2030

NRM Strategy

SOUTHERN TASMANIA

nrm SOUTH
NATURAL RESOURCE MANAGEMENT

2030 NRM Strategy

SOUTHERN TASMANIA

Version 3.0

« Cover: Forty-spotted pardalote, Dennes Point, Bruny Island (Stuart Smith)

« Inside cover: Tasman Arch, Tasman National Park

Photos are credited throughout Strategy. Photos without acknowledged credits are supplied by NRM South.

Acknowledgements

NRM South thanks the following organisations and individuals for generously providing input to this Strategy including:

- Funding partners
- Project partners including land managers, community groups and investors
- Organisational Boards, Management Committees and NRM Advisory Committees
- Industry and sector experts
- Tasmanian Aboriginal community and organisations
- Australian, Tasmanian and local governments
- Non-Government Organisations and
- Community members including individuals and groups.

The three Tasmanian NRM organisations worked collaboratively in the development of the 2030 NRM Strategies:

Cradle Coast NRM
CRADLE COAST AUTHORITY

NRM North

nrm SOUTH
NATURAL RESOURCE MANAGEMENT

Funding partners:

Australian Government

National Landcare Program

Tasmanian Government

Acknowledgement of the Tasmanian Aboriginal people as the Traditional and Original Owners of this land

We pay respect to the Traditional Owners of *lutruwita* (Tasmania), the Tasmanian Aboriginal people, and acknowledge their continued survival and connection with their land, sea and sky Country that spans millennia.

We acknowledge the many Nations of Tasmanian Aboriginal people, past and present, as the traditional and ongoing owners of their respective countries within lutruwita and the islands.

We pay respect to those who have passed and acknowledge today's Aboriginal people who are the custodians of this land.

We acknowledge that all land, sea, and sky Country holds cultural values that provide strong and continuing significance to the Tasmanian Aboriginal people. We acknowledge that Tasmanian Aboriginal people are part of a continuous culture that holds traditional knowledge about the ecosystems we all depend on. The landscapes of *lutruwita* have been shaped by Aboriginal management of plants, animals, and water (particularly using fire).

We acknowledge that colonisation and migration has caused injustice for Aboriginal people and impacted the living cultural landscape. This has created a legacy that we seek to improve.

We are working to integrate 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.

Through our work, we aim to reflect these values by recognising that Tasmanian Aboriginal people determine both the boundaries for the sharing of their cultural heritage and opportunities for participation in NRM activities that embrace and support their aspirations. We pay respect to Tasmanian Aboriginal people's requirements to own, care and manage Country by aligning our strategic priorities to Tasmanian Aboriginal people's land, sea and sky Country priorities.

» Silver banksia

Contents

» NRM South agricultural workshop

Tables

Attachments

Ref.	Document
A1	Tasmanian NRM policy context and drivers
A2	Tasmanian NRM linkages with UN SDGs
A3	Tasmanian NRM prioritisation process
A4	Stakeholder engagement
A5	NRM planning linkages with Regional Land Partnerships Outcomes
A6	References and relevant resources

Figures

» Southern Tasmanian coastline (Nathalie Laurence)

1

Tasmanian Natural Resource Management

1 Tasmanian Natural Resource Management

1.1 NRM organisations

The Southern Tasmanian Natural Resource Management Association Inc., trading as NRM South, is one of 54 natural resource management (NRM) organisations in Australia and one of three in Tasmania (alongside NRM North and the Cradle Coast Authority).

The role of NRM organisations is to protect, sustainably manage and improve natural resources for the shared environmental, cultural, social and economic benefit of the community.

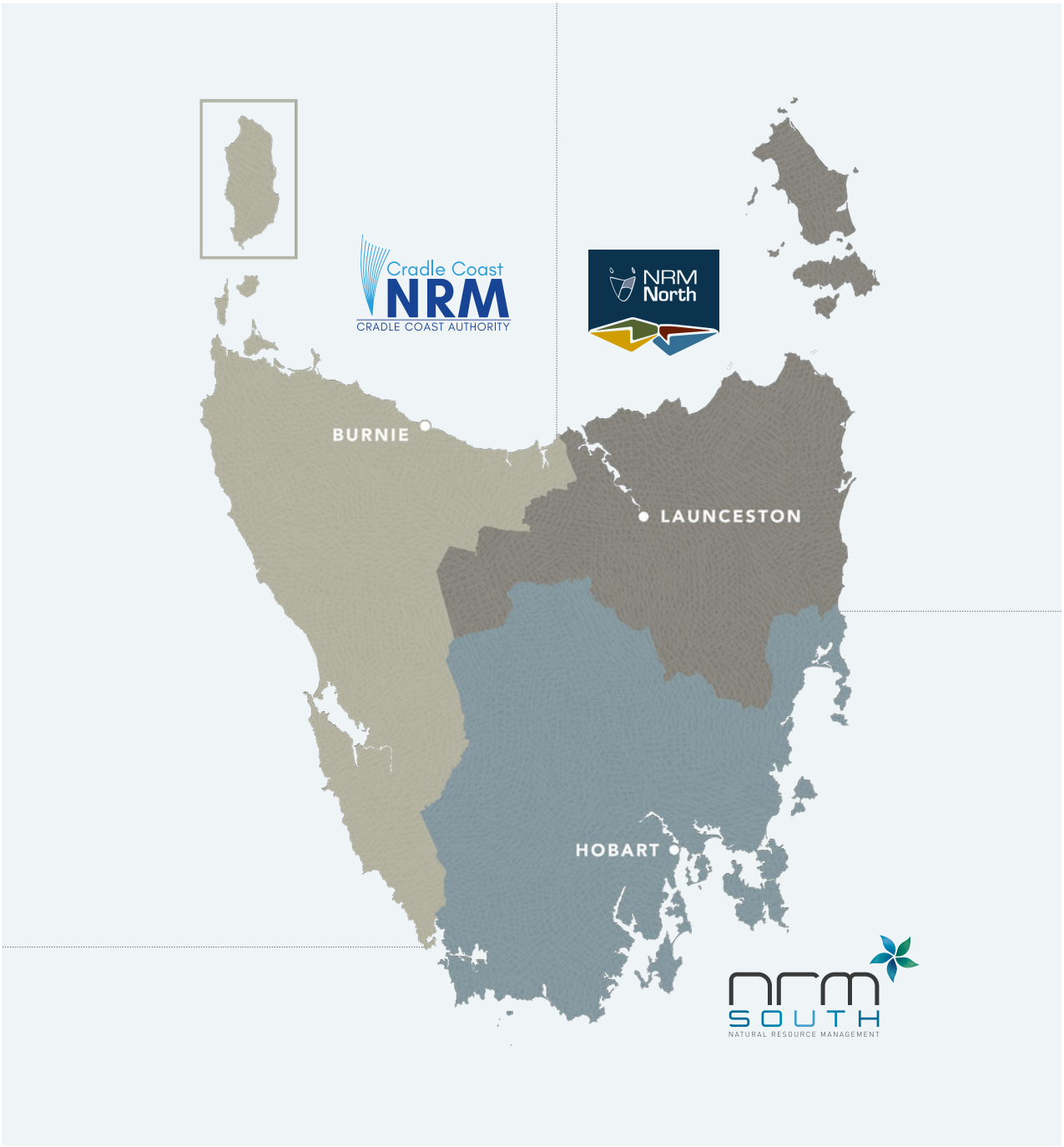


FIGURE 1: **Tasmanian NRM regions**

1.2 The southern region

2.5
MILLION HECTARES
2.5 million ha of natural, production, lifestyle and urban landscapes (38% of Tasmania's land area).

279
THOUSAND PEOPLE
Tasmania's southern region is home to around half the State's population.

12
MUNICIPAL AREAS
Brighton, Central Highlands, Clarence, Derwent Valley, Glamorgan Spring Bay, Glenorchy, Hobart, Huon Valley, Kingborough, Sorell, Southern Midlands, Tasman.

GLOBALLY SIGNIFICANT SITES

- Tasmanian Wilderness World Heritage Area
- Midlands biodiversity hotspot
- Macquarie Island
- World Heritage Convict Sites

4
RAMSAR WETLANDS
Moulting Lagoon, Apsley Marshes, Pitt Water–Orielton Lagoon, Interlaken

135
THOUSAND HECTARES
Marine protected area

35% OF TASMANIA'S TOTAL FARMLAND

1.3 M HA NATIVE FORESTS

CRITICAL REGION FOR WILD FISHERIES, AQUACULTURE AND RECREATIONAL FISHING

ECONOMY

Revenue from primary production and tourism depends on our natural assets. NRM South supports projects that bring direct and indirect benefits to Tasmania's important industry sectors, including:

- Tourism $1.5B
- Forestry $712M raw wood products
- Renewable energy
- Fisheries and aquaculture $1B
- Agriculture $2.15B

*Approximate total state-wide production value annually

689
LISTED PLANT AND ANIMAL SPECIES

- PLANTS 439 species
- INSECTS 117 species
- FISH 19 species
- AMPHIBIANS + REPTILES 9 species
- BIRDS 37 species
- MAMMALS 15 species

IMPORTANT HABITATS

- Riparian and remnant vegetation
- Native grasslands
- Saltmarsh and wetlands
- Coastal communities
- Waterways (e.g. Derwent, Huon, Coal, Swan, D'Entrecasteaux)
- Marine and soft sediment systems
- 36 threatened vegetation communities

FIGURE 2: **Southern regional statistics**

The southern region of Tasmania covers 2.5 million hectares of land and is bounded by the Southern Ocean.

With a backdrop of kunanyi/Mount Wellington, Tasmania's capital, nipaluna/Hobart, and its urban fringes and towns, support almost half of Tasmania's total population (and over 85% of the regional population). Southern Tasmania's wealth of natural resources underpins its economic, social and environmental wellbeing. Managing these valuable assets underpins the success of the lifestyle and the key industries on which we rely. The southern region spans twelve municipal areas (Brighton, Central Highlands, Clarence, Derwent Valley, Glamorgan Spring Bay, Glenorchy, Hobart, Huon Valley, Kingborough, Sorell, Southern Midlands, and Tasman) and three electoral divisions (Franklin, Clark and around one-third of Lyons).

Southern Tasmania is recognised globally for its healthy, intact and diverse natural landscapes. The region contains diverse natural environments, intact ecosystems, and productive land and seascapes. The wealth of natural resources contribute significantly to the region's identity and economic, social, and environmental wellbeing. The economy is driven by sectors reliant on natural resources, including agriculture, fisheries, aquaculture, forestry, tourism, and energy production.

The region has a diverse agricultural sector and contains 24% of all farm businesses in Tasmania. Land used for production spans approximately 6,450 km^2 (27%) of the region's land area and 35% of the total farmland within Tasmania. The region's most valuable agricultural commodities (based on gross value of production) are wool ($60m), cherries ($51m), and sheep and lambs ($25m).

Native vegetation covers approximately 76% of Southern Tasmania, a large proportion of which is globally significant. Native forests are found in nature conservation reserves (621,500 ha), while 404,500 ha of forests are privately owned and 220,500 ha are managed in multiple-use public forests. More than 47% of the region is managed primarily for conservation through the public and private reserve estate.

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

In addition to features such as near-pristine river systems and lakes, the region contains rich flora and fauna, including many species endemic to Tasmania, a range of complex landscapes and internationally recognised natural icons such as the Tasmanian Wilderness World Heritage Area (TWWHA).

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

Hobart is the main fishing port in Tasmania, servicing fishers across a range of commercial and recreational fishing activities. The southern region contributes significantly to Tasmania's commercial wild-caught blacklip abalone, southern rock lobster and scallop catch. The oceanic or offshore parts of the region provide high catch concentration for several finfish species. Most operations for salmonid aquaculture occur in the southern region. Shellfish farms, including oyster and abalone, also operate in the south-east and greater Hobart region. Collectively, the annual value of fisheries and aquaculture to Tasmania is $1.07B.

An overview of the region's natural and production assets is provided in the Land (Section 5.0), Water (Section 6.0), and Biodiversity (Section 7.0) Theme areas.

» Veined sun orchid (Georgie Butorac)

1.3 NRM South

NRM South is a not-for-profit organisation (incorporated association) established in 2003 in response to the Tasmanian Government's Natural Resource Management Framework and its enabling legislation, the Tasmanian *Natural Resource Management Act 2002 (NRM Act)*.

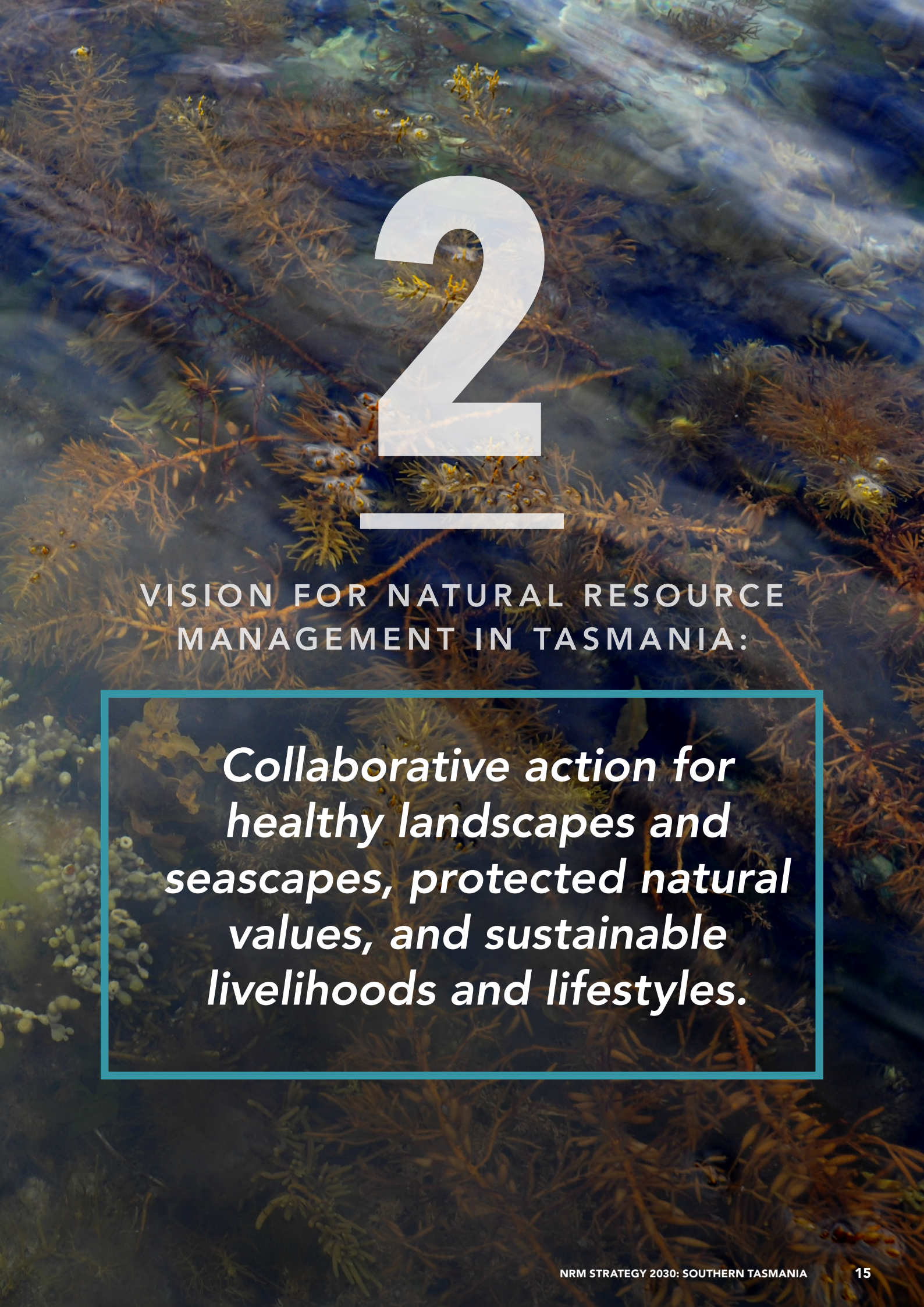
NRM South works to keep the natural and productive landscapes of south-eastern Tasmania healthy over the long term. The organisation plays a key role in building partnerships, securing and directing investment, connecting knowledge and expertise to action and increasing the capacity of others to engage in NRM activities.

NRM South is governed by a Board in accordance with Section 9 of the NRM Act. This includes up to 15 Directors with skills in best practice governance, business administration, legal and contractual issues, and the achievement of natural resource management and conservation outcomes. The Board employ a Chief Executive Officer, who in turn employs professional staff to manage NRM programs and projects across the region and collaboration with state-wide partners. NRM South's office is in Hobart, Tasmania.

The diversity, condition and use of natural resources in the region presents both opportunities and complex management challenges. NRM South works with land managers (including farmers), the community, private land managers, the Tasmanian Aboriginal community and organisations, governments, specialist consultants, research organisations and other non-government organisations to address land, water, and biodiversity management issues and to better understand, protect and manage these diverse natural assets.

FIGURE 3: **Southern Tasmania NRM region**

» Seaweed in coastal rockpools, D'Entrecasteaux Channel



2

VISION FOR NATURAL RESOURCE MANAGEMENT IN TASMANIA:

Collaborative action for healthy landscapes and seascapes, protected natural values, and sustainable livelihoods and lifestyles.

» Pandani grove, Mount Field National Park (Nathalie Laurence)

3

The framework

3 The framework

3.1 Purpose

The 2030 Natural Resource Management (NRM) Strategy for Southern Tasmania provides a framework to facilitate sustainable management of southern Tasmania's natural resources. The Strategy is one of three in Tasmania and is complemented by the Strategies for northern Tasmania and the Cradle Coast region. These regional Strategies are consistent with state and national policies and priorities. The shared aims of the NRM strategies are to create a balanced approach to build, support and maintain:

- Healthy, resilient, and biodiverse environments;
- Healthy and productive water and marine resources; and
- Productive and sustainable land management.

Tasmania's three regional NRM organisations recognise the delicate balance between the environmental, social, and economic needs of the community and that natural and cultural landscapes are not confined by organisational boundaries. Working together towards a single vision for natural resource management in Tasmania is essential to effective long-term outcomes.

The Strategy framework is built on natural resource assets within the state and regions. It is recognised that asset prioritisation and related opportunities and threats can differ at the regional or local scale. The Strategies reflect this complexity – with the vision, core values, aspirations and outcomes for Tasmania achieved through specific and targeted Outcomes, which are prioritised at a regional level.

In a changing world, it is important that there is a regular review and assessment of strategic approaches and priorities. The NRM Strategies are intended to not only meet the requirements under the Tasmanian *Natural Resource Management Act 2002* and the Australian Government's Regional Land Partnerships Program, but also to create a framework for ongoing review, evaluation, and re-prioritisation as part of an adaptive management approach.

NRM South is the Australian Government's service provider for the southern Tasmanian NRM Management Unit.

As a service provider, NRM South is obliged to maintain the currency of natural resource management planning and the prioritisation of management actions to ensure that:

- Projects can be identified and appropriately scaled and scoped, are based on best available scientific, economic and social information, take into account the Australian Government's investment priorities relevant to the region, and consider emerging science and innovations, climate change impacts, and the views of the community; and that
- Projects will effectively contribute to the Australian Government's six long-term outcomes, including through identification and on-going prioritisation of management actions that support the delivery of the outcomes.

The six outcomes of the current Regional Land Partnerships program are:

OUTCOME 1	The ecological character of Ramsar sites is maintained or improved.
OUTCOME 2	The trajectory of species targeted under the Threatened Species Strategy, and other EPBC Act priority species, is improved.
OUTCOME 3	The natural heritage Outstanding Universal Value of World Heritage properties is maintained or improved.
OUTCOME 4	The condition of EPBC Act listed Threatened Ecological Communities is improved.
OUTCOME 5	The condition of soil, biodiversity and vegetation are improved.
OUTCOME 6	Agriculture systems have adapted to significant changes in climate and market demands.

Attachment 5 to this Strategy specifies how NRM South is supporting the delivery of these outcomes, by ensuring that our regional priorities align with the Australian Government's outcomes, where appropriate.

3.2 Collaboration beyond regional boundaries

NRM South, NRM North and Cradle Coast Authority have worked together to ensure a high level of consistency across the three 2030 NRM Strategies for Tasmania. This collaborative approach builds on the previous work of the three organisations and provides a framework to:

- improve ease-of-use and accessibility of the Strategies for all stakeholders, particularly statewide and multi-region organisations;
- share information and other resources – to enable a statewide or multi-region approach to measuring success;
- promote a united state-wide approach to collectively contribute to delivering State and Australian Government policy and targets and respond to local expectations; and to
- consistently apply contemporary natural resource management planning practices.

» NRM South soil health workshop

3.3 Principles

The strategic framework is:

Responsive	to new approaches or information;
Adaptive	incorporating adaptive management in planning and delivery;
Relevant	to government and other investment programs as well as to community needs and expectations;
Consistent	with national and international systems including the United Nations Sustainable Development Goals; and
Informed	using evidence and sound program logic including a focus on outcomes, and a Monitoring, Evaluation, Reporting and Improvement (MERI) framework.

The following principles for natural resource management are applied through all projects and programs.

STEWARDSHIP

Promote and enable the growth and uptake of knowledge, capabilities and practices that supports the natural environment and productive landscapes to sustain productivity, profitability and healthy functioning.

RISK AND RESILIENCE

Facilitate access to information that enables people to anticipate challenges, avoid or resist impacts, and recover without loss of economic, social or environmental functional capability or capacity, especially in relation to the direct and indirect consequences of changing regional climate conditions.

INFLUENCE

Work with planners and policy developers to inform regional environmental and agricultural initiatives at state and federal levels.

ABORIGINAL CULTURE AND KNOWLEDGE

Appropriately and respectfully recognise and engage with Tasmanian Aboriginal people around natural resource management knowledge, perspectives, and practices.

PARTICIPATION

Actively establish and nurture partnerships and collaborations as the preferred operating arrangement for the planning and implementation of regional, cross-regional and local NRM programs, projects and activities.

FIGURE 4: **Natural resource management principles in this strategy**

3.4 United Nations Sustainable Development Goals

The United Nations Sustainable Development Goals (UN SDGs) recognise environmental, economic and social aspects to sustainability and that action in one area will contribute to the outcomes in other areas. The UN SDGs provide a framework that outlines the linkages between actions in achieving sustainability outcomes – including for development and production. The 2030 NRM Strategies have been developed with clear linkages and alignment with this global framework and the following subset of the UN SDGs. Attachment 2 provides further detail.

FIGURE 5: **Subset of the United Nations Sustainable Development Goals relevant to the 2030 NRM Strategy**

3.5 State-wide drivers, opportunities and threats to natural resource management

3.5.1 Policy outlook overview

Global trends in international markets, climate change and unexpected events (such as the COVID-19 pandemic) present both risks and opportunities for Australia and Tasmania, adding to uncertainty while also providing growth and development opportunities. A detailed review of the current national, state and local policy setting, risks, opportunities and local drivers is provided in Attachment 1.

In summary, at the national level, the *National Landcare Program, Regional Land Partnerships Program* addresses agricultural sustainability and conservation of nationally significant natural values and landscapes. As preferred service providers to the Australian Government, the three Tasmanian NRM organisations deliver services and projects to meet the specific and targeted outcomes and priorities of the Australian Government. This work aligns with programs delivered by NRM organisations across Australia and supports national policy agendas such as *Australia's Strategy for Nature 2019-2030 – Australia's national biodiversity strategy and action plan; Threatened Species Strategy; National Soil Strategy;* and the *Drought Resilience Funding Plan 2020 – 2024.*

Tasmania's policy outlook over the next five years and beyond is characterised by the drive to build the economy by expanding primary production and competitiveness of the agriculture, forestry, tourism, and fisheries sectors while significantly expanding renewable energy output and storage for export to mainland states.

Governments at state and local levels are planning for increased tourism and population growth from both interstate and international migration – attracting people to visit and make their home in the state.

Specific Tasmanian policy and agendas relevant to natural resource management include:

- The enhancement of primary production through policies and plans such the *Competitiveness of Tasmanian Agriculture for 2050 (White Paper 2020); Sustainable Agri- Food Plan 2019-23; Strategic Growth Plan for the Tasmanian Forests, Fine Timber and Wood Fibre Industry; Rural Water Use Strategy and Tasmanian Biosecurity Strategy.*

- Addressing climate change through *Climate Action 21 – Tasmania's Climate Change Action Plan* and the *Tasmanian Renewable Energy Action Plan 2020*.
- The vision for the renewable energy sector over the next 20 years, as set out in the Tasmanian Renewable Energy Action Plan and Tasmanian Renewable Hydrogen Action Plan, includes 200 percent Tasmanian Renewable Energy Target and Renewable Energy Coordination Framework.
- Protection of natural values and biodiversity through the *Tasmanian Wilderness World Heritage Area Management Plan,* management planning for national parks and reserves and environmental management planning and monitoring activities.
- Management of the health, welfare and impact of cats under the *Cat Management Act 2009* (as amended 2020).
- Enhancing disaster resilience and recovery through the *Tasmanian Disaster Resilience Strategy 2020-25*; Tasmanian Fuel Reduction Plan, and other policies and programs.
- Addressing regional and state-wide land use planning through the Regional Land Use Strategies and the State-wide Planning Scheme.

These policy drivers create both opportunities and threats to natural resources – for example:

- While expansion of water and irrigation infrastructure will support agriculture and offset rainfall uncertainty, careful management of water, soils, on-farm vegetation and biodiversity is critical.
- While growth of the tourism sector contributes to regional economies, managing impacts on sensitive landscapes is critical.
- While the growth in renewables and establishment of Tasmania as a major exporter of renewal energy will support the transition of energy systems in Australia and globally from fossil fuels to renewables-based energy generation, consideration and mitigation of local impacts on water resources and native species is critical.

Within this context, NRM organisations focus at the local level – building resilience into the management of natural resources, working in a collaborative environment with many stakeholders and partners. The aim is to balance the complex environmental, social and economic needs of the community and Tasmania's natural resources.

Stakeholders in the commercial and non-government sectors are also vital contributors to natural resource management in Tasmania and have a direct or aligned interest in sustainable management of natural resources in Tasmania. NRM organisations aim to partner and work with a range of stakeholders as many have policies and strategic plans that support healthy ecosystems and sustainable use of natural resources.

3.5.2 Understanding drivers and threats to natural resource management

Natural resource management in Tasmania is affected by six categories of drivers (Figure 7), which may generate both positive influences (opportunities) and/or negative pressures (challenges) for the three organisations over the period to 2030. Known threats impacting on Tasmania's natural assets inform the selection of Priorities and mitigating Actions – these have been categorised into four key areas (Figure 7).

The impact of cumulative threats and pressures on natural assets and values is becoming increasingly important (i.e. the effect of multiple direct and indirect pressures). Sparse environmental baseline data, complex ecological processes and intensifying global issues – such as warming and climate variability – contribute to an issue that is difficult to predict, measure, assess and manage.

Limited resources coupled with system and habitat decline mean that it is not possible to manage all threats to natural resources, in all locations. For this reason, the Strategy provides a targeted approach to ensure investment is efficient and effective.

» Flowering Tasmanian blue gum (Georgie Butorac)

DRIVERS

CLIMATE CHANGE IMPLICATIONS

A changing climate presents clear risks to the region's resources such as reduced rainfall, increased likelihood of dry lightning strikes and bushfire risks, increased extreme weather events and potential for flooding, and increased coastal hazards. However, opportunities, such as renewable energy expansion, innovation in agriculture and forestry, and changes in suitable and profitable crops, are also emerging.

COMMUNITY ASPIRATIONS

The preferences and aspirations of community members and community groups determine many natural resource management priorities. Community perspectives underscore the need to balance economic productivity and social needs with conservation, in an environment with increasingly unpredictable ecosystem responses to changing climate. The will of the community is behind consumer choices, political decisions, and the important element of each region's volunteer workforce. Aboriginal community groups bring specialised aspirations and unique knowledge and perspectives to natural resource management work.

GOVERNMENT POLICIES AND STRATEGIES

Although NRM organisations usually work at the regional and local scales, guidance and direction is provided by the policies and legislation managed by the Tasmanian and Australian Governments. Of particular importance are the Commonwealth EPBC Act and Threatened Species Strategy, and Tasmania's plans for agricultural competitiveness, for land use planning and for renewable energy development.

THREATS

CLIMATE CHANGE IMPACTS

Changes to air and ocean temperatures, rainfall, evaporation, wind speed, storm frequency and sea level are all becoming apparent in Tasmania. With these changes will come impacts on our natural resources and the ecosystem services that humans rely on. Some natural resource management activities directly address these threats, and others work to improve ecosystem and human community resilience and adaptability.

HABITAT LOSS AND FRAGMENTATION

A key threatening process affecting many important biodiversity areas and communities is habitat loss. This could be because of historical conversion for agriculture, clearing for development or industry, or piecemeal and cumulative loss of ecological functions via a range of human impacts.

FIGURE 6: **Drivers and threats impacting Tasmania's natural resources**

AVAILABLE FUNDING

Funding opportunities influence each NRM organisation's capacity and priorities. Important sources of funding are currently the Australian Government's National Landcare Program (and its Investment Priorities) and the Tasmanian Government (which sets Key Performance Indicators for the NRM organisations). Independent, private (commercial) and philanthropic funding sources are also emerging.

INDUSTRY PRIORITIES

Agriculture, forestry, fisheries, aquaculture, tourism, energy and manufacturing industries all exert a wide range of pressures and influences on Tasmania's natural resources. Within this broad category, there are a range of opportunities for, and risks to, natural resource management.

INCREASING HUMAN POPULATION AND CHANGING DEMOGRAPHICS

Development pressures and land-use changes (including clearing of native vegetation) are strongly linked to changing demographics. Urban expansion, increased demand for food production, tourism, increased migration to Tasmania and interest in rural and peri-urban living all drive changes in natural resource management priorities, actions and activities. In addition, the uncertainty regarding COVID-19's effects on movement of people and availability of resources may impact organisational capabilities and outputs.

