

Logan Lagoon  
Conservation Area  
(Ramsar Site)  
Management Plan

2000

DRAFT

# Logan Lagoon Conservation Area (Ramsar Site) Management Plan

2000



**Parks and Wildlife Service**

Department of Primary Industries,  
Water and Environment

**LOGAN LAGOON CONSERVATION AREA (RAMSAR SITE)  
DRAFT MANAGEMENT PLAN 2000**

This draft Management Plan for Logan Lagoon Conservation Area (Ramsar Site), has been prepared in accordance with the requirements of Part IV of the *National Parks and Wildlife Act 1970*.

Unless otherwise specified, this plan adopts the interpretation of terms given in Section 3 of the *National Parks and Wildlife Act 1970*. The term 'Minister' when used in the plan means the Minister administering the *Act*. The term 'conservation area' refers to the Logan Lagoon Conservation Area. The term 'PWS' refers to the Parks and Wildlife Service.

In accordance with Section 23 of the *National Parks and Wildlife Act 1970*, the managing authority for the conservation area will give effect to the provisions of this Management Plan.

**ACKNOWLEDGEMENTS**

Many people have assisted in the preparation of this plan by providing information and comments on earlier drafts. Their time and efforts are gratefully acknowledged.

**ISBN**

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## Making a Representation - What do You Think?

What do you think of the proposals in this draft management plan? This is your chance to have your say on how it is proposed to manage the Logan Lagoon Conservation Area for the next 10 years.

Copies of the draft plan are available for inspection or purchase at a cost of \$3 at Service Tasmania offices in Hobart, Launceston and Whitemark on Flinders Island, and at the Hobart, Launceston and Whitemark offices of the Parks and Wildlife Service, Department of Primary Industries, Water and Environment.

### Making a Representation

Please make your representation concise and clear. It will help if you refer to the section numbers in the plan. Say whether you agree or disagree with the actions proposed in the areas, which interest you. Wherever possible, give reasons and provide sources of information. Suggest alternatives if you disagree. Giving reasons, offering information and alternative suggestions will help improve the plan. Your representation should be addressed to:

The Minister for Primary Industries, Water and Environment  
First Floor  
Franklin Square Offices  
Hobart, Tasmania 7000

### How is Your Representation Assessed?

The Minister will consider all representations made with respect to the draft plan and may make alterations to the draft plan having regard to the representations. As a general guide, and depending on all the circumstances, the draft plan may be amended if a representation:

- provides new information relevant to planning and management;
- indicates proposed policies and actions are misunderstood and need clarification;
- clarifies or proposes policies and actions that would better achieve the management objectives;
- identifies a lack of policies or actions for particular issues; or
- corrects errors, omissions or lack of clarity.

Similarly, the draft plan may not be amended if a representation:

- contradicts planning proposals for which there is widespread support;
- conflicts with government policy;
- is contrary to the intention of relevant legislation or national or international conventions and agreements;
- is among widely divergent viewpoints better handled or balanced by the proposed approach to policies or actions;
- addresses issues beyond the scope of the plan; or
- ignores or contradicts relevant established facts.

### How Much Time Do You Have?

This draft management plan was released for public comment on the **2<sup>nd</sup> of September 2000**. Your comments should be submitted to the Minister by the **3<sup>rd</sup> of November 2000**.

### Confidentiality

Your representation may be accessible under the *Freedom of Information Act 1991*.

## Summary

Logan Lagoon Conservation Area on the south-east corner of Flinders Island in Bass Strait, is internationally recognised as a significant wetland, by its listing under the Convention on Wetlands of International Importance (the Ramsar Convention). The lagoon contains a particularly good example of a near natural wetland and provides feeding and resting habitat for a number of migratory waders including the red-necked stint, common greenshank, eastern curlew, bar-tailed godwit and double-banded plover, and is one of the major summer feeding grounds in Tasmania for these species. Twenty of these bird species are listed in international agreements between Australia and China and Japan, under which Australia has obligations to ensure the protection of listed migratory bird species and their habitats. The importance of Logan Lagoon as a wader feeding and resting site is also recognised with the lagoon being listed on the East Asian – Australasian Shorebird Site Network. The network links wetlands that are internationally important for shorebirds (waders) and occur within the East Asian – Australian Flyway. Logan Lagoon is one of only two Tasmanian sites out of the nine Australian sites on the network.

Little terns, listed as endangered under Tasmanian and Commonwealth threatened species legislation have been recorded breeding in the area.

Logan Lagoon's flora communities contain good examples of native coastal vegetation with remnant patches of pre-European vegetation types. The Holocene shorelines that incorporate the lagoon are representative and outstanding geomorphological examples for the local region.

The reserve is close to the township of Lady Barron, and is a popular location for the community and visitors. Recreational uses include walking, sightseeing, bird watching, off-road vehicle driving and beach fishing.

Logan Lagoon Conservation Area will be managed to protect its outstanding natural and cultural values, and provide for an appropriate range of recreational opportunities.

To these ends, the management plan proposes:

- greater involvement of the community, land owners and other stakeholders in management of the conservation area;
- liaising with neighbouring land managers to achieve co-operative and complementary management of adjoining areas, to protect the values of the conservation area;
- providing continued access for off-road vehicle users to the southern beach for fishing, whilst managing summer use of Planter Beach, to avoid disturbance of vulnerable shorebirds and damage to dunes and vegetation;
- improved interpretation of the Ramsar site, and investigating the potential for a bird hide and short interpreted walk; and
- guidelines for artificial breaching of the lagoon mouth under conditions of high water.

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## Part A Management Context

### Section 1 Introduction

This draft plan covers all of the land on the south-east coast of Flinders Island known as Logan Lagoon Conservation Area. First reserved in 1968, the area was listed as a Wetland of International Importance under the Ramsar Convention on Wetlands in 1982. Under the *National Parks and Wildlife Act 1970*, the Director, National Parks and Wildlife is the managing authority for the conservation area and is responsible for the preparation of a management plan.

Logan Lagoon Conservation Area is important for nature conservation because of its fauna, flora and geomorphological values. The lagoon is an important resting and feeding site for migratory waders. The flora communities, although dramatically altered by a high fire frequency, provide good examples of native coastal vegetation containing remnant patches of pre-European vegetation types. The Holocene shorelines that incorporate the lagoon are representative and outstanding geomorphological examples for the local region.

This plan outlines the long term management objectives of the reserve and the necessary management prescriptions to meet those objectives. It consists of three main parts:

Part A is an introduction and an account of the physical features, uses and management of the reserve for which management objectives and prescriptions are developed

Part B contains the management objectives and prescriptions for management and constitutes the Management Plan as required by Part IV of the *National Parks and Wildlife Act 1970*.

Part C is the Implementation Schedule of actions required and does not constitute part of the statutory management plan.

#### 1.1 The Ramsar Convention

The Convention on Wetlands (Ramsar, Iran 1971) is an intergovernmental treaty which provides the framework for international co-operation for the conservation and wise use of wetlands. It is the first of the modern global treaties on conservation and wise use of natural resources (Ramsar Convention Bureau 1997). The Convention, which is commonly referred to as the Ramsar Convention, takes its name from the Iranian city of Ramsar where the treaty was adopted in 1971.

The Ramsar List of Wetlands of International Importance has been established under the Convention. Sovereignty of the sites remains with the countries within which the sites are located. By January 2000 there were 117 Contracting Parties to the Convention, with 1,011 wetland sites totalling 71.8 million hectares, designated for inclusion in the list.

