

King Island

Natural Resource Management Strategy

2010 to 2020







King Island Natural Resource Management Group 2010

Cradle Coast NRM

Natural Heritage Trust

Helping Communities Helping Australia

A Commonwealth Government Initiative

King Island Natural Resource Management Group Inc

King Island
Natural Resource Management Strategy
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This Strategy contains four sections:

Acknowledgements

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Cover photos from top left:

Bennetts wallabies, King Island Natural Resource Management Group
Hooded Plover eggs, King Island Natural Resource Management Group
Cattle grazing, King Island Natural Resource Management Group
Western coastline, King Island Natural Resource Management Group
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Introduction

The King Island Natural Resource Management Strategy 2010—2020 (referred to as the Strategy) outlines the expectations and aspirations of the King Island Natural Resource Management Group (KINRMG) for natural resource management (NRM) on the Island. It describes the aspirational goal of KINRMG and the outcomes for the condition of King Island's asset areas of Land, Biodiversity, Coast and Water that should be achieved within ten and twenty years.

Aspirational Goal

Natural resources are managed in a coordinated and integrated way which contributes to the environmental, economic and social sustainability of King Island.

This goal determines all work of the KINRMG in the different asset areas. How we manage our resources may change over time as more is learned and influences on our natural resources change, such as climate change. If management practices change, the aspirational goal will remain the same.

Managing our natural resources is a difficult task and involves many stakeholders and the community, including land managers and people living in rural, urban and coastal areas, industries, the King Island Council, State and Federal Government agencies and numerous other organisations. This Strategy covers island-wide NRM but is mindful that the KINRMG and the community have limited capacity to deliver comprehensive NRM outcomes. Therefore only those outcomes and actions are listed which the KINRMG and community can deliver, or where they can assist other organisations to reach these outcomes.

Planning for the management of natural resources must consider the environmental, economic and social situation of the Island as all are intrinsically connected. Economic considerations determine the environmental management capacity of farmers and volunteers. Social cohesion can be built through volunteering and participating in management activities outlined in this Strategy. People must have the economic and social capacity to contribute. Therefore it is important to provide appropriate incentives and funding to enable the community to implement the Strategy.

The Strategy consists of four sections.

1. The **Introduction** outlines the framework and structure of the Strategy and provides background information about King Island.
2. The **Strategic Plan** briefly describes the Island's NRM assets and their condition, and lists longer term (to be achieved by 2030) and intermediate (2020) outcomes for the state of the asset.
3. The **Implementation Plan** is designed to be a users' guide. It outlines the outcomes that should be achieved within five years and recommends activities to achieve these outcomes.
4. The **Appendices** provide additional information such as references, glossary and a table with all the outcomes and activities in the four asset areas.

All outcomes and activities listed in the Strategic Plan and the Implementation Plan contribute to the Aspirational Goal above.

The Strategy has been developed to direct the management of natural resources into the future. It uses the Monitoring, Evaluation, Reporting and Improvement (MERI) Framework (Roughley, 2009) of the Australian Government as a structure. It is based on a review of the *King Island Natural Resource Management Review and Strategic Action Plan 1998 – 2001* (Morgan, 2001), the results of consultations with the KINRMG, the King Island community and key stakeholders, and is incorporating recommendations from recent research and publications.

Framework of the Strategy

The MERI Framework (Roughley, 2009) outlines key concepts and principles of NRM, including Program Logic. The Program Logic developed for this Strategy can be found in Appendix 1.

Program Logic expresses how change is expected to occur (Roughley, 2009). It has been used in this Strategy to develop the relationships between longer term, intermediate and immediate outcomes and the activities needed to achieve those outcomes in the different asset areas of Land, Biodiversity, Coast and Water. The desired longer term outcomes, to be achieved within 20 years, were developed first, and from these the intermediate (10 years) and immediate (5 years) outcomes were determined. A series of activities was then developed, designed to reach these outcomes. With this clear direction of what

needs to be achieved, activities can be monitored and evaluated to see whether they are contributing to the outcomes. This makes activities more effective.

The development of the Program Logic for the Strategy involved thinking about and planning for outcomes that should be achieved for the sustainable management of natural resources on King Island. The Program Logic was developed with input from the community, including consultations conducted for other plans, key stakeholders and the KINRMG, incorporating past and present knowledge and priorities.

Development of the Strategy

Several management plans have been developed for King Island with extensive community involvement, which recommend actions that contribute to the outcomes of this Strategy. These plans have informed the development of the Strategy, and their activities are incorporated into those of the Implementation Plan. The *Draft King Island Biodiversity Management Plan* (KIBMP) (Department of Primary Industries, Parks, Water and the Environment, 2010) is of particular importance for the management of biodiversity and threatened species. All actions that come directly from the recommendations of the KIBMP are indicated in the Implementation Plan with an Asterix (*). A full list of plans utilised is included in Appendix 3.

The implementation plan does not set out priority areas to focus on, but lists all the actions that should be implemented. Part of the difficulty of delivering NRM outcomes is the change of priorities for management and funding at the different levels of government. Therefore prioritisation of the implementation of this Plan will be based on community needs and motivation, funding opportunities and emerging issues.

Use of the Strategy

The Strategy should be used by anyone who is interested and involved in the management of natural resources on King Island. It is the responsibility of the King Island community, industry and other stakeholders to help implement the Strategy.

The two main sections of the Strategy have different roles in planning and implementing NRM outcomes on the Island. The Strategic Plan has been developed with the intention of providing a longer term, twenty year framework that can be adapted to changes in knowledge, priorities and abilities of implementing NRM on King Island. It should be reviewed every five years.

The Implementation Plan is designed as a short term, five year plan to be used by those interested in and responsible for the management of natural resources on King Island. Its outcomes and activities provide a framework for project planning and implementation. This Plan should be reviewed and updated every two years.

Both Plans list the information under the four asset areas of Land, Biodiversity, Coast and Water. These assets are interrelated, and impacts and changes in one affect the other. For the purpose of developing the outcomes and actions of this Strategy, the asset areas have been addressed separately.

Climate change and atmospheric impacts are becoming increasingly important in the management of natural resources. While the current Strategy does not directly address atmosphere as an asset, impacts of climate change are addressed in all asset areas as far as possible and as recommended in other plans.

Community involvement must be included in all aspects of the Implementation Plan to ensure success in project planning and implementation, and it is one aspect of every action listed in this Plan. Community involvement will be achieved through collaboration with land managers, rural, coastal and urban residents, groups such as the King Island Field Naturalists, King Island Garden Club, King Island Tourism Association, and the King Island District High School and Ballarat Clarendon College. The utilisation of community knowledge as well as scientific advice and knowledge is to be encouraged.

Definition of Asset Areas

These descriptions are for the purpose of the Strategy and may differ to descriptions elsewhere.

Land:

The Land asset comprises all aspects which make up the land, including soil, unique features like geoheritage sites and issues impinging on the land, such as waterlogging, salinity and acid sulphate soils, for example the effect improved nutrient management may have on streams.

Biodiversity:

Biodiversity refers to the diversity of native flora and fauna at genetic, species and community level. It also covers threatened species, their habitat and negative impacts on both.

Coast:

The coast asset includes coastal and marine environments, comprising all inshore areas affected by tidal waters and all life within and dependent on these environments which are not covered in the Land and Biodiversity asset areas.

Water:

The Water asset area includes all surface water such as in streams, lakes and wetlands, as well as groundwater, water availability and influences on water quality.

King Island Background Information

For more detailed information, please refer to the King Island Natural Resource Management and Strategic Action Plan 1998 – 2001 (Morgan, 2001) and other relevant references listed in the Appendices.

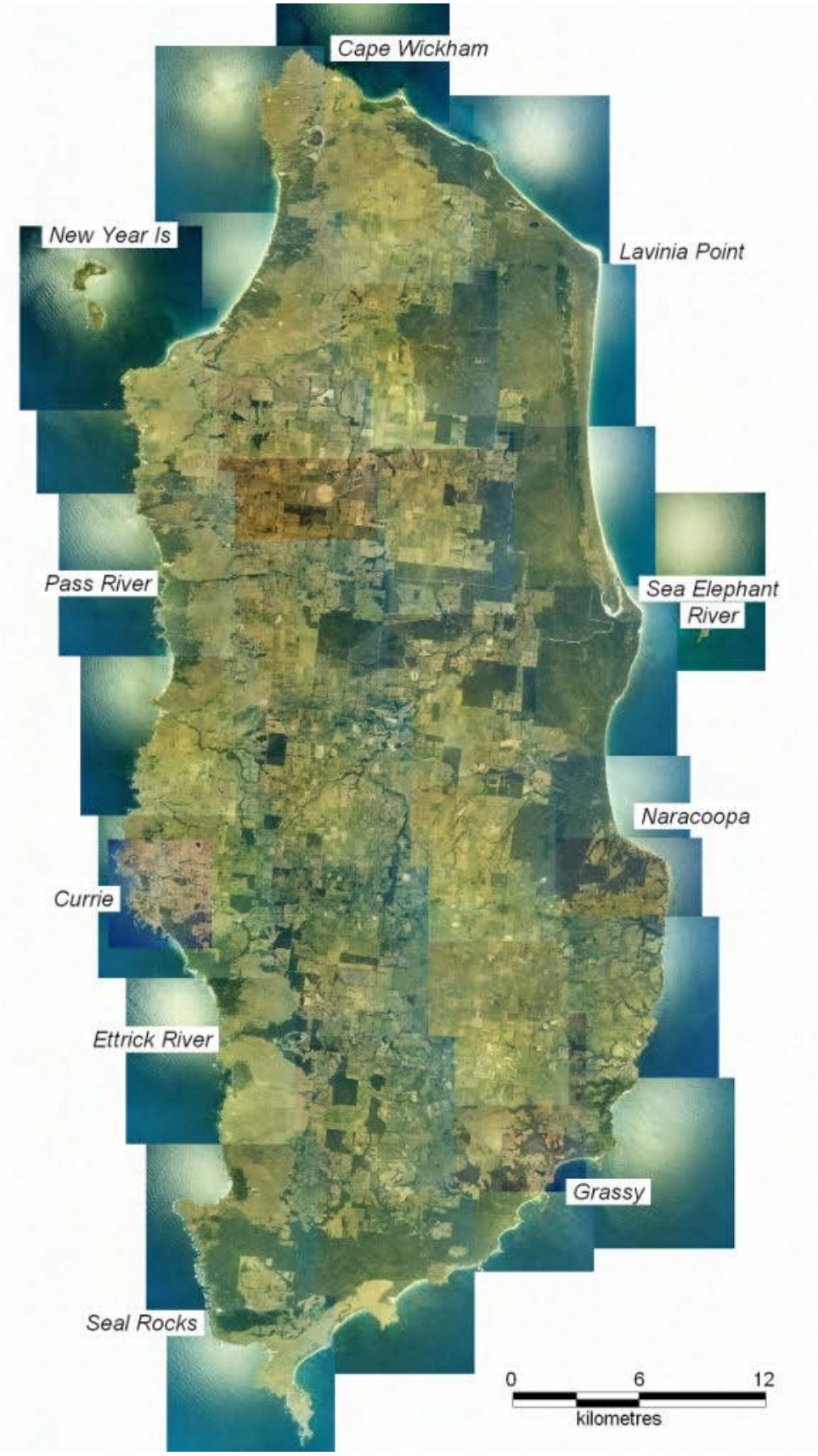
Location and Access

King Island is the second largest of the 126 islands in Bass Strait and lies at its western end, midway between Victoria and mainland Tasmania. It is about 140 km both from Cape Otway on the Victorian coast and Cape Grim on the north-west tip of Tasmania. It is 64 km from north to south and a maximum of 25 km from east to west with an area of 110 160 ha (Barnes et al., 2002).