BIOSECURITY THREATS

Introduced plants, animals and diseases threaten Tasmania's ecosystems and productive industries through competition for space and resources, predation and population decline, or productivity loss. Climate change is also expected to exacerbate biosecurity threats, providing increased opportunity for pests and pathogens to establish.

URBAN AND INDUSTRIAL IMPACTS

Urban and industrial impacts contribute to pollution of waterways, coastlines and the atmosphere. Poor water quality, increased carbon dioxide in the atmosphere, soil degradation, and the impacts of plastics on coasts and oceans, are all clear threats to Tasmania's natural resources.

OUTCOMES AND ACTIONS

3.5.3 Climate change in Tasmania

Central to natural resource management planning is recognition and response to the observed and projected effects of climate change. Based on higher-level emission scenario modelling of climate change – the IPCC's SSP 8.5 projection - Tasmania can expect significant impacts over the current century. The Intergovernmental Panel on Climate Change (IPCC AR6) reports note that the changes in the climate, observed globally, are unprecedented at least in the last 2000 years.

Locally, the *Climate Change in Australia Projections Cluster Report – Southern Slopes* identified significant climate change impacts for Tasmania (as summarised in Table 1). Climate modelling predicts Tasmania is at increased risk of wildfires and higher rainfall intensity and associated flooding with global warming. However, on an annual and decadal basis, natural variability in the climate system can act to either mask or enhance any long-term human induced trend, particularly in the next 20 years and for rainfall.

Many climate change driven phenomena are already occurring, significantly impacting people's health and wellbeing, damaging infrastructure and enterprises, and disrupting natural ecosystems and species. The State of the Climate 2020 report prepared by the Bureau of Meteorology observes *"The greatest ocean warming in the Australian region since 1970 has occurred around south-eastern Australia and Tasmania. The East Australian Current now extends further south, creating an area of more rapid warming in the Tasman Sea where the warming rate is now twice the global average."*

Tasmania is actively engaged with climate change projection and response through the *Climate Change (State Action) Act 2008*, Climate Futures for Tasmania initiative and the work of the Climate Futures Research Group at the University of Tasmania (UTas). While Tasmania's C*limate Change Action Plan 2017–2021* has expired, Tasmania's next climate change action plan is under development.

» Shoreline of the Huon estuary

TABLE 1: **A summary of Climate Change impacts in Tasmania (see Attachment 6 for references)**

	Direction	Confidence	Tasmanian Detail
Temperature	**INCREASE ↑**	**Very High**	By 2050, Tasmania is projected to experience an increase of at least 1.5 °C, in all seasons, even if a low-emissions scenario is followed.
Extreme temperature	**INCREASE ↑**	**Very High**	More hot days and warm spells are projected, with fewer frosts. 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. All scenario assessments indicate an increase in all types of high temperature extremes, including maximum daily temperatures, heatwave intensity and heatwave duration.
Rainfall	**DECREASE ↓**	**Medium**	Strong regional differences. A decrease in spring rainfall (10-20% less rain in some areas, and up to 25% by 2050 in the central north). Large reduction in autumn rainfall (up to 50% less rain for some areas relative to 2010-2020). Some regional increases in winter rainfall over the next 20-50 years (e.g. western Tasmania).
Extreme rainfall	**INCREASE ↑**	**Medium**	Increased intensity of extreme rainfall events is projected. Increase in extreme rainfall, particularly along east coast in summer and autumn. Frequency of westerly rain-bearing fronts is expected to decrease gradually, and east-coast lows to increase. Intermittent, more damaging, high intensity rainfall is possible.
Evaporation rate	**INCREASE ↑**	**High**	Higher decline in soil moisture during summer and autumn in Tasmania. Increased evaporation associated with warming.
Drought	**INCREASE ↑**	**Medium**	Episodic and regional nature of drought events will continue. Projected decrease in rainfall and increase in evaporation contribute to more time in drought. The east coast of Tasmania will stay especially drought prone.
Wind speed	**INCREASE ↑**	**Medium**	Stronger wind speed in winter in western Tasmania, and a decrease in summer wind speed. Possible increase in extremes.
Fire weather	**INCREASE ↑**	**High**	A harsher fire-weather climate in the future with consistent increases in fire weather projected for Tasmania. A steady increase in fire danger throughout the current century, including an increase in the length of the fire season and an increase in the number of days at the highest range of fire danger. By the end of this century: twice the fire danger, over twice the area, twice as often in Tasmania. This is an eight-fold increase in fire risk.
Sea level	**INCREASE ↑**	**Very High**	Mean sea level will continue to rise and height of extreme sea-level events will also increase. By 2030, between 0.07-0.19 m rise from 1986-2005 sea levels is projected. By 2090, 0.27-0.66 m under low emission scenario and 0.39-0.89 m under high emission scenario. Some exposed locations are projected to see a 1-in-100-year coastal inundation event move towards an event occurring almost every year (during the annual high tide).
Ocean temperature	**INCREASE ↑**	**High**	South-eastern Australia is a hotspot for ocean temperature changes, with projected rise of >3°C under a high emission scenario. The western Tasman Sea is considered a global ocean warming hotspot. By 2060, intense marine heatwave events are expected to increase.
Ocean acidification CO_2	**INCREASE ↑**	**Medium**	Benthic and pelagic calcifiers, such as diatoms, molluscs and deep water coral, will show reduced calcification rates and/ or increased dissolution.

3.6 Reading this Strategy

This NRM Strategy is founded on a clear long-term Vision informed and supported by a framework of Outcomes and Actions. Aspirational Outcomes for natural resource management in the southern region of Tasmania have been developed in the context of long-term (20+ year) state-wide Outcomes. These are informed and supported by regionally identified Priorities with specific 10-year Outcomes and Actions.

The structure of the Strategy is based on the concept of Program Logic where long-term (aspirational) Outcomes are clearly defined, and Priorities, Actions, are designed to contribute to the Vision and Outcomes.

Actions are presented under three interrelated **Themes** of Land, Water and Biodiversity and are prioritised within **Asset Classes** under each Theme. **Actions** are presented in a framework that shows the connection between the overall Vision and the Outcomes and Actions.

» Hooded plover chick (Paul Gray)

FIGURE 7: **Strategy framework**

3.7 Terminology

3.7.1 Themes

Land, Water, and Biodiversity are the key Themes (i.e. high-level categories) adopted to provide the structure of the regional NRM Strategies at the state-wide scale. These Themes are consistent with state and national policies and priorities and build upon a shared commitment to address the key issues confronting productive and environmental landscapes and achieve lasting and meaningful outcomes.

Land	Productive and sustainable land management in natural, cultural, and productive landscapes
Water	Healthy, resilient, sustainable, and productive water resources – coastal and riparian systems and fresh, estuarine, and marine waterways.
Biodiversity	Healthy, resilient, and biodiverse environments and species.

3.7.2 Asset Classes

Within each of the identified Themes, specific Asset Classes are identified at the state and regional scale. Asset identification provides a structure that focuses action and investment in priority areas.

3.7.3 Outcomes – measuring strategic success

Long-term (aspirational) and near-term Outcomes for Tasmanian natural resources were identified by the regional NRM organisations in consultation with stakeholders. These Outcomes form benchmarks for measuring the success of Actions described in this Strategy.

2050 Outcomes	These long-term aspirational Outcomes are broad (at the Asset Class level) focus on a 20+ year timeframe at a state-wide scale. The aspirations are informed by the longer-term objectives and priorities identified in Tasmanian and Australian Government strategies and policies, long-term goals identified by stakeholders, and through research.
2030 Outcomes	The medium-term outcomes have a 2030 planning horizon and are regionally specific. They apply to the Priorities within each Asset Class.

3.7.4 Priorities

Priorities are assets that have been identified under each Asset Class through a regional prioritisation process. Priorities within the Strategy are not necessarily listed in priority order. More information about the prioritisation process is in Section 4.4 (Prioritisation process).

3.7.5 Actions

Actions are the identified tangible steps to address the threatening processes affecting the Priorities. Actions have been informed by extensive consultation with partners, stakeholders, investors, and the wider community. The Actions outline potential investment options that will guide specific project development and activities further refined in a Regional Investment Plan or similar document. The Actions have been developed based on best available scientific, economic and social information. The defined Actions will enable the regional organisations to identify and develop appropriate and relevant projects, taking into account any emerging science and innovations, threats, drivers or impacts, and the views and aspirations of stakeholders and project partners.

» Swift parrot (Eric Woehler)

4

A shared approach

4 A shared approach

4.1 Acknowledging connections

Landscapes – living and productive – are made up of many interconnected ecosystems, communities and uses. The Themes (Land, Water, Biodiversity) of this Strategy are therefore intrinsically linked. This results in some Priorities and Actions crossing over more than one Theme. It is recognised that the delivery of Actions can also result in improvements benefiting multiple natural, cultural, and productive systems and across Themes.

In some cases, Priorities and Actions cross regional boundaries and the relevant NRM organisations endeavour to work jointly to achieve shared objectives. These shared objectives are identified throughout the Strategy by the following icons (Figure 9). These linkages may not necessarily result in identical projects or Outcomes, but are complimentary and include cross-regional consultation and engagement.

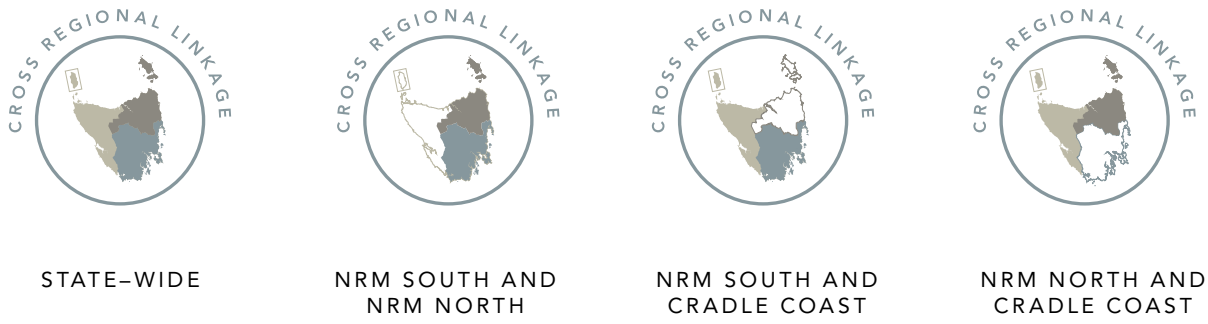


FIGURE 8: **Icons representing cross-regional linkages**

4.2 Working together for Healthy Country

It is important for this Strategy to articulate the fundamental philosophy of Aboriginal land, sea, and sky Country. Country holds special meaning for Aboriginal people – it is more than the place of origin, it has cultural and spiritual meanings, including beliefs, values, obligations, connections to ancestors, creation stories and all the animals and plants within. Aboriginal people know Country as an interconnected life-force with its own agency that encapsulates land, sea, and sky Country, while allowing each to exist in its own right and be interpreted in different ways.

Aboriginal land, sea, and sky Country is an important part of natural resource management – this view of Country integrates lore and respect for culture with caring for nature and landscapes. NRM organisations seek open engagement with Tasmanian Aboriginal people, seeking their priorities for actions that support their access, healing, protection and management of land, sea, and sky Country.

Working together, NRM organisations will:

- Honour, respect and value the strong physical and spiritual connection Aboriginal people have with Country and acknowledge their custodianship of land, sea, and sky Country.
- Look forward to a growing and influential role for Aboriginal people in natural resource management.
- Work respectfully, acknowledging that all landscapes are important and are integral parts of Country.
- Foster partnerships to better understand Aboriginal perspectives on natural resource management knowledge and practices.
- Support achievable projects, as identified by the Aboriginal community and organisations, through an ongoing process of consultation on project opportunities, planning and implementation.

4.3 Stakeholder engagement

The three regional NRM organisations have undertaken extensive and multi-faceted engagement with key stakeholders both state-wide and within their specific regions. The Strategies have received valuable guidance and input from the Tasmanian Aboriginal community and organisations, industry, research organisations, consultancies, Australian, Tasmanian and local government departments, peak bodies, and community interest groups. Stakeholder aspirations have been carefully considered in the Strategy development process and – where possible – are reflected in the relevant Priorities and Actions.

Further detail regarding the stakeholder engagement process is provided in Attachment 4.

4.4 Prioritisation process

Priorities and associated Actions have been identified by evaluating known natural resource assets and threats in each region. An assessment was undertaken to determine the importance of each asset in the region, and the potential for NRM strategic investment in actions to mitigate threats and improve or stabilise the health and trajectory of that asset. This process recognises that some regional assets and values of high significance may not be readily influenced by NRM investment, noting that other strategies, policies, agencies, or interest groups may be active in the management or protection of these assets.

Unlike previous NRM strategies, the 2030 NRM Strategy focusses on those assets that the NRM organisations have a capacity, capability, and role to act upon.

The prioritisation process used all available data and expert knowledge to list potential assets on which to focus. To short-list Priorities and Actions, six key criteria were identified, reflecting strategic considerations for decision-making, and expert knowledge of the required level of investment of resources (time, money, human effort and expertise) to make a difference to the asset. The six criteria are complex considerations expressed simply, so they can be scored and compared across diverse areas of proposed intent, and then ranked. For most of the asset classes in each region, the criteria were used in a fit-for-purpose Multi-Criteria Analysis (MCA).

The criteria used were:

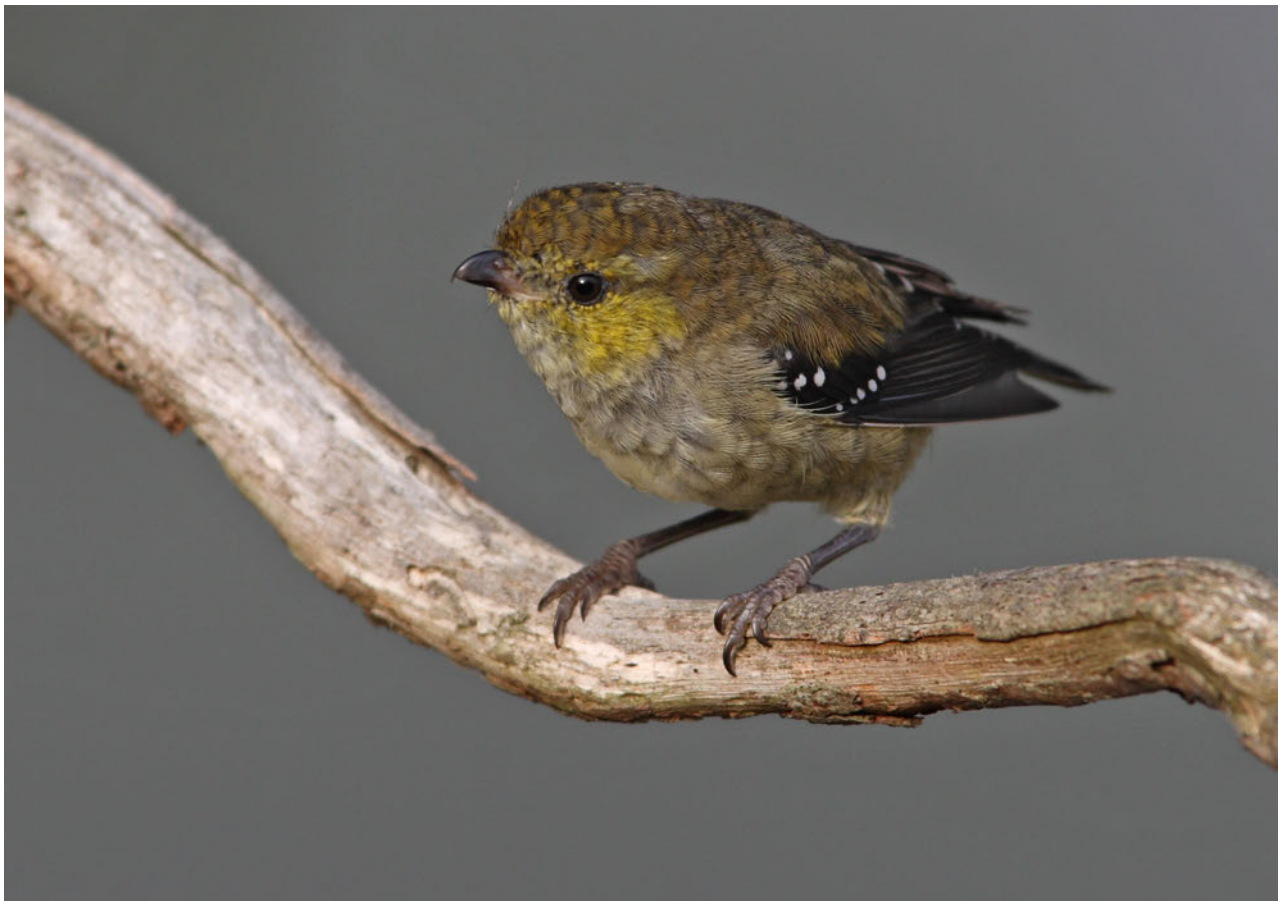
1	**Strategic importance:**	Is the asset strategically significant at a regional, state, and/or national scale (considering environmental, social, and economic implications)?
2	**Influence:**	Are the NRM organisations the right organisation to do this work?
3	**Practicality:**	Can the NRM organisations do something valuable?
4	**Value:**	Is action worth it when considering the likely benefit?
5	**Risk:**	Can the NRM organisations reduce known or likely threats by acting locally?
6	**Priorities and linkages:**	Is this a priority of likely funders? Does it link with Government or stakeholder policy, priorities, or other drivers?

As key sources of funding to the natural resource management sector, linkages with Australian Government (e.g. Regional Land Partnership 5-year Outcomes and Investment Priorities) and Tasmanian Government priorities have been an important consideration.

Additionally, expert and community stakeholder knowledge has been sought through consultation, with expectations and aspirations considered. This engagement phase also highlighted some limitations to the available data and potential knowledge gaps. These have been addressed as actions, if appropriate to the broader achievement of outcomes.

It should be noted that the priorities, actions and outcomes for each prioritised asset class provide general guidance for the development of potential projects. Actions will be further assessed, refined, and developed into project designs/plans, based upon community interest and future investor potential and requirement. This phase of project development is described in Section 8.1.

Attachment 3 provides further detail on the prioritisation approach within each Theme.



» Forty-spotted pardalote (Chris Tzaros)

» Agricultural landscape in southern Tasmania

5

Land

5 Land

The Land Theme identifies how NRM organisations partner with land managers to support sustainable natural and production landscapes and industries in a changing environment. NRM South aims to respect and acknowledge Aboriginal understanding of land and Country, conserve natural, cultural and production values associated with these assets, and to build capacity and develop resilience across these assets to protect them from ongoing and emerging threats.

Land assets encompass topography and the soils that support agriculture, plantation forestry and natural ecosystems, the vegetation that covers and protects these soils, and cultural heritage values.

Impacts to natural and cultural values, soil condition and vegetation are projected due to changes to land use, management practices and biosecurity threats.

Local threats and impacts can be compounded when combined with the global impacts of climate change (including changes in weather patterns and increased frequency and severity of extreme weather).

Asset Classes of Healthy Country, Resilient Landscapes and Soils and Vegetation have been developed to address these issues. Maintenance of healthy landscapes, soil and vegetation are essential components of all ecosystems – rural and urban, aquatic and terrestrial, domestic and wild. It is therefore acknowledged that the Land Theme is inextricably linked to the Themes of Water and Biodiversity, particularly in supporting vital ecosystem services. There are Priorities and Actions relevant to sustainable land management in all Themes, such as catchment management planning, soil erosion and nutrient management and the management of important vegetation communities, including riparian vegetation.

Supporting Tasmanian Aboriginal people to increase capacity to manage, access or heal Country, based on self-determined priorities.

Building the capacity of land managers to address the risk of adverse events, protect natural capital, and take advantage of opportunities for production industries in the face of challenges such as climate change, weeds, pests and diseases.

Supporting land managers to improve soil condition and manage vegetation cover to improve natural values, biodiversity, and production outcomes and mitigate emerging risks.

5.1 Land in Tasmania

TABLE 2: **A snapshot of Tasmania's land assets**

77	**PARCELS OF ABORIGINAL MANAGED LAND** 63,930 ha is under management by Aboriginal land authority	Indigenous Protected Areas include Preminghana, Risdon Cove, Putalina, Mount Chappell, Badger Island, Babel Island, Great Dog Island, lungtalanana
28%	**FARMLAND** 18,900 km^2 of Tasmania is used for farming	Sheep farming (2,646 km^2), beef cattle farming (5,670 km^2), dairy farming (3,591 km^2) and vegetable farming (2,079 km^2) account for 56% of agricultural land area
2,171	**FARM BUSINESSES** Generated $1.68B during 2018–19, increasing from $1.48B during 2015–16	Milk ($475M), cattle and calves ($342M) and potatoes ($127M) accounted for 57% of state-wide agricultural production
18	**IRRIGATION SCHEMES** Operated by Tasmanian Irrigation (GBE), the schemes supply over 85,000 ML of water to agriculture per year	Dial-Blythe, Duck, Cressy Longford, Great Forester, Greater Meander, Kindred-North Motton, Lower South Esk, Midlands, North Esk, Sassafras Wesleyvale, Scottsdale, Sorell, South East (Stages 1 & 2), Southern Highlands, Swan Valley, Upper Ringarooma, Whitemore, Winnaleah
37%	**OF FARMS WITH CONSERVATION AREAS** Combined total of 110,770 ha	812 Tasmanian farm businesses have an area of land set aside for conservation or protection purposes
812 K	**HECTARES OF PRODUCTION FOREST** Total area on public land	434k hectares of private timber reserves on private land. 283k plantation forest across tenures. Annual value of $1.2B to the Tasmanian economy.

5.2 Healthy Country

5.2.1 State-wide Outcome

By 2050, Aboriginal communities have been supported to access, heal, protect and manage land, sea and sky Country in a way that respects their knowledge and rights as Traditional Owners, according to their priorities.

5.2.2 Regional context

NRM South acknowledges the Tasmanian Aboriginal people's strong connections to land, sea and sky Country (which includes the coast, land, and waterways of the southern region, as well as cultural values, sites, plants and animals), as well as traditional uses and significance in ceremonies, creation stories, art and identity. Stewardship of these sites and the cultural landscapes of southern Tasmania are not only integral to Aboriginal identity, health and wellbeing but also to the recognition of the rights of Aboriginal people.

Evidence of Tasmania's Aboriginal people's connection to Country is found across the region, with concentrations on the coast and along river valleys that provided pathways to coastal resources for the region's Traditional Owners. Places of significance include living cultural sites (including middens, quarries, and rock art).

This evidence and the capacity of Tasmania's Aboriginal people to carry out traditional practices, including harvesting and cultural burning, are at risk from factors including a changing climate (physical degradation of sites from sea level rise, changes to ecosystem function and native species assemblages), loss of knowledge and opportunities to connect to or access Country, and changes to land use and/or condition (from urbanisation, changing fire regimes, pest species including weeds, and biosecurity threats).

Alongside the need to manage Healthy Country and cultural landscapes, there are approximately 7,205 hectares of Aboriginal managed land in the southern region. These areas currently include trawtha makuminya (Bronte Park), 'Murrayfield' (Bruny Island), putalina (Oyster Cove), piyura kitina (Risdon Cove), pungkatina (Great Bay, North Bruny), 'Little Swanport' (Little Swanport), and 'Rockmount' (Ellendale). These places provide important opportunities for increasing and re-establishing the formal involvement of Aboriginal people in managing Country, as well as enhancing health and wellbeing, and providing cultural, social, economic and environmental benefits.

NRM South acknowledges that valuing and managing Aboriginal land, sea, and sky Country requires an understanding of – and alignment with – Tasmanian Aboriginal people's self-determined priorities. As such, Actions have been developed as a first step to work with the Tasmanian Aboriginal people, to support and understand these self-determined priorities, and to build an organisational culture within NRM South to value and pursue an understanding of further priorities.

NRM South recognises the importance and role of Traditional Ecological Knowledge in natural resource management and aims to facilitate opportunities for the continuation or reestablishment of traditional practices by Aboriginal people who are looking after Country.

» Cultural burning, Bruny Island

Our organisation aims to support the integration of traditional land management practices, where possible and appropriate, to contribute to the Outcomes of the Strategy.

NRM South's Actions aim to support access, healing, protection and management of land, sea, and sky Country by community, and are embedded across all three Themes (Land, Water and Biodiversity). Within the Healthy Country section, NRM South's Actions focus on partnerships with the Tasmanian Aboriginal community and organisations to conserve or restore healthy Country, build on current, and creating new, relationships and mutual understanding, provide planning support, respect Aboriginal ecological and cultural knowledge, build natural resource management capacity and career pathways, and deliver on-ground activities together.

Consultation and inclusion of the Tasmanian Aboriginal community will occur beyond the Healthy Country section across all Themes. In recognition of the importance of this, Aboriginal culture and knowledge are recognised in the Strategy Principles (Section 3.3).

Priorities in the Strategy have been developed in consultation with Aboriginal organisations and reflect their self-determined priorities and aspirations.

5.2.3 Priorities and Actions

PRIORITY LH1: Healthy Country

Opportunities for engagement with Tasmanian Aboriginal people in natural resource management activities – through partnership approaches and sharing of knowledge, perspectives, and practices – are considered across all Themes and Priorities. Specific to the Land Theme, consideration is given to how NRM South can support Aboriginal people and organisations to conserve or restore Healthy Country. NRM South's aim is to increase and encourage stronger engagement with the Tasmanian Aboriginal community and organisations regarding their self-identified priorities for Country and to exchange information on traditional and contemporary land management practices.

Outcome:

> By 2030, there are increased opportunities to work with Tasmanian Aboriginal people on their priorities for protection and caring of Country.

Local threats that can be addressed by NRM actions:

- Loss of cultural knowledge, barriers to participation and opportunities to connect to and manage Country
- Changes to cultural landscape and biodiversity due to multiple threats (fire, weeds, pests, climate change, inappropriate land use, loss of culturally significant species)

Actions:

LH1.a Identify opportunities and resources to respond to Tasmanian Aboriginal self-determined priorities for access, healing, and protection of Country – such as:

- The review, development and/or implementation of Healthy Country Plans and weed management plans – this may include trawtha makuminya, putalina, pungkatina, Little Swanport. Bruny Island, and other culturally significant areas;
- Heritage assessments or spatial mapping of activities, projects, or other priorities and
- The management of areas of special significance, including land with cultural; and heritage values, and sites at risk due to exposure or climate change impacts.

LH1.b Identify opportunities and resources to respond to Tasmanian Aboriginal self-determined priorities for working, learning, or gathering on Country – including:

- Career pathways in natural resource management – including research/academic roles, entry level roles (e.g. trainee), on-ground roles (e.g. projects or ranger), and management roles; and
- Capacity building in fire management, biosecurity, wildlife management, reef restoration, native species aquaculture and/or monitoring and evaluation.

LH1.c Identify opportunities to support Aboriginal land management across important natural landscapes on public land such as Southport Lagoon and the TWWHA.

LH1.d Seek partnerships with Tasmanian Aboriginal organisations in areas of mutual interest – including native shellfish reef restoration, threatened species management (e.g. Miena cider gum, forty-spotted pardalotes), Ramsar and coastal sites, fire management for ecological benefit and pastoral land management (e.g. Murrayfield) *(as outlined in specific actions included in other Themes)*.

LH1.e	Build and maintain NRM South's relationships with the Tasmanian Aboriginal community and organisations by encouraging cultural competency training for all employees and project partners, and valuing practices such as yarning and meaningful consultation.
LH1.f	Increase Aboriginal representation in decision making by inviting Aboriginal representation to NRM South's Board and other governance committees.

Implementation:

Investment opportunity	✓ Australian Government	✓ Tasmanian Government	✓ Regional or Local	☐ Private or philanthropic

Potential delivery methods	Supporting Aboriginal people to: maintain traditional knowledge and practices; build capacity (e.g. planning, training, education and skill development); and support decision making and mutual understanding. • Undertaking on-ground works (e.g. Healthy Country Plans, weed and pest management, site management). • Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.
Potential collaborators	Tasmanian Aboriginal people and community; Tasmanian Aboriginal organisations, businesses and groups (e.g. Tasmanian Aboriginal Centre (TAC), Tasmanian Regional Aboriginal Communities Alliance (TRACA), South East Tasmanian Aboriginal Corporation (SETAC), weetapoona Aboriginal Corporation (wAC), Parrdarrama Pungenna Aboriginal Community, pakana Services, Riawunna Centre (UTas)); authorities, regulators and state government (e.g. Aboriginal Land Council of Tasmania (ALCT), Aboriginal Heritage Tasmania/Parks and Wildlife Service, NRET); Australian government; and local governments.
Opportunities for community participation	Involvement in planning, decision making and governance; on-Country management action/activities and monitoring; and capacity building activities (e.g. training, field days and events).

» Southport heath at Southport Bluff

5.3 Resilient landscapes

5.3.1 State-wide Outcome

By 2050, actions have been implemented to improve the resilience of landscapes, communities, and enterprises, and the capacity to adapt to climate change.

5.3.2 Regional context

The management of land for primary production in the southern region is characterised by innovation and adaptive thinking through networking and collaboration. Land managers (including farmers) are supported by research organisations, secondary processors, consultants, and government agencies to improve productivity and market access, and to responsibly manage natural resources. The State Government's 2050 Agrifood Plan and the Strategic Growth Plan for the Tasmanian Forests, Fine Timber and Wood Fibre Industry underscores the importance of agriculture and primary production to the future growth of the regional economy.

Southern Tasmania's production landscapes contain significant areas of high conservation value, including land, biodiversity, water, coastal and marine assets. These landscapes also contain fragmented, but significant, areas of remnant native and semi-native vegetation.

Challenges affecting land management and sustainable production in southern Tasmania include:

- Climate change and its associated impacts;
- Rising global biosecurity threats;
- Soil and water quality degradation;
- Competing land uses;
- Market changes and increasing demand;
- A fragmented planning system, poor regulatory tools and under-resourced compliance; and
- Land use intensification.