Management of wetlands and Ramsar sites should be in accordance

with the duties and obligations of signatories to the Convention. In particular, Article 3.1 states that the Contracting Parties “shall formulate and implement their planning so as to promote the conservation of wetlands included in the List, and as far as possible the wise use of wetlands in their territory”.

Australia was the first nation to become a Contracting Party to the Convention in 1971. It nominated Cobourg Peninsula, an Aboriginal Land and Conservation Area in the Northern Territory, as its first Ramsar site which, consequently, became the world’s first Ramsar site. Australia now has 53 Ramsar sites (at January 2000) covering an area in excess of five million hectares. Ten of these 53 sites are located in Tasmania.

The Logan Lagoon Conservation Area on Flinders Island was the fourth Australian Ramsar site to be listed under the Convention.

## 1.2 Criteria Met for Ramsar Listing

The Logan Lagoon Conservation Area meets the following criteria for listing as an internationally important wetland (full criteria are listed in Appendix 1):

- 1(a) it is a particularly good representative example of a natural, or near natural, wetland, characteristic of the appropriate biogeographical region;
- 2(c) it is of special value as the habitat of plants or animals at a critical stage of their biological cycle;
- 3(b) it regularly supports substantial numbers of individuals from particular groups of waterbirds, indicative of wetland values, productivity or diversity.

Logan Lagoon Conservation Area provides feeding and resting habitat for a number of migratory waders including red-necked stint *Calidris ruficollis*, common greenshank *Tringa nebularia*, eastern curlew *Numenius madagascariensis* and double-banded plover *Charadrius bicinctus*.

## 1.3 Migratory Birds Agreements

As a signatory to the Japan-Australia and China-Australia Migratory Bird Agreement (JAMBA/CAMBA), and as a member of the East Asian - Australasian Shorebird Site Network (EAASSN), Australia has obligations to ensure the protection of migratory bird species and their habitats.

## 1.4 Legislation and Administration

### 1.4.1 Legislation

Australia’s obligations under the Ramsar Convention are primarily met through legislation and administrative arrangements governed by the State and Territory Governments.

The Commonwealth *Environment Protection and Biodiversity*

*Conservation Act 1999* will provide a national legislative framework for the protection of Ramsar wetlands and listed migratory species when it comes into effect in July 2000.

Conservation areas are protected under the National Parks and Wildlife Act 1970 and are subject to the *Wildlife Regulations 1999* and the *National Parks and Reserved Land Regulations 1999*. All items of Aboriginal heritage in the state are protected under the *State Aboriginal Relics Act 1975*. The *Commonwealth Aboriginal and Torres Strait Islander Heritage Protection Act 1984* empowers the Commonwealth to protect threatened Aboriginal heritage at the request of Aboriginal people. Threatened plants and animals are protected under the *Threatened Species Protection Act 1995*. Historic cultural heritage is protected under the *Historic Cultural Heritage Act 1995*.

The Tasmanian State Coastal Policy 1996 applies to all Tasmanian coastal zones and provides for the sustainable development objectives of the *State Policies and Projects Act 1993* to be met.

#### **1.4.2 Administration**

The Wetlands Unit of Environment Australia is the administrative authority for the Ramsar Convention in Australia. Under the Australian Constitution, primary responsibility for land and resource use lies with the State and Territory Governments. Accordingly, in Australia the Convention on Wetlands is implemented primarily under State and Territory legislation. Co-ordination is achieved through a network of officers representing State, Territory and Commonwealth nature conservation agencies constituted under the auspices of the Australia and New Zealand Environment and Conservation Council (ANZECC), known as the Wetlands and Migratory Shorebirds Taskforce.

Management of the Logan Lagoon Conservation Area is the responsibility of the Director. The reserve lies in the Central North District of the Northern Region of the Parks and Wildlife Service. The staff of the Service are charged with enforcing the Acts and Regulations and may also be empowered to police other pertinent legislation in consultation with relevant authorities.

## **1.5 Location, Plan Area and Access**

Logan Lagoon Conservation Area is located 5km east of Lady Barron on the south-east coast of Flinders Island (Maps 1 & 2). The conservation area covers approximately 2172 hectares, with the centre of the lagoon at latitude 40°10' South, longitude 148°20' East. The eastern and southern boundaries of the reserve follow the low water mark. The western and northern boundaries follow title boundaries of freehold and Crown land.

Access to the conservation area is via Pot Boil Road and Logan Lagoon Road. Both roads are unsealed gravel. A fire trail cuts through the northern part of the conservation area and extends north through the unallocated Crown land to Cameron Inlet. This fire trail may not be usable during wet conditions, following burning of a bridge over Pot Boil Creek.

## **1.6 Adjacent Land Use**

Private land adjoins the conservation area to the west and unallocated Crown land adjoins to the north.

The unallocated Crown land, and some of the private land, is covered with native vegetation. Areas of cleared private land have been sown with pasture grasses and are used for grazing sheep and cattle. Artificial fertilisers and lime-sand are regularly spread over these pastures to increase grass productivity. Any runoff from these areas flows into the Logan Lagoon Conservation Area.

In wet seasons the lagoons within the unallocated Crown land are used for hunting ducks during the open season.

## 1.7 Reservation History

### **Conservation Area**

Logan Lagoon Conservation Area was declared “a sanctuary with respect to animals and birds” on 6<sup>th</sup> August, 1968 under the *Animals and Birds Protection Act 1928*. Following the passing of the *National Parks and Wildlife Act 1970* the area became a wildlife sanctuary. In 1974, two blocks on the north-east corner and one block on the eastern edge of the sanctuary were acquired and added to the conservation area. A further block on the western edge was acquired in May 1977. Under Section 17 of the *Regional Forest Agreement (Land Classification) Act 1998*, the Wildlife Sanctuary is declared to be reserved land in the class of Conservation Area and is taken to have been so declared under the *National Parks and Wildlife Act 1970*.

### **Ramsar Site**

Logan Lagoon Conservation Area was designated as a Ramsar site in 1982. The boundaries of the Ramsar site correspond to the boundaries of the Conservation Area.

### **Shorebird Network Site**

The conservation area was declared a Shorebird Network Site on the East-Asian-Australasian Shorebird Reserve Network in 1996 because of the presence of a significant number of double-banded plovers *Charidrius bicinctus*.



## Section 2 Features of the Area

### 2.1 Catchment

The catchment of Logan Lagoon is approximately 75 square kilometres and has been significantly increased in area from its original size because of the construction of drainage channels throughout Bootjack Flats and other low lying areas. Most of the catchment is privately owned and has been cleared and drained for grazing.

### 2.2 Geology, Geomorphology and Soils

The geology of the Furneaux Group can be characterised as an older (Palaeozoic) basement consisting of folded quartzites and argillites (the Mathinna beds) intruded by granite plutons. These are all overlain unconformably by a much younger superficial layer of Cainozoan sediments (Dixon 1996).

Flinders Island was isolated from mainland Australia by rising sea levels following the last glacial period, 13,000 years before present (BP) and from Tasmania approximately 8,000 years BP.

Logan Lagoon is part of the extensive eastern Flinders Island parallel dune - coastal barrier system, and associated coastal lagoons and inlets. Building of the system followed the establishment of present sea levels approximately 6000 years ago. The east coast has consisted of two embayments in the past which have gradually been reduced to the present alignment by barrier formation (south of Sellars Point) and shoreline progradation. The east coast of Flinders Island appears to be prograding at a faster rate than any other part of the 'sandy' Tasmanian coast (Dixon 1996).