The Island lies at 144° longitude and 40° latitude, placing it in the path of the "Roaring Forties", a strong prevailing westerly wind. The island has low relief, with the high point being 168 m above sea level at Gentle Annie in the south-east (Barnes et al., 2002).

Even though King Island is geographically and economically isolated it shows similarities to both the north-west corner of Tasmania and south-east mainland Australia and is a transition zone between continental and island flora and fauna assemblages. The isolation has resulted in island vegetation that lacks structural and floristic diversity compared with that of the Tasmanian mainland (Barnes et al., 2002).

Aerial map of King Island (2006).



King Island's isolation also has some economic and social consequences. Air travel is the only means of transport for passengers. Mail and some freight items are also transported via air, with daily services from both Tullamarine and Moorabbin in Melbourne and Devonport on the north-west coast of Tasmania. Freight is moved by ship on a weekly basis through the Port of Grassy, operating a triangular service between Melbourne, Devonport and King Island.

Climate

King Island has a mild maritime climate, similar to some coastal areas on mainland Tasmania, with moderate temperatures, infrequent frosts and moderate to high rainfall. The prevailing westerly winds can reach over 100 km/h (Donaghey, 2003). The climate is conducive to year round pasture growing.

Aboriginal Heritage

Some evidence of Aboriginal occupation has been found on King Island in the form of stone artifact scatters and middens. Some remains have indicated seasonal occupation from the Ice Age up to 2000 years ago (Parks and Wildlife Service, 2000). The sites are principally located along the west coast or inland along watercourses and lagoons. The archaeological evidence suggests that during the last 6000 years Aboriginal occupation of King Island was seasonal rather than continuous, indicating that west and north-west Tasmanian Aboriginal groups had watercraft capable of crossing the 55 km stretch of water between the smaller Tasmanian Islands and King Island (Parks and Wildlife Service, 2000). More recent remains have been recorded, likely left by Aboriginal women slaves brought to King Island by sealers in the 19th century (Finzel, 2004).

Settlement and Environmental Changes

King Island was first sighted by one of three European explorers between 1797 and 1801. Although it is unclear who 'discovered' the island, it was named 'King's Island' by John Black in 1801 (Finzel, 2004). The first people to occupy the island were sealers who were dropped off to collect oil and skins. Their three main camps were at Sea Elephant Bay, New Year Island and Yellow Rock. By 1886 the sealing trade had wiped out the once abundant populations of sea elephants and severely diminished the seal population.

As sealing became unprofitable, many hunters came to the island. Their main targets were wallabies as well as emus and other wildlife. There was no evidence of wombats or the King Island emu after this period. These early settlers saw many shipwrecks and had interaction with survivors from the wrecks who were temporary residents over the years.

In the 1850s surveyors began to come to King Island because interest in leasing land for farming sheep and cattle rose. Settlement was slow due to the rugged coast and doubt about the land's suitability for agricultural development. King Island's landscape changed dramatically from this time on through the use of fire, the introduction of pasture grasses, stocking with sheep and cattle, the harvesting of timber and further hunting of native animals (Finzel, 2004). Since permanent settlement in 1888 approximately 70% of the native vegetation has been destroyed by fire or through clearing to support the beef and dairy industry (Department of Primary Industries, Parks, Water and the Environment, 2010).

The increased clearing and cultivation of land with pasture provided food not only for stock but also for wallabies, pademelons and brush-tail possums. Consequently, the numbers of wallabies in particular increased dramatically (Finzel, 2004). This remains a problem for agriculture and biodiversity today. Recent studies by the Tasmanian Institution of Agricultural Research have indicated browsing damage caused by wallabies is resulting in significant agricultural production losses. The management of natural resources started to change in the 1980's with an increased understanding of environmental issues (Finzel, 2004). Today the land is mainly used for agriculture, with 60 000 ha used principally for cattle and sheep grazing (Australian Bureau of Statistics, 2007a).

King Island has six reserves which are managed by DPIPWE—Lavinia State Reserve, Seal Rocks State Reserve, Kentford Forest Nature Reserve, Kentford Forest Conservation Area, Tathams Lagoon Conservation Area and Cape Wickham State Reserve. New Year Island is a Game Reserve and Christmas Island a Nature Reserve, both are located off King Island's west coast. Crown reserves are located around some of the most significant waterways (Barnes et al., 2002) and the coast, and the Island has a number of Private Forest Reserves.

Lavinia State Reserve is a Ramsar wetland, covers 6800 ha (Parks and Wildlife Service, 2000) of the north–west coast and hinterland and contains the most significant areas of scrub, heath, wetland and coastal communities on the island (Barnes et al., 2002). In 2007 a large fire burnt around 12 500 ha of vegetation, with about two thirds of this within the reserve and adjoining Crown Land, including vegetation communities highly sensitive to fire (Resource Management and Conservation Division, 2007).

People

In 2006 King Island had a population of 1639 people. This has decreased from 1797 people in 1996. The current population is made up of 53.1% males, 46.9% females and 2.7% Indigenous persons, with an average age of 41 (Australian Bureau of Statistics, 2007a).

The people of King Island have a pronounced sense of place, and many feel deeply connected to the Island. The coast plays a strong bearing on their culture (Lovibond, 2007). The isolation forces people to undertake all their daily activities on the Island, including work and recreation (Department of Primary Industries, Parks, Water and the Environment, 2010). Many of the recreational activities are based on the outdoors and rely on King Island's natural values, such as bird watching, fishing, surfing, diving, beach combing, camping, horse riding and motor bike riding (Department of Primary Industries, Parks, Water and the Environment, 2010).

Economy

King Island's major industries in relation to employment are sheep and beef cattle farming (14.9%), dairy product manufacturing (13.6%), dairy cattle farming (8.5%), meat and meat product manufacturing (4.4%) and fishing (4.3%). In 2006 King Island had a 2.1% unemployment rate of people over the age of 15 (Australian Bureau of Statistics, 2007a).

Agricultural activities remain the dominant land use on King Island. The Island's high quality dairy and beef produce is particularly well known due to the pristine and "clean green" image of the island. This has led to the development of the "King Island Brand" (Connell Wagner, 2008). Dairy farmers supply milk to the King Island Dairy, and one dairy supplies milk to local supermarkets.

King Island also has a seafood industry. Rock lobster fishing operates out of Currie and Grassy harbours. There is also some abalone and giant crab fishing (Morgan, 2001).

Another industry on the Island is kelp harvesting and processing. Cast kelp is pulled from beaches with winches and carted to the factory for drying and preliminary processing. The end product is exported to Scotland for further refining.

Other industries are retail trade, health care, social assistance, education and training. A range of small and cottage industries produce organic vegetables and apples, pepper, honey, soap, eggs, organic herbs and teas for sale on King Island. Tourism brings a calculated annual income of $5.6 million to the Island (King Island Council, 2008). The retail trade, accommodation and food service industries together employ 101 people (Australian Bureau of Statistics, 2007b). Most visitors to King Island come for a holiday, with the next most significant group visiting for business purposes (King Island Council, 2008).

NRM Achievements

The KINRMG has been instrumental in assisting land managers and the community to manage King Island's natural resources. The Group was formed in 1997 with representatives of the three existing Landcare groups and various other organisations. The group's objective has been from the beginning "to promote co-ordinated and integrated management of natural resources which will contribute to the economic and environmental sustainablility of King Island" (King Island Natural Resource Management Group Inc, 2002). The first project was to develop the *King Island Natural Resource Management Review and Strategic Action Plan 1998-2001* (Morgan, 2001) to identify priorities for the management of natural resources. The Group developed a multi-faceted program with funding from the Australian Government's Natural Heritage Fund, Phase 1 (NHT1), comprising Waterwatch, Coastcare, a Vegetation Management Strategy, Devolved Grant work for fencing and the additional work of the Landcare groups. This brought an investment in NRM to the island of around $650 000 per year between 1999 and 2002 (Finzel, 2009).

With the change to NHT2 in 2003 King Island was included into the Cradle Coast NRM (CCNRM) region which covers the north-west region, and approximately one third of Tasmania, including off-shore islands. CCNRM developed a strategy which incorporated the *King Island Natural Resource Management Review and Strategic*

Action Plan 1998-2001 (Morgan, 2001). With nearly all funding from the Australian Government going to the regions in NHT2, projects addressing King Island priorities then had to compete for funding with other priority projects in the region, and the KINRM group experienced a sharp drop in funding. However, CCNRM provided ongoing funding for a facilitator position located on King Island which enabled the KINRMG to continue with its work (Finzel, 2009).

Since its inception the KINRMG has completed many projects to address problems such as salinity, water quality, weeds, threatened species protection, and has introduced environmental management systems on farms. This latter project was one of fifteen pilot projects Australia wide and the only one in Tasmania (Department of Agriculture, Fisheries and Forestry, 2008). It commenced in July 2003, thus easing the transition from NHT1 to NHT2 on the Island. The KINRMG has produced a range of publications to assist with the management of natural resources. A list of projects and publications can be found in Appendix 4 and 5.

