approach to insect conservation. Conservation Biology: 12 (3) 1523-1739
46 McMullan-Fisher, SJ, Kirkpartrick, JB, May, TW and Pharo, EJ, 2010, Surrogates for macrofungi and mosses in reservation planning. Biodiversity Conservation: 24 (3) 1523-1739

Threats and opportunities

Projected climate change impacts

- Increases in temperature, rainfall variability and extremes in weather patterns will impact Biodiversity Assets separately or in combination with land management practices to exacerbate the known risks to the condition of Land Assets.
- Changes in climatic regimes will result in shifts in species and communities' habitat ranges. This will see retraction of some ranges and expansion of others.
- Changes in composition, through the loss of species and establishment of new species, have the potential to reduce the richness and diversity of local species.
- Changes in the relative abundance or dominance of species lead to changes in habitat structure, potentially resulting in development of 'novel' or new ecological communities.
- Loss in net primary productivity may occur, for example changes in environmental potential or abundance of producer species resulting in impacts to food-web interactions.

Threats

- Land clearing driven by conversion of native forest for plantation, changes in Production and Lifestyle Landscapes, and urban spread result in loss of native vegetation.
- Incremental loss and degradation of habitat areas may occur, including impacts from land management practices ranging from grazing pressure, through to recreational use that can modify the condition, structure or function of an ecosystem.
- Invasive species and disease are an ongoing threat:
  - Some weeds and diseases affect the floristic composition, structure and function of habitat. The region has a wide range of environmental weeds;
  - Invasive vertebrates such as cats are well established and there is potential for establishment of foxes. The impact of domestic dogs on coastal shorebird populations is an ongoing concern. Feral pigs, though isolated to Flinders Island, are a significant threat to coastal wetlands and reserve values; and
  - Diseases are a threat to flora and fauna. *Phytophthora* root rot fungus, myrtle wilt, devil facial tumours and platypus fungal disease are all existing threats. Recent incursions of myrtle rust highlight the susceptibility of the region to introduced diseases.
- Fire is a natural component of the landscape that has shaped distribution and constitution of vegetation communities. Inappropriate use of fire is listed as a generic threat to threatened species and considered a threat to natural values more widely.[47] Altered fire regimes outside the bounds under which species and ecosystems evolved (including absence, frequency, intensity and timing) are likely to be detrimental to those species and ecosystems.
- Altered fire regimes outside the bounds under which species and ecosystems evolved are likely to be detrimental to those species and ecosystems. Fire management practices that do not recognise ecological requirements can significantly impair ecosystem and habitat values.

47 DPIPWE, 2010, Vulnerability of Tasmania's Natural Environment to Climate Change: An overview

Biodiversity Assets

Opportunities

- The region maintains a large proportion of the natural vegetation extent in comparison to many regions across Australia, providing a strong basis for future management. Maintaining large connected areas is the best way to preserve and support biodiversity values.
- Variegated landscapes within the region represent the greatest opportunity for improving landscape function efficiently. The highest density of remnant vegetation is concentrated in fragmented catchments used for agriculture and settlements. There is significant potential to secure, buffer and connect remnant vegetation patches in the Northern Midlands bioregion, Tamar and north-east coastal catchments.
- Landscape function is degraded substantially across much of the floodplains of the Northern Midlands. Restoring landscape function in these areas will require a long-term focus to establish effective connections at a landscape scale.
- Maintaining water quality and riparian habitats of waterways can provide significant outcomes to the Biodiversity Asset while supporting outcomes for Land and Water Assets. Prioritisation of sub-catchments for focussed activity is underway through collaborative planning for water quality improvement for the TEER, Brid, Mersey, and George catchments. Targeted riparian activity has the potential for significant outcomes for Biodiversity Assets including benefits for freshwater habitat, landscape connectivity and riparian refugia values.
- Prioritisation of recovery actions for threatened flora and fauna[48] species was undertaken as a statewide approach to identifying efficiencies in implementation of recovery projects and to also identify statewide and cross-regional priorities for future action. Projects were prioritised on the basis of contribution to a single objective: minimisation of the number of extinctions in the short term (50 years).
- Recent biodiversity management research and projected responses to climate change are increasing the knowledge base, while synthesis of new information for incorporation into planning and management processes has the potential to significantly improve management processes for Biodiversity Assets.
- Biodiversity conservation is a core focus for a number of organisations in the region, supporting conservation, restoration and planning processes and research at various scales.
- Current planning reforms occurring at a state level provide opportunities to improve integration of biodiversity outcomes.

48 DPIPWE, 2010, Prioritisation of Threatened Flora and Fauna Recovery Actions for the Tasmanian NRM Regions

5. Community Assets

Definition

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

About Northern Tasmania's Community Assets

Community Assets include everyone who lives and works in the region, as well as the people who visit and/or have some connection with it.

The individuals, landholders, primary producers, Aboriginal community, community groups and organisations (rural and urban), businesses (large and small), industry, volunteers, and people in government agencies, research institutions and councils are the region's greatest assets for managing its natural resources successfully.

Implementation of natural resource management, while strategically driven through the regional NRM Strategy and investment planning, is dependent on sub-regional processes for much of its coordination. In particular, the roles of local government and sub-regional natural resource bodies are pivotal to providing local direction on issue identification, work programs and stakeholder liaison with regional natural resource management programs.

Sub-regional strategies produced within the region include:

- Meander Valley Natural Resource Management Strategy
- Tamar Valley Region Natural Resource Management Strategy
- Furneaux Natural Resource Management Strategy
- Break O'Day Natural Resource Management Strategy
- Dorset Natural Resource Management Strategy.

Key management elements

Capacity and engagement

- Community capacity includes 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.
- The need to build community capacity to deliver and manage the region's natural resources reflects comments received from the public consultation processes. While stakeholder capacity building has been a continual focus for NRM North and many other agencies and organisations at regional, state and national levels, continued efforts will be required to ensure the region's stakeholders are able to meet their responsibilities and deliver effective environmental outcomes.
- To develop the capacity of stakeholders and the general community to manage their natural resources, investment must be made in activities that build knowledge and support their work, so that a balance can be achieved between social, economic and environmental aspects of natural resource management. Sustainable natural resource management will be best achieved through the collaborative action of stakeholders. Actions throughout this Strategy aim to build on the considerable strengths, knowledge, resources and capacities that exist in the region.
- The approach adopted here recognises the need to address each of the five key requirements of capacity building:
    - Raising awareness of relevant issues and their impacts on the community;
    - Sharing information to build knowledge;
    - Developing skills through appropriate training;
    - Providing support and facilitation decisions about, and implementation of, natural resource management; and
    - Recognising and acknowledging what people do and how they achieve it.

- Capacity building involves continuous dialogue between resource managers and resource users to engender support for, and genuine involvement in, adaptive management.
- Changes in community, landholder and corporate behaviour occur over long periods of time, and for that reason it is imperative that capacity building is seen as an investment in both funds and time.
- 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 potential implications.
- To ensure effective application of research findings, it is key that the design of natural resource management-focussed applied research projects considers the needs and capacities of end-users, including presentation of findings and tools in an accessible format.
- Active participation and engagement of the research sector are required to support appropriate use and analysis of current information, and to fill knowledge gaps to support decision processes.
- 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 strongly on informing decision-makers; the need for researchers to act as knowledge brokers and communicate findings to end-users is emphasised in program design.

Aboriginal engagement and participation

- On behalf of the northern regional community, NRM North acknowledges 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 region for over 40,000 years.
- Many of the patterns we see in the region's natural landscapes have been shaped by Aboriginal 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 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 perspective of Aboriginal people.
- There is also a clear need to work towards consistent incorporation of Aboriginal cultural heritage and knowledge in relation to management of Land, Water, Biodiversity and Coastal Assets and to facilitate participation of Aboriginal people in natural resource management activities.

Governance, policy and integrated planning

- Several key organisations and agencies are responsible for managing and regulating the majority of natural resources in the region, including local and State Government, key industries and landholders.
- The intention of this regional strategy is not to duplicate or supersede other state, regional or local planning processes, but to support and nest priorities and information upon which industry, government and community can base future planning and immediate investment.
- This Strategy is based at a regional level to ensure local issues and opportunities are recognised and incorporated into considerations of larger-scale state and national interests and obligations.
- As key land managers within the region, local and State Government hold powerful positions and responsibility for ensuring sustainable resource management and use take appropriate directions. They are essential to decision-making, on-ground activity and community support for the management of beaches, roadsides, reserves, Crown land and production areas.
- Local government plays an essential role in the identification and management of community needs and prioritisation of on-ground action. Local government's strategic direction of identifying and supporting natural resource management is necessary to realise multiple benefits from planning and policy decisions and to strive for sustainable outcomes.
- The broader natural resource management community and general public also hold a very powerful role within the region, as it is their values and votes that determine the outcomes of elections, and subsequent policy development, which may impact on the region's resources. The region's landowners are the single largest group of stakeholders involved with natural resource management.
- The complexities of managing natural resource issues necessitates cooperation between a considerable number of stakeholders with highly varying norms, interests and powers to act.[49] Effective management therefore requires coordination and cooperation across policy and institutional systems and structures including:
  - Across administrative boundaries;
  - Between agencies and departments within the same level of government when management components of a single natural system are fragmented between them;
  - Between government and non-government stakeholders who affect, or are affected by, natural resource management; and
  - Vertically when responsibility for management of ecological or spatial natural unit processes rests with different levels of government and/or private stakeholders.
- Regional strategies and regional natural resource management organisations are in a unique position to broker partnerships between multiple agencies so that they work jointly on projects.
- There is the potential to allow community ownership of local/regional issues and opportunities, enable integration (e.g. across vegetation, land, biodiversity, water), guide management and investment at an effective scale, and serve as an accountability mechanism for private and public investment from all levels of government.
- Supporting regional initiatives on a collaborative basis, such as the Tamar Estuary and Esk Rivers program, can support integration of issues, community engagement, coordinated monitoring processes for optimal data gathering, and targeted research to fill information gaps and link policy initiatives to on-ground outcomes.