Climate change and its associated impacts will have profound impacts on the land and land-use (including agriculture) in the southern region. It is anticipated that more extreme weather events will impact livestock health and welfare, increase erosion risk, and reduce pasture productivity. Changes in hydrology associated with climate change will strongly influence soil degradation processes and agricultural and forest productivity. Changes to rainfall, temperature, frosts, and ocean temperatures will impact on crop viability, time to crop maturity, crop yields, and the incidence and severity of weeds, pests, and diseases. These impacts can also intersect with and exacerbate market forces and changing consumer demand.

The increasing occurrence of drought in the Midlands, Derwent catchment and east coast regions of Tasmania has significantly reduced seasonal ground cover and decreased the resilience of the associated grazing enterprises. Without adaptation measures, these declines will lead to increased soil erosion and carbon loss, reduced water holding capacity, and a decline in soil function, ultimately further reducing the resilience and viability of these dryland grazing systems.

» Farming landscapes on south Bruny Island

There is increasing evidence of long-term changes to the frequency and magnitude of rainfall events. There are also a number of climate change adaptation and mitigation opportunities in agriculture within southern Tasmania: including expansion of irrigation to provide greater reliability of soil moisture for crops, pasture and horticulture; planting of vineyards and other crops currently suited to warmer and drier climates; sequestration of carbon in existing extensive forests and new plantations; and encouraging the uptake of agricultural practices that maintain and improve ground cover for greater feed base resilience. In considering these opportunities for a resilient landscape, three factors should be considered: opportunities for maintained or increased production (effectiveness), capital and supply cost (efficiency), and environmental impact (e.g. degradation, salinity, habitat impacts and biodiversity).

Enterprise suitability mapping developed in Tasmania by Natural Resources and Environment Tasmania (NRET) can also be used to identify local opportunities for enterprise change and adaptation.

Stakeholder consultation has indicated that while many land managers are aware that the climate and markets are changing, they are often not aware of the possible implications or how to prepare for this change.

Adaptation and improved resilience in landscape and agricultural systems help land managers to minimise the severity, duration, and consequences of these threats. NRM South works with land managers and agricultural industries to plan for and mitigate risk through improved land management approaches and capacity building, and to recover from the impact of events. This includes providing farmers in drought-prone regions with support for the development of locally appropriate and innovative drought resilience strategies. The Resilient Landscapes assets identified include Climate and Market Resilience, and Biosecurity, and recognise that actions associated with these assets will apply across other Asset classes and Themes.

5.3.3 Priorities and Actions

PRIORITY LR1: Climate and market resilience

Climate change will have a significant impact on the environment in the coming decades. More extreme weather, and changes in rainfall, temperature, frosts, and ocean temperatures will affect primary production (yields, crop viability, harvest times). This Strategy includes a plan for the future viability of southern Tasmania's natural, cultural and production landscapes, to encourage resilience to change and realise opportunity through change. Emerging markets and opportunities for carbon storage in soils and vegetation provide mechanisms for land managers to profit from restorative and sustainable land management.

Outcome:

> By 2030, there is an increase in the proportion of land managers that have adopted the knowledge, tools and resources they need to adapt to significant changes in climate, to participate in emerging carbon markets, and to prepare for and recover from extreme events.

Local threats that can be addressed by NRM actions:

- Loss of productivity and localised impact on natural values due to impacts from climate change and extreme events
- Lack of resilience to market shifts
- Lack of information and planning for future climate scenarios

Actions:

LR1.a	Deliver information and targeted extension to support participation in emerging ecosystem service and carbon market opportunities, and respond to or recover from climate and market changes (including land use adaptation and diversification).
LR1.b	Participate in and contribute to the Tasmania Drought Resilience Adoption and Innovation Hub and increase industry knowledge of adaptation pathways to ensure communities and enterprises remain resilient to climate challenges.
LR1.c	Engage with governments (including councils) and industry to encourage appropriate consideration of NRM-based issues and opportunities – including adaptation and resilience pathways in response to climate challenges.
LR1.d	Form partnerships to share knowledge and develop and/or promote tools and resources to improve awareness of climate drivers, triggers and indicators and inform management decisions (e.g. production, water use, nutrient management, climate adaptation, resilience, and emerging opportunities).
LR1.e	Form partnerships in drought-affected regions to improve farm and community resilience to natural disasters and changes in climate and markets (including through the development of employment and training opportunities).
LR1.f	Collaborate with state and Australian Government agencies to respond to potential (likely) severe or catastrophic events such as wildfire, flooding, or breaches in biosecurity and to support the delivery of natural disaster or extreme event recovery programs.

Implementation:

Investment opportunity	✓ Australian Government	✓ Tasmanian Government	✓ Regional or Local	☐ Private or philanthropic

Potential delivery methods

- Attitude and behavioural change (through education and awareness, extension, training, workshops, field days, communication materials and demonstration), disaster preparedness
- Policy and planning (input, influence and direction of responses, including disaster recovery)
- On-ground works and use of planning and decision support tools (e.g. ecological restoration, farm forestry, shelterbelt, habitat corridors and permanent carbon storage).
- Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.

Potential collaborators

Land managers (including farmers); Industry (e.g. AWI and Sheep Connect, TFGA, MLA, Tasmanian Irrigation, consultants and advisors, AgriProve, Private Forests Tasmania, Dairy Tasmania, Wine Tasmania); Farming Forecaster Project Steering Committee; Community, Landcare and producer groups (e.g. East Coast Primary Producers Association, Coal River Products Association, Tasman Landcare Group, Derwent Catchment Project, Murrayfield, Landcare Tasmania, Farmers For Climate Action); Research institutes (e.g. CSIRO, TIA); Australian Government (e.g. National Recovery and Resilience Agency); state government (e.g. AgriGrowth/NRET, Climate Change Office/DPAC); Tasmania Drought Resilience Adoption and Innovation Hub; Forum of Rural Stakeholders; Rural Business Tasmania; Australian government; and local government.

Opportunities for community participation

Extension activities (e.g. open days, field days, training, demonstration/trial sites, one-on-one engagement, Communities of Practice or discussion groups); and participation in on-ground management action/activities.

» NRM South Small Farm Planning workshop

PRIORITY LR2: Biosecurity

New and existing invasive weeds, pests and diseases pose a significant risk to all aspects of land, water and biodiversity assets. Risks include the loss of agricultural productivity, increased expenditure on management, and risks associated with the decline and loss of native species and terrestrial and aquatic ecological communities.

In addition to the impacts of biosecurity threats on natural systems, biosecurity threats (local and global) impact production levels and endanger export markets, if established.

Best practice management involves reducing the risk of pest and disease incursions (before they occur) and containing outbreaks to reduce the spread and impact (when they occur).

Coordination, cooperation and partnerships are essential for biosecurity management in southern Tasmania. Biosecurity issues and management is complex – effectiveness relies on a strong approach that spans tenures and across stakeholders.

Outcome:

By 2030, there is an increase in the capacity to manage key industry and environmental biosecurity risks.

Local threats that can be addressed by NRM actions:

- Loss of productivity, market, cultural or natural values due to the spread of weeds, pests and diseases.

Actions:

LR2.a	Form partnerships to support the development and distribution of information on the impact of key biosecurity threats, prevention and management options, early detection guidance, new research findings, and promote the General Biosecurity Duty.
LR2.b	Form partnerships to increase the adoption of best practice management for biosecurity, and improve integrated management of pests, weeds, and diseases on-farms, in natural areas, and in the community (e.g. roadsides and public land).
LR2.c	Engage with governments and policy and planning process to ensure appropriate consideration of biosecurity issues and opportunities.

Implementation:

Investment opportunity	✓ Australian Government ✓ Tasmanian Government ✓ Regional or Local ✓ Private or philanthropic
Potential delivery methods	• Education and awareness, leading to increased capacity and behavioural change • Policy and planning input • Planning, on-ground action (e.g. weed management), and coordination • Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.
Potential collaborators	Land managers (including farmers); industry (e.g. TFGA agricultural consultants, and weed management professionals, Wine Tasmania, Dairy Tasmania, Tas Irrigation); community, Landcare and producer groups (e.g. Landcare Tasmania and local groups); research institutes (e.g. CSIRO, UTas); Australian Government; state government (e.g. NRET – Biosecurity Tasmania); and local governments.
Opportunities for community participation	Extension (e.g. field days; discussion groups; trials; planning workshops; citizen science); and participation in on-ground eradication, control and monitoring activities.

» Sheep farm, Southern Midlands

5.4 Soils and vegetation

5.4.1 State-wide Outcome

By 2050, actions have been implemented to improve soil health, vegetation cover and increased adoption of best management practices in productive agricultural landscapes.

5.4.2 Regional context

The Tasmanian Government has set targets for significant growth in the agriculture and food sectors to 2050. Productivity improvement and sustainable growth in the farming sector are fundamental to meeting these targets. Agriculture, horticulture, and grazing are vital to the State's economy through multiple enterprises on around 1.89M ha of farmed land. In 2018-19 this sector generated $1.68B at the farm gate.

Production landscapes are largely concentrated on the eastern side of the region, encompassing approximately 6,450 km^2 (27%) of the south-east region's land area. Dryland grazing (13% of the region's land area) is the most common land use, followed by irrigated cropping (0.3% of the region's land area). Agricultural development has generally occurred at lower altitudes (below 400 m) resulting in a concentration of activity across the floodplains and valleys. Higher altitudes are used for grazing of near-natural areas, including areas of native grasslands, grassy woodlands, and native pastures with variable proportions of native species in varying condition. Southern Tasmania's production landscapes contain significant areas of high conservation value land, with areas such as the Southern Midlands and Derwent Valley containing fragmented, but significant areas of remnant native and semi-native vegetation.

Land-use change, including agricultural intensification, will have an impact on the condition of soil and vegetation assets in the southern region. Soils most at risk from decline in condition through land-use intensification include duplex soils. Soils on dryland north-facing slopes in the Derwent Valley and Southern Midlands are vulnerable to a decline in condition through wind and hillslope erosion.

The extent and condition of native vegetation is also likely to decrease because of land-use intensification.

Productive and healthy soils are integral for the long-term sustainability of agricultural systems, while native vegetation on farms supports biodiversity and improves the resilience of production land against impacts and change. Declining soil condition and vegetation cover can impact negatively on production, leading to degrading land and waterway condition, weed incursion and increased costs (e.g. due to an increased reliance on chemical inputs).

Working landscapes that are well planned, protected by mosaics of native vegetation and managed using best available science provide the best means to ensure long-term viability for Tasmanian farming industries. Actions to reduce the degradation of soils

» Agricultural landscape, Bruny Island

from processes such as erosion, loss of soil biodiversity, nutrient imbalance and pests and diseases are fundamental for maintaining soil productivity. Native vegetation (e.g. native vegetation shelter belts and remnant areas of native vegetation) also contributes to sustainable production and biodiversity.

The following Priorities were identified and described using a risk/threat-based approach. NRM South works in partnership to implement practices that protect the environment and improve production.

Priorities include: actions to enhance soil health (e.g. address soil carbon levels, structural decline, prolonged saturation, erosion and salinisation); and actions to improve the extent, quality and connectivity of on-farm native vegetation.

5.4.3 Priorities and Actions

PRIORITY LS1: On farm native vegetation

Native vegetation communities and species are important, across the agricultural landscape. They provide 'ecosystem services', which are the direct and indirect benefits of ecosystems to human well-being. These ecosystem services include:

- Provisioning services such as food and fibre production; pasture and crop pest control
- Regulating services such as carbon sequestration and water filtration and;
- Cultural services such as recreation, traditional areas and historic sites.

Land managed for agriculture includes assets important for biodiversity conservation. These include remnant native vegetation (such as patches of forest, woodlands, shrublands and grasslands), native vegetation along rivers and creeks, wetlands, and rocky outcrops. Wetlands, riparian land, aquatic ecosystems, public forests, reserves, and important areas such as the TWWHA will be considered in the 'Biodiversity' and 'Water' themes.

Farm biodiversity can be impacted due to clearance and conversion practices, land-use intensification, and increased use of pivot irrigation. Land fragmentation and subdivision of agricultural land is a risk to the natural values, and agricultural productivity (e.g. due to increased risk from weeds, pests, diseases and fire management issues). While intensive agriculture practices can have an impact on biodiversity, appropriate property and landscape planning enable farming and biodiversity to coexist.

Outcome:

By 2030, the condition and extent of native vegetation on agricultural land is maintained or improved through the implementation of management plans and measures to protect and expand areas of native vegetation on farms.

Local threats that can be addressed by NRM actions:

- Loss of ecosystem services and natural capital, including biodiversity on farms and threatened species
- Loss of productivity, economically viable enterprise, or market advantage
- Impacts to water quality (sedimentation, erosion, nutrient loads)

Actions:

LS1.a Develop partnerships to increase the extent and improve the condition of wetland, remnant and riparian vegetation to increase habitat value, landscape connectivity and river health and resilience in production landscapes, particularly in the Derwent catchment, Coal Valley, Swan/Apsley catchments, and Little Swanport sub-catchment.

LS1.b Leverage funding and work with partners to support and deliver initiatives that demonstrate the economic value of retaining and establishing trees in the agricultural landscape, including targeted extension to support land managers to actively participate in emerging soil carbon and ecosystem service markets.

LS1.c Support mechanisms to protect and offset vegetation loss resulting from agricultural development (e.g. expanding irrigation).

Implementation:

Investment opportunity	✓ Australian Government	✓ Tasmanian Government	✓ Regional or Local	Private or philanthropic

Potential delivery methods	• Extension activities (e.g. education and awareness, cost-benefit and viability analysis) • On-ground management actions/activities (e.g. tree planting, shelter belts, incentives, land conservation mechanisms) • Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.
Potential collaborators	Land managers (including farmers); industry (e.g. Tasmanian Irrigation, irrigation agronomists, Fruit Growers Tasmania, Wine Tasmania); Community, Landcare and producer groups (e.g. Landcare Tasmania, Greening Australia, and Derwent Catchment Project); Research institutes (e.g. CSIRO); state government (e.g. NRET, FPA, Private Forests Tasmania/The Tree Alliance); Australian Government (e.g. DAWE, Carbon + Biodiversity program); and local governments.
Opportunities for community participation	Extension (e.g. field days; discussion groups; trials; planning workshops; citizen science), and participation in on-ground management (including protection of sites, restoration and revegetation) and monitoring activities.

» Sheep farm, Bothwell

PRIORITY LS2: Soils at risk of carbon decline

Tasmanian agricultural systems have relatively high organic carbon content (significantly greater than most of those on mainland Australia) due to climatic and soil influences (lower mean annual temperature and higher precipitation in Tasmania, which result in less oxidation of soil organic matter). Soil organic carbon relates directly to productivity in agricultural soils. The relationship is a function of the organic carbon content in soil improving water holding capacity and nutrient availability, in addition to improving conditions for soil biological activity.

Within the southern region, the potential for increasing storage of soil carbon in agricultural landscapes remains greatest in the Central Highlands, Derwent Valley and Southern Midlands. Over the past 220 years of cropping in Tasmania, soil organic carbon has declined significantly, and issues have become more widespread (due to compaction, erosion, poor water infiltration and poor nutrient cycling). These issues are particularly evident on vulnerable soils under irrigation, where carbon losses can result from moisture and nitrogen being available year-round.

Outcome:

> By 2030, an increased number of land managers have awareness of and have implemented or adopted land management practices that improve soil carbon levels.

Local threats that can be addressed by NRM actions:

- Loss of natural capital (including soil carbon, vegetation, and ground cover)
- Loss of soil productive capacity and economically viable enterprise.

Actions:

LS2.a	Develop partnerships to deliver targeted extension, that supports land managers to adopt cropping and cropping /grazing rotation practices that improve soil carbon levels, targeting vulnerable duplex soils and class five and six land undergoing land use change.
LS2.b	Develop partnerships to deliver information and targeted extension (a) to support land managers to adopt grazing management practices that maintain and improve soil carbon levels; and (b) to enable land managers to actively participate in emerging soil carbon markets.
LS2.c	Develop partnerships to share and promote understanding of soil carbon management, markets, and the findings of new research and knowledge.

Implementation:

Investment opportunity	✓ Australian Government; ✓ Tasmanian Government; ✓ Regional or Local; ☐ Private or philanthropic
Potential delivery methods	• Extension activities, coordination and on-ground works (e.g. education and awareness, trials/demonstrations, communication activities) • Development and promotion of planning tools • Policy and planning input
Potential collaborators	Land managers (including farmers); industry (e.g. dairy and red meat and cropping consultants. Wine Tasmania); community, Landcare and producer groups; research institutes (e.g. TIA); Australian Government (e.g. DAWE, Carbon + Biodiversity program); state government (e.g. NRET, State Growth, DPAC); local governments.
Opportunities for community participation	Extension (e.g. field days; discussion groups; trials; planning workshops; citizen science), and participation in on-ground management and monitoring activities.

PRIORITY LS3: Soils at risk of structural decline

Soil structural decline through compaction is a threat and ongoing management issue for intensively farmed land under irrigation across the southern region. Compaction is the result of tillage operations or excessive traffic (animal or vehicular) when soil moisture conditions are less than optimal. Compaction leads to increased bulk density by reducing the volume of air and water in the soil, gives rise to poorer plant growth and root penetration, reduces the ability of water to infiltrate into the soil profile and increases the risk of surface run off. Structural decline from excessive traffic at elevated soil moisture levels usually occur during winter and spring in Tasmania, and in intensive grazing systems this can lead to significantly reduced pasture growth from trampling and poor pasture utilisation.

Outcome:

By 2030, an increased number of land managers have awareness of and have implemented or adopted practices that reduce the risk of structural decline.

Local threats that can be addressed by NRM actions:

- Loss of natural capital (including soil structure, water quality, biodiversity, and ecosystem function within freshwater and marine ecosystems)
- Loss of soil productive capacity and economically viable enterprise.

Actions:

LS3.a Deliver targeted extension with partners to supports land managers to adopt appropriate rotational cropping/grazing practices – targeting duplex soils, soils of high risk of structural decline, and priority soils under irrigation.

Implementation:

Investment opportunity	✓ Australian Government	✓ Tasmanian Government	✓ Regional or Local	Private or philanthropic

Potential delivery methods

- Extension activities (e.g. education and awareness, trials/demonstrations, communication activities)
- Policy and planning input, particularly rural water use and irrigation scheme planning.

Potential collaborators Land managers (including farmers); industry (e.g. red meat, dairy and cropping consultants); community, Landcare and producer groups; research institutes (e.g. TIA); Australian Government (e.g. DAWE); state government (e.g. NRET, State Growth); and local governments.

Opportunities for community participation Extension (e.g. field days; discussion groups; trials; planning workshops; citizen science); and participation in on-ground management and monitoring activities.

PRIORITY LS4: Soils at risk from prolonged saturation

Prolonged periods of excessive soil moisture are a concern for intensively farmed land under irrigation in the southern region. These periods of saturation in the soil profile result in poor respiration (anaerobic conditions), reduced root growth, greater likelihood of root diseases and development of toxic compounds, leaching of nutrient fertilisers away from the root zone, soil erosion, and development of perched water tables especially in texture contrast soils.

Prolonged periods of soil wetness may be caused by rainfall or irrigation volumes exceeding the water infiltration capacity of the soil, and the infiltration capacity itself may be limited if the soil is compacted, particularly where over-wet soils prevent normal machinery movement in farm activities such as sowing and cultivation. Natural drainage may contribute to periods of soil wetness, such as on fine-textured alluvial river flats where water infiltration rates into the soil profile are slow.

Outcome:

By 2030, an increased number of land managers have awareness of and have implemented or adopted practices that reduce the risk of prolonged soil saturation.

Local threats that can be addressed by NRM actions:

- Loss of natural capital (including biodiversity and ecosystem function within freshwater and marine ecosystems, drainage action, salinity management, nitrogen export)
- Loss of soil productive capacity and economically viable enterprise.

Actions:

LS4.a Deliver information with partners to support land managers to adopt drainage practices that lead to sustainable soil, water, and environmental outcomes, targeting vulnerable duplex soils and class five and six land under irrigation.

Implementation:

Investment opportunity	✓ Australian Government	✓ Tasmanian Government	✓ Regional or Local	☐ Private or philanthropic

Potential delivery methods

- Extension activities (e.g. education and awareness, trials/demonstrations, communication activities)
- Policy and planning (influencing and direction), particularly rural water use and irrigation scheme planning.

Potential collaborators Land managers (including farmers); industry; community, Landcare and producer groups; research institutes (e.g. TIA); Australian Government (e.g. DAWE); state government (e.g. NRET, State Growth); and local governments.

Opportunities for community participation Extension (e.g. field days; discussion groups; trials; planning workshops; citizen science); and participation in on-ground management and monitoring activities.

PRIORITY LS5: Soils at risk of erosion

Soil erosion including hillslope and wind erosion has been (and continues to be) a key threat to many areas of agricultural land in the southern region. Maintenance of vegetative groundcover is a key method for minimizing the likelihood of soil erosion. The Derwent Catchment, and Southern Midlands are particularly vulnerable to hillslope and wind erosion. The predominant land use in these areas is dryland grazing, which is reliant on pasture and bush runs. Pasture is under increasing pressure and is unreliable in times of drought. Cleared north-facing slopes have been recognised as a particularly fragile component of dryland enterprises in the Derwent Catchment, as they are difficult to incorporate into grazing systems without significant environmental impacts.

Outcome:

By 2030, an increased number of land managers have awareness of and have implemented or adopted practices that reduce the risk of soil erosion.

Local threats that can be addressed by NRM actions:

- Loss of natural capital (including biodiversity and ecosystem function)
- Loss of soil productive capacity and economically viable enterprise due to wind, water and hillslope erosion.

Actions:

LS5.a

- Deliver targeted extension with partners to support land managers to adopt:
- Management practices that reduce the risks of soil erosion, targeting the dryland north-facing slopes in the Derwent catchment and Southern Midlands
- Practices that improve ground cover and resilience in dryland grazing systems, targeting dryland areas in the Derwent catchment, East Coast and Southern Midlands and/or
- Broad acre management practices that reduce the risk of water and wind erosion, targeting Derwent catchment, and Southern Midlands.

Implementation:

Investment opportunity	✓ Australian Government	✓ Tasmanian Government	✓ Regional or Local	Private or philanthropic

Potential delivery methods

- Extension activities (e.g. education and awareness, trials/demonstrations, communication activities)
- Policy and planning (influencing and direction), particularly rural water use and irrigation scheme planning.

Potential collaborators

Land managers (including farmers); industry (e.g. advisors, AWI and Sheep Connect, MLA and TFGA); community, Landcare and producer groups (e.g. Derwent Catchment Project and East Coast Primary Producers Association); research institutes (e.g. TIA); Australian Government (e.g. DAWE); state government (e.g. NRET, State Growth); and local governments.

Opportunities for community participation

Extension (e.g. field days; discussion groups; trials; planning workshops; citizen science); and participation in on-ground management and monitoring activities.

PRIORITY LS6: Soils at risk from salinisation

Salinity has been recognised as a significant natural resource management issue in southern Tasmania, which is impacting on natural resources and the economy. It is a critical issue that needs to be addressed to support productive and sustainable land use and natural capital. Salinity impacts (economic, social and environmental) are likely to increase if appropriate sustainable land management practices are not implemented. In areas of southern Tasmania with a rainfall below 850 mm, evaporation rates exceed rainfall, and naturally occurring salt accumulates in the soil, groundwater or bedrock below. Salinity accumulates in low-lying areas in the landscape – any salinity increase can therefore impact productive land.

The area of salt-affected private land in Tasmania (based on visible symptoms) is estimated to be 73,800 ha or 4% of Tasmania's agricultural land. The NRM Southern region accounts for 15% of salinity (10,800 ha). The Coal Valley including the Jordan River and Pitt Water-Coal Catchments account for 57% of the region's salinity-affected land. In 2003, 90% of the dryland salinity was known to occur in areas used by the grazing industries (beef and sheep), with less than 3,000 ha (<5%) of the salted-affected land being irrigation salinity. Irrigation within low rainfall catchments remains a significant risk to increased salinity, particularly where irrigation is expanding and thus land-use-change occurs.

Outcome:

> By 2030, an increased number of land managers have awareness of and have implemented or adopted practices that reduce the risk of soil salinity.

Local threats that can be addressed by NRM actions:

- Loss of natural capital (including soil productivity and ecosystem function)
- Loss of soil productive capacity and economically viable enterprise due to wind, water and hillslope erosion.

Actions:

LS6.a Deliver targeted extension with partners to support land managers in identifying and managing salinity risks to soil structure and to vulnerable groundwater flow systems, by prioritising soils undergoing land use change.

Implementation:

Investment opportunity	✓ Australian Government	✓ Tasmanian Government	✓ Regional or Local	☐ Private or philanthropic

Potential delivery methods

- Extension activities (e.g. education and awareness, trials/demonstrations, communication activities)
- Policy and planning input, particularly rural water use and irrigation scheme planning.

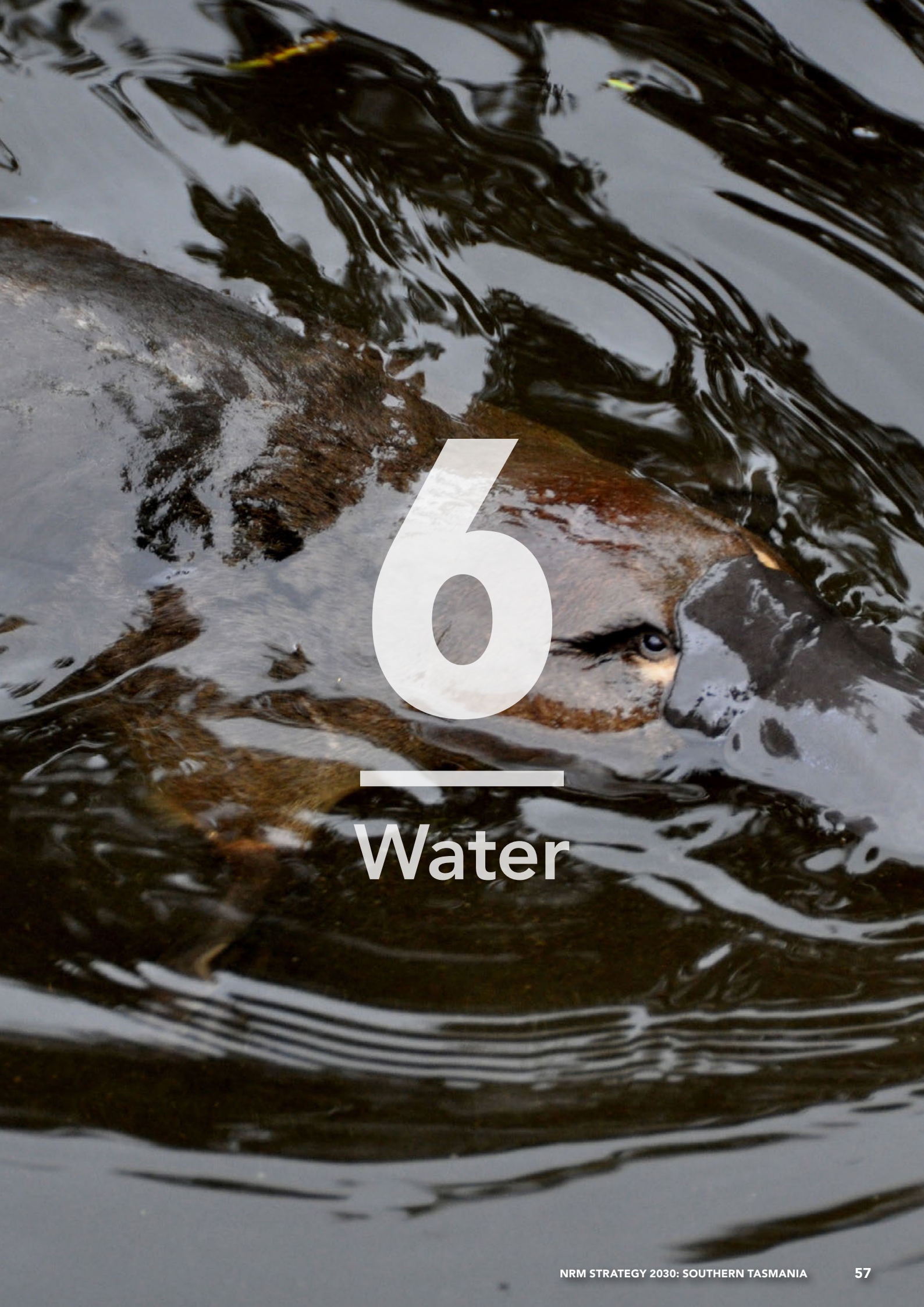
Potential collaborators

Land managers (including farmers); industry and business (e.g. Tasmanian Irrigation, consultants and advisors, TFGA, Dairy Tasmania, rural supply merchants, Forum of Rural Stakeholders, Rural Business Tasmania); community, Landcare and producer groups (e.g. Coal River Products Association, new irrigators); research institutes (e.g. TIA); Australian Government (e.g. DAWE); state government (e.g. NRET, State Growth); and local governments.

Opportunities for community participation

Extension (e.g. field days; discussion groups; trials; planning workshops; citizen science); and participation in on-ground management and monitoring activities.

» Platypus (Lyndel Wilson)



6 Water

6 Water

The Water Theme encompasses Tasmania's key water assets, which include rivers and estuaries, wetlands and waterbodies, and coastal and marine systems. Tasmania's water assets are essential for clean drinking water, biodiversity, and supporting aquatic ecosystem health (freshwater, wetlands, estuarine, marine). They support multiple primary industries including irrigation for agricultural production, fisheries and aquaculture production, industrial use, recreation and tourism. They also support community-dependent infrastructure systems for hydro-electric power generation, drinking water supply and wastewater treatment, ports, and marine traffic. The built environment is concentrated near the state's water assets.

Land-use and water-use activities have an impact on Tasmania's water assets – through activities that modify flows, input pollutants (e.g. nutrients, sediments, pathogens, waste), disturb or clear vegetation, or modify riverbeds, wetlands and coastal areas.

