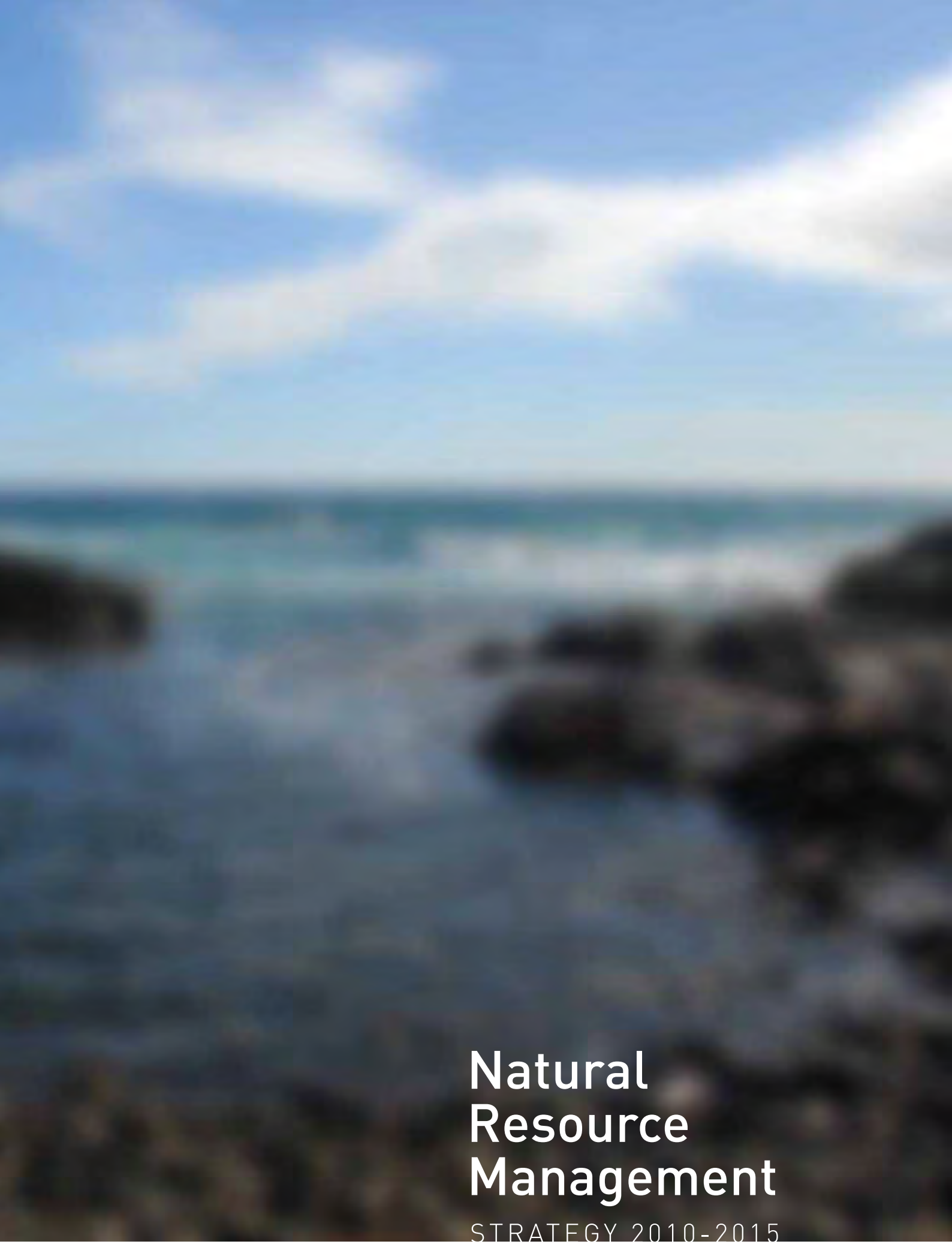

Natural Resource Management

STRATEGY 2010-2015

Cradle Coast Tasmania

Natural Resource Management Strategy

2010 – 2015

Cradle Coast Tasmania

Published by the Cradle Coast Natural Resource Management Committee

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Cradle Coast NRM is a committee of the Cradle Coast Authority.

Note: This document is based on existing information that may be subject to change. Every effort was made to check that the information in this document is accurate and representative.

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Tasmania

Cradle Coast NRM

Section 1 - Introduction

The Cradle Coast region is home to over 112,000 people who enjoy the benefits of its abundant natural resources and landscapes. Our natural assets – rivers, wetlands, groundwater, coasts, estuaries, oceans, natural and productive landscapes, biodiversity, geology, atmosphere and cultural heritage – all contribute to the unique character of this region. These assets are the foundation for our industries and give us clean water, fresh air and healthy lifestyles. The natural resources also have intrinsic values, which are recognised by their protection in the Tasmanian Wilderness World Heritage Area and many other State Reserves.

The region's future depends on healthy ecosystems. As stewards of natural resources, we all have a stake in managing and protecting these assets for future generations.

The people of the Cradle Coast region are fundamental to sustainable natural resource management. Many people are already actively managing and protecting the region's natural resources through their work as primary producers and land managers, as volunteers in Landcare, Coastcare, and conservation groups and as members of Aboriginal communities. The Cradle Coast Natural Resource Management (NRM) Strategy (referred to as the Strategy in this document) builds on these activities and seeks to improve how we manage our natural resources.

The natural resource management vision for the region takes a long term view. The Strategy is based on this vision and the achievement of a general aim to protect, maintain, improve and restore natural resources. Achieving the vision relies on a sustainable balance between economic, social and environmental outcomes.

Natural resource management vision for the Cradle Coast region

Vibrant communities committed to protecting natural resources and actively involved in managing the resources for their environmental, social and economic benefits and values, to ensure a sustainable future for our region.

Purpose of the strategy

A natural resource asset is a natural resource or landscape feature that has economic, social or environmental values.

Having a strategy for the management of natural resources in the North West and Western region of Tasmania helps to focus on a common vision and identify the activities that contribute to achieving that vision.

The State and Federal Governments have adopted a regional approach to natural resource management initiatives in Australia. There are fifty-six NRM regions nationwide, including three NRM regions in Tasmania, and each has a strategy that combines to deliver natural resource outcomes for the benefit of us all. The North West and West of Tasmania is commonly referred to as the Cradle Coast region. The Strategy has been developed by the Cradle Coast Natural Resource Management Committee in conjunction with stakeholder and community support.

The 2010-2015 Cradle Coast NRM Strategy aims to represent the views of the whole community. It aims to balance economic, social and environmental objectives and encourage partnerships between community, industry and Government.

The Strategy does not have any statutory power or replace any current mechanism or policy relating to natural resource management but seeks to build partnerships between stakeholders engaged in NRM.

The Cradle Coast NRM Strategy is intended to guide anyone living or working in the region in the identification of activities they could undertake to ensure healthy natural resources. It does this by setting out:

- a vision of healthy resources in the region with achievable goals, so we know what we are working towards
- the current condition of the region's natural resources, so we can build on previous achievements and recognise key areas for future activities
- the main threats and issues facing these resources, so we can plan preventative actions as well as implementing restorative works where necessary, and
- what is known about the resources, so we are working from a common understanding, can help to fill any knowledge gaps and share knowledge from past experience.

This Strategy has been developed as a reference document for the region and as such it does not prescribe actions to individuals, groups or organisations. The Strategy instead helps readers identify the issues and opportunities that will exist over the five year planning period and that have a bearing on the attainment of the regional NRM goals and vision. Based on the information in the Strategy, individuals, groups and organisations are encouraged to create their own action plans to reflect their resources, skills and interests.

How this strategy was developed

The three Tasmanian NRM regions were created under the Natural Resource Management Act 2002 as part of an integrated natural resource management framework for the State. The Cradle Coast NRM Committee was established as a committee of the Cradle Coast Authority in 2003 and comprises of up to 15 members selected in accordance with the Act. The Committee has no regulatory role or powers but is responsible for a number of key functions including the development of a regional NRM strategy and to facilitate, monitor and report on its implementation.

The Cradle Coast NRM Strategy reflects both the national priorities defined by the Federal Government, the requirements defined by the State Government's Natural Resource Management Act and the unique conditions, opportunities and challenges present or emerging in our region.

Emerging issues such as the government policy regarding climate change have potentially significant impact on the region and will continue to be monitored by Cradle Coast NRM. Climate change also has associated issues including greenhouse gas emissions, a carbon economy and the sustainability of current reserve systems. These issues create challenges across the region's social, economic and environmental boundaries and may result in increased pressure to develop water resources, carbon taxes or changes to traditional agricultural practices and products. As with all change, opportunities arise in areas such as carbon sequestration and Cradle Coast NRM will continue to inform, support and develop these opportunities with regional partners.

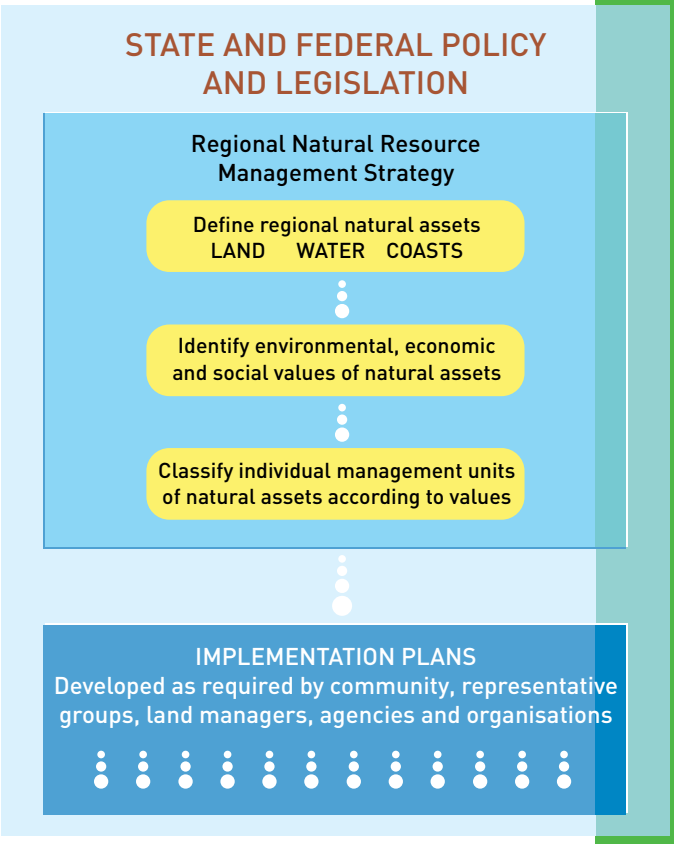
Other emerging issues include demographic and population pressures, technological changes, international demand for commodities and the changing political environment.