49 Brown, AJ, Bellemy, JA (Eds), 2007, Federalism and Regionalism in Australia: New approaches, new institutions?

- Some of the leading issues regarding governance arrangements underpinning natural resource management programs include:
  - Design of devolved responsibilities that support networks and partnerships across local community and regions;
  - The need for stable, long-term funding and institutional commitment to support partnerships, collaboration, trust and legitimacy; and
  - Establishment of partnership and collaboration frameworks that are inclusive of all stakeholders and diverse communities.
  - Support of governance arrangements that provide appropriate incentives for collaboration and coordination across scales and stakeholders.[50]

Image: Rob Burnett

Threats and opportunities

Projected climate change impacts

- Rural communities have been identified as being vulnerable to climate change[51] with environmental, economic and social changes predicted to affect the health of these communities. Tasmanian rural communities are predicted to experience less environmental change compared to other areas in Australia. However, these communities are predicted to have the highest fall in farm cash returns.[52]
- Sea level rise will impact on property and transport infrastructure for many people living in the northern 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 of essential services.
- Sea level rise will also impact on Aboriginal cultural heritage sites, as the coastal zone is a hotspot for cultural sites.
- There could be an increase in movement of people from interstate to Tasmania as climate refugees because of the relatively lower environmental change predicted compared to mainland Australia.

50 HC Coombs Policy Forum, 2011, 'Synthesis of broad issues and opportunities: Document I', HC Coombs Policy Forum-Fenner School of Environment and Society NRM initiative, The Australian National University
51 Climate Commission, 2010, The Critical Decade: Tasmanian impacts and opportunities. Climate Commission Technical Report, Department of Climate Change and Energy Efficiency, Canberra, ACT
52 Nelson, R, Kokic, 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

- The following processes threaten the building of sustainable communities:
  - Community burnout;
  - Low levels of understanding;
  - Resourcing limitations;
  - Ineffective policy and legislative frameworks, planning and coordination;
  - Lack of monitoring and evaluation;
  - Resource intensity of engagement and capacity exercises;
  - Lack of time or opportunities for people to get involved; and
  - Lack of coordination between management agencies and authorities.

Opportunities

- Increasing community awareness, knowledge and skills in natural resource management have proven to have a direct influence on the capacity and outputs of activity. Placing further emphasis on these activities will support advocacy and consideration of natural resource management in governance and planning as well as on-ground works.
- Opportunities for collaboration and partnerships between organisations for planning and coordinated implementation of management activities across agencies and sectors can increase engagement and participation rates while providing significant implementation efficiencies.
- The Tamar Estuary and Esk Rivers program is a successful collaborative approach to natural resource management planning and implementation. The program has a high level of commitment from all levels of government, as well as industry and community. The program provides a model that can be applied to other facets of natural resource management in the region.
- A high level of expertise in environmental management already exists. There are strong community groups, including traditional care groups such as Landcare, Coastcare and Wildcare as well as community service groups, school associations, and industry sector groups with a vested interest in natural resources at varying scales (site to landscape).
- Relevant state and Commonwealth data are already available through services such as DPIPWE's Natural Values Atlas, List Map and Wist. The community has identified the strong need for processes to support the analysis of data for ready application to planning and management processes based on known information.

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 and many industries and non-government organisations (NGOs).

An external review of natural resource management in the northern region made several 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.

General Targets and Priority Actions

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.	> Australian Government > Tasmanian Government > Local government > NRM bodies
	SPA2 Provide support to review and develop natural resource management-related legislation, planning and policy including the single statewide planning policy and the review of policy and legislation that affects NRM outcomes.	> Tasmanian Government > Local government > NRM bodies > Industry > NGOs
	SPA3 Facilitate investment and knowledge and information resource development to build capacity, education levels and awareness.	> Australian Government > Tasmanian Government > Researchers > Land, sea and water managers > Local government > NRM bodies > Business > Community groups and volunteers
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.	> 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.	> All stakeholders
	SPA6 Maximise and coordinate funding opportunities to support implementation of reference group recommendations.	> 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).	> 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 details regional Asset Management Targets for biophysical assets (which excludes Community Assets) and identifies how these 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 Northern 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 have key roles to play within 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 North 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 NTD 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.

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 Targets: **LMT1** Assets and hazards associated with the land asset are given greater consideration in land management and planning activities and take account of projected climate change impacts. **LMT2** Increased adoption of best practice land management practices with an emphasis on soil health, vegetation/groundcover and ecological function. **LMT3** Knowledge of the condition, capacity and threats to the Land Assets is maintained and improved to inform planning and management. **LMT4** Biosecurity processes are in place and effective at minimising the spread of invasive species or disease outbreaks. ***Contributing to Resource Condition Targets:*** **LCT1** Soil condition is maintained within desirable SCEAM[53] condition ranges for important soil and land use combinations. **LCT2** The extent of vegetation cover (both native and modified) is improved and maintained, as measured by land cover mapping. **LCT3** The condition of the region's listed geo-conservation sites and values be maintained or enhanced. **LCT4** A reduction in current extent of identified weeds and pest animals, with no new high threat weeds, pests and diseases established.	**LPA1** Consider the Land Assets' condition, capacity, hazards and landscape values in planning and management processes at regional and local scales. Key activities: > Develop collaborative approaches to planning and management to support cross-jurisdictional management issues and support efficiencies in delivery; > Incorporate Aboriginal cultural heritage values and knowledge in planning and management processes; > 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; and > Support land managers and industry in the development, promotion and adoption of sustainable management practices which maintain carbon, health, vegetation/ground cover, and ecological function of soils.	✓	✓	✓	✓	> Tasmanian Government > Local government > NRM North > NGOs > Land and water managers
	LPA2 Provide access to and support development of relevant land asset and hazard information in a format that can be readily adopted to inform end-user planning processes. Key topics include: > Land-use and management practice information; > Hazard/risk assessments including soil degradation and salinity; > Geo-conservation values; > Land capacity and enterprise suitability information; and > Ecosystem service priority areas.	✓	✓	✓	✓	> NRM bodies > Researchers > Tasmanian Government

53 SCEAM – Soil Condition Evaluation Assessment and Monitoring

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)	
	LPA3 Build the knowledge, skills and capacity of land managers and support dissemination of knowledge and decision-support tools for key sector groups. Key activities: > Develop direct and next-user extension packages (including events, traditional and online information marketing) to support adaptive land management practices; > Establish case study and demonstration projects which demonstrate application; > Provide specific training and support for the prevention and management of invasive weed and disease threats; and > Provide specific training to relevant council staff regarding the requirements for sediment and erosion control.	✓	✓	✓	✓	> Researchers > Tasmanian Government > NRM North > Industry > Business
	LPA4 Support land and soil research and monitoring programs to inform continual improvement of management and planning processes. Key topics include: > Soil condition and hazard assessment (including extreme events); > Salinity trends and groundwater monitoring; > Land use and land management practice; > Geo-conservation; and > Climate change impact assessment.	✓	✓	✓	✓	> Researchers > Tasmanian Government > NRM North > Industry > Business
	LPA5 Undertake a strategic review of data collection systems against regional requirements for monitoring and reporting of strategy implementation.	✓	✓	✓	✓	> NRM North
	LPA6 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.	✓	✓	✓	✓	> NRM North