The combined influence of climate change, development and land use change, human movement and population change, and ageing infrastructure, is increasing pressure on water assets. Climate-driven events (such as drought, bushfire and flood) will be ongoing issues in managing water resources. These threats and changes will result in new and emerging priorities over time, which may need to be addressed to adequately protect and manage the identified Water Assets.

Protection and management of water resources is closely linked with land management, including some actions listed in the Land Theme (e.g. soil and erosion management and resilient landscapes) and Biodiversity Theme (e.g. aquatic threatened species and important vegetation communities, including riparian vegetation). The delivery of actions across all Themes will contribute to the health of Tasmania's water resources.

The movement of fresh surface and groundwaters through the landscape supports ecological, economic, and social values. Ecological values of catchments and estuaries, and current and emerging threats in receiving waters are used to identify Priorities and Actions for rivers, floodplains, and estuaries.

Wetlands and other waterbodies include internationally recognised wetlands of significance under the Ramsar Convention, which support high-value ecological communities. Nationally and regionally important wetlands and other water bodies are recognised for their conservation value.

Coastal and marine areas encompass a wide variety of landscapes and habitat types. Important coastal and marine areas can be identified by high value habitats or species. To enhance ecological, social, and economic values, identified Actions will build resilience to pressures and emerging threats across regional Priorities.

6.1 Water in Tasmania

TABLE 3: **A snapshot of Tasmania's water assets**

48	**WATER CATCHMENTS** Approximately 150,000 km of river systems	Longest rivers: • South Esk – 252 km (North) • Derwent – 239 km (South) • Arthur –172 km (Cradle Coast)
10	**RAMSAR WETLANDS** Internationally significant wetlands covering 26,000 ha	• 10 Ramsar wetlands ranging in size from 7 ha to 4,517 ha • 89 nationally important wetlands ranging in size from 1 ha to 16,070 ha
113	**ESTUARIES** Moderate to large in size	• 68 critical/high conservation value estuary systems
3,030	**KM OF COASTLINE** 2,237 km of mainland coastline	• 900 beaches • 9 Interim Marine and Coastal Regionalisation of Australia bioregions • Over 300 islands with 10 over 5,000 ha in size
10	**MARINE CONSERVATION AREAS** Covering 135,000 ha	• 7 Marine Nature Reserves • 3 Australian Marine Parks

6.2 Rivers, floodplains and estuaries

6.2.1 State-wide Outcome

By 2050, actions have been implemented to improve waterway health and the condition of riparian vegetation for improved health and function of rivers, floodplains and estuaries.

6.2.2 Regional context

Southern Tasmania's rivers and freshwater surface flows support aquatic ecosystem health and biodiversity, primary production and industrial use, recreation, and tourism and are essential for the provision of clean drinking water. Southern Tasmania has 33 rivers containing sections of very high conservation status, and 26 undisturbed catchment areas. There are two large river systems wholly within the southern region (Derwent and Huon), with numerous other smaller and coastal catchments.

The Derwent River flows from the Central Highlands and supports almost a quarter of Tasmania's sheep production in the catchment, and Tasmania's largest human population at its estuary. The social, economic, and natural values of the Derwent River, along with threats to water quality in the catchment, define the system as a Priority in the southern region for developing and supporting collaborative partnerships.

The region contains examples of entire pristine catchments, such as the New River, as well as small rivers where the trajectory of water quality is declining but the system is not considered degraded. In other systems, such as Port Davey, human visitation is increasing, with implications for changes in water health and the introduction of invasive species and pathogens.

The region's 39 estuaries vary significantly in condition, use and disturbance, and conservation status. Five are of critical conservation status, with many being of high conservation status and in near pristine or largely unmodified condition.

Some coastal estuaries and their catchments support multiple and important social and economic uses, and human use and movement impacts upon flows and water quality. These areas provide essential links between terrestrial and marine environments as well as ecosystems services and processes. The D'Entrecasteaux Channel, Pipeclay Lagoon, Little Swanport, Huon Estuary, and Boomer Bay and their catchment areas are Priorities in the region.

NRM South's Actions take account of projected climate change impacts and aim to improve (where feasible), or maintain, overall condition of the waterway.

6.2.3 Priorities and Actions

PRIORITY WR1: Derwent River catchment and estuary

The Derwent River and catchment is the most economically and socially significant river system in southern Tasmania. The catchment covers approximately 8,900 km^2 of south-eastern and central Tasmania and is one of the largest river basins in the State. It encompasses Tasmania's capital city (Hobart), the Greater Hobart urban centres (Clarence, Glenorchy) and regional areas (Brighton, Derwent Valley, Central Highlands). It is a multiple-use catchment, with a drinking water intake situated at the base of the freshwater extent of the catchment. The Derwent River starts at Lake St Clair and flows southeast through a series of dams, power stations and reservoirs until it joins the Derwent estuary at New Norfolk, 190 km downstream. Water is also extracted for irrigation, cropping and dairy industry expansion.

There are a broad range of actual and potential water quality issues in the Derwent River, which could affect drinking and ambient water quality, and river health. It is critical that water use and impacts to water quality and quantity (flow) in the Derwent catchment are managed holistically to ensure that negative outcomes are avoided (and repaired, where possible).

Outcome:

> By 2030, Derwent River, catchment and estuary health is improved by working with key partners and encouraging investment in monitoring, land and water management practices and on-ground works.

Local threats that can be addressed by NRM actions:

Declining river health (e.g. riparian condition – weeds and erosion, diffuse and point-source pollutants including nutrients, sediments, pathogens and reduced and/or altered flows).

Actions:

WR1.a	Establish a formal partnership with the Derwent Estuary Program to identify existing and ongoing monitoring data to support the evaluation of resource condition trends and management effectiveness in the estuary and catchment. Work with partners to contribute to developing innovative technology to assess resource condition.
WR1.b	Form partnerships to plan, coordinate and deliver on-ground priorities to conserve, restore and improve habitat, riparian vegetation, water quality and river health outcomes, based on an assessment of resource condition, threats, climate change and resource availability.
WR1.c	Work with partners, governments, and potential investors to advocate for and secure investment in priority planning, on-ground, monitoring and coordination activities.
WR1.d	Deliver targeted activities such as: • Threat mitigation (e.g. priority weeds and stock access); • Remediation of wetland areas or exclusion and buffer zones to limit impacts on wetland areas; • Habitat restoration, based on restoration suitability modelling (e.g. seagrass, handfish, native shellfish); • Increase streamside protection (e.g. riparian management and stock access); • Improve erosion vulnerability, including under forecast climate change conditions; and • Stormwater management (improved planning and practices such as Water Sensitive Urban Design).

Implementation:

Investment opportunity	✓	Australian Government	✓	Tasmanian Government	✓	Regional or Local	✓	Private or philanthropic

Potential delivery methods

- Improved information and knowledge (e.g. ongoing monitoring and feedback)
- On-ground works (e.g. revegetation, removing weeds, riparian fencing, off-stream water infrastructure, access management)
- Policy and planning input
- Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.

Potential collaborators

Land managers; industry (e.g. TasWater, Hydro Tasmania); specialist and research organisations (e.g. Derwent Estuary Program, UTas); community, Landcare and producer groups (e.g. Landcare Tasmania, Derwent Catchment Project); local governments (e.g. Derwent Valley Council, Central Highlands Council, Brighton Council, Glenorchy City Council, City of Hobart, Clarence City Council, Kingborough Council and LGAT); Australian Government (e.g. DAWE); and state government (e.g. NRET).

Opportunities for community participation

Project evaluation to identify opportunities for extending or building successor projects and programs; project reference/working groups or Communities of Practice to increase shared learning and maximise project outcomes; and extension (e.g. field days; discussion groups; trials; planning workshops; citizen science).

» River Derwent | timtumili minanya

PRIORITY WR2: Port Davey

Port Davey is located on the south-west coast of Tasmania, between the Southern Ocean and Bathurst Harbour. It is part of Tasmania's Southwest National Park and the Tasmanian Wilderness World Heritage Area, which is recognised for its Outstanding Universal Values. The Port Davey area also includes the Port Davey Marine Reserve, which encompasses Port Davey, Bathurst Harbour and Bathurst Channel. The reserve protects an unusual underwater landscape created by the deep layer of dark, tannin-rich freshwater which overlies the tidal saltwater. Due to low sunlight penetration, the growth of marine plants is restricted. Instead, a unique collection of marine invertebrates inhabit the area. With boat-based visitation to the area increasing, biosecurity is of increasing importance, with colonisation by invasive species identified as a key threat to the area along with physical threats to the shoreline.

Outcome:

> By 2030, partnerships have been established and measures are implemented to reduce biosecurity threats and risks associated with human movement in Port Davey.

Local threats that can be addressed by NRM actions:

- Commercial water-craft access and recreational activities (e.g. boating, fishing, diving, camping)
- Biosecurity (invasive species and disease)
- Nutrients and pollutant inputs (effluent, waste)

Actions:

WR2.a	Improve access to biosecurity information and management tools, focusing on soil and water borne pathogens and invasive species in the marine environment.
WR2.b	Develop partnerships to identify activities that protect the wilderness and cultural values of Port Davey – including training, awareness-building and management of issues such as bank-erosion, on-shore access, and anchorages.
WR2.c	Establish partnerships to monitor and manage marine pests and emerging threats.

Implementation:

Investment opportunity	✓ Australian Government ✓ Tasmanian Government ✓ Regional or Local ✓ Private or philanthropic
Potential delivery methods	• Improved information and knowledge (e.g. extension, education and skills development) • On-ground works (e.g. controlling access, erosion management) • Policy and planning input • Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.
Potential collaborators	Community and Landcare groups (e.g. Wildcare); tourism operators; research institutes; Australian Government (e.g. DAWE), state government (e.g. NRET); and Aboriginal community and organisations.
Opportunities for community participation	Extension (e.g. field days; discussion groups; trials; planning workshops; citizen science, education and training); liaising with stakeholder groups to identify interests, concerns and opportunities that may be developed into projects; sharing strategy, operations, and portfolio updates with key stakeholders (e.g. industry groups) for feedback to inform direction and priority; and respond to Tasmanian Aboriginal self-determined priorities for working, learning or gathering on Country.

PRIORITY WR3: Environmentally, socially and economically important systems including D'Entrecasteaux Channel, Pipeclay Lagoon, Little Swanport, Huon Estuary, and Boomer Bay and their catchment areas

Five areas in southern and eastern Tasmania have been identified as regionally important for providing ecological and socio-economic services: D'Entrecasteaux Channel, Pipeclay Lagoon, Little Swanport, Huon Estuary, and Boomer Bay. Threats to waterway health at these sites can be addressed through specific Actions. These areas are known as 'multiple-use waterways', valued for their biodiversity hotspots and important habitats, aesthetic values, commercial values (e.g. fishing, aquaculture (shellfish and salmon), boating, tourism) and recreational activities (e.g. fishing, boating, swimming, walking). Similarly, land-use within these coastal catchments is complex, with environmental, social and economic values (and threats) originating from small regional townships (and associated infrastructure), production (e.g. agriculture, aquaculture, fishing, forestry), tourism, and natural areas.

Outcome:

> By 2030, river and wetland health is improved for socio-economically important systems by working with key partners and encouraging investment in monitoring, land and water management practices and on-ground works.

Local threats that can be addressed by NRM actions:

Declining waterway health (e.g. shoreline and riparian condition – weeds and erosion, diffuse and point-source pollutants including nutrients, sediments, pathogens and reduced and/or altered flows).

Actions:

WR3.a Identify areas and sources of high-nutrient outflows from private and public ageing infrastructure or lack of public amenities, and work with partner organisations and land managers to improve infrastructure and remediate impacted areas.

WR3.b Work with partners to:

- assess and understand resource condition, threats (including pollutants, stock access, weeds, vegetation loss/connectivity), climate change (and other emerging challenges) and resource availability;
- identify, plan and coordinate on-ground priorities to conserve, restore and improve habitat, riparian vegetation, and river health outcomes; and
- increase land manager understanding of the relationship between land management practices and end of catchment health.

WR3.c Work with Tasmanian Aboriginal community and organisations to support self-identified land management activities at Little Swanport – including the development of employment and training opportunities, on-ground control actions for exotic species (e.g. gorse), and management and/or monitoring of natural and cultural values.

Implementation:

Investment opportunity	✓ Australian Government	✓ Tasmanian Government	✓ Regional or Local	☐ Private or philanthropic

Potential delivery methods	• Improved information and knowledge (e.g. ongoing monitoring and feedback) • On-ground works (e.g. controlling access, removing weeds, revegetating habitat) • Policy and planning input (i.e. integrate natural resource management principles and measures into land-use planning)
Potential collaborators	Land managers; community and Landcare groups; local governments (e.g. Glamorgan-Spring Bay Council, Tasman Council, Clarence City Council, Kingborough Council, Huon Valley Council); Australian Government (e.g. DAWE); and state government (e.g. NRET, ShellMAP); specialist and research organisations (e.g. Derwent Estuary Program, IMAS); and Aboriginal community and organisations.
Opportunities for community participation	Identify interests, concerns and opportunities that may be developed into projects; sharing strategy, operations, and portfolio updates with key stakeholders (e.g. industry groups) for feedback to inform direction and priority; and collaborate with Aboriginal organisations and communities.

» Huon River and Egg Islands

PRIORITY WR4: Small freshwater systems with declining water quality – including Mountain River

Long-term river health monitoring by the Tasmanian government indicates the health of some small rivers in southern Tasmania is impaired, with degradation to river health in lower reaches. This is based on monitoring of macroinvertebrates, instream habitat condition (benthic algae and sediment) and water quality.

For example, river health monitoring at Mountain River (Huon catchment) has provided evidence of a decline in condition over the past 20 years. Mountain River flows southward from the Wellington range into the Huon River in south-east Tasmania. Much of the catchment is in a protected area. The remaining portion of the catchment is covered by lower-lying river plains that are used extensively for small-scale agriculture (hobby farms) and large-scale horticulture (apples, cherries, blueberries). The system supports numerous lifestyle properties, with strong community interest in understanding and addressing threats to the health of the waterway. Mountain River has been proposed by experts and stakeholders as a casing example of river health decline in the southern region, and where early intervention may be successful and provide learnings that can be applied at a broader scale, in similar catchments.

Outcome:

> By 2030, river health is improved for freshwater systems with declining instream health and riparian condition, using Mountain River as a case study for initial investment in monitoring, improved land and water management practices and on-ground works.

Local threats that can be addressed by NRM actions:

Declining river health (e.g. riparian condition – weeds and erosion, diffuse and point-source pollutants including nutrients, sediments, pathogens and reduced and/or altered flows).

Actions:

WR4.a	Identify key actions and partnerships to undertake river health improvement activities and monitoring in freshwater systems with declining instream health and riparian condition (starting with Mountain River as a case study).
WR4.b	In partnership with NRET, identify existing monitoring data to support the evaluation of resource condition trends and sources, including sites for improvement, in the Mountain River catchment and other small freshwater systems with declining water quality.
WR4.c	Identify and promote opportunities to monitor or manage green and gold frog and/or platypus populations, as a measure of waterway health.
WR4.d	Develop and promote information based on a trial at Mountain River to facilitate on-ground work in other small freshwater systems with declining aquatic ecosystem health, riparian condition and water quality.

Implementation:

Investment opportunity	✓ Australian Government	✓ Tasmanian Government	✓ Regional or Local	Private or philanthropic

Potential delivery methods	• Improved information and knowledge (e.g. ongoing monitoring and feedback) • On-ground works (e.g. revegetation, removing weeds, riparian fencing, off-stream water infrastructure, access management) • Policy and planning input • Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.
Potential collaborators	Land managers; local governments (e.g. Huon Valley Council); community and Landcare groups (e.g. Landcare Tasmania, agricultural productivity groups); research organisations; Australian Government (e.g. DAWE) and state government (e.g. NRET).
Opportunities for community participation	Identify interests, concerns and opportunities; and extension (e.g. field days; discussion groups; trials; planning workshops; citizen science, education and training); and participation in on-ground works (restoration).

» The upper reaches of Mountain River

6.3 Wetlands and other waterbodies

6.3.1 State-wide Outcome

By 2050, actions have been implemented to improve or maintain the ecological character and resilience of Tasmania's wetlands and waterbodies.

6.3.2 Regional context

The southern region of Tasmania hosts four internationally significant wetlands listed under the Ramsar convention; Moulting Lagoon, Apsley Marshes, Interlaken and Pitt Water-Orielton Lagoon. All these wetlands support biodiversity, including vegetation, migratory and water birds, and fish. They sit within some of the region's most significant agricultural landscapes, such as the Swan-Apsley and Coal River catchments. The high conservation status, ecological services provided, and threats to each of the four Ramsar listed wetlands define them as Assets in the southern region, along with their connected water bodies.

Moulting Lagoon and Apsley Marshes are ecologically connected systems. Along with Pittwater-Orielton Lagoon, these coastal wetlands support extensive temperate saltmarsh ecological communities. They hold great Aboriginal significance, from both a heritage viewpoint and as a living-connection to Country and culture. They are also threatened by system degradation associated with human use across the connected systems which support these wetlands, and broader global threats including projected climate change impacts.

Interlaken Lakeside Reserve is a near-natural, Ramsar-listed wetland in the north-west corner of Lake Crescent which is important freshwater wetland habitat in the southern region.

Thirty of the region's wetlands are listed in the Directory of Important Wetlands in Australia. Important wetland features include naturally saline as well as freshwater wetlands, especially in the southern part of the Midlands Biodiversity Hotspot Area.

NRM South's Actions aim to maintain or improve (where feasible) condition or ecological character of Ramsar wetlands, and other nationally and regionally significant wetlands (e.g. Directory of Important Wetlands, and Atlas of Tasmanian Wetlands).

6.3.3 Priorities and Actions

PRIORITY WW1: Moulting Lagoon and Apsley Marshes catchments

The Moulting Lagoon and Apsley Marshes Ramsar sites are contiguous. They lie within the Glamorgan-Spring Bay municipal area.

Moulting Lagoon Ramsar Site

The Moulting Lagoon Ramsar Site is located on the east coast of Tasmania between the townships of Bicheno and Swansea, approximately 190 km north-north east of Hobart and six kilometres north west of Coles Bay. The site covers approximately 4,507 ha. The site, plus several sections of coastal reserve surrounding it and an additional area of land to the north, is located within the Moulting Lagoon Game Reserve, under the management of the Tasmanian Parks and Wildlife Service (NRET).

Moulting Lagoon is one of the most complex and extensive wetland systems in Tasmania, and is home to many rare and significant plants and animals. It comprises an estuarine and marine system and is influenced by freshwater inflows from two permanent rivers. The western shore has been largely cleared, with patches of remnant vegetation remaining. It is used for livestock grazing and viticulture. The eastern shore is relatively undisturbed. Recreational and commercial activities include shooting, fishing, boating, aquaculture, tourism, off-road driving, birdwatching and camping. The area is known for its Aboriginal cultural significance.

In 1982, Moulting Lagoon was listed as a wetland of international importance under the Ramsar Convention on Wetlands.

It was recognised because it met specific criteria, including that it supports vulnerable or endangered animal and plant communities and is crucial in maintaining biological diversity. It is also an important spawning ground and source of food for fish on which the food chain depends. The site is one of the most extensive areas of temperate coastal saltmarsh in Tasmania. It also provides an important resting and breeding ground and drought refuge for around one hundred resident and migratory birds species, including the Australian shelduck and the black swan.

Apsley Marshes Ramsar Site

The Apsley Marshes Ramsar site is located on the east coast of Tasmania, fourteen kilometres south west of the town of Bicheno. The site covers approximately 880 ha. It is situated almost entirely within private (freehold) land, however a small portion of the site is within the Moulting Lagoon Game Reserve, under the management of the Tasmanian Parks and Wildlife Service (NRET). The floodplains are part of Apslawn, a working agricultural property. Other commercial and recreational activities include livestock grazing, birdwatching, and duck hunting.

Apsley Marshes has some of the best representatives of a range of wetland types in Tasmania, including estuarine waters, coastal freshwater marsh and swamp. The Site is located at the mouth of the Apsley River. It has a great richness and diversity of freshwater and marine plants, including some nationally threatened species such as the swamp everlasting. The wetland is also significant for waterbirds such as the endangered Australasian bittern.

» NRM South field work, Moulting Lagoon

Outcome:

> By 2030, the condition and extent of wetland vegetation communities has improved, hydrology has been restored, threats to the ecological character of Moulting Lagoon and Apsley Marshes Ramsar site have been reduced, and investment is being directed into improving monitoring, land and water management practices and on-ground works.

Local threats that can be addressed by NRM actions:

Landscape modification (e.g. clearing and fragmentation, altered hydrology/tidal restriction, invasive species (gorse, African boxthorn, crack willow), recreational vehicle and livestock access, exposure of acid sulfate soils).

Actions:

WW1.a Work in partnership to:

- address cross-tenure issues;
- develop and promote planning tools;
- undertake priority activities to improve ecological condition and manage threats to hydrology, saltmarsh, wetlands and fish habitat (e.g. remediate hydrological flows and water quality, remove weeds, exclude stock, manage access, erosion and fire, revegetate wetlands and surrounds, and improve connectivity of remnant vegetation);
- protect cultural values; and
- manage access, change behaviours, and remove vehicles from wetland areas.

WW1.b Work in partnership to improve knowledge and understanding by:

- identifying existing monitoring data (including water quality, biodiversity and wildlife);
- supporting evaluation of resource condition trends (including hydrology, saltmarsh, wetlands, and fish habitat); and
- increasing awareness and understanding of the environmental, economic, cultural, and social values of Moulting Lagoon, Apsley Marshes, and their catchments.

WW1.c Work with research organisations to trial rapid revegetation methods in degraded saltmarsh areas.

WW1.d Support the Tasmanian Aboriginal community and organisations to work, gather and learn on Country.

Implementation:

Investment opportunity	✓ Australian Government	✓ Tasmanian Government	✓ Regional or Local	✓ Private or philanthropic

Potential delivery methods

- Improved information and knowledge (e.g. ongoing monitoring and feedback)
- On-ground works (e.g. hydrological restoration, revegetating habitat, removing weeds, controlling access, erosion management)
- Policy and planning input
- Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.

Potential collaborators Land managers; specialist and conservation organisations (e.g. Nature Glenelg Trust, Tasmanian Land Conservancy, BirdLife Tasmania); representative bodies (e.g. Friends groups, Wine Tasmania); research organisations (e.g. UTas, Geoscience Australia); local government (Glamorgan Spring Bay Council); state government (e.g. NRET, including PWS); and Aboriginal community and organisations.

Opportunities for community participation Identify interests, concerns and opportunities; extension (e.g. field days; discussion groups; trials; planning workshops; citizen science, education and training); and participation in on-ground works (restoration).

PRIORITY WW2: Pitt Water and Orielton Lagoon

The Pitt Water-Orielton Lagoon Ramsar site is located in south-east Tasmania, close to the state capital, Hobart, and is surrounded by agricultural land and small towns (including one of the fastest growing peri-urban areas in Tasmania). The site covers approximately 3,334 ha. Extensive oyster farming operations occur within the site and the surrounding area is used for livestock grazing. The area contains significant Aboriginal heritage and living cultural sites and continues to be important for the local Aboriginal community.

Pitt Water-Orielton Lagoon is a tidal salt-water lagoon with a narrow entrance to the sea, and has input from four rivers. The principal features are the channel and mouth of the Coal River estuary, and Orielton Lagoon, a large embayment and an extensive area of open marine waters. The site is a species-rich environment that supports a diversity of coastal, intertidal, and marine habitats and communities. It is considered important for the conservation of coastal birdlife at the bioregional and global scale (for migratory bird species). Most of the wetland is fringed by saltmarsh vegetation and rocky shores, but spanned by a causeway and fringed by peri-urban and agricultural development. The area supports a range of threatened species such as the critically endangered swift parrot, the endangered Tasmanian wedge-tailed eagle, the far eastern curlew, and the endemic Tasmanian viviparous sea-star.

Outcome:

> By 2030, the condition and extent of saltmarsh and wetland vegetation communities has improved, threats to the ecological character of the Pitt Water and Orielton Lagoon Ramsar site have been reduced, and investment is being directed into improving monitoring, land and water management practices and on-ground works.

Local threats that can be addressed by NRM actions:

Declining river, catchment and waterway health (e.g. shoreline and riparian condition – weeds and erosion, diffuse and point-source pollutants including nutrients, sediments, pathogens and reduced and/or altered flows, altered hydrology/tidal restriction/loss of freshwater input, and waste products/marine debris, clearing and fragmentation, and invasive species).

Actions:

WW2.a	Work with partners to implement actions such as limiting stock access to waterways, revegetating, and removing weeds, particularly in saltmarsh and culturally important areas.
WW2.b	Work with partners to identify existing monitoring data and support evaluation of resource condition trends, including hydrology/flows, saltmarsh, wetlands, fish and bird species and habitat.
WW2.c	Support on-ground action and build an on-going legacy that protects the environmental, economic, and social values of the system.
WW2.d	Work with partners to plan and implement actions that improve ecological condition and water quality in-flows, build resilience to erosion, and restore natural flows to saltmarsh – including under forecast climate change conditions.
WW2.e	Support the Tasmanian Aboriginal community and organisations to work, gather and learn on Country.

Implementation:

Investment opportunity	✓ Australian Government	✓ Tasmanian Government	✓ Regional or Local	✓ Private or philanthropic

Potential delivery methods

- Improved information and knowledge (e.g. ongoing monitoring and feedback)
- On-ground works (e.g. hydrological restoration, revegetating habitat, removing weeds, controlling access, erosion management)
- Policy and planning input
- Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.

Potential collaborators

Representative bodies (e.g. OzFish, TARFish, Coal River Products Association, Wine Tasmania); land managers and communities (e.g. farmers, marine farmers, NRET/Parks and Wildlife); local governments (e.g. Sorell and Clarence City Councils); research organisations (e.g. UTas); Aboriginal community and organisations; community, Landcare and conservation organisations (e.g. Landcare Tasmania, BirdLife Tasmania, Conservation Volunteers Australia); TasWater; Australian Government (e.g. DAWE) and state government (e.g. NRET).

Opportunities for community participation

Identify interests, concerns, and opportunities; extension (e.g. field days; discussion groups; trials; planning workshops; citizen science, education and training); and participation in on-ground works (restoration).

» Culturally significant and biodiverse shoreline of Pitt Water-Orielton Lagoon (Lyndel Wilson)

PRIORITY WW3: Inland wetlands and lagoons of central highlands and Interlaken

Interlaken Lakeside Reserve is a 517 ha Ramsar wetland site located on the eastern edge of Tasmania's central highlands, approximately 20 kilometres west of the township of Tunbridge. The site includes the north-western corner of Lake Crescent, an intermittently inundated wetland and an area of mixed light bush. The northern edge of the dry land component of Interlaken forms part of the shoreline of another freshwater lake, Lake Sorell. The character and condition of the site are dependent on the whole context of the Lakes Sorell and Crescent system. Lake Crescent is a significant source of water used for irrigation in the Clyde River catchment, which itself flows into the Derwent River.

Interlaken was listed as a Ramsar site in 1982. It is a significant example of a mid-altitude wetland, which supports threatened endemic species, wetland vegetation communities and an unusual phytoplankton assemblage. The system provides habitat for the nationally endangered golden galaxias (occurs naturally only in Lakes Sorell and Crescent and associated streams and wetlands). The site is also one of the three known localities in Tasmania for *Scirpus montivagus*, a sedge, and for the southern swamp wallaby grass. Recreational and commercial activities include livestock grazing, tourism, sport fishing, and duck shooting.

Outcome:

> By 2030, condition and extent of wetland vegetation communities and habitats is maintained or improved by managing threats to the ecological character of the Interlaken Ramsar site and nearby network of wetlands and lagoons, and investment is being directed into improving monitoring, land and water management practices and on-ground works.

Local threats that can be addressed by NRM actions:

- Water and land resource use (e.g. clearing, grazing) and impacts on sediment transport
- Current and high risk invasive species and pathogens (e.g. chytrid fungus, didymo, European carp, trout, other exotic fish species, and wetland/riparian weed species).

Actions:

WW3.a	Work with partners to develop an action plan that assesses (a) existing effort and gaps across the landscape of wetlands and lagoons of central highlands and Interlaken; (b) on-ground priorities to conserve, restore and improve habitat and wetland health; (c) potential roles and partnerships; and (d) resource condition, threats, and resource availability.
WW3.b	Identify existing monitoring data to support the evaluation of resource condition trends, including wetland condition, and fish and bird habitat.
WW3.c	Develop partnerships to address cross-tenure issues and undertake priority activities. Priority actions include managing stock access to waterways, strategic fencing, riparian and fish habitat restoration (galaxiids), coordination and improved access to information.

Implementation:

Investment opportunity	✓ Australian Government	✓ Tasmanian Government	✓ Regional or Local	✓ Private or philanthropic

Potential delivery methods	• Improved information and knowledge (e.g. ongoing monitoring and feedback) • On-ground works (e.g. controlling pest species, revegetating habitat, removing weeds, managing access, erosion management) • Policy and planning input.
Potential collaborators	Land and water managers and communities (e.g. farmers, Parks and Wildlife, IFS, Hydro Tasmania); local governments (e.g. Central Highlands Council); research organisations (e.g. UTas); Aboriginal community and organisations; community, Landcare and conservation organisations (e.g. Derwent Catchment Project and other Landcare groups, BirdLife Tasmania).
Opportunities for community participation	Identify interests, concerns, and opportunities; extension (e.g. field days; discussion groups; trials; planning workshops; citizen science, education and training); and participation in on-ground works (restoration).

» Interlaken (Department of Agriculture, Water and Environment)

» Wetlands, east coast Tasmania

6.4 Coastal and marine areas

6.4.1 State-wide Outcome

By 2050, actions have been implemented to improve management and human use of coastal and marine areas to build resilience to threatening processes.