Development of this Strategy has also considered existing plans such as those relating to catchment management, municipal weed management, rivercare, parks management and sub-regional documents such as the West Coast Weed and Fire Management Strategy. This Strategy document is based on a review of the goals and five year actions identified in the 2005-2010 Cradle Coast NRM Strategy.

The 2010-2015 Strategy builds on current natural resource management activities already underway in the region and recognises the positive contributions being made by landholders, land managers, Local, State and Federal Governments and community members and groups.

The Strategy is based on extensive input from community, industry, Government and other stakeholders in both formal and informal channels. The content reflects the continual engagement between Cradle Coast NRM and the region's natural resource managers. Feedback and input to the Strategy is an ongoing process and will shape the next strategy revision to be undertaken in 2015.

Cradle Coast NRM staff and Committee members will also continue to use this regional NRM Strategy to guide development of their own operational plans reflective of their available resources. An example process for developing an operational plan can be found on the Cradle Coast NRM website (www.cradlecoastnrm.com)



Natural Resource Management

STRATEGY 2010-2015

How to read this strategy

The 2010-2015 Cradle Coast NRM Strategy is divided into three key sections.

(1) Introduction

(2) Natural Resource Assets

(3) Monitoring, Evaluation, Reporting and Improvement.

The **Introduction** contains information to help readers understand the structure of the Strategy and how it can be used. It identifies the different sources for the content in the Strategy and outlines why a regional NRM Strategy is needed. This section also explains who can use the Strategy and provides an introduction to the natural resources of the Cradle Coast region.

The **Natural Resource Assets** section contains information to help readers identify natural resource management threats and opportunities that can lead to actions to achieve our regional goals and vision.

A framework has been created (see following) encompassing the three key natural resource assets of land, water and coast. For each of these resources a description and components of healthy systems are proposed, threats are identified, the method for classifying strategies is defined and the outcomes of this classification are presented. Focus areas for resource actions are provided as a guide. The focus areas help to prioritise regional assets but are not definitive or prescriptive about how investment should be allocated.

As an example, high conservation estuaries found within a World Heritage Area could be assumed to have levels of protection, management plans and funding to ensure the integrity of the asset and therefore actual investment could be applied to lower priority focus areas identified in the Strategy.

Focus areas in this Strategy emphasise asset preservation. This emphasis results from the ready availability of environmental data compared to an absence of social and economic data that could better inform prioritisation. This information gap has been noted within the Strategy and is a potential area for action in subsequent implementation plans.

All of the natural resource assets are strongly inter-related and are only discussed separately in the Strategy so that each asset can be adequately described and to allow individuals or groups with specific interests to easily navigate the document.

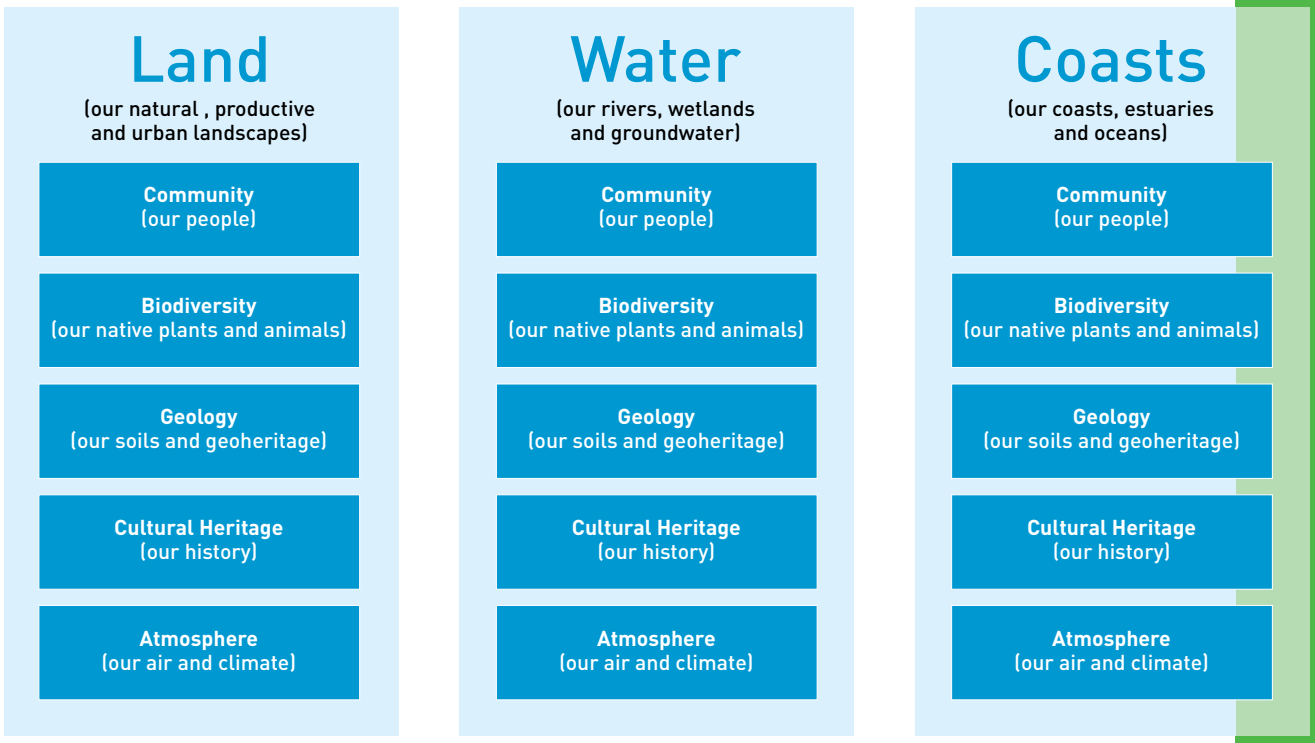
Any type of natural resource can be aligned with one of the land, water or coast assets. Land includes natural, productive and urban landscapes and all of the components that make up these landscapes. Water includes rivers, wetlands and groundwater and all of the components that make up these fresh-water environments. Coast includes coastlines, estuaries and oceans and all of the components that make up these salt-water environments.

In all three resource areas there are common components – **community, biodiversity, geology, cultural heritage** and the **atmosphere**. These components influence the natural resource goals and potential actions and their descriptions, opportunities, and threats are reflected in this second section of the Strategy.

The role of the regional community is an important determinant of the Strategy's success. The Cradle Coast is essentially a rural community with a small and diverse population. The voluntary nature of this Strategy and the connections between social, economic and environmental benefits derived from natural resources underlines the importance of understanding and engaging the community. Cradle Coast NRM has initiated a learning process through a Social Benchmarking Study to inform and guide the implementation of the Strategy.

Another consideration in this Strategy has been the balancing of local, regional, state and national NRM priorities; for example maintenance of NRM networks and activities in remote areas such as King Island and the West Coast. Funding programs may not cater for local needs and **innovative and co-operative approaches may instead be required**. Advances in technology may provide some solutions, however the success of the Strategy in achieving the NRM targets and vision will rely on harnessing the knowledge and skills held by the community.

The Cradle Coast strategic framework for natural resource management



The **Monitoring, Evaluation, Reporting** and **Improvement** section of the Strategy contains information to help community members and land managers identify required outcomes and measure progress. It shows how different activities combine to produce one to five-year outcomes, ten to twenty-year outcomes and ultimately contribute to achieving the natural resource management vision of the Cradle Coast region.

This section also defines specific targets for the resource areas of land, water and coast, plus the common components of community, cultural heritage and atmosphere. The targets reflect a 20 year time frame and where no benchmark data exists, interim targets of 5 years have been defined.

Principles of Natural Resource Management

The following principles of natural resource management identified in the **Tasmanian Natural Resource Management Framework** have been adopted in the creation of this Strategy:

- Ecosystem approach – Natural resource management should be based on an understanding of the relationship between natural resources and the ecosystems they support and upon careful monitoring of change over time.
- Balanced decisions – Natural resource management decisions should take proper account of the range of environmental, social and economic benefits, values and costs in accordance with the objectives of the Tasmanian Resource Management and Planning System.
- Integrated management – The management of natural resources should be integrated within regions and catchments, as well as across industry sectors, Government agencies and specific issues.
- Priority-based – Natural resource management actions are to be undertaken according to priorities that are based on the best available science and information, and relevant experience, as well as on assessment of the relative cost-effectiveness of various options.
- Prevention is better than cure – It is often more efficient to prevent damage than to repair it. Therefore, where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
- Partnerships – To be effective, natural resource management requires the establishment of partnerships between all levels of Government and the community, including the Aboriginal community, industry, land holders and individuals, with agreed roles and responsibilities.

- We are all responsible – All Tasmanians receive benefits from the use, development and conservation of natural resources; they share responsibility for managing natural resources sustainably and for providing economic resources to do so.

About the Cradle Coast region

The Cradle Coast region is remarkably diverse, bounded by 2,640km of coastline and covering 22,520 square kilometres; approximately one-third of Tasmania. The region's natural resources and landscapes are valuable for their ability to sustain primary industries, their ability to provide ecosystem services such as clean water and air, and their intrinsic value as homes for animal and plant communities which also act as tourism drawcards for the region.