Around Logan Lagoon a number of old, slightly higher than present, strand lines are evident which suggest recent uplift, or higher mid Holocene sea levels and consequently, this area has been identified as a site of geoconservation significance (Dixon 1996). Part of the east coast dune system on Flinders Island has also been identified as having National Estate significance.

Logan Lagoon is isolated from the sea by a large sand bar. This bar is breached very rarely under natural conditions, usually when lagoon levels are at their maximum.

Soils within the Logan Lagoon Conservation Area are dominated by uniform sandy deposits. The beaches are composed of undifferentiated, calcareous sand and are highly susceptible to wind and wave erosion. Inland the soils consist of a surface layer of organic materials.



## **2.3 Climate**

The Flinders Island airport at Whitemark is the only station on the island with a complete range of meteorological records. The station is approximately 25km WNW of the lagoon and is more exposed to the prevailing westerly winds than Logan Lagoon.

Flinders Island experiences a mild maritime climate similar to, but warmer during the summer than, other coastal areas of northern Tasmania and Bass Strait. July is the coldest month with mean daily temperatures ranging from 6.1°C to 13.2°C and February the warmest month with mean daily temperatures ranging from 13.4°C to 22.5°C. The airport receives an average annual rainfall of 770mm. Rain is normally winter/spring dominant and annual rainfall variability is low from 41mm in February to 89mm in July.

The effect of the maritime influence in moderating temperatures and preventing major fluctuations is clearly evident. Frosts (climatologically defined to be when the air temperature at a height of 1.3m decreases below 2.2°C) are rare with an average of 21 days per year and occur between June and September. The minimum temperature recorded at the Flinders Island airport is -3.5°C.

## **2.4 Hydrology**

The catchment of Logan Lagoon is low lying with the water table very close to the soil surface. Only one small natural watercourse, Pot Boil Creek, flows into Logan Lagoon.

Logan Lagoon is generally 1-2m in depth and is isolated from the sea by a large sand bar. Consequently, the water level of the lagoon fluctuates seasonally with rainfall, generally being high during winter and spring and low during late summer and autumn. Opening of the sand bar occurs infrequently under natural conditions, either from overflow when the lagoon is full or when rough seas erode the dunes in easterly weather. In extended dry periods (1995 - 96 and 1998 through to early 2000) the lagoon dries out and water is only contained in the southern most section of the lagoon. All other lagoons on the east coast of Flinders Island, except Cameron Inlet, are also dry. During much of 1998, 1999 and early 2000, the lagoon mouth has been open naturally.

On private land adjacent to Logan Lagoon drains have been constructed. Water has been directed into the lagoon from as far away as Bootjack Flats approximately seven kilometres west of the lagoon. Many of these drains have become overgrown with vegetation preventing the movement of water. During extended periods of wet weather the land adjacent to the lagoon becomes waterlogged. The water level in the lagoon is often blamed for this waterlogging and consequently, on occasions, the mouth has been artificially opened, illegally. A Department of Agriculture (1987) report indicates that the waterlogging is caused by lack of water movement within the drains rather than the water level of the lagoon.

Most of the water that enters the Logan Lagoon Conservation Area originates or flows through land that is subject to agricultural activities, particularly the improvement of pasture for grazing. Runoff and leaching into the water system of fertilisers, herbicides and pesticides may indirectly have a significant impact on the natural properties of the lagoon through changes in water parameters, such as pH, phosphates, nitrates, and turbidity.

## 2.5 Flora

The vegetation of Logan Lagoon and the Flinders Island east coast plain reflects the constraints imposed by the physical environment. Since early European settlement the vegetation has been dramatically altered with the use of fire for land clearance. The relationship between vegetation and fire is largely responsible for the pattern observed in the present vegetation of the conservation area.

The low lying country around Logan Lagoon comprises unconsolidated sediments covered with a complex mosaic of scrub, forest, heath, grassland and herbfield. Fire frequency and drainage/salinity are the most likely major variables that determine the vegetation and species at any locality.

On the eastern side of the lagoon there is dense coastal shrubbery of coast wattle *Acacia sophorae* and coast tea tree *Leptospermum laevigatum* interspersed with some grassy patches. North of Logan Lagoon on the leeward of other lagoons, there is forest and scrub which is subject to a lower fire frequency than the vegetation on the windward side. The prevailing wind direction is from the west and north west. The lagoons consequently act as fire breaks which protect vegetation from many fires. This more protected vegetation is dominated by Smithton peppermint *Eucalyptus nitida*, *L. laevigatum* and honeysuckle *Banksia marginata* and Oyster Bay pine *Callitris rhomboidea*. Three successive fires, with intervals of less than eight years, will cause local extinction of *C. rhomboidea*.

On the windward side of Logan Lagoon, and in the southern part of the conservation area, there is mainly *E. nitida* dominated scrub with a heathy understorey which in many places has been converted to a predominantly bracken understorey by the high fire frequency. Some *Eucalyptus viminalis* occurs on the dune ridges.

Around the edges of the lagoon there are pockets of golden speargrass *Stipa stipoides* grassland and coastal tussock grass *Poa poiformis* grassland. The former has salt tolerant herbs such as *Samolus repens* and *Selliera radicans*. Samphire *Sarcocornia quinqueflora* is scattered on the fringes of the lagoon on the flats which are subject to periodic inundation.

In poorly drained swales and along drainage channels coastal paperbark *Melaleuca ericifolia* thickets occur.

### 2.5.1 Threats to the Flora Values

The main threats to the plant species within the conservation area are feral pigs (Section 2.10.1), and an inappropriate fire regime. Feral pigs occur throughout the conservation area, usually associated with seasonal wetlands because of their reliance on fresh water. Extensive runways have been created and large areas of the soft sandy soils are uprooted in the pigs' search for food. There are no reliable population estimates and the extent of their impact needs to be determined.

Funds were obtained in 1998 from the Natural Heritage Trust to undertake a comprehensive study of feral pigs on Flinders Island. Its aim is to focus on the values of the east coast wetlands and develop more effective management strategies for their control.

Frequent firing has, in some areas, led to the replacement of woody vegetation by floristically poor bracken fields or tussock grasslands. The dense vegetation is often perceived as a safety risk due to potential wildfire and often results in legal and illegal fuel reduction burning. Species which regenerate from seeds, rootstocks or sensitive underground organs are often eliminated by such frequent fires.

Human interference in the natural processes of the lagoon, such as artificially opening the mouth, may be detrimental to some aquatic plant and algal species. Species that occur in these coastal lagoon systems have adapted to the extreme variability in conditions from freshwater to hypersaline and even extended periods of drying. Some species may rely on a particular stage of this process for their survival.

Although present on Flinders Island, *Phytophthora cinnamomi* is not considered a threat to the vegetation of the conservation area.

A number of weeds are found in the conservation area (Section 2.10.1).

## 2.6 Fauna

Over 160 bird species have been recorded from Flinders Island (Appendix 4), many of which would occur in the conservation area. Being situated between Tasmania and the Australian mainland, Flinders Island contains many bird species that are present on one but not the other. Logan Lagoon provides important resting and feeding habitat for a number of migratory waders. Thirteen migratory wader species have been recorded and all but one of these, the double-banded plover *Charadrius bicinctus*, breed in the Arctic region during the northern hemisphere summer and migrate south for the southern hemisphere summer. The double-banded plover breeds in New Zealand and migrates to Australia in January. Many of these migratory waders are also listed on the Japan/Australia and China/Australia Migratory Bird Agreements (JAMBA/CAMBA) which are treaties signed by the governments of Australia and Japan/China to protect migratory birds and their environments. The importance of Logan Lagoon as a wader feeding and resting site is also recognised with the lagoon being listed on the East Asian - Australasian Shorebird Site Network (see Section 3.1).