Resources for Implementing the Strategy

In 2008 the Australian Government introduced the Caring for our Country (CfoC) program which brought new challenges for the KINRMG. Since then all funding opportunities are solely project based, with specific national priorities which may not be relevant to King Island or to the region. The regions' base level funding from CfoC also has to be spend on national priority areas. In addition, competition for other funding from the Australian Government, such as Community Action Grants and grants in the competitive rounds, has increased, making it more difficult for community groups to access funding. Outcomes based on value for money and numbers of participants do not allow for the extra cost of delivery on King Island as a result of its isolation and small population.

Funding for 'Community Skills, Knowledge and Engagement' in CfoC is only available as part of a broader project based funding proposal. Therefore Cradle Coast NRM no longer has the opportunity to contribute to the funding of a Facilitator on King Island. Currently the King Island community needs to provide all human and financial resources for planning and preparing project applications. This involves assessing the need for a specific project, its relevance to the community, community capacity to

complete the project and partnerships available, as well as maintaining community awareness and developing the applications.

While CCNRM has decided to fund a regional facilitator team, tied to its overall project work, delivery by this team on King Island is impeded by the additional financial and time resources required for travelling to the Island. The delivery of many programs on the Island by CCNRM, DPIPWE, TIAR and other State and Australian Government agencies is severely limited by the same factors. Very few projects delivered by these agencies have a budget that includes work on King Island. A further problem for project planning and implementation is that King Island's small population base restricts the voluntary capacity of the community.

State Government agencies, the Australian Government and CCNRM must recognise the particular challenges of delivering NRM outcomes on King Island. They need to provide appropriate resources to the KINRMG to fulfil its role of coordinating and integrating the management of natural resources on the Island. The KINRMG, together with the King Island community, has developed this Strategy which will serve as a base for future funding applications. The capacity to implement the Strategy, and the various management plans and strategies which are incorporated into it, depends on the support the KINRMG will receive from CCNRM and the different levels of government.

Strategic Plan

The Strategic Plan gives a definition of King Island's NRM assets and briefly describes them and their condition. It lists longer term outcomes, to be achieved by 2030, and intermediate outcomes, to be achieved by 2020, for the state of each asset and outlines the background for these outcomes.

Outcomes and activities are listed under the four asset areas of Land, Biodiversity, Coast and Water. These assets are interrelated, and therefore some overlap can occur. For example, the outcomes for threatened species are generally listed under Biodiversity, but those for threatened shorebirds appear in the Coast asset area.

Contents

1. Land

The Land asset comprises all aspects which make up the land, including soil, unique features like geoheritage sites and issues impinging on the land, such as waterlogging, salinity and acid sulphate soils. It also includes how the changes in land affect surrounding environments, for example the effect improved nutrient management may have on streams.

1.1 Good soil quality supports land uses on King Island, which includes environmental, social and economic aspects. (2030)

Intermediate outcomes—by 2020

- ***Land managers are involved in improving soil condition and reducing negative impact on soils.***
- ***Waterlogging and salinity are managed to best practice standards.***
- ***Acid sulphate soils are managed to best practice standards.***

King Island has nine soil groups (Stephens and Hosking, 1932). The Pegarah, Naracoopa and Lappa sands are highly acidic, while the swamp soils and Currie calcareous sands are highly alkaline (Morgan, 2001). The Island has a strong reliance on agricultural production, with soil supporting productivity on beef, sheep and dairy farms. The soil acts as a filtering system for waterways, and provides habitat for vegetation and animals. Some vegetation types are susceptible to root rot fungus, *Pythopthera cinnamomi,* a soil borne pathogen that can destroy native vegetation. Only soil that is kept in a good condition can provide the services needed for agriculture and biodiversity to support our life style into the future.

King Island has some areas at risk from developing acid sulphate soils. These are known and can be managed to prevent the risk of environmental damage.

1.1.1 Land managers are involved in improving soil condition and reducing negative impact on soils. (2020)

Land managers on King Island are actively involved in improving soil condition, which is a prerequisite for successful farming and has a positive effect on the environment. An increased awareness and knowledge of the impacts management practices have on soil condition will lead to a minimisation of critical issues, such as nutrient run-off.

Understanding nutrient management can also benefit both land managers and the environment, for example, soil ph can have a major influence on nutrient uptake and conversion. This can lead to more appropriate fertiliser use and, consequently, reduced nutrient run off. Improved management of fertilisers means less wastage, less cost, and better economic and environmental outcomes. Involvement of land managers in improving soil condition is therefore essential. Preventing erosion is another issue that needs to be addressed.

1.1.2 Waterlogging and salinity are managed to best practice standards. (2020)

The King Island Salinity Forum, held in 2008, identified waterlogging as a major problem, restricting production on some of King Island's agricultural land. In several places poor drainage exacerbates salinity. Saline areas occur mostly in the west and north, but severe scalding is quite localised. According to Dyson and Brown (2008) wind-blown sea spray is the major cause of salt deposition on King Island, and salinity will be best managed by drainage, using appropriate pasture species and grazing management. They suggest that a substantive increase in dryland salinity is unlikely.

1.1.3 Acid sulphate soils are managed to best practice standards. (2020)

Areas at risk from developing acid sulphate soils are low-lying coastal margins where marine sediments are mixed with organic materials, and some pockets further inland that were once estuarine (Cradle Coast Natural Resource Management Committee, 2005). On King Island limited areas are at risk. The risks associated with these soils can be easily minimised with the right management actions. Some quarries, which provide gravel for road construction, experience problems with acid sulphate soils that potentially can lead to acid drainage. The King Island Council manages them accordingly.

1.1.4 Soil pathogens are managed to maintain vegetation communities. (2020)

Pythopthera cinnamomi, commonly known as root rot fungus, is a soil borne pathogen that can be spread through machinery movement, the nursery trade and bushwalking. A number of vegetation communities on King Island have been identified as being susceptible to infection by the fungus; at greatest risk are the King Island Heath/Scrub

Complex and Coastal Heathland (Department of Primary Industries, Parks, Water and the Environment, 2010). The fungus has been identified in wet heath in Lavinia State Reserve, with symptoms observed in the Counsel Hill and Seal River Road areas (Department of Primary Industries, Parks, Water and the Environment, 2010). Its complete distribution on King Island is unknown. Management recommendations are available that can be adopted by the community and industry which would minimise the spread of this pathogen.

1.2 Land uses are managed to conserve geoconservation sites. (2030)

Intermediate outcome—by 2020

- ***The condition of geoconservation sites is maintained.***

There are 24 geoconservation sites on King Island, with nearly all in the coastal zone (Morgan, 2001). These sites consist of a variety of environments and are subject to environmental pressures which directly influence biodiversity. Geoconservation sites also have important conservation values of their own, independent of any role in sustaining living things (Department of Primary Industries, Parks, Water and Environment, 2009a).

1.2.1 The condition of geoconservation sites is maintained. (2020)

King Island's geoconservation sites are located around the Island and many are on private land and in coastal areas. They have been rated at various levels of significance according to their uniqueness and nature of formation. City of Melbourne Bay foreshore is of World Significance, the Tufa Terraces are of National Significance and six sites are of Tasmanian Significance (Morgan, 2001). Many of these sites are unknown to the general public, in some cases assisting their preservation. Other sites are damaged from stock access, vandalism, or poor scientific practices.

2 Biodiversity

Biodiversity refers to the diversity of native flora and fauna at genetic, species and community level. It covers also threatened species, their habitat and negative impacts on both.

2.1 Current biodiversity is maintained and managed. (2030)

Intermediate outcomes—by 2020

- ***Pests are managed to minimise environmental damage and economic loss.***
- ***Weeds of National Significance are controlled/ eradicated, and no new incursions of weeds have developed.***

On King Island, low physical variation and geographic isolation has led to vegetation that is relatively low in structural and floristic diversity. About 470 native vascular plant species have been recorded on King Island (Department of Primary Industries, Parks, Water and the Environment, 2010). The Island is also home to 197 vertebrate species, with 164 of these being birds (Donaghey, 2003).

The Island's biodiversity has been influenced by its history of land use over the last 200 years. The use of fire by explorers and surveyors to clear vegetation, the development of agriculture and the introduction of feral species led to a reduction in the diversity of species. The natural balance of ecosystems was further disturbed through settlement and the ongoing use of fire during the 20th century (Finzel, 2004). Since discovery, several species have been declared extinct from the Island, such as the King Island emu (*Dromatius ater*), southern elephant seal (*Mirounga leonina*) and common wombat (V*ombatus ursinus*).

2.1.1 Pests are managed to minimise environmental damage and economic loss. (2020)

King Island has introduced and native pests. The Bennett's wallaby (*Macropus rufogriseus)* is the major pest animal currently having an impact on the economic viability of farms as well as on biodiversity. Wallaby numbers have increased island-wide as a result of pasture development for agricultural production. The population increase has been exacerbated since the use of 1080 poison as a wildlife management tool has been restricted in 2005. Other species causing damage mainly to biodiversity

are feral cats (*Felis catus)*, forest ravens (*Corvus tasmanicus*) and fallow deer (*Dama dama)*. No rabbits or foxes exist on the Island. Deer have escaped from enclosures and are in low numbers but have the potential to cause more damage if left uncontrolled. European wasp populations have been controlled, with follow-up control vital. All pests have a negative effect on King Island's economy and/or biodiversity.

2.1.2 Weeds of National Significance are controlled/ eradicated, and no new incursions of weeds have developed. (2030)

There are currently six WoNS on King Island—bridal creeper, boneseed, serrated tussock, blackberry, willow and gorse. In addition, 21 Declared Weeds have been recorded which are listed in the Tasmanian Weed Management Act 1999 (North, 2003). As WoNS generally have a long-lived seed bank, complete eradication by 2020 may not be possible. The aim is to manage them for eradication, which is in line with the Australian Government's Caring for our Country Business Plan 2010-2011 (Commonwealth of Australia, 2010). New incursions will need to be stopped from spreading as this is more efficient than implementing full scale control measures. The KINRMG has completed various programs to manage these weeds with the assistance of land managers, the King Island Council and funding from the Australian Government through CCNRM.