6.4.2 Regional context

Coastal and marine systems support a variety of ecological values, habitats, and social, economic and cultural values.

The southern region constitutes 39% of the Tasmanian coastline and features coastal landforms including dramatic sea cliffs, offshore island habitats (such as Bruny and Maria Islands), recreational and economic hotspots (including the D'Entrecasteaux Channel and Derwent Estuary), and environmental treasures (such as the undeveloped coast of the south-west wilderness and nationally significant giant kelp forests, which are listed as an endangered community).

Aboriginal people have lived in, used and managed the coastal and marine landscape of southern Tasmania for over 35,000 years. Knowledge and stories of these areas are held by Tasmanian Aboriginal people, and physical evidence of this long-term connection can be found on most shorelines in southern Tasmania, within the many cultural living sites (including Aboriginal middens and stone tool quarries).

The temperate marine waters of the southern region are characterised by a diversity of species and ecological communities. Australia's Great Southern Reef, which surrounds Tasmania, is a global hotspot for macroalgal biodiversity and endemism. Coastal saltmarshes and wetlands, and marine reefs and seagrass beds provide essential ecosystem services and habitats, and store significant amounts of 'teal' and 'blue' carbon.

The region's coasts are the focal point of many urban and lifestyle landscapes, and human movement and social activity. The economic activities based within the region's coastal and marine areas offer significant value, including wild caught fisheries and marine farming of salmonoids, shellfish and seaweeds. Recreational fishing is very popular in Southern Tasmania, with up to one third of the population reporting that they pursue this activity. Southern Tasmania supports a high concentration of marine scientific research organisations, bringing value to our understanding of coastal and marine processes and impacts of climate change and positioning Tasmania as a potential leader in marine natural resource management.

The economic and social values of the region are significant, however it is recognised that there are cumulative pressures on the environment due to increasing population, tourism, recreation, urban and industrial development, as well as climate change impacts such as sea level rise, storm surge, inundation, and erosion. It is for these reasons that integrated and coordinated management of the coastal and marine areas is of critical importance.

Increasing storm events, weather severity, rising sea levels and inundation threaten vulnerable coastlines. These processes lead to erosion and damage, including to beach and dune system Assets. Habitat loss and fragmentation, rapidly increasing water temperature, increasing pollutants (from catchment and marine inputs, plastics and boat waste), pole-ward range shifts for many marine species and introduction of northern species into Tasmanian waters is continuing to impact coastal and marine areas. These threats are complex and challenging, but present opportunities for partnerships to restore habitats and build resilience in ecological communities using innovative methods.

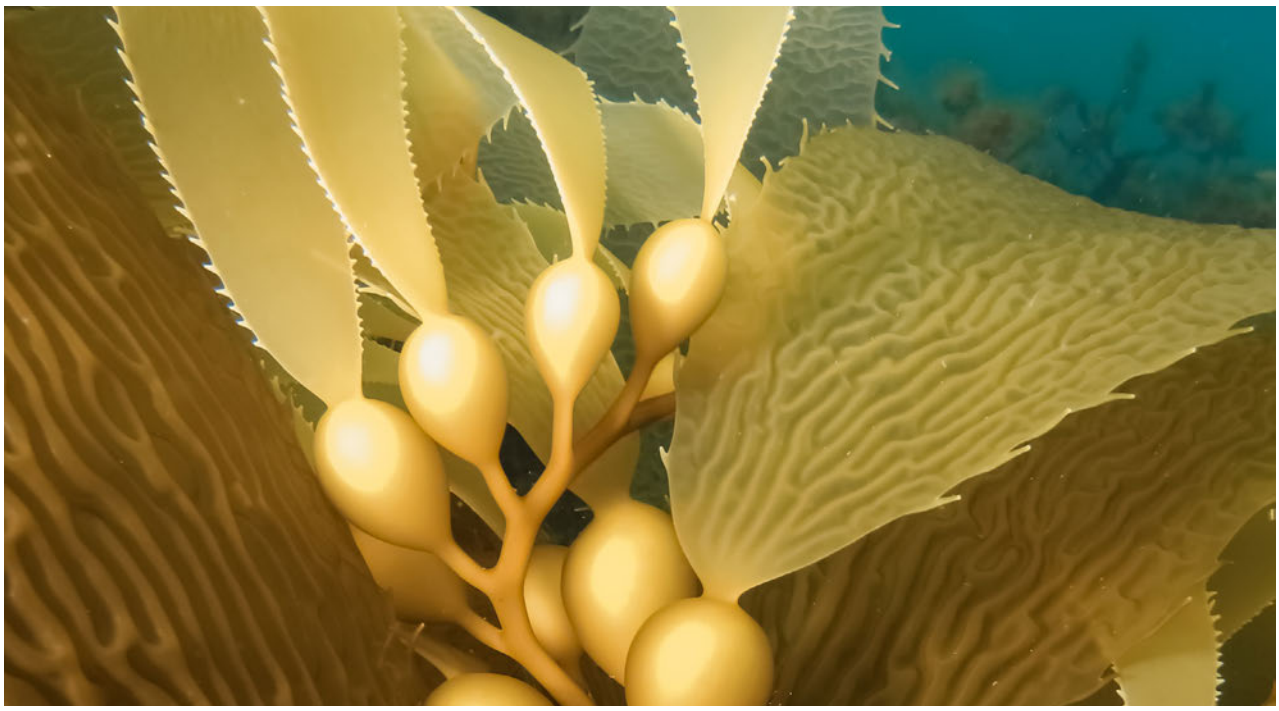
Biosecurity risks and invasive species in rocky reef and coast Assets, as well as offshore islands, are exacerbated by increasing human use and movement and changes in climate influencing range and opportunity. These emerging and cumulative impacts are recognised in defining Priorities and Actions, and link with the Biodiversity Theme.

The value of receiving waters in the catchments which flow to coastal and marine areas, including built infrastructure, influences water quality across assets and provides a system link to the Land Theme, which has been considered in identifying priorities, outcomes, and actions.

NRM South prioritises the following coastal and marine areas due to their high natural and social values and the opportunities for ecological restoration to build resilience and maintain ecological services:

- Rocky reefs of the east coast;
- Soft sediment, seagrass habitats and native shellfish reefs of the south-east;
- Vulnerable coastlines, including beach and dune systems;
- Rocky coasts; and
- Offshore islands.

NRM South's Actions aim to improve the management of coasts and marine assets, with an emphasis on increasing the adoption of management practices that enhance the adaptive capacity to be resilient to climate change and sea level rise.



» Giant kelp, Ninepin Point (Emma Flukes)

6.4.3 Priorities and Actions

PRIORITY WC1: Rocky reefs of the east coast

In Tasmania, shallow rocky reefs have been identified as a key marine habitat in coastal waters and are under increasing pressure from climate change, invasive species and resource extraction. The Giant Kelp Marine Forests of South East Australia ecological community has been progressively lost, especially on the east coast of Tasmania, due to changing oceanographic conditions and corresponding changes in threatening processes caused by climate change. Rocky reefs in this area support environmental, social and economic values of the region. They also are carbon sinks and increasingly contribute to Tasmania's blue economy.

Outcome:

> By 2030, the resilience of rocky reef communities on the east coast of Tasmania is being maintained or improved through best practice resource harvest, biosecurity, and on-ground works to restore habitat.

Local threats that can be addressed by NRM actions:

- Invasive species and range expansions
- Resource extraction
- Habitat loss

Actions:

WC1.a	Work with partners to support restoration initiatives for kelp forests (including giant kelp forest restoration trials, multi-species trials, and marine pest management) and foster ongoing stewardship.
WC1.b	Work with partner organisations to build the capacity of recreational and commercial fishers to undertake their General Biosecurity Duty.
WC1.c	Identify priority areas, mitigation or restoration actions, and adaptive opportunities to improve the resilience of rocky reef communities on the east coast, using spatial mapping and planning techniques.
WC1.d	Leverage funding and work with the seafood industry to support diversification of markets and remove invasive sea urchins through industry-based initiatives, including training.
WC1.e	Support the Tasmanian Aboriginal community and organisations to work, gather and learn on Country.

Implementation:

Investment opportunity	✓ Australian Government	✓ Tasmanian Government	✓ Regional or Local	✓ Private or philanthropic

Potential delivery methods	• Attitudinal and behavioural change (education and skills) • Improved information (e.g. spatial mapping and planning) and on-ground works (e.g. restoration, pest management) • Policy and planning input • Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.
Potential collaborators	Seafood industry; research organisations (e.g. UTas); environmental organisations (e.g. The Nature Conservancy); state government (e.g. NRET); and Australian Government (e.g. DAWE).
Opportunities for community participation	Education and training; identify interests, concerns and opportunities that may be developed into projects; and establish working groups and/or communities of practice to increase shared learning and maximise project outcomes.

» Purple shore crab, Coningham

PRIORITY WC2: Offshore Islands

There are some 8,222 islands dotted around Australia's shores, with 334 located off the coast of Tasmania.

Bruny Island is a focal point for action in the southern region, and is located near Hobart. South Bruny Island is hilly and forested, containing the National Estate-listed Labillardière State Reserve. North Bruny Island is only lightly timbered and contains open pasture. The island is sparsely populated and has an abundance of native birdlife, marsupials, and marine life.

A second focal point is Maria Island, which is situated off Tasmania's east coast. Maria Island is 115 km^2 and is one of Tasmania's 19 national parks managed by the Tasmanian Parks and Wildlife Service. It is home to a diverse range of native wildlife – including the nationally listed forty-spotted pardalote – and managed to maintain an insurance population of the Tasmanian devil. The island's vegetation consists primarily of wet and dry sclerophyll forest with some coastal heath, and areas of cleared land around the main settlement of Darlington. The island has no permanent residents, but receives over 31,000 visitors per year.

Offshore islands are vulnerable to invasive weed and pest (e.g. cats and rats) species, which impact native bird communities and small marsupials.

Outcome:

> By 2030, priority biodiversity and conservation values for offshore islands (e.g. Bruny Island, Maria Island) are identified and a strategic program is developed outlining investment priorities for improved management and on-ground works.

Local threats that can be addressed by NRM actions:

- Biosecurity: introduced fauna (native and non-native) and invasive weed species
- Land use change (clearing and fragmentation, stock trampling and browsing), pollutants (including marine debris) and access issues (walking and vehicular tracks)

Actions:

WC2.a	Leverage funding and work partners to plan and implement management actions on offshore islands (particularly Bruny and Maria Islands), with the aim to achieve multiple benefits across targets including biodiversity and conservation through pest eradication (e.g. cats), biosecurity management, responding to climate risk and building resilience.
WC2.b	Support the Tasmanian Aboriginal community and organisations to work, gather and learn on Country.

Implementation:

Investment opportunity	✓	Australian Government	✓	Tasmanian Government	✓	Regional or Local	✓	Private or philanthropic

Potential delivery methods	• Attitudinal and behavioural change (education and skills) • Improved information (e.g. monitoring, applied research and feedback) • On-ground management actions/activities (e.g. pest management) • Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.
Potential collaborators	Land managers; research organisations; industry (e.g. Bruny Farming); local governments (e.g. Kingborough Council); community organisations and groups (e.g. Ten Lives Cat Centre, Landcare, Wildcare); specialist and research organisations (e.g. Derwent Estuary Program); Aboriginal community and organisations (e.g. weetapoona Aboriginal Corporation); Australian Government (e.g. DAWE); and state government (e.g. NRET).
Opportunities for community participation	Identify interests, concerns and opportunities that may be developed into projects; establish working groups and/or communities of practice to increase shared learning and maximise project outcomes; collaborate with Aboriginal organisations and communities.

» The Neck, Bruny Island (J.J. Harrison)

PRIORITY WC3: Vulnerable coastlines, including beach and dune systems

The Tasmanian coastal landscape includes diverse rocky reefs, sandy beaches and dunes, sea cliffs, headlands, lagoons, river estuaries, harbours and open coast. Vulnerable coastlines contain sensitive natural and cultural values, erodible shores, and important vegetation communities and wildlife habitat, including for shorebirds and migratory waders. Beach and dune systems are valued highly by the community due to their role as a buffer against high winds and waves, as habitat for important species, and as a focal point for recreational and commercial activities. These systems are vulnerable to seaward changes in sea level, storm surge and extreme weather events. Land use and development, coupled with an increasing coastal population (permanent settlements and visitation/tourists), creates pressure on these sensitive environments, particularly through habitat disturbance. The rate of change due to coastal development is particularly evident in the south east and east coast of Tasmania.

Outcome:

By 2030, the resilience of priority beach and dune systems is improved through the identification of priority sites (based on use, condition and vulnerability to climate change impacts), and the implementation of best management practices and on-ground works.

Local threats that can be addressed by NRM actions:

- Lack of baseline information and contemporary planning documentation
- Biosecurity (pests, including ranging domestic animals, weeds and disease)
- Pollutants, marine debris, and excess nutrients
- Shoreline and coastal disturbance, modification and development
- Recreational activities (fishing, boating, camping, vehicle access)

Actions:

WC3.a	Improve coastal zone planning and management planning to address vulnerability to climate change impacts by identifying: priority beach and dune sites (spatial planning); mitigation, restoration or adaptive opportunities; and monitoring, citizen science or knowledge building initiatives.
WC3.b	Engage with coastal land managers to support the management of coastal infrastructure (e.g. amenities, tracks, eco-friendly marine infrastructure) to limit movement through priority dunes and improve coastal biodiversity and biosecurity outcomes.
WC3.c	Support best-practice marine debris collections by building understanding of bird breeding and sensitive locations.
WC3.d	Support the Tasmanian Aboriginal community and organisations to work, gather and learn on Country.

Implementation:

Investment opportunity	✓	Australian Government	✓	Tasmanian Government	✓	Regional or Local	✓	Private or philanthropic

Potential delivery methods	• Attitudinal and behavioural change (education and skills) • Improved information and on-ground management actions/activities (e.g. debris collection and enhancing biosecurity measures) • Policy and planning input • Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works
Potential collaborators	Seafood industry; local governments; state government (NRET, DPAC); Aboriginal community and organisations; research organisations (e.g. UTas); community groups (e.g. Landcare, Wildcare); conservation organisations (e.g. BirdLife Tasmania, TNC, TLC)
Opportunities for community participation	Identify interests, concerns and opportunities that may be developed into projects; collaborate with Aboriginal organisations and communities; and engage strategic partners.

» Cockle Creek (Nathalie Laurence)

PRIORITY WC4: Rocky coasts

The Tasman and Forestier peninsulas, to the south-east of Hobart, contain some of Australia's most rugged coastline as well as unique rock formations. This includes the steep cliffs, coastal rock formations, and slanted dolerite bluffs of the Three Capes (Cape Pillar, Cape Hauy and Cape Raoul). Other examples of rocky coasts include the Maria Island limestone and sandstone cliffs and South Bruny blow hole, caves, caverns, natural bridges and dolerite stacks. Rocky coasts are habitat for diverse coastal fauna and flora, including invertebrate communities. They are recreationally important areas for the southern Region, with high visitation to some sites. Access, modification, erosion, and biosecurity are threats to rocky coasts.

Outcome:

By 2030, the condition of rocky coasts in the southern region is maintained or improved through increased on-ground management, knowledge and planning.

Local threats that can be addressed by NRM actions:

- Erosion and climate change impacts
- Biosecurity (pests and disease)
- Shoreline and coastal disturbance, modification and development

Actions:

WC4.a	Improve coastal zone planning and management planning by identifying: rocky foreshore condition and values at priority sites (spatial planning); mitigation, restoration or adaptive opportunities; and monitoring, citizen science or knowledge building initiatives.
WC4.b	Work with partners to improve behaviours and stewardship of rocky coasts (e.g. responsible recreational use of rocky coasts – access points, erosion, species composition, biosecurity, hygiene, climate change).
WC4.c	Work with community, recreational fishers and businesses to: limit extraction of important invertebrates from rocky coasts; and develop and implement biosecurity management plans or codes of practices.
WC4.d	Support the Tasmanian Aboriginal community and organisations to work, gather and learn on Country.

Implementation:

Investment opportunity	✓ Australian Government ✓ Tasmanian Government ✓ Regional or Local ✓ Private or philanthropic
Potential delivery methods	• Attitudinal and behavioural change (education and skills) • Improved information and on-ground management actions/activities (e.g. controlling access, erosion management) • Policy and planning input • Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works
Potential collaborators	Industry; community groups; local governments; state government; Australian Government; Aboriginal community and organisations; research organisations
Opportunities for community participation	Project reference/working groups to develop project briefs and contribute to design; engage strategic partners; establish working groups and/or communities of practice to increase shared learning and maximise project outcomes; share strategy, operations, and portfolio updates for feedback to inform direction and priority.

PRIORITY WC5: Soft sediment, seagrass habitats and native shellfish reefs of the south east

Soft sediment coasts and benthic zones are comprised of loose sediment, which is easily erodible. The muddy, sandy soft-sediment environments on the sea floor are habitat for crabs, worms, shellfish and other aquatic creatures.

Seagrass beds sequester large amounts of carbon per unit area – up to 40 times more than forests. They are highly productive plants that provide food and shelter for many fish, birds and other animals and are a critical link in the marine food web. They are usually found in shallow water and are very sensitive to water pollution by sediments and nutrients, and scarring and habitat fragmentation caused by traditional chain swing moorings scraping the seafloor.

Native oyster reefs were once a common feature of estuarine and nearshore marine waters in southeast Tasmania alongside rocky reef, seagrass, sand, and soft sediment habitats. Tasmanian government fishery records from the 1800s indicate that native shellfish reefs were extensive, but were since fished to commercial extinction. These oyster reefs were comprised primarily of the Australian flat oyster and occurred in low intertidal areas and formed subtidal reefs in depths down to 30 m. Oyster reefs play an important role in estuarine and marine ecosystems, providing high quality structured habitat for a range of fishes and marine invertebrates, high fish productivity for commercial and recreational species by providing shelter from predation and abundant sources of food, and improved water quality as the oysters filter large volumes of water and nutrient cycling between the water column and sediments.

Outcome:

> By 2030, the condition and extent of native shellfish reefs and seagrass communities is maintained or improved at priority sites, with on-ground works to restore habitat and stabilise sediments.

Local threats that can be addressed by NRM actions:

- Sediment and nutrient load
- Habitat loss and fragmentation, and scarring of seagrass beds and disturbance of soft sediments by traditional chain swing moorings
- Low recruitment of native invertebrates, including native oysters

Actions:

WC5.a	Engage with MAST and mooring owners/lessees, including recreational and commercial fleets, to transition traditional chain swing moorings to Environmentally Friendly Moorings.
WC5.b	Work in partnership to identify existing and new monitoring data that will support the evaluation of resource condition trends of soft sediment communities – including spatial planning, and monitoring change (i.e. changes in the condition and extent, stability, variability, the use of soft sediments by threatened, endangered and protected species (e.g. spotted and red handfish), the impact of invasive and introduced species, changes in populations of key species, and the growth requirements of seagrass species for restoration purposes).
WC5.c	Participate in 'blue' and 'teal' carbon and diffuse nutrient sequestration through restoration activities and assess viability as financial incentive to practice change for biodiversity and water health outcomes.
WC5.d	Work in partnership to coordinate efforts to restore and monitor shellfish reefs, including the native flat oyster, and work with the Aboriginal community towards restoring native Angasi oyster reefs and developing a cultural resource for harvesting native Angasi oysters.

WC5.e	Engage community-based organisations (through extension, skills development, and remote citizen science activities) in upscaling current seagrass and native oyster reef restoration trials into broader scale activities and monitoring.
WC5.f	Improve coastal zone planning and management planning by continuing to build relationships and planning tools to support and prioritise on-ground action.
WC5.g	Undertake a review of conservation and non-fed aquaculture for restoration purposes.
WC5.h	Support the Tasmanian Aboriginal community and organisations to work, gather and learn on Country.

Implementation:

Investment opportunity	☑ Australian Government	☑ Tasmanian Government	☑ Regional or Local	☐ Private or philanthropic

Potential delivery methods	• Attitudinal and behavioural change (education and skills) • Improved information and on-ground management actions/activities (e.g. installation of environmentally friendly moorings, selecting suitable sites for construction of native oyster reefs) • Policy and planning input • Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works
Potential collaborators	Australian Government (DAWE); state government (e.g. MAST, NRET); local governments (e.g. Kingborough Council); businesses and industry; research organisations (e.g. CSIRO); volunteer organisations (e.g. OzFish Unlimited); conservation organisations (e.g. TNC).
Opportunities for community participation	Provide project updates through our website, social presence and mailing list; surveys (landholders, interest groups, users); engage volunteers and land managers in project activities, trials or demonstration sites.

» Installing environmentally friendly moorings over seagrass, North West Bay (Grace Isdale)

» Striped sun orchid (Georgie Butorac)

7

Biodiversity

7 Biodiversity

The Biodiversity Theme encompasses the full variety of life found in the state, including all species of plants, animals, fungi, microorganisms and the ecosystems in which they live. While biodiversity refers to all living things, the NRM organisations focus on natural assets native to the state.

Ecologically functioning systems are those that can maintain their biodiversity and ecological processes. A highly functioning ecosystem can support the full complement of its biodiversity and contribute to a range of ecosystem services. By contrast, poorly functioning ecosystems lose biodiversity and other resources such as soil, water and nutrients, leading to the local extinction of species. A highly functioning ecosystem is more resilient and has a greater capacity to adapt to change while maintaining similar function, structure, and composition. By protecting and conserving areas that support biodiversity, the diversity of genes, species, communities, and ecosystems is also maintained.

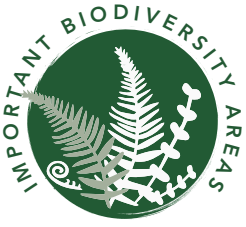
It is the suite of species and ecosystems that provide the services for our health and well-being, including clean water, air, shelter, and food.

Many agencies and individuals are working to protect and maintain Tasmania's high value habitat for threatened species, important biodiversity areas and ecological communities. Tasmania's NRM organisations work with partners to achieve shared strategic outcomes. Community and partner involvement in biodiversity programs range from monitoring, research, and on-ground restoration activities.

There is overlap between the Biodiversity, Land and Water Themes, including the maintenance of biodiversity on farms and resilient landscapes (Land Theme) and the prioritisation of Ramsar sites and aquatic and coastal habitats that support threatened species and ecological communities (Water Theme). The delivery of actions across all Themes will contribute to the health of Tasmania's biodiversity resources.

Important biodiversity areas are significant because they are home to a diversity of biota and include formally recognised sites such as World Heritage Areas, important reserves, recognised biodiversity hotspots or Key Biodiversity Areas.

Threatened ecological communities include the communities listed under the EPBC Act and NC Act. Regionally or locally important and emerging priority ecological communities are also recognised.



Threatened species include species listed under the EPBC Act and TSP Act. Important species recognises that there are regionally or locally important species, as well as emerging threatened species.

7.1 Biodiversity in Tasmania

TABLE 4: **A snapshot of Tasmania's biodiversity assets**

42%	**PARKS AND RESERVES** Tasmania has 19 national parks and 823 natural reserves, covering 42% of the island. This includes the Tasmanian Wilderness World Heritage Area	The TWWHA is 15,800 km^2, which is almost 25% of the state. It meets seven of the ten UNESCO World Heritage criteria.
7	**COMMONWEALTH–LISTED COMMUNITIES** Ecological communities listed as being under threat	These communities are diverse, ranging from alpine to rainforest, buttongrass plains, wetlands and grasslands.
39	**STATE–LISTED COMMUNITIES** 23 state-listed threatened forest communities and 16 state-listed threatened non-forest communities	State-wide, there are 39 listed communities. These include 23 forest communities and 15 non-forest communities.
689	**LISTED PLANT AND ANIMAL SPECIES**	• 493 plant species • 19 fish species • 37 bird species • 117 insect species • 9 amphibian and reptile species • 14 mammal species • *Threatened Species Protection Act 1995* and *Environment Protection and Biodiversity Conservation Act 1999*

7.2 Important biodiversity areas

7.2.1 State-wide Outcome

By 2050, actions have been implemented that reduce threats to the natural values of Tasmania's important biodiversity areas

7.2.2 Regional context

The southern region of Tasmania is internationally recognised as an area of exceptional environmental significance. It includes pristine to near-pristine river systems and lakes, rich flora and fauna – including many species endemic to Tasmania – as well as complex, geo-diverse landscapes. It contains the world heritage areas of the Tasmanian Wilderness World Heritage Area (TWWHA) and Macquarie Island, as well as seven national parks, one nationally-recognised biodiversity hotspot (Midlands) and terrestrial, estuarine and marine ecosystems with high levels of biodiversity.

More than 47% of the region (both public and private land) is managed primarily for conservation, and is included in the National Reserve System. The area of public land that is reserved is 1,152,097 ha (including the TWWHA and Macquarie Island).

In addition to these reserved areas more than 50,000 ha of private land has been protected through the establishment of formal management agreements, including approximately 250 conservation covenants.

However, significant biodiversity values, including nationally and state-recognised threatened ecological communities, and threatened species and their habitats, remain under-reserved.

Through implementation of key Actions, NRM South aims to support appropriate management of the region's important biodiversity areas, and the important ecosystem services and biodiversity values within them. Actions focus on increasing the adoption of management practices that enhance the adaptive capacity to be resilient to impacts associated with past land management and climate change.

7.2.3 Priorities and Actions

PRIORITY BI1: Midlands Biodiversity Hotspot

The Tasmanian Midlands consists primarily of temperate grasslands and grassy woodlands, and is recognised as one of Australia's 15 biodiversity hotspots, due to its diversity of endemic flora and fauna, including 32 threatened species listed under the EPBC Act and 180 listed under the TSP Act. Less than 10% of the original native grasslands and 30% of native vegetation remains and much is highly degraded.

The Midlands Biodiversity Hotspot also contains wetlands of national and regional significance, which provide habitat for endemic freshwater molluscs and invertebrates.

Outcome:

> By 2030, the number of hectares in the Midlands Biodiversity Hotspot under improved management or formal land conservation has increased.

Local threats that can be addressed by NRM actions:

Land use and modification (e.g. clearing and conversion, habitat fragmentation, inappropriate fire regimes, invasive species, intensive farming).

Actions:

BI1.a	Identify areas of high ecological value and work with partners and land managers to improve connectivity, buffer native vegetation and aquatic ecosystems, and protect these through land conservation mechanisms (e.g. covenant or Part V on title).
BI1.b	Raise awareness about the natural values and importance of managing biodiversity assets within the Midlands Biodiversity Hotspot.
BI1.c	Leverage funding and work with partnering organisations to improve land management practices, and property management planning, focusing on production and conservation values.
BI1.d	Increase capacity to reduce threats from ecosystem altering weeds, stock access and inappropriate fire regimes.

Implementation:

Investment opportunity	✓ Australian Government ✓ Tasmanian Government ✓ Regional or Local ✓ Private or philanthropic
Potential delivery methods	• Attitudinal and behavioural change (education and skills) • Improved information and on-ground management actions/activities (e.g. weed control, revegetation, fencing, contracted works, targeted incentives, stewardship payments, small grants) • Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.
Potential collaborators	Conservation organisations (e.g. TLC, Bush Heritage Australia, Greening Australia, NRM North); land managers; state government (e.g. NRET, PFT); research organisations (e.g. UTas, La Trobe University); Australian Government and local governments.
Opportunities for community participation	Proactive engagement with landholders; identify interests, concerns and opportunities; participation in community forums/events; conduct field days, events, education and training; build and maximise community outreach; participation in project governance and working groups; and engage with Aboriginal community and organisations (opportunity to apply knowledge and practices, and learn, gather and work on Country).

PRIORITY B12: Tasmanian Wilderness World Heritage Area (TWWHA)

The TWWHA is recognised under UNESCO's World Heritage Convention as being of Outstanding Universal Value (OUV), meeting seven of the ten UNESCO World Heritage site criteria. It is the largest Tasmanian contiguous reserved area, covering 15,800 km^2 (25% of the state) or 1.38M ha. It is one of the last areas of temperate wilderness in the world.

As a Matter of National Environmental Significance (MNES), actions that may impact on the values of the TWWHA must be assessed against criteria established under the EPBC Act. The TWWHA is managed under the statutory *Tasmanian Wilderness World Heritage Area Management Plan* (2016), which establishes use zones for the TWWHA, and associated management requirements for each zone.

The TWWHA contains six recognised ecosystems: rainforest, sclerophyll communities, alpine treeless vegetation, subalpine treeless vegetation, and wetland communities. There are records for 1,397 species, including 30 species of terrestrial mammals, 120 species of terrestrial birds, 14 species of terrestrial reptiles, seven species of frogs, 16 species of freshwater fish, and 68 species of marine fish.

The TWWHA is recognised by UNESCO in its *World Heritage forests: carbon sinks under pressure* analysis (2021) as the largest world heritage carbon sink, with the second highest net carbon sink per unit area.

As an area of international significance, the values of the TWWHA have continued to be studied. The frequency with which new information is discovered requires an adaptive management approach, especially in responding to new and emerging threats.

Recent research has focussed on climate change impacts on alpine moorlands, ecosystem responses to fire, and biosecurity. Management and mitigation of climate change impacts and fire are the responsibility of state agencies. However, there are opportunities for NRM South to collaborate with other partners to address biosecurity threats to the TWWHA.