Ecosystem services reflect the way living things and environments are naturally connected and how they interact to deliver a wide range of benefits to the region. These benefits underpin the economy and the standard of living enjoyed by residents and visitors to the Cradle Coast. Examples of the different services provided by ecosystems include biodiversity conservation; food production and security; water security; coastal stability; carbon sequestration; resilience to climate change; tourism and recreation; and quality of life.

The Cradle Coast region stretches from Narawntapu National Park in the East to Cape Grim in the far North West, and to Port Davey in the South. Its Eastern border runs diagonally through Cradle Valley. The region includes King Island and other islands in Bass Strait and also includes State waters which extend to three nautical miles. The region shares borders with both NRM North and NRM South and covers nine local government

municipalities: West Coast, Circular Head, King Island, Waratah-Wynyard, Burnie City, Central Coast, Devonport City, Kentish and Latrobe.

In 2009 the region was home to 112,383 people, around 22% of the population of Tasmania. The majority of residents live in coastal towns and cities between Wynyard and Latrobe, especially in Burnie and Devonport, the two major centres.

Over 1200 people are active in the 73 Landcare, Coastcare, conservation and other 'care' groups in the region. Of these groups, 23 are agriculturally based and include many farmers. Most of the other groups are concerned with coastal or urban bushland issues.

The mainstays of the region's economy are agriculture, forestry, manufacturing, mining, retail and tourism. Compared with the whole State, a greater proportion of the population is employed in primary industries (agriculture, forestry and fishing), mining and manufacturing.

The wilderness areas of the Cradle Coast region are some of the most pristine in the world, and the Tasmanian Wilderness World Heritage Area (1,380,000 ha) potentially incorporates a greater range of natural and cultural values than found anywhere else. About 350,000 ha of the western region are listed by the National Estate as the Tarkine Wilderness Area, with about 70% encompassed in various State Reserves, including the Savage River National Park, Rocky Cape National Park and Narawntapu National Park.

The region's Cradle Mountain National Park is the second most visited park in the state. Many tourism activities in the region focus on local produce and natural resources.

The diverse climate and landscapes, and the geological evolution since Tasmania was part of Gondwana, have created naturally high levels of biodiversity. The region covers five of Tasmania's nine terrestrial bioregions and four of its seven marine bioregions.

The Cradle Coast region has the greatest native vegetation cover of the three NRM regions in Tasmania, with the most diverse range of vegetation types. These vary greatly across the region from alpine moorland to sub-alpine woodlands, rainforests, wet eucalypt forests, swamp forests, coastal heaths and salt marsh. The main features determining the vegetation communities are fire, rock and soil type, elevation, rainfall, drainage and aspect.

The region has a temperate maritime climate. Summer temperatures along the North coast are warm and mild with summer maximums averaging 20°C and minimums of 12°C in Burnie. Winter maximums and minimums in Burnie are 13°C and 6°C respectively. Inland and more elevated areas can experience colder weather and snow fall has been recorded year round.

One of the region's biggest natural assets is its abundant and dependable rainfall. Rainfall in the West is much higher than along the North coast (2,400mm plus per year in Queenstown, compared to 800-1,000mm along the North coast between Wynyard and Devonport). Over 3 metres of rain falls annually in the highlands between Waratah and Lake Gordon.

Around 27% of the region is private land and 50% is public land reserved mainly for conservation and recreation. Most of the rest is State Forest (23%), with about half of this available for production forestry. Around 14% of the region (over half the private land) is used for agriculture and about 4% is currently under plantation on State and private land. Other land uses include hydro-electricity production, mineral exploration and mining. Marine farming continues to be a growing industry in some estuarine areas.

Agriculture is the main commercial land use in the region. The red soils of the lower catchments support up to three crops a year, with major crops being potatoes, carrots, and onions and the region is an important producer of poppies and pyrethrum. Dairy and beef cattle are also grown widely, particularly in the Circular Head municipality and on King Island.

Further inland and to the West, the terrain is generally more mountainous. Forestry dominates land use in many of these areas. Forestry Tasmania manages the State Forest, approximately half of which is actively used for wood production by harvesting native trees or plantations. On-farm forestry (where areas of farms are devoted to growing timber) is also becoming increasingly common. District Forest Management Plans apply to the State Forest, where large areas are protected from timber harvesting and are managed for other

values. Wood production is excluded in Protection Zones, which include Reserves, cultural and geomorphic sites, areas managed for protection of flora and fauna species, areas with sensitive landscape values and wildlife habitat corridors.

In the West mining has been the main economic activity for 140 years. This area hosts deposits of copper, gold, silver, iron ore, lead, zinc, tin and other minerals.

The Cradle Coast region includes nine major river basins – the Gordon, King-Henty, Pieman, Sandy Cape, Arthur, King Island, Smithton-Burnie Coast, Forth and Mersey. In total there are over 6,000 kilometres of streams and rivers, more than 8,000 wetlands and extensive groundwater systems. The region contains fractured rock aquifers of Tertiary basalt and pre-carboniferous rocks. The coastlines of King Island and around Macquarie Harbour also have porous rock aquifers of Quaternary and Tertiary sediments. The Cradle Coast region covers 20 water management catchments, 14 of which are entirely within the region.

With the high rainfall and mountainous terrain, many of the major river systems are developed for hydro-electricity, including the Mersey-Forth, Gordon-Franklin, Pieman and King-Henty. These catchments have a number of impoundments and a total of 14 power stations producing, on average, more than half the state's electricity.

Natural Resource Management statement from the Tasmanian Aboriginal community

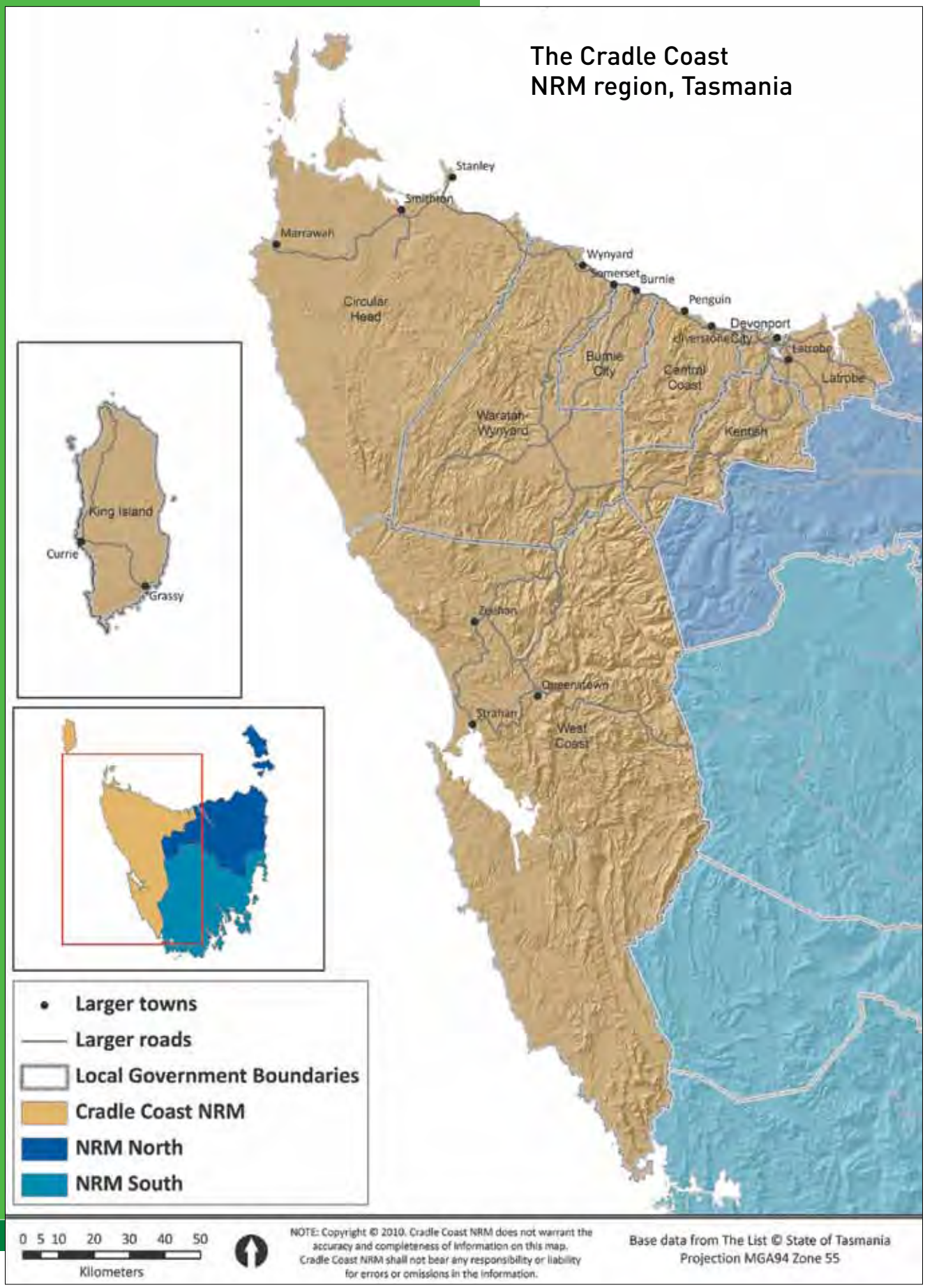
Aboriginal people have lived on the islands that make up Tasmania for many thousands of years (upwards of 40,000 years), living interdependently with the land throughout that time.

Many of the values Aboriginal people hold as important exist within and across the wider landscape, and respect, management and protection of those values is seen as a broad Tasmanian community responsibility.

The whole landscape is part of the story. All Aboriginal sites are important in that each one is an integral part of the country. In recent times the Tasmanian Aboriginal community has progressed from being dispossessed of land a little over 200 years ago to having a small amount of that land returned (in 1995 and 2005). Other areas of land have been purchased by the Aboriginal community. With the return of land, a number of land management problems, resulting from historical European land management practices, have been inherited by the Aboriginal community.