2.2 There are viable and healthy populations of all priority flora and fauna species and vegetation communities on King Island. (2030)

Intermediate outcomes—by 2020

- ***Vegetation communities are maintained and strengthened.***
- ***The King Island populations of threatened species have increased and no new species have been listed as threatened.***

The Draft King Island Biodiversity Management Plan (KIBMP) lists flora and fauna species which are considered priorities for management on King Island. They include all species listed under the EPBC and TSP Acts and those rated as high priority by the King Island community. Twelve vegetation communities are also listed as a priority for management in the KIBMP (Department of Primary Industries, Parks, Water and the Environment, 2010). These priorities have been incorporated into this Strategy as they are essential for ensuring that the Island has a healthy and viable biodiversity.

2.2.1 Vegetation communities are maintained and strengthened. (2020)

King Island has 28 broadly defined native vegetation communities, including forest and woodland communities, scrubs, grasslands, heathlands, wetlands and salt marsh (Department of Primary Industries, Parks, Water and the Environment, 2010). Of the twelve vegetation communities listed as priority for management in the KIBMP, six are listed as threatened under the *Nature Conservation Act 2002* (Tasmania). Vegetation communities have been mapped in TASVEG on a broad scale which is inaccurate for King Island and should be taken as a guide only. King Island's history of fires, land clearing and agricultural development has led to modification and fragmentation of vegetation communities. Management actions are needed to reverse this trend.

2.2.2 The King Island populations of threatened species have increased and no new species have been listed as threatened. (2020)

King Island has 49 flora species listed in the TSP Act, with three of these also listed in EPBC Act. Of the fauna species ten are listed in the EPBC Act (Department of Primary Industries, Parks, Water and the Environment, 2010).

People on King Island can only aim to have a positive effect on the Island's population numbers as the community has no control of the status of State-wide population numbers. The ability to increase the populations of resident threatened species will depend on the capacity to implement actions from the KIBMP. With migrating species such as the Orange-bellied Parrot (OBP) the King Island community can contribute by managing habitat on the island.

3 Coast

The coast asset includes coastal and marine environments, comprising all inshore areas affected by tidal waters and all life within and dependent on these environments which are not covered in the Land and Biodiversity asset areas.

3.1 The integrity of coastal areas is maintained and protected. (2030)

Intermediate outcomes—by 2020

- ***All habitat of threatened resident and migratory shorebirds is managed for protection.***
- ***The community is aware of the importance of coastal areas and their management needs, including weed control.***
- ***Industry, recreation and development are managed sustainably in coastal areas.***

King Island's coastal areas are diverse, made up of cliffs, long sandy beaches, pebbly beaches, rocky headlands, harbours and estuaries. The western coastline is influenced by the force of the Southern Ocean, and the north-east coast is dominated by long sandy beaches. Much of King Island is rimmed with two major Old and New Dune systems (Jennings, 1959). Coastal areas provide habitat for flora and fauna, contain sites of Aboriginal and cultural heritage from early sealing, exploration and ship wrecks, and support economic and social activities of the community. Many coastal areas have changed from their natural, pre-settlement state through the impact of stock and vehicles, removal of vegetation, spreading of weeds and the recreational activities of people.

3.1.1 All habitat of threatened resident and migratory shorebirds is managed for protection. (2020)

Many coastal areas provide habitat to resident and migratory shorebirds. The entire coast of King Island is listed as an Important Bird Area because of its significant habitat for shorebirds (Dutson et al., 2009). Shorebirds resident on King Island are Hooded (*Thinornis rubricollis)* and Red-capped Plovers (*Charadrius ruficapillus*) and Pied (*Haematopus longirostris)* and Sooty Oystercatchers (*Haematopus fuliginosus)*. In addition, more than ten species of migratory shorebirds have been recorded (Woehler, 2009). The Island has large colonies of Little Penguin (*Eudyptula minor*) and Short-tailed Shearwater (*Puffinus tenuirostris)*. The three small off-shore islands support large

numbers of nesting seabirds—Christmas Island and Councillor Island are Nature Reserves, and New Year Island is a Game Reserve on which harvesting of Shearwaters is allowed (Woehler, 2006).

3.1.2 The community is aware of the importance of coastal areas and their management needs, including weed control. (2020)

King Island's coastal areas play an important role in the community. Residents appear to place a high value on coastal environments (Lovibond, 2007), but an increase in the community's awareness of coastal management requirements is needed to protect this value. Of particular concern are weeds and the management of shorebird habitat. Because of the Island's remoteness and extent of the coastal area, collaboration between the different user groups and those responsible for its management is essential. Regulatory bodies alone are unable to manage these areas effectively without the support of the community.

3.1.3 Industry, recreation and development are managed sustainably in coastal areas. (2020)

Industry, recreation and development all have an impact on coastal areas and need to be managed to preserve the value of the coast. The Island's coast supports kelp harvesting, farming, oyster farming, tourism and recreation. It is used by the community and tourists for activities such as fishing, camping, surfing and walking. A sand mine development is planned on Fraser Beach on the east coast. The coastal area is Crown Land, but access to the coast is mostly through private property. Maintenance of access tracks is predominantly the responsibility of land managers. The King Island Council is responsible for managing coastal development according to the relevant legislation and policies. Industries on the Island affect the coastal area and have to manage their impacts. Recreational activities need to be managed for sustainability by both the users and those responsible for the design of infrastructure, use and development of these areas.

3.2 Negative impacts on marine and estuarine areas are reduced. (2030)

Intermediate outcomes—by 2020

- ***The community has the understanding to manage impacts on marine areas.***
- ***Estuarine areas are managed for improvement.***

King Island has a large marine area with over 200 km of coastline which supports a seafood industry based on southern rock lobster, abalone and oysters, as well as recreational fishing and diving. Catch limits are enforced by state regulations. King Island has one marine conservation area, Waterwitch Reef Research Area, located approximately 1km offshore north-west of Currie, and four areas with net and line restrictions (Department of Primary Industries, Parks, Water and Environment, 2010). A study into potential marine reserves revealed extensive seagrass beds around New Year Island (Barrett and Edgar, 2002). This study surveyed six sites around the Island, but otherwise little is known about the marine areas.

King Island has two main estuaries—Yellow Rock estuary in the north-west of the Island and the Sea Elephant River estuary in the east, which is part of Lavinia State Reserve and a Ramsar wetland. It supports an oyster farm and is managed by the Tasmanian Parks and Wildlife Service.

3.2.1 The community has the understanding to manage impacts on marine areas. (2020)

The community's capacity to deal with marine issues is restricted to managing fishing practices, reducing pollution and reporting new marine threats such as pests and diseases. Ocean currents disperse weed seeds and wash up litter on the beaches, but the King Island community has no control over this and can only mitigate the effects of these off-island influences. Impacts that can be managed are those that are generated on the Island, such as administering fertiliser to minimise run-off. Raising awareness of these impacts and providing training on best practice land management can lead to an increased understanding of marine areas.

3.2.2 Estuarine areas are managed for improvement. (2020)

Estuaries have marine and terrestrial influences and provide sheltered conditions for rich plant and animal life. The Sea Elephant and Yellow Rock estuaries are influenced by the natural process of shifting sands at the river mouths, which results in backing up of water and creating specific habitat types (Morgan, 2001). The Sea Elephant estuary provides critical habitat for Orange-bellied Parrots (*Neophema chrysogaster)* during their migration between their breeding and overwintering habitats and is listed as a Ramsar site. The estuary and its associated samphire mud flats are important for other native wildlife as well, such as Sea Eagles and migratory shorebirds. A commercial oyster lease operates out of the estuary.

Yellow Rock estuary also provides important feeding and roosting habitat for the Orange-bellied Parrot (*Neophema chrysogaster)* during migration. It partly adjoins a Public Reserve but largely is not protected by reserve status (Department of Primary Industries, Parks, Water and Environment, 2009b). Surrounding properties are used for agriculture, and wallaby browsing on native vegetation has developed as a problem. Some fencing has been undertaken to reduce impacts of cattle grazing and wallaby browsing.

Smaller estuaries are Porky Creek, Ettrick River and Seal River. Management needs for these vary.

4 Water

The Water asset area includes all surface water such as in streams, lakes and wetlands, as well as groundwater, water availability and influences on water quality.

4.1 Water is managed to meet the needs of industry, biodiversity and King Island's population. (2030)

Intermediate outcomes—by 2020

- ***Land managers are working together and with relevant agencies to manage water supply for industrial, environmental and human needs.***
- ***The management of ground water leads to improved environmental conditions.***
- ***Wetlands and their biodiversity are protected.***

King Island has a relatively high rainfall, with an annual mean at King Island Airport of 855.6 mm (Bureau of Meteorology, 2010). King Island's low lying land, combined with the high rainfall and changed land use, has led to problems such as waterlogging and pugging on agricultural land. As the impacts of climate change become more evident, there may be changes in water availability and the need for better management of water usage to maintain water supply for streams, wetlands, lagoons, agricultural production and for the townships which have reticulated water. People living outside Currie and Grassy secure their own water supply through tanks.

4.1.1 Land managers are working together and with relevant agencies to manage water supply for industrial, environmental and human needs. (2020)

The management of town water supply is the responsibility of Cradle Mountain Water, a regional organisation. Other areas of water management, such as rivers, dams and streams are the responsibility of state and local governments and involve state agencies, the Island's land managers and industries such as the abattoir of Swift Australia and King Island Dairy. More information and research is needed to effectively manage water usage, irrigation and environmental requirements. Successful water management on King Island requires cooperation of the different levels of government, and has to be on an island-wide, catchment and property scale.

4.1.2 The management of ground water leads to improved environmental conditions. (2020)

The groundwater systems of King Island are small, operating over distances ranging from a few hundred meters to perhaps five to ten kilometers. They are essentially 'local' in that they are mainly restricted to local catchments or river basins (Dyson and Brown, 2008). The capacity for groundwater flow is greatest within the sediments of coastal dunes and the fractured rocks of the southern plateau/central regions of the Island. The annual rainfall that replenishes groundwater systems is high relative to the volume of groundwater that can be transmitted through the system (Dyson and Brown, 2008). More research is needed to better understand and manage ground water on the Island.

Land managers have measured salinity in parts of the Island since 2002 with piezometers that have been set up in a previous KINRMG project, and continue to do so. In addition, bores used for irrigation are monitored, and KI Council monitors bores in relation to some infrastructure developments. In the longer term these data should assist with better management of this resource.