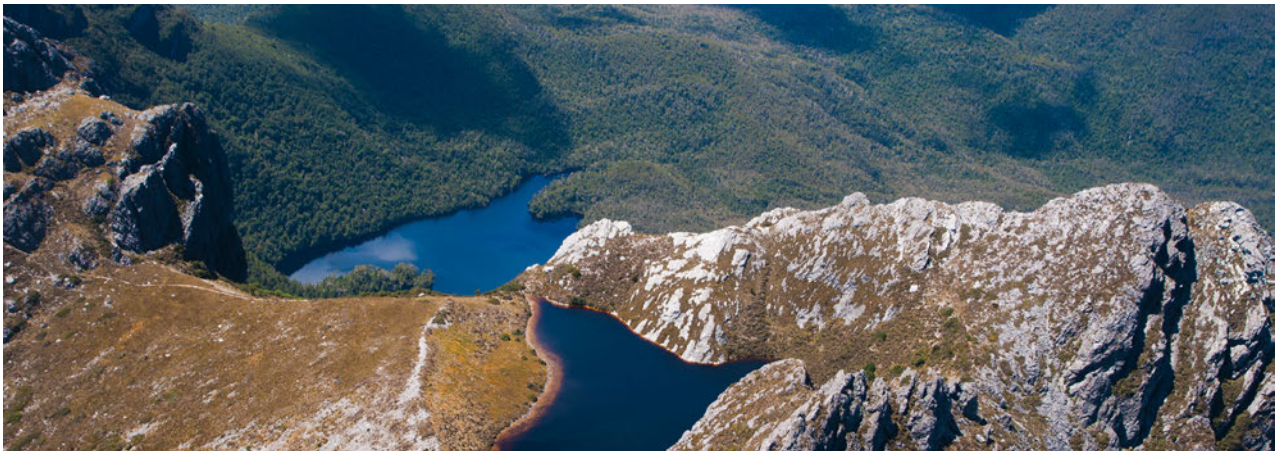
The *Tasmanian Wilderness World Heritage Area Biosecurity Strategy 2021-2031* identifies 20 high priority biosecurity threats to the TWWHA:

a) Ten invasive weed and fungi species
   - Spanish heath
   - Ragwort
   - Blackberry
   - Gorse
   - Bulrush
   - Orange hawkweed
   - Sea spurge
   - Marram grass
   - Fly agaric mushroom
   - Orange pore fungus

b) One freshwater species of concern
   - Didymo

c) Five invasive animal (fauna) species
   - Brown trout
   - Superb lyrebird
   - European wasp
   - Sugar glider
   - Fallow deer

d) Four diseases
   - Amphibian chytrid fungus
   - Phytophthora dieback
   - Devil Facial Tumour Disease (DFTD)
   - Myrtle rust



» Aerial view of the Tasmanian Wilderness World Heritage Area (Nathalie Laurence)

Outcome:

> By 2030, previously unidentified threats to the TWWHA are reduced through a partnership program to manage priority weeds, pests and diseases and an active biosecurity campaign is implemented at key entrances to the TWWHA in the southern region.

Local threats that can be addressed by NRM actions:

Biosecurity issues (weed invasion from surrounding properties and spread by visitors and fauna, introduction or spread of disease, invasive species such as deer and cats)

Actions

BI2.a	Work in partnership to reduce the movement of water and soils, which can transport weeds and diseases, and to manage invasive species.
BI2.b	Promote measures that increase awareness and information exchange about biosecurity threats – including how to identify, report and prevent their spread.
BI2.c	Work in partnership on appropriate and targeted fire management and measures to manage or protect iconic species (e.g. Huon and Pencil Pines, Myrtles).
BI2.d	Develop and/or implement targeted management plans to control feral animals that impact the values in the TWWHA, such as deer or cats.
BI2.e	Work with the Tasmanian Aboriginal Centre and other partners to support land management activities at trawtha makuminya and adjacent properties – including control actions for exotic species, and management and/or monitoring of natural and cultural values.

Implementation:

Investment opportunity	✓ Australian Government; ✓ Tasmanian Government; ✓ Regional or Local; ✓ Private or philanthropic
Potential delivery methods	• Attitudinal and behavioural change (education and skills) • Improved information and on-ground management actions/activities (e.g. biosecurity awareness, capacity building and management; revegetation; fencing, contracted works, targeted incentives) • Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.
Potential collaborators	State government (NRET – including PWS and NCH); Australian Government (e.g. DAWE); conservation organisations (e.g. TLC, Landcare and Wildcare – Friends of groups); neighbouring land managers; and Aboriginal community and organisations.
Opportunities for community participation	Proactive engagement with landholders; identify interests, concerns and opportunities; participation in community forums/events; conduct field days, events, education and training; build and maximise community outreach; participation in project governance and working groups; and engage with Aboriginal community and organisations (opportunity to apply knowledge and practices, and learn, gather and work on Country)

7.3 Threatened and important ecological communities

7.3.1 State-wide Outcome

By 2050, actions have been implemented that reduce impacts to Tasmania's threatened and important ecological communities.

7.3.2 Regional context

Ecological communities are groups of organisms found growing together in many places, with a given species composition and sometimes geology. They are most often described by the dominant flora species or group of species.

In Tasmania, terrestrial ecological communities are defined by TASVEG, the official, publicly available state-wide vegetation map. TASVEG identifies more than 150 vegetation communities, of which 138 vegetation communities occur in the south, covering 76% of the region. These vegetation types range from alpine vegetation, rainforests, eucalypt forests and woodland, other forests, heath, scrub, buttongrass plains, moorland, wetlands, swamp and grasslands.

Threatened communities are listed at the state level under the *Nature Conservation Act 2002* (NC Act). There are 39 listed threatened native vegetation communities, of which 36 occur in the southern region. Their management is regulated through forestry and planning legislation.

The EPBC Act lists seven Threatened Ecological Communities that occur in Tasmania, all of which occur in the southern region:

- Alpine sphagnum bogs and associated fens
- *Eucalyptus ovata – Callitris oblonga* forest
- Giant Kelp Marine forests of South East Australia
- Lowland Native Grasslands of Tasmania
- Subtropical and Temperate Coastal saltmarsh
- Tasmanian Forest and Woodlands dominated by black gum or Brookers gum (*E. ovata/E. brookeriana*)
- Tasmanian white gum (*E. viminalis*) wet forest

These communities are subject to localised impacts such as loss and fragmentation of important areas, weeds and diseases, invasive species that browse the communities, degradation from changes in water regimes, pollution or changes to nutrients and inappropriate fire regimes (burns that are too frequent, not frequent enough, or of damaging intensity).

Changing climate is a global-level impact that will affect species differently. The composition (species, and relative abundance of species) of existing vegetation communities is expected to change, leading to changes in ecological function.

Through implementation of key Actions, NRM South aims to support appropriate, informed management of the region's complex ecological communities, focusing on areas that require immediate attention. Actions focus on extent, condition and connectivity of critical habitats and the status of threatened and vulnerable communities. NRM South will implement effective interventions with the aim to get the best outcomes, protecting the best condition areas first (including remnants), and identifying locations and measures for restoration.

7.3.3 Priorities and Actions

PRIORITY BC1: Alpine Sphagnum bogs and associated fens

The southern region contains a nationally-significant proportion of the threatened Alpine Sphagnum bogs and associated fens community. While many examples are formally reserved, this community consists of highly fragmented, isolated remnants, and its geographic extent is restricted.

This community is found in permanently wet sites in high rainfall, alpine, sub-alpine, and montane areas. Sphagnum vegetation and the underlying peat organosols (soils dominated by organic matter) have a significant water-holding capacity, which is important in modulating water flow and maintaining the hydrology of surrounding environments. The manner in which bog and fen communities gradually release water from the spring snow melt is critical to the survival of numerous other ecological communities. Intact areas of sphagnum act as a natural filter for nutrients, pathogens and sediments, thus playing an important role in maintaining water quality throughout catchments.

'Sphagnum peatland' is listed as a threatened native vegetation community under the NC Act, and is listed as Endangered under the EPBC Act due to its small geographic distribution coupled with demonstrable threats, the continued decline of functionally important species, and the severe reduction in community integrity across its range.

Outcome:

> By 2030, improve the outcomes for Alpine Sphagnum bogs and associated fens by focussing on management on private land and improving awareness of unsustainable use of sphagnum.

Local threats that can be addressed by NRM actions:

- Harvesting for the nursery industry
- Land use and modification (e.g. vehicle damage, grazing, trampling, inappropriate fire regimes, water extraction)
- Biosecurity issues (weeds and pathogens – including dieback disease, *Phytophthora cinnamomi*)

Actions:

BC1.a	Conduct an education and awareness campaign with nurseries and the community about the unsustainable use of sphagnum (e.g. poaching of protected areas and that on private land) and to encourage alternate products.
BC1.b	Work with partners to implement on-ground actions via management plans to protect sphagnum bogs, including ensuring that vehicles are kept out of the bogs, that the natural hydrology is unaltered, and fire is managed.

Implementation:

Investment opportunity	✓ Australian Government	✓ Tasmanian Government	Regional or Local	Private or philanthropic

Potential delivery methods

- Attitudinal and behavioural change (education and skills)
- Improved information and on-ground management actions/activities (e.g. weed control, controlling access, fire management plans, contracted works, targeted incentives)
- Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.

Potential collaborators	State government (e.g. NRET, Forest Practices Authority, PWS); GBEs (Hydro Tasmania); industry (e.g. plant nurseries, STT, Forico); Aboriginal community and organisations; local governments (e.g. Central Highlands, Meander Valley, Kentish, West Coast, Derwent Valley); conservation organisations (e.g. TLC, Threatened Plants Tasmania, Landcare and Wildcare); and Australian Government (e.g. DAWE).
Opportunities for community participation	Proactive engagement with landholders including sharing strategy, operations, and portfolio updates; identify interests, concerns and opportunities; participation in community forums; conduct field days, events, surveys, education and training; build and maximise community outreach; participation in project governance and working groups; and engage with Aboriginal community and organisations (opportunity to apply knowledge and practices, and learn, gather and work on Country).

» *Sphagnum cristatum* in Tasmania (Micah Visoiu)

PRIORITY BC2: Tasmanian forests and woodlands dominated by black or Brookers gum

This ecological community is unique to Tasmania. It is listed (as two separate communities – "*Eucalyptus brookeriana* wet forest" and "*E. ovata* forest and woodland" under the NC Act, and is listed (as a single community) as Critically Endangered under the EPBC Act.

It is estimated to have declined by 90% since European settlement, largely due to historical land-clearing of fertile floodplains, and the community now mainly occurs as scattered remnants in low-lying areas.

These forests and woodlands provide habitat for at least 51 nationally threatened species – including 16 fauna and 31 flora species. The ecological community also helps to maintain natural water tables and flows, and provide amenity such as shelter to stock and people.

In the southern region *E. brookeriana* wet forest occurs in small patches in higher rainfall areas in the south west, predominantly within reserves on public land (including the TWWHA).

Patches of *E. ovata* forest and woodland are more common in the Huon Valley and D'Entrecasteaux Channel areas, as well as along watercourses on the East Coast. This community is under-reserved in the region, and engagement with private landowners is essential to improve the resilience and conservation of this ecological community.

Outcome:

By 2030, the amount and quality of black or Brookers gum being protected through land conservation mechanisms has increased, and awareness of measures to protect and enhance the ecological community has been improved.

Local threats that can be addressed by NRM actions:

- Land use and modification (e.g. clearance and conversion, understorey clearance, drainage and changes to water flow and quality, grazing pressure, including from deer and stock, inappropriate fire regimes)
- Biosecurity issues (weed invasion, pathogens – including dieback disease, *Phytophthora cinnamomi*)
- Hybridisation with non-Tasmanian plantation eucalypts
- Climate change (e.g. altered fire and flooding regimes, decline in tree health due to prolonged drought and heat stress)

Actions:

BC2.a	Identify and assess extent and condition of black or Brookers gum remnants on private land and protect areas of high value through conservation mechanisms with land managers and landowners.
BC2.b	Increase awareness of the values and regulation of black or Brookers gum to reduce rates of clearing, modification, and conversion.
BC2.c	Leverage funding and work with land managers to implement on-ground actions to protect vegetation (e.g. fencing, deer control, weed control, fuel-reduction work, fire planning and management of unregulated clearing).

Implementation:

Investment opportunity	✓ Australian Government	✓ Tasmanian Government	✓ Regional or Local	Private or philanthropic

Potential delivery methods	• Attitudinal and behavioural change (education and skills) • Improved information and on-ground management actions/activities (e.g. improve mapping of the community and ground-truth that mapped, weed control, vegetation buffers, fencing to control access, contracted works, targeted incentives, stewardship payments, small grants) • Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.
Potential collaborators	Land managers; local governments (e.g. City of Hobart, Kingborough, Huon Valley); conservation organisations (e.g. Threatened Plants of Tasmania, Tasmanian Seed Conservation Centre, TLC, Landcare, Wildcare); industry (e.g. farming businesses, TFGA, Wine Tasmania); research organisations (e.g. UTas); Aboriginal community and organisations; state government (e.g. NRET, FPA) and Australian Government (e.g. DAWE).
Opportunities for community participation	Proactive engagement with landholders including sharing strategy, operations, and portfolio updates; identify interests, concerns and opportunities; participation in community forums; conduct field days, events, surveys, education and training; build and maximise community outreach; participation in project governance and working groups; and engage with Aboriginal community and organisations (opportunity to apply knowledge and practices, and learn, gather and work on Country).

» Black gum in flower (Joe Quarmby)

PRIORITY BC3: Highland and lowland grasslands

Highland Poa grasslands

Highland Poa grassland is listed as a threatened native vegetation community under the NC Act. This community is not listed under the EPBC Act. The community is dominated by silver tussock, and is found in fertile valleys and plains between 600 m above sea level and the lower limit of alpine vegetation (approximately 1000 m above sea level).

In the southern region Highland Poa grassland occurs on both reserved and private land in the central highlands area. Many of the pre-European upland tussock grasslands survive, although often in a degraded state. All of these highland grasslands have been used for stock grazing, and many retain that use. Both grazing and fire have contributed to the persistence of this community in some locations, by preventing natural ecological succession.

Lowland grasslands

The ecological community "Lowland Native Grasslands of Tasmania" is listed as Critically Endangered under the EPBC Act. It is not listed under Tasmanian legislation.

This community comprises two major sub-types differentiated by the dominant native tussock-forming perennial grass species: silver tussock and kangaroo grass. This ecological community is mostly limited to a ground layer of grasses and other herbs. Trees and shrubs are usually absent or sparse. Lowland native grassland typically occurs in areas up to 600 m above sea level, generally on soils underlain by basalt, dolerite, deep sands, or alluvial deposits. The ecological community generally exists as small, fragmented remnants within its range. It is estimated that more than 83% of the community has been lost since European settlement.

In the southern region lowland native grassland dominated by silver tussock occurs in the Derwent Valley, Midlands and south-east areas, with smaller patches near the East Coast. Lowland native grassland dominated by kangaroo grass is much less common; small patches exist in these same areas. Both sub-types occur predominantly on private land, and although some of these areas are protected by perpetual covenants (mainly in the southern Midlands area), the majority are not. As with highland grasslands, their persistence is in part due to grazing and fire regimes that prevent succession.

Lowland native grasslands are habitat for a number of nationally and state-listed fauna and flora species, including eastern-barred bandicoot and purple glycine.

Land use change, particularly the expansion of irrigation, presents a significant on-going threat to this community.

Outcome:

> By 2030, the number of highland and lowland grasslands protected through land conservation mechanisms has increased.

Local threats that can be addressed by NRM actions:

- Land use and modification (e.g. clearance and fragmentation of remnants through factors such as urban expansion and agriculture, vehicle damage, salinity, grazing by stock and feral animals, inappropriate fire regimes)
- Biosecurity issues (weeds)

Actions:

BC3.a	Identify and assess condition of highland and lowland grassland remnants on private land and protect grasslands through land conservation mechanisms (e.g. covenant or Part V on title) and with associated management plans.
BC3.b	Work with partners to improve land management practices (e.g. weed, fertiliser and fire management) and reduce rates of decline and clearing/conversion native grassland (e.g. through awareness, education and skill development).

Implementation:

Investment opportunity	✓ Australian Government ✓ Tasmanian Government ✓ Regional or Local ☐ Private or philanthropic
Potential delivery methods	• Attitudinal and behavioural change (education and skills) • Improved information and on-ground management actions/activities (e.g. formal conservation arrangements/management agreements/covenants on private land, weeding, fencing, revegetation, fire management plans, contracted works, targeted incentives, stewardship payments, small grants) • Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.
Potential collaborators	Land managers (including farmers); conservation organisations (e.g. Landcare Tasmania, Wildcare, Threatened Plants Tasmania, TLC); local governments (e.g. Southern Midlands); and Aboriginal community and organisations.
Opportunities for community participation	Proactive engagement with landholders including sharing strategy, operations, and portfolio updates; identify interests, concerns and opportunities; participation in community forums; conduct field days, events, surveys, education and training; build and maximise community outreach; participation in project governance and working groups; and engage with Aboriginal community and organisations (opportunity to apply knowledge and practices, and learn, gather and work on Country).

» Common beard-heath (Georgie Butorac)

PRIORITY BC4: Subtropical and temperate coastal saltmarsh

Subtropical and Temperate Coastal Saltmarsh is listed as Vulnerable under the EPBC Act. The Tasmanian NC Act lists wetlands as a threatened native vegetation community, with the mapping extent of this community including both inland and coastal saltmarshes. Inland saltmarshes are restricted to the dry Tasmanian Midlands region (such as Township Lagoon, Tunbridge) and are limited in distribution and extent.

Coastal saltmarshes in the southern region form a crucial link between terrestrial and marine systems, providing critical ecological functions that support a range of ecosystem services and biodiversity values. The most extensive areas of saltmarsh habitats in southern Tasmania include Moulting Lagoon (with Swan and Apsley Rivers) and Pitt Water-Orielton Lagoon (with Coal River and Duckhole Rivulet). Examples of saltmarshes found in coastal lagoons include Pipe Clay Lagoon and Cloudy Bay Lagoon, and river and creek mouth examples include the Derwent, Huon and Little Swanport estuaries.

In the southern region close to half of these important coastal ecosystems have been lost or degraded in the last 220 years, due to land use change and impacts, sporadic and variable management approaches and lack of broad awareness of the important values provided by these habitats. In addition, future climate change and sea level rise projections leave these ecosystems in a precarious position given that they occupy shores within 1 m of high water.

Outcome

By 2030, the extent and condition of saltmarsh in the southern region is increased and improved by managing threats and identifying retreat pathways, where feasible.

Local threats that can be addressed by NRM actions

- Land use and modification (e.g. clearance and fragmentation, altered hydrology/tidal restriction, recreational vehicle access, exposure of acid sulfate soils, grazing impacts)
- Biosecurity issues (weeds, deer)

Actions

BC4.a	Identify strategic areas to improve saltmarsh condition and extent by reducing impacts from stock, weeds, erosion control and altered hydrological regimes.
BC4.b	Protect priority saltmarsh areas through land conservation mechanisms (e.g. covenant or Part V on title) and implementation of associated management plans.
BC4.c	Work in partnership to identify existing monitoring data and support evaluation of resource condition trends, including hydrology/flows, saltmarsh, wetlands and fish species and habitat.
BC4.d	Participate in assessments of 'blue' and 'teal' carbon and diffuse nutrient sequestration through restoration activities and assess viability as financial incentive to practice change for saltmarsh protection and restoration (and associated biodiversity and water health outcomes).

Implementation

Investment opportunity	✓ Australian Government	✓ Tasmanian Government	✓ Regional or Local	✓ Private or philanthropic

Potential delivery methods

- Attitudinal and behavioural change (education and skills)
- Improved information and on-ground management actions/activities (e.g. hydrological restoration, revegetating habitat, removing weeds, controlling access, erosion management, contracted works, targeted incentives, stewardship payments, small grants)
- Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.

Potential collaborators

Land managers (e.g. PWS, farmers); other NGOs and conservation organisations (e.g. TLC, Derwent Estuary Program, Nature Glenelg Trust, Birdlife Tasmania, Landcare, Wildcare); research organisations (e.g. UTas); industry (e.g. Wine Tasmania); local government (e.g. Kingborough Council, Clarence City Council, Sorell Council, Brighton Council, Tasman Council, Glamorgan Spring Bay Council); state government (NRET) and Australian Government (DAWE).

Opportunities for community participation

Proactive engagement with landholders including sharing strategy, operations, and portfolio updates; identify interests, concerns and opportunities; participation in community forums; conduct field days, events, surveys, education and training; build and maximise community outreach; participation in project governance and working groups; and engage with Aboriginal community and organisations (opportunity to apply knowledge and practices, and learn, gather and work on Country).

» Saltmarsh, Port Cygnet

PRIORITY BC5: Riparian and remnant (particularly in urban and peri-urban areas) vegetation

Riparian zones are areas of land that adjoin, influence or are influenced by a body of water. Typical examples are river banks, floodplains, lake foreshores and wetland fringes. A variety of vegetation types make up riparian vegetation, including rainforest, wet forest, dry forest and scrub.

Healthy riparian zones are essential for maintaining healthy ecosystems and economic productivity along rivers. They provide habitat for native species, and play an important role in flood mitigation.

However, riparian land often has high fertility, and as a result much of the riparian vegetation found in Tasmania has been lost to agriculture and other land use development in the last 220 years.

All catchments in the southern region contain some remnant riparian vegetation, with condition ranging from near-pristine to severely degraded. Protecting good condition riparian vegetation is more efficient than trying to restore degraded vegetation communities. The priorities are therefore to protect good condition riparian vegetation and to restore riparian vegetation where its degradation or loss has significant environmental and/or social and/or economic consequences.

Outcome

By 2030, the condition of priority riparian and remnant vegetation has improved through the prevention of stock access, weed control, revegetation, and an improved level of custodianship of remnant native vegetation in urban and peri-urban areas.

Local threats that can be addressed by NRM actions

- Land use and modification (e.g. clearing and fragmentation, stock trampling and browsing, erosion, altered streambeds and hydrology)
- Biosecurity issues (weeds – willows, gorse, blackberry)

Actions

BC5.a	Within priority catchments (e.g. Swan, Apsley, Coal, Derwent, Huon) and urban and peri-urban centres (e.g. Greater Hobart), identify and assess the condition of riparian vegetation and remnant patches and options for improved management.
BC5.b	Work with partners to improve quality of high value riparian habitat by controlling weeds, developing appropriate fire regimes, re-establishing hydrological regimes, managing stock, and undertaking revegetation activities to improve connectivity and buffer intact remnant patches.

Implementation

Investment opportunity	✓ Australian Government	✓ Tasmanian Government	✓ Regional or Local	✓ Private or philanthropic

Potential delivery methods

- Attitudinal and behavioural change (education and skills)
- Improved information and on-ground management actions/activities (e.g. hydrological restoration, revegetating habitat, removing weeds, controlling access, erosion management, contracted works, targeted incentives, stewardship payments, small grants)
- Policy and planning input
- Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.

Potential collaborators	Land managers; conservation organisations (e.g. TLC, Landcare, Wildcare); community, Landcare and volunteer groups (e.g. Landcare Tasmania, recreational fishers); research organisations; industry; local governments; Aboriginal community and organisations; state government (NRET) and Australian Government (DAWE).
Opportunities for community participation	Proactive engagement with landholders including sharing strategy, operations, and portfolio updates; identify interests, concerns and opportunities; participation in community forums; conduct field days, events, surveys, education and training; build and maximise community outreach; participation in project governance and working groups; and engage with Aboriginal community and organisations (opportunity to apply knowledge and practices, and learn, gather and work on Country).

» Echidna (Eric Woehler)

PRIORITY BC6: Other emerging priority ecological communities; iconic plant communities in key locations (e.g. Tasmanian pine species)

This priority has been included to recognise that new priority ecological or plant communities may emerge over the life of the strategy. This may occur as the result of the impact of new or emerging threats, changes in listing status at state or national level, or other factors.

This strategy recognises that early intervention is both more efficient and likely to be successful. See Section 8.3 (Emerging priorities) for further details.

Outcome:

> By 2030, there has been an improvement in the condition of the relevant community through the identification and mitigation of key threatening processes.

Local threats that can be addressed by NRM actions:

To be confirmed as emerging priorities are identified.

Actions:

BC6.a	Monitor emerging priorities from a local, state and national perspective – where a community has been newly listed or identified at a local scale, undertake a prioritisation process to determine the need for, and type of action.

Implementation:

Investment opportunity	Australian Government	Tasmanian Government	Regional or Local	Private or philanthropic
Potential delivery methods	To be confirmed as emerging priorities are identified.			
Potential collaborators	To be confirmed as emerging priorities are identified.			
Opportunities for community participation	To be confirmed as emerging priorities are identified.			

7.4 Threatened and important species

7.3.1 State-wide Outcome

By 2050, actions have been implemented that reduce impacts to Tasmania's threatened and important species

7.3.2 Regional context

Threatened species are those that are currently at risk of extinction in their natural habitat and are listed under state or Commonwealth legislation to support their protection.

Tasmania has over 680 species (fauna and flora) listed under the TSPA Act. The majority of these occur within the southern region. This includes migratory, resident and endemic fauna, and many endemic flora species, including some, such as Kings Holly, that are found nowhere else in the world (only in the southern region of Tasmania).

There are 114 species listed as threatened (Vulnerable, Endangered or Critically Endangered) under the EPBC Act in southern Tasmania (excluding species from Macquarie Island). Not all species listed nationally are listed at the state level (for example the eastern quoll, eastern barred bandicoot, eastern bettong).

Other species (not listed under the TSP Act or EPBC Act) are regionally important. The southern NRM region's native flora includes 16 species of eucalypt endemic to Tasmania, plants that have survived from the last glacial times such as native conifers in the genus *Podocarpus,* and a diversity of bryophytes (mosses, liverworts, and hornworts) in the wet forests. Native fauna includes 14 of Tasmania's 18 lizard species, all eight of the bat species and 12 of the State's endemic birds.

All native species in southern Tasmania (threatened or otherwise) are facing a suite of often inter-connected challenges, resulting in declines in condition or extent.

Through implementation of key Actions, NRM South aims to support appropriate management of the region's native species, focusing on species in decline or requiring urgent intervention. Actions focus on extent, condition and connectivity of critical habitats, improved management of threatened and important species, mitigating immediate and emerging threats, and supporting breeding and reproductive success. By investing in the management of multiple species (and catchments, communities and priorities identified under other Themes), NRM South aims to improve habitat, connectivity and ecosystem health, which will have broader benefits for all species.

7.3.3 Priorities and Actions

PRIORITY BS1: Threatened mammals (eastern-barred bandicoots, eastern quolls) impacted by cats on islands and roadkill

Eastern-barred bandicoots

Tasmania is the stronghold for the eastern-barred bandicoot, which is listed as Endangered under the EPBC Act, but not listed under the TSP Act. It was once distributed across southern Victoria and Tasmania, with the exception of south-west Tasmania. The species became extinct on mainland Australia, but it has been since reintroduced to eight locations in Victoria. There are no dedicated captive breeding programs for this species in Tasmania, but Tasmanian stock has been used to supplement captive-bred releases for the mainland re-introduction.

In the southern region of Tasmania, it is widespread in grasslands and woodlands, including in peri-urban areas where it is especially vulnerable to being struck by a vehicle, or being predated by cats. Removing cats from islands is an especially useful and effective tool to mitigate against this threat, as it allows bandicoot numbers to stabilise.

Eastern quolls

The eastern quoll is listed as Endangered under the EPBC Act, but not listed under the TSP Act. It is also one of the priority species under the Australian Government's Threatened Species Strategy. The historic distribution of the eastern quoll included parts of South Australia, Victoria, NSW and Tasmania. The last eastern quoll record from mainland Australia (excluding recent reintroductions), was from Sydney in 1963.

The eastern quoll is widespread in southern Tasmania, with the majority of records from the drier eastern part of the region.

Eastern quolls are susceptible to predation from introduced carnivores (such as the domestic cat), and, like the eastern barred bandicoot, benefit from cat control programs, and the creation of predator-free isolated environments, such as islands.

Tasmania has played a major role in the recent re-introduction of this species to the ACT, Victoria and NSW, with animals being supplied from both the wild and a dedicated captive breeding program.

Outcome:

By 2030, the impact of cats and roadkill on threatened mammals (eastern-barred bandicoots and eastern quolls and) has been reduced.

Local threats that can be addressed by NRM actions:

- Land use and modification (e.g. habitat loss, predation by feral cats and domestic dogs, secondary poisoning, road mortality)
- Biosecurity issues (weeds and disease)

Actions:

BS1.a	Reduce the predation pressure from cats and other feral pests on small mammals in priority areas (e.g. Bruny Island, Maria Island) using a suite of known or emerging control techniques (e.g. Felixers, Curiosity® bait, trapping and shooting) and education.
BS1.b	Working with partners, to improve understanding and compliance with the *Cat Management Act* and local government by-laws, and increase education and awareness about the impact of cats.
BS1.c	Develop strategic approaches to support the captive breeding and supply of individuals of threatened mammals to mainland conservation programs and apply the strategic planning and participation model developed for the Tasmanian Quoll Conservation Program to other species, where feasible.

BS1.d	Leverage funding and work with potential project partners, to implement key or specific activities to reduce roadkill – particularly in relation to improving driver behaviour and educating local drivers and tourists about including awareness-raising and coordination.
BS1.e	Work with partners, including Aboriginal community, to identify and collate baseline data requirements, which will be used to inform management activities at key sites (e.g. cat and wildlife monitoring).

Implementation:

Investment opportunity	✓ Australian Government ✓ Tasmanian Government ✓ Regional or Local ✓ Private or philanthropic
Potential delivery methods	• Attitudinal and behavioural change (education and skills) • Improved information and on-ground management actions/activities (e.g. feral animal control, fencing, management of domestic and stray dogs and cats, education about relevant Acts and By-Laws, driving behaviour, contracted works) • Policy and planning input • Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.
Potential collaborators	Specific programs (e.g. Tasmanian Quoll Conservation Program); local governments (e.g. Kingborough, City of Hobart); NGOs and conservation organisations (Ten Lives Cat Centre, Landcare, Wildcare, TLC); industry; land managers; Aboriginal community and organisations (e.g. wAC); private wildlife facilities (e.g. Bonorong Wildlife Sanctuary, Zoodoo); state government (NRET) and Australian Government (DAWE).
Opportunities for community participation	Proactive engagement with landholders including sharing strategy, operations, and portfolio updates; identify interests, concerns and opportunities; participation in community forums; conduct field days, events, surveys, education and training; citizen science; build and maximise community outreach; participation in project governance and working groups; and engage with Aboriginal community and organisations (opportunity to apply knowledge and practices, and learn, gather and work on Country).