Aboriginal land management knowledge and practices have been increasingly acknowledged by sections of the wider community. Aboriginal people have strong physical and spiritual links with country. Land management expertise of the old people has survived. Today's Aboriginal community is also developing knowledge and skills of contemporary land management practices.

The aim of this Statement is to promote the views, needs and aspirations of Tasmanian Aborigines in relation to sustainable natural resource and land management practices that ensure protection and enhancement of Aboriginal culture and heritage values throughout Tasmania.


The Cradle Coast
NRM region, Tasmania
Stanley
Smithton
Marrawah
Wynyard
Somerset
Burnie
Penguin
Devonport
Latrobe
Circular Head
Burnie City
Central Coast
Waratah-Wynyard
Kentish
King Island
Currie
Grassy
Zeehan
Queenstown
Strahan
West Coast
Larger towns
Larger roads
Local Government Boundaries
Cradle Coast NRM
NRM North
NRM South
0 5 10 20 30 40 50
Kilometers
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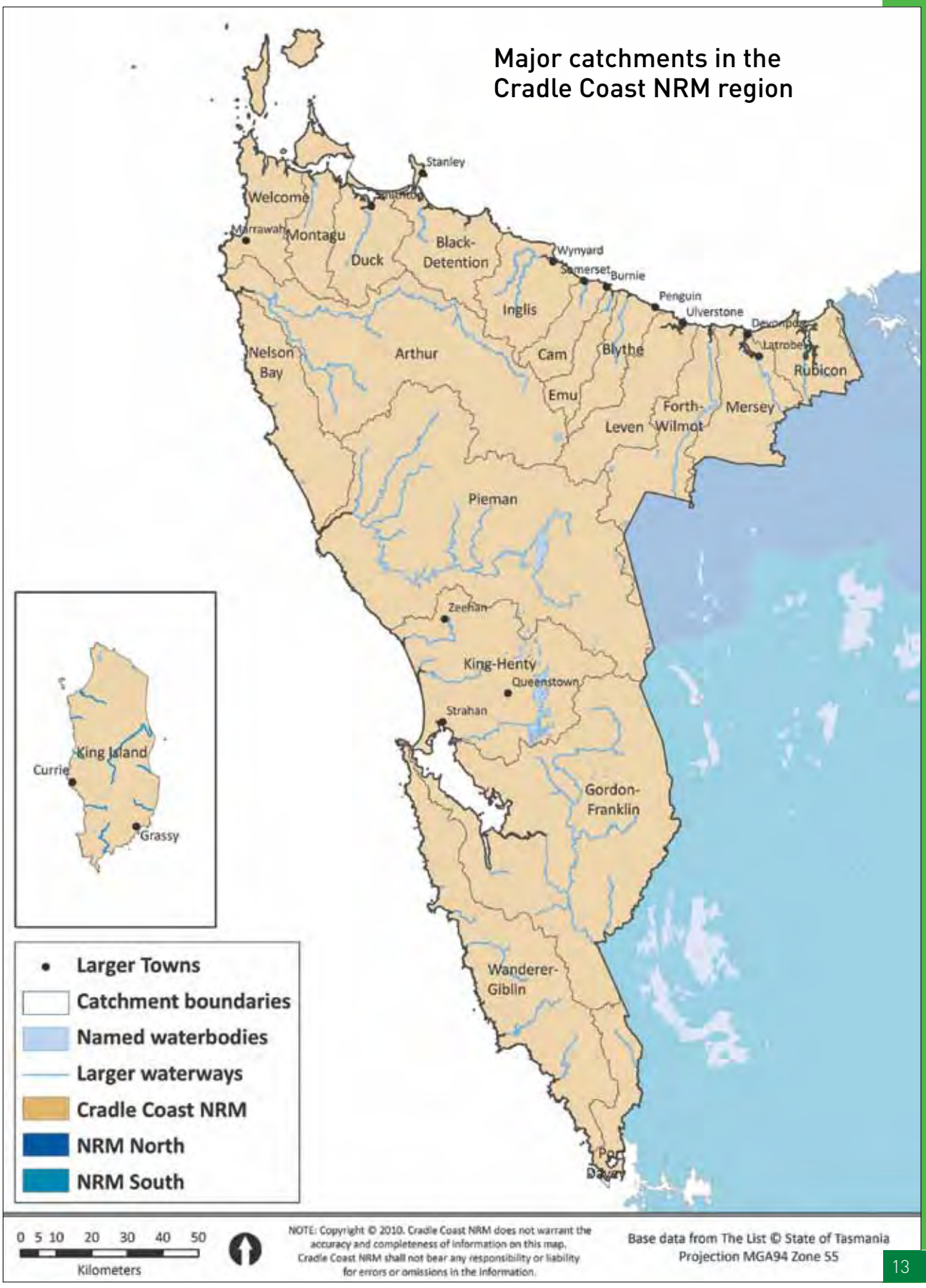
Projection MGA94 Zone 55


Major catchments in the
Cradle Coast NRM region
Stanley
Welcome
Smithton
Marrawah
Montagu
Duck
Black-
Detention
Wynyard
Somerset
Burnie
Penguin
Ulverstone
Devonport
Latrobe
Rubicon
Inglis
Cam
Blythe
Nelson
Bay
Arthur
Emu
Forth-
Leven
Wilmot
Mersey
Pieman
Zeehan
King-Henty
Queenstown
Strahan
Gordon-
Franklin
Wanderer-
Giblin
King Island
Currie
Grassy
Larger Towns
Catchment boundaries
Named waterbodies
Larger waterways
Cradle Coast NRM
NRM North
NRM South
0 5 10 20 30 40 50
Kilometers
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SECTION TWO

Natural Resource Assets

Land

Aspirational goal

To protect and maintain or improve our natural, productive and urban landscapes by ensuring a sustainable balance between economic, environmental and social values.

The natural resource of land has been defined to include productive landscapes encompassing agriculture, forestry and mining; natural landscapes; and urban landscapes.

Although much of the region is pristine or near-pristine wilderness, the use of its natural resources including fertile soils, forests, minerals, rivers, estuaries and coastlines has inevitably modified extensive areas of land. The variety and richness of the Cradle Coast region's land has produced a diversity of land uses from conservation and recreation, to agriculture, forestry and mining.

Our natural landscapes

Natural landscape description

Natural landscapes are those which maintain their natural character and are not used for productive purposes or urban development. Within the region, natural landscapes vary from alpine areas to coastal zones and terrestrial, aquatic and marine habitats.

Natural landscapes are valued for their vegetation communities, faunal habitat and geological history. The region's vegetation communities include rainforests, wet eucalypt forests, buttongrass plains, alpine moorlands, swamp forests, coastal heathland and salt marsh, all creating unique habitats for local animal and bird species.

Much of the region's natural vegetation is held in formally reserved conservation areas such as the World Heritage Area of Cradle Mountain – Lake St Clair National Park and the South West National Park. There are also significant amounts of remnant native forest and shrublands on unreserved public lands, and on private land in farming areas under varying management agreements.

Our natural landscapes are highly valued by the community for recreational activities and tourism ventures. The Aboriginal community's strong relationship with the land is evidenced by their spiritual connection with place and their influence in shaping vegetation communities through the use of fire.

Components of healthy natural landscapes

Healthy natural landscapes have the ability to support natural processes and provide ecosystem services to the regional community. For a natural landscape to maintain key ecological processes it must be adequate in size to sustain vegetation communities and faunal populations; maintain links to other natural landscapes to enable exchange and dispersion of plant and animal life; have a diversity of flora, fauna and landforms; and be resilient to appropriate disturbance such as fire.

Natural landscape threats

Natural landscape threats in the Cradle Coast region:

- Physical threats: Degradation of habitat and geological history by inappropriate fire management; urban and semi-rural development; disturbance by recreational activities, vehicle access and stock access; excavation of materials; and installation of infrastructure such as roads.
- Biological threats: The condition and composition of vegetation communities and fauna habitat may be impacted by clearance; inappropriate fire management; introduction of weeds, non-native plants, pests and diseases; trampling and consumption of vegetation by stock; and disturbance by recreational activities, vehicle and stock access.

Secondary threats which may impede the effective management of natural landscapes are organisational barriers such as lack of coordination between neighbouring land managers and inadequate community participation and engagement.

Classifying natural landscape strategies

Classification of the Cradle Coast region's natural land assets is considered at the scale of catchment areas defined by the Tasmanian Department of Primary Industries, Parks, Water and Environment (DPIPWE) Land and Water Management units.

The assessment of natural landscapes is based upon vegetation communities defined by TASVEG (DPIPWE) and is also used as a surrogate for faunal habitat in this Strategy.

Catchments have been classified on the basis of the condition of the vegetation with the NRM principle of **protecting the best**. The TASVEG database was used with emphasis on maximum diversity and minimal fragmentation.

This Strategy presents a general guide to the classification of natural resource asset areas for management purposes. Consideration should be given to the appropriateness of the methodology used and its suitability to individual applications. Modified approaches may be needed where specific values and asset-uses are considered, where interactions with other asset areas are significant, or where new information becomes available that contributes to a reassessment of the classification process. Strategies may also be influenced by legislation, the need to urgently address issues to avoid long-term damage or to consolidate the outcomes of past investments.

Focus for action

Natural landscapes with vegetation communities of highest diversity, condition and continuous area:

- Gordon-Franklin; Pieman; and Forth-Wilmot catchments.

Natural landscapes with vegetation communities of good diversity, condition and continuous area:

- Port Davey; Wanderer-Giblin; King-Henty; Arthur; Leven; and Mersey catchments.

Natural landscapes with vegetation communities of less diversity, condition and continuous area:

- Nelson Bay; Welcome; Montagu; Black-Detention; Inglis; Emu; Blythe, Rubicon, King Island; Duck; and Cam catchments.

Natural landscape notes

1. The TASVEG database is a collation and interpretation of vegetation information at a statewide level. Consideration of data at a regional or local level may provide a more refined assessment.
2. Key information which would improve the management of the natural landscapes in the region:

- Distribution of key fauna species and mapping of critical habitats;
- Composition, extent and condition of scrub vegetation and fungi;
- Social and economic values associated with natural landscapes, and;
- Historical and contemporary Aboriginal cultural values associated with natural landscapes.