4.1.3 Wetlands and their biodiversity are protected. (2020)

Wetlands are important areas for wildlife habitats, filtering water, regulating floods, maintaining fish stocks and being a focal point for many recreational and tourism activities. Bungaree Lagoon, Lake Flannigan, and Pearshape Lagoons are listed as Nationally Important Wetlands (Department of Primary Industries, Parks, Water and Environment, 2008) and Lavinia State Reserve, which contains significant wetlands, is a Ramsar site and of international importance. Wetlands are affected by external influences such as water flow and quality. Encouraging conservation and good land management practices on adjoining land will reduce negative external impacts and assist in the protection of the wetlands.

4.2 Stream water quality levels have improved from 2008 levels or are at a healthy level. (2030)

Intermediate outcomes—by 2020

- ***All priority waterways have established data sets of vital indicators which measure improvement of condition.***
- ***All land managers, businesses and industry are managing their impact on water/ stream quality.***

Stream water quality has been monitored, partly by volunteers, at key sites since 2001 to establish baseline data relevant to King Island. Data obtained between 2004 and 2008, which has high reliability, has been used to establish a baseline for future management (Searle, 2010). Stream water quality provides an overview of the health of streams, identifies water quality problems and potential sources of pollution, helps prioritise water quality management decisions and serves as a baseline for comparing future data and trends over time.

4.2.1 All priority waterways have established data sets of vital indicators which measure improvement of condition. (2020)

Vital indicators such as electrical conductivity, pH, temperature, turbidity, dissolved oxygen phosphorus, nitrogen, and phosphate are used to measure the condition of waterways. KINRMG, with support of CCNRM and North-West Waterwatch, have collected data in priority catchments since 2001 (Brown, 2003). From 2004 more accurate equipment was used and water quality measured according to ANZECC guidelines. In addition, at some sites an Ausrivas assessment was conducted to assess stream condition. The report *Water quality and stream condition on King Island 2004 to 2008* identified five priority waterways for ongoing data collection—Sea Elephant River, Grassy River, Ettrick River, Porky Creek, and Yellow Rock River. These have been chosen for their specific unique characteristics and importance (Searle, 2010). Continued monitoring is necessary to measure improvement of the rivers' conditions.

4.2.2 All land managers, businesses and industry are managing their impact on water/stream quality. (2020)

All activities on the land have the potential to affect water quality. King Island has a large agricultural industry which uses fertilisers to sustain productivity. These have the potential to leach into water systems if used incorrectly. Recent nutrient management projects have shown that managing fertiliser use results in considerable economic benefits and may have environmental benefits through decreased nutrient run-off (pers. Communication, Bill Cotching, TIAR). Many riparian areas have been fenced to exclude stock and to improve stream condition.

Companies such as King Island Dairy and Swift Australia have an important role in managing their effluent to minimise environmental impacts. Both are implementing effluent improvement programs.

Implementation Plan

The Implementation Plan is designed to be a users' guide. It briefly describes the intermediate outcomes, to be achieved within ten years, outlines the immediate outcomes, to be achieved within five years, and recommends activities to attain these outcomes. It provides a framework for project planning and implementation and should be used by those interested in and responsible for the management of natural resources on King Island.

Outcomes and activities are listed under the four asset areas of Land, Biodiversity, Coast and Water. These assets are interrelated, and therefore some overlap can occur. For example, the outcomes for threatened species are generally listed under Biodiversity, but those for threatened shorebirds appear in the Coast asset area.

Activities marked with an Asterix (*) indicate actions recommended by the *Draft King Island Biodiversity Management Plan* (Threatened Species Section, 2010).

Contents

1 Land

1.1.1 Land managers are involved in improving soil condition and reducing negative impact on soils. (2020)

Soil condition can be affected by erosion, nutrient deficiency, soil pugging and compaction, soil degradation and levels of soil carbon. Over-grazing, inappropriate land use and mismanaged fertiliser application can contribute to these impacts.

1.1.1 (a) Land managers are aware of potential impacts on soil condition and soil profiles, such as those caused by pugging and compaction, and the necessary management actions required to retain/improve quality. (2015)

Immediate activities

- Develop best practice guidelines for reducing impacts from pugging and compaction.
- Promote training for land managers in soil management.

1.1.1 (b) Priority erosion areas are being managed. (2015)

Immediate activities

- Identify and prioritise erosion areas for management.
- Implement erosion management on affected areas.
- Monitor water turbidity to determine the impact of erosion on streams.

1.1.2 Waterlogging and Salinity are managed to best practice standards. (2020)

Waterlogging and salinity are threats to agricultural productivity, water resources and biodiversity. They can reduce the productivity of pastureland, affect water quality and prevent plant species from growing due to oxygen depletion. Waterlogging can also lead to increased salinity. In the *Salinity and Waterlogging Control Manual for King Island's Farmland*, Dyson and Brown (2008) suggest some practical solutions, including controlled grazing together with strategic drainage, as most suitable for managing salinity on King Island. They recommend work and research which is needed to improve the management of these problems.

1.1.2 (a) Understanding of the management of waterlogging through drainage has been developed in the community.

(b) Waterlogged areas are managed to reduce negative impacts on pasture production and other vegetation. (2015)

Immediate activities

- Source funding to implement actions of the Salinity and Waterlogging Control Manual for King Island's farmland.
- Implement actions from this Manual.
- Source funding for and conduct waterlogging and drainage workshops.
- Ensure new residents are aware of resources for managing waterlogging and drainage with inclusion of information in new residents' packs.

1.1.3 Acid sulphate soils are managed to best practice standards. (2020)

Acid sulphate soils become a threat if they are disturbed or exposed. They can increase the acidity of soil, kill aquatic species, degrade habitat and lower plant productivity. Acid sulphate soils also pose a threat to steel and concrete infrastructure and can be very costly to manage in rural and urban areas.

1.1.3 (a) Knowledge about management of acid sulphate soils has increased. (2015)

Immediate activities

- Collect base data of acid sulphate soils and continue to monitor.
- Identify land and infrastructure at risk of developing acid sulphate soil issues.

1.1.3 (b) All potentially affected land managers are involved in acid sulphate awareness raising activities. (2015)

Immediate activities

- Make information available to land managers with potential acid sulphate soil.

1.1.4 Soil pathogens are managed to maintain vegetation communities. (2020)

The root-rot fungus *Phytophthora cinnamomi* is a soil pathogen that poses a threat to vegetation. It causes the roots of certain plants to rot. It spreads via spores on soil and

plant matter, carried by animals, on clothing and machinery. The degradation of the plants can lead to habitat loss, which affects native animals and puts more pressure on already threatened species.

1.1.4 (a) Community is aware of the impact of root-rot fungus (Phytophthora cinnamomi) on native vegetation and how it is spread. (2015)

(b) Relevant machinery operators and industries are applying hygiene procedures to minimise spread.* (2015)

Immediate activities

- Source general information about root rot fungus.
- Raise community awareness about root rot fungus and its management.
- Disseminate information to all stakeholders.
- Support and encourage the mapping and monitoring of the current distribution of root rot fungus.
- Provide mapping to the KIFMAC to assist in wildfire management with minimising spread of soil pathogens*.
- Source funding for awareness raising and signage.

1.2.1 The condition of geoconservation sites is maintained. (2020)

Geoconservation areas are threatened by vandalism, inappropriate management of the surrounding area, stock trampling and a change in water dynamics or water condition. The lack of knowledge of the significance of these areas can also play a part in their mismanagement.

1.2.1 (a) The community recognises the importance of geodiversity in underpinning the knowledge of our natural history. (2015)

(b) The community recognises the importance of geodiversity in underpinning ecological processes. (2015)

(c) Geoheritage areas such as the Tufa Terraces are fenced to protect them from negative impacts. (2015)

Immediate activities

- Collate current information on sites and prioritise management needs.
- Involve land managers in the management of geoheritage sites.
- Raise community awareness about importance of geoheritage sites.
- Promote fencing of geoheritage sites, where needed.
- Source funding to assist land managers with fencing.
- Include sites in tourism information where appropriate.

2 Biodiversity

2.1.1 Pests are managed to minimise environmental damage and economic loss. (2020)

Pest species add to the decline of threatened species on King Island through predation, competition for food and increased browsing on vegetation. They cause economic loss to agricultural production through browsing of pasture and can transmit disease. Species that currently are in pest proportions and need management are cats, forest ravens, Bennet's wallabies, deer and European wasps.

2.1.1 (a) New pest invasions have been prevented. (2015)
(b) Feral deer population is eradicated. (2015)

Immediate activities

- Determine impacts of ravens* and deer.
- Promote eradication of wild deer.
- Monitor European wasps and maintain wasp free status.
- Promote re-appointment of King Island quarantine officer.

2.1.1 (c) Recommendations from the Alternative to 1080 project have been implemented. (2015)

Immediate activities

- Develop a wallaby management plan in conjunction with the Game Management Unit, DPIPWE.
- Source funding to implement the Alternative to 1080* recommendations and other pest minimisation actions from relevant management plans.

2.1.1 (d) Community is aware of and practicing responsible cat ownership. (2015)
(e) Cat management plan has been implemented. (2015)

Immediate activities

- Continue cat control program, including community education about responsible cat ownership*.
- Research the implications for ecosystem balance of removing predators*.

2.1.2 Weeds of National Significance are controlled/eradicated, and no new incursions of weeds have developed. (2020)

Weeds pose a great threat to biodiversity and the economy of King Island. They compete with native plants and pasture, modify native habitat and take considerable long term investment to control. The consequences of climate change may enable new weed species to adapt to the Island.

2.1.2 (a) Management priorities for WoNS have been developed and actions implemented. (2015)

(b) The impacts of weeds have been reduced. (2015)

Immediate activities

- Develop a WoNS management plan and implement its actions.
- Continue current weed mapping, management and monitoring programs* and develop them into a comprehensive and coordinated King Island weed management program.
- Encourage the appointment of an authorised weeds officer*.
- Source funding for weed management projects.
- Promote weed hygiene on King Island through CCNRM's Weed Hygiene Action Plan.

2.1.2 (c) Awareness of weeds in the greater community has increased. (2015)

Immediate activities

- Develop and implement a community awareness raising program for weeds.
- Encourage the appointment of a weeds officer*.

2.2.1 Vegetation communities are maintained and strengthened. (2015)

Vegetation communities are threatened by fire, habitat degradation and fragmentation, plant disease and browsing by native animals. The current mapping of vegetation communities on King Island is inaccurate, leading to difficulties in planning for conservation and research.