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 Targets: **WMT1** Surface and groundwater asset and landscape values and associated hazards will be given greater consideration in land management and planning activities and take account of projected climate change impacts. **WMT2** Catchment water management plans/frameworks to be operational for all catchments within the region. **WMT3** Regional skills knowledge and capacity to manage water assets will be enhanced. **WMT4** Adoption of best practice water management practices is increased, with an emphasis on water quality and ecosystem health. **WMT5** Knowledge of the condition and capacity of, and threats to, the Water Assets is maintained and improved to inform planning and management. **WMT6** Biosecurity processes are in place and effective at minimising the spread of invasive species or disease outbreaks. *Contributing to Resource Condition Targets:* **WCT1** 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). **WCT2** A net increase in the extent of riparian native vegetation across the region. **WCT3** The ecological condition of Ramsar wetlands will be maintained or improved above baselines established in ecological character descriptions developed for each Ramsar wetland.	**WPA1** Consider the Water Assets' condition, capacity, hazards and landscape values in planning and management processes at regional and local scales. Key activities: > Develop collaborative approaches to planning and management to support cross-jurisdictional management issues and support efficiencies in delivery; and > Incorporate Aboriginal cultural heritage values and knowledge in planning and management processes.	✓	✓	✓	✓	> Tasmanian Government > Local government > NRM North > NGOs > Industry > Land managers
	WPA2 Support collaborative catchment/landscape scale management initiatives to address waterway health and water quality. Key activities: > Implement Water Quality Improvement Plans currently in development for the TEER, Mersey, George and Brid catchments. These plans will identify priority land use-specific management actions to reduce pollutant loads to waterways; > Implement the NRM North Regional Stormwater Quality Management Strategy 2014–2017. The strategy includes prioritised sub-catchments for management and intervention for each municipality in the region; > Control (in coordinated and adaptive ways) new and existing high threat aquatic pest and disease incursions, to prevent further spread; and > Implement the Launceston Sewerage Improvement Project to address sewage discharge and overflow issues impacting on water quality and ecological values of the Tamar River.	✓	✓	✓	✓	> Water managers > Researchers > Tasmanian Government > Local government > Industry sectors

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)	
WCT4 The areal extent and condition of individual, regionally significant wetlands listed in the Directory of Important Wetlands, and those identified as priority wetlands/water bodies in the Atlas of Tasmanian Wetlands, to be maintained or improved above the 2006 baseline levels.	**WPA3** Support the development, promotion and adoption of management plans and environmental management systems which include adaptive actions to address responses within the Water Assets to land use and climate influences. Key activities: > Include high-value Water Asset and landscape value considerations in regional and municipal scale planning processes; > Develop, implement and review management plans for high-value wetlands, including Ramsar sites, and high conservation value aquatic ecosystems; and > Support the adoption of property-scale planning systems that incorporate consideration of Water Assets, including managing potential impacts from production practices such as the export of sediment and nutrients.	✓	✓	✓	✓	> Water managers > Researchers > Tasmanian Government > Local government > NRM North
	WPA4 Build the knowledge, skills and capacity of water and land managers and support dissemination of knowledge and decision-support tools for key sector groups including the agricultural, government and industry sectors. Key activities: > Provide access to extension support (including events, and traditional and online information) to support adaptive planning and management practices; > Establish case studies and demonstration projects which demonstrate the application of adaptive planning and management practices; > Provide training to relevant council staff regarding the principles and implementation of Water Sensitive Urban Design; > Support the development of processes and tools to improve sustainability of catchment and property-scale irrigation management practices; and > Provide specific training and support for the prevention and management of invasive pest and disease threats to Water Assets.	✓	✓	✓	✓	> Water managers > Researchers > Tasmanian Government > Local government > NRM North

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)	
	WPA5 Support aquatic research and monitoring programs to inform continual improvement of management and planning processes. Key topics include: > Water quality and quantity; > Riparian zone condition and trend in response to management practices; > Identification of aquatic refugia; > Sediment and nutrient sources and management approaches; > Wetland condition and trend; > Geo-conservation values and trends; > New and existing high risk invasive threats and control measures to address; and > Groundwater and groundwater-dependent ecosystem condition, trend and management.	✓	✓	✓	✓	> Tasmanian Government > Local government > NRM bodies > Industry sector bodies > Researchers
	WPA6 Undertake a strategic review of data collection systems against regional requirements for monitoring and reporting of strategy implementation.	✓	✓	✓	✓	> NRM North
	WPA7 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.	✓	✓	✓	✓	> NRM North

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

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 Targets: **CMMT1** Shoreline, estuarine and marine-dependent species and ecosystems, and the processes that support them will be recognised, conserved and protected within planning systems. **CMMT2** Improved management of Coasts and Marine Assets, with an emphasis on increasing the adoption of management practices that enhance the adaptive capacity of Coasts and Marine Assets to be resilient against climate change and sea level rise. **CMMT3** Regional skills, knowledge and capacity to manage Coasts and Marine Assets are further enhanced. **CMMT4** Increased knowledge of the condition, capacity and threats to Coasts and Marine Assets to inform planning and management processes. **CMMT5** Biosecurity processes are in place and effective at minimising the spread of invasive species or disease outbreaks.	**CMPA1** Consider Coasts and Marine Assets and associated landscape values in planning and management processes at regional and local scales.	✓	✓	✓	✓	> Researchers > Tasmanian Government > Local government > NRM North > Community groups > Volunteers
	CMPA2 Consider Aboriginal cultural heritage practices and values in planning and management processes.	✓	✓	✓	✓	> Researchers > Tasmanian Government > Local government > NRM North > Community groups > Volunteers
	CMPA3 Support collaborative planning approaches that address threats to estuarine and near-shore marine environments. Key activities: > Implement Water Asset Priority Actions to have a direct positive influence on estuarine and near-shore receiving waters. Urban Landscapes will have elevated priority due to having high relative contributions of pollutants and a greater influence on receiving waters; > Support and build the coordinating capacity of coastal and marine working groups with representation from industry, local government and community such as George Town coastal working group, north-east coastal working group Transition, Break O'Day, Coastcare and Wildcare; and > Support the development and implementation of coastal adaptation and management for and with the specific inclusion of coastal and marine values.	✓	✓	✓	✓	> All stakeholders

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 (N)	Production (P)	Lifestyle (L)	Urban (U)	
Contributing to Resource Condition Targets: **CMCT1** Maintain and improve the condition of coastal and estuarine terrestrial and marine habitats, as measured at representative sites. **CMCT2** The current extent of identified coastal and marine invasive pests and pathogens are reduced and managed, with no new high threat invasive pests and pathogens established in the coastal and marine environments. **CMCT3** The condition of the region's listed coastal geo-conservation sites and values are maintained with respect to sea level rise and related coastal processes.	**CMPA4** Continue to 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, high value wetlands, other areas of sensitive coastal habitat and marine areas used for aquaculture. Key activities: > Manage high value coastal habitat areas including foreshore vegetation and coastal wetlands; > Support coastal and marine monitoring programs including Tasmark, RedMap, marine pests, intertidal habitat, and shore birds; and > Incorporate ecological considerations in fire management practices for community protection and safety.	✓	✓	✓	✓	> Tasmanian Government > Local government > NRM North > Coastal community groups > User groups
	CMPA5 Provide access to and support development of relevant Coasts and Marine Assets' hazard information in a format that is readily adoptable to inform end-user planning processes. Key topics include: > Coastal inundation and erosion hazards; > Acid sulphate hazard assessment; > Estuarine and near-shore water quality; and > Marine ecosystems and fisheries condition.	✓	✓	✓	✓	> Tasmanian Government > NRM North

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)	
	CMPA6 Support and undertake on-ground activities to conserve and protect shoreline, estuarine and marine-dependent species and ecosystems. Key activities: > Raise awareness and provide support programs that encourage best management practice; > Provide access to extension support (including events, and traditional and online information) to support adaptive planning and management practices; > Establish case studies and projects which demonstrate application of adaptive planning and management practices; > Provide specific training to relevant council staff regarding the requirements for water sensitive urban design; > Implement and develop management plans for high value conservation and public amenity areas; and > Raise awareness in the general boating and fishing community regarding general coastal and marine pest issues and the identification of target pests, particularly those considered to be an introduction or translocation threat.	✓	✓	✓	✓	> Tasmanian Government > Local government > NRM North > Community groups
	CMPA7 Support marine and coastal research and monitoring programs to support continual improvement of management and planning processes. Key topics include: > Coastal and marine ecosystem condition and vulnerability assessment; > Identification of retreat pathways for coastal ecosystems to respond to predicted coastal inundation; > Fire management and ecology; > Estuarine ecosystem health (with particular focus on identified priority research areas in the Tamar Estuary Management Plan); > Geo-conservation condition and trend; and > Invasive species and pathogens.	✓	✓	✓	✓	> Researchers > NRM North > Tasmanian Government > Local government > Industry sectors

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	
	CMPA8 Undertake a strategic review of data collection systems against regional requirements for monitoring and reporting of strategy implementation.	✓	✓	✓	✓	> NRM North
	CMPA9 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.	✓	✓	✓	✓	> NRM North

