

Wingaroo Nature Reserve

Wingaroo Conservation Area

Management Plan

2000



Parks and Wildlife Service

Department of Primary Industries,
Water and Environment

**WINGAROO NATURE RESERVE AND WINGAROO
CONSERVATION AREA MANAGEMENT PLAN 2000**

This Management Plan for Wingaroo Nature Reserve and Wingaroo Conservation Area has been prepared in accordance with the requirements of Part IV of the *National Parks and Wildlife Act 1970*.

In accordance with Section 23(2) of the *National Parks and Wildlife Act 1970*, the managing authority for the nature reserve, in this case the Director of National Parks and Wildlife, shall carry out his or her duties in relation to the nature reserve for the purpose of giving effect to, and in accordance with the provisions of this management plan.

A draft of this plan was released for public comment in accordance with statutory requirements from 15 April until 9 June 2000. This plan is a modified version of that draft, having been varied to take account of public input during that period and the views of the National Parks and Wildlife Advisory Council.

APPROVAL

This management plan was approved by His Excellency the Governor-in-Council on 18 September 2000 and took effect on 10 October 2000, being seven days after publication of that approval in the *Government Gazette*.

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Summary

Wingaroo Nature Reserve (9144 ha) is located in the north of Flinders Island, the largest of the Bass Strait Islands. The reserve protects an extensive area of endangered heathland, valuable wetlands, estuarine marshes and relict Oyster Bay pine (*Callitris rhomboidea*) scrub-woodland communities that are of considerable conservation significance. The type of country represented in the nature reserve is not currently represented elsewhere in the Tasmanian reserve system.

The nature reserve forms part of the catchment for the North East River and estuary which is a significant biological and recreational asset for Flinders Island. The nature reserve has considerable aesthetic value, due in large part to the visual contrast between native heaths and surrounding farmland, and the panoramic views from the saddle below Mount Boyes across an undisturbed landscape to the north-east coast of Flinders Island.

The nature reserve contributes to the conservation of rare plant species which have their Tasmanian distribution confined to the Furneaux Island Group, including one of the two known populations of saw-leaved banksia (*Banksia serrata*) in Tasmania. The reserve conserves three priority forest communities as well as fourteen different heath communities which represent the best examples of their type found on Flinders Island. The nature reserve also plays an important role in the protection of species susceptible to the cinnamon fungus disease (*Phytophthora cinnamomi*).

The reserve contains habitat for the rare New Holland mouse (*Psuedomys novaehollandiae*) and has considerable scientific interest and educational potential.

The major management initiatives for the nature reserve are summarised below.

- ¥ Implement measures to control the spread of the cinnamon fungus disease (*Phytophthora cinnamomi*) in the nature reserve.
- ¥ Limit access within the nature reserve to protect significant flora values, particularly the horny cone-bush (*Isopogon ceratophyllus*) and saw-leaved banksia (*Banksia serrata*) from the spread of cinnamon fungus disease.
- ¥ A fire management plan for the nature reserve will be prepared that will utilise periodic burning to maintain habitat values and vegetation regeneration.
- ¥ Existing fire trails and fire breaks will be maintained for fuel reduction burning and to protect important vegetation assets but not for fire-suppression activities.
- ¥ Basic fire protection strategies for private land and environmental assets will be implemented.
- ¥ The Mount Boyes track into the nature reserve will be maintained to provide one-way access.
- ¥ All other informal tracks not required for management purposes or to access private land will be closed and rehabilitated.

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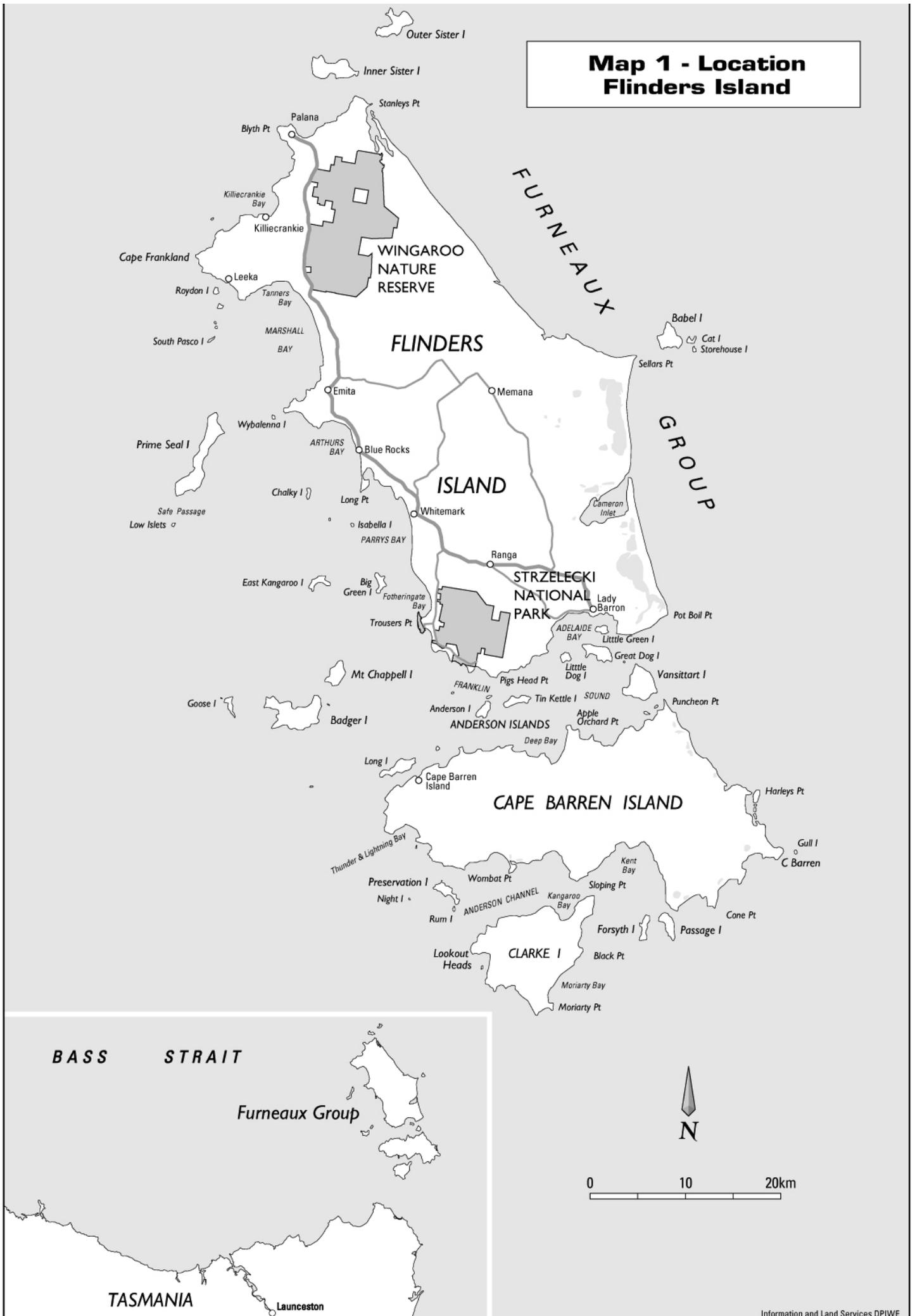
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Map 1 - Location Flinders Island



1 Overview

1.1 Location, Reservation and Regional Context

Wingaroo Nature Reserve is located at the northern end of Flinders Island (see Map 1). The area was first reserved as a conservation area in November 1988 with an area of 202 hectares. It was proclaimed a nature reserve in September 1991 when a further 8942 hectares were added, creating a total area of 9144 hectares. In 1992, a 202 hectare block in the northern half of the reserve was acquired and designated a conservation area until such time as it could be added to the nature reserve (see Map 2).

The nature reserve is contiguous with the North East River Game Reserve on its north-east boundary. The exact boundaries of the nature reserve and conservation area are set out in registered plan number LD 1257.

The area is botanically significant and is home to a wide variety of birdlife which makes it ideally suited for nature-appreciation-type activities. An annual wildflower display could become a feature of the area, as could a nature trail that interprets the heathland community and its relationship with fire.

1.2 Importance of the Nature Reserve

The Mount Boyes—Wingaroo Heaths have been listed on the Register of the National Estate in recognition of their biogeographic significance, species and community diversity and restricted distribution of the heathland communities present. In addition, the presence of rare or uncommon species, the capacity to contribute to the understanding of natural processes, and the aesthetic values of the area, are also important.

The nature reserve protects an excellent diversity of flora including endangered heathland communities, which have been largely cleared for agriculture from the remainder of Flinders Island. Also present in the nature reserve are valuable wetlands and relict Oyster Bay pine (*Callitris rhomboidea*) scrub woodland. This type of country is not represented in any other conservation reserve in Tasmania and has considerable conservation significance.

The vegetation of the reserve, and Flinders Island generally, is of particular interest in that it forms a link between the flora of Tasmania and

Victoria. The reserve contains several rare and threatened or locally endemic species, including swamp beard-heath (*Leucopogon esquamatus*), furze hakea (*Hakea ulcinina*) and horny cone-bush (*Isopogon ceratophyllus*), that occur only in the Furneaux Group. A small population of saw-leaved banksia (*Banksia serrata*) occurs in the south-west corner of the reserve and forms one of only two stands found in Tasmania.

The nature reserve contains a number of seasonal wetlands and marshes that provide a refuge for wildlife and forms part of the catchment for the North East River which has important birdlife and recreational fishing values. The nature reserve is important for wildlife conservation. The New Holland mouse (*Pseudomys novaehollandiae*), listed as rare in Tasmania, has been recorded from heathlands along the western boundary of the nature reserve.

The nature reserve is of interest for scientific research into isolated plant and animal populations as well as the interaction between fires, plant community distributions and soil fertility. In addition, there is the potential for education programs to be developed which focus on heathland communities and their fauna.

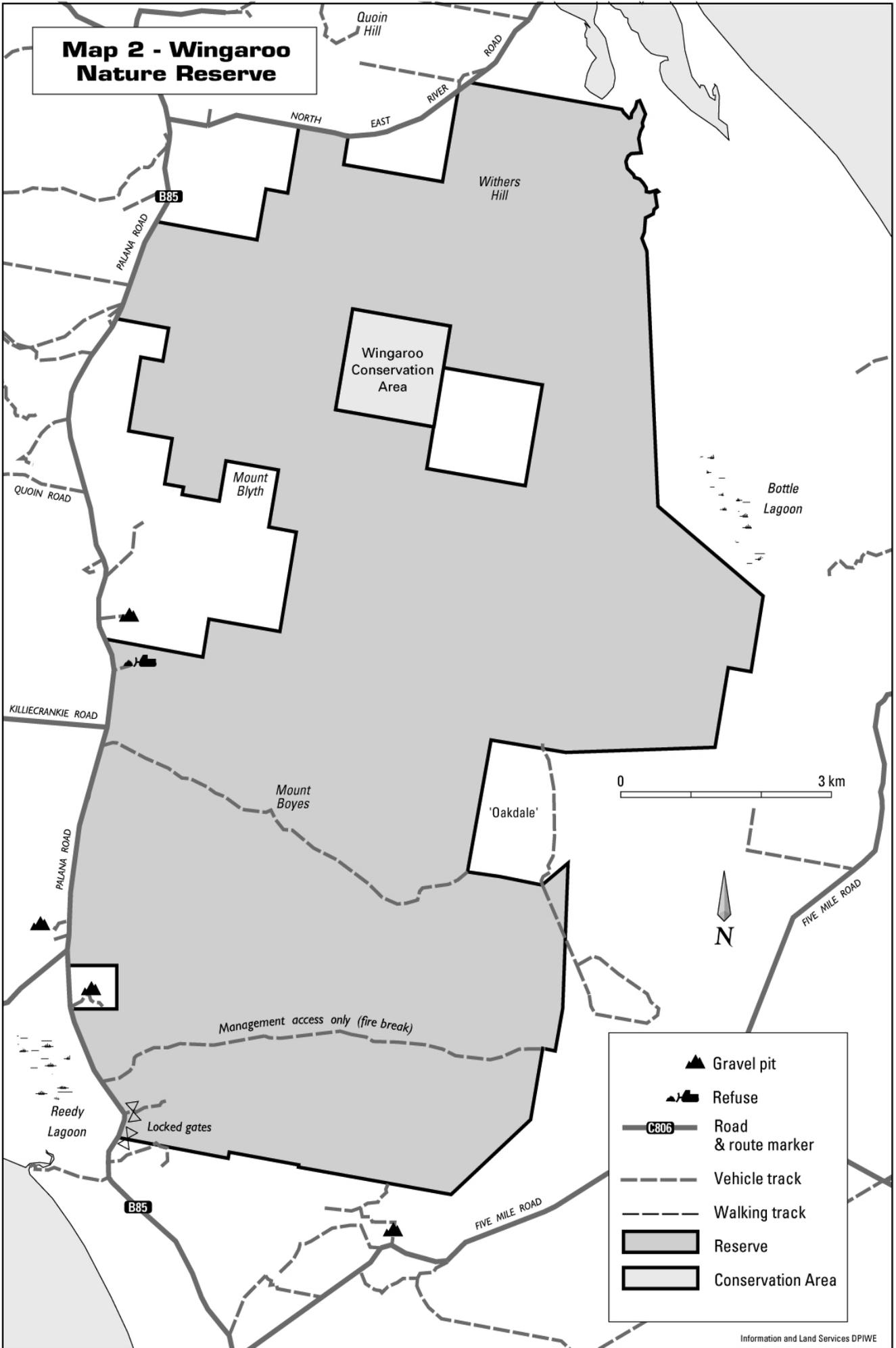
1.3 Threats to Nature Reserve Values

A number of factors detract from, or have the potential to diminish the values and character of the nature reserve. These include:

- ¥ wildfire which may threaten the safety of visitors, destroy facilities or private property, and threaten fire sensitive flora and fauna;
- ¥ the exclusion of fire from some areas may impact on the survival of certain fire-dependent species,
- ¥ introduced plants, animals and diseases which invade the ecosystem and displace or destroy native species; and
- ¥ unsuitable developments or activities which degrade natural or cultural values or spoil the character of the nature reserve.

These factors must be effectively dealt with if the values and character of the nature reserve are to be retained in the long term.

Map 2 - Wingaroo Nature Reserve



-  Gravel pit
-  Refuse
-  Road & route marker
-  Vehicle track
-  Walking track
-  Reserve
-  Conservation Area

2 Vision and Objectives

2.1 The Vision for Wingaroo Nature Reserve

Developing a vision for the nature reserve allows people to picture how the area will be in the future and to provide direction on future management. This long-term vision provides goals for sustaining the values of the nature reserve into the future by avoiding inappropriate development and undesirable management practices.

2.1.1 The Vision

These vision statements are not listed in order of priority and have equal importance.

The nature reserve contains a healthy and natural biodiversity, with viable populations of all native species and with no significant disturbance from human activities.

- ¥ Populations of threatened species within the nature reserve are stable or increasing.
- ¥ The nature reserve continues to support secure populations of other flora and fauna.
- ¥ Feral pig numbers have been reduced to manageable levels.
- ¥ Weed populations have been eradicated and are not displacing native species.
- ¥ The role of fire in the ecology of the nature reserve is understood and applied to maintain species diversity.
- ¥ The risk from wildfire has been reduced significantly through a combination of an improved understanding of the role of fire, cooperative arrangements with landowners and effective fire-management actions.

Landforms are undisturbed and the land, air and water are unpolluted.

- ¥ All plant communities are able to regenerate without disturbance.
- ¥ Damaged or degraded areas have been stabilised or rehabilitated and restored.
- ¥ Water quality is of a high standard.
- ¥ Cinnamon fungus disease has been contained and no new sites have been infected.

The Aboriginal and historic heritage of the nature reserve has been identified and is protected.

- ¥ Any sites present have been identified and are protected.
- ¥ Suitable interpretation of Aboriginal and historic sites has been provided.

- ¥ Arrangements are in place to consult with the Aboriginal community on the management of Aboriginal heritage sites.

Visitor numbers are limited and controlled so as not to threaten the environmental values of the nature reserve.

- ¥ Visitors are able to visit and appreciate the special features of the nature reserve.
- ¥ All tracks except those used for management or visitor access have been closed and rehabilitated.

Educational and research programs are providing a better understanding of the flora and fauna communities present and are assisting with improved management of the nature reserve.