2.2.1 (a) Land managers know how to protect priority vegetation communities on their property from fire. (2015)

Immediate activities

- Promote knowledge development about fire management in the community.
- Encourage land managers to develop and implement a fire management plan for their property with the assistance of the Tasmanian Fire Service and KIFMAC if required.
- Establish a KINRMG representative on KIFMAC.
- Support KIFMAC to explore future opportunities to protect remnant vegetation with high conservation values from the impacts of fire*.

2.2.1 (b) Connectivity of priority vegetation communities has increased. (2015)

Immediate activities

- Promote activities that connect priority vegetation communities.
- Encourage land managers to manage for biodiversity.
- Seek funding for establishing vegetation corridors.

2.2.1 (c) Accurate mapping of vegetation communities is available. (2015)

Immediate activities

- Improve accuracy of TasVeg mapping through ground truthing and other appropriate means*.

2.2.2 The King Island populations of threatened species have increased and no new species have been listed as threatened. (2015)

The KIBMP lists a range of threats affecting listed species. Habitat degradation and fragmentation, fire, predation, weeds and human influences have some of the largest impacts, in particular on the already low populations of listed species which can take longer to recover, if they recover at all.

2.2.2 (a) The level of permanent protection of threatened flora species and their habitat has increased. (2015)

(b) The quality of habitat of threatened species has improved. (2015)

Immediate activities

- Source funding for fencing off native vegetation corridors and raising community awareness.
- Promote the establishment of covenants or other management agreements with land managers.
- Encourage re-vegetation projects to increase habitat.
- Monitor the quality of threatened species' habitat.
- Make mapping available to relevant bodies such as KIC, KINRMG, FPA, DPIPWE and DEWHA to encourage conservation values to be included in relevant activities.
- Continue actions to decrease the impact of pests on theratened species.

2.2.2 (c) Community knowledge about protection and conservation of threatened species and the relevant provisions of the EPBC Act and TSP Act has increased*. (2015)

Immediate activities

- Raise community awareness of the management needs of threatened species.

2.2.2 (d) Connectivity of remnant vegetation through corridors has increased. (2015)

Immediate activities

- Promote the establishment of vegetation corridors.
- Determine priorities for stock exclusion fencing and corridors for habitat linkages.
- Encourage re-vegetation projects which increase connectivity.

3 Coast

3.1.1 All habitat of threatened resident and migratory shorebirds is managed for protection. (2020)

Impacts on threatened shorebirds are predation by introduced species, disturbance to their nesting by humans and predators, and a reduction in habitat. These birds nest in exposed areas on beaches, and during breeding times activities such as beach driving, walking and animals like dogs disturb and threaten their breeding. Weeds pose an additional threat as they reduce the area used for nesting. Climate change has the potential to affect the habitat of these birds in the future.

3.1.1 (a) Actions regarding threatened shorebirds and migratory birds from all relevant management plans have been implemented. (2015)

(b) The number of resident shorebird populations has been maintained. (2015)

Immediate activities

- Develop a community education program for shorebirds.
- Source funding for implementing a community education program*.
- Determine priority shorebird habitat/breeding sites*.
- Promote successful breeding of threatened shorebirds.
- Support the annual monitoring of populations*.

3.1.1 (c) Facilities for beach access and recreation have been designed to minimise impact on threatened shorebird habitat. (2015)*

Immediate activities

- Encourage organisations responsible for planning to incorporate design principles that will reduce impact on shorebird habitat when designing access and recreation facilities on beaches.

3.1.2 The community is aware of the importance of coastal areas and their management needs, including weed control. (2020)

Coastal areas are affected by numerous threats, ranging from ocean currents dispersing weed seeds and litter, pollution from inappropriate land uses to the impacts of recreational pursuits. Given the length of the coastline and the difficulty to reach some areas, the threats can become difficult to manage. This is the case for coastal weeds which can displace native vegetation and destroy shorebird habitat. Involvement of the community is important in mitigating these impacts.

3.1.2 (a) The King Island community is actively involved in responsibly managing and using coastal areas. (2015)

(b) The community is involved in coastal weed control. (2015)

Immediate activities

- Develop and implement a program to raise awareness in the community of coastal issues and the responsible use of coastal areas.
- Source funding for awareness raising activities.
- Develop a Coastal Users' Guide for King Island beaches.
- Include coastal values in tourism publications.
- Promote community participation in coastal weed management activities.

3.1.2 (c) Land managers are applying appropriate coastal management actions. (2015)

Immediate activities

- Identify priority sites for management to protect coastal integrity.

Encourage land managers to control sand blows, weeds and any other issues impeding the integrity of the coast.

3.1.3 Industry, recreation and development are managed sustainably in coastal areas. (2020)

Industry, recreation and development affect coastal areas in different ways. Demand for coastal land to develop housing and tourism is increasing. Industry can put pressures on the coast through pollution or the use of coastal areas for industrial enterprises. The

access to and use of beaches for recreation can have a negative impact on fragile areas, fauna and flora. As King Island is small in size, all activities on the land have the potential to affect the coast. The fragile dunes, which provide habitat for threatened species are at risk of erosion and invasion by weeds. The impacts must be mitigated with appropriate measures to avoid and reduce disturbance to the coast.

3.1.3 (a) Impacts of industry and development on the coast are minimised. (2015)

Immediate activities

- Determine capacity of KINRMG in managing coastal issues.
- Inform relevant organisations and industries about coastal impacts and issues.
- Work with relevant organisations to develop and implement strategies to minimise impact from coastal access.
- Source incentive funding for land managers and industry.

3.1.3 (b) Accessing the coast has limited impact on the environment. (2015)

Immediate activities

- Work with relevant organisations to develop and implement strategies to minimise impact from coastal access.
- Promote in the community the use of established access tracks to avoid negative impacts on the coastal environment.

3.2.1 The community has the understanding to manage impacts on marine areas. (2020)

The main threats to marine areas are pollution from land and sea, marine pests and disease and overfishing. Some of these are caused by external influences, brought by ocean currents or ship ballast water, and therefore can be difficult to manage. Fishing is regulated by legislation and controlled by Government agencies. Climate change may have an impact on marine species and may enable new pests to survive in changed conditions.

3.2.1 (a) Pollution caused by land use activities is reduced. (2015)

Immediate activities

- Collate and, if necessary, build knowledge about pollution caused by land use.
- Encourage better management of fertiliser application to reduce run-off.

3.2.1 (b) The community can identify marine pests. (2015)

Immediate activities

- Promote awareness of marine pests and diseases.
- Disseminate marine pest information.

3.2.1 (c) Research findings and information about marine areas from other organisations are made available to the general public. (2015)

Immediate activities

- Support surveys of marine species.
- Work with relevant organisations to promote dissemination of information.

3.2.2 Estuarine areas are managed for improvement. (2020)

Estuary condition can be affected by grazing, agriculture and aquaculture, water pollution, vegetation clearance, altered water regimes, introduced species and inappropriate recreational activities. Effects on estuaries can be difficult to manage as they often originate in the surrounding catchment.

3.2.2 (a) Community is aware of the importance of estuaries. (2015)
(b) The need for conservation of estuaries is recognised in the community. (2015)

Immediate activities

- Increase community awareness of conservation needs of estuaries.
- Extend Coastal Users' Guide to cover estuaries.
- Assist in and promote the responsible management of estuaries.
- Collaborate and share findings with relevant organisations.

3.2.2 (c) Invasive pests and diseases such as chytrid fungus are controlled. (2015)

Immediate activities

- Raise community awareness of pests and diseases.

4 Water

4.1.1 Land managers are working together and with relevant agencies to manage water supply for industrial, environmental and human needs. (2020)

Demand for water is increasing as more land managers use irrigation and the needs of industry increase. Knowledge about ground and surface water supply on King Island is limited. This lack of knowledge is further impeded by the uncertain influences climate change will have on supply and needs. Currently, streams, waterways and dams supply water for stock watering points. A decrease in supply would affect agricultural and industrial productivity and environmental flows with consequences for the Island's economic, environmental and social sustainability.

4.1.1 (a) The development of a King Island Water Resource Management Plan is underway. (2015)

(b) Catchment management groups have been established to oversee and implement catchment management recommendations. (2015)

Immediate activities

- Support and lobby relevant organisations to develop management plans.
- Source funding and support from relevant agencies for the development of management plans.
- Define environmental needs.
- Ensure environmental needs are met.

4.1.1 (c) Irrigation is managed and controlled at a catchment level, and incorporated into whole farm planning. (2015)

Immediate activities

- Promote research of irrigation management appropriate for King Island.

4.1.2 The management of ground water leads to improved environmental conditions. (2020)

Changes in groundwater can lead to higher salinity, loss of groundwater flow and issues associated with rise in the water table. Groundwater management interacts closely with waterlogging and drainage issues. Little is known about the groundwater patterns on King Island.

4.1.2 (a) Impacts of water table and its management needs are known. (2015)

Immediate activities

- Collate existing ground water data.
- Develop priorities for ground water activities.
- Monitor data loggers in bores.
- Install data loggers in bores, continuing from the groundwater monitoring program 2008, which was part of KISHAP.

4.1.3 Wetlands and their biodiversity are protected. (2020)

Wetlands are affected by adjoining land usage, such as poor use of fertilisers, effluent discharge, litter, chemical run-off into streams, water flow, impacts from cattle and changes in catchment land use. Introduced weeds and pests, increased nutrients and the effects of climate change also threaten wetlands and their biodiversity.

4.1.3 (a) Sound management practices are being implemented on lands adjoining or affecting wetland reserves. (2015)

Immediate activities

- Identify priority catchments that run into wetlands for monitoring.
- Monitor priority catchments and manage impacts.
- Continue water monitoring in streams and encourage greater community involvement.
- Source funding for managing catchment of wetlands.
- Promote continued partnerships with wetland reserve managers.

4.2.1 All priority waterways have established data sets of vital indicators which measure improvement of condition. (2020)

Activities around waterways can lead to increased turbidity and nitrification through run-off of sediment and fertilisers. Industrial effluent can produce pollution, cattle grazing in riparian areas can cause erosion, and the removal of vegetation can increase water temperature and nutrients in the water. The collection of data allows for the monitoring of these impacts and adaptations to improve conditions.