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 (N)	Production (P)	Lifestyle (L)	Urban (U)	
Management Targets: **BMT 1** Biodiversity and ecological function conservation principles are recognised and supported in planning processes at landscape and property scales. **BMT2** Management of Biodiversity Assets is improved, with an emphasis on increasing the adoption of management practices that enhance the adaptive capacity of Biodiversity Assets to be resilient against impacts associated with land management and climate change. **BMT3** Increased knowledge of the condition, capacity and threats to the Biodiversity Assets and associated landscape values to inform planning and management processes. **BMT4** Biosecurity processes are in place and effective at minimising the spread of invasive species or disease outbreaks. ***Contributing to Resource Condition Targets:*** **BCT1** The extent, condition and connectivity of critical habitats and the status of threatened and vulnerable species and communities are improved. **BCT2** Achieve full CAR representation of vegetation communities managed primarily for conservation at a bioregional scale. **BCT3** The current extent of identified invasive pests and pathogens to the Biodiversity Assets are reduced and managed, with no new high threat invasive pests and pathogens established.	**BPA1** Incorporate Biodiversity Assets and associated landscape values in planning and management processes at regional and local scales. Key activities: > Support collaborative approaches to planning and management to inform cross-jurisdictional management of biodiversity assets and linkages to state and national conservation plans; > Support and encourage the inclusion of Biodiversity Assets, their associated landscape values, and management principles for biodiversity conservation into planning and development processes; > Incorporate Aboriginal cultural heritage and knowledge into management of biodiversity assets; and > Provide access to, and support development of, relevant biodiversity asset information in a format that can be readily adopted to inform end-user local and regional-scale planning processes.	✓	✓	✓	✓	> Tasmanian Government > Local government > Industry > NRM North > Community
	BPA2 Work with and support land managers in the management of native habitat through the development and implementation of management plans for properties, parks and reserves. Key activities: > Develop and implement property-scale planning processes that include provisions for biodiversity management; and > Develop and implement reserve management plans including Ramsar sites.	✓	✓	✓	✓	> Tasmanian Government > Local government > Industry > NRM North > Community

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 (N)	Production (P)	Lifestyle (L)	Urban (U)	
	BPA3 Continue to plan, prioritise and undertake activities to control existing weeds, pests and diseases, and establish and support effective coordination mechanisms to enable rapid response to new incursions. Key activities: > Support implementation of the regional weed management strategy;[54] > Support collaborative approaches to the management of invasive weed, pest and disease threats to high priority biodiversity assets across land tenures; and > Increase community capacity to identify and manage invasive risks including the adoption of hygiene management protocols.	✓	✓	✓	✓	> Researchers > NRM North > Tasmanian Government > Local government > Industry sector (including tourism and recreation) > Land and water managers
	BPA4 Continue to undertake activities to mitigate local and landscape-scale threats to threatened species, communities and specialised habitats, with a focus on establishing effective coordination mechanisms. Key activities: > Increase protection of under-represented ecological communities within the Reserve estate, including the establishment of protected areas on private land; > Work with and support land managers to increase the extent and condition of habitat through the development and implementation of management plans for properties, parks and reserves; > Support the implementation of prioritised threatened species recovery actions; > Support coordinated protection and management for other special biodiversity values including refugia, landscape connectivity and endemic species and communities; and > Where appropriate, provide incentives to support on-ground implementation of management actions to protect or enhance biodiversity assets.	✓	✓	✓	✓	> Tasmanian Government > Local government > NRM North > NGOs > Industry sector (including tourism and recreation) > Land and water managers

54 Cronin, S, 2012, Weed Management Strategy: Northern Natural Resource Management Region

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 (N)	Production (P)	Lifestyle (L)	Urban (U)	
	BPA5 Support ongoing, and establish further, capacity to monitor species and community distribution and change, with a focus on building understanding of the impact of land management and climate change influences. Key activities: > Increase collective capacity of monitoring programs including the use of citizen science and the use of remote sensing applications to detect and monitor change; > Support the development of decision-support tools to identify and prioritise activities to improve habitat/ecosystem and connectivity and resilience; and > Increase community capacity to identify and monitor invasive pest and pathogen species.	✓	✓	✓	✓	> Tasmanian Government > Local government > NRM North > Land managers > Recreational user groups > NGOs > Community groups
	BPA6 Undertake a strategic review of data collection systems against regional requirements for monitoring and reporting of strategy implementation.	✓	✓	✓	✓	> NRM North
	BPA7 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.	✓	✓	✓	✓	> NRM North

5. Community Asset Targets, Priority Actions and Key Contributors

Community Asset Management Targets[55] (CMT) (5 Year)	Community Asset Priority Actions (CPA)	Alignment with Landscape Goals				Key Contributors
		Natural (N)	Production (P)	Lifestyle (L)	Urban (U)	
Management Targets: **CMT1** The community of Northern Tasmania will be increasingly involved in natural resource management policy, planning, action and research. **CMT2** The community engaged in natural resource management activities 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. **CMT3** The engagement and participation of Aboriginal people in natural resource management activities from planning through to implementation will be enhanced across all assets.	**CPA1** Raise community awareness and understanding of the impact of human activities and climate change on natural resources.	✓	✓	✓	✓	> All stakeholders
	CPA2 Where appropriate, support the establishment of collaborative arrangements to provide a coordinated management approach and guide for solutions and investment for natural resource management at an appropriate scale.	✓	✓	✓	✓	> All stakeholders
	CPA3 Facilitate the interaction and collaboration between experts undertaking research activities, community members interested in natural resource research, and research end-users.	✓	✓	✓	✓	> Researchers > Tasmanian Government > Local government > NRM North > Community groups > Volunteers
	CPA4 Foster greater community understanding of existing natural resource management policy, legislation and planning, and encourage community participation in the future review and development of such policies and instruments. .	✓	✓	✓	✓	> Tasmanian Government > Local government > NRM North
	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.	✓	✓	✓	✓	> Tasmanian Government > Local government > NRM North > Community groups > Volunteers > NGOs
	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.	✓	✓	✓	✓	> Tasmanian Government > Local government > NRM North > NGOs > Community groups > Volunteers

Community Asset Management Targets[55] (CMT) (5 Year)	Community Asset Priority Actions (CPA)	Alignment with Landscape Goals				Key Contributors
		Natural N	Production P	Lifestyle L	Urban U	
	CPA7 Support key agencies, organisations and industry bodies to include natural resource management and climate change adaptation into plans, strategies and operations.	✓	✓	✓	✓	> Tasmanian Government > Local government > NRM North
	CPA8 Support the natural resource management community in Northern Tasmania in building relationships and mutual understanding with Aboriginal people and utilising and respecting Aboriginal ecological and cultural knowledge in natural resource management activities.	✓	✓	✓	✓	> Aboriginal community organisations > Tasmanian Government > Local government > NRM North > NGOs > Community groups > Volunteers
	CPA9 Reduce barriers for land managers to appropriately manage cultural values, such as Aboriginal heritage and cultural landscapes, through facilitating identification and supporting actions to avoid damage.	✓	✓	✓	✓	> Aboriginal community organisations > Tasmanian Government > Local government > NRM North > NGOs > Community groups > Volunteers
	CPA10 Support or lead the mapping of Indigenous cultural landscape areas in the region, then prepare a framework for the monitoring and restoration of these areas.	✓	✓	✓	✓	> Aboriginal community organisations > Tasmanian Government > Local government > NRM North > NGOs > Community groups > Volunteers

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

Image: Rob Burnett

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 Northern Tasmanian community. During the strategy development, 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. 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.

NRM North's role in implementation

NRM North is not a land, coastal, marine or water manager, nor is it a regulator. NRM North'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 North will support implementation of this Strategy through:

- Providing support and facilitation of collaborative partnerships to further the implementation of the Strategy with key management agencies, authorities, and stakeholders. NRM North is in a unique position to be able to broker partnerships between multiple agencies to work jointly on projects. Programs such as TEER adopt a partnership approach which creates trust, builds engagement between partners, promotes resource sharing opportunities, leverages funds and allows partners to develop strategic approaches to problems in conjunction with other major stakeholders in a non-threatening environment;
- Ongoing support for regional delivery models including provision of municipal-based facilitation networks in partnership with local government and sub-regional natural resource management organisations that provide community facilitation and support services for land managers and community groups;
- Ongoing support for delivery programs providing landholder support for uptake of Priority Actions. Property management planning and extension programs supporting land management programs are well established in the region through NRM North's Sustainable Agriculture and Small Farm Living programs;

- Supporting, in partnership with the Indigenous community, the implementation of Indigenous land management programs with the Aboriginal community to determine interests and priorities for natural resource management and support increased participation;
- 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 pathways[56] for key areas of concern;
- Establishing and facilitating sector-based or themed reference groups to build Key Contributor ownership and stakeholder involvement;
- Developing and implementing effective programs that are relevant to the region's resource managers, funding sources and available resources to support the targets within the regional natural resource management strategy;
- Supporting and participating in the ongoing development and refinement of monitoring programs and information systems that will inform natural resource management planning processes;
- Implementing review processes for the regional Strategy and delivery mechanisms across the operational programs of the organisation; and
- Further refining and developing evaluation systems for collation of the regional collective adoption and implementation of the Strategy.

Assessment

This Strategy identifies three levels of headline indicator to 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. The indicators are:

1. **Foundational indicators:** Allow measurement of the awareness, involvement and capacity of the community to undertake natural resource management activities.
2. **Asset Target indicators:** Allow measurement of progress towards the Asset 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 the following table.