- ¥ The nature reserve has been maintained as a scientific reference area.
- ¥ There is wide community support for the nature reserve and a good understanding of the management objectives.

2.1.2 Achieving the Vision

This management plan sets out a series of specific management actions to achieve this vision. These actions are measurable and will be used to evaluate implementation of the management plan and to determine whether the vision for the nature reserve has been achieved.

Policies

- ¥ Review the plan ten years after gazettal or sooner if research, monitoring, or other circumstances demonstrate that this is required.
- ¥ In reviewing the plan, evaluate the implementation of the management actions and their effectiveness in achieving the management objectives for the nature reserve.
- ¥ Use the implementation schedule set out in Appendix 1 when evaluating the plan s implementation and outcomes.

2.2 Purposes and Objectives of Nature Reserves

Nature reserves are a category of reserve classified under the Tasmanian reserve system.

The purposes and objectives of nature reserve are set out in the *National Parks and Wildlife Act 1970*.

Nature reserves are areas of land that contain natural values that —

- (a) contribute to the natural biological diversity or geological diversity of the land, or both; and
- (b) are unique, important or have representative value.

The purposes of reservation are to conserve the above-mentioned values. These purposes apply to Wingaroo Nature Reserve.

The management objectives of nature reserve are:

- to conserve natural biological diversity (see Sections 3.4 and 3.5);
- to conserve geological diversity (see Section 3.2);
- to preserve the quality of water and protect catchments (see Section 3.3);
- to conserve sites or areas of cultural significance (see Section 3.6);
- to encourage education based on the purpose of reservation and the natural or cultural values of the nature reserve, or both (see Section 5.2);
- to encourage research, particularly that which furthers the purposes of reservation (see Section 7.3);
- to protect the nature reserve against, and rehabilitate the nature reserve following, adverse impacts such as those of fire, introduced species, diseases and soil erosion on the nature reserve's natural and cultural values and on assets within and adjacent to the nature reserve (see Section 4);
- to encourage cooperative management programs with Aboriginal people in areas of significance to them in a manner consistent with the purpose of reservation and the other management objectives (see Sections 3.6, 5.4.6 and 7.3).

All of these objectives will apply to the nature reserve. The reasons these objectives apply and the manner in which the objectives will be implemented are specified in detail throughout this management plan.

2.3 Purposes and Objectives of Conservation Areas

The nature reserve contains a 202 hectare conservation area (see Map 2) that will be added to the nature reserve at some stage in the future.

Conservation areas are a category of reserve classified under the Tasmanian reserve system. The purposes and objectives of conservation areas are stated in the *National Parks and Wildlife Act 1970*.

Conservation areas are an area of land in a predominantly natural state. The purpose of a conservation area is to:

- (a) protect and maintain the natural and cultural values of the area of land; and
- (b) allow for the sustainable use of the natural resources of that area of land.

The management objectives of a conservation area are:

- to conserve natural biological diversity (see Sections 3.4 and 3.5);
- to conserve geological diversity (see Section 3.2);
- to preserve the quality of water and protect catchments (see Section 3.3);
- to conserve sites or areas of cultural significance (see Section 3.6);
- to provide for the controlled use of natural resources;
- to provide for exploration activities and utilisation of mineral resources subject to appropriate controls;
- to provide for the taking, on an ecologically sustainable basis, of designated game species for commercial or private purposes, or both;
- to provide, in special circumstances, for other small-scale commercial or industrial uses;
- to encourage education based on the purpose of reservation and the natural or cultural values of the nature reserve, or both (see Section 5.2);
- to encourage research, particularly that which furthers the purposes of reservation

(see Section 7.3);

- to protect the conservation area against, and rehabilitate the conservation area following, adverse impacts such as those of fire, introduced species, diseases and soil erosion on the conservation area's natural and cultural values and on assets within and adjacent to the conservation area (see Section 4);
- to encourage cooperative management programs with Aboriginal people in areas of significance to them in a manner consistent with the purpose of reservation and the other management objectives (see Sections 3.6, 5.4.6 and 7.3).

Not all of the listed objectives will apply to the nature reserve; in particular, those referring to the taking of game species, mineral utilisation and other commercial uses will not apply. These objectives are not considered appropriate given that the conservation area lies within and is completely surrounded by the existing nature reserve. It is also the intention that this conservation area is included in the nature reserve at some future date. Therefore only those objectives that are consistent with the management objectives of a nature reserve will apply to the conservation area.

The *State Coastal Policy 1996* applies to Wingaroo Nature Reserve, which falls, at least in part, within the Policy's definition of the coastal zone. The management objectives of the *National Parks and Wildlife Act 1970* and the policies, objectives and actions within this management plan are considered by the Department to be consistent with the outcomes of the State Coastal Policy.

2.4 Management Zones

The nature reserve has been zoned to ensure appropriate management and use occur in different parts of the nature reserve.

Objectives

The objectives of zoning are to:

- ¥ take account of localised features, conditions, and values;
- ¥ protect and enhance nature reserve values; and

- ¥ provide for research and education opportunities consistent with the values of the nature reserve.

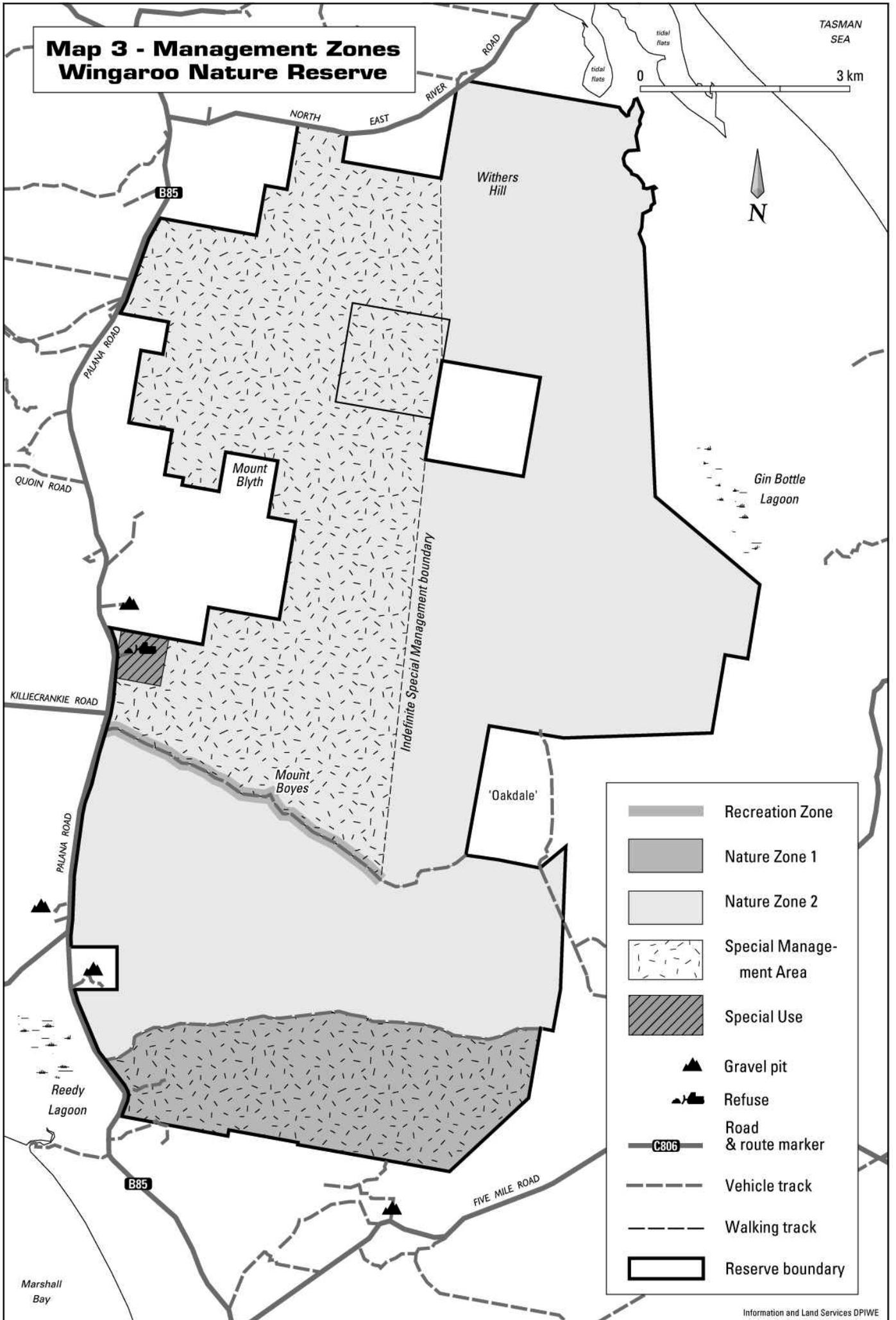
Policies

- ¥ Four management zones and one special management area are designated for Wingaroo Nature Reserve (see Map 3). These are:

1. Recreation Zone
2. Nature 1 Zone
3. Nature 2 Zone
4. Special Use Zone
5. Special Flora Management Area

- ¥ If access in any zone of the nature reserve needs to be restricted, declare restrictions under the provisions of Regulation 11 of the *National Parks and Reserved Land Regulations 1999*, or revise the management plan if permanent restricted areas are necessary.

Map 3 - Management Zones Wingaroo Nature Reserve



-  Recreation Zone
-  Nature Zone 1
-  Nature Zone 2
-  Special Management Area
-  Special Use
-  Gravel pit
-  Refuse
-  Road & route marker
-  Vehicle track
-  Walking track
-  Reserve boundary

Table 1 Management Zones

ZONE	DESCRIPTION	OBJECTIVES	POLICIES
Recreation Zone	This zone encompasses the Mount Boyes track , which accesses the nature reserve. The zone is primarily a corridor for access to the nature reserve, and other natural features.	To provide for sustainable dispersed recreational activities and small-scale recreational facilities without significant impact on natural processes.	Facilities, services and activities for this zone will be limited to those provided for in Section 5.4.1 of this management plan.
Nature 1 Zone	This zone encompasses the area between the fire break and the southern boundary of the nature reserve. This part of the nature reserve has a high level of conservation significance and access will be strictly managed.	To protect priority forest communities from fire and to ensure a disease-free status for heathland communities present. To implement special management measures to protect significant or vulnerable plant communities or species from the introduction and spread of cinnamon fungus disease.	Prescriptions for this area are detailed in Section 5.4.2 of this management plan.
Nature 2 Zone	This zone encompasses the majority of the nature reserve. This is a largely unmodified natural area containing species of importance. Disturbance within this zone will be minimised as far as possible.	The area will be primarily managed for the protection of identified natural and cultural features. Limited recreational use is allowed to a level compatible with the conservation of natural and cultural features.	Facilities, services and activities for this zone will be limited to those provided for in Section 5.4.3 of this management plan.
Special Use Zone	This zone encompasses areas subject to use of natural resources or for a particular purpose, for example, any gravel pits or rubbish tips.	To monitor site impacts and impacts on the surrounding area. Take measures to minimise any adverse effects on nature reserve values from the activity. Rehabilitate degraded areas where possible.	Facilities, services and activities for this zone will be limited to those provided for in Section 5.4.4 of this management plan.
Special Flora Management Area	This special management area encompasses the western half of the nature reserve as far as the Mount Boyes track. Localised rare and threatened plant communities occur in this area.	To identify and protect significant plant communities that are vulnerable to disturbance and may require specific management measures beyond those applied to the underlying zone. To implement, if required, special management measures to protect significant or vulnerable plant communities or species from cinnamon fungus disease.	Prescriptions for this area are detailed in Section 5.4.5 of this management plan.

3 Conservation

3.1 Topography and Climate

The eastern side of the nature reserve is comprised of undulating low-lying plains consisting of quaternary sands and clays with mostly uniform sand and duplex soils. This part of the nature reserve has numerous freshwater lagoons and marshes. The western side exhibits areas of higher relief with undulating low mountains and hills, the highest point being Mount Boyes at 274 metres.

Flinders Island has a cool maritime climate. Strong westerly winds can blow for several days on end. The average annual rainfall at the northern end of the island varies between 750 and 1000 millimetres. The wettest months are May to August with mean rainfalls between 70 and 80 millimetres. The driest months are January and February with mean rainfalls between 40 and 45 millimetres. The mean summer temperature on Flinders Island is 21.2°C, which occurs between January and March.

The climate experienced by the island has several implications for nature reserve management. During the summer months, the danger of wildfire is greatly increased and often requires precautions, such as total fire bans. The absence of permanent water in the nature reserve necessitates the careful use of water by managers.

3.2 Geodiversity

The Wingaroo area is dominated by dune country where prominent dune systems have developed over the last 6000 to 10 000 years. These dunes are composed mostly of siliceous sands derived from marine sediments from the eastern side of Flinders Island and deposited as beach ridges and parallel dunes. These have produced one of the most spectacular and well-preserved examples of a prograding (growing out to sea) coast in Tasmania. These sand barriers have also dammed inland areas, creating peat swamps and coastal lagoons.

The western side of the nature reserve is composed of Devonian granite and a thick sequence of sandy, silty and muddy sediments (the Mathinna beds) which were deposited during the Paleozoic, giving rise to mottled duplex soils. These soils are highly erodible and

occur on undulating low mountains and hills, the highest being Mount Boyes.

On the eastern side of Mount Boyes a wetland has formed due to the impoundment of several streams soon after reaching the coastal plain, by the advance of dunes into the stream valley possibly during the late Pleistocene or early Holocene. The area is considered to be representative at a local level and the condition of the landscape is rated as vulnerable.

Objectives

The objectives of geoconservation in the nature reserve are to:

- ¥ protect, maintain and monitor geodiversity;
- ¥ protect, maintain and monitor sites of geoconservation significance; and
- ¥ minimise harmful impacts on geoconservation values.

Policies

- ¥ The geoconservation values of remaining natural systems will be best protected if human disturbance is minimised.
- ¥ Potential adverse impacts on geodiversity and earth processes will be assessed when planning any development or action, including land rehabilitation and stabilisation (see Section 4.3).
- ¥ Management practices and development will avoid or otherwise minimise impacts on the integrity of sites of geoconservation significance.
- ¥ Promote public awareness and appreciation through public education and interpretation, to minimise disturbance to geoheritage sites.

Actions

- ¥ Prepare and disseminate an inventory of sites of geoconservation significance.
- ¥ Monitor and prevent any impacts on geodiversity values.

3.3 Water Quality

Wingaroo Nature Reserve contributes to the water quality condition of the North East River and estuary. The estuary is a significant area for marine and birdlife in addition to providing an important recreational fishing destination for the local community and visitors alike.

The *State Policy on Water Quality Management 1997* requires that protected environmental values (current values of a water body for which water quality should be protected) and water quality objectives are set for all surface waters within Tasmania.

The Board for Environmental Management and Pollution Control and the Director of Parks and Wildlife will set protected environmental values for surface waters within the nature reserve. These will become the water quality objectives for the nature reserve.

Objectives

- ¥ To identify environmental and recreational protected environmental values for the surface waters of the nature reserve.
- ¥ To identify, maintain or enhance water quality and to protect aesthetic values of surface waters in the nature reserve.

Policies

- ¥ Designated protected environmental values will be adopted as the minimum standard for water quality within the nature reserve.
- ¥ Water quality within the nature reserve will be maintained at the level of pristine or nearly pristine ecosystems for those watercourses with their headwaters in the nature reserve.

Actions

- ¥ Liaise with other relevant government agencies and neighbouring landowners to ensure integrated management of the catchment of the nature reserve.
- ¥ Respond to incidents involving pollution by oil and other hazardous or noxious substances within or adjacent to the nature reserve.
- ¥ Assess the potential for ground-water

contamination in the nature reserve, in particular with relation to the rubbish tip on the western side of the nature reserve.

3.4 Flora

Wingaroo Nature Reserve contains a mosaic of dry sclerophyll woodlands, heaths, sedgeland and swamp shrubland. This vegetation has evolved in response to low-nutrient soils, sea-level change, periodic drought and the prevalence of fire. These dry sclerophyll communities have adopted various strategies to cope with fire and may benefit from some fire regimes. Heath communities require certain fire frequencies to maintain floristic diversity and to prevent heathlands developing into other vegetation structure types.