Eight duck species have been recorded on the island of which four species - black duck, Australian shelduck, chestnut teal and grey teal, are hunted during the duck season. The lagoon is an important refuge for these species during the hunting season, as hunting is not

permitted within the conservation area.

Cape Barren geese are considered to be the world's second rarest goose species. The species was nearly hunted to extinction in the mid 1800's to early 1900's by sealers and settlers and although fully protected in 1929, the population was only approximately 600 birds by 1960. With the increase in improved pasture the population in the Furneaux Islands has increased to about 8500 birds on Flinders Island and approximately 15000 in total. During the 1970's areas in the conservation area were planted with grass to provide a refuge and food source for the geese to attract them away from pasture on private property.

Flinders Island contains a smaller number of native mammal species than is found on mainland Tasmania with only fourteen of the 35 Tasmanian species being present (Appendix 4). All of these mammals are likely to occur in the conservation area, including the New Holland mouse which is listed as rare under the *Threatened Species Protection Act* 1995. Calcified remains of a number of species now extinct on Flinders Island have been recorded from eroded dune deposits including Tasmanian devil, eastern and spotted-tailed quoll, eastern barred bandicoot, eastern grey kangaroo and three rodent species (Edgecombe 1986).

Six of the 11 Tasmanian frog species occur on Flinders Island (Appendix 4) and all are likely to occur in freshwater lagoons and drains within the Ramsar site. One of these species, the green and gold frog *Litoria raniformis* is listed as vulnerable.

Nine native freshwater fish species occur on Flinders Island, all of which are likely to occur in Logan Lagoon or Pot Boil Creek (Appendix 4). The dwarf galaxias (*Galaxiella pusilla*) is the only species considered threatened and is listed as rare in Tasmania.

### **2.6.1 Threats to the Faunal Values**

Logan Lagoon is an important refuge for birds during the duck hunting season. During dry summers Logan Lagoon and all the smaller lagoons on the east coast dry out, leaving only Cameron Inlet holding sufficient water to support waterbirds. At such times duck species are forced to congregate at Camerons, where they can be easily shot.

Human interference in the natural processes of a lagoon by artificially opening the mouth, has adverse impacts on waterfowl (Mooney 1996). Impacts include:

- reduced food supplies and a consequent decline in hatchlings, primarily due to a reduced water perimeter and shallows;
- reduced nest security and increased exposure to predation;
- reduced chick survival due to exposure while moving over sand and mud to the receding waters edge;
- reduced chick survival due to reduced food supplies and vegetation cover.

Evaporation from saline wetlands increases salinity, which is not suitable for chicks. Additionally, the overflow from drains entering the lagoon would go out to sea through the breached lagoon mouth rather than replenishing the habitat of surrounding wetlands, further

reducing suitable habitat.

Artificial breaching may also be detrimental to some aquatic animal species, particularly invertebrates and micro-crustacea. Species that occur in these coastal lagoon systems have adapted to the extreme variability in environmental conditions from freshwater to hypersaline and even extended periods of drying. Some species may rely on a particular stage of this process for their survival.

Feral cat numbers are believed to be increasing on Flinders Island, and these may present significant threats to the fauna of the conservation area, particularly small mammals, reptiles and birds. Some exotic birds are also present (see Appendix 4). European starlings compete with native birds for nesting hollows. Domestic dogs sometimes stray in or are brought into the conservation area. Rabbits and foxes have not been introduced to Flinders Island, which is fortunate because these two species can have a devastating impact on vegetation and native fauna.

The presence of species that are not indigenous to the area is out of keeping with its purposes of reservation.

## **2.7 Values on Adjacent Land**

Cameron Inlet, an area of unallocated Crown land to the north of Logan Lagoon, is an important feeding and resting area for waders, ducks, swans and other waterbirds. The Inlet is considered equally as important as Logan Lagoon as feeding habitat for migratory waders, one of the reasons for which Logan Lagoon was listed on the Ramsar Convention. Under the JAMBA and CAMBA agreements there is an obligation by the Australian Government to protect important habitats for migratory birds. During extreme dry conditions Cameron Inlet is the only lagoon in the southern section of Flinders Island that contains permanent water and consequently contains the only suitable habitat available for these species.

Duck species are forced to either leave the area or congregate at the site and are therefore vulnerable during the duck hunting season.

The unallocated Crown land between Logan Lagoon and Cameron Inlet contains remnant patches of vegetation that are indicative of, and reliant on, a low fire frequency (see Section 2.5). Reservation of this land would greatly increase the protection of these patches to ensure their long term survival.

By extending the Logan Lagoon Conservation Area north to include all or part of Cameron Inlet, these values would be protected and a reliable refuge for ducks during the hunting season would be achieved.

## 2.8 Cultural Resources

### 2.8.1 Aboriginal

The following brief overview presents an archaeological perspective of Aboriginal cultural resources on Flinders Island. In the management and protection of Aboriginal cultural resources this limited perspective is acknowledged as inadequate, and alone cannot be used to direct management actions. Effective and appropriate management of Aboriginal cultural resources requires recognition of values held by the Tasmanian Aboriginal community concerning Flinders Island, and ongoing consultation with Aboriginal community organisations. Aboriginal values extend beyond site resources and include natural resources such as animals, plants and landscape features.

When Europeans first arrived in Bass Strait, Flinders Island was uninhabited. The first systematic survey of Flinders Island for Aboriginal sites was conducted in 1975 by Melbourne University. The survey recorded a number of stone artefacts and discovered several middens. Most of these middens were on the north-west and west coast (Sim 1989). Radiocarbon dating suggests that the middens were deposited as recently as about 4000 years ago, a time when Flinders Island was separated from mainland Tasmania (Sim 1992). Older evidence of Aboriginal occupation in the Furneaux Group dates back as far as 20,000 years ago (Brown 1991).

To date, no systematic archaeological surveys have been undertaken in the conservation area and so no sites have been identified. However the concentration of sites around freshwater lagoons at other locations on Flinders Island suggest that these locations were a focus of activity. There could also be contemporary artefact scatters in the conservation area, if the Aboriginal people who were re-located at Wybalena visited Logan Lagoon.

If sites are found they would have considerable cultural significance for Aboriginal people, and they would require protection from the impacts of development and visitor use. New legislation dealing with Aboriginal heritage management is under consideration. At present, the *Aboriginal Relics Act 1975* applies.

### 2.8.2 Historic

The Furneaux Group was named by Captain James Cook in 1773 in honour of Captain Tobias Furneaux who, in charge of the ship *Adventure*, accompanied Cook in the *Resolution* during his second voyage in 1772-1774.

The first official European settlement on Flinders Island commenced in 1831, with the relocation of G A Robinson's Aboriginal station from Gun Carriage (Vansittart) Island to The Lagoons on the south-west coast of Flinders. The settlement later moved north to Wybalenna, finally closing in October 1847.

Following the settlement's closure the whole of Flinders Island was leased from 1850 to 1861 by Captain Malcolm Smith, a former Commandant of Wybalenna. Tin was discovered at Killiecrankie in 1883 and in 1888 the island was opened for land selection. George Boyes, who took up land at Palana in 1889, is credited with being the first official land owner in this period. By the turn of the century a bustling community had developed at Whitemark and in 1910-1911 the wharf at Lady Barron was constructed.