56 Adaptation pathways provide more detail for uncertain futures with decision points being identified, and contingencies and modified approaches to activity being 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://terranova.org.au/repository/southern-slopes-nrm-collection

Table 2: Headline indicators

Level	Indicator	Measure	Baseline
Foundational Level	> Increased level of community understanding of *Tasmanian Natural Resource Management Act 2002.*	> Proportion of respondents answering "I have a very good understanding".	> PDF Scans Report (supporting baseline to be obtained)
	> Community confidence in ability to plan for climate change in natural resource management.	> Proportion of respondents answering "able to do it without assistance".	> PDF Scans Report (supporting baseline to be obtained)
	> Sector or theme-based reference groups are established and/or maintained.	> Number of groups established and/or maintained. > Number of sectors or themes covered.	> Develop list of existing theme-based reference groups as part of implementation planning with Key Contributors.
	> Community organisations and individuals are involved in implementation planning and in reporting and review of this Strategy.	> Number of community organisations involved/supported. > Number of Aboriginal community organisations involved/supported. > Number of individuals involved/supported.	> Develop list as part of implementation planning with Key Contributors.
	> Natural resource management and climate change adaptation are referenced and supported in organisational plans of key stakeholders.	> Number of Local Government Strategic Plans that feature natural resource management and climate change adaptation and mitigation objectives and actions. > Number of organisations with climate change provisions included in corporate and strategic planning documents.	> PDF Scans Report. > Develop list as part of implementation planning with Key Contributors.

Level	Indicator	Measure	Baseline
Asset Targets			
Land	> The community is contributing to actions toward achievement of Land Assets 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. > ABS – NRM on Aust Farms.[57]
		> Changes in vegetative cover extent and condition.	> TASVEG, land-use and land-cover mapping.
		> Uptake of Property Management Planning (PMP) processes.	> NRM North PMP program participation. > ABS – NRM on Aust Farms.
		> Uptake in sustainable management practices.	> NRM North PMP program participation. > ABS – NRM on Aust Farms.
		> Further recognition of geo-conservation and culture heritage sites 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.
		> Groups and partnerships towards coordinated invasive species management established and/or maintained.	> Develop list as part of implementation planning and evaluation with Key Contributors.

57 ABS, 2008, 4620.0 - Natural Resource Management on Australian Farms 2006-07

Level	Indicator	Measure	Baseline
Asset Targets			
 **Water**	> The community is contributing to actions toward achievement of Water Asset 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.
		> Adoption of on-ground actions associated with water quality improvement.	> CAPERS DSS – modelled management practices. > TEER Report card. > ABS – NRM on Aust Farms.
		> Impacts on freshwater ecosystems are reflected in land-use policy and planning.	> Review of changes in water-use policy and planning.
		> Increase in resources available and coordination groups and partnerships to support management practices that promote water quality and sustainable use.	> Develop list as part of implementation planning and evaluation with Key Contributors.
		> Groups and partnerships towards coordinated invasive aquatic species management established and/or maintained.	> Develop list as part of implementation planning and evaluation with Key Contributors.

Level	Indicator	Measure	Baseline
Asset Targets			
 **Coasts and Marine**	> The community is contributing to actions toward achievement of Coasts and Marine Assets Targets.	> Number of Key Contributors undertaking biodiversity priority actions, or those revised during implementation planning.	> Develop list as part of implementation planning and evaluation with Key Contributors.
		> Marine Values are identified and mapped.	> Marine Values Atlas developed.
		> Impacts of sea level rise on natural and cultural values are effectively considered in land-use policy and planning.	> Review of changes in coastal land-use policy and planning.
		> Increase in resources available and coordination groups and partnerships to support management practices that mitigate threats to coastal and marine ecosystems.	> Develop list as part of implementation planning and evaluation with Key Contributors.
		> Groups and partnerships towards coordinated invasive marine and coastal species management established and/or maintained.	> Develop list as part of implementation planning and evaluation with Key Contributors.

Level	Indicator	Measure	Baseline
Asset Targets			
 **Biodiversity**	> The community is contributing to actions toward achievement of Biodiversity Asset Management Targets.	> Number of Key Contributors undertaking biodiversity priority actions, or those revised during implementation planning.	> Develop list as part of implementation planning and evaluation with Key Contributors.
		> Changes in extent and representation of threatened communities, or vegetation communities that support threatened species, in reserve estate or under stewardship agreements.	> DPIPWE vegetation reports, number of management agreements and private land covenants.
		> Number of threatened species recovery actions undertaken.	> DPIPWE Threatened Species Section reporting and/or implementation review of Prioritisation of Threatened Flora and Fauna 2010.[58]
		> Impacts of development on biodiversity values are considered consistently and within a cumulative impact approach in land-use policy and planning.	> Review of changes in land-use policy and planning.
		> Increase in resources available and coordination groups and partnerships to support management practices that promote ecosystem function.	> Develop list as part of implementation planning and evaluation with Key Contributors.
		> Groups and partnerships towards coordinated invasive species management established and/or maintained.	> Develop list as part of implementation planning and evaluation with Key Contributors.

58 DPIPWE, 2010, Prioritisation of Threatened Flora and Fauna

Level	Indicator	Measure	Baseline
Asset Targets			
 **Community**	> Awareness and involvement of natural resource management planning and implementation by the community, including how the community values protection of Aboriginal cultural heritage.	> 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.	> NRM North program records. > NRM North Community Group Survey. > NRM North Program Assessments.
Implementation level	> Key contributors are supported to develop implementation plans linked to of referencing this Strategy and/ or climate change adaptation and NRM.	> Number of Key Contributors involved/ supported.	> Develop list as part of implementation planning with Key Contributors.
	> Aboriginal environmental, cultural and economic perspectives are incorporated in implementation planning.	> Number of Aboriginal community organisations involved/ supported. > Number of Key Contributors incorporating Aboriginal perspectives in implementation planning and action.	> Develop list as part of implementation planning with Key Contributors.
	> Community is undertaking priority actions or revised actions, to increase their operational alignment during implementation planning.	> Number of Priority Actions or linked actions undertaken. > Number of Key Contributors undertaking actions.	> Develop list as part of implementation planning with Key Contributors.

Evaluation and improvement

NRM North 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, objectives and targets for landscapes and natural resource assets.

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. DPIPWE's vegetation reporting and soil condition and assessment methodology, TEER ecosystem health assessment programs). This will help ensure these data sources continue to be useful for measuring progress towards targets and that they provide accurate, cost-effective and timely natural resource management information.

In evaluating this Strategy, NRM North 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 North 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.