The distribution of vegetation communities in the nature reserve is largely determined by soil type, fire regime and drainage characteristics. Sedgely woodlands dominated by a mallee form of (*Eucalyptus ovata*) with an understorey of (*Leptospermum* spp.) and (*Gahnia* spp.) occur on the eastern side of the nature reserve, which consists of low lying plains of sand and clay soils. The heath communities occur predominantly on the western side of the nature reserve on the better-drained soils. Areas of (*Eucalyptus nitida*) woodlands dominate the slopes of Mount Boyes, Mount Blyth and Withers Hill. Mature stands of Oyster Bay pine (*Callitris rhombioides*) and Tasmanian blue gum (*Eucalyptus globulus*) forest occur in sheltered gullies and on southward-facing slopes at scattered locations around the south-west corner of the nature reserve where they have been afforded some fire protection.

Fourteen different heath communities are represented in the nature reserve and are the best examples of their type found on Flinders Island. Heathlands were cleared extensively on the island between the 1950s and 1960s for sheep and cattle grazing. Outside the nature reserve most of the remaining heath is located on unallocated Crown land or private land where it is subject to frequent burning, grazing and fertiliser drift from developed pasture areas. The cinnamon fungus (*Phytophthora cinnamomi*) has been found associated with tracks in the southern part of the nature reserve.

Broad vegetation descriptions have been produced for the nature reserve but more detailed botanical surveys are required. Flora species recorded to date are listed in Appendix 2. The nature reserve contains several plant species that are considered rare and threatened. These

include populations of the rare swamp beard-heath (*Leucopogon esquamatus*) found in the southern half of the nature reserve and the vulnerable horny cone-bush (*Isopogon ceratophyllus*), found in the north of the reserve, and furze hakea (*Hakea ulicina*). Two endemic species of grass-tree (*Xanthorrhoea arenaria*) and (*X. bracteata*), known locally as yacca gums, listed as vulnerable, also occur in the reserve. Other significant heathland species include *Pseudanthus ovalifolius*, *Ammobium calyceroides*, *Selaginella gracillima*, *Brachyscome cardiocarpa*, *Lawrencia spicata*, *Lythrum hyssopifolia* and *Trithura submersa*.

An isolated population of the saw-leaved banksia (*Banksia serrata*), listed as rare in Tasmania, occurs at the southern end of the nature reserve. This population comprises approximately between 60 to 80 individual trees, the majority of which are believed to be quite old. There is evidence of slow and continuous regeneration which appears to be occurring in the absence of fire. Interstate studies have shown that this species responds well to fire and will regenerate

vigorously after fire, provided the fire events do not occur at too high a frequency. This species, although common on the Australian mainland, only occurs in one other location in Tasmania. This population constitutes a very significant value of the nature reserve.

There are mature stands of Oyster Bay pine and Tasmanian blue gum in the south-west corner of the nature reserve. Despite frequent burning, small remnant Oyster Bay pine dominated scrub communities can still be found on the leeward side of lagoons where they have been afforded some protection from fire. These remnant communities are of conservation significance and should be protected from fire as far as possible (Harris 1993).

The vegetation of the nature reserve has significant conservation value. The importance of the nature reserve for vegetation conservation means that conservation of plant communities and species is one of the major considerations of management.

Table 2 Threatened Flora Species

Species	Common Name	Status
<i>Acacia retinodes</i>	Wirilda	rare
<i>Banksia serrata</i>	saw-leaved banksia	rare
<i>Leucopogon esquamatus</i>	swamp beard-heath	rare
<i>Potamogeton pectinatus</i>	fennel pondweed	rare
<i>Phylloglossum drummondii</i>	pygmy clubmoss	rare
<i>Pomaderris intermedia</i>	shrubby dogwood	rare
<i>Pomaderris paniculosa</i> ssp. <i>paralia</i>	shore dogwood	rare
<i>Stylidium despectum</i>	small trigger plant	rare
<i>Sporobolus virginicus</i>	salt couch	rare
<i>Hakea ulicina</i>	furze hakea	vulnerable
<i>Isopogon ceratophyllus</i>	horny cone-bush	vulnerable
<i>Xanthorrhoea arenaria</i>	sand grass-tree; Yacca	vulnerable
<i>Xanthorrhoea bracteata</i>	grass-tree, black-boy	vulnerable

Objectives

The objectives of flora conservation in the nature reserve are to:

- ¥ allow for ongoing evolutionary processes to occur unhindered;
- ¥ protect, maintain and monitor natural flora diversity;
- ¥ protect, maintain and monitor threatened flora species;
- ¥ protect, maintain and monitor plant communities of conservation significance; and

- ¥ minimise harmful impacts on the indigenous flora of the nature reserve.

Policies

- ¥ The following plant communities will be given high flora conservation priority:
 - *Banksia serrata* community
 - blue gum/Oyster Bay pine forest communities;
 - rare or threatened heath species.
- ¥ Actions which result in adverse impacts in high flora-conservation priority areas will be avoided or limited to those which are localised and of minimal impact.

- ¥ Only local provenance species native to the nature reserve will be used in rehabilitation works unless written approval is given for alternatives.
- ¥ Fire management in high flora-conservation priority areas, including fuel-reduction burning and habitat-management burning, will conform with this management plan (see Section 4.1).
- ¥ Exclude unwanted wildfire from or restrict its spread in high flora-conservation priority areas within the constraints imposed by available resources, prevailing Fire Danger Index, fire intensity and fire crew safety (see Section 4.1).
- ¥ The collection of deadfall or cutting of live shrubs for firewood in the nature reserve is prohibited under the *National Parks and Reserved Land Regulations 1999*.
- ¥ Implement measures to contain and exclude the spread of cinnamon fungus infection from the *Banksia serrata* area (see Sections 4.2.3, 5.4.5).

Actions

- ¥ Prepare a detailed vegetation map and description of communities and species for the nature reserve.
- ¥ Prepare programs for ecological management burning, setting out the fire frequencies necessary to maintain viable populations of species and communities of conservation value (see Section 4.1).
- ¥ Prepare and/or implement management programs for threatened flora species or communities of conservation significance.
- ¥ Restrict access in the Nature Zone 1/Special Flora Management Area in the nature reserve to protect significant flora values and to minimise the spread of cinnamon fungus, particularly in the *Banksia serrata* area.
- ¥ Populations of rare and threatened species should be surveyed to determine their vigour and whether cinnamon fungus disease is impacting on them. Permanent vegetation plots should be established and monitored long term for this purpose.
- ¥ Implement suitable control strategies identified in the feral pig management plan

developed for Flinders Island to reduce the number of feral pigs in the nature reserve.

3.5 Fauna

A list of fauna known to occur in the reserve is included in Appendix 3. A complete fauna list is not available for the reserve.

Mammals

Fourteen species of native terrestrial mammals have been recorded on Flinders Island. Most of these probably occur in the nature reserve. Species of particular interest include the New Holland mouse (*Pseudomys novaehollandiae*), which is listed as rare in Tasmania and has been recorded from heathlands on the western side of the nature reserve. This is a fire-adapted species which favours areas burnt between two to three years previously to provide both feeding areas and nearby cover from predators. A localised, low-intensity fire regime is required to provide habitat suitable for this species (see Section 4.1).

The swamp antechinus (*Antechinus minimus*) and white-footed dunnart (*Sminthopsis leucopus*) may also be present in the nature reserve but are still to be verified.

There are also a number of introduced mammal species within the nature reserve including cats, pigs, mice, rats and introduced birds (refer to Section 4.2.1).

Birds

Bird life in the nature reserve is expected to be species rich as the area provides variety of habitat favouring many different species. Flinders Island has particular significance as an important stop-over point for bird species migrating between the Australian mainland and Tasmania. Therefore the conservation of large areas of diverse habitat is essential. A number of rare and threatened species occur in the nature reserve (see Appendix 3).

The swift parrot (*Lathamus discolor*), listed as vulnerable in Tasmania, is a migratory species which visits Flinders Island during its migration between mainland Australia and breeding areas along the east coast of Tasmania. The nectar from Tasmanian blue gum is the main food source for these parrots. There are mature stands of glue gum forest in the south-west corner of the nature reserve which may provide feeding areas for the parrot. The habitat of the swift parrot has been drastically reduced through land clearing to the point where fewer than 1000 pairs now

remain throughout its range in south-east Australia.

The wedge-tailed eagle (Tasmanian) (*Aquila audax fleayi*), rated as vulnerable has been recorded in the nature reserve. The most recent sighting was made in 1996 on the southern boundary of the nature reserve. Large tracts (more than 10 hectares) of forested country are required to support one breeding pair of eagles.

Management of the nature reserve needs to ensure protection of threatened bird species.

Reptiles and Amphibians

In the absence of systematic fauna surveys there is an incomplete knowledge of the number of species present in the nature reserve. To date, White s skink (*Ergenia whitei*) and two species of frog, the banjo frog (*Limnodynastes dumerili*) and the spotted marsh frog (*L.tasmaniensis*) have been recorded in the nature reserve. Numerous other species are also likely to be present. Anecdotal information suggests that

blue-tongue lizards (*Tiliqua nigrolutea*) and tiger snakes (*Notechis ater*) are quite abundant in the reserve. Confirmed reptile and amphibian species are listed in Appendix 3.

Fish

Wingaroo Nature Reserve has a species of native galaxiea (*Galaxiella pusilla*) which has been recorded in a fresh water swamp in the south-eastern corner of the nature reserve. This species is listed as rare in Tasmania. Very little is known about the species.

Invertebrates

The invertebrate fauna of the nature reserve is poorly understood and no records exist. No exhaustive surveys of insect fauna have been undertaken to date and a great deal more work needs to be carried out in this area. A rare species of damselfly (*Hemiphebia mirabilis*) has been recorded in fresh water swamps in the south-eastern corner of the nature reserve.

Table 3 Threatened Fauna Species

Species	Common Name	Status
<i>Sterna nereis nereis</i>	fairy tern	rare
<i>Accipiter novaehollandiae</i> *	grey goshawk	rare
<i>Hemiphebia mirabilis</i>	damselfly	rare
<i>Pseudomys novaehollandiae</i> *	New Holland mouse	rare
<i>Aquila audax fleayi</i>	wedge-tailed eagle (Tasmanian)	vulnerable
<i>Lathamus discolor</i> *	swift parrot	vulnerable

* Species to be verified if present in the nature reserve.

Objectives

- ¥ The objectives for fauna conservation in the the nature reserve are to:
 - protect, maintain and monitor threatened fauna species, in particular the swift parrot and New Holland mouse.
 - determine the presence or otherwise of previously recorded species such as the wedge-tailed eagle or predicted species such as the swamp antechinus and white-footed dunnart;
 - protect, maintain and monitor the diversity of indigenous fauna and habitat; and
 - minimise harmful impacts on indigenous fauna and habitats.

Policies

- ¥ The following nature reserve habitats will be left undisturbed or otherwise given special protection or management:
 - swift parrot habitat;
 - New Holland mouse habitat; and
 - any other threatened species habitat.
- ¥ Prepare programs of ecological management, setting out the fire frequencies necessary to maintain habitat and viable populations of species of conservation value.
- ¥ All practicable efforts will be made to prevent adverse fire and other impacts on breeding of threatened species.
- ¥ Wildlife management and control measures, including fencing, culling, biological control, removal, or relocation, will be adopted if studies show them to be warranted and practicable.

Actions

- ¥ Adopt appropriate fire regimes to maintain the habitat of the New Holland mouse (see Section 4.1).
- ¥ Conduct fauna surveys to fill gaps in knowledge useful for management and protection.
- ¥ Implement the relevant prescriptions of any relevant threatened species recovery plans for species occurring in the reserve.
- ¥ Discourage visitors from feeding wildlife by making them aware of the harmful effects of inappropriate food and dependence on humans.

3.6 Aboriginal and Historic Heritage

3.6.1 Aboriginal Heritage

Aboriginal people are known to have occupied the islands of the Furneaux Group for thousands of years. Aboriginal people continued to inhabit the region after the islands became isolated from mainland Tasmania for some time until their demise 4 500 years ago.

The land-use practices of these people were probably similar to those practiced on mainland Tasmania where Aboriginal people regularly used fire to burn thick vegetation, to assist with travel and attract game to newly burnt areas.

To date, no systematic archeological surveys to identify cultural heritage sites have been undertaken in the nature reserve. However, the concentration of sites around freshwater lagoons at other locations on Flinders Island, suggests that these environments were a focus of activity. There may also be contemporary artefact scatters located in the nature reserve associated with the Aboriginal people who were re-located at Wybalenna on the west coast of Flinders Island. These sites are protected under the *Aboriginal Relics Act 1975*. The single biggest issue for cultural heritage management in the nature reserve is a lack of adequate baseline knowledge.

Further regional archaeological and palaeo-environmental data is required to determine if any sites are present in the nature reserve and to determine their archaeological and heritage significance. Any sites that are located will have considerable cultural significance for Aboriginal people.

Aboriginal sites and the cultural landscapes of the nature reserve have a strong and continuing significance to the Tasmanian Aboriginal community. Sites need to be located and protected, particularly from the impacts of development and visitor use. There is potential for the Tasmanian Aboriginal community to promote and interpret these sites to the wider community and provide greater understanding of Aboriginal culture in the nature reserve.

New legislation dealing with Aboriginal heritage management is under consideration. At present, the *Aboriginal Relics Act 1975* applies.

Objectives

The objectives of management of Aboriginal heritage are, in cooperation with the Aboriginal community, to:

- ¥ identify and record any sites of Aboriginal heritage;
- ¥ protect and conserve any Aboriginal heritage; and
- ¥ interpret any Aboriginal heritage.

Policies

- ¥ Aboriginal heritage values will be assessed and protected in accordance with agreed national or state charter or guidelines for Aboriginal sites
- ¥ Sites of Aboriginal significance will not be publicised unless the site has been assessed, in cooperation with the Aboriginal community, for educational or interpretive use. Where applicable, make use of any agreed Aboriginal interpretation strategy.
- ¥ The Aboriginal community will be consulted on any undertaking or development which may impinge upon Aboriginal sites.
- ¥ All proposed landscape modification, development, or maintenance within the nature reserve will be subject to the prescriptions of Section 4.6 (Managing Development Works).
- ¥ As far as possible, development will be located well away from areas of Aboriginal heritage.
- ¥ Aboriginal heritage will not be deliberately

disturbed for management, development or research purposes unless the Director determines there is no practicable alternative and a permit to disturb aboriginal relics has been issued under the *Aboriginal Relics Act 1975*.

Actions

- ¥ In cooperation with the Tasmanian Aboriginal Land Council (TALC) and representatives from the Aboriginal community on Flinders Island, identify and record any Aboriginal sites.
- ¥ Consult with TALC and the Flinders Island Aboriginal community on the management of Aboriginal heritage.
- ¥ Develop interpretation of any Aboriginal heritage of the nature reserve in consultation with TALC and the local Aboriginal community.
- ¥ Monitor any Aboriginal sites for, and protect from damage or interference.

3.6.2 Historic Heritage

Sites and artefacts related to mining and mineral prospecting, including cuts, a shaft and the remains of an aqueduct are believed to be present in the nature reserve.

The nature reserve has remained substantially unmodified by agricultural activity on Flinders Island, due largely to the unsuitable nature of the soils and the low rainfall. While most of the area contained in the reserve has remained intact, there has been land development on the perimeter for pasture. The Mount Boyes track was established in the 1960s as an east—west stock route.

There is a pressing need to identify historic resources within the reserve in order to protect and document early economic uses of the area. Historic features, including previously cleared areas, all form an identifiable heritage setting of varying significance. Conservation of heritage values requires not only attention to remaining structures, features, and artefacts, but also careful and sympathetic management of the surrounding settings and cultural landscapes.

Objectives

The objectives of historic heritage conservation and management are to:

- ¥ identify and record historic heritage in the nature reserve;
- ¥ actively conserve and maintain the heritage integrity and quality of significant cultural landscapes, any heritage structures and vegetation, and other heritage features;
- ¥ protect and conserve historic heritage from damage;
- ¥ present and interpret historic heritage; and
- ¥ exclude intrusive development and activity.

Policies

- ¥ Conservation and management of historic heritage in the nature reserve will adhere to the Australia ICOMOS Charter for the Conservation of Places of Cultural Significance (The Burra Charter) (see Marquis-Kyle & Walker, 1992) and its associated guidelines.
- ¥ A conservation policy statement or conservation plan, including specific assessment of significance, will be prepared before any decisions about major works, use, removal or interpretation of individual elements of historic heritage are made. Such statements or plans will be prepared in accordance with the principles outlined in the Burra Charter, using the methodology outlined in Kerr (1996).
- ¥ A cyclical maintenance program should be developed and operate for significant historic places.