No systematic surveys for historic heritage have been carried out within the boundaries of the conservation area. The Tasmanian Historic Places Inventory does not contain any entries for the area.

## 2.9 Fire

Islands of the Furneaux Group were not occupied by Aboriginal people at the time of European settlement. The archaeological evidence suggests there were probably no human induced influences such as fire on the vegetation in the millennia prior to European settlement. The islands therefore are of potential interest in providing remnant examples of fire excluded vegetation.

Since the arrival of Europeans the island has been subject to a regime of frequent and extensive firing which has dramatically altered the vegetation within the conservation area. The vegetation of the conservation area on the western windward side of the lagoon, is very conducive to fire with areas of tussock grasslands, sedgeland, heath and scrub (see Section 2.5). In the southern part of the conservation area there is mainly *E. nitida* dominated scrub with a heathy understorey which in many places has been converted to a predominantly bracken understorey by the high fire frequency. The lagoon system acts as a firebreak and consequently the area to the north and east of Logan Lagoon is subject to a lower fire frequency. This is reflected in the vegetation with Smithton peppermint *Eucalyptus nitida*, coast tea tree *Leptospermum laevigatum*, *Banksia marginata* and Oyster Bay pine *Callitris rhomboidea* being present. These remnant communities are of conservation significance (Harris, 1989).

The Parks and Wildlife Service has a responsibility to protect life and property from the consequences of fire. Private land abuts the conservation area to the west and the township of Lady Barron is only 5km to the west. As well the maintenance of specific conservation values may depend upon periodic low intensity fires.

There are many fire trails in the Furneaux region that are not maintained. Some of these could be valuable if maintained, and provide access routes and/or fire breaks in the case of a wildfire. There are others that are of no strategic importance and lead to fishing and swimming beaches, duck holes or nowhere in particular. (Furneaux Natural Resource Draft Management Strategy 1999).

Cleared fire trails without fuel reduction on both sides of the trail would become death traps in the event of a wildfire. Fuel reduction burning is difficult in many of the fuel types, with the limited resources available. At the edge of paddocks wildfire may be controlled where there is a low risk to life or equipment.

Fire management co-ordination responsibility is vested in the Furneaux Fire Management Area Committee (FFMAC). This committee includes representatives from the Tasmanian Fire Service (TFS), local brigades, Parks and Wildlife Service and Flinders Island Council. Under section 20 (1) of the *Fire Service Act 1979* the committee has the following functions:

- to prepare a fire protection/management plan for its area and to review it regularly;
- to advise the State Fire Commission on matters pertaining to fire (eg fire permit periods, fire services, fire breaks, trails);
- to advise local councils on the removal of fire hazards.

A draft fire management plan was produced in 1991 by the TFS. This

plan was not approved by the State Fire Commission. The Tasmanian Fire Service will release little or no money for fire management works until such a plan is approved. Once approved, the Furneaux Fire Management Area Plan (FFMAP) would provide general strategies and principles to guide the formation of detailed local fire management plans, but would not over-ride them. The PWS will then be able to provide detailed plans for reserved lands including Logan Lagoon and significant Crown land parcels, and to undertake works. These PWS plans and works will support the overall FFMAP.

## 2.10 Environmental Degradation

### 2.10.1 Introduced Species

A number of introduced plant and animal species have established wild populations on Flinders Island and in the conservation area and pose varying threats to the native fauna and flora.

Feral cats are widespread on the island and have been observed throughout the conservation area. Diet studies have revealed that across Australia cats kill over 100 species of birds, 50 species of both reptiles and mammals, and many species of amphibians and invertebrates (Dredge 1993).

Feral pigs are also widespread throughout the conservation area and have caused extensive localised damage to terrestrial and wetland vegetation and favoured plant species may be selectively eliminated from the area. The uprooting disturbance to vegetation and soils can destroy soil structure, promote erosion and invasion by weeds, displace invertebrates and hasten drying out.

A number of introduced plant species occur in the conservation area. Pampas *Cortaderia selloana* (a prohibited weed species), slender thistle *Carduus pycnocephalus*, spear (scotch) thistle, *Cirsium vulgare* and African boxthorn *Lycium ferocissimum* are all listed as secondary weeds in Tasmania (Parsons & Cuthbertson 1992). All of these species are invasive and outcompete other plants, particularly where the soil has been disturbed. Sea spurge *Euphorbia paralias* is also colonising the southern beach of the conservation area.

### 2.10.2 Off-road Vehicles

Off-road driving is not permitted within Logan Lagoon Conservation Area under regulation 12 of the *National Parks and Reserved Land Regulations 1999*. However, it does occur in the conservation area and on unallocated Crown land between Cameron Inlet and Logan Lagoon.

Evidence suggests that 4-wheel driving and the use of 2, 3 and 4 wheeled motorbikes is becoming more common, causing damage to the vegetation within the conservation area, particularly to the *Sarcocornia quinqueflora* saltmarsh edge at the mouth of the lagoon. The vegetation is easily damaged and takes many years to recover so that vehicle tracks are easily recognisable. Recreational driving has also caused erosion at the lagoon mouth where vehicles have spun tyres in the soft sediments or become bogged. Off-road driving on sand dunes north of the conservation area has resulted in vegetation being destroyed

allowing blowouts to develop. The use of off-road vehicles on Planter Beach south of Cameron Inlet within the conservation area is a major problem, causing erosion of sand dunes, disturbance of beach and coastal breeding birds and destruction of their eggs. Anecdotal evidence suggests that little terns *Sterna albifrons sinensis* which are listed as endangered under Tasmania's *Threatened Species Protection Act 1995* and the Commonwealth *Threatened Species Act 1992* have attempted to nest at Pot Boil Point for the last 6 years but failed, partly due to human disturbance.

The following tracks are most commonly used (Map 2):

- Pot Boil Point Road to the southern beach, giving access to Pot Boil Point (eastern end) and Dick Davey Shoals (western end, out of the reserve), for the purpose of coastal driving and beach fishing.
- Logan Lagoon Road to the northern end of Logan Lagoon, giving access to South and North Chain lagoons and Camerons Inlet for hunting.
- The reverse is also done, where people cross the mouth of Cameron Inlet and either drive down Planter Beach for beach fishing or link up with Logan Lagoon Road.
- A northern branch of Pot Boil Road leading to private property on the edge of Logan Lagoon is used by off-road vehicles, which cut across the dry lagoon bed to the mouth and Pot Boil Point for beach fishing.

### **2.10.3 Artificial Draining**

The mouth of Logan Lagoon is usually closed and only opens when the water level in the lagoon is extremely high or a storm event occurs to break down the sand bar. As indicated in section 2.4 the mouth of the lagoon has been illegally opened on a number of occasions. Such actions may threaten some species at critical life stages (see sections 2.5 and 2.6).

The *Environment Protection (Sea Dumping) Act 1987* sets out regulations with regard to the translocation and dumping of materials in the marine environment. Due to potential issues such as translocation of introduced marine species and dumping of waste materials on sensitive habitats, any activities that involve removal of materials from one location and translocation to another require careful regulation.

## **2.11 Recreation and Tourism**

Visitor numbers to the conservation area have not been recorded, but it is believed that they are increasing. Because of its proximity to Lady Barron, the conservation area is used for a range of recreation activities by local people as well as tourists.

### **2.11.1 Facilities and Services**

Two wooden signs signify the Logan Lagoon Conservation Area. The signs are located on Logan Lagoon Road and Pot Boil Point Road respectively, at the boundary of the conservation area. The signs do not indicate that the area is managed by the Parks and Wildlife Service. No camping areas have been constructed because of the close proximity to the township of Lady Barron. Similarly, no toilets have been provided at the conservation area.