» Eastern quoll (Eric Woehler)

PRIORITY BS2: Forty-spotted pardalote

The forty-spotted pardalote is endemic to eastern Tasmania and listed as Endangered under both the EPBC and TSP Acts. It occurs in small, isolated populations in south-east mainland Tasmania and on offshore islands including Flinders, Maria and Bruny Islands.

Threats to this species include habitat loss and fragmentation (principally the loss of white gum forest), competition from other pardalote species, small population size, and the fatal parasitism of nestlings by the larvae of an endemic fly.

Outcome:

By 2030, there has been an increase in the habitat of forty-spotted pardalotes and improved fledgling survival at key sites.

Local threats that can be addressed by NRM actions:

- Land use and modification (e.g. habitat loss, development)
- Parasitic fly on nestlings

Actions:

BS2.a	Coordinate management action and support partners to improve outcomes for forty-spotted pardalotes. Key activities include protecting key breeding habitat and connectivity; protection of white gum communities; undertaking management interventions that are demonstrably effective at increasing effective breeding habitat and fledgling survival; and revegetation.
BS2.b	Work with weetapoona Aboriginal Corporation (wAC) to build on previous work, manage nest boxes, improve habitat, and stimulate white gum regeneration at Murrayfield.

Implementation:

Investment opportunity	✓ Australian Government ✓ Tasmanian Government ✓ Regional or Local ✓ Private or philanthropic
Potential delivery methods	• Attitudinal and behavioural change (education and skills) • Improved information and on-ground management actions/activities (e.g. monitor populations, protect and restore habitat, improve fledgling survival, contracted works, targeted incentives) • Policy and planning input • Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.
Potential collaborators	Research organisations (e.g. ANU); conservation organisations (e.g. TLC, Wildcare, Landcare); land managers; local governments (e.g. Kingborough Council); Aboriginal community and organisations (e.g. wAC); state government (NRET) and Australian Government (DAWE).
Opportunities for community participation	Proactive engagement with landholders including sharing strategy, operations, and portfolio updates; identify interests, concerns and opportunities; participation in community forums; conduct field days, events, surveys, education and training; citizen science; build and maximise community outreach; participation in project governance and working groups; and engage with Aboriginal community and organisations (opportunity to apply knowledge and practices, and learn, gather and work on Country).

PRIORITY BS3: Threatened parrots (orange-bellied parrots and swift parrots)

Orange-bellied parrots

The orange-bellied parrot is listed as Critically Endangered under the EPBC Act, and as endangered under the TSP Act (both the highest level of listing available). It is also one of the priority species under the Australian Government's Threatened Species Strategy.

The orange-bellied parrot is one of only a few migratory parrots, and breed in remote coastal south-west Tasmania. They survive in the wild as a diminished, single population that migrates along the Tasmanian west coast between coastal Victoria and south-eastern South Australia. The orange-bellied parrot population has declined from several thousand in the late 1800s to about 50 birds in the wild today. The cause of this decline is not fully understood, but threats to the species are likely to include past and ongoing loss and degradation of habitat (particularly non-breeding habitat), changes in fire regimes reducing available food sources, loss of genetic diversity and inbreeding, stochastic environmental events (such as storms during migration), and the impact of predators and competitors.

NRET undertakes a dedicated orange-bellied parrot conservation program, which includes large-scale captive breeding in partnership with mainland partners (governments, public and private zoos and research organisations). This supplies birds for release to supplement the wild population.

Swift parrots

The swift parrot is listed as Critically Endangered under the EPBC Act and Endangered under the TSP Act. They are also one of the priority species under the Australian Government's Threatened Species Strategy.

It is a migratory species that over-winters in south-eastern mainland Australia, and flies to Tasmania to breed in spring and summer. Accurate population counts have proven difficult but the population is estimated to be less than 1,000 birds.

During the breeding season the swift parrot forages on nectar from a limited range of eucalypt species, predominantly Tasmanian blue gums and black gums. It breeds in tree hollows of mature eucalypts near foraging resources. As not all suitable food species flower every year, the swift parrot's breeding areas vary annually.

In the southern region the swift parrot is typically found in coastal or near-coastal forests, including those on Maria and Bruny Islands. Swift parrot habitat includes reserved, forestry and private land.

The main threats to the species are the loss of foraging and nesting habitat, and predation by sugar gliders. Other threats include competition from the introduced rainbow lorikeet (and other hollow-nesting species), and collision mortality (with structures such as windows and chain-link fences).

Outcome:

By 2030, there is an increase in the breeding success of orange-bellied parrots and swift parrots at key sites – achieved through regenerating degraded habitat, protecting prime habitat and implementing other emergency interventions.

Local threats that can be addressed by NRM actions:

- Land use and modification (e.g. habitat loss – including nesting hollows and feeding resources, collision mortality)
- Predation (e.g. sugar gliders – swift parrots) and direct competition (e.g. starlings, rainbow lorikeets, bees)
- Collision mortality
- Psittacine Beak and Feather Disease
- Illegal wildlife capture and trade

Actions:

BS3.a	Work with partners to deliver key actions that support the orange-bellied parrot captive breeding program – including the identification of a second release site for captively-bred birds, and improving burning regimes to increase the amount of native food resources.
BS3.b	Protect key nesting sites for swift parrots through land conservation mechanisms (e.g. covenant or Part V on title) in key habitat, habitat improvement measures and revegetation.
BS3.c	Work with partners to increase swift parrot foraging habitat on Bruny Island (as a predator-free landscape).
BS3.d	Work with partners to reduce the loss of key swift parrot habitat due to illegal firewood harvesting, using strategies such as education and awareness campaigns and implementing a sustainable firewood certification scheme.
BS3.e	Reduce swift parrot predation pressure by controlling predators (e.g. sugar gliders) and competitors (e.g. rainbow lorikeets) at active breeding sites – including through the application of emerging research findings and management trials.
BS3.f	Work with partners to improve understanding of sugar glider ecology in Tasmania to inform control and management, with the aim to improve outcomes for swift parrots.
BS3.g	Coordinate effort and seek funding for orange-bellied and swift parrot recovery, and support partners in reporting to funders.

Implementation:

Investment opportunity	✓ Australian Government ✓ Tasmanian Government ✓ Regional or Local ✓ Private or philanthropic
Potential delivery methods	• Attitudinal and behavioural change (education and skills) • Improved information and on-ground management actions/activities (e.g. improved baseline information, habitat augmentation, weed control, revegetation, fencing, contracted works, targeted incentives, stewardship payments, small grants) • Policy and planning input • Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.
Potential collaborators	Research organisations (e.g. ANU); conservation organisations (e.g. Wildcare, Landcare Tasmania, TLC); Aboriginal community and organisations; GBEs (e.g. STT); industry; land managers; private wildlife facilities (e.g. Zoodoo, Bonorong); state government (e.g. NRET, FPA, PWS) and Australian Government (DAWE).
Opportunities for community participation	Proactive engagement with landholders including sharing strategy, operations, and portfolio updates; identify interests, concerns and opportunities; participation in community forums; conduct field days, events, surveys, education and training; citizen science; build and maximise community outreach; participation in project governance and working groups; and engage with Aboriginal community and organisations (opportunity to apply knowledge and practices, and learn, gather and work on Country).

PRIORITY BS4: Tasmanian masked owl

The Tasmanian masked owl is listed as Vulnerable under the EPBC Act and endangered under the TSP Act. It is a subspecies of masked owl found only in Tasmania, with an estimated population of 500 breeding pairs.

The species requires hollows in old-growth trees for roosting and breeding.

The Tasmanian masked owl has been recorded from a very wide variety of forest and woodland habitats in the southern region, including highly modified agricultural and peri-urban settings.

The main known threats to this species are the loss of breeding and roosting habitat, secondary poisoning from rodenticides, and competition with other species for nesting hollows.

Outcome:

> By 2030, awareness of the threats to masked owls is increased, and impacts of habitat loss and secondary poisoning are reduced.

Local threats that can be addressed by NRM actions:

- Loss of habitat
- Secondary poisoning
- Vehicle collisions

Actions:

BS4.a Work with partners to implement high priority actions to reduce threats from vehicle collisions, secondary poisoning (e.g. rodenticides) and loss of nesting habitats.

BS4.b Work with partners to identify key nesting habitat features and sites, and promote information to improve awareness of the importance of nesting habitat for masked owls, how to recognise habitat and best practice management options.

Implementation:

Investment opportunity

- ✓ Australian Government
- ✓ Tasmanian Government
- ✓ Regional or Local
- ✓ Private or philanthropic

Potential delivery methods

- Attitudinal and behavioural change (education and skills – safe rodent baits, driver behaviour)
- Improved information and on-ground management actions/activities (e.g. improved baseline information, habitat protection and restoration, land conservation mechanisms, contracted works, targeted incentives)
- Policy and planning input
- Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.

Potential collaborators Local governments; private wildlife facilities (e.g. Bonorong Wildlife Sanctuary, Zoodoo); representative bodies and businesses (e.g. RACT); conservation organisations (e.g. TLC, Landcare Tasmania); land managers; state government (e.g. NRET, Forest Practices Authority, PWS) and Australian Government (DAWE).

Opportunities for community participation Proactive engagement with landholders including sharing strategy, operations, and portfolio updates; identify interests, concerns and opportunities; participation in community forums; conduct field days, events, surveys, education and training; citizen science; build and maximise community outreach; participation in project governance and working groups; and engage with Aboriginal community and organisations (opportunity to apply knowledge and practices, and learn, gather and work on Country).

PRIORITY BS5: Coastal shorebirds (including hooded plover)

Coastal shorebirds include resident (e.g. pied and sooty oystercatchers) and migratory species (e.g. far eastern curlew) that depend on the coastal environment for breeding and foraging habitat. Some of these species (such as the fairy tern) are listed under both the EPBC Act and or the TSP Act, while international migrants may be included in bilateral migratory bird agreements (such as the Japan-Australia, China-Australia and Republic of Korea-Australia Migratory Bird Agreements), which provide for the protection and conservation of migratory bird species. The Moulting Lagoon and Pitt Water-Orielton Lagoon Ramsar sites are important habitat for migratory waders.

The effects of climate change and development pressure on coastal ecosystems impact on both migratory and resident coastal shorebird habitat (including many Ramsar wetlands).

Coastal shorebirds are found throughout the southern region. Important sites include:

- Derwent region including Lauderdale, Clear Lagoon, Mortimer Bay, Pipeclay Lagoon, Calvert's Lagoon, South Arm Neck, Barilla Bay, Iron Creek, Carlton River, Five Mile Beach, Seven Mile Beach, Orielton / Sorell, Waterview Sanctuary. These sites are priority sites for resident species, are long-term monitoring sites, and are priority sites for the migratory eastern curlew and whimbrel.
- Orford Spit, which has high species diversity, is a priority site for resident species, and a priority site for breeding species, including the fairy tern.
- Little Swanport (lagoon mouth), which has high species diversity, and is a priority site for resident species.
- Meredith River (river mouth), which has high species diversity, and is a priority site for resident species.
- Bruny Island, including Great Bay, The Neck, Adventure Bay, Cloudy Bay, Lighthouse Bay, which are priority sites for resident species.
- Sandspit, Rheban, which is a priority site for resident species.
- Pirates Bay, which is a priority site for resident species.
- Lachlan Island, which is a priority site for breeding species.

Hooded plovers

The hooded plover is listed as Vulnerable under the EPBC Act, but is not listed under the TSP Act.

The species is a resident of sandy coastal beaches, and its distribution often overlaps with areas that are popular with people.

In the southern region the hooded plover has been recorded from suitable habitat throughout the region. However, there is evidence of population decline from beaches with regular human visitation, especially those close to residential areas. The hooded plover has been the focus of previous public education campaigns designed to encourage beach visitors to avoid negatively impacting on this species.

Key threats to the hooded plover include degradation or loss of habitat due to coastal development, and the impact of weeds and predators, and the impacts of climate change (such as storm surge and coastal erosion). Other significant threats include direct impact to breeding as the result of human behaviour, such as inappropriate beach access with vehicles or domestic dogs.

» Hooded plover with chick (Paul Gray)

Outcome:

By 2030, threats to nesting shorebirds have been reduced by working with key groups and reducing identified impacts.

Local threats that can be addressed by NRM actions:

- Land use and modification (e.g. development causing habitat loss, disturbance to breeding birds and or nest sites, harvesting of seaweed and bivalves, human, dog and cat disturbance, predation)
- Biosecurity issues (e.g. weed invasion)

Actions:

BS5.a	Improve understanding of the population size, trends for shorebirds through existing conservation partners (e.g. long-term monitoring programs) and community volunteers.
BS5.b	Work with partners to implement recovery actions for hooded plover and other shorebird populations (see also SERSA Beach-nesting Birds Management Strategy for southern Tasmania) – including protecting key nesting sites on beaches, supporting best practice marine debris collection, raising community awareness of threats, and reducing threats from domestic dogs, feral cats and human disturbance.
BS5.c	Work with partners to coordinate, endorse and collaborate on existing programs to protect and build understanding of bird breeding and sensitive locations.

Implementation:

Investment opportunity	✓ Australian Government ✓ Tasmanian Government ✓ Regional or Local ✓ Private or philanthropic
Potential delivery methods	• Attitudinal and behavioural change (education and skills) • Improved information and on-ground management actions/activities (e.g. weed control, fencing, small grants) • Policy and planning input • Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.
Potential collaborators	Local governments; conservation organisations (e.g. BirdLife Tasmania, BirdLife Australia, SERSA, Wildcare); state government (e.g. NRET, Forest Practices Authority, PWS) and Australian Government (DAWE).
Opportunities for community participation	Proactive engagement with landholders including sharing strategy, operations, and portfolio updates; identify interests, concerns and opportunities; participation in community forums; conduct field days, events, surveys, education and training; citizen science; build and maximise community outreach; participation in project governance and working groups; and engage with Aboriginal community and organisations (opportunity to apply knowledge and practices, and learn, gather and work on Country).

PRIORITY BS6: Tasmanian wedge-tailed eagle

The Tasmanian wedge-tailed eagle is currently regarded as a separate sub-species, although there remains uncertainty about this, and is listed as Endangered under both the EPBC Act and the TSP Act.

It nests in mature forests with sheltered aspects throughout Tasmania and large offshore islands. The adult population is estimated at less than 1,000 birds, although these numbers are based on extrapolations and the population trends are not known. It is widespread in the southern region, with the majority of records coming from the drier, eastern half of the region. NRM South plays an important role in the conservation of this species through the provision of expert advice and the operation of a research and management fund.

Principal threats include loss of nesting habitat, nest disturbance, collisions (with artificial structures, vehicles and aircraft), electrocution and persecution.

Outcome:

> By 2030, anthropogenic impacts to the Tasmanian wedge-tailed eagle will be better understood, management actions implemented, and the conservation status of the sub-species will be better understood.

Local threats that can be addressed by NRM actions:

- Land use and modification (e.g. habitat loss or disturbance, industry interactions)
- Lack of data on the size and trend of the population and the key threats

Actions:

BS6.a	Work with research organisations to improve understanding of population size and status (by updating Population Viability Analysis); the causes of "unnatural" (anthropogenic) mortality; and habitat use, territories, carrying capacity and distribution through telemetry surveys.
BS6.b	Informed by research and trials, seek resources to implement actions and initiatives that reduce impacts.
BS6.c	Assist governments and industry in strategic planning and development of initiatives for eagle management in Tasmania.
BS6.d	In partnership with government and industry sectors, manage an Eagle Fund to undertake critical research and management actions.

Implementation:

Investment opportunity	✓	Australian Government	✓	Tasmanian Government	✓	Regional or Local	✓	Private or philanthropic

Potential delivery methods

- Attitudinal and behavioural change (education and skills – awareness raising about impacts to eagles and reducing persecution)
- Improved information and on-ground management actions/activities (e.g. improved baseline information, small research and management grants)
- Policy and planning input
- Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.

Potential collaborators	Research organisations (e.g. UTas, ANU, TMAG); NGOs and conservation organisations (e.g. Birdlife Tasmania, Birdlife Australia, Bookend Trust); industry and GBEs (e.g. forestry and energy sectors); state government (e.g. NRET, FPA, PWS) and Australian Government (DAWE).
Opportunities for community participation	Proactive engagement with landholders including sharing strategy, operations, and portfolio updates; identify interests, concerns and opportunities; participation in community forums; conduct field days, events, surveys (e.g. encourage participation in 'Where, where, wedgie?'), education and training; citizen science; build and maximise community outreach; participation in project governance and working groups; and engage with Aboriginal community and organisations (opportunity to apply knowledge and practices, and learn, gather and work on Country).

» Tasmanian wedge-tailed eagle (iStock)

PRIORITY BS7: Threatened fish (Swan galaxias and migratory species, including the Australian grayling)

Swan galaxias

The Swan galaxias is listed as Endangered under both the EPBC Act and the TSP Act. It is also one of the priority species under the Australian Government's Threatened Species Strategy.

It is a freshwater fish native to Tasmania and endemic to the upper Swan River and Macquarie River catchments. The species is restricted to a few very small populations in headwater streams in eastern Tasmania, which have in the past been protected from invasive introduced fish such as trout and redfin perch. These remaining populations include nine natural populations and a small number of translocated populations.

Key threats to the species are from introduced fish and from changes to water flow and quality.

Australian grayling

The Australian grayling is listed as Vulnerable under the EPBC Act and TSP Act.

It is a small to medium-sized, slender, silvery fish with soft-rayed fins lacking any spines. It is a migratory species that inhabits estuarine waters and coastal seas as larvae/juveniles, and freshwater rivers and streams as adults. It is endemic to south-eastern Australia, including Victoria, Tasmania and New South Wales.

In the southern region it has historically been recorded from the Derwent and Huon River systems, as well as from a number of rivers on the east coast, and at least one location in the south-west. Little is known of the population size in Tasmania, but it is believed that the species' range has contracted substantially in recent years.

The major threat to this species is the construction of barriers to fish movement which prevent adults migrating upstream to breed, and larvae moving downstream.

Outcome:

By 2030, the extent of high-quality habitat for threatened fish has been increased and the quality of water inflow to key fish habitat has been improved through catchment management improvements.

Local threats that can be addressed by NRM actions:

- Land and waterway use, modification and condition (e.g. barriers to migration – dams, weirs, reduced and/or altered flows, increased sediments and nutrient levels)
- Biosecurity issues (introduced species and diseases)

Actions:

BS7.a	Work with partners to improve education and awareness in relevant fishing and regional communities about threatened fish, by focussing on biosecurity (spread of weeds and diseases by boats), moving fish species and other aquatic fauna between waterways, wood hooking, river health, and pest fish species (e.g. redfin perch, eastern gambusia).
BS7.b	Identify existing monitoring data to support the evaluation of trends for the species and key habitat management actions (e.g. weirs).
BS7.c	Work with partners to improve habitat for Swan galaxias.
BS7.d	Improve fish passage in locations where infrastructure is impacting the movement of migratory fish species, including Australian grayling (which is a flagship species for these impacts).

Implementation:

Investment opportunity	✓ Australian Government	✓ Tasmanian Government	✓ Regional or Local	☐ Private or philanthropic

Potential delivery methods

- Attitudinal and behavioural change (education and skills)
- Improved information and on-ground management actions/activities (e.g. habitat management actions, including hydrological restoration, revegetating habitat, removing weeds, contracted works, small grants)
- Policy and planning input
- Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.

Potential collaborators

Land managers; research organisations (e.g. UTas); GBEs (e.g. Hydro Tasmania); recreational fishers; state government (e.g. NRET, IFS); and Australian Government (DAWE).

Opportunities for community participation

Proactive engagement with landholders including sharing strategy, operations, and portfolio updates; identify interests, concerns and opportunities; participation in community forums; conduct field days, events, surveys, education and training; citizen science; build and maximise community outreach; participation in project governance and working groups; and engage with Aboriginal community and organisations (opportunity to apply knowledge and practices, and learn, gather and work on Country).

» Swan River

PRIORITY BS8: Handfish group (particularly spotted and red)

Handfish belong to a group of coastal anglerfish with a narrow distribution in south-eastern Australia. There are 14 species with seven endemic to Tasmania and Bass Strait. Handfish do not have a planktonic stage, but lay eggs, and have parental care of eggs. This means that they can only recruit locally. Very little is known about handfish in general.

Three handfish species are listed under the EPBC Act. The red handfish and the spotted handfish are listed as Critically Endangered; the Ziebell's handfish is listed as Vulnerable, although there has been no confirmed sighting of this species (endemic to the southern region) since 2007 and it may have become extinct. All three species are listed as endangered under the TSP Act.

The red handfish is also one of the priority species under the Australian Government's Threatened Species Strategy.

Both the spotted and red handfish have been the subject of a recent captive breeding program, which has successfully produced and released juvenile handfish. NRM South is a member of the National Handfish Recovery Team.

Spotted handifsh

The spotted handfish is the most common and well understood of all the handfish species. Found only in the Derwent Estuary, there are thought to be fewer than 3,000 individuals remaining in the wild.

The major threats to the recovery of the spotted handfish include pollution, invasive predatory marine species (northern Pacific sea star) and habitat loss due to sedimentation.

Red handfish

The red handfish is currently known from only three small patches of reef in south-eastern Tasmania and is thought to have a population of approximately 100 adults.

Habitat loss and destruction (including direct impact from human activity and the impacts of the long-spined sea urchin on reef health), pollution and urban development resulting in erosion are the main threats to the recovery of the red handfish population.

Outcome:

> By 2030, habitat condition is improved through an increased uptake of strategies such as eco moorings, the installation and/or maintenance of artificial habitat, and increased awareness of handfish and how to protect them.

Local threats that can be addressed by NRM actions:

- Land/water use and modification (e.g. habitat destruction and loss – particularly breeding habitat)
- Biosecurity issues (e.g. introduced or range-expanding species – including the North Pacific seastar and long-spined urchins)
- Collection for the aquarium trade.

Actions:

BS8.a	Work with partners to implement key actions for red and spotted handfish including: monitoring; education and awareness; habitat restoration and protection (e.g. ecologically friendly moorings (EFMs), artificial habitat for spawning; urchin management; protection of key breeding sites); and captive breeding programs.

Implementation:

Investment opportunity	✓	Australian Government	✓	Tasmanian Government	✓	Regional or Local	✓	Private or philanthropic

Potential delivery methods	• Attitudinal and behavioural change (education and skills) • Improved information and on-ground management actions/activities (e.g. habitat management actions) • Policy and planning input • Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.
Potential collaborators	Representative bodies (e.g. OzFish, TARFish); land and water managers; research organisations (e.g. CSIRO, UTas); local governments (e.g. City of Hobart, Kingborough Council, Clarence City Council, Sorell Council); other NGOs and conservation organisations (e.g. Derwent Estuary Program, Wildcare); state government (e.g. NRET); and Australian Government (DAWE).
Opportunities for community participation	Proactive engagement with landholders including sharing strategy, operations, and portfolio updates; identify interests, concerns and opportunities; participation in community forums; conduct field days, events, surveys, education and training; citizen science; build and maximise community outreach; participation in project governance and working groups; and engage with Aboriginal community and organisations (opportunity to apply knowledge and practices, and learn, gather and work on Country).

» Spotted handfish (Tim Lynch, CSIRO)

PRIORITY BS9: Threatened eucalypts (Miena cider gum and Morrisby's gum)

Morrisby's gum

Morrisby's gum is listed as Endangered under both the EPBC Act and TSP Act.

There are approximately 2,000 plants occurring in the wild, making it Australia's rarest eucalypt species.

Morrisby's gum is endemic to the southern region, occurring in areas of poor drainage in coastal, dry sclerophyll woodland on gentle to hilly slopes. It is now found naturally in only two places in south-eastern Tasmania: on the South Arm peninsular, and the eastern shore of the River Derwent at Government Hills. *Ex situ* populations have been established in other sites in the southern region, including at Geeveston and Brighton.

Key threats are grazing and browsing (including by native mammals), poor genetic diversity, climate change, weeds and fire risk.

Miena Cider Gum

Miena cider gum is listed as Endangered under both the EPBC Act and TSP Act.

It is endemic to Tasmania and is found around Great Lake on the Central Plateau. In 1999 there were estimated to be more than 10,000 seedlings and trees but they were in decline. Bushfires in 2019 had a severe impact, with the remaining population in poor condition and displaying poor reproductive capacity. The population is estimated to now be less than 2,500 mature individuals with a projected estimated decline within 5 years. A reassessment of the status of the species is urgently required.

The main threats are drought, browsing, inappropriate fire regimes, fragmentation, climate change, clearing and stochastic events.

Outcome:

> By 2030, the trajectory for Miena cider gum and Morrisby's gum is established or improved by reducing browsing impacts, increased planting across current and predicted climate change range.

Local threats that can be addressed by NRM actions:

- Land use and modification (e.g. clearing and fragmentation, habitat alteration)
- Localised pressures (e.g. vertebrate browsing, increased fire frequency/intensity, insect attack)
- Loss of reproductive capacity, declining health and condition of existing stands

Actions:

BS9.a	Advocate and seek funding for further work on the Miena cider gum and Morrisby's gum, support reporting to government, and coordinate efforts across partners to improve outcomes for the species.
BS9.b	In conjunction with partners, assess the status of the Miena cider gum and Morrisby's gum (including reproductive capacity, health and condition), and determine what future strategies should be implemented.
BS9.c	Work with the Tasmanian Aboriginal Centre to map current extent of Miena cider gum, with a specific focus on mapping and protecting scar trees.

BS9.d Work with partners to leverage funding, support reporting, and coordinate efforts to improve outcomes for Morrisby's gum, including:

- Halting the decline at the reserve site by protecting remaining plants from browsers, wildfire and extreme hot and dry conditions;
- Connecting remnants and establishing small seed orchards in the known range by working with local champions to support landholder, school and community group plantings;
- Extending the distribution of the species into future climatic range through large biodiverse, multi-provenance conservation plantings that will be designed as seed orchards and to recreate self-sustaining *Eucalyptus morrisbyi* woodland; and
- Enhancing the quantity and genetic diversity of seed banked reserves to allow for future conservation plantings with maximum adaptive capacity

Implementation:

Investment opportunity	✓ Australian Government	✓ Tasmanian Government	✓ Regional or Local	☐ Private or philanthropic

Potential delivery methods	• Attitudinal and behavioural change (education and skills) • Improved information and on-ground management actions/activities (e.g. weed control, revegetation, fencing, seed collection, contracted works, targeted incentives, stewardship payments) • Policy and planning input • Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.
Potential collaborators	State government (e.g. NRET); Australian Government (DAWE); specialist consultants (e.g. EnviroDynamics); research organisations (e.g. UTas); conservation organisations (e.g. Tasmanian Seed Conservation Centre, Threatened Plants Tasmania, Wildcare, Landcare Tasmania); land managers; and Aboriginal community, organisations and service providers (e.g. pakana Services),
Opportunities for community participation	Proactive engagement with landholders including sharing strategy, operations, and portfolio updates; identify interests, concerns and opportunities; participation in community forums; conduct field days, events, surveys, education and training; citizen science; build and maximise community outreach; participation in project governance and working groups; and engage with Aboriginal community and organisations (opportunity to apply knowledge and practices, and learn, gather and work on Country).

» Morrisby's gum

PRIORITY BS10: Endemic plant species with a restricted range (e.g. South Esk pine, Threatened orchids, Tasmanian sea lavender and Southport heath)

This priority includes species that are endemic to Tasmania and are at risk due to their restricted range and a series of threats.

Threatened orchids

There are a number of orchids in this category – sagg spider orchid (known from two sites – fewer than 450 mature plants), milford leek orchid (known from a single site near Cambridge), and fleshy greenhood (known from four sites in the Southern Midlands – fewer than 1,000 mature plants) that have been prioritised for action in the southern region. All three species are endemic to southern Tasmania and listed as endangered under the TSP Act and Critically Endangered under the EPBC Act. These species are at risk from land clearance, inappropriate fire regimes, grazing and other disturbance, climate change and stochastic events.

South Esk pine

South Esk pine is known from sites including the Apsley River – adjacent to the Apsley Marshes Ramsar site, and Freycinet National Park. The species is listed as vulnerable under the TSP Act and Endangered under the EPBC Act. It is also a defining species within the nationally listed Black gum – South Esk pine ecological community (with less than 600 ha remaining). Threats include firewood collection, clearance and conversion, burning, changed hydrology, and development.

Tasmanian sea lavender

Tasmanian sea lavender is endemic to saltmarshes in south eastern Tasmania. The species is at risk, with a highly restricted range and total population of less than 1,000 mature plants, and threats due to drainage and land reclamation, eutrophication, mechanical disturbance and rising sea levels. It is listed as vulnerable under the TSP Act and EPBC Act.

Southport heath

Southport Heath is listed as Critically Endangered under the EPBC Act and endangered under the TSP Act. It occurs at only one location, Southport Bluff in southern Tasmania. It is estimated there are less than 1,000 plants in the wild. It is threatened by dieback (*Phytophthora cinnamoni*), inappropriate fire regimes and storm damage.

Outcome:

By 2030, there has been an improvement in the condition or range of the relevant species through the identification and mitigation of key threatening processes.

Local threats that can be addressed by NRM actions:

- Land use and modification (e.g. clearing and fragmentation, habitat alteration, firewood collection, inappropriate fire regimes – too frequent or too hot burning, grazing and trampling by cattle and/or sheep, nutrient enrichment)
- Biosecurity issues (weeds – competition for habitat, dieback disease – *Phytophthora cinnamomi*)

Actions:

BS10.a	Work with partners to identify key sites for protection of the Tasmanian sea lavender (through land conservation mechanisms and/or fencing), retreat pathways, translocation, and rehabilitation.
BS10.b	Improve awareness of key sites for key threatened flora species (e.g. Tasmanian sea lavender) to prevent damage due to stock grazing, the accidental slashing/mowing of flowering plants, or weed/pest infestations.
BS10.c	Work with partners to implement Southport heath actions including management of habitat altering weed infestations, management of *ex situ* populations and new plantings, protection from mammal browsing and Healthy Country planning and/or implementation.