Actions

- ¥ Identify, record and assess the significance of any historic features.
- ¥ Make safe any dangerous structures.
- ¥ Remove damaging uses, activities and developments that intrude upon or detract from heritage values.
- ¥ Where possible, mitigate natural processes that are having an adverse effect on heritage values.
- ¥ Conserve and interpret key historic places for interaction with the general public.

4 Protection

4.1 Fire Management

The nature reserve has experienced a dramatic increase in fire frequency since European settlement, with evidence of fires occurring in the southern, northern and eastern boundaries of the nature reserve. The recent fire history of the area indicates that generally fires have originated from land clearing and development activity on private land bordering the nature reserve. Since 1971, two major fires (greater than 200 hectares) and four smaller fires have been recorded. Two of these fires are thought to have been deliberate while the others have resulted from fuel reduction or land clearing operations on private land.

Other potential sources of fire spreading into the nature reserve include the burning of rubbish at shack sites along North East River and at Edens Creek. Fires have escaped from cooking fires at picnic and camping areas behind the sand dunes at Holloway Point, North East River and Gin Bottle Lagoon during the duck-hunting season. Arson is another risk and has the potential to occur at any point where there is access to the boundary of the reserve, particularly along the Palana or North East River Roads. Other potential sources of fire are the gravel pit on the western side of the nature reserve and the network of tracks, although many of these can only be accessed through private land (see Section 4.4).

Fire frequency has probably been the single most influential factor affecting the vegetation of the nature reserve. A combination of persistent westerly winds, relatively few topographical obstructions and many likely ignition sources on the western side of the island have given rise to a northern plain area shaped by fire. The only areas to have escaped the very high fire frequency are some of the rugged gullies and slopes of Mount Boyes, and the leeward (eastern) margins of some of the lagoons. Historically fires appear to have been initiated under a prevailing northerly wind, which then swings to the west or south-west. Fire in the nature reserve appears to travel in a north-west to south-east direction.

The distribution of Oyster Bay pine in the nature reserve gives some indication of fire history. The species regenerates well after fire but will not tolerate a fire frequency with an interval shorter than the time it takes to produce pine

cones. The species was once more widespread on Flinders Island but is now restricted to the leeward side of lagoons. This indicates that the fire frequency in the area has been higher than this species has been able to tolerate.

A combination of lower relief and easier access means fire could be more easily controlled in the nature reserve. In addition, fire could play a significant ecological role in maintaining species diversity and allowing fire-tolerant communities and species (principally grasslands, heathland and woodlands) to regenerate. This needs to be more fully investigated to determine if fire can have a beneficial role in habitat management. For example, the maintenance of many heath species as well as the habitat of the New Holland mouse depends on periodic low-intensity burning.

The heaths in the nature reserve require fire for their maintenance but it is apparent that in some areas the heath has been converted to sedgeland and bracken through too high a fire frequency. It has been suggested that heaths in the nature reserve should be burnt in sections with a frequency of between 10 and 20 years spacing. This would require that internal tracks are constructed or existing ones maintained for this purpose. None of the heath species present (with the exception of saw-leaved banksia (*Banksia serrata*) or Oyster Bay pine (*Callitris rhomboidea*) is likely to be threatened by this type of fire management (S. Harris, 1993).

Those plant communities within the nature reserve that are fire sensitive, such as the taller forests of blue gum and Oyster Bay pine, should be protected from fire as far as possible. However, fire management in relation to the population of *Banksia serrata* in the south-west of the nature reserve needs further investigation. A mild fire of sufficiently low intensity is not likely to kill mature trees and would trigger regeneration. A more intense fire would probably kill the mature trees but also initiate a regeneration event, although successive fires would kill seedlings and effectively eliminate the entire population.

The nature reserve has a fire trail on the southern boundary to protect property and assets south of the nature reserve. There is no public access along this fire trail. This trail should be cleared of regrowth and combined with fuel-reduction burning to back-burn from in the event of a wildfire from the north. Another graded fire

break is located two kilometres to the north of this main fire trail in order to protect the population of *Banksia serrata* that occurs between the fire break and fire trail. There is no public access along these tracks and therefore no vehicle access into the *B. serrata* area. Fuel-reduction burning carried out along the northern fire break to date has been patchy and remains ineffective as a means to reduce the fire risk to the population of *B.serrata*.

The formed gravel road to Palana forms a fire boundary between Crown and private land on the western side of the nature reserve. The North East River Road runs along most of the northern boundary of the nature reserve with the exception of three private blocks.

The eastern side of the nature reserve lacks an effective barrier to the spread of wildfire. This is a critical area in terms of preventing fire passing into private land. Here the nature reserve shares boundaries with three private blocks. At present there is a slashed fire break that runs from the locked gate at the eastern end of the main southern fire trail and runs north along the western boundary of Carnac s Flat to the south-east corner of the Oakdale property. A track then follows the boundary of this property. There is a fire break along the western side of Wingaroo Pastoral Holdings to the north of Oakdale. These fire breaks should be continuous and connected to each other. At the very minimum, these fire breaks need to be improved and maintained with a program of fuel-reduction burning being carried out to increase their width.

The Parks and Wildlife Service is responsible under the *Fire Service Act 1979* and the *Fire Service (Miscellaneous) Regulations 1996* for all aspects of fire management within the nature reserve, including prevention, containment and suppression.

The highest priority for wildfire suppression is protection of visitors to the nature reserve. Nevertheless, during a wildfire, fire behaviour and suppression necessity will determine the on-ground actions and may mean that priorities need modification on the day.

The focus of wildfire prevention is on the protection of assets including areas of high environmental or heritage significance and neighbouring properties.

In order to protect assets within or adjacent to the nature reserve it is appropriate that fuel-reduction burning be carried out along shared boundaries in the south and east of the nature reserve. In addition, strip or mosaic burns could be utilised

to improve habitat availability. The pattern and frequency of burning needs to be further investigated through the preparation of a fire management plan, an element of which would consider the ecological requirements of species and communities and suitable fire intervals.

Appropriate risk management and ecological fire management strategies are essential to the overall management of the nature reserve.

Objectives

The objectives of fire management are to:

- ¥ protect visitors and management staff;
- ¥ maintain or improve nature conservation values; and
- ¥ protect neighbours and their property.

General Policies

- ¥ Fire management will accord with any fire management plan developed for the nature reserve and this management plan.
- ¥ Subject to the preceding paragraph, all practicable measures will be taken to diminish the risk of wildfires occurring in the nature reserve, to lessen their impact in high conservation priority areas and to prevent fires from entering the nature reserve from adjoining private land.
- ¥ All fire management actions including habitat-management burning, fuel-reduction burning, water hole and fire track construction or maintenance will be undertaken in accordance with Section 4.6.
- ¥ To lessen the risk of arson or inadvertent ignition causing a wildfire, the public will be permitted to use vehicles on designated tracks only.
- ¥ Fire trails and fire breaks will be cleared, maintained and upgraded as required for fire management purposes.
- ¥ When fire danger conditions warrant, PWS staff may close all or some areas of the nature reserve.
- ¥ Fire management and suppression procedures will accord with the Inter-Agency Fire Management Protocol agreed between the Parks and Wildlife Service, the

Tasmania Fire Service and Forestry
Tasmania.

- ¥ Any fire management works will be undertaken in consultation with the relevant authorities and local landowners.

Specific Policies

- ¥ High priority should be given to the preparation of a fire management plan for the nature reserve.
- ¥ This fire management plan should provide a strategic program of fuel reduction burning to protect private property and to avoid the emergency use of machinery on fire breaks and the main fire trails.
- ¥ Minimise management use of the fire break and southern fire trail and wherever possible access the fire trail only when the tracks are dry (see Section 4.2.3).
- ¥ Limit all fire break construction to areas known to be affected by cinnamon fungus or in immediate threat from uphill infections (see Section 4.2.3).
- ¥ All fire break maintenance must be conducted in accordance with the hygiene prescriptions in the Parks and Wildlife *Phytophthora Hygiene Manual 1994* and Section 5.5.
- ¥ Adopt appropriate fire frequencies set out in ecological management programs that aim to maintain viable populations of and/or habitats for plants and animals of conservation value.
- ¥ Visitors will not be permitted to camp or to light fires in the nature reserve.
- ¥ The rubbish tip on the western side of the nature reserve forms an unacceptable fire risk to the nature reserve. Consideration should be given to closure at the expiry of the current licence with Flinders Council (see Section 7.2).

Actions

- ¥ Prepare a fire management plan for the nature reserve, which considers;
 - fire suppression;
 - fuel reduction burning;
 - protection of rare, vulnerable, threatened and endangered species;
 - minimising cinnamon fungus infection;

- burning for habitat manipulation;
- cooperative arrangements with landowners; and
- education programs.

- ¥ Prioritise the protection of the remnant, fire-excluded plant communities where possible, to exclude wildfire.

- ¥ If possible, maintain a mosaic of fire exclusion in the nature reserve heaths, as well as prioritising the protection of habitat for the New Holland mouse (see Section 3.5).

- ¥ Maintain fire trails and fire breaks as necessary.

- ¥ Inform fire crews of the cinnamon fungus threat to the reserve so that they can take measures to avoid transporting the disease.

- ¥ Fit fire management tracks not designated for public use with secure, locked gates.

- ¥ Liaise with Flinders Island Municipal Council to regularly maintain the roadside verges of Palana and North East River Roads by slashing or mowing to reduce the fire hazard during the summer period.

4.2 Pests, Weeds, and Diseases

4.2.1 Introduced Fauna

Several species have been introduced to Flinders Island as a result of European settlement. Of these, feral pigs (*Sus scrofa*) and feral cats (*Felis catus*) are the most widespread in the nature reserve. Pigs were introduced onto Flinders Island accidentally from shipwrecks or deliberately by early visitors to ensure a meat supply.

Feral pigs are believed to be present in the nature reserve, primarily on the eastern side, and tend to be associated with seasonal wetlands. There are no reliable population estimates available and the extent of their impact needs to be determined.

As pigs are reliant on fresh water they are most usually associated with wetland areas. Their distribution in the nature reserve can be correlated with the availability of fresh water in that they will spread out in wetter years and recede to smaller pockets in drier years. Pigs cause tremendous damage to wetland areas through trampling and selective feeding.

The implementation of control methods for feral pigs in the nature reserve remains a significant management priority and will require further funding by the Tasmanian and Commonwealth Governments.

Anecdotal information suggests that feral cat populations are rapidly increasing on Flinders Island, and may present significant threats to fauna of the nature reserve, particularly small mammals, reptiles and birds. Some exotic birds have also been introduced or arrived from mainland Tasmania (see Appendix 3). European starlings occur in large flocks in the nature reserve where they compete with native birds for nesting hollows. Domestic dogs sometimes enter the nature reserve, with or without their owners.

The nature reserve is fortunate that rabbits or foxes have never been introduced onto Flinders Island, as these species can have a devastating impact on vegetation and native fauna.

The presence of species not indigenous to the nature reserve is out of keeping with the concept of a nature reserve.

Objectives

The objectives of management of introduced fauna in the nature reserve are to:

- ¥ eradicate introduced species where this is feasible and warranted by the damage being caused; and
- ¥ control and manage introduced species where eradication is not practicable or warranted.

Policies

- ¥ New introductions of animals to the nature reserve will not be permitted without an approved comprehensive scientific assessment.
- ¥ Eradication of introduced species will only be attempted where non-target species are not threatened by the proposed methods, unless the threat from the introduced species is greater than the threat from eradication methods.
- ¥ Eradication, control, and containment programs and priorities for feral species will be based on clear, well-documented contemporary knowledge or, where necessary, additional research that:

- identifies species requiring priority for control;
- identifies areas of scientific or conservation significance where feral animals should be eradicated or controlled;
- specifies the control methods to be used;
- identifies protocols for the use of poison, shooting and trapping;
- prescribes the appropriate time of year for control; and
- outlines the structure of any further research into the most effective means of control.

¥ Except in accordance with the *National Parks and Reserved Land Regulations 1999*, stock, pets and other domestic animals will not be permitted entry into the nature reserve.

¥ Horse riding will not be permitted in the nature reserve.

Actions

- ¥ Implement any control methods identified as suitable for the nature reserve from the feral pig management plan developed for Flinders Island.
- ¥ Remove other introduced species where practicable.
- ¥ Monitor introduced animal populations and undertake regular surveys of each species.
- ¥ Make visitors aware that dogs are not permitted in the nature reserve.

4.2.2 Weeds

Weeds have the potential to enter the nature reserve via tracks, the rubbish tip or gravel pit adjacent to the nature reserve where plant refuse is either dumped or becomes established on disturbed sites. Effective control and management of weeds is necessary and priority targets for control need to be identified. Planning and resources are also required. In addition, landowners and land managers have a responsibility to prevent weeds spreading from their land into the nature reserve.

The regular disturbance to ground cover in the construction and maintenance of fire trails and fire breaks could facilitate the spread of unwanted weeds and cinnamon fungus unless a high degree of vigilance and care is exercised.

Objectives

The objectives of weed management in the nature reserve are to:

- ¥ eradicate weeds where this is feasible and warranted by the damage being caused; and
- ¥ control and manage weeds where eradication is not possible or warranted.

Policies

- ¥ In general, weed management will accord with the provisions of the introduced plants policy (Parks and Wildlife Service, 1998).
- ¥ Weed management will be linked with:
 - protection of natural and cultural values;
 - erosion control; and
 - revegetation works.
- ¥ An integrated regional approach to weed management, involving neighbouring landowners and managers, will be supported.
- ¥ Eradication or control of weeds will only be attempted where non-target species are not threatened by the proposed methods, unless the threat from the weeds is greater than the threat from eradication methods.
- ¥ Weed eradication, control and containment actions and priorities will be based on clear, well-documented contemporary knowledge or, where necessary, additional research that:
 - identifies species requiring priority for weed control;
 - identifies areas where weeds should be eradicated or controlled, including where they should be retained as an interim means of environmental protection;
 - specifies methods of removal and disposal of weeds;
 - identifies protocols for the use of herbicides and fertilisers;
 - prescribes the appropriate time of year for control; and
 - outlines the structure of any further research into the most effective means of control.
- ¥ The assistance of volunteers will be sought for control and eradication where suitable planned and programmed works and effective supervision or direction are available.

Action

- ¥ Prepare and implement weed management programs for weeds as they become identified.

4.2.3 Cinnamon Fungus

Cinnamon fungus (*Phytophthora cinnamomi*) is an introduced soil-borne fungus which attacks the root system of woody plants and causes dieback in native vegetation. Heathland species are particularly susceptible to the disease including both xanthorrhoeas (grass trees) and banksias. The mass collapse of grass trees provides the most obvious sign that cinnamon fungus is present in an area, although it is often attributed to drought or some other cause.

Cinnamon fungus is spread through the transport of spores through wet soil, in water or from plant to plant through root contact. The fungus is generally spread into new areas by off-road vehicles and earth-moving machinery. The disease is also spread by animals or walkers passing through contaminated areas and transporting the spores into previously uncontaminated areas. Feral pigs may be a spreading agent for the disease, therefore effective feral pig control is a fundamental component of any disease management program for the reserve.

From a management perspective the only realistic measure available to control the spread of cinnamon fungus is by the quarantine of uninfected vegetation, preferably on a catchment basis. Catchments free of the disease require strict hygiene measures to prevent the inadvertent entry of the disease.

There is a system of informal tracks within the reserve that pre-date the creation of the nature reserve. One of these, the Mount Boyes track, was constructed in the 1960s to develop and access the Oakdale property on the eastern side of the nature reserve. The spread of cinnamon fungus along this track has been recorded. It was an established practice to move cattle along this track but this has not occurred since the early 1990s.

Infrequent horse riding is undertaken in the nature reserve by a few private individuals, generally along the Mount Boyes track. A continuation of this activity is incompatible with the primary objective of the nature reserve, which is to protect flora and fauna values, unless it can be demonstrated that the activity is not having a detrimental impact on those values.

The possible impacts include the introduction of weeds and nutrients through dung, the effects of trampling and browsing on vegetation, and the risk of spreading cinnamon fungus disease into areas not accessible by vehicles.

Surveys carried out in November 1999 confirmed that cinnamon fungus is well established in the southern part of the nature reserve, and is most commonly associated with existing tracks. There is also extensive infection along the south-eastern boundary where the reserve shares a boundary with private land. Past invasion by feral pigs, native wildlife, track construction and the movement of vehicles and cattle have all contributed to the spread of the disease in the reserve. It is possible that hundreds of hectares may be affected.