4.2.1 (a) Data provides integrated measure of river health. (2015)

Immediate activities

- Develop Water Quality Targets in key catchments.
- Locate and monitor unimpacted sites in priority catchments to act as reference sites.
- Promote the adoption of the Tasmanian River Condition Index.

4.2.1 (b) Trends in water quality can be determined, based on reliable data. (2015)

Immediate activities

- Continue monthly water quality monitoring program in priority catchments to determine long term trends.

4.2.2 All land managers, businesses and industry are managing their impact on water/stream quality. (2020)

Land use practices affect the quality of streams, and best practice land management techniques must be used to minimise the impacts.

4.2.2 (a) Water quality (especially turbidity and nutrient levels) has improved in all catchments. (2015)

(b) Land managers have adopted best practice land management techniques. (2015)

(c) Local industries have adopted best practice effluent disposal. (2015)

Immediate activities

- Promote and encourage responsible use of chemicals, particularly around waterways and priority threatened species sites*.
- Continue to source funding for nutrient management on farms.
- Continue to inform land managers of best practice in grazing and fertiliser management.
- Communicate water quality monitoring results to land managers, local industry and community.

4.2.2 (d) Ninety per cent of riparian areas are fenced or protected from stock to reduce bank erosion and sediment in waterways. (2015)

Immediate activities

- Source funding for fencing.
- Provide incentives for fencing of waterways to encourage the regrowth of riparian vegetation.

Appendices

Contents

Appendix 1

Program Logic Hierarchy Tables

Actions of the Draft King Island Biodiversity Management Plan 2010 are indicated with an Asterix (*).

Aspirational goal	**Natural resources are managed in a coordinated and integrated way which contributes to the environmental, economic and social sustainability of King Island.**				
Asset area	**Land**				
Longer term outcomes *By 2030*	**Good soil quality supports land uses on King Island, which includes environmental, social and economic aspects.**				**Land uses are managed to conserve geoconservation sites.**
Intermediate outcomes *By 2020*	*Land managers are involved in improving soil condition and reducing negative impact on soils.*	*Waterlogging and salinity are managed to best practice standards.*	*Acid sulphate soils are managed to best practice standards.*	*Soil pathogens are managed to maintain vegetation communities.*	*The condition of geoconservation sites is maintained.*
Immediate outcomes *By 2015*	• Land managers are aware of potential impacts on soil condition and soil profiles, such as those caused by pugging and compaction, and the necessary management actions required to retain/improve quality. • Priority erosion areas are being managed.	• Understanding of the management of waterlogging through drainage has been developed in the community. • Waterlogged areas are managed to reduce negative impacts on pasture production and other vegetation.	• Knowledge about management of acid sulphate soils has increased. • All potentially affected land managers are involved in acid sulphate awareness raising activities.	• Community is aware of the impact of root-rot fungus *(Phytophthora cinnamomi*) on native vegetation and how it is spread*. • Relevant machinery operators and Industries are applying hygiene procedures to minimise spread *.	• The community recognises the importance of geodiversity in underpinning the knowledge of our natural history. • The community recognises the importance of geodiversity in underpinning ecological processes. • Geoheritage areas such as the Tufa Terraces are fenced to protect them from negative impacts.
Immediate and foundational activities *By 2015*	• Develop best practice guidelines for reducing impacts from pugging and compaction. • Promote training for land managers in soil management. • Identify and prioritise erosion areas for management. • Implement erosion management on affected areas. • Monitor water turbidity to determine the impact of erosion on streams.	• Source funding to implement actions of the Salinity and Waterlogging Control Manual for King Island's farmland. • Implement actions from the Salinity and Waterlogging Control Manual. • Source funding for and conduct waterlogging and drainage workshops. • Ensure new residents are aware of resources for managing waterlogging and drainage with inclusion of info in new residents packs.	• Collect base data of acid sulphate soils and continue to monitor. • Identify land and infrastructure at risk of developing acid sulphate soil issues. • Make information available to land managers with acid sulphate soil, include also in new residents packs.	• Source general information about root rot fungus. • Raise community awareness about root rot fungus and its management. • Disseminate information to all stakeholders. • Support and encourage the mapping and monitoring of the current distribution of root rot fungus. • Provide mapping to the KIFMAC to assist in wildfire management with minimising spread of soil pathogens. * • Source funding for awareness raising and signage.	• Collate current information on sites and prioritise management needs. • Involve land managers in management of geoheritage sites. • Raise community awareness about importance of geoheritage sites. • Promote fencing of geoheritage sites, where needed. • Source funding to assist land managers with fencing. • Include sites in tourism information where appropriate.

Aspirational goal	**Natural resources are managed in a coordinated and integrated way which contributes to the environmental, economic and social sustainability of King Island.**			
Asset area	**Biodiversity**			
Longer term outcomes *By 2030*	**Current biodiversity is maintained and managed.**		**There are viable and healthy populations of all priority flora and fauna species, and vegetation communities on KI.**	
Intermediate outcomes *By 2020*	*Pests are managed to minimise environmental damage and economic loss.*	*Weeds of National Significance are controlled /eradicated, and no new incursions of weeds have developed.*	*Vegetation communities are maintained and strengthened.*	*The King Island populations of threatened species have increased and no new species have been listed as threatened.*
Immediate outcomes *By 2015*	• New pest invasions have been prevented. • Feral deer population is eradicated. • Recommendations from the Alternatives to 1080 project have been implemented. • Community is aware of and practicing responsible cat ownership. • Cat management plan has been implemented.	• Management priorities for WoNS have been developed and actions implemented. • The impacts of weeds have been reduced. • Awareness of weeds in the greater community has increased.	• Land managers know how to protect priority species on their property from fire. • Connectivity of priority communities has increased. • Accurate mapping of vegetation communities is available.	• The level of permanent protection of threatened flora species and their habitat has increased. • The quality of habitat of threatened species has improved. • Community knowledge about protection and conservation of threatened species and the relevant provisions of the EPBC Act and TSP Act has increased. * • Connectivity of remnant vegetation through corridors has increased.
Immediate and foundational activities *By 2015*	• Determine impacts of ravens* and deer. • Promote eradication of wild deer. • Monitor European wasps and maintain wasp free status. • Promote re- appointment of King Island quarantine officer. • Develop a wallaby management plan in conjunction with the Game Management Unit, DPIPWE. • Source funding to implement the Alternative to 1080* recommendations and other pest minimisation actions from relevant management plans. • Continue cat control program, including community education about responsible cat ownership. * • Research implications for ecosystem balance of removing predators. *	• Develop a WoNS management plan and implement its actions. • Continue current weed mapping, management and monitoring programs* and develop into a comprehensive and coordinated King Island weed management program. • Encourage the appointment of a weeds officer. * • Source funding for weed management projects. • Promote weed hygiene on King Island through CCNRM's weed hygiene action plan. • Develop and implement a community awareness program for weeds.	• Promote knowledge development about fire management in the community. • Encourage land managers to develop and implement a fire management plan for their property. • Establish a KINRMG representative on the fire management group. • Support KIFMAC to explore future opportunities to protect remnant vegetation with high conservation values from the impacts of fire. * • Promote activities that connect priority vegetation communities. • Encourage land managers to manage for biodiversity. • Seek funding for establishing vegetation corridors. • Improve accuracy of Tas Veg mapping through ground truthing and other appropriate means. *	• Source funding for fencing native vegetation corridors and raising community awareness. • Promote the establishment of covenants or other management agreements with land managers. • Encourage re-vegetation projects to increase habitat and increase connectivity. • Monitor the quality of threatened species' habitat. • Make mapping available to relevant bodies such as KIC, KINRMG, FPA, DPIPWE and DEWHA to encourage conservation values to be included in relevant activities. • Continue actions to decrease the impact of pests on threatened species. • Raise community awareness of management needs of threatened species. • Promote the establishment of vegetation corridors. • Determine priorities for stock exclusion fencing and corridors for habitat linkages. • Encourage re-vegetation projects which increase connectivity.

Aspirational goal	Natural resources are managed in a coordinated and integrated way which contributes to the environmental, economic and social sustainability of King Island.				
Asset area	**Coast**				
Longer term outcomes *By 2030*	**The integrity of coastal areas is maintained and protected.**			**Negative impacts on marine and estuarine areas are reduced.**	
Intermediate outcomes *By 2020*	*All habitat of threatened resident and migratory shorebirds is managed for protection.*	*The community is aware of the importance of coastal areas and their management needs, including weed control.*	*Industry, recreation and development are managed sustainably in coastal areas.*	*The community has the understanding to manage impacts on marine areas.*	*Estuarine areas are managed for improvement.*
Immediate outcomes *By 2015*	• Actions regarding threatened shorebirds and migratory birds from all relevant management plans have been implemented. • The number of resident shorebird populations has been maintained. • Facilities for beach access and recreation have been designed to minimise impact on threatened shorebird habitat*.	• The King Island community is actively involved in responsibly managing and using coastal areas. • The community is involved in coastal weed control. • Land managers are applying appropriate coastal management actions.	• Impacts of industry and development on the coast are minimised. • Accessing the coast has limited impact on the environment.	• Pollution caused by land use activities is reduced. • The community can identify marine pests. • Research findings and information about marine areas from other organisations are made available to the general public.	• Community is aware of the importance of estuaries. • The need for conservation of estuaries is recognised by the community. • Invasive pests and diseases such as chytrid fungus are controlled.
Immediate and foundational activities *By 2015*	• Develop a community education program for shorebirds. • Source funding for implementing a community education program. * • Determine priority shorebird habitat/breeding sites. * • Promote successful breeding of threatened shorebirds. • Support the annual monitoring of populations. * • Encourage organisations responsible for planning to incorporate design principles that will reduce impact on shorebird habitat when designing access and recreation facilities on beaches.	• Develop and implement a program for raising awareness in the community of coastal issues and the responsible use of coastal areas. • Source funding for awareness activities. • Develop a Coastal Users' guide for King Island beaches. • Include coastal values in tourism publications. • Promote community participation in coastal weed management activities. • Identify sites for priority management to protect coastal integrity. • Encourage land managers to control sand blows, weeds and other issues impeding the integrity of the coast.	• Determine capacity of KINRMG in managing coastal issues. • Inform relevant organisations and industries about coastal impacts and issues. • Work with relevant organisations to develop and implement strategies to minimise impact from coastal access. • Source incentive funding for land managers and industry. • Promote in the community the use of established access tracks to avoid negative impacts on the coastal environment.	• Collate and, if necessary, build knowledge about pollution caused by land use. • Encourage better management of fertiliser application to reduce run-off. • Promote awareness of marine pests and diseases. • Disseminate marine pest information. • Support surveys of marine species. • Work with relevant organisations to promote dissemination of information.	• Increase community awareness of conservation needs of estuaries. • Extend Coastal Users' guide to cover estuaries. • Assist in and promote the resoponsible management of estuaries. • Collaborate and share findings with relevant organisations. • Raise community awareness of pests and diseases.