Our productive landscapes

Productive landscape description

Productive landscapes are those where the natural resources of the land are directly used to provide food, fibre and minerals.

Forestry, farming and mining are mainstays of the regional economy and can have positive and negative consequences for the natural environment depending on how they are managed. Primary production plays a role in the active management of remnant vegetation and paddock trees on farms; in informal reserve areas with production forests; and in site management and rehabilitation of mines. The interactions of productive landscapes with cultural heritage values are guided by State and Federal legislation.

Components of healthy productive landscapes

Healthy productive landscapes are determined by sustainable resource management; the condition of components such as soil, water and vegetation; and interactions with the natural environment.

When interacting with the natural environment, a healthy productive landscape is one which does not cause negative off-site impacts; maintains the biological, chemical and physical well-being of the landscape; and protects plant and animal productivity and diversity.

Healthy soil is able to sustain biological functioning, maintain environmental quality, and promote plant and animal health. It should have the ability to continue functioning during stress or disturbance and to recover after such occurrences. The natural landscapes and water sections of this Strategy provide guidance on healthy vegetation and water assets.

Productive landscape threats

Productive landscape threats in the Cradle Coast region:

- Physical threats: Degradation of soils and terrain by accelerated erosion; soil structure decline; urban and other development encroachment; disturbance by recreational activities and vehicle access; and inappropriate excavation of materials.
- Biological threats: Degradation of soil biology and structure, paddock trees, remnant stands of vegetation and vegetation in native production and plantation forests may be caused by inappropriate fire management; introduction of weeds, non-native plants, feral and native pest animals and diseases; improper or inappropriate application of insecticides and herbicides; and disturbance by recreational activities and vehicle access.

Secondary threats which may impede the effective management of productive landscapes are organisational barriers such as lack of coordination between neighbouring land managers and inadequate community participation and engagement.

Classifying productive landscape strategies

Classification of the Cradle Coast region's productive land assets is considered at the catchment area scale defined by the Tasmanian Department of Primary Industries, Parks, Water and Environment (DPIPWE) Land and Water Management units.

The assessment of agricultural landscapes is based upon land use and land capability mapping undertaken by DPIPWE.

Catchments have been classified on the basis of economic potential. Land use and land capability mapping was applied with an emphasis on intensive uses such as dairy and cropping.

Focus for action

This Strategy presents a general guide to the classification of natural resource asset areas for management purposes. Consideration should be given to the appropriateness of the methodology used and its suitability to individual applications. Modified approaches may be needed where specific values and asset-uses are considered, where interactions with other asset areas are significant, or where new information becomes available that contributes to a reassessment of the classification process. Strategies may also be influenced by legislation, the need to urgently address issues to avoid long-term damage or to consolidate the outcomes of past investments.

Catchments with a high level of intensive agricultural use:

- Duck, Inglis and Mersey

Catchments with a medium level of intensive agricultural use:

- Rubicon, Leven, Blythe and Black-Detention

Catchments with a low level of intensive agricultural use:

- Welcome, Montagu, Cam, Emu and Forth-Wilmot.

Productive landscape notes

1. Key information which would improve the management of the productive landscapes in the region:

- Updated land use mapping
- Statewide land suitability mapping
- Land capability mapping on King Island
- Recreational and cultural values associated with productive landscapes.

Our urban landscapes

Urban landscape description

Urban landscapes include the region's towns and cities where structural development has occurred and residential and commercial communities exist. Devonport and Burnie are the largest urban centres in the region with Smithton, Queenstown and Currie being significant towns relative to their local areas. Except for the West Coast towns which rely on mining and tourism, urban centres generally service rural industries.

With many of the region's towns located on the coast or estuaries and containing significant areas of remnant vegetation, the urban community has strong connections with its natural assets, particularly through recreational and social activities.

Components of healthy urban landscapes

Healthy urban landscapes as centres of human population and industry should reflect the needs of a healthy population.

Healthy urban landscapes have sufficient open space and natural areas to provide opportunities for recreation, support social activities and contribute to the well-being of the community. Ambient air quality is clean and naturally refreshed and the general environment free of litter and other pollutants.

Urban landscape threats

Urban landscape threats in the Cradle Coast region:

- Physical threats: Degradation of natural and open spaces by unsuitable recreational activities; inappropriate development or land use; and incorrect disposal of waste, litter and pollutants.
- Biological threats: Degradation of natural areas through vegetation clearance; introduction of weeds, non-native plants, pests and diseases; disturbance by recreational activities and vehicle access; and illegal or mismanaged fires.
- Atmospheric threats: Decline in ambient air quality through local industrial, commercial or domestic pollution such as wood-fire smoke; or pollution from near-by primary production activities such spray drift and smoke from burn-offs.

Secondary threats which may impede the effective management of urban landscapes are organisational barriers such as lack of coordination between neighbouring land managers and inadequate community participation and engagement.

Classifying urban landscape strategies

Due to limited existing information on the condition of the region's natural assets in urban landscapes, this Strategy does not provide a method for classifying urban landscape strategies.

Focus for action

No urban focus areas have been specified in this Strategy. Refer to urban landscape notes below for possible information gathering actions.

Urban landscape notes

1. Key information which would improve the management of the urban landscapes in the region:

- Recreational and cultural values associated with natural assets in urban areas;
- Extent and condition of native vegetation in urban areas;
- Landform and riparian vegetation condition of urban streams.

Water

Aspirational goal

To protect and maintain or improve our rivers, wetlands and groundwater environments by ensuring a sustainable balance between economic, environmental and social values.

The natural resource of water has been defined to include rivers, wetlands and groundwater. Like all natural resources, one asset's condition is connected to the condition of others. In the case of the region's water, its health is reflective of the health of the drainage systems in the catchment areas and land use management practices.

The topography of the landscape and its underlying geology provide the foundation for our waterways to collect, direct, transport and store

water. Water also shapes the landscape through erosion and surface deposits, within waterways and below the ground. The variety of habitats and niche environments created by water across the landscape increases the opportunities for enrichment and evolution of the region's unique biodiversity.

There is limited and fragmented understanding of the historical Aboriginal cultural links to our region's waters. Some insight into the Aboriginal community's connection with the region's waterways comes from knowledge passed down, such as stories featuring shell collecting in the Robbins Passage / Boullanger Bay wetlands.

The community's dependence on waterways for freshwater drinking supplies, irrigation and transport shaped European settlement patterns in the region. While these needs continue to be important, our relationship with the region's water has broadened to encompass social and environmental values, as well as economic benefits.

Our rivers

River description

Rivers include the region's flowing surface waters, which are primarily fresh and do not experience tidal influences. They range from temporary headwater streams to permanent river systems running through natural, rural and urban landscapes.

The Welcome, Montagu and Duck catchments have gentle gradients where the lowland streams once branched through swamp forests. Large areas of these catchments have been highly modified through agricultural development with channels straightened, riparian vegetation cleared and in-stream habitat removed.

The Cam, Emu, Blythe, Leven and Forth-Wilmot catchments have steeper gradients and are narrower than the lowland catchments. Although there has been significant agricultural and urban development in the lower ends of these catchments large connected areas of riparian vegetation also remains. In the upper catchments National Parks and native and plantation forestry assist in protecting the condition of headwater streams.

The modified, north-flowing catchments have benefited from improved management practices and rehabilitation efforts which are expected to lead to long-term condition improvements. Examples include the removal of willows and revegetation of riparian zones in the Inglis-Flowerdale catchment; improving measuring, monitoring and management of water extraction; adoption of sustainable farm practices to reduce erosion from intensive cropping areas; and improved management of dairy effluent on farms in the Duck and Montagu catchments.

Refer to the Catchment map on page 13.

Components of healthy rivers

Healthy rivers have a structure which is created by, and suited to, their local environment.

Although highly variable in their structure, rivers can be characterised by hydrology (flow regime); water quality; geomorphology (landforms); riparian zones, and in-stream plant and animal life. In a healthy river these components will be sufficiently similar to natural conditions to maintain key ecological processes, provide a suitable variety of habitats and environmental conditions to support diverse in-stream and streamside life, and to provide adequate connectivity to floodplains, wetlands, estuaries and groundwater systems.

River threats

Cradle Coast rivers are exposed to a range of threats resulting from direct actions on the waterway, broad-scale catchment activities, indirect specific actions, transference of impacts from up or down-stream, or from conditions occurring beyond the catchment. Some threats are also directly caused by the adoption of social and economic values we associate with our region's waters.

River threats in the Cradle Coast region:

- Physical threats: The physical environment of the river may be impacted by bed and bank erosion, modification of the channel, removal or modification of in-stream habitat structures, sedimentation, extraction of sand and gravel, and installation of infrastructure.
- Flow threats: Modification of natural flows (magnitude, duration and frequency) via extraction and harvesting of water, regulation of flows, changes to catchment yields and to the exchanges between floodplains, groundwater and wetlands.
- Water quality threats: Exceedance or trends towards exceedance of recommended ranges of chemical, physical and biological water quality parameters including: salinity, electrical conductivity, dissolved oxygen, acidity/alkalinity, nutrients, heavy metals, pesticide pollutants, temperature, light, turbidity, suspended sediments, gross litter pollutants, faecal coliforms and viral and biological pollutants.
- Biological threats: The condition and composition of plant and animal communities may be impacted by degradation and/or removal of riparian vegetation; the presence of introduced flora and fauna; growth of nuisance aquatic plants; pests and diseases; barriers to movement (especially fish migration), and unsustainable and illegal fishing.

Secondary threats which may impede the effective management of rivers are organisational barriers such as lack of coordination between neighbouring land managers and inadequate community participation and engagement.

Classifying river strategies

Classification of the Cradle Coast region's river assets is based on the catchment areas defined by the Tasmanian Department of Primary Industries, Parks, Water and Environment (DPIPWE) Land and Water Management units. These catchments represent natural boundaries of the surface water systems and provide consistency for existing management approaches.