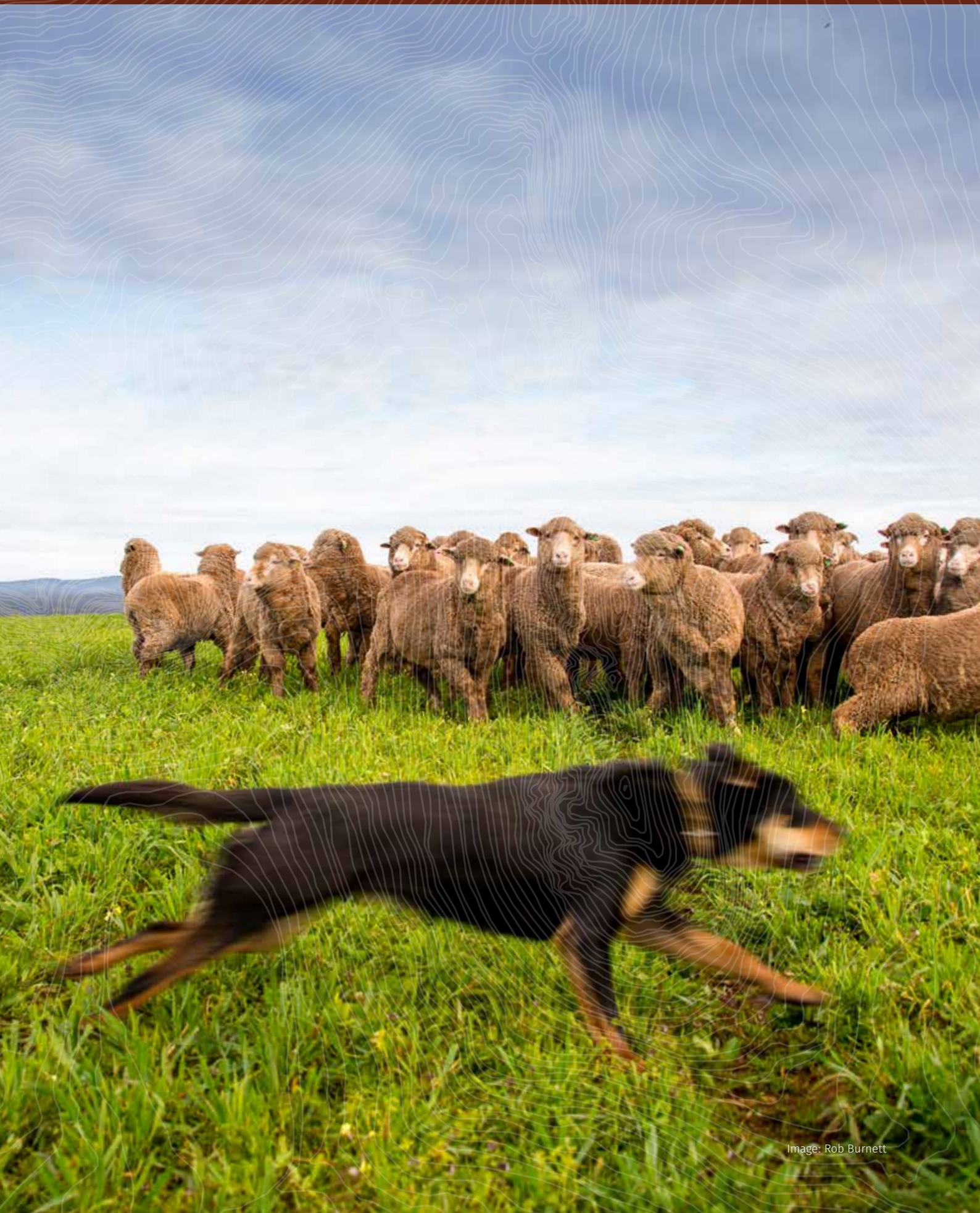


Image: Rob Burnett

Strategic Context

Our approach to developing the Strategy

This Strategy has been informed by:

1. The two previous NRM strategies;
2. Consideration of regional achievements;
3. Consultation (including an independent third party analysis);
4. Climate change-specific research;
5. Consideration of the legislative and policy framework impacting natural resource management in Northern 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 Northern Tasmania.

It recognises the need to work in harmony with industry, primary producers and rural communities to provide solutions to existing problems, leading to an improved and sustainable environment.

The Strategy aims to ensure the natural resources of the region are managed responsibly and farmers remain economically viable for the benefit of all the people of the region. Without good natural resource management, farmers cannot be sustainable or competitive. Without strong, confident and economically viable communities, we will not be able to manage and improve the natural resources that communities depend on for their livelihood.

In order to develop the capacity of stakeholders and the general community to manage their natural resources, it must be acknowledged that a balance can be achieved between social, economic and environmental aspects of natural resource management. This Strategy 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.

The approach to developing this Strategy was to ensure it:

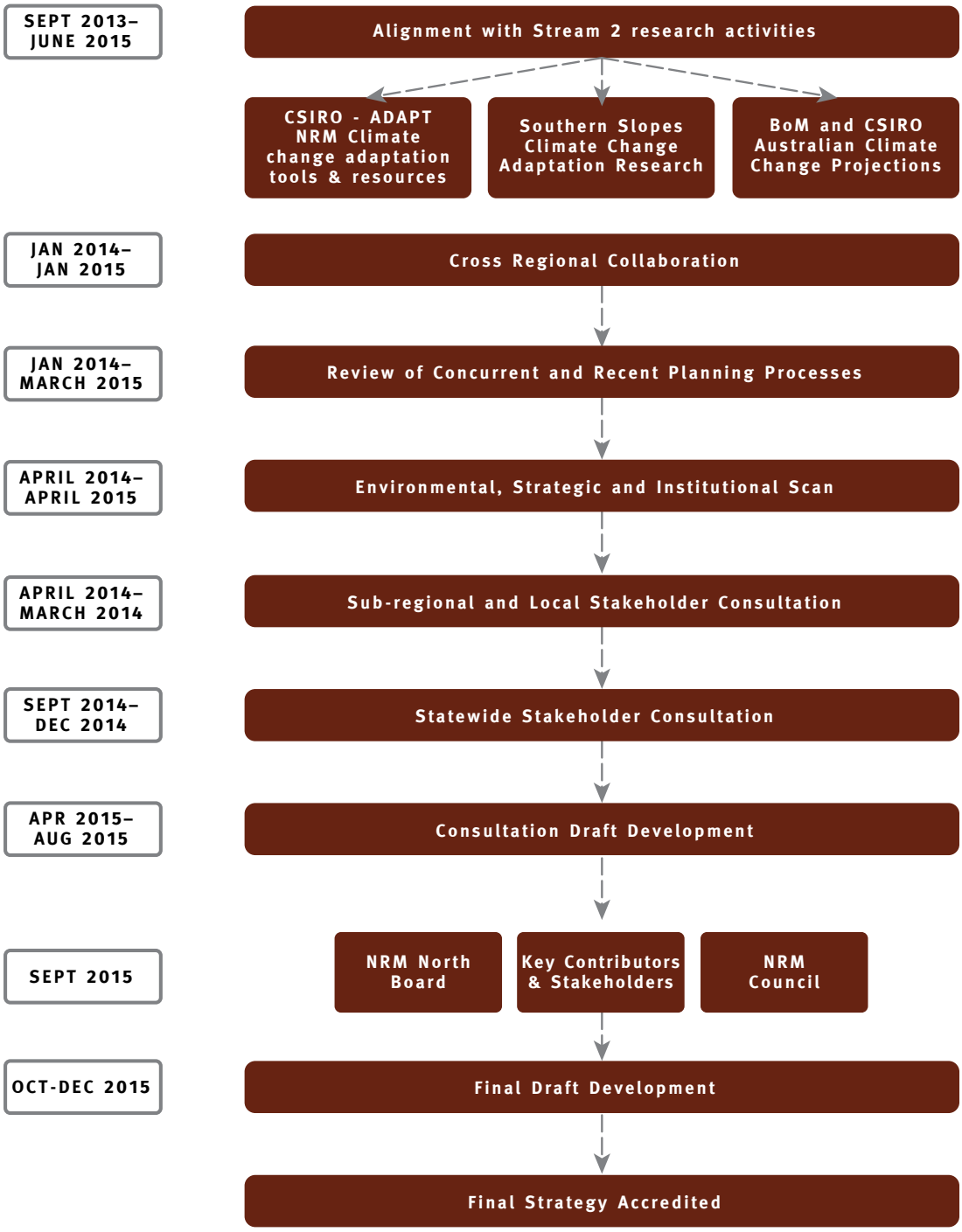
- Has a biophysical focus and is mindful of current and future development opportunities;
- Supports diversification, recognising that businesses, communities and ecosystems that are diverse are better able to respond to change and are more productive;
- Encourages activity to build and maintain resilient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

A key component of the Strategy's development has been 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 human resources has provided for a holistic approach to strategy development and is a core focus for implementation prioritisation.

The development process and major inputs are outlined in Figure 3 on the following page.

Figure 3: Development process for the Strategy



1. What we've learned from previous strategies

Regional natural resource management has become a key delivery mechanism for many environmental and agricultural programs throughout Australia over the past 15 years. This model has arisen through a need to target relevant regional scale priorities throughout the country. This Strategy is the third regional strategy for Northern Tasmania and builds on the knowledge base, community values 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 the environmental, strategic and institutional factors surrounding natural resource management in Northern Tasmania that was undertaken to inform this Strategy identified that the focus of previous strategies remains largely still relevant.[59]

NRM North's first strategy, produced in 2005, provided a detailed classification and assessment of the region's natural assets supported by highly detailed resource condition targets and management action targets. The second strategy, produced in 2010, was more simply structured, with a much more general approach to setting priorities and their implementation.

In moving towards this third round of NRM strategies, Tasmania's NRM regional bodies have aimed to seek a practical balance between principles and detailed priorities. Prescriptive management actions have been avoided to enable greater flexibility and adaptive options to achieve higher order targets and visions for the region's landscapes and natural assets.

2. Regional achievements

Since 2007, NRM North has been providing annual yearbooks to acknowledge regional achievements in implementing its strategies. The reports provide: a summary of known activities across a broad range of community sectors involved in natural resource management in the region; an insight into the range of action and progress in the region; an appreciation of how work is undertaken; and results that are achieved.

The reports acknowledge the considerable efforts and contributions undertaken each year through direct investment of financial resources, man hours and in-kind support provided through Australian, state and local governments, industry sectors, private landholders and community organisations to natural resource management in the region. Partnerships and collaborative programs maximised return on investment by:

- Leveraging funds and in-kind contributions across organisations;
- Achieving efficiencies through resource sharing to make effective use of available skills and resources; and
- Providing a conduit for integration of natural resource management activities with operational procedures.

Further information and access to the NRM North Year Books can be accessed from www.nrmnorth.org.au

59 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.