BS10.d	Work with partners to identify and implement appropriate fire management plans for the management of threatened flora species (e.g. threatened orchids, particularly sagg spider, Milford leek and fleshy greenhood).
BS10.e	Work with partners to protect key sites for South Esk pine through the establishment of land conservation mechanisms (e.g. covenant or Part V on title) and associated management plans, reducing threats from weeds and inappropriate fire regimes and improving awareness to reduce rates of clearing.

Implementation:

Investment opportunity	✓ Australian Government	✓ Tasmanian Government	✓ Regional or Local	✓ Private or philanthropic
Potential delivery methods	• Attitudinal and behavioural change (education and skills) • Improved information and on-ground management actions/activities (e.g. weed control, fencing, seed collection, contracted works, targeted incentives, stewardship payments, small grants) • Policy and planning input • Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.			
Potential collaborators	State government (e.g. NRET); Australian Government (DAWE); research organisations; Aboriginal community, organisations and service providers (e.g. pakana Services); conservation organisations (e.g. Tasmanian Seed Conservation Centre, Threatened Plants Tasmania, TLC, Bush Heritage Australia, Wildcare, Landcare Tasmania); land managers.			
Opportunities for community participation	Proactive engagement with landholders including sharing strategy, operations, and portfolio updates; identify interests, concerns and opportunities; participation in community forums; conduct field days, events, surveys, education and training; citizen science; build and maximise community outreach; participation in project governance and working groups; and engage with Aboriginal community and organisations (opportunity to apply knowledge and practices, and learn, gather and work on Country).			

» Fawn spider orchid (Georgia Butorac)

PRIORITY BS11: Chaostola skipper

The chaostola skipper is listed as Endangered under both the EPBC Act and the TSP Act.

This medium-sized butterfly occurs in isolated populations in the south (within a 30km radius of Hobart) and east coast of Tasmania, where it is restricted to dry forest and woodland supporting sedges of the *Gahnia* genus, on which it is dependent for breeding.

Degradation of the *Gahnia* habitat – including as a result of clearing and inappropriate fire regimes – is the key threat to the species.

Outcome:

> By 2030, threats to habitat condition for the chaostola skipper have been identified and investment sought to implement appropriate fire regimes, manage weeds and reduce clearing and fragmentation.

Local threats that can be addressed by NRM actions:

- Land use and modification (e.g. clearing and fragmentation, habitat alteration, inappropriate fire regimes)
- Biosecurity issues (weeds)

Actions:

BS11.a	Work with partners to identify and implement appropriate fire and mosaic burning regimes, protect habitat and reduce clearing at key sites.
BS11.b	Work with land managers to encourage weed control and grazing management (including livestock and rabbits) at key sites.

Implementation:

Investment opportunity	✓ Australian Government ✓ Tasmanian Government ☐ Regional or Local ☐ Private or philanthropic
Potential delivery methods	• Attitudinal and behavioural change (education and skills) • Improved information and on-ground management actions/activities (e.g. weed control, revegetation, fire regimes, contracted works, targeted incentives) • Policy and planning input • Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.
Potential collaborators	Local Governments (e.g. City of Hobart); land managers; research organisations; Aboriginal community, organisations and service provers; state government (e.g. NRET); and Australian Government (DAWE).
Opportunities for community participation	Proactive engagement with landholders including sharing strategy, operations, and portfolio updates; identify interests, concerns and opportunities; participation in community forums; conduct field days, events, surveys, education and training; citizen science; build and maximise community outreach; participation in project governance and working groups; and engage with Aboriginal community and organisations (opportunity to apply knowledge and practices, and learn, gather and work on Country).

PRIORITY BS12: Green and gold frog

The green and gold frog (growling grass frog/ southern bell frog) is listed as Vulnerable under both the EPBC Act and the TSP Act. It is also one of the priority species under the Australian Government's Threatened Species Strategy.

The green and gold frog is a large frog (80-90 mm long), which occurs in Tasmania and south-eastern mainland Australia.

In the southern region, the species occurs in lowland areas, breeding in permanent freshwater lagoons with emergent vegetation, particularly in the Coal, Derwent and Jordan catchments. Anecdotally, the range and abundance of the species has contracted.

Key threats include habitat degradation and loss due to changes to water quality and quantity, increased salinity, drought, and disease.

Outcome:

> By 2030, the habitat and trajectory of green and gold frogs at priority sites in the Derwent Valley, Coal Valley and Southern Midlands and are secured and stabilised.

Local threats that can be addressed by NRM actions:

- Land use and modification (e.g. habitat loss and fragmentation, changes to hydrology – drainage, irrigation, salinity)
- Biosecurity issues (e.g. chytrid)

Actions:

BS12.a	Monitor and assess the regional conservation status of the green and gold, to identify and confirm habitat requirements and evaluate local threats and establish baselines.
BS12.b	Protect and restore high value habitats, including reconnecting wetlands with vegetated areas required for frog life cycle.
BS12.c	Develop and implement an education and awareness campaign (including biosecurity and chytrid containment/management, and citizen science or monitoring program).

Implementation:

Investment opportunity	✓ Australian Government ✓ Tasmanian Government ✓ Regional or Local ✓ Private or philanthropic
Potential delivery methods	• Attitudinal and behavioural change (education and skills – including biosecurity and citizen science) • Improved information and on-ground management actions/activities (e.g. weed control, hydrology restoration, land conservation mechanisms, contracted works, targeted incentives, small grants) • Ensure that Aboriginal cultural and heritage values and sites are considered and protected when planning and conducting on-ground works.
Potential collaborators	Local governments; land managers; local community and Landcare groups; research organisations (e.g. UTas); state government (e.g. NRET, FPA); and Australian Government (DAWE).
Opportunities for community participation	Proactive engagement with landholders including sharing strategy, operations, and portfolio updates; identify interests, concerns and opportunities; participation in community forums; conduct field days, events, surveys, education and training; citizen science; build and maximise community outreach; participation in project governance and working groups; and engage with Aboriginal community and organisations (opportunity to apply knowledge and practices, and learn, gather and work on Country).

PRIORITY BS13: Emerging priorities

This priority has been included to recognise that priority threatened species may emerge over the life of the strategy. This may occur as the result of the impact of new or emerging threats, changes in listing status at state or national level, or other factors. This strategy recognises that early intervention is both more efficient and likely to be successful. See Section 8.3 (Emerging priorities) for further details.

Outcome:

> By 2030, emerging priorities are assessed, and a regional threatened species prioritisation has been completed or updated.

Local threats that can be addressed by NRM actions:

To be confirmed as emerging priorities are identified.

Actions:

BS13.a	Review emerging priorities as required.
BS13.b	Work with NRET to update the state-wide threatened species prioritisation and/or undertake a prioritisation process to determine the need for action.

Implementation:

Investment opportunity	✓ Australian Government	✓ Tasmanian Government	☐ Regional or Local	☐ Private or philanthropic
Potential delivery methods	To be confirmed as emerging priorities are identified.			
Potential collaborators	To be confirmed as emerging priorities are identified.			
Opportunities for community participation	To be confirmed as emerging priorities are identified.			

» Deciduous beech

» East coast beach

8

Implementation

8 Implementation

8.1 Project development

The Strategy identifies the priorities, actions, and outcomes for each prioritised asset class to guide the development of potential projects (identified in Sections 5, 6 and 7). Project designs/plans aligned with the Strategy may be further assessed, refined, and developed during the preparation of Regional Investment Plans and/or in response to investor requests, tender or funding application requirements, or emerging needs.

Each project design/plan will outline, as appropriate, specific, measurable, attainable, realistic and timebound outcomes, methods, baselines, deliverables, monitoring indicators, budgets, measures of success, adaptive management processes, and an evaluation and improvement framework.

All projects will be developed and designed with the funding body/bodies, project partners and in consultation with stakeholder groups to maximise opportunities at the regional level. Projects will effectively contribute to the Outcomes of the Strategy, and those of the funding body/bodies (e.g. the outcomes defined under the Regional Land Partnerships/National Landcare Program, Australian Government).

It is acknowledged that data is deficient for many Priorities identified in the Strategy. Expert technical knowledge was sought to develop appropriate Actions in the Strategy. As projects are developed, NRM organisations will continue to seek expert advice where required to complement available scientific data and address data deficiency. The collection of baseline data may be a component of some project designs/plans.

Regional Investment Plans, or similar documents will be dynamic and will be modified on an as needs basis, such as when new issues or opportunities arise (see Section 8.3).

As Priorities and Actions are developed into Projects, the NRM regions will apply principles and processes to select and rank activities and interventions which are cost effective and demonstrate value for investment (see Attachment 3 and 5). Regional Investment Plans will be developed to identify and describe the types of delivery mechanisms in projects to ensure delivery is cost-effective and outcome focused.

8.2 Partnerships: the way we work

Tasmania's regional NRM organisations work in collaboration with industries, communities, NGOs, specialist groups, research organisations and governments (including GBEs). This Strategy provides a framework that considers community values, expert knowledge and scientific evidence, with the aim to focus the efforts of the NRM organisations.

Critical to the effective and successful delivery of natural resource management projects in the region is the active involvement of individuals, communities, organisations and businesses. Partnerships provide opportunities to for broader involvement in natural resource management.

Through the process of project development, the NRM organisations will continue to work with existing and new partners to:

- Understand diverse views and find commonality, where appropriate;
- Be informed and to inform decision-makers about regional natural resource management priorities;
- Target action in prioritised areas and achieve the best outcomes possible with the resources available;
- Identify opportunities to improve natural resource management practices;
- Facilitate collaboration across multiple partners, in priority areas; and
- Advocate for investment into identified regional natural resource management priorities.

8.3 Emerging priorities

New priorities are likely to emerge in and across the three Themes during the life of this strategy. Emerging issues may stem from new or changed threats, or shifts in drivers such as government priorities, regional, local or community concerns.

The regional NRM organisations will monitor emerging priorities from a local, state, and national perspective.

As an example, the list of nominated species, ecological communities and key threatening processes that have been approved for assessment by the Minister responsible for the EPBC Act are detailed annually in the Finalised Priority Assessment List (FPAL). Relevant Actions have been identified in the Strategy to support/reduce threats to species and communities currently listed under the EPBC Act – the Regions will monitor the FPAL list annually to assess and prioritise new Actions for emerging species and communities that are scheduled to be assessed for the EPBC Act.

The process to monitor for emerging issues will involve the periodic review of:

- Relevant government policies, strategies, and positions;
- Changes in the listing of species or ecological communities under relevant legislation;
- Updates to recovery plans, listing statements or conservation advice;
- Key advances or updates on threatening processes, strategies or technological developments to address threatening processes;
- Regular communication and consultation with key stakeholders including local and regional organisations (e.g. Government, research institutions, GBEs and NGOs, etc); and
- Reports on the work of our partners and stakeholders.

The Multi-Criteria Decision Analysis process (see Appendix 3) will be used to determine if the emerging issue will change current priorities or actions. This assessment will also consider the resources required. For example, while a priority may emerge or change, it may not be feasible to alter current priorities or actions to address the emerging one.

Projects based on emerging priorities may be included in the Regional Investment Plan from time to time.

8.4 Reviewing the Strategy

The 2030 NRM Strategy provides the framework for natural resource management delivery in Tasmania to 2030. It is a statutory requirement (under Tasmanian legislation) that this Strategy is reviewed in 5 years. While the planning horizons of the strategy are to 2030, a review will be undertaken in 2027. This review will inform the development of any required updates to Outcomes, Priorities, Actions, or other elements of the strategies.

The review will assess the extent the Strategy has achieved its outcomes – including the extent to which Priorities have been addressed, or Actions have been completed.

As a part of the review of the strategy, the following Key Evaluation Questions will be considered:

1. Strategic alignment and appropriateness:

a) Are the Outcome statements for each Asset Class still appropriate, or should they be modified?
b) Are the Priorities or Actions in each Asset class still relevant and appropriate?

2. Progress and impact:

a) What was the level of investment secured to deliver the strategy?
b) What proportion of Priorities or Actions identified in the Regional Strategy plan have been addressed (in part or in full)?
c) Have the funded projects contributed to the achievement of the Outcome statements for each Theme?

3. Adaptability:

a) Have emerging priorities been identified since the strategy was developed? Were they addressed in any way?
b) Are there any new or changed focus areas that should be addressed by the strategy?
c) What were the key learnings from project implementation, including any constraints, and the implications for the strategy?

4. Engagement and sustainable outcomes:

a) Are the identified UN SDGs being addressed in the delivery of projects?
b) Has Aboriginal participation, culture and knowledge been included in relevant projects?
c) Were stakeholder aspirations reflected adequately in the strategy?
d) What was the percentage of projects delivered in partnership with stakeholders (with shared aspirations)?

8.5 Measuring project success

A MERI (Monitoring, Evaluation, Reporting and Improvement) framework will be used to assess progress on achieving outcomes of funded projects. This framework embeds adaptive management and establishes a measure of success for a project.

The specific MERI framework used for each project will be developed on a case-by-case basis, but will broadly cover the approach described by the Australian Government (http://www.nrm.gov.au/publications/meri-strategy):

Monitoring: Collection of data and information.

Evaluation: Analysing monitoring data, assessing what it means and making informed judgements about the success of a project (or program) and potential improvements.

Reporting: Communicating what was found from monitoring and evaluation. It is about sharing information, including about achievements and lessons learnt.

Improvement: Using this information to improve the way things are done.

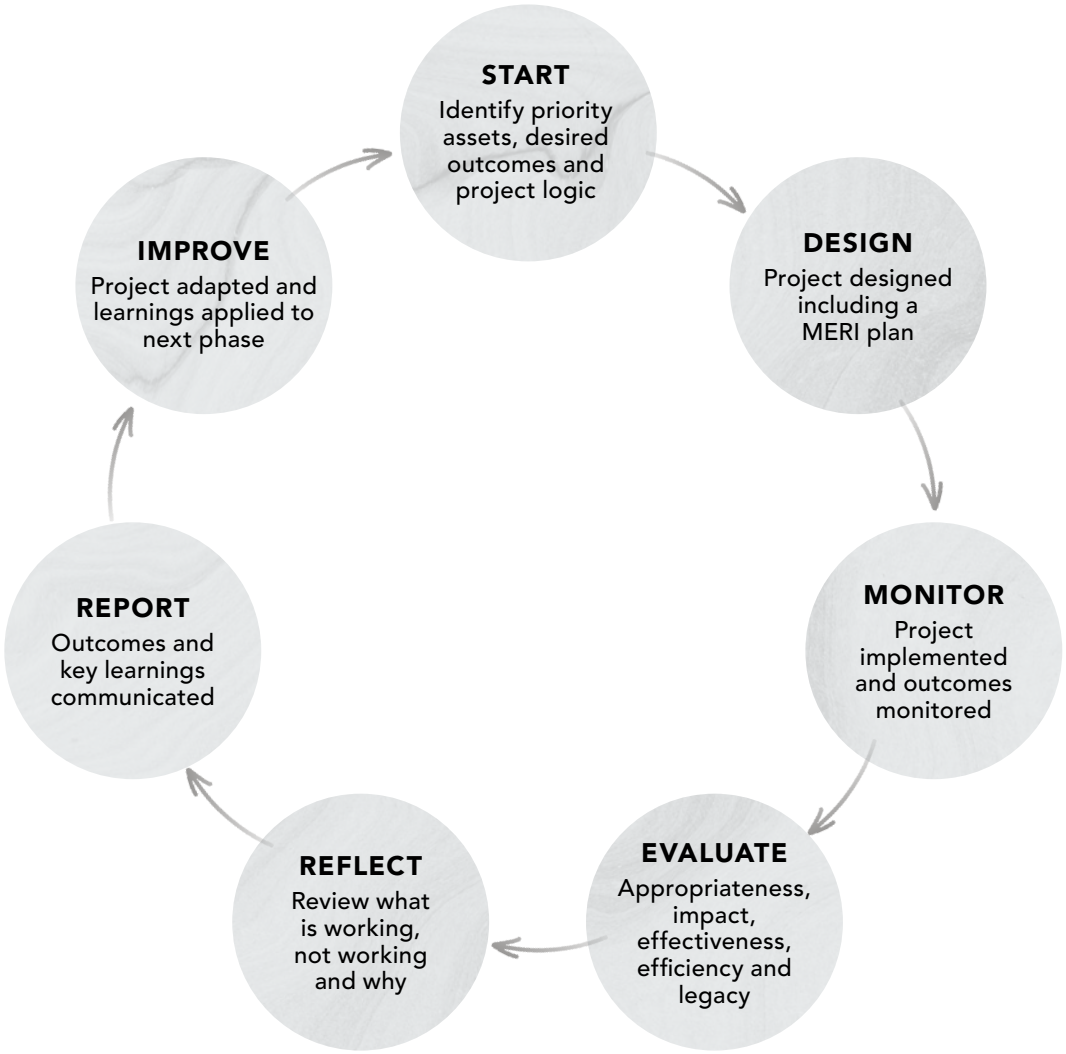


FIGURE 9: **Project level MERI processes that support adaptive management and continuous improvement**

» Collecting Morrisby's gum seed

9

Acronyms and glossary

9 Acronyms and glossary

9.1 Acronyms

ALCT	Aboriginal Land Council Tasmania	**ML**	megalitre
ANU	Australian National University	**MLA**	Meat and Livestock Australia
AWI	Australian Wool Innovation	**NC Act**	*Nature Conservation Act 2002* (Tasmanian)
CCA	Cradle Coast Authority	**NGO**	Non-government organisation
cm	centimetre	**NRET**	Department of Natural Resources and Environment Tasmania
COVID-19	2019 novel coronavirus disease	**NRM**	Natural Resource Management
CSIRO	Commonwealth Scientific and Industrial Research Organisation	**OBP**	Orange-bellied parrot
DAWE	Department of Agriculture, Water and the Environment	**PESRAC**	Premier's Economic and Social Recovery Advisory Council
DEP	Derwent Estuary Program	**PWS**	Parks and Wildlife Service
DPAC	Department of Premier and Cabinet	**RACT**	Royal Automobile Club of Tasmania
EFM	Ecologically Friendly Moorings	**RLP**	Regional Land Partnerships
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)	**SETAC**	South East Tasmanian Aboriginal Corporation
FPA	Forest Practices Authority	**ShellMAP**	The Shellfish Market Access Program
GBE	Government Business Enterprise	**STT**	Sustainable Timbers Tasmania
ha	hectares	**TAC**	Tasmanian Aboriginal Centre
IFS	Inland Fisheries Service	**TAPG**	Tasmanian Agricultural Productivity Group
IMAS	Institute for Marine and Antarctic Studies	**TFGA**	Tasmanian Farmers and Graziers Association
IPA	Indigenous Protected Area	**The LIST**	The Land Information System Tasmania
IPCC	Intergovernmental Panel on Climate Change	**TIA**	Tasmanian Institute of Agriculture
IUCN	International Union for Conservation of Nature	**TLC**	Tasmanian Land Conservancy
KBA	Key Biodiversity Area	**TNC**	The Nature Conservancy
KI	King Island (CCA)	**TRACA**	Tasmanian Regional Aboriginal Communities Alliance
kilo	kilo or thousand	**TSP Act**	*Threatened Species Protection Act 1995* (Tasmanian)
km	kilometres	**TWWHA**	Tasmanian Wilderness World Heritage Area
km²	square kilometres	**UN SDGs**	United Nations – Sustainable Development Goals
MAST	Marine and Safety Tasmania	**UTas**	University of Tasmania
MCA	Multi-criteria Analysis	**wAC**	weetapoona Aboriginal Corporation
MERI	Monitoring, Evaluation, Reporting and Improvement	**WQIP**	Water Quality Improvement Plan

9.2 Glossary

Tasmanian Aboriginal people and community	This is the name used for the First Tasmanians and their descendants throughout the Strategies. We acknowledge that some organisations and individuals prefer First Nations People, or Indigenous people.
Actions	Actions are the identified tangible steps to address the threatening processes affecting the Priorities, and outline potential investment options that will guide specific project development and activities further refined in a Regional Investment Plan or similar document.
Asset Class	Within each of the identified Strategy Themes, specific Asset Classes are identified at the state and regional scale. Asset identification provides a structure that focuses action and investment in priority areas.
assets	Natural resource assets represent a specific form of natural value, and its interaction with economic and social values. This includes natural values such as a species, ecological community or character description, water body, geographical area, or a combination of soil type and land use. Asset Classes are used to classify assets within the Strategy Themes.
adaptive management	The principle of observing, recording and monitoring project delivery mechanisms and resulting responses in order to inform changes and different approaches for future work. This involves regularly evaluating and analyse progress to adapt management decisions as required, resulting in robust decision making in the absence of certainty. This approach reduces uncertainty over time and improves resource management.
anthropogenic	Originating in or from human activity
best management practice	Methods that have been determined to be the most effective and practical means of achieving a positive outcome. These are methods that are supported by best available science, as well as government, industry, and/or certification programs, and have been practically applied and tested through adaptive management processes.
biodiversity	The variety of all life forms on earth—the different plants, animals and micro-organisms, their genes, and the terrestrial, marine and freshwater ecosystems of which they are a part
biosecurity	The management of risks to the economy, the environment, and the community, of pests and diseases entering, emerging, establishing, or spreading
blue carbon sequestration	Blue carbon refers to the contribution of coastal vegetated Ecosystems to global carbon sequestration.
carbon storage	Retain carbon and keep it from entering Earth's atmosphere
citizen science	The practice of public participation and collaboration in scientific research to increase scientific knowledge.
collaborator	NRM organisations rely on project collaborators, groups or organisations that help facilitate project outcomes through mechanisms such as: in-kind commitment, associated services and endorsement. This may include project participation through activities such as citizen science, or participating in project governance.
covenant	A voluntary agreement made between a landholder and an authorised body (for conservation purposes in an NRM context)
Curiosity®	A new bait designed to target feral cats and limit risks to native species
ecological character	The combination of the ecosystem components, processes, benefits and services that characterise the wetland at a given point in time

ecological communities	A naturally occurring group of native plants, animals and other organisms that are interacting in a unique habitat
ecosystem function	The combined effects of all natural processes that sustain an ecosystem
emerging priority ecological communities	Includes communities that have been nominated for listing and may be assessed during the life of the Strategy under the EPBC Act or state legislation, and are identified as priorities based on a final listing status and other MCA criteria.
endemic	Native and restricted to a certain place
Felixers	A humane, targeted and effective grooming trap that automatically apply a measured dose of toxin to the fur of unrestrained feral cats, which is ingested when they instinctively and fastidiously groom
fragmentation	Relating to habitat, a process during which a large expanse of habitat is transformed into a number of smaller patches
hydrology	The distribution and movement of water
indicators	Measuring success in delivery towards achieving outcomes
invasive species	A species occurring, as a result of human activities, beyond its accepted normal distribution and which threatens valued environmental, agricultural or other social resources by the damage it causes
Key Biodiversity Areas	Key Biodiversity Areas are sites of global importance to the planet's overall health and the persistence of biodiversity. The Key Biodiversity Area Partnership is an international programme supporting nationally led efforts to identify areas that are critical for the survival of unique plant, animals and ecological communities.
land manager	Any person or group of people with responsibility for managing land, including but not limited to land owners and lease holders, farmers, government or privately owned entities.
partner	Partners are organisations who have a formal relationship with NRM organisations through an existing mechanism such as a grant deed, contract or other agreement.
Priorities	Priorities are assets that have been identified under each Asset Class through a regional prioritisation process.
management actions	Are developed as a part of the project implementation process, within specific projects, as project-related activities
Outcomes	Long-term (aspirational) and near-term Outcomes for Tasmanian natural resources were identified by the regional NRM organisations. These Outcomes form benchmarks for measuring the success of Actions described in this Strategy.
peri-urban	Transition from rural to urban land uses located between the outer limits of urban and regional centres and the rural environment.
Ramsar Convention/ site	Ramsar Convention on Wetlands of International Importance is an international treaty for the conservation and sustainable use of wetlands
recognised biodiversity hotspots	areas that are acknowledged in scientific literature, management plans or other technical references as having high biodiversity and important conservation values

Regional Land Partnerships	As the largest component of the Governments National Landcare Program, the Regional Land Partnerships investment is being delivered through a reformed regional model that supports a range of projects contributing to four environment and two sustainable agriculture outcomes. The program logic provides an overview of Regional Land Partnerships outcomes and how these outcomes will be achieved through the implementation of services appropriate to priority actions identified in plans, strategies, reports and advices.
Regional Land Partnerships 5-Year Outcomes	Long term outcomes in the RLP Program Logic will be achieved through 5-year outcomes in each of the environment and agriculture outcomes.
reforestation	The intentional replanting of forests and woodlands that have been depleted, usually through deforestation or land clearing
rodenticide	Pesticides that specifically kill rodents, including mice and rats.
Themes	Land, Water, and Biodiversity are the high-level categories, adopted as Themes, to provide the structure of the regional NRM Strategies at the state-wide scale.

9.3 Species list

Scientific name of species cited in text. Please note species listed in the Attachments are not repeated here.

Scientific name	Common name
FLORA AND FUNGI	
Eucalyptus ovata	Black gum
Rubus fruticosus	Blackberry
Eucalyptus globulus	Blue gum
Eucalyptus brookeriana	Brookers Gum
Typa latifolia	Bulrush
Nothofagus gunni	Deciduous beech
Didymosphenia geminata	Didymo
Caladenia echidnachila	Fawn spider orchid
Pterostylis wapstrarum	Fleshy greenhood
Amanita muscaria	Fly agaric mushroom
Macrocystis pyrifera	Giant kelp
Ulex europaeus	Gorse
Themeda triandra	Kangaroo grass
Ammophila arenaria	Marram grass
Eucalyptus gunnii subsp. divaricata	Miena cider gum
Prasophyllum milfordense	Milford leek orchid
Eucalyptus morrisbyi	Morrisbys gum
Austropuccinia psidii	Myrtle rust
Pilosella aurantiaca subsp. aurantiaca	Orange hawkweed
Favolaschia calocera	Orange pore fungus
Richea pandanifolia	Pandani
Phytophthora cinnamomi	Phytophthora dieback
Senecio japonica	Ragwort
Caladenia saggicola	Sagg spider orchid
Juncus krausii	Saltmarsh species
Gahnia filum	Saltmarsh species
Euphorbia paralia	Sea spurge

Halophita australis	Seagrass
Heterozostera tasmanica	Seagrass
Zostera muelleri	Seagrass
Scirpus motivagus	Sedge
Tecticornia arbuscula	Shrubby glasswort (saltmarsh species)
Banksia marginata	Silver banksia
Poa labillardierei	Silver tussock grass
Callitris oblonga	South esk pine
Amphibromus fluitans	Southern swamp wallaby grass
Epacris stuartii	Southport heath
Erica lusitanica	Spanish heath
Thelymitra erosa	Striped sun orchid
Limonium australe var. baudinii	Tasmanian sea lavender
Thelymitra cyanea	Veined sun orchid
Eucalyptus viminalis	White Gum

FAUNA

Salmo salar	Atlantic salmon
Prototroctes maraena	Australian grayling
Bettongia gaimardi	Bettong
Haliotis rubra	Black-lip abalone
Salmo trutta	Brown trout
Felis catus	Cat
Antipodia chaostola subsp. leucophaea	Chaostola skipper
Pecten fumatus	Commercial scallop
Perameles gunnii	Eastern barred bandicoot
Dasyurus viverrinus	Eastern quoll
Tachyglossus aculeatus	Echidna
Passeromyia longicornis	Endemic parasitic fly
Vespula germanica	European wasp
Sternula nereis subsp. nereis	Fairy tern

Dama dama	Fallow deer
Numenius madagascariensis	Far eastern curlew
Pardalotus quadragintus	Forty-spotted pardalote
Littoria raniformis	Green and gold frog
Thinornis rubricollis	Hooded plover
Megaptera novaeangliae	Humpback whale
Potorous tridactylus	Long-nosed potoroo
Centrostephanus rodgersii	Long-spined urchin
Ostrea angasi	Native (angasi) oyster
Asterias amurensis	North pacific sea star
Neophema chrysogaster	Orange-bellied parrot
Crassostrea gigas	Pacific oyster
Haematopus longirostris	Pied oyster catcher
Ornithorhynchus anatinus	Platypus
Leptograpsus variegatus	Purple shore crab
Brachionichthys politus	Red handfish
Haematopus fuliginosus	Sooty oyster catcher
Jasus edwardsii	Southern rock lobster
Brachionichthys hirsutus	Spotted handifsh
Petaurus breviceps	Sugar glider
Menura novaehollandiae	Superb lyrebird
Galaxias fontanus	Swan galaxias
Lathamus discolor	Swift parrot
Sarcophilus harrisii	Tasmanian devil
Parvulastra vivipara	Tasmanian live-bearing sea star
Tyto novaehollandiae subsp. castanops	Tasmanian masked owl
Aquila audax fleayi	Tasmanian wedge-tailed eagle

10 Attachments

The following documents provide further context or background relevant to the Strategy. This information is available on the Tasmanian NRM websites:

https://nrmsouth.org.au/

https://nrmnorth.org.au/

https://www.cradlecoast.com/

Ref.	Document	Description
A1	Tasmanian NRM policy context and drivers	A description of the current policy setting, risk and opportunities arriving from global and local drivers.
A2	Tasmanian NRM linkages with UN SDGs	A table summary of priorities and linkages with UN SDGs.
A3	Tasmanian NRM prioritisation process	A summary of the MCA prioritisation process undertaken for each theme.
A4	Stakeholder engagement	A summary of the stakeholder engagement processes undertaken for strategy development.
A5	NRM planning linkages with Regional Land Partnerships Outcomes	A detailed outline of the strategic and planning linkages with the Australian Government's Regional Land Partnerships program.
A6	References and relevant resources	A summary of key reference documents.

» Trestle Mountain, Wellington Ranges

NRM SOUTH

PO Box 4657, Hobart TAS 7000
0447 266 527 | www.nrmsouth.org.au | @nrmsouth
www.facebook.com/NRMsouthTas