The disease is less likely to have spread through areas where there are fewer or no tracks, such as in the northern part of the reserve. Where existing tracks are free of cinnamon fungus it is highly likely that the adjacent areas are also free of the disease. Although it is possible that more remote areas in the reserve are infected, the absence of tracks reduces this likelihood.

Minimising the spread of cinnamon fungus is the overriding management issue for the nature reserve. The predominantly heath vegetation of the nature reserve is considered susceptible to the spread of the disease. Two threatened species, saw-leaved banksia (*Banksia serrata*) and horny-cone bush (*Isopogon ceratophyllus*), are particularly susceptible to the disease. These species occur in the south-western and northern part of the nature reserve. In addition, if there is a link between the presence of feral pigs and the spread of cinnamon fungus, this could place these species at risk, particularly the very localised population of *B. serrata*.

Objectives

The objectives of plant disease management are to:

- ¥ Protect highly susceptible species and communities present in the reserve including the threatened species *Banksia serrata* and *Isopogon ceratophyllus*.
- ¥ Protect the northern and southern areas of the reserve from possible infection of cinnamon fungus along vehicle tracks.
- ¥ Educate the community and visitors in plant disease-prevention hygiene measures.

Policies

- ¥ One-way vehicle access into the nature reserve will be provided along the Mount Boyes track.
- ¥ Develop quarantine procedures for the stand of *Banksia serrata* to prevent the incursion of cinnamon fungus (see Section 5.4.5).
- ¥ Minimise management use of the fire break and southern fire trail and wherever possible access the fire trail only when tracks are dry.
- ¥ All fire break maintenance must be conducted in accordance with the hygiene prescriptions in the Parks and Wildlife *Phytophthora Hygiene Manual 1994* and Section 4.6 (See Section 4.1).
- ¥ Limit all fire break construction to areas known to be affected by cinnamon fungus or in immediate threat from uphill infections (see Section 4.1).
- ¥ Close and rehabilitate all minor tracks originating from private blocks into the nature reserve, with the exception of those being used used to legitimately access private blocks.
- ¥ Any imported soil, fill or crushed rock used in any construction project in areas known to be free of the disease, and where exclusion of the disease is a priority, will be obtained from sites where the disease is not present, using machinery that has been thoroughly washed clean.
- ¥ Where direct seeding is not used, all plants used in planting works within areas free of the disease will be propagated under hygienic conditions and monitored for dieback prior to planting.
- ¥ Any promotional material developed for the nature reserve will contain information on the cinnamon fungus threat to the nature reserve and methods used to reduce the risk.
- ¥ Fungicide treatment will be required for equipment used in direct scientific sampling to prevent the transfer of infection (see Section 7.3).
- ¥ The entry of horses or livestock through the nature reserve is prohibited under the *National Parks and Reserved Land Regulations 1999*.

Actions

- ¥ Gate or otherwise restrict public access to vehicle tracks designated for management purposes only (see Sections 4.4 and 5.3).
- ¥ Maintain fire breaks and fuel-reduction burning programs to avoid emergency machinery use for fire control (see Section 4.1).
- ¥ Undertake periodic surveys of cinnamon fungus-prone areas to monitor the disease status of the nature reserve.
- ¥ Conduct a cinnamon fungus survey of the track leading from Duckhole Lagoon west into the central private block.
- ¥ Inform visitors and fire crews of the cinnamon fungus threat to the reserve so that they can take measures to avoid transporting the disease (see Sections 4.1 and 5.2)
- ¥ Implement any control methods identified as suitable for the nature reserve from the feral pig management plan developed for Flinders Island (see Section 4.2.1).

<p>4.3 Soil Conservation and Erosion Control</p>

Maintenance of roadside verges along public and reserved roads is undertaken by Flinders Council to reduce fire hazard and provide for unimpeded drainage. The management of roadsides beside the nature reserve is of concern as soils in the area are susceptible to erosion if ground cover is removed. In addition, the use of herbicides, while effective as weed suppressants, can also affect the health of native heaths. Flinders Council has developed a roadside management strategy to provide broad guidelines on roadside clearing operations as well as a register of the locations of rare and endangered plant species. An overhead power line is located on the road reserve beside Palana Road on the western side of the nature reserve. Aurora Services maintain this and other overhead power lines throughout the island. The clearing of vegetation under power lines is carried out as part of a general maintenance schedule. The practice of grading down to bare earth rather than slashing along Palana Road has resulted in the loss of ground cover and surface erosion problems. It may also promote the spread of plant disease and weeds.

There is a thirty-six hectare gravel reserve on the south-western side of the nature reserve which is accessed from the Palana Road. The pit is

located on unallocated Crown land and was used by Flinders Council to provide road base. Although the gravel pit is no longer active, a three hectare area has been cleared which is now experiencing considerable erosion and run-off from the site. The proximity of the gravel pit to the nature reserve as well as its prominent location on a slight rise, in what it essentially a flat landscape, makes it very unsightly.

Flinders Council has made some efforts to rehabilitate the site involving smoothing and laying of brush for re-seeding. Vegetation is gradually reclaiming the previously cleared areas. However the site requires more careful management and active rehabilitation. In addition, the vehicle track into the gravel pit should be closed and rehabilitated to prevent further erosion.

The large population of wallabies needs to be considered when revegetation works are being undertaken as wallabies will readily graze tree and other seedlings. Therefore new seedlings may need to be protected by enclosures.

Objective

The objective of soil conservation and erosion control in the nature reserve is to:

- ¥ prevent erosion and rehabilitate damaged areas.

Policies

- ¥ Erosion hazard and status assessments will be made where significant ground disturbance or soil exposure is proposed.
- ¥ Land rehabilitation and stabilisation will be carried out on the basis of a prior geomorphological assessment.
- ¥ Roadside vegetation management undertaken within or beside the nature reserve should be carried out in consultation with district management staff.
- ¥ Alternatives to grading under transmission lines should be sought as the height of the heath vegetation does not require complete removal of vegetation.

Actions

- ¥ Rehabilitate, revegetate or otherwise stabilise disturbed or eroding areas, including unwanted vehicle trails.

- ¥ Liaise with the Flinders Council to manage the gravel pit in accordance with best practice with regard to the adjacent nature reserve.
- ¥ Liaise with Flinders Council and Transend to develop alternatives to grading under transmission lines adjacent to the nature reserve.

4.4 Vehicle Track Management

Managing vehicle tracks within the nature reserve is a key component in protecting the flora values of the area. There is an informal system of vehicle tracks in the Wingaroo area which pre-date the creation of the nature reserve. These tracks were installed by the local community to gain access to the coast or lagoons for duck hunting. One of these tracks have been used for transfer of stock between different properties. Many of these tracks are no longer used and are largely overgrown. Shooters currently access the North East River Game Reserve via rough vehicle tracks that exist along the eastern side of the nature reserve.

A track to develop and access the Oakdale property on the eastern side of the nature reserve was constructed during the 1960s. This track is not a designated reserved road nor does the property owner have an established right of use over the track. The spread of cinnamon fungus along this route has been recorded. The practice of moving cattle along this track has not occurred since the early 1990s. As the nature reserve exists for the protection of flora and fauna, a continuation of cattle transfer is undesirable in view of the impacts on vegetation from stock browsing enroute, soil compaction and further risk from cinnamon fungus.

There are a number of rough tracks that lead from private land and terminate in the nature reserve. These tracks pre-date the reserve and do not serve any legitimate purpose. The continued presence of these tracks is undesirable and their continued use will not be encouraged.

The main fire trail on the southern boundary of the nature reserve is a management track and not available for public access. The track to the north of here at Deadmans Corner has been closed due to illegal firewood collection. The next track to the north is a slashed fire break put in to protect the *Banksia serrata* population from fire. This fire break is used for fuel-reduction burning and does not provide a through route to the other side of the nature reserve. It is the intention of this management plan to limit

vehicle use along this fire break to prevent the introduction of cinnamon fungus into the southern section of the reserve.

Illegal use of trail bikes occurs, particularly on fire trails. Motorbikes have been accessing the main southern fire trail in the nature reserve from private land in the south. The poor condition of fencing on this boundary enables motorbikes to get through and use the fire trail. There are locked gates at either end of the fire trail so access can only be gained through private land adjoining the nature reserve.

Policies

- ¥ Vehicle access to specific areas may be restricted to protect natural or cultural values of high conservation value. Closure of roads to vehicles is enabled through the use of Regulation 13 of the *National Parks and Reserved Land Regulations 1999*.
- ¥ Minor tracks originating from private blocks into the nature reserve, with the exception of those being used to legitimately access private blocks, will be closed and rehabilitated.
- ¥ The transfer of livestock through the reserve is prohibited under the *National Parks and Reserved Land Regulations 1999*.

Actions

- ¥ Gate or otherwise restrict public access to vehicle tracks designated for management purposes only.
- ¥ Stabilise those tracks required for fire management and close others not required for public access or for access to private blocks.
- ¥ Seek the cooperation of the local community to undertake rehabilitation works on closed tracks.

4.5 Managing Visitor Impacts

No visitor numbers are available for the nature reserve, although they are generally thought to be quite low as the area has not been actively promoted as a location to visit and does not possess any visitor facilities. Future use of the reserve will be subject to certain measures being introduced to protect the nature reserve. These include pre-visit hygiene to sensitive locations,

on-site behaviour and limits to which areas can be accessed. Unless these measures are implemented, visitors could pose a real threat to the values of the reserve.

The nature reserve has experienced a problem in the past with the cutting of mature Tasmanian blue gum and Oyster Bay pine for use as fencing posts. A locked gate has been installed at Deadmans Corner to prevent this from occurring.

Objectives

The objectives for managing visitor impacts are to:

- ¥ protect, maintain and monitor environmental and heritage values; and
- ¥ maintain the nature reserve in a state that is valued by visitors.

Policies

- ¥ Visitor numbers, services and activities will be limited to those that are ecologically sustainable.
- ¥ The best available and practicable technology will be used to protect environmental quality from human impacts.
- ¥ The maximum party size for licensed walking tour groups will be consistent with the principles of the *Walking Track Management Strategy* (Parks and Wildlife Service, 1998).
- ¥ The general public will be encouraged to observe the same party size requirements as licensed groups.
- ¥ All waste material and rubbish brought into the nature reserve must be removed by those who brought it in.
- ¥ Except for approved scientific or management purposes, no overnight stays will be permitted in the reserve.
- ¥ School and other groups undertaking educational activities will be encouraged to develop their proposed program in consultation with the Senior Ranger.

Actions

- ¥ Inform visitors of, and encourage them to

apply techniques for minimal impact use of the nature reserve.

- ¥ Ensure all visitors comply with the requirements of a cinnamon fungus management program.
- ¥ Require management staff to observe the same requirements applied to licensed tour, scientific and education visitors.

4.6 Managing Development Works

Development works can range from manipulative research, construction or repair of walking or vehicle tracks, erosion control works, and the erection of signs or gates.

The *National Parks and Wildlife Act 1970* requires that, in managing development on reserved land, regard must be had to the Resource Management and Planning System (RMPS) objectives. In addition, the management objectives, policies and actions contained in this plan give effect to and are consistent with the principles of the *Tasmanian State Coastal Policy 1996*.

Objectives

The objectives of managing development works are to:

- ¥ avoid or minimise the impact of development works on nature reserve values;
- ¥ foster public confidence in any approved and appropriate development.

Policies

- ¥ All development will be limited to that provided for in this management plan, and must be consistent with the objectives of the zone in which it is to occur.
- ¥ Assess all proposals for any development, landscape modification, research, management or maintenance work involving any ground breaking, structural disturbance, or environmental manipulation of any kind, in accordance with procedures approved by the Director.
- ¥ Confirm statutory requirements for planning and building approval before proceeding.
- ¥ Where they apply, ensure compliance with

relevant Australian standards.

- ¥ Prepare and approve design concepts and details for each development or activity permitted by this plan in accordance with the above prescriptions prior to the commencement of any work.
- ¥ Do not permit variations to the approved design concepts and details unless such changes have been, in the first instance, discussed with the relevant specialist staff and if necessary confirmed and approved by the Director.
- ¥ Prepare detailed costing for implementing works in conjunction with preparation of design details for those works.
- ¥ Minimise areas of disturbance arising from any site works permitted by this plan. Where necessary, peg or fence to define the limits of the site that may be disturbed. If trees or shrubs or other site features to be retained occur within this area, protect them for the duration of the works.
- ¥ No memorials or commemorative plaques will be permitted in the nature reserve.

Actions

- ¥ Confirm statutory requirements for planning and building approval before proceeding.
- ¥ Where they apply, ensure compliance with relevant Australian standards.
- ¥ Ensure the design, placement and construction of facilities is consistent with the scenic values of the nature reserve.
- ¥ Rationalise provision of facilities where impacts or demand do not warrant the number or type of facilities provided.

5 Visiting the Reserve

5.1 The Reserve Visit

At present, the nature reserve does not receive a large number of visitors, but it does have the potential to contribute to the overall experience of visitors coming to Flinders Island.

The type of visitors expected to visit the nature reserve are management staff, scientific researchers and groups involved in an education program. Licensed tour groups and private individuals may also visit the nature reserve, in accordance with the plan. Visitors can access the nature reserve by vehicle or on foot.

Objectives

The objectives of understanding the nature reserve visit are to:

- ¥ understand visitor pressures on the nature reserve; and
- ¥ provide the basis for effective visitor management.

Policies

The educational and scientific aspects of the nature reserve will be emphasised over any recreational value.

- ¥ Future visitor research will focus on an improved understanding of visitor numbers and characteristics, behaviour, needs and expectations, and assisting visitor management.

Actions

- ¥ Collect visitor arrival information regularly at the main access point to the nature reserve.
- ¥ Monitor and investigate visitor pressures on the nature reserve.

5.2 Interpretation and Education

Interpretation of the natural and cultural values of the nature reserve to visitors is presently undeveloped. The only information provided is restricted to directional signage. The standard of

information provided to visitors about the nature reserve needs to be improved to make visitors aware of the importance of the reserve and how to best minimise their impact when visiting the area. The advantages of this will be increased understanding and awareness of the area and a greater degree of enjoyment by visitors.

At present there are no information boards in the nature reserve. However, pamphlets, maps and brochures could be made available through the Service Tasmania centre in Whitemark.

Objectives

The objectives of interpretation and education for the nature reserve are to:

- ¥ encourage pre-visit awareness of the special features and importance of the nature reserve;
- ¥ encourage visitors to pursue their interests and explore what the nature reserve has to offer;
- ¥ realise the educational values of the nature reserve;
- ¥ canvas issues to be confronted in managing the nature reserve;
- ¥ increase public awareness of safety issues; and
- ¥ inform visitors of the hygiene protocols of the disease management program and minimal impact practices.

Policies

- ¥ High priority will be given to provision of good-quality visitor information and interpretation including, improved directional signage, consistent with the Departmental Signs Manual.
- ¥ Interpretation programs and facilities will mainly be concentrated outside the nature reserve. Some basic interpretation may be provided in the Recreation Zone. No interpretation facilities will be located in the Nature Zone.
- ¥ Use interpretation to enhance visitor

understanding and appreciation of the environmental and heritage values of the area, foster appropriate visitor behaviour and explain management strategies.

- ¥ Use of the nature reserve for teaching about its environmental and heritage values will be encouraged.
- ¥ School and other groups undertaking educational activities will be encouraged to discuss their proposed program with the Senior Ranger when planning their visit.

Actions

- ¥ Provide prospective visitors to the nature reserve with pre-visit information, in particular the cinnamon fungus threat and make this information available to local tourism operators, airport and information centres.
- ¥ Detail ways for visitors to prepare for visiting the nature reserve, and to handle any emergency situations during their visit e.g. fire or snake bite.
- ¥ Consider the nature reserve in the development of any interpretation plan for conservation areas on Flinders Island, as part of a wider visitor strategy to guide development of interpretation facilities and resources.
- ¥ Where appropriate, develop interpretation of the Aboriginal heritage of the nature reserve in consultation with TALC and the Flinders Island Aboriginal community.
- ¥ Improve road signage to the nature reserve from the Palana Road.

5.3 Access

The entrance to the nature reserve is reached by way of Palana Road, an all-weather gravel road that runs along the western boundary of the nature reserve. There is a management sign on the roadside verge just before the Mount Boyes track, 200 metres before the Killcrankie turn-off, if approaching from the south. This track is the main access into the reserve but is not signposted so the entrance can easily be missed.