The diversity of land uses and complexity of management issues within the smaller catchments is comparative to those of the larger catchments, despite the catchments' size variance. The general approach in this Strategy is to classify catchments on the basis of the health of their waterways, adopting naturalness as a surrogate measure for health. The NRM principle of **protecting the best** was applied at a catchment scale using the Conservation Freshwater Ecosystems Value (CFEV) project database. This project combined environmental data with expert opinion to assess the freshwater dependent ecosystems in Tasmania.

Under the CFEV framework, river systems are divided into comparable sections for which a range of physical and biological characteristics are described. In this Strategy's classification process the CFEV categorisation of Representative Conservation Value (RCV) has been applied. RCV provides assessment of a section of river's level of naturalness allowing for an interpretation of condition.

Cradle Coast region catchments were classified according to the proportion of waterway in the catchment, measured as length of streams of order 4 and over (Strahler), scoring the highest grade of RCV. This approach provides a classification based on condition and also reflects the rarity of a stream's biogeographic type (the type of distribution of the stream's plant and animal life). This can result in an apparently contradictory classification with streams of rare biogeographical type and poor condition having an equivalent status to those of a less rare type in a healthier condition.

This Strategy presents a general guide to the classification of natural resource asset areas for management purposes. Consideration should be given to the appropriateness of the methodology used and its suitability to individual applications. Modified approaches may be needed where specific values and asset-uses are considered, where interactions with other asset areas are significant, or where new information becomes available that contributes to a reassessment of the classification process. Strategies may also be influenced by legislation, the need to urgently address issues to avoid long-term damage or to consolidate the outcomes of past investments.

Focus for action

Majority of river length is highly representative and/or in good condition:

- Welcome and Duck.

Considerable river length is representative and/or in good condition:

- Rubicon, Black-Detention, King-Henty, Gordon-Franklin, Mersey, Leven, Arthur and Wanderer-Giblin.

Less river length is representative and/or in good condition:

- Nelson Bay, Forth-Wilmot, Emu, Port Davey, Cam, Blythe, King Island, Pieman, Inglis and Montagu.

River notes

1. The use of the CFEV database creates some limitations in the assessment:

- The CFEV framework relates only to environmental information, it does not include information relevant to economic and social values associated with rivers.
- The database represents the collation and interpretation of environmental information at a statewide level. Consideration of some data sets at a regional or local level may provide a more refined assessment. For example, data collected in recent years under the Regional Waterway Monitoring Program and Tasmanian River Condition Index project is currently not included in the database.
- Some information contained within the database is out-of-date and not representative of conditions in the catchment, potentially misleading the classification process. For example, in recent years there has been a significant change in the riparian zones of the Inglis-Flowerdale catchment with the removal of willows and revegetation of stream banks.
- The use of representative indices in the assessment process may overshadow the worth of the condition measure. This may result in catchments of poor condition, but highly representative of their type, taking precedence over those in good condition but less representative of their type.

2. Key information which would improve the management of the rivers in the region:

- Reliable assessments of riparian vegetation community composition and condition;
- Accurate information on river flow and potential daily water extractions;
- Historical and contemporary Aboriginal cultural values associated with rivers and streams and;
- Improved understanding of the connectivity between surface waters and groundwater.

Our wetlands

Wetland description

Wetlands include standing surface waters which may be fresh, saline or brackish and may be estuary, river or groundwater dependent. The region's wetlands can be found from the alpine areas to the coastal zone in permanent, seasonal or occasional states.

Such a diversity of wetland types provides for a diversity of habitats and species. This dependence is evident in many migratory bird species and the specially adapted cave fauna found in the region's karst systems.

The Lavinia State Reserve on King Island, incorporating the Sea Elephant River estuary, features a perched (groundwater) lake and extensive *Melaleuca ericifolia* swamps acknowledged as a wetland of international significance through its nomination as a Ramsar site.

On the far north-west coast the Robbins Passage and Boullanger Bay wetlands combine saltmarshes, paperbark swamps, intertidal flats and subtidal areas. These wetlands are considered an internationally important site for migratory birds and provide shoreline and seabed stability, maintain water quality, and contribute to carbon sequestration.

In the west of the region there are blanket bogs formed by peat soils of buttongrass moorlands, unique permanently stratified lakes along the Gordon River and glacial lakes on the Sticht and Tyndall Ranges.

Subterranean karst wetlands are also present in the region at Dismal Swamp in the far north-west and the Vale of Belvoir in the alpine area north of the Cradle Mountain- Lake St Clair National Park.

Components of healthy wetlands

A healthy wetland, as for a healthy river, is one in which key components of flow regime, geomorphology, water quality, wetland vegetation and supported life remain near to natural in order to maintain core ecosystem functions.

A healthy wetland has the capacity to maintain a balanced ecological system, is resilient to enable condition recovery after disturbance, and can continue to provide environmental, economic and social benefits.

Wetland threats

Wetland threats in the Cradle Coast region:

- Physical threats: Modification of the wetland through land reclamation, urban development or other activities to convert the wetland or surrounding areas to other uses; physical disturbance by recreational activities, fire or stock access; excavation of materials; and installation of water harvesting infrastructure such as bores and dams.
- Water regime threats: Extraction of water for stock and domestic purposes; drainage of wetlands to convert to other land uses; construction of dams in the wetland or in streams and rivers flowing into the wetland.
- Water quality threats: Pollution from catchment activities and upstream sources including industrial discharges, agricultural and forestry run-off and urban development; sedimentation from upstream and catchment erosion, and faecal pollution from direct stock access.
- Biological threats: Degradation of vegetation communities through clearance of wetland margins; harvesting of vegetation; introduction of weeds and other nuisance plant growth; trampling and consumption of vegetation by stock; and destruction of vegetation by fire, recreational activities and vehicle access. Plant and animal life dependent on a wetland may be impacted by wetland threats described above or directly by introduced species, pests and diseases; hunting, and; destruction of habitat and breeding sites.

Secondary threats which may impede the effective management of wetlands are organisational barriers such as lack of coordination between neighbouring land managers and inadequate community participation and engagement.

Classifying wetland strategies

For the purposes of identifying the wetlands of the Cradle Coast region, this Strategy has maintained consistency with other recognised classifications including the National Land and Water Resources Audit, the Directory of Important Wetlands in Australia and Atlas of Tasmanian Wetlands for Potential Inclusion into the Directory of Important Wetlands in Australia GHD (2007).

Wetlands are identified as individual waterbodies, a group of wetlands of a particular type in a region, or a group of different wetland types which are directly or indirectly interdependent.

The approach to classification is aligned with the recognised method for determining important wetlands at international and national levels.

Most significant are the wetlands which have formal recognition at an international level through the Ramsar Convention, and for which Australia has international obligations to conserve their ecological character. These wetlands fulfil criteria of:

- Sites containing representative, rare or unique wetland types, and;
- Sites of international importance for conserving biological diversity.

Also considered of highest significance are wetlands which fulfil most of the Ramsar Criteria and are acknowledged as internationally important sites for migratory birds listed under the Japan-Australia Migratory Bird Agreement (JAMBA) and the China-Australia Migratory Bird Agreement (CAMBA). A regional example is Robbins Passage – Boullanger Bay.

The next significant classification contains wetlands which have been listed in the Directory of Important Wetlands for Australia (DIWA). These sites meet at least one of the criteria for an important wetland but have no formal recognition under State or Federal legislation. A review of wetlands in Tasmania conducted by GHD (2007) identified a large number of additional wetlands which fulfil criteria to be listed on the DIWA but have yet to be nominated.

This Strategy presents a general guide to the classification of natural resource asset areas for management purposes. Consideration should be given to the appropriateness of the methodology used and its suitability to individual applications. Modified approaches may be needed where specific values and asset-uses are considered, where interactions with other asset areas are significant, or where new information becomes available that contributes to a reassessment of the classification process. Strategies may also be influenced by legislation, the need to urgently address issues to avoid long-term damage or to consolidate the outcomes of past investments.

Focus for action

Wetlands of international significance or international recognition:

- Lavinia State Reserve (King Island); Robbins Passage - Boullanger Bay (Circular Head).

Wetlands listed on the Directory of Important Wetlands in Australia:

- Rocky Cape Marine Area (Circular Head), Lake Chisholm (Circular Head), Unnamed wetland TAS 081 (Circular Head), Lake Lea (Kentish), Pearshape Lagoon (King Island), Lake Flannigan (King Island), Bungaree Lagoon (King Island), Hatfield Sphagnum (Waratah-Wynyard), Lake Ashwood – Lake Bantick – Lake Garcia association (West Coast).

Non-listed wetlands fulfilling one or more criteria of the Directory of Important Wetlands:

- Audit or Non-Audit A1 (GHD 2007): Mosquito Inlet (Circular Head), Welcome and Dismal Swamps (Circular Head), Big Lake (King Island). Audit A2 (GHD 2007): Blue Bog (Circular Head), Vale of Belvoir (Kentish), Gordon River Lakes (West Coast), Frenchman's Cap glacial lakes (West Coast), Hibbs Lagoon (West Coast) and Payne Bay (West Coast).

Wetland notes

1. The Directory of Important Wetlands in Australia is currently undergoing a review and, as such, the status of wetlands listed or not listed under DIWA may change. Of relevance to the review is the collation of a significant amount of information on the state's wetlands through the Conservation Freshwater Ecosystem Values project. This is demonstrated by the review of wetlands conducted by GHD (2007) which was able to use the CFEV database to identify unlisted wetlands which meet DIWA criteria for listing.
2. Information and data collected at a local scale is now available for some wetlands, particularly Lavinia State Reserve and Robbins Passage – Boullanger Bay.

3. Key information which would improve the management of the wetlands in the region:

- Consistent information on the condition of wetlands to enable comparative assessments and individual benchmarking;
- Economic and social values associated with wetlands;
- Wetland biota (supported life), particularly fish and invertebrate communities;
- Historical and contemporary Aboriginal cultural values associated with wetlands, and;
- Understanding the connectivity between surface waters and groundwater.