### **2.11.2 Fishing**

Fishing is a popular pursuit on Flinders Island and the Pot Boil Point and Dick Davey Shoals (Map 2) in particular, are popular fishing locations. People gain access to the point with off-road vehicles either via Pot Boil Road and the southern beach, or via the dry lagoon bed and lagoon mouth. Most of the people who use Pot Boil Point for fishing are considered to be local residents. However, approximately 18% of visitors to Flinders Island report they go sea fishing, more than go sight seeing or touring (Flinders Island Visitor Survey 1994).

### **2.11.3 Bird Watching and Beach Walking**

Bird watching within the conservation area is a recreational pursuit which is often associated with beach walking. The high number of migratory and sedentary bird species which inhabit the conservation area makes this a popular activity. Anecdotal reports indicate that the number of people visiting the lagoon for these reasons is increasing. Many tourists to Flinders Island go walking. Approximately 39% of all visitors report taking recreational walks while 25% go bushwalking (Flinders Island Visitor Survey 1994). Construction of a bird hide would enhance the bird watching opportunities, however suitable sites are difficult to identify under the current prolonged dry conditions.

No formal walking tracks are designated within the conservation area. With increasing visits to the area the absence of short walk opportunities limits its potential enjoyment by day users. The track out to Pot Boil Point could potentially be promoted for mountain bikes, and as a long walk. A short trail along the western boundary of the conservation area past one of the two remaining waterholes in Logan Lagoon could also provide bird watching and a walking opportunity.

### **2.11.4 Recreation Vehicles**

Off-road vehicle use occurs in the reserve, (Section 2.10.2), and is associated with a range of impacts on some of the conservation area's key natural values. People access the area in off-road cars and bikes to go beach fishing, duck hunting on Crown land, or just for driving in a challenging environment. The following routes are most commonly

used:

- Pot Boil Road and track to the southern beach, and from there to Pot Boil Point and Dick Davey Shoal;
- Logan Lagoon Road to the northern end of the lagoon, then up through the Chain lagoons to Cameron Inlet, out onto Planter Beach, or across to the mouth of the lagoon and Pot Boil Point.

## **2.12 Information, Interpretation and Education**

There are currently no interpretation signs within the conservation area, and its recreational and environmental potential has not been greatly promoted. Signs are needed to inform visitors of the status of the area; why this area has been reserved for conservation; and why it has been recognised as a wetland of international importance. A project to produce interpretive signs for all of the Ramsar sites in Tasmania is underway and signs are planned at both main access points, on Logan Lagoon Road and Pot Boil Road.

There is potential for use of the area in environmental education. A district high school is located at Whitemark and valuable information could be gained from field trips to the lagoon, or from classroom projects based on life cycles and ecological relationships evident in the area.

Local tourist operators make limited use of the area as a site for bird and nature observation. During much of the 1990s, the lagoon has been largely dry, however it is likely to be more attractive to visitors when it contains water. Usage is also limited because the lagoon is not well marked or signed and because there are no established viewing sites. Cameron Inlet is used more often by tourist operators, given that it contains water when Logan Lagoon is dry.

## Part B Management Prescriptions

The prescriptions of this plan are subject to the provisions of funding and other resources sufficient to meet them, and may be prioritised by the Parks and Wildlife Service according to resource availability.

### Section 3 Significance and Objectives

#### 3.1 Statement of Significance

Logan Lagoon Conservation Area is recognised as a wetland of international importance because it supports an appreciable number of migratory waders, including eastern curlew, bar-tailed godwit, common greenshank, curlew sandpiper and red-necked stint, and is one of the major summer feeding grounds in Tasmania for these species. Twenty of these bird species are listed in international agreements between Australia and China and Japan (JAMBA/CAMBA)<sup>1</sup>, under which Australia has obligations to ensure the protection of listed migratory bird species and their habitats. The importance of Logan Lagoon as a wader feeding and resting site is also recognised with the lagoon being listed on the East Asian - Australasian Shorebird Site Network. The network links wetlands that are internationally important for shorebirds (waders) and occur within the East Asian - Australasian Flyway<sup>2</sup>. Logan Lagoon is one of only two Tasmanian sites out of the nine Australian sites on the network.

As outlined in Section 1.2, Logan Lagoon meets Ramsar criteria 1(a), 2(c) and 3(b) for listing as an internationally important wetland. A full description of the listing is contained in Appendix 2 and criteria that were applied at the time of listing are outlined in Appendix 1.

The conservation area contains remnant patches of vegetation that are indicative of the pre-European environment with a much lower fire frequency regime.

The conservation area also has value as a recreation area because it provides a spectrum of recreational opportunities in close proximity to the township of Lady Barron. It has commercial value to the local tourism industry and it is valued for the recreational opportunities it provides for bird watching, nature appreciation and fishing. The reserve's continuing conservation contributes to the economic, social and aesthetic well being of the local community.

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<sup>1</sup> Japan Australia Migratory Birds Agreement and China Australia Migratory Birds Agreement

<sup>2</sup> Flyways are the routes that migratory birds travel. The East Asian - Australasian Flyways extends from within the Arctic Circle through South-east Asia to Australia and New Zealand.

## 3.2 Management Objectives

Under the Convention on Wetlands (Ramsar, Iran), the primary objective for the Ramsar site is:

- to ensure the **wise use** and conservation of wetlands because of their abundant richness in flora and fauna and their economically important functions and values.

### 3.2.1 Purposes and Management Objectives of Conservation Areas

Conservation areas are a class of reserved land under the *National Parks and Wildlife Act 1970*. Conservation areas are areas of land in a predominantly natural state.

#### *Purposes*

The purposes of reservation of conservation areas, as set out in the *National Parks and Wildlife Act 1970*, are the protection and maintenance of the natural and cultural values of the area of land and the sustainable use of the natural resources of that area of land. Logan Lagoon is reserved for these purposes.

#### *Management Objectives*

The management objectives of conservation areas are set out in the *National Parks and Wildlife Act 1970*. The management objectives of conservation areas which apply in Logan Lagoon Conservation Area are listed below.

Because of the complex interrelationship of factors to be considered in managing the conservation area, the reasons these objectives apply and the manner in which the objectives will be achieved are dealt with in a number of sections of the management plan. The sections of the management plan which primarily deal with each management objective in the Act are shown in brackets.

- to conserve natural biological diversity (Sections 1.2, 2.5, 2.6, 8);
- to conserve geological diversity (Sections 2.2, 6);
- to preserve the quality of water and protect catchments (Sections 2.4, 10.1, 10.2, 10.3, 10.4);
- to conserve sites or areas of cultural significance (Section 2.8, 11);
- to provide for the controlled use of natural resources, including as an adjunct to utilisation of marine resources;
- to encourage education based on the purposes of reservation and the natural or cultural values of the conservation area, or both (Section 2.12, 15);
- to encourage research, particularly that which furthers the purposes of reservation (Section 17);
- 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 (Section 2.9, 2.10, 7, 9, 13);
- to encourage appropriate tourism, recreational use and enjoyment (including private uses) consistent with the conservation of the conservation area's natural and cultural values and on assets within and adjacent to the reserve (Section 2.11, 14);
- to encourage co-operative management programs with Aboriginal

people in areas of significance to them in a manner consistent with the purposes of reservation and the other management objectives (Section 2.8.1, 11).