Objectives

The objectives for access to and within the nature reserve are to:

- ¥ maintain, develop and promote opportunities for people, including those with disabilities, to visit;
- ¥ protect nature reserve values by concentrating and limiting developed visitor arrival points and travel routes to designated locations;
- ¥ maintain basic access to the nature reserve to that necessary for educative, scientific or management purposes;
- ¥ direct and develop access within the nature reserve appropriate to the zone in which it occurs.

5.3.1 Aircraft

There are no airstrips or helicopter landing grounds in the nature reserve.

Policies

- ¥ Airdrops within the nature reserve will only be permitted for management or emergency purposes.
- ¥ Except in an emergency, all aircraft, including helicopters, will require an authority to land or take off in the nature reserve, as required by the *National Parks and Reserved Land Regulations 1999*.

5.3.2 Vehicles (also see Section 4.4)

Conventional vehicles are able to access the nature reserve from the western side via Palana Road and the Mount Boyes track. The track is in reasonable condition at present. However, its use remains largely weather dependent.

The Mount Boyes track passes over a saddle between Mount Boyes and a smaller peak to the south, affording a good view of the east coast. The track is not intended to be a through road and terminates at the boundary of private land. Access beyond this point can be difficult and often requires a four-wheel drive vehicle. It is proposed that a turning circle be constructed at the eastern end of this track.

Policies

- ¥ The Mount Boyes track will be managed as a shared vehicle and walking track. All

vehicles are to keep to safe speeds at all times.

- ¥ At all times pedestrians have absolute right of way over any motor vehicle, bicycle or other wheeled vehicle.
- ¥ The Mount Boyes track will only be accessed from Palana Road and will have a turning circle at the eastern end.
- ¥ Other vehicle tracks within the nature reserve will be limited to those designated in this plan.
 - Before any re-routing of existing vehicle tracks, survey the proposed route for disease risk, habitat and species significance, and heritage significance.
- ¥ Vehicle track development and maintenance will accord with the prescriptions in Section 5.4.

Actions

- ¥ Support from relevant authorities will be sought to provide adequate direction signs to the nature reserve.
- ¥ Construct a turning circle at the junction of the Mount Boyes track with the main track leading to the Oakdale property.
- ¥ For fire management purposes, designate tracks to be retained or constructed as fire breaks or fire trails.
- ¥ Bring tracks designated for public and management use to an adequate standard.
- ¥ Gate or otherwise restrict public access to vehicle tracks designated for management purposes only.
- ¥ Permanently close and rehabilitate vehicle or other tracks not required for public or management use.

5.3.3 Walking

There are no developed walking tracks in the nature reserve. However the Mount Boyes track is used as a walking route. This track is four to five kilometres long and relatively flat except where it rises to pass over the saddle of Mount Boyes and a smaller hill to the south. As this will be a shared walking and vehicle track there are some public safety concerns. This risk could

be minimised by implementing vehicle speed restrictions along the track.

Within the nature reserve a short half-hour walk from the existing track to the summit of Mount Boyes has been proposed. This could provide an interesting botanical walk and good views of the coast. However, there is a concern that further track development in this part of the nature reserve would facilitate the spread of cinnamon fungus from the Mount Boyes track into an area that is presently free of the disease. If a walking track to the summit of Mount Boyes were established it would require strict hygiene procedures.

Policies

- ¥ The Mount Boyes track will be managed as a shared vehicle and walking track.
- ¥ At all times pedestrians have absolute right of way over any motor vehicle, bicycle or other wheeled vehicle.
- ¥ Priority will be given to upgrading existing tracks before any new tracks are constructed.
- ¥ Before construction of any new walking tracks, or re-routing of existing tracks, survey the proposed route for disease risk, habitat and species significance, and heritage significance.
- ¥ Exact track locations and standards will be determined, and construction undertaken, using appropriate guidelines from the Walking Track Management Manual (Blamey, 1987).
- ¥ With the exception of a proposed side track to the summit of Mount Boyes, walking tracks will not be constructed in the Nature Zone unless monitoring of walking routes indicates the need for minimal surfacing and drainage for environmental protection purposes only.

Actions

- ¥ Liaise with the Department of Infrastructure, Energy and Resources to establish speed signs along the Mount Boyes track.
- ¥ Maintain and clearly mark all designated walking tracks.

5.3.4 Bicycles

Vehicle tracks in the reserve are used by cyclists, particularly by mountain bikes. The use of bicycles, particularly mountain bikes, is increasing. Inappropriate use of bicycles can cause conflict with other users and impact on environmental, Aboriginal and historic heritage.

Policies

- ¥ Bicycles will only be permitted on the one designated vehicle track within the nature reserve.
- ¥ Bicycles will not be permitted on any walking tracks should they be developed.

Actions

- ¥ Designate and signpost vehicle tracks available for bicycle use.
- ¥ Prepare, disseminate and enforce a code of practice for the use of bicycles in the nature reserve.

5.4 Developing Facilities and Services

At present, facilities in the nature reserve are limited to one access track and a few signs. There are no toilets or overnight camping areas in the reserve.

As the primary reason for the existence of the nature reserve is the protection of biological and geological diversity, the area is seen more as an educational and scientific resource than a recreational one. Therefore any future developments should be of a low-key nature, perhaps in the form of a short guided nature trail to provide an educative and interpretive opportunity in the southern part of the nature reserve.

Objectives

The objectives of developing visitor facilities and services are to:

- ¥ provide opportunities for activities, relaxation, contemplation, enjoyment and educational experiences through direct contact or participatory involvement with the values of the nature reserve;

- ¥ enrich visitor experiences of the nature reserve;
- ¥ encourage understanding of and support for the nature reserves by highlighting and presenting its values;
- ¥ minimise impacts on nature reserve values;
- ¥ promote sound, sustainable, environmental behaviour and practices;
- ¥ contribute directly to meeting the costs of researching, protecting, and managing the nature reserve;
- ¥ provide an economic benefit to the community.

Policies

- ¥ Any visitor facilities will mainly be concentrated outside the nature reserve.
- ¥ Some basic interpretation may be provided in the Recreation Zone.
- ¥ No interpretation facilities will be located in the Nature Zone(s).
- ¥ Any interpretation facilities will be low-key and of a scale and design which is visually unobtrusive.
- ¥ Playground equipment will not be provided in the nature reserve.

5.4.1 The Recreation Zone

This zone encompasses the main access track, known in this management plan as the Mount Boyes track, into the nature reserve.

Policies

- ¥ The Mount Boyes track will be managed as a shared vehicle and walking track.
- ¥ Priority will be given to upgrading existing tracks before any new tracks are constructed.
- ¥ Before any re-routing of existing vehicle tracks, survey the proposed route for disease risk, habitat and species significance, and heritage significance.

Table 4 Summary of Permitted Facilities, Services, and Activities in Wingaroo Nature Reserve by Management Zone

e = existing, p = potential

Facility, Service or Use	Management Zone				
	Recreation Zone	Nature 1 Zone	Nature 2 Zone	Special Use Zone	Special Mgt Area
Built accommodation	No	No	No	No	No
Camping	No	No	No	No	No
Standing camp	No	No	No	No	No
Bicycles	Yes (e)	No	No	No	No
Vehicles	Yes (e)	No	No	No	No
Walking tracks	Yes (e)	No	No	No	No
Fire trails	No	No	Yes (e)	No	Yes
Toilets	No	No	No	No	No
Fires	No	No	No	No	No
Gas barbecues	No	No	No	No	No
Research	Yes	Conditional	Yes (e, p)	Yes (p)	Yes (p)
Education programs	Yes	No	Yes (p)	Yes (p)	No
Picnic facilities	No	No	No	No	No
Domestic animals	No	No	No	No	No
Hunting	No	No	No	No	No
Interpretive displays	No (p)	No	No	No	No
Direction signs	Yes (e, p)	No	No	No	Yes (e)
Rubbish collection	No	No	No	No	No

- ¥ Types of recreational use and levels of use will be limited to those which minimise impacts on environmental and heritage features and values.
- ¥ Facilities in this zone, depending on the location, may be developed to the level of walking tracks, vehicle tracks for management purposes, and signs.
- ¥ Any developments in the zone will accord with prescriptions set out in Section 4.6.
- ¥ Rubbish bins will not be provided in the nature reserve and visitors will be required to carry out their rubbish.
- ¥ Signs will be limited to those giving information on directions, historic features, safety of users, or protection of the nature reserve.

Actions

- ¥ Maintain and, as necessary, upgrade existing tracks to ensure protection of the environment and the reasonable safety of users.
- ¥ Clearly mark tracks.
- ¥ Monitor and respond to user impacts.

5.4.2 The Nature 1 Zone

This zone encompasses the area between the fire break and the southern boundary of the nature reserve. This part of the nature reserve has a high level of conservation significance and access will be strictly managed.

This part of the nature reserve has particular significance for flora conservation. A population of *Banksia serrata* and priority forest communities are located within the zone. Protection of these different vegetation types and the prevention of cinnamon fungus disease are the primary management concerns (see Section 5.4.5).

Policies

- ¥ Visitors will not be encouraged to access this part of the nature reserve.
- ¥ No vehicle or new walking tracks will be provided for in this zone.
- ¥ No visitor buildings or similar facilities will be provided in the Nature 1 Zone.
- ¥ Temporary standing camp, equipment cache, or similar accommodation provisions will not be permitted in the zone.

Actions

- ¥ Monitor the disease status of the zone.
- ¥ Monitor and respond to any disturbance within the zone.

5.4.3 The Nature 2 Zone

This zone encompasses the majority of the nature reserve. This is a largely unmodified natural area containing vulnerable species such as the horny cone-bush (*Isopogon ceratophyllus*). Disturbance within this zone will be minimised as far as possible.

The primary purpose will be to provide reference areas for research and educational programs. Limited recreational use is allowed to a level compatible with the conservation of natural and cultural features.

Policies

- ¥ Visitors will be educated about appropriate minimal impact behaviour and practices.
- ¥ No visitor buildings or similar facilities will be provided in the Nature 2 Zone.
- ¥ Temporary standing camp, equipment cache, or similar accommodation provisions will not be permitted in the zone.
- ¥ Vehicle access may be restricted to reduce environmental degradation.
- ¥ Scientific research directed at conserving and better managing natural or cultural features will be encouraged.

Actions

- ¥ Monitor and respond to user impacts within the zone.
- ¥ Close and rehabilitate all minor tracks originating from private blocks into the nature reserve, with the exception of those being used to legitimately access private blocks.

5.4.4 Special Use Zone

This zone encompasses areas subject to use of natural resources or for a particular purpose.

Within the nature reserve this zone applies to any gravel pits and a licensed rubbish tip on the western boundary.

Policies

- ¥ Monitor site impacts and impacts on surrounding areas with a view to preventing impacts from spreading into the adjacent zone(s).
- ¥ Any commercial/private operations or facilities must be licensed or leased.
- ¥ Monitor license or lease conditions and modify as necessary to ensure that the values of the nature reserve are not being compromised.
- ¥ Areas adjacent to the site may need to be modified to reduce the risk of fire escaping from the site.
- ¥ Ensure public safety where there is public access to the site.
- ¥ Rehabilitate degraded areas where possible.
- ¥ Where possible, ensure that disturbance to natural areas can be rehabilitated should use of the site cease.

Actions

- ¥ Review the conditions of the licence for the rubbish dump to prevent ground water contamination, reduce the fire risk and potential for weed escapes and possible spread of cinnamon fungus.
- ¥ Cooperate with and provide advice to Flinders Council on the rehabilitation of the gravel pit located on Crown land beside the nature reserve.
- ¥ Liaise with Flinders Council to identify sites on Crown land suitable for gravel extraction.
- ¥ Rehabilitate any gravel pits within the nature reserve.

5.4.5 Special Flora Management Area

A special flora management area is proposed on the western side of the nature reserve and between the fire break and the southern boundary of the reserve (Map 3). Its purpose is to protect

highly susceptible species and communities present in the reserve, including the threatened species *Banksia serrata* and *Isopogon ceratophyllus*. These species require specific management measures beyond those applied to the underlying zone.

Zone set out in Section 5.4.1, development proposals will not be considered for the nature reserve.

Of particular concern is the *Banksia serrata* population in the southern part of the nature reserve and other heath species on the western side of the reserve (see Map 3). In these areas of the reserve there is a greater risk of risk of cinnamon fungus infection due to the presence of tracks and developed areas adjacent to the nature reserve.

Policies

- ¥ Public access within this area will be restricted.
- ¥ Scientific research in the area will be subject to agreed quarantine procedures to prevent the introduction of cinnamon fungus disease into the area.
- ¥ No new vehicle or walking tracks will be constructed in the area.
- ¥ Existing tracks within the area will be closed, except those required for management purposes.
- ¥ No visitor buildings or similar facilities will be provided in this area.

Actions

- ¥ Further sampling is required to determine whether cinnamon fungus infection is present within these areas.
- ¥ Implement quarantine procedures for the stand of *Banksia serrata* to prevent the introduction of cinnamon fungus.
- ¥ Implement suitable control strategies identified in the feral pig management plan developed for Flinders Island to reduce the number of feral pigs in the nature reserve.

5.4.6 Assessing Development Proposals

Policy

- ¥ Except for the provisions of the Recreation

6 Involving the Community

6.1 Community Support

Community recognition of the importance and support for the nature reserve is very important. Although limited use is made of the nature reserve, community acceptance of the objectives of the reserve and the management problems it faces is critical for the future well-being of the area.

Initiatives such as Wildcare can be utilised to develop partnerships between volunteers and the Parks and Wildlife Service to deliver community action for natural and cultural heritage conservation. Interested groups can seek financial support for partnership projects under the Wildcare program.

Objectives

The objectives of fostering community support are to:

- ¥ develop community appreciation of and support for nature reserve values;
- ¥ promote a positive image of the nature reserve and its contribution to the community; and
- ¥ encourage community involvement in nature reserve management.

Policies

- ¥ Relevant people, communities and groups will be consulted when their interests may be affected.
- ¥ Partnerships will be developed with local and other communities and groups that wish to be involved in the management of the nature reserves in accordance with this management plan.
- ¥ Volunteers will be encouraged when suitable, planned and programmed works and adequate supervision are available.

Actions

- ¥ Develop mechanisms and opportunities for consulting with people interested in management of the nature reserve.

- ¥ Encourage community involvement through the Wildcare structure.

6.2 Working with Neighbours

Much of the nature reserve shares boundaries with private land, comprising predominantly rural holdings. The management of the nature reserve will affect landowners in regard to policies and actions relating to fire, feral animal and plant disease management and general use of the reserve. The nature reserve can also be affected by surrounding private land, in terms of weed and cinnamon fungus invasion and fire control.

Objectives

The objectives of working with neighbours are to:

- ¥ take account of concerns of neighbours in managing the nature reserve;
- ¥ encourage conservation and sound land management practices on lands adjoining the nature reserve; and
- ¥ enlist the cooperation of neighbours in conserving nature reserve values.

Policies

- ¥ Neighbouring landowners and land managers will be consulted when their interests may be affected.
- ¥ Establish liaison with neighbours in relation to minimising impacts on the reserve of adjacent land-use practices on adjoining properties (e.g. reducing fertiliser drift), with a view to achieving positive outcomes.
- ¥ Management agreements may be developed with neighbours.

Action

- ¥ Regularly liaise and develop good working relations with adjacent landowners and land managers on management issues and projects of common interest.

7 Other Issues

7.1 Boundaries

The nature reserve shares boundaries with a number of private blocks mainly on its external boundary. When the Wingaroo Nature Reserve was proclaimed in 1991, there were two large private parcels within the reserve boundary which became wholly surrounded by the reserve. At the time of proclamation it was generally agreed that negotiations would be entered into for the purchase of private land captured by reserve boundaries, preferably by exchange with Crown land further to the south. In 1992, one of these blocks was acquired and automatically became a conservation area. This block should be added to the nature reserve as soon as practicable.

The remaining privately held block at the northern end of the reserve is completely surrounded by the reserve on all sides. It is imperative that this private block is added to the reserve. The continued presence of private land within the nature reserve poses a considerable concern for future management. Any development of the block would necessitate infrastructure requirements such as roads and power. In addition, future development could result in enormous management problems, such as increased access, introduction of cinnamon fungus disease, fertiliser drift and increased fire risk. All these factors would impact on the visual or environmental values of the nature reserve.