Our groundwater

Groundwater description

Groundwater is water located and sourced from below the earth's surface, but has close links with surface rivers and wetlands. The connectivity of surface and ground waters is determined by the relative levels of the aquifer and stream bed and the permeability of materials between the two.

Evidence of surface and ground water connectivity can be seen in Groundwater Dependent Ecosystems (GDEs). These are unique ecological systems which are dependent on specific groundwater flows, fluctuations in level or pressure, or on water quality such as mineral content.

The major types of Groundwater Dependent Ecosystems found in the Cradle Coast region are:

- Terrestrial vegetation communities such as Paperbark swamps.
- River base flow systems where the flow in a stream is only fed by groundwater during low rainfall periods, such as with King Island streams.
- Aquifer and cave systems including karst aquifers in which water dissolves the relatively soft rock increasing the size of the fracture and creating underground cave systems, and karst water springs found around Smithton and Gunns Plains.
- Wetlands and lakes.
- Estuarine and near-shore marine ecosystems.

Components of healthy groundwater

Limited understanding of the region's groundwater warrants a precautionary approach to describing a healthy groundwater system. For the purposes of this Strategy a healthy groundwater system is defined as one which is able to maintain the natural balance between recharge and discharge water flow.

Factors contributing to net natural flow are the volume and quality of water entering via rainfall or irrigation; flow in from surface water systems or water rising from aquifers below; the volume and quality of water leaving by evaporation and transpiration; and the flow out to surface waters or into deeper aquifers.

Groundwater threats

Groundwater threats in the Cradle Coast region:

- Physical threats: Modification of the groundwater systems through installation of groundwater bores; physical disturbance by recreational activities; and disturbance of surface based groundwater dependent ecosystems by urban development, agriculture or recreational activities.
- Water regime threats: Extraction of water for stock and domestic purposes both directly and via connected surface water systems.
- Water quality threats: Pollution leakage from surface waters and catchment discharges including domestic, industrial, urban and agricultural land uses.
- Biological threats: Plant and animal life dependent on groundwater may be impacted by the other groundwater threats such as poor water quality or reduced water availability.

Secondary threats which may impede the effective management of groundwater are organisational barriers such as lack of coordination between neighbouring land managers and inadequate community participation and engagement.

Classifying groundwater strategies

Due to limited existing information on the extent and condition of the region's groundwater and groundwater dependent ecosystems, this Strategy does not provide a method for isolated classification of groundwater strategies. Given the importance of the connectivity of surface and ground waters, the Strategy recommends that groundwater assets be considered in conjunction with river and wetland strategies.

Focus for action

Refer to focus areas for the Cradle Coast region's rivers and wetlands.

Groundwater notes

1. There is a lack of information available on the groundwater resources of the Cradle Coast region. The Tasmanian Department of Primary Industries, Parks, Water and Environment is carrying out investigations at the time of Strategy writing to improve data on groundwater systems across the State.

2. Key information which would improve the management of groundwater in the region:

- Identification of groundwater management units, their extent and characterisation (geology, water quality, depth, volume) of aquifers within the region;
- Accurate information on groundwater bores and volumes of extraction;
- Ecological characterisation of distinctive groundwater dependent ecosystems such as karst; and
- Improved understanding of the connectivity between surface waters and groundwater.

Coasts

Aspirational goal

To protect and maintain or improve our coastal, estuarine and marine environments by ensuring a sustainable balance between economic, environmental and social values.

The natural resource of coasts has been defined to include coastlines, estuaries and oceans. The region's coasts are a focus for communities with the majority of towns being established close to these assets.

Coastal landscapes vary from exposed, rocky shorelines in the south-west and west to extensive sandy beaches and dunes north of Cape Sorell. The sheltered coast of the far north-west includes broad intertidal flats and salt marshes. Eastwards from Circular Head, coastal development has significantly modified landforms.

There is extensive evidence of the strong historical connection of the Aboriginal community to the coast ranging from small scattered artefacts left from skin preparation, hut building and spear making, to large middens spanning thousands of years of food gathering and living on the coast. Aboriginal places also include rock shelters with painted walls, hut depressions and rock carvings. The connection of the past and contemporary Aboriginal community to the coast is also evidenced by the knowledge and stories passed from generation to generation.

Our coastlines

Coastline description

Coastlines mark the boundary between the region's marine environment and land environment and their reach inland varies with the vegetation communities and land formations that they contain.

The region's coastlines support important vegetation including coastal heath, grasslands, wetlands, salt marshes, dry and wet sclerophyll forest and rainforest. Significant faunal communities are also dependent on the region's coastlines such as seal, penguin and resident and migratory seabird colonies.

Components of healthy coastlines

Healthy coastlines are naturally dynamic systems whose landforms are moulded by the wind and waves, and whose vegetation communities are uniquely designed for such challenging environments.

While each coastal environment will have its own specific requirements, in general, healthy coastal ecosystems maintain natural rates of deposition, erosion and sediment transport mechanisms; native vegetation cover of similar composition, structure and extent as naturally occurs; sufficient protection of faunal habitat including breeding sites; and the integrity of cultural heritage sites.

Coastline threats

Coastline threats in the Cradle Coast region:

- Physical threats: Damage to coastal landforms, including acceleration of erosion processes, may be caused by livestock disturbance, recreational activities and vehicles; modification of landforms for agricultural development; or installation of infrastructure for industrial or urban development.
- Biological threats: Vegetation communities may be degraded through clearance; introduction of weeds and non-native plants; trampling and consumption of vegetation by stock; and destruction of vegetation by fire, recreational activities and vehicle access.
- Climatic threats: Sea level rise, increased storm events and alterations to tidal movements are expected to change current sediment transport patterns.

Secondary threats which may impede the effective management of coastlines are organisational barriers such as lack of coordination between neighbouring land managers and inadequate community participation and engagement.

The coastline threats identified may also have a negative impact on the integrity of cultural heritage sites.

Classifying coastline strategies

Classification of the Cradle Coast region's coastline assets is based on the methodology developed and applied in the Coastal Values Mapping Project (North Barker 2008). This approach classifies coastal areas based upon vegetation condition and significance, faunal habitat and geomorphic (landform) condition.

The Coastal Values Mapping Project did not assess the entire Tasmanian north-west coast and no data was collected for protected coastal areas. An assumption has therefore been applied in this Strategy that the level of protection or reservation afforded to these additional locations is reflective of the condition of that area. That is, the World Heritage Area and National Parks are assumed to have coastlines in the best condition.

The Coastal Values Mapping Project applied an arbitrary mapping unit of 100m which is not considered effective for coastline sections. Project results were therefore aggregated in this Strategy to a more suitable scale to enable the classification of areas outside the reserved zones.

Focus for action

This Strategy presents a general guide to the classification of natural resource asset areas for management purposes. Consideration should be given to the appropriateness of the methodology used and its suitability to individual applications. Modified approaches may be needed where specific values and asset-uses are considered, where interactions with other asset areas are significant, or where new information becomes available that contributes to a reassessment of the classification process. Strategies may also be influenced by legislation, the need to urgently address issues to avoid long-term damage or to consolidate the outcomes of past investments.

Coastlines where public land is managed for conservation values:

- South West National Park World Heritage Area; Rocky Cape National Park; Narawntapu National Park.

Coastlines where public land is managed for conservation values and recreational experiences, and private land is managed for conservation:

- Southwest Conservation Area; Arthur Pieman Conservation Area; Lavinia State Reserve; and privately owned covenanted land.

Coastlines where public and private lands are not managed for specific conservation values:

- Coastal values mapping of Very High, High, Medium, and Low.

Coastline notes

1. A particular challenge for developing strategies for the coastline is to define an effective spatial scale for management units. For the purposes of this Strategy it is recommended that management units be defined by considering a combination of vegetation and geomorphic condition, land tenure and landform typologies.
2. The Coastal Values Mapping Project assessments were limited to an inland extent of 100 metres. Many of the region's coastlines extend well beyond 100 metres, thus the assessments may not be representative of those locations.
3. Key information which would improve the management of coastlines in the region:

- Complete mapping of Aboriginal heritage sites and Places of Significance;
- Economic and social values associated with coastlines and;
- Accurate tidal monitoring.

Our estuaries

Estuary description

Estuaries are the transitional zones between rivers and streams and the marine environment. There are 38 estuaries in the Cradle Coast region. The variation in the shape of the coastline, climate, types of river and different stages of land evolution results in the formation of different types of estuary.

Many of the region's towns are located on estuaries and as a result they are a focal point for community cultural and recreational activities, tourism and marine-based industries. The Mersey estuary at Devonport hosts a large commercial port and is the transit point for the **Spirit of Tasmania**, the main non-aerial passenger transport route into the State.

Aquaculture is important in the region with oyster farms well established in the Rubicon estuary and Robbins Passage and a successful salmon farming industry based in Macquarie Harbour.

Components of healthy estuaries

A healthy estuary, as for a healthy river, is one in which key components of flow regime, geomorphology, water quality, wetland vegetation and supported life remain near to natural in order to maintain core ecological processes.

A healthy estuary has the capacity to protect saltwater-freshwater exchanges, provide a suitable variety of habitats and environmental conditions to support a diversity of in-stream and streamside life, and to provide adequate connectivity to rivers, wetlands, oceans and groundwater systems.

Estuary threats

Estuary threats in the Cradle Coast region:

- Physical threats: Modification of the estuary through urban foreshore development; infrastructure to support marine farming operations; infrastructure such as boat ramps to support recreational and tourism activities; and accelerated bed and bank erosion.
- Water quality threats: Increased siltation resulting from land clearance and urban and rural runoff; increased nutrients resulting from sewage and agricultural use of fertilisers; urban and rural effluent discharges; and acidification of rivers and heavy metal pollution from mines.
- Flow threats: Regulation of water flow through dams and weirs; and upstream extraction of freshwater for stock and domestic purposes.
- Biological threats: Clearance of vegetation; the introduction of weeds or non-native plants; and the destruction of vegetation by fire, recreational activities and vehicle access.
- Climatic threats: Sea level rise, increased storm events and alterations to tidal movements are expected to change current sediment transport patterns.