Not all of the management objectives for conservation areas set out in the Act will apply in every conservation area. Because Logan Lagoon is of international importance as a sanctuary for migratory birds, any activities that are likely to prevent migratory birds from using the area or reduce the numbers that it could support are to be avoided.

Therefore, the following management objectives for conservation areas set out in the Act will not apply in Logan Lagoon Conservation Area:

- to provide for exploration activities and utilisation of mineral resources;
- to provide for the taking, on an ecologically sustainable basis, of designated game species for commercial or private purposes, or both;
- to provide for commercial or industrial uses of coastal areas.

### **3.2.2 Specific Objectives**

The following specific objectives elaborate upon and give emphasis to the statutory management objectives in response to the special features and issues in the conservation area (Section 2) and the statement of significance (Section 3.1).

- protect and conserve threatened species and their habitat;
- protect and conserve the migratory wader habitat;
- maintain the ecological character of the Ramsar site;
- seek to ensure that water quality and quantity is adequate to maintain natural systems;
- promote appreciation of the natural values of the conservation area;
- encourage protection programs in the catchment of the conservation area;
- co-operate with neighbours and all users in managing the conservation area.

## **Section 4**

### **Reserve Status**

Given the importance of the conservation area at an international level, the maximum protection possible under state legislation is necessary in order to recognise, protect and conserve those internationally significant wetland values.

As early as 1969, the Animals and Birds Protection Board proposed extending the wildlife sanctuary north to incorporate wetland and dunal areas on unallocated Crown land between Logan Lagoon and Cameron Inlet. In 1974, the Parks and Wildlife Service proposed upgrading the conservation area to state reserve status, and extending it up the east coast to Foo Chow Inlet.

The Resource Planning and Development Commission (RPDC) has recently published a draft report with proposed recommendations on its inquiry into unallocated Crown land on Flinders Island (RPDC April 2000). Proposals for Crown land in the south-east corner of Flinders Island are to reserve the following as conservation areas (Map 2):

- land north of Logan Lagoon up to and including Cameron Inlet
- blocks of land west of Logan Lagoon that were set aside as reserves under Section 8 of the *Crown Lands Act 1976*
- the Shag Lagoon area, west of Logan Lagoon.

The section of land north of Cameron Inlet up to and including Sellars Lagoon is proposed as a game reserve (Map 1).

The objectives of management of conservation areas as set out in the *National Parks and Wildlife Act 1970* include several resource use objectives that are incompatible with the values of Logan Lagoon. Section 3.2.1 of this management plan outlines why these objectives will not apply to Logan Lagoon Conservation Area. The conservation area classification is considered inadequate for the area. A more appropriate classification would be State reserve which allows for conservation of values, recreation and tourism use but precludes hunting, mineral exploration, mining and industrial use.

- **Support an extension of the conservation area over adjacent unallocated Crown land as recommended by RPDC, including Cameron Inlet and the unallocated Crown land between Logan Lagoon and Cameron Inlet, so that natural values not occurring in the Logan Lagoon Conservation Area are protected.**
- **Seek to upgrade the status of the existing reserve to a State reserve under the *National Parks and Wildlife Act 1970*.**

## Section 5

### Access

Off-road vehicle driving is prohibited within the conservation area (see section 2.10.2), however it does occur on fire trails, across the dry lagoon bed and shoreline, and on the beaches and dunes. Unallocated Crown land to the north is also used by people in off-road vehicles for recreational driving, hunting and beach fishing. In places this activity causes erosion, vegetation damage, disturbance of coastal breeding birds and destruction of their eggs.

In managing off-road vehicle use in the conservation area, there is a need to balance provision of recreation opportunities with protection of important natural values. In particular, vulnerable beach and wetland habitat must be protected from vehicle damage. At the same time it is recognised that people cannot easily leave Flinders Island for recreation and they need to find recreation opportunities on the island.

- **Assess, monitor and rehabilitate beach erosion and vegetation damage in the conservation area, particularly in relation to use by off-road vehicles.**
- **Assess and monitor shorebird populations in the conservation area, particularly in relation to disturbance. Identify areas and populations that may require protection, including access**

restrictions, during vulnerable periods such as the breeding season.

- Subject to points 1 and 2, allow continued use of Pot Boil Road by off-road vehicles, as well as use of the southern beach between Dick Davey Shoals (western end) and the southern side of Pot Boil Point (eastern end, Grid Reference 134 480).
- Because of continued vandalism to the bridge over Pot Boil Creek, as well as damage to lagoon verges and coastal dunes north and east of there, terminate Logan Lagoon Road where it enters the conservation area, and construct a turning circle/carpark at this point. Develop and install appropriate interpretation at the roadhead, reflecting wetland and flora values (Section 15).
- Prohibit vehicles from driving on Planter Beach between the mouth of Cameron Inlet and the north side of Pot Boil Point (Grid Reference 134 480) from 1<sup>st</sup> October to 31<sup>st</sup> of March, in order to protect vulnerable nesting birds and their eggs and minimise damage to coastal vegetation and the lagoon mouth. This section of beach is the most remote and therefore more easily protected when there are optimum water levels in Cameron Inlet and Logan Lagoon.
- Maintain the track that continues on through the conservation area from Logan Lagoon Road as a fire trail with access for management purposes only.
- Aside from access to and use of the southern beach mentioned above, vehicles are prohibited from driving off-road within the conservation area, to avoid environmental damage particularly on the lagoon bed, shoreline and lagoon mouth that are most used by shorebirds and waders.
- In consultation with the community, users of the area and other stakeholders, identify permitted access points for the conservation area as well as areas and times of restricted access, and promote these and minimal impact behaviour.
- Erect signs identifying authorised uses of the conservation area by off-road vehicles.

## **Section 6**

### **Geoconservation**

Management of geodiversity for the conservation area aims to maintain the natural rates and magnitudes of change and to protect sites of geoconservation significance.

- Protect the geodiversity of Logan Lagoon, in particular the old strandlines and parallel dune systems (Section 2.2).
- Conduct surveys to identify requirements for geoconservation prior to the commencement of any developments.

## **Section 7**

### **Rehabilitation**

Areas of damage in the conservation area include the saltmarsh edge at the mouth of the lagoon and loss of vegetation leading to dune

erosion on Planter Beach.

- **Identify, prioritise and rehabilitate habitats and areas that have been degraded.**
- **Monitor erosion of soils, roads or tracks within the conservation area and undertake action in consultation with specialists to rehabilitate and restore damaged areas.**

## **Section 8**

### **Protection of Flora and Fauna**

Threats to the flora and fauna values of the conservation area include feral pigs, cats, frequent fire, off road vehicles, artificial draining of the lagoon, and introduced weeds (Sections 2.5.1, 2.6.1, 2.9 and 2.10 respectively)

- **Protect threatened species and communities of high conservation value. In particular, the fire sensitive remnant vegetation on the seaward side of the conservation area needs to be protected from frequent fires (those with a frequency of less than 8 years).**
- **Monitor threatened species; undertake appropriate research; develop recovery plans; and undertake management actions to ensure their survival.**
- **Public access to areas of threatened species may be limited, if deemed necessary through monitoring and research.**
- **Conduct surveys of the aquatic macro and micro invertebrates of the lagoon to establish baseline information and to examine the natural food sources available to waterfowl and other waterbirds.**
- **Identify and monitor key indicator species of the conservation area and in particular, Logan Lagoon, to determine the health of, and changes within, the area.**
- **Monitor waterfowl and wader numbers.**
- **Prepare visitor guidelines advising reasonable group size, adequate supervision and behaviour to minimise disturbance to wildlife (Section 14, 15).**

## **Section 9**

### **Introduced Species and Diseases**

A number of exotic plant and animal species occur in the Logan Lagoon Conservation Area (Section 2.5.1).