Actions

- ¥ Add the existing conservation area to the nature reserve.
- ¥ Investigate the options available to secure the remaining parcel of private land at the northern end of the nature reserve.

7.2 Leases, Licences and Authorities

The *National Parks and Wildlife Act 1970* requires commercial activities undertaken in the nature reserve to be licensed. There are currently no licences issued for commercial tourism operators to utilise the nature reserve for guided tours and activities.

There are no authorised gravel pits within the nature reserve. There are a number of sites that are no longer used or have been put in without authority. These occur beside the various tracks in the nature reserve.

Flinders Council holds an annual licence for a two-hectare rubbish tip on the western side and within the nature reserve. The Council pays an annual licence fee in order to keep using the rubbish tip. A set of general conditions applies to this licence. This rubbish tip should be managed on a best-practice basis in accordance with the licence conditions and relevant Tasmanian environmental legislation. If this cannot be guaranteed then consideration should be given to closure at the expiry of the current licence with Flinders Council.

Objectives

- ¥ The objectives of leases, licences and authorities are to:
 - ¥ provide efficient and high-quality facilities and services to the public;
 - ¥ manage and control uses and activities not undertaken by the managing authority;
 - ¥ contribute to recovery of costs arising from leased, licensed or permitted uses; and
 - ¥ ensure nature reserve values are protected.

Policies

- ¥ All leases, licences and authorities will be consistent with the goals, objectives, and prescriptions of this management plan.
- ¥ Subject to the *National Parks and Wildlife Act 1970* and this management plan, leases and licences to provide services within the nature reserve may be issued for limited tourism or education purposes.
- ¥ No leases or licences for commercial development will be issued for the nature reserve. However, authorities may be considered.

- ¥ Authority to conduct infrequent, organised events or activities within the nature reserve, of not more than one week duration, may be issued by the Director. Where Section 25B of the *National Parks and Wildlife Act 1970* applies, a business licence will be required.
- ¥ Leases, licences and authorities may be issued for any zone in the nature reserve, provided that they conform with the objectives and prescriptions for that zone. Authorities to conduct scientific research may be issued for the nature reserve.
- ¥ Consistent with Section 4.6 of this plan, an environmental and heritage effects assessment may be required before lease, licence or authority proposals are considered.
- ¥ Compliance with the terms and conditions of leases, licences and authorities will be monitored and reviewed prior to any renewal.

Action

- ¥ The licence conditions for the rubbish tip should be reviewed to ensure that best practice at the site is occurring. If this cannot be demonstrated then the licence for the tip should not be renewed.

7.3 Research and Monitoring

Research, involving surveying, recording, monitoring and analysing, is a requisite for conservation of the values of the nature reserve. Scientific research is permitted in all zones of the nature reserve provided that the researcher has an authority to conduct the research and does so in accordance with the conditions of the authority.

Objectives

The objectives of research in the nature reserve are to:

- ¥ document and improve the understanding of environmental and heritage features and processes;
- ¥ use the nature reserve as a scientific reference area;
- ¥ improve knowledge and understanding of visitor behaviour;

- ¥ assess impacts of and long-term cumulative changes caused by development or use of the nature reserve; and
- ¥ assist and improve management of the nature reserve.

Policies

- ¥ All research proposed in this management plan will depend on availability of funding and other necessary resources.
- ¥ All proposed research which may have an impact on the nature reserve will require written approval of detailed study proposals and methods before research begins, and be subject to this management plan.
- ¥ Fungicide treatment will be required for equipment used in direct scientific sampling to prevent cinnamon fungus infection transfer (see Section 4.2.3).
- ¥ Researchers will submit to the managing authority not less than three copies of all work produced during the period of the research. The managing authority will determine requirements for the form of representation, its timing, confidentiality, and any other matters.
- ¥ Authorities for the collection of research material within the nature reserve will not be issued where the managing authority determines that it is possible and appropriate to collect the material outside them.
- ¥ Only research that does not have long term adverse effects on the environmental, heritage, or aesthetic values of the nature reserve will be permitted.
- ¥ The approval of the TALC and the Flinders Island Aboriginal community will be obtained for any research involving Aboriginal heritage.
- ¥ Research that improves the documentation and understanding of the environmental features and processes of the nature reserve, or assists with management, will be encouraged.
- ¥ Research that improves the documentation and understanding of Aboriginal and historic heritage and archaeological features of the nature reserve, or assists in management of them, will be encouraged.
- ¥ Research that improves the recording and

understanding of visitor numbers and characteristics, behaviour, needs and expectations, or assists visitor management, will be encouraged.

- ¥ Use and development practices will be monitored for their effects on nature reserve values and, where necessary, modified.
- ¥ The efficacy of management practices in the nature reserve and the effects of management actions on nature reserve values will be monitored and, where necessary, modified.
- ¥ Any cumulative changes in reserve values will be documented at regular intervals.

Priorities for research

- ¥ Establishing baseline data on the geoheritage, flora, fauna and cultural heritage of the nature reserve.
- ¥ Monitoring and researching the distribution, numbers and control of feral animals, weeds and diseases, particularly cinnamon fungus disease.
- ¥ Monitoring of ground water at the rubbish tip to assess the risk of contamination to ground water in the nature reserve.
- ¥ Systematic, reliable recording and analysis of visitor numbers, profiles and impacts.

7.4 Administration

Administratively, the nature reserve is part of the Northern Region of the Parks and Wildlife Service. The Senior Ranger (Furneaux Group) and two field officers are based at Whitemark on Flinders Island. These staff have day-to-day management responsibility for all conservation reserves and Crown land in the Furneaux Group. In addition to Parks and Wildlife staff, certain works in the nature reserve involve contractors and temporary staff.

Objectives

The objectives of administration of the nature reserve are to:

- ¥ ensure management responsibilities are efficiently and effectively carried out;
- ¥ ensure public safety and prompt response in emergencies; and

- ¥ enforce the management plan and relevant Acts and Regulations.

7.4.1 Search and Rescue, First Aid

Tasmania Police and the State Emergency Service have primary responsibility for all search and rescue within the nature reserve. Parks and Wildlife staff are often called upon to provide local knowledge.

Policy

- ¥ Resources for the nature reserve will be maintained at a level sufficient to provide a reasonable response to emergency situations.

Actions

- ¥ Cooperate with Tasmania Police and State Emergency Services in search and rescue operations.
- ¥ Maintain a reasonable store of first-aid supplies.
- ¥ Educate and encourage visitors to adopt safe practices and provide them with sufficient information about potential hazards to enable them to make responsible decisions.
- ¥ Establish a risk-management system that provides for regular identification, inspection, reporting and amelioration of existing and potential risks to public and staff safety.
- ¥ Ensure the training of staff in incident response procedures.

7.4.2 Enforcement

Policies

- ¥ Within the nature reserve, authorised staff of the Parks and Wildlife Service will be responsible for enforcing the provisions of the *National Parks and Wildlife Act 1970*, the *Aboriginal Relics Act 1975*, the *National Parks and Reserved Land Regulations 1999*, the *Wildlife Regulations 1971*, the *Aboriginal Relics Regulations 1978*, and any other Acts for which staff may be authorised.
- Other law enforcement will be the responsibility of Tasmania Police.

8 Implementation

8.1 Implementation of the Plan

Implementation of the actions proposed in this plan will be undertaken in stages and will be the responsibility of the relevant program areas within DPIWE. Achievement of these management actions will be evaluated as part of the service agreement process negotiated annually between the various program areas within DPIWE and operational staff.

Objectives

The objectives of implementing the plan are to:

- ¥ ensure that management actions are addressed in a timely and effective manner;
- ¥ implement the actions identified in the management plan with the assistance of and direction from relevant program areas.

Policies

- ¥ The actions proposed in this plan are summarised in Appendix 1 of this management plan.
- ¥ The actions in this plan have been prioritised in accordance with Appendix 1 and will be subject to the provision of funding and other resources sufficient to meet them.
- ¥ To coordinate effective implementation of this management plan, service agreements between program areas and operational staff will be reviewed annually to assess whether management priorities for the nature reserve have been met.
- ¥ As a general rule, higher-priority management tasks must be met prior to undertaking lower-priority management tasks. However, if opportunities arise to fund and implement lower priority works, these tasks can be undertaken, provided they are agreed to by program areas and operational staff.

Actions

- ¥ Inform program managers (see Appendix 1) of the relevant actions in the management

plan that are to be implemented by their program areas.

- ¥ Program managers are to review the implementation of the requirements of the management plan annually and revise their individual service agreements as necessary. Base any revision on analysis of past progress and incorporate newly identified requirements. Add a further year s program of tasks in each annual service agreement.
- ¥ Annually evaluate the outcomes of management against the objectives of the management plan through the Department s service agreement process.

8.2 Plan Revision

- ¥ Review the plan ten years after gazettal of its approval by the Governor, or sooner if research, monitoring, or other circumstances show this to be needed.
- ¥ Take into account the findings and recommendations of the relevant program areas in addressing and evaluating nature reserve management priorities in order to guide and progressively improve ongoing management of the nature reserve.
- ¥ The management plan may only be varied in accordance with the procedures set out in Sections 19 and 20 of the *National Parks and Wildlife Act 1970*.

Glossary

Biodiversity (biological diversity) means the variety of life forms: the different plants, animals and micro-organisms, the genes they contain, and the ecosystems they form. It is usually considered at four levels: genetic diversity, species diversity, ecosystem diversity and community diversity.

Conservation means all the processes and actions of looking after a place so as to retain its significance, always including protection, maintenance and monitoring.

DPIWE is the Department of Primary Industries, Water and Environment.

Earth processes are the interactions, changes and evolutionary development of geodiversity over time.

Geoconservation means the conservation of geodiversity for its intrinsic, ecological and heritage values.

Geodiversity means the range or diversity of geological (bedrock), geomorphological (landform) and soil features, assemblages, systems and processes that exist naturally.

Geoheritage means those components of natural geodiversity that are of significant value to humans for purposes such as scientific research, education, aesthetics and inspiration, non-destructive recreation, cultural development and contribution to the sense of place experience by human communities.

Indigenous species means a species that occurs at a place within its historically known natural range and that forms part of the natural biodiversity of a place.

ICOMOS means International Council on Monuments and Sites.

Introduced species means a translocated or alien species occurring at a place outside its historically known natural range as a result of intentional or accidental dispersal by human activities.

Natural integrity means the degree to which a natural system retains its condition and natural rate of change in terms of size, biodiversity, geodiversity and habitat.

Natural landscape means a large, relatively undisturbed area with topographic and catchment integrity where natural processes continue largely unmodified by human intervention.

Protection means taking care of a place by maintenance and by managing impacts to ensure that significance is retained.

TALC is the Tasmanian Aboriginal Land Council.

Threatened species means a species listed in the Schedules of the *Threatened Species Protection Act 1995*.

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Appendix 1

Implementation Priorities and Responsibilities

Note: The Program Areas nominated are responsible for the actions outlined in this schedule and for ensuring that they are implemented during the lifetime of the plan.

The figure(s) in brackets under the Action column is the relevant section of the management plan in which the action is prescribed.

ACTIONS BY ISSUE TYPE	PRIORITY	RESPONSIBLE PROGRAM AREA
Nature Conservation		
Prepare a detailed vegetation map and description of communities and species for the nature reserve. (3.4)	High	Nature Conservation Branch
Prioritise the protection of the remnant, fire-excluded plant communities where possible to exclude wildfire. (3.4, 4.1)	High	Nature Conservation Branch/Fire Management Section
Limit access to designated tracks in the nature reserve to minimise the spread of cinnamon fungus. (3.4, 4.2.3, 4.4, 5.3.2, 5.4.5)	High	Nature Conservation Branch
Implement quarantine procedures for the stand of <i>Banksia serrata</i> to prevent the incursion of cinnamon fungus. (4.2.3, 5.4.5)	High	Nature Conservation Branch
Monitor the population of <i>Banksia serrata</i> in the south-west corner of the nature reserve for any sign of cinnamon fungus. (3.4, 4.2.3, 5.4.5)	High	Nature Conservation Branch
Permanently close and stabilise those tracks and vehicle tracks not required for public access, management use or for access to private blocks. (4.3, 4.2.3, 4.4, 5.4.3)	High	Nature Conservation Branch
Prepare programs of ecological management, setting out the fire frequencies necessary to maintain habitat and viable populations of species of conservation value. (3.4, 3.5, 4.1)	High	Nature Conservation Branch
Maintain a mosaic fire regime in some parts of the nature reserve to provide habitat for the New Holland mouse. (3.5, 4.1)	High	Nature Conservation Branch/Fire Management Section
Prepare and/or implement management programs for threatened flora species or communities of conservation significance. (3.4)	High	Nature Conservation Branch
Conduct fauna surveys to fill gaps in knowledge useful for management and protection. (3.5)	High	Nature Conservation Branch
Liaise with Flinders Council and Transend to develop alternatives to grading under transmission lines adjacent to the nature reserve. (4.3)	High	Nature Conservation Branch

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Rehabilitate, re-vegetate or otherwise stabilise disturbed or eroding areas, including unwanted vehicle trails. (4.3)	High	Nature Conservation Branch
Implement the relevant prescriptions of any relevant threatened species recovery plans for species occurring in the nature reserve. (3.5)	Moderate	Nature Conservation Branch
Populations of rare species should be surveyed to determine their vigour and whether regeneration is occurring. (3.4)	Moderate	Nature Conservation Branch
Implement suitable control strategies identified in the feral pig management plan developed for Flinders Island to reduce the number of feral pigs in the nature reserve. (4.2.1, 4.2.3)	Moderate	Nature Conservation Branch
Monitor introduced animal populations and remove other introduced fauna species where practicable. (4.2.1)	Moderate	Nature Conservation Branch
Monitor and respond to user impacts in Nature 1 and Nature 2 Zones. (5.4.2, 5.4.3)	Moderate	Nature Conservation Branch
Prepare and disseminate an inventory of sites of geoconservation significance. (3.2)	Low	Nature Conservation Branch
Monitor and prevent any impacts on geodiversity values. (3.2)	Low	Nature Conservation Branch
Prepare weed management programs for weeds in the nature reserve as they become identified. (4.2.2)	Low	Nature Conservation Branch
Rehabilitate existing gravel pits within the nature reserve. (4.3, 5.4.4)	Low	Nature Conservation Branch
Cultural Heritage		
Make safe any dangerous structures. (3.6.2)	High	Cultural Heritage Branch
Remove damaging uses, activities and developments, that intrude upon or detract from heritage values. (3.6.2)	High	Cultural Heritage Branch
Where possible, mitigate natural processes that have an adverse effect on heritage values. (3.6.2)	High	Cultural Heritage Branch
Consult with the Aboriginal community on the management of Aboriginal heritage. (3.6.1)	High	Aboriginal Heritage Section
In cooperation with the Aboriginal community, identify and record Aboriginal sites. (3.6.1)	Moderate	Aboriginal Heritage Section
Monitor Aboriginal sites for, and protect from damage or interference. (3.6.1)	High	Aboriginal Heritage Section
Identify, record and assess the significance of any historic features. (3.6.2)	High	Historic Heritage Section

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Conserve and interpret key historic places for interaction with the general public. (3.6.2, 5.2)	Low	Historic Heritage Section /Visitor Services Branch
Fire Management		
Prepare a fire management plan for the nature reserve. (4.1)	High	Fire Management Section
Maintain fire trails and fire breaks as necessary. (4.1, 4.4, 5.3.2)	High	Fire Management Section
Fit fire management tracks not designated for public use with secure, locked gates. (4.1, 4.2.3, 4.4, 5.3.2)	High	Fire Management Section
Inform fire crews of the cinnamon fungus threat to the reserve so that they can take measures to avoid transporting the disease. (4.1, 4.2.3)	High	Fire Management Section
Liaise with Flinders Municipal Council to regularly maintain the roadside verges of Palana and North East River Roads by slashing or mowing to reduce the fire hazard during the summer period. (4.1)	Moderate	Fire Management Section /District Manager
Visitor Services		
Inform visitors of the cinnamon fungus threat to the nature reserve and explain measures required to control its spread. (4.2.3, 5.2)	High	Visitor Service Branch
Ensure all visitors and management staff comply with the requirements of a cinnamon fungus management program. (4.2.3, 4.5)	High	Visitor Services/District Manager
Make visitors aware that dogs are not permitted in the nature reserve. (4.2.1)	High	Visitor Services Branch
Inform visitors of, and encourage them to apply techniques for minimal impact use of the nature reserve. (4.5)	High	Visitor Services Branch
Educate and encourage visitors to adopt safe practices and provide them with sufficient information about potential hazards to enable them to make responsible decisions. (5.2, 7.4.1)	High	Visitor Services Branch
Provide prospective visitors with pre-visit information; in particular the cinnamon fungus threat to the reserve, make information available to local tourism operators, airport and information centres. (5.2)	High	Visitor Services Branch
Improve road signage to the nature reserve from the Palana Road. (5.2)	Moderate	Visitor Services Branch
Bring tracks designated for public and management use to an adequate standard. (5.3.2, 5.4.1)	Moderate	Visitor Services Branch
Maintain and clearly mark all designated walking tracks. (5.3.3, 5.4.1)	Moderate	Visitor Services Branch