Aspirational goal	**Natural resources are managed in a coordinated and integrated way which contributes to the environmental, economic and social sustainability of King Island.**				
Asset area	**Water**				
Longer term outcomes *By 2030*	**Water is managed to meet the needs of industry, biodiversity and King Island's population.**			**Stream water quality levels have improved from 2006 levels or are at a healthy level.**	
Intermediate outcomes *By 2020*	*Land managers are working together and with relevant agencies to manage water supply for industrial, environmental and human needs.*	*The management of ground water leads to improved environmental conditions.*	*Wetlands and their biodiversity are protected.*	*All priority waterways have established data sets of vital indicators which measure improvement of condition.*	*All land managers, businesses and industry are managing their impact on water/stream quality.*
Immediate outcomes *By 2015*	• The development of a King Island Water Resource Management Plan is underway. • Catchment management groups have been established to oversee and implement catchment management recommendations. • Irrigation is managed and controlled at a catchment level, and incorporated into whole farm planning.	• Impacts of water table and its management needs are known.	• Sound management practices are being implemented on lands adjoining or affecting wetland reserves.	• Data provides integrated measure of river health. • Trends in water quality can be determined, based on reliable data.	• Water quality (especially turbidity and nutrient levels) has improved in all catchments. • Land managers have adopted best practice land management techniques. • Local industry have adopted best practice effluent disposal. • Ninety per cent of riparian areas are fenced or protected from stock to reduce bank erosion and sediment in waterways.
Immediate and foundational activities *By 2015*	• Support and lobby relevant organisations to develop management plans. • Source funding and support from relevant agencies for the development of management plans. • Define environmental needs. • Ensure environmental needs are met. • Promote research of irrigation management appropriate for King Island.	• Collate existing ground water data. • Develop priorities for activities. • Monitor data loggers in bores. • Install data loggers in bores, continuing the groundwater monitoring from KISHAP.	• Identify priority catchments for monitoring. • Monitor priority catchments and manage impacts. • Continue water monitoring and encourage greater community involvement. • Source funding for managing catchment of wetlands. • Promote continued partnerships with wetland reserve managers.	• Develop Water Quality Targets in key catchments. • Locate and monitor unimpacted sites in priority catchments to act as reference sites. • Promote the adoption of the Tasmanian River Condition Index. • Continue monthly water quality monitoring program in priority catchments to determine long term trends.	• Promote and encourage responsible use of chemicals, particularly around waterways and priority threatened species sites. * • Continue to source funding for nutrient management on farms. • Continue to inform land managers of best practice in grazing and fertiliser management. • Communicate water quality monitoring results to land managers, local industry and community. • Source funding for fencing. • Provide incentives for fencing of waterways to encourage the regrowth of riparian vegetation.

Appendix 2

Glossary and Abbreviations

Acid Sulphate Soils	Soils formed when sulphide-rich sediments are drained and exposed to air.
CCNRM	Cradle Coast Natural Resource Management.
CfoC	Caring for our Country program of the Australian Government.
DPIPWE	Tasmanian Department of Primary Industries, Parks, Water and Environment (formerly DPIWE).
DEWHA	Department of the Environment, Water, Heritage and the Arts, Australian Government.
Estuarine	A semi-enclosed or periodically closed coastal body of water affected by both fresh and marine systems.
EPBC Act	Environmental Protection and Biodiversity Conservation Act 1999.
Geoconservation	The conservation of geodiversity.
Geodiversity	The range or diversity of geological (bedrock), geomorphological (landform) and soil features, assemblages, systems and processes.
Geoheritage	The integrity of geological and geomorphological sites.
KIBMP	King Island Biodiversity Management Plan.
KIC	King Island Council
KINRMG	King Island Natural Resource Management Group Inc.
KISHAP	King Island Salinity Hazard Assessment Project
MERI	Monitoring, Evaluation, Reporting and Improvement.
NC Act	Tasmanian Nature Conservation Act 2002.
NHT1, NHT2	Natural Heritage Trust, Australian Government funding program, 1996 to 2007.
NRM	Natural Resource Management: the management of any activity that uses, develops or conserves natural resources.
OBP	Orange-bellied Parrot, listed as critically endangered.
Phytophthora cinnamomi	Commonly known as 'root rot fungus', this is a soil-based fungal disease that infects plant roots and kills some species of native plants.
Ramsar wetland	Internationally important wetland listed in the *Ramsar Convention on Wetlands* and covered by the *Environment Protection and Biodiversity Conservation Act (1999)* (EPBC Act)
Riparian vegetation	Plants growing on the banks and floodplains of rivers and other water bodies.

Salinity	The accumulation of excessive salts in land and water at levels to have a negative impact on human and natural assets.
Soil Carbon	Carbon held within the soil, primarily in association with its organic content.
TASVEG	A State-wide vegetation mapping project (1:25 000 scale) of Tasmania's native vegetation communities.
Threatened species	Flora or fauna species that are listed in the *Threatened Species Protection Act 1995* and/or in the EPBC Act.
WoNS	Weeds of National Significance: Weeds classified under the National Weeds Strategy, twenty introduced plants that are regarded as the worst weeds in Australia because of their invasiveness, potential for spread, and economic and environmental impacts.

Appendix 3

Plans and Publications with Actions Contributing to Implementation Plan

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Appendix 4

KINRMG Projects

Note: Funding made available by CCNRM comes from the Australian Government's NHT2 and CfoC programs.

2010-11	Biodiversity monitoring—OBP, wallaby exclusion plots, threatened species, shore birds and water monitoring. CCNRM Devolved Grant.
2010-11	Life on the Coast—King Island Coastal Community Engagement. Raising awareness of coastal weeds, shorebird management and responsible coastal usage. Tasmanian Landcare Association.
2010	Sea spurge mapping, development of King Island Sea Spurge Management Plan and setting up removal trials. CCNRM.
2010	Weed management: isolated weeds project, asparagus fern control. CCNRM.
2010	Community capacity building assistance for KINRMG and Herbarium. CCNRM.
2010	Wallaby exclusion plots in coastal areas, determining browsing impacts on coastal vegetation. CCNRM.
2010	Nutrient management on farms, developing nutrient management budgets with focus on reducing run-off into Lavinia State Reserve, a Ramsar wetland. Australian Government, CfoC, Community Action Grant.
2009 to 2010	Scientific analysis of the diet of feral cats with the aim to determine a future cat management program. Development of long-term cat management project and implementation of intensive short-term cat control program. CCNRM.
2009	Development of Biodiversity Management Plan. KI Council, DPIPWE, KINRMG.
2008 to 2009	Alternatives to 1080 Project—Researched browsing impact of Bennett's wallabies on pasture and some native vegetation, established baseline data about wallaby numbers on the Island and researched cost effective control methods. DPIPWE and Tasmanian Institute of Agricultural Research.
2008 to 2009	Conservation of migratory and resident shorebirds project—Protection of shorebird nesting sites, shorebird awareness. Australian Government, Envirofund.
2007 to 2008	Orange-bellied Parrot Recovery Project—in conjunction with the Orange-bellied Parrot Recovery team, implemented recovery actions on King Island, including some cat control work and the development of a cat management plan. Australian Government, NHT2, through DPIPWE.

2008	Completion of the King Island Threatened Species Management Plan. DPIPWE.
2008	King Island Salinity Forum—to review King Island salinity data from previous projects and recommend actions for dealing with the salinity hazard. CCNRM.
2007 to 2008	Waterwatch Education Program—designed to provide waterwatch education to King Island's community. CCNRM.
2003 to 2007	Environmental Management System Pilot Project (EMS)—one of 15 projects Australia wide and the only one in Tasmania. Sixteen farms participated with farm mapping, risk assessment and the development of an environmental management plan. Consolidation of project in 2006/07 through monitoring and evaluation, benchmarking, external reviews and developing continuous improvement cycles. Australian Government DAFF.
2004 to 2006	KI Salt Hazard Assessment Project (KISHAP)—assessed the salinity hazard on King Island, funding for deep drilling to consolidate the results of KISHAP in 2006 to complete the assessment. CCNRM (NHT2).
2006/07	King Island Cat Control Project—to protect the Orange-bellied Parrots during their migration periods on King Island from cat predation. Threatened Species Network, WWF.
2007	Interim funding for cat control by KINRMG.
2006 to 2008	Weed mapping, weed control work by Weedbusters. CCNRM.
2004	Threatened birds project— to raise awareness in the community about King Island's threatened bird species, collate data of bird sightings and encourage Green Rosellas to breed, through volunteers setting up and regularly checking nest boxes. Threatened Species Network, WWF.
2004	History of environmental change on King Island—a community group collated the history of environmental change for publication. Tasmanian Government, Bicentenary Grant.
2002/03	KI Salinity Management Action Program (KISMAP)—investigated the salinity problem in the north of the Island and determined how to best cope with it. Land managers set up piezometers on their properties and monitored once a month. Some trial pasture plantations were established to test salt-tolerant species. Australian Government, NHT1.
since 2001	Waterwatch—to assess the quality of King Island's waterways. This included monthly monitoring of nine sites to obtain baseline data of the quality of King Island's streams, additional monitoring by community members and educational activities for the community, including school students. From 2004

	to 2006 the project was administered by North-West Waterwatch, but otherwise was under the control of KINRMG. NHT1 and CCNRM (NHT2).
2000 to 2003	Devolved Grant work—included fencing, re-vegetation and direct seeding projects, the development of several strategies and the publication of books and reports. A community group worked intensely for over a year to publish a field guide of King Island's flora. A revolving fund was set up to protect high priority ecosystems buying properties, covenanting and re-selling them. This is ongoing. Australian Government, NHT1.
1998 to 2001	Development of a natural resource management review and strategic action plan for King Island to integrate Landcare projects by optimising an island wide approach to natural resource management. Australian Government, NHT1.

Appendix 5

KINRMG Publications

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Appendix 6

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