3. Consultation

Consultation was central to the development of this Strategy with involvement of key stakeholders and the broader community to ascertain values, priorities, concerns and preferences for the region's landscapes and assets. Consultation targeted building on previous strategy development processes and aimed to maximise considerations of other planning and consultation processes currently being undertaken in the region including the:

- Greater Launceston Plan;
- Coastal adaptation planning undertaken for a number of coastal communities;
- Tamar Estuary and Esk Rivers (TEER) Program and subsequent planning for the TEER Water Quality Improvement Plan, supported by local and State Government, key industry stakeholders and water managers;
- NRM North Regional Stormwater Management Plan, developed in consultation with local and State Government;
- Regional Land Use Strategy of Northern Tasmania; and
- Program evaluation processes undertaken on a continual basis through the implementation of natural resource management initiatives undertaken by NRM North independently and in partnership with program partners.

Several methods were used to enable the greatest ability for regional input.

Table 3: Participants and organisations represented according to consultation method

Method of consultation		No. of participants
Draft Strategy Development	Review of concurrent and recent planning processes	**N/A**
	Analysis of NRM North stakeholder feedback and assessment processes	**N/A**
	Regional engagement – network questionnaire and consultation sessions	**50**
	Regional workshop	**30**
	Statewide workshop	**26**
	Targeted stakeholder interviews	**20**
Draft Strategy Validation	Draft Strategy Consultation – call for submissions: > Public Notice Launceston Examiner (12 Sept) > Direct email invitations – reach 327 > Included in October E-News – reach 1161 > Social Network Sites (Twitter/Facebook) – reach 769 > NRM North Website – 116 page views	
	Draft Strategy Consultation total submissions received	**11**

Statewide stakeholder consultation

A statewide stakeholder consultation process was completed by the three Tasmanian NRM regional bodies to recognise the nature of many stakeholders' needs 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 addressed 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

A series of opportunities enabled the community to engage face-to-face at selected fora around the region to provide feedback and complete paper-based or digital surveys. In addition to traditional means of consultation, such as attending rural shows, presentations and consultation on the process, online mediums were also employed including Twitter, Facebook, newsletter and network email contacts.

Key outcomes from this work have indicated that, from an assets point of view, the community sees all assets as being of near equal importance for focus.

Regarding threatening processes, the community recognised that the key values they sought to protect included:

- Freshwater systems
- Community's capacity to sustainably manage the resource
- Terrestrial systems
- Productive land capacity
- Marine systems
- Integrity of coastal zone
- Estuarine systems
- Sense of place
- Landscape amenity.

All of these key 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.

Key threats identified through consultation included:

- Water quality (rivers, streams, estuaries, marine) – nutrients, sediment, salinity, pH, algal blooms
- Soil health and condition
- Habitat loss and preservation
- Pests and weeds
- Water quantity
- Governance
- Capacity and knowledge to act or participate
- Climate change
- Fire and fuel management, and extreme fire events.

4. Climate change-specific scientific research

Climate change-specific scientific support for this Strategy's development was provided through:

- The Southern Slopes Climate Adaptation Research Partnership (SCARP), which focussed on developing tools and guides through iterative research to support natural resource management planning;[60]
- 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;[61] 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.[62]

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.[63]

5. Legislative and policy framework

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.

Local

Implementation of natural resource management, whilst strategically driven through the regional natural resource management strategy and investment planning, is dependent on sub-regional processes for much of its coordination. In particular, the role of local government and the sub-regional NRM bodies is pivotal in providing local direction to issue identification, resource condition monitoring, work programs and stakeholder liaison.

The Tasmanian Natural Resource Management Act 2002 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 government as a key custodian and deliverer of programs that will support positive natural resource management outcomes.

Local governments are generally the first point of contact for people affected by a development activity or an environmental problem in their local area. 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 for small operations;
- Developing by-laws to deal with specific issues, such as keeping chickens in residential areas, activities in Council reserves, or operating hours for outdoor festivals;
- Imposing conditions to regulate pollution, including dust, smoke, noise and liquid emissions; and
- Taking enforcement action where permit conditions are not complied with.

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 from broader impacts at a regional scale, might 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.

60 https://terranova.org.au/repository/southern-slopes-nrm-collection
61 http://adaptnrm.csiro.au
62 http://www.climatechangeinaustralia.gov.au/en/
63 http://www.dpac.tas.gov.au/divisions/climatechange/adapting/climate_futures

Since 2003, local governments in the region have partnered with NRM North in the establishment and management of a highly successful local facilitator network to assist community engagement in the strategy development process. This has enabled the establishment of close relationships with key stakeholders right across the region, from urban communities to the remotest towns, and the establishment of regional collaborative partnership programs such as the Tamar Estuary and Esk Rivers program.

Sub-regional strategies produced within the region also include:

- Meander Valley NRM Strategy
- Tamar Valley Region NRM Strategy
- Furneaux NRM Strategy
- Break O'Day NRM Strategy
- Dorset NRM Strategy.

Regional

Municipalities in Tasmania have been grouped into three regions: Cradle Coast, Southern and Northern Tasmania. Regional land-use strategies for each region have been gazetted.

Northern Tasmanian Development (NTD) is the northern regional body established by the eight councils that make up the Northern Tasmanian region. These councils are Break O'Day, Dorset, Flinders, George Town, Launceston City, Meander Valley, Northern Midlands and West Tamar. NTD operates closely with other regional bodies including NRM North and Tourism Northern Tasmania.

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.[64] The strategies identify resource issues and management objectives in the region, identify appropriate urban growth boundaries and key constraints and opportunities for regional development.

Since the formation of NRM North, many valuable relationships have been formed both within the region, between the other Tasmanian regions, and with the Tasmanian and Australian Governments. It is imperative that this Strategy emphasises and strengthens these networks. 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, Tasmanian and Australian Government bodies, and businesses have been working together to improve the management of Northern Tasmania's natural resources.

Our region has benefited from programs such as property management planning, covenanting, 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 natural resource management 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.

64 Tasmanian Government, Land Use Planning and Approvals Act 1993 (Part 3, Division 1A)

State

State 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. The core of environmental management is an integrated system of laws, policies and procedures embodied in the Resource Management and Planning System (RMPS). The RMPS requires state and local government bodies to further sustainable development in their planning and in their assessments of proposed developments, and it provides opportunities for community participation in these matters.

Legislative documents and supporting policy that contribute to the RMPS (see Figure 4: Summary of legislation associated with The Tasmanian Resource Management and Planning System) 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 the following objectives when making decisions under those Acts:

- 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 Framework and the *Tasmanian Natural Resource Management Act 2002* encompass the State Government's approach to capacity building and commitment to actions that assist in education and communication about natural resources. The framework provides a platform for the coordination and integration of activities by the wide range of entities that are involved in the management of natural resources in the State. The framework complements, but does not replace, the formal systems that the State Government currently uses to regulate natural resource management, including the RMPS. The RMPS continues to provide the overarching legislative framework for natural resource management and for planning and development control. The Tasmanian NRM Framework helps integrate the elements of the RMPS with other policies and legislation.

Therefore this Strategy cannot, and does not attempt to, override existing legislation, policies and strategies.

The Framework defines natural resource management as "the management of all activities that use, develop, and/conserve our air, water, land, plants, animals and microorganisms, and the systems they form". The Tasmanian NRM Framework proposed the establishment of administrative mechanisms to underpin the regional delivery of natural resource management in Tasmania.

The Tasmanian Natural Resource Management Act 2002 provides legislative support for the Framework. The Act:

- Establishes a 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
- Provides for three regional committees in the northern, north-west and southern regions of the State (NRM North, Cradle Coast NRM and NRM South). Each is responsible for preparing a strategy for its region and facilitating its implementation.
- Provides for the formal acknowledgment of "NRM principles" and "NRM priorities". These were formalised in March 2003 when the Minister accepted the advice of the NRM Council and confirmed the statutory status of the principles and priorities published in the NRM Framework.

The Tasmanian Resource Management and Planning System

Key Legislation

Land Use Planning and Approvals Act 1993 (LUPAA)

- Regulates land use and development in Tasmania through planning schemes, planning assessment processes and a permit system.

Environmental Management and Pollution Control Act 1994 (EMPCA)

- Manages and regulates pollution and other environmental problems through various management tools and prescribed offences.

State Policies and Projects Act 1993

- Deals with the creation, enforcement and review of Tasmanian state policies.

Tasmanian Planning Commission Act 1997

- Sets up the Tasmanian Planning Commission, which is responsible for assessing planning schemes, state policies and Projects of State Significance.

Resource Management and Planning Appeal Tribunal Act 1993

- Establishes the Resource Management and Planning Appeal Tribunal (RMPAT), the principal tribunal to hear appeals against planning decisions and to ensure that planning and environmental controls are enforced.

Linked Legislation

Major Infrastructure Development Approvals Act 1999 (MIDA)

- Regulates the approval process for certain major developments such as power transmission lines.

Historic Cultural Heritage Act 1995

- Sets up a register of places of historical cultural heritage significance and provides a system for approvals of work on these places.

Living Marine Resources Management Act 1995

- Concerns normal fisheries operations and fisheries research; establishes some marine reserves; and manages aquaculture licensing (in combination with the *Marine Farming Planning Act 1995*).

Marine Farming Planning Act 1995

- Regulates marine farming, through a system of marine farming leases.