Develop interpretation of any Aboriginal heritage of the nature reserve in consultation with the Aboriginal community. (3.6.1, 5.2)	Low	Visitor Services Branch /Cultural Heritage
Collect visitor arrival information at the main access point to the nature reserve. (5.1)	Low	Visitor Services
Monitor and investigate visitor pressures on the nature reserve. (5.1)	Low	Visitor Services
Consider the nature reserve in the development of any interpretation plan for conservation areas on Flinders Island, as part of a wider visitor strategy to guide development of interpretation facilities and resources. (5.2)	Low	Visitor Services
Designate and signpost vehicle tracks available for bicycle use. (5.3.4)	Low	Visitor Services
Prepare, disseminate and enforce a code of practice for the use of bicycles in the nature reserve. (5.3.4)	Low	Visitor Services
Critical Incident Response		
Ensure the training of staff in incident response procedures. (7.4.1)	High	Visitor Services (Critical Incident Response)
Respond to incidents involving pollution by oil and other hazardous or noxious substances within or adjacent to the nature reserve. (3.3)	High	Visitor Services (Critical Incident Response)
Park management staff to maintain a reasonable store of first-aid supplies. (7.4.1)	High	Visitor Services (Critical Incident Response)
Establish a risk-management system that provides for regular identification, inspection, reporting and amelioration of existing and potential risks to public and staff safety. (7.4.1)	Moderate	Visitor Services (Critical Incident Response)
Community Partnerships		
Regularly liaise and develop good working relations with adjacent landowners and land managers on management issues and projects of common interest. (6.2)	High	Community Partnerships
Seek the cooperation of the local community to undertake rehabilitation works. (4.4)	Moderate	Community Partnerships
Develop mechanisms and opportunities for consulting with people interested in management of the nature reserve. (6.1)	Moderate	Community Partnerships
Encourage community involvement through the Wildcare structure. (6.1)	Low	Community Partnerships
Liaise with other relevant government agencies and neighbouring landowners to ensure integrated management of the catchment of the nature reserve. (3.3)	Low	Community Partnerships

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Resource Use		
Cooperate with and provide advice to Flinders Council on the rehabilitation of the gravel pit located beside the nature reserve. (4.3, 5.4.4)	High	Crown Land Services
Liaise with Flinders Council to identify sites on Crown land suitable for gravel extraction. (5.4.4)	Low	Crown Land Services
Nature Reserve Additions		
Investigate the options available to secure the remaining parcel of private land at the northern end of Wingaroo Nature Reserve. (7.1)	High	Integrated Policies & Strategies (Conservation Initiatives)
Environmental Management		
Review the conditions of the licence for the rubbish tip to ensure best environmental management practice for the site. (5.4.4, 7.2)	High	Environment, Planning and Technical Services
Liaise with the Flinders Council to manage gravel pit with regard to the adjacent nature reserve. (4.3)	Moderate	Environment, Planning and Technical Services
Assess the potential for ground-water contamination in the nature reserve, in particular with relation to the rubbish tip on the western side of the reserve. (3.3, 7.3)	Moderate	Environment, Planning and Scientific Services
Plan Implementation		
Inform program managers of the relevant actions in the management plan that are to be implemented by their program areas. (8.1)	High	District Manager
Program managers are to review the implementation of the requirements of the management plan annually and revise their individual service agreements with the District if necessary. Add a further year s program of tasks in each annual service agreement. (8.1)	High	Individual program managers
Annually evaluate the outcomes of management against the objectives of the management plan through the Department s service agreement process. (8.1)	High	Program Manager/District Manager

Appendix 2

Flora of Wingaroo Nature Reserve

E	=	Endemic to Tasmania
I	=	Introduced to Tasmania
T	=	Listed in the Schedules of the <i>Threatened Species Protection Act 1995</i>

FAMILY	Species Name	Common Name
APIACEAE	<i>Centella cordifolia</i>	Centella
	<i>Xanthosia pilosa</i>	Woolly Xanthosia
	<i>Xanthosia tridentata</i>	Hill Xanthosia
ASPLENIACEAE	<i>Asplenium obtusatum</i>	Shore Spleenwort
ASTERACEAE	E <i>Ammobium calyceroides</i>	Spiny Swamp-daisy
	<i>Argentipallium dealbatum</i>	White Everlasting
	<i>Brachyscome cardiocarpa</i>	Blue Daisy
CASUARINACEAE	E <i>Allocasuarina monilifera</i>	Necklace Sheoak
CENTROLEPIDACEAE	<i>Centrolepis aristata</i>	Pointed Centrolepis
	<i>Centrolepis strigosa</i>	Hairy Centrolepis; Bristlewort
CRASSULACEAE	<i>Crassula helmsii</i>	Swamp Stonecrop
CUNONIACEAE	<i>Bauera rubioides</i>	Bauera, Wiry Bauera, Dog Rose
CUPRESSACEAE	<i>Callitris rhomboidea</i>	Oyster Bay Pine
CYPERACEAE	<i>Baumea juncea</i>	Bare Twig-rush
	<i>Gahnia radula</i>	Raspy Cutting-grass
	<i>Gahnia trifida</i>	Coast Cutting-grass
	<i>Hypolaena fastigiata</i>	Tassel Rope-rush
	Isolepis nodosa	Knobby Club-rush
	<i>Lepidosperma concavum</i>	Sand or Hill Sword-sedge
	<i>Lepidosperma filiforme</i>	Thread Rapier-sedge
	<i>Schoenus lepidosperma</i> ssp. <i>lepidosperma</i>	Slender Bog-rush
DILLENACEAE	<i>Hibbertia acicularis</i>	Prickly Guinea-flower
	<i>Hibbertia empetrifolia</i>	Scrambling Guinea-flower
	<i>Hibbertia prostrata</i>	Bundled Guinea-flower
	<i>Hibbertia riparia</i>	Erect Guinea-flower
DROSERACEAE	<i>Drosera glanduligera</i>	Scarlet Sundew
	<i>Drosera macrantha</i>	Climbing Sundew
	<i>Drosera peltata</i> ssp. <i>peltata</i>	Slender Sundew
	<i>Drosera pygmaea</i>	Tiny Sundew
EPACRIDACEAE	<i>Astroloma humifusum</i>	Native Cranberry
	<i>Epacris impressa</i>	Common Heath
	<i>Leucopogon collinus</i>	White Beard-heath
	<i>Leucopogon ericoides</i>	Pink Beard-heath
	T <i>Leucopogon esquamatus</i>	Swamp Beard-heath
	<i>Leucopogon virgatus</i>	Common Beard-heath
	<i>Sprengelia incarnata</i>	Pink Swamp Heath

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EUPHORBIACEAE	<i>Pseudanthus ovalifolius</i>	Oval-leaved Pseudanthus
FABACEAE	<i>Aotus ericoides</i> <i>Daviesia ulicifolia</i> <i>Dillwynia glaberrima</i> <i>Gompholobium huegelii</i> <i>Platylobium triangulare</i> <i>Pultenaea gunnii</i> <i>Pultenaea juniperina</i>	Golden Pea, Common Aotus Native Gorse, Gorse Bitter-pea Smooth Parrot Pea Bladder-pea, Pale Wedge-pea, Karella Ivy Flat-pea Golden Bush-pea Prickly Beauty
GOODENIACEAE	<i>Dampiera stricta</i> <i>Scaevola hookeri</i>	Blue Dampiera Creeping Fan-flower
HALORAGACEAE	<i>Gonocarpus tetragynus</i>	Common Raspwort
HYDATELLACEAE	<i>Trithuria submersa</i>	Tiny Trithuria; Tiny Juncella
IRIDACEAE	<i>Patersonia fragilis</i>	Blue Iris, Short Purple-flag Iris
LAURACEAE	<i>Cassytha glabella</i> <i>Cassytha pubescens</i>	Slender or Tangled Dodder-laurel Hairy Dodder-laurel
LINDSAEACEAE	<i>Lindsaea linearis</i>	Screw fern
LYCOPODIACEAE	T <i>Phylloglossum drummondii</i>	Pygmy Clubmoss
LYTHRACEAE	<i>Lythrum hyssopifolia</i>	Hyssop Loosestrife
MALVACEAE	<i>Lawrenca spicata</i>	Salt Lawrenca
MIMOSACEAE	<i>Acacia genistifolia</i> <i>Acacia mucronata</i> var. <i>mucronata</i> <i>Acacia myrtifolia</i> T <i>Acacia retinodes</i> <i>Acacia suaveolens</i>	Spreading or Early Wattle Variable Sallow Wattle Myrtle Wattle Wirilda Sweet Wattle
MYRTACEAE	E <i>Eucalyptus globulus</i> ssp. <i>globulus</i> <i>Eucalyptus ovata</i> E <i>Eucalyptus nitida</i> <i>Kunzea ambigua</i> E <i>Leptospermum glaucescens</i> <i>Leptospermum scoparium</i> var. <i>scoparium</i> <i>Melaleuca gibbosa</i> <i>Melaleuca squamea</i> <i>Melaleuca squarrosa</i>	Tasmanian Blue Gum Swamp; Black or Marrawah Gum Smithton Peppermint White Kunzea; Tick-bush Semi-glaucous Tea-tree Manuka Small-leaved Paperbark Swamp or Heath Honey-myrtle Scented Paperbark
ORCHIDACEAE	<i>Corybas diemenicus</i>	Stately Helmet Orchid
POACEAE	I <i>Poa annua</i> T <i>Sporobolus virginicus</i>	Tussock Grass Salt Couch
POLYGALACEAE	<i>Comesperma calymega</i> <i>Comesperma ericinum</i> <i>Comesperma volubile</i>	Spike or Blue-spike Milkwort Heathy Milkwort Blue Love Creeper
POTAMOGETONACEAE	T <i>Potamogeton pectinatus</i>	Fennel Pondweed
PROTEACEAE	<i>Banksia marginata</i> T <i>Banksia serrata</i> <i>Hakea nodosa</i>	Silver Banksia, Honeysuckle Saw-leaved Banksia Yellow Hakea

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	<i>Hakea teretifolia</i>	Dagger Hakea
	T <i>Hakea ulicina</i>	Furze Hakea
	T <i>Isopogon ceratophyllus</i>	Horny Cone-bush
	E <i>Lomatia tinctoria</i>	Guitar Plant
	E <i>Persoonia juniperina</i> var. <i>brevifolia</i>	Prickly Geebung
RESTIONACEAE	<i>Empodisma minus</i>	Spreading Rope-rush
	<i>Leptocarpus tenax</i>	Slender Twine-rush
RHAMNACEAE	T <i>Pomaderris intermedia</i>	Shrubby Dogwood
	T <i>Pomaderris paniculosa</i> ssp. <i>paralia</i>	Shore Dogwood
	Spyridium parvifolium	Dusty Miller
RUTACEAE	<i>Correa reflexa</i>	Native Fuchsia
SELAGINELLACEAE	<i>Selaginella gracillima</i>	Tiny Selaginella; Tiny Clubmoss
	<i>Selaginella uliginosa</i>	Swamp selaginella
STERCULIACEAE	<i>Lasiopetalum macrophyllum</i>	Shrubby Velvet Bush
STYLIDIACEAE	T <i>Stylidium despectum</i>	Small Trigger Plant
TREMANDRACEAE	<i>Tetradheca pilosa</i>	Common Lilac-bells, Hairy Pink-bells
VIOLACEAE	<i>Viola sieberana</i>	Tiny Violet
XANTHORRHOEACEAE	E,T <i>Xanthorrhoea arenaria</i>	Sand Grass-tree; Yacca
	<i>Xanthorrhoea australis</i>	Yacca Gum; Austral Grass-tree
	E,T <i>Xanthorrhoea bracteata</i>	Grass-tree, Black-boy
XYRIDACEAE	<i>Xyris operculata</i>	Tall Yellow-eye

Note: This is not a complete flora species list. Other rare, threatened and uncommon species are expected to occur in the nature reserve.

Sources: Kirkpatrick, J.B. 1977; Kirkpatrick, J.B. and Harris, S. 1999; Tasmanian Herbarium, 2000; GT Spot (DPIWE Database); *Threatened Species Protection Act* 1995.

Appendix 3

Known Fauna of Wingaroo Nature Reserve

E	=	Endemic to Tasmania
I	=	Introduced to Tasmania
T	=	Listed in the Schedules of the <i>Threatened Species Protection Act 1995</i>
*	=	To be verified if present in Wingaroo Nature Reserve

Mammals

T <i>Pseudomys novaehollandiae</i>	New Holland mouse
<i>Rattus lutreolus velutinus</i>	swamp rat
<i>Antechinus minimus</i> *	swamp antechinus
<i>Sminthopsis leucopus</i> *	white-footed dunnart
I <i>Rattus rattus</i>	black rat
I <i>Rattus norvegicus norvegicus</i>	brown rat
I <i>Felis catus</i>	feral cat
I <i>Sus scrofa</i>	feral pig
I <i>Mus musculus</i>	house mouse

Reptiles

<i>Egernia whitei</i>	White s skink
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Amphibians

<i>Limnodynastes dumerili</i>	banjo frog
<i>Limnodynastes tasmaniensis</i>	spotted marsh frog or spotted grass frog

Birds

<i>Zoothera lunulata</i>	bassian or White s thrush
<i>Acanthiza pusilla archibaldi</i>	brown thornbill
<i>Coracina novaehollandiae</i>	black-faced cuckoo-shrike
<i>Melithreptus affinis</i>	black-headed honeyeater
<i>Emblema bellum</i>	beautiful firetail
<i>Strepera fuliginosa</i>	black currawong
<i>Ninox novaeseelandiae</i>	boobook owl
I <i>Lophortyx californicus</i>	california quail
I <i>Sterna vulgaris</i>	common starling
<i>Phylidonyris pyrrhoptera</i>	crescent honeyeater
<i>Acanthorhynchus tenuirostris</i>	eastern spinebill
T <i>Sterna nereis nereis</i>	fairy tern
<i>Petroica goodenovii</i>	flame robin
E <i>Pardalotus quadragintus</i> *	forty-spotted pardalote
<i>Corvus tasmanicus</i>	forest raven
E <i>Platycercus caledonicus</i>	green rosella
<i>Strepera versicolor</i>	grey currawong
<i>Rhipidura fuliginosa</i>	grey fantail
<i>Colluricincla harmonica</i>	grey shrike-thrush
T <i>Accipiter novaehollandiae</i> *	grey goshawk
<i>Pachycephala olivacea</i>	olive whistler
I <i>Anas platyrhynchos</i>	mallard
<i>Falco peregrinus</i>	peregrine falcon
<i>Petroica rodinogaster</i>	pink robin
<i>Sericornis magnus</i>	scrub-tit
<i>Zosterops lateralis</i>	silveryeye
<i>Pardalotus striatus</i>	striated pardalote
<i>Melithreptus validirostris</i>	strong-billed honeyeater
<i>Cacatua galerita</i>	sulphur-crested cockatoo
T <i>Lathamus discolor</i> *	swift parrot
E <i>Acanthiza ewingii</i>	Tasmanian thornbill
<i>Podargus strigoides</i>	tawny frogmouth

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T, E <i>Aquila audax fleayi</i>	wedge-tailed eagle (Tasmanian)
<i>Sericornis frontalis</i>	white-browed scrubwren
<i>Calyptorhynchus funereus funereus</i>	yellow-tailed black cockatoo
<i>Lichenostomus flavicollis</i>	yellow-throated honeyeater
<i>Anthochaera paradoxa</i>	yellow wattlebird

Fish

<i>Galaxiella pusilla</i>	native galaxia
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Insects

<i>Hemiphebia mirabilis</i>	damsel fly
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Sources: Hocking, G. 1999; GT Spot (DPIWE Database); *Threatened Species Protection Act (Tasmania)* 1995.