Secondary threats which may impede the effective management of estuaries are organisational barriers such as lack of coordination between neighbouring land managers and inadequate community participation and engagement.

Classifying estuary strategies

Classification of the Cradle Coast region's estuary assets is based on work by Edgar *et al* (1997). Classification is achieved by grouping estuaries according to their physical, landform and hydrological attributes then ranking estuaries within groups taking account of human-induced impacts. Estuaries with minimal human disturbance and maximum areas protected by statute are given the highest classification.

Focus for action

This Strategy presents a general guide to the classification of natural resource asset areas for management purposes. Consideration should be given to the appropriateness of the methodology used and its suitability to individual applications. Modified approaches may be needed where specific values and asset-uses are considered, where interactions with other asset areas are significant, or where new information becomes available that contributes to a reassessment of the classification process. Strategies may also be influenced by legislation, the need to urgently address issues to avoid long-term damage or to consolidate the outcomes of past investments.

Estuaries of critical conservation significance:

- Black River, Payne Bay, Wanderer River.

Estuaries of high conservation significance:

- Sea Elephant, Mosquito Inlet, Giblin River, Hibbs Lagoon, Henty River, Nelson Bay, Arthur River.

Estuaries of moderate or low conservation significance:

- Ettrick River, Seal River, Yellow Rock River, Welcome River, Montagu River, West Inlet, East Inlet, Detention River, Little Henty River, Pieman River.
- Duck Bay, Crayfish Creek, Blythe River, Forth River, Port Sorell, Macquarie Harbour.
- Inglis River, Cam River, Emu River, Leven River, Don River, Mersey River.

Estuary notes

1. The classification undertaken by Edgar *et al* (1997) was comprehensive in its assessment of data, and included biological information, water quality data, physical descriptors of the catchment and estuary, and measures of the human population pressures.
2. Although the Edgar ***et al*** (1997) classification considered population pressure it did not include information relevant to the economic and social values associated with estuaries.
3. The classification was carried out at a state-wide level. Consideration of some data sets at a regional or local level may provide a more refined assessment.
4. Data collected from studies undertaken in the region since the 1997 classification may provide a more accurate representation of the condition of north-west estuaries.
5. Key information which would improve the management of estuaries in the region:

- Long-term baseline water quality information;
- Historical and contemporary Aboriginal cultural values associated with estuaries and;
- Accurate tidal monitoring.

Our oceans

Ocean description

Oceans are the marine environment beyond the region's coastlines. The Cradle Coast region is bounded by Bass Strait to the north and the Southern Ocean to the west. The major current acting on the region is the Zeehan Current which flows across the Great Australian Bight from Western Australia and down the West Coast of Tasmania.

Mapping of inshore marine habitats across the region's north coast from West Head to Robbins Passage has shown that although sand is the chief habitat, rocky reefs, cobble and seagrass beds also make up significant proportions. Less is known of the marine environment surrounding King Island or off the West Coast.

The region's marine waters are rich in diversity and support a variety of commercial fishing industries. Rock lobsters and abalone are harvested along the West Coast, off the far north-west part of the region and around King Island. There are over 50 species commercially fished in the region including garfish, Australian salmon, flounder, warehou, mullet and flathead and King Island and the West Coast also have well established local kelp collection and processing operations.

Marine resources were also historically important to the Aboriginal community and early European settlers. Near-shore fish traps on the north coast and extensive middens of the West Coast are indicative of the strong connection the Aboriginal community had, and continues to maintain, with the marine environment. European cultural heritage is also linked to the sea as evidenced by stories of sealers and the shipwrecks found along the coast.

Components of healthy oceans

Healthy oceans are able to balance the economic and social benefits that they provide with their environmental condition. In healthy marine environments natural levels of complexity, biodiversity, water quality and population age structures are maintained with opportunities for sheltering and growing marine species such as invertebrates, fish, algae and seagrasses.

In healthy environments, marine water characteristics of temperature, light, nutrients and acidity/alkalinity also remain within ranges suitable for the survival and reproduction of local marine species.

Ocean threats

Ocean threats in the Cradle Coast region:

- Physical threats: Habitat damage caused by recreational and commercial fishing; marine-based industrial activities; coastal infrastructure development; and extreme weather events.
- Biological threats: Establishment of non-native or pest species; unsustainable commercial and recreational fishing and harvesting.
- Climatic threats: Changes to light and temperature regimes and nutrient cycling caused by climate change impacts on regional ocean currents.
- Water quality threats: Pollution from agricultural lands, urban development, industrial and urban discharges, oil and gas extraction, aquaculture, shipping, tourism and fishing.

Secondary threats which may impede the effective management of marine environments are organisational barriers and inadequate community participation and engagement.

Classifying ocean strategies

Due to limited existing information on the condition of the region's marine environment, this Strategy does not provide a method for classifying ocean strategies.

Focus for action

No focus areas have been specified in this Strategy. Refer to Ocean notes below for possible information gathering actions.

Ocean notes

1. Key information which would improve the management of ocean environments in the region:

- Mapping of inshore marine habitats on the West Coast and around King Island;
- Population status, structure and trends of commercially harvested marine species;
- Population status, structure and trends of marine species vulnerable to climate change induced events and;
- Accurate tidal monitoring.

Monitoring, Evaluation, Reporting and Improvement

Natural resource targets

Note: Targets reflect specific measures that can track resource condition and the outcomes of activities against the Strategy. Some targets refer to maintaining or improving conditions; this recognises that the improvement of some conditions may not be achievable and that maintenance is a valued outcome.

Land

1. Soil condition is maintained or improved from 2004-2010 benchmarks by 2030.
2. Sites listed on the Tasmanian Geoconservation Database undergo no degrading impacts by 2030.
3. Vegetation condition is improved from the 2015 baseline by 2030.
4. Vegetation extent is maintained or improved from the 2009 baseline by 2030.
5. Native fauna condition is maintained or improved from the 2015 baseline by 2030.

Interim targets

a) Regional vegetation condition baseline is established by 2015.

b) Baseline and assessment method for native fauna condition is established by 2015.

Water

1. The condition of rivers in priority catchment is maintained or improved from the 2015 baseline by 2030.
2. The condition of priority wetlands is maintained or improved from the 2015 baseline by 2030.
3. Groundwater system health is maintained or improved from the 2015 baseline by 2030.

Interim targets

a) Baseline for rivers in priority catchments in the region is established by 2015.

b) Baseline and condition assessment method for the condition of priority wetlands is established by 2015.

c) Improved understanding of groundwater systems, a condition assessment method and baseline for groundwater health is established by 2015.

Coasts

1. Condition of coastal, estuarine and marine environments is maintained or improved from the 2015 benchmarks by 2030.

Interim targets

a) Benchmark and condition assessment method for coastal and marine resource condition is established by 2015.

b) Benchmark for estuarine condition is extended beyond four current estuaries by 2015.

Community

1. Number of community members undertaking NRM practices is increased or maintained from 2010 benchmark by 2030.

2. Number of community members with high or very high abilities to manage natural resource threats is maintained or improved from the 2010 benchmark by 2030.

Cultural heritage

1. Level of protection of all 2010 registered Aboriginal cultural heritage sites is maintained or improved, in partnership with the Aboriginal community, by 2030.

2. Level of protection of all 2010 listed heritage sites on the Register of the National Estate is maintained or improved by 2030.

Atmosphere

1. Air quality meets or exceeds National Environment Protection Measure for Ambient Air Quality (or equivalent) standards by 2030.

2. Reduce greenhouse gas emissions to at least 60 per cent below 1990 levels by 2050.

Interim targets

a) Interim target for greenhouse gas reduction adopted when developed at a State or Federal level (ie 2015 or 2030 target).

Monitoring progress of the Strategy

To manage the natural resources of the region and track progress towards targets, it is important to document the 'before and after' condition of our natural resource assets.

Where possible a Monitoring, Evaluation, Reporting and Improvement (MERI) Framework will be applied to activities arising from this Strategy undertaken by individuals or groups. MERI provides accountability and information to funding bodies and the community on progress of the Strategy.

MERI is a formalised approach to the traditional **Plan, Do, Review** cycle that is used by State and Federal funding bodies.

Monitoring is the deliberate collection of data about the activities undertaken and the state of natural assets. Monitoring helps to plan, implement and evaluate activities in a transparent manner.

Evaluation is the regular review of the appropriateness, effectiveness, efficiency and continuing impact of the actions undertaken.

Reporting is communicating the results of the activities, monitoring and evaluation.

Improvement is ensuring that the monitoring and evaluation of activities is incorporated into current and future activity design and implementation.

If planning activities against this Strategy it is recommended that the short and long term goals of the activity are clearly identified and documented; these may include changes to asset condition, participant's attitudes or practices and improved knowledge. Key data and information used (or required) and any assumptions that have been made about the activity should also be documented as part of this process. Documenting an activity plan makes it easier to undertake appropriate MERI activities and to prove, improve and communicate your actions and their outcomes. One method of documenting the activity plan is to develop a **Program Logic**, an example for this Strategy is provided below.

In addition to ongoing project-level monitoring and reporting undertaken by Cradle Coast NRM for its own projects, Cradle Coast NRM will also measure progress against the targets in this regional Strategy based on information from stakeholders every two years.

Notes on Supporting Documents and Information

The following supporting documents and information will be made available on the Cradle Coast NRM website (www.cradlecoastnrm.com) at the completion of the Strategy consultation and approval period:

- Technical and Process Manual: comprising information on the consultation process, additional technical detail on the processes used to develop strategic classifications and links to Strategy reference documents and maps.
- Monitoring, Evaluation, Reporting and Improvement (MERI) Framework.
- Process for developing an implementation plan.

Strategy logic