Threatened Species Protection Act 1995

- Aims to protect, manage and promote conservation of threatened plants and animals in Tasmania.

Water Management Act 1999

- Regulates the use of Tasmania's freshwater resources through development of water management plans and issuing water licences. Also regulates construction and use of dams.

Natural Resource Management Act 2002

- Sets up the Tasmanian Natural Resource Management Council to set priorities for natural resource management. Establishes regional strategies and means for coordinated natural resource management.

Nature Conservation Act 2002

- Provides for declaration of national parks and reserves; sets up regulations for taking and trading in native wildlife; and lists threatened native vegetation communities that are to be protected under the forest practices system.

National Parks and Reserves Management Act 2002

- Establishes management plans for reserved areas; and restricts use and development in reserved areas.

Figure 4: Summary of legislation associated with The Tasmanian Resource Management and Planning System

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, including responsibilities to meet obligations agreed to in international treaties and conventions. To clarify the role of the 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's 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, such as defence facilities and airports; fishing and development in waters outside the state 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 Program, has supported the revision of the regional plans to accommodate recent information on the impacts and pressures resulting directly and indirectly 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.

International

Australia is 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 a number 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, wetlands conservation, trade in endangered species and climate change.

6. Natural resource management principles

This Strategy also incorporates and integrates with the Tasmanian Principles for Natural Resource Management and the Tasmanian Resource Management and Planning System Objectives as required under the *Natural Resource Management Act 2002*. These two sets of state policy are highly complementary and have provided a solid framework upon which to develop this regional Strategy.

The incorporation of the Tasmanian Principles for Natural Resource Management into this Strategy is illustrated in the following table.

Table 4: How the Strategy aligns with Tasmania's natural resource management principles

NRM Principle	How the Strategy aligns
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.[65]

7. Consideration of Resource Management and Planning System objectives

The Tasmanian Resource Management and Planning System objectives support the Strategy's focus of raising awareness, 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 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.[66]

65 DPIW, 2009, Review of the Tasmanian Natural Resource Management (NRM) Framework and Legislation. Final Report to the Minister of Primary Industries and Water.
66 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 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.
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.
Capers DSS	Meta-model developed for the Tamar Estuary and Esk Rivers catchments to explore impacts from various land-use and land-management scenarios on estuary and freshwater ecological values.
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 that drains into a particular watercourse (river, stream or creek) and is a natural topographic division of the landscape. It includes 'end of catchment', that is, where catchments join other rivers or estuaries.
Climate change adaptation	Initiatives and measures to reduce the vulnerability of natural and human systems 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.)

Glossary

Community	Community is used as an inclusive term to include everyone in Northern 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.
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.
Geodiversity	Fragmentation is an issue for marine and other aquatic environments as well as terrestrial environments.
Indicator	The range or diversity of geological (bedrock), geomorphological (landform) and soil features, assemblages, systems and processes.
Integrated natural resource management	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	Natural resource management is complex, spanning multiple issues. An integrated approach addresses natural resource management issues holistically, with coordination across different agencies and organisations, and across different land tenures and geographical areas. Integrated natural resource management should deliver more coordinated, efficient and effective outcomes.
Management actions	Activities to be undertaken to improve the condition of Northern Tasmania's natural resources.
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.

Glossary

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, employment).
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.
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 socio-economic 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 Northern Tasmania's natural resources.

Glossary

Sustainable development	Managing the use, development and protection of natural and physical resources in a way, or at a rate, that enables people and communities to provide for their social, economic and cultural wellbeing and for their health and safety while: > sustaining the potential of natural and physical resources to meet the reasonably foreseeable needs of future generations; > safeguarding the life-supporting capacity of air, water, soil and ecosystems; > avoiding, remedying or mitigating any adverse effects of activities on the environment.
Tasmanian Natural Resource Management Council	A Council established under the *Tasmanian Natural Resource Management Act 2002* 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 *Threatened Species Protection Act 1995*. That is, species or subspecies listed as extinct, endangered, vulnerable or rare.
Vulnerable	Where threatening processes have caused loss or significant decline in species that play a major role within the ecosystem, or a significant alteration to ecosystem processes.

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 DPIPWE)
CITES	Convention on International Trade in Endangered Species (of Wild Fauna and Flora)
CSIRO	The Commonwealth Scientific and Industry Research Organisation
DIWA	Directory of Important Wetlands Australia
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
NCCARF	National Climate Change Adaptation Research Facility
NGO	Non-governmental organisation
NRM	Natural Resource Management
PMP	Property Management Planning
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
TEER	Tamar Estuary and Esk Rivers Program
TLC	Tasmanian Land Conservancy
TRMC	Tasmanian Resource Management Council
TWWHA	Tasmanian Wilderness World Heritage Area

Appendices

Note, there are four appendices to this Strategy:

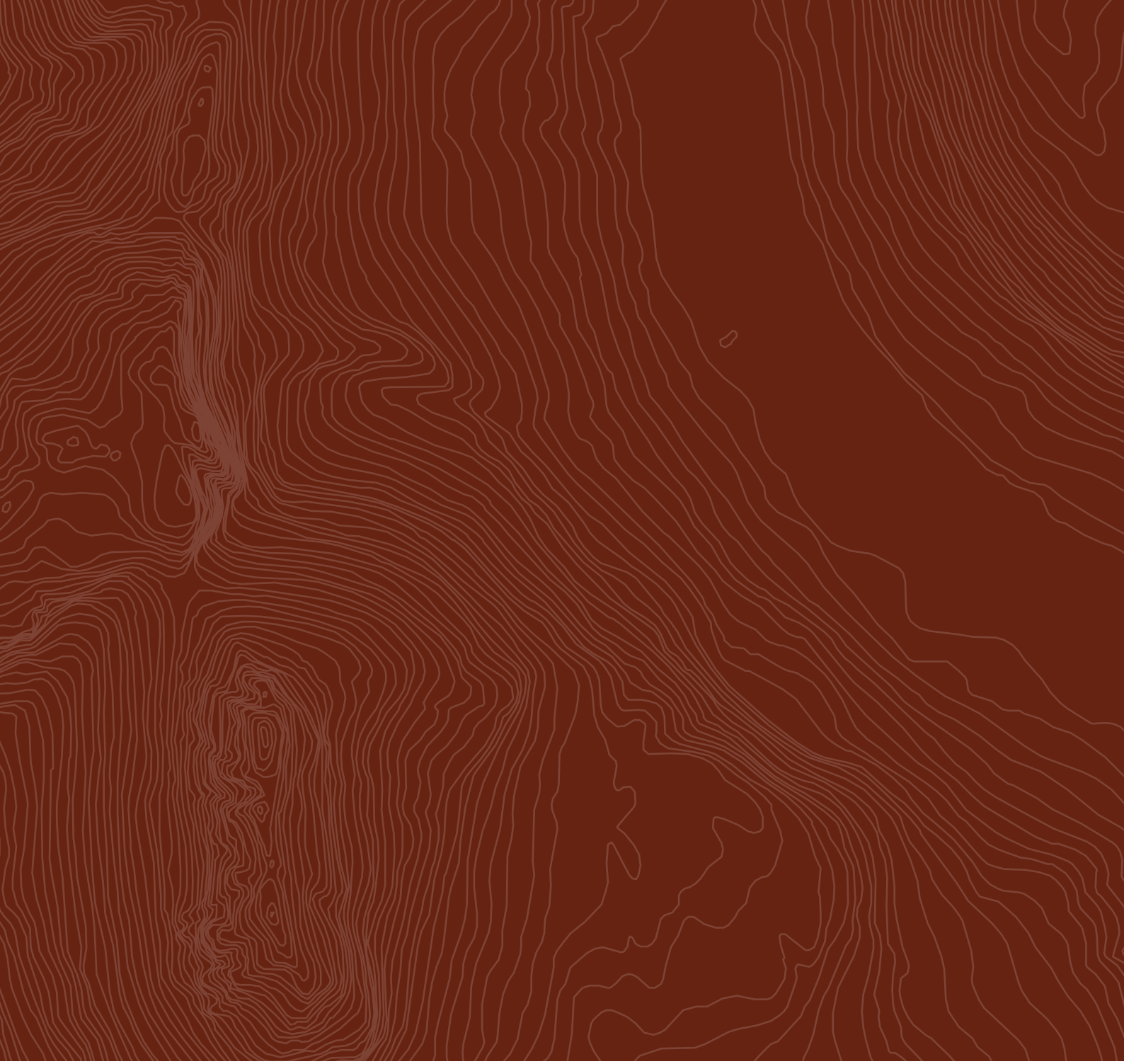
- **Appendix 1** – An Assets Based Knowledge Gateway
- **Appendix 2** – Carbon Planting Spatial Prioritisation
- **Appendix 3** – Nationally Significant Species and Communities
- **Appendix 4** – PDF Scans Report (Institutional, Strategic and Environmental Scans Report)

Given that this information is likely to be updated during the life of this Strategy these appendices have been made available on the NRM North website at www.nrmnorth.org.au

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/

NOTES



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