- **Prioritise introduced species control actions according to the species' impacts on the values of the conservation area. Actions should be focussed on introduced species which affect the values for which the conservation area was designated.**
- **Eradication will only be attempted where non target species are not threatened by the proposed methods.**
- **Control and containment of the introduced species will be the objective if eradication is not possible.**
- **Map the distribution of sea spurge in the conservation area, and develop and implement appropriate strategies to eradicate it or**

**minimise its impact.**

- **As part of a broader program of determining the population of feral pigs in reserves on Flinders Island, develop and implement an eradication/control program.**
- **Continue the program of control/eradication of pampas grass in the conservation area.**

## Section 10 Water Quality

### 10.1 Monitoring

Periodically, much of the conservation area is inundated or saturated by water and consequently the natural values are affected by changes in the water physico-chemical parameters. Baseline data is vital for making informed management decisions and meeting conservation objectives. Maintenance of water quality is a priority because it is the basis for the ecological structure of the conservation area.

- **Survey and monitor water bodies within the conservation area to establish physico-chemical baseline data.**
- **Liase with organisations such as Rivers and Water Supply Commission, CSIRO, "Waterwatch" student school network, University of Tasmania, the Resource Management and Conservation Division of the Department of Primary Industries, Water and Environment and community groups to develop and implement monitoring strategies.**
- **Liase with adjacent land users/owners to develop and implement strategies (such as buffer zones along watercourses) to reduce runoff of sediment, pesticides and fertilisers.**

### 10.2 Water Quality Policy

The State Policy on Water Quality Management requires that Protected Environmental Values (PEVs) and water quality objectives are set for all surface waters within the State. The following Protected Environmental Values are proposed for the Logan Lagoon Conservation Area, having regard for the values for which the site is listed under the Convention on Wetlands of International Importance (Ramsar Convention) and for the management objectives for conservation areas outlined in Schedule 4 of the *National Parks and Wildlife Act, 1970*):

- A. Protection of Aquatic Ecosystems;
  - (ii) Protection of modified (not pristine) ecosystems from which edible fish are harvested;
- B. Recreational Water Quality and Aesthetics
  - (i) Primary contact water quality (for activities which are permitted under the management plan or regulations);
  - (ii) Secondary contact water quality (for activities which are permitted under the management plan or regulations);
  - (iii) Aesthetics.

That is, as a minimum, water quality management strategies for surface waters in Logan Lagoon should provide water of a physical and chemical nature which will support a healthy but modified aquatic ecosystem; and which will enable people to safely engage in recreational activities such as swimming, paddling, boating and fishing in aesthetically pleasing waters.

- **In co-operation with relevant agencies, council and community groups, manage the conservation area to maintain or enhance**

**water quality designated by Protected Environmental Values and Water Quality Objectives.**

### **10.3 Environmental Flows**

- **Ensure that the ecological requirements of Logan Lagoon are accounted for in the establishment of environmental flows for the east coast of Flinders Island, and are appropriately considered in the assessment and development of any further irrigation infrastructure and water catchment strategies that may have an impact on these requirements.**

## 10.4 Catchment Management and Drainage

Artificial drains direct water from private land adjacent to Logan Lagoon and from as far away as Bootjack Flats. Many of these drains have become overgrown, with vegetation preventing the movement of water. During extended periods of wet weather the land adjacent to the lagoon becomes waterlogged. The water level in the lagoon is often blamed for this waterlogging and on occasions the mouth has been illegally opened (see section 2.4). Adverse impacts on fauna and flora are outlined in Sections 2.5 and 2.6.

Coastal estuaries and lagoons should be allowed to function naturally wherever possible. This involves minimising artificial input of sediment, nutrients and chemicals in runoff and drainage; maintaining natural water levels in the lagoon (including allowing cyclic flooding of the lagoon verges and adjacent land); and avoiding artificial draining of the lagoon.

Agricultural land in the vicinity of coastal lagoons is periodically subject to flooding and fluctuations in salinity as part of the natural cycle of events. In order to reduce the impacts of flooding, landowners should retain or restore native or riparian vegetation in the catchment of streams leading into coastal lagoons, and salt and flood tolerant species should be retained or planted in the expected zone of flooding.

All works in the coastal area must be compatible with the *State Coastal Policy 1996*.

- **Liaise with landowners, relevant catchment management authorities and other stakeholders to ensure that drains outside of but in the catchment of the conservation area, are cleared of vegetation and properly maintained, and to encourage planting of salt and flood tolerant species in the expected zone of flooding on adjacent land.**
- **The mouth of Logan Lagoon should be breached by natural forces only. Artificial breaching will only be permitted as a last resort: when high water levels cause flooding of pasture; if all drains into the lagoon are cleared of vegetation and fully maintained, and if there is a clearly demonstrated economic loss to affected landowners or threat to human life. Before seeking approval to breach the mouth of the lagoon, proponents must complete an environmental impacts assessment. The operation must be approved by the Director of National Parks and Wildlife, and if approved, is to be carried out under the supervision of the Parks and Wildlife Service.**

## Section 11 Cultural Heritage

Little work has been conducted on the cultural heritage resources of the conservation area.

- Undertake programs to protect, conserve, monitor and, where appropriate, present cultural heritage.
- Conduct surveys for Aboriginal and historic heritage. Develop and implement protection strategies to identify and conserve such sites.
- Conduct surveys for Aboriginal heritage in co-operation with the Aboriginal community.
- Establish specific policies and procedures once the full scope of cultural heritage resources are known.
- Report all Aboriginal relics discovered, to the Director in accordance with the *Aboriginal Relics Act 1975*.
- Develop and implement cyclical maintenance plans for each identified historic cultural site.
- Consult with specialist PWS staff during the planning stage, to assess and minimise the impact of any developments.
- With the support of the Aboriginal community, incorporate the Aboriginal use of the area into interpretive and educational resource materials.
- Consult with the Aboriginal community on the management of Aboriginal heritage.

## Section 12 Protection of Natural and Cultural Values on Adjacent Land

Many natural and cultural values of high conservation value are located outside the boundaries of the conservation area and therefore are not given the same degree of recognition and protection as values within the conservation area (Sections 2.7, 4). At the same time the conservation area could be better protected by sympathetic management of land along the western boundary, where the lagoon edge abuts agricultural land (Map 2).

- Investigate the feasibility of improving protection of Logan Lagoon by encouraging and facilitating sympathetic land management along the western boundary of the reserve. Consider mechanisms such as voluntary agreements, conservation covenants, land swap, "Land for Wildlife", or donation of the land by the owner.
- Provide assistance and advice, if required, in the preparation of funding applications that will help to protect or improve management of the conservation area and adjacent lands.

## **Section 13 Fire Management**

The objectives of fire management in the conservation area are to protect and maintain natural and cultural values consistent with the protection of human life and property both within the conservation area and on adjacent land. Refer to Section 2.9.

- **Liaise with the Tasmanian Fire Service, local brigades, council and other stakeholders, in the development of a Furneaux Fire Management Plan (FFMP) that is approved by the State Fire Commission.**
- **Develop a fire management plan for the conservation area and adjacent unallocated Crown land between the lagoon and Cameron Inlet, following approval of and consistent with the Furneaux Fire Management Plan.**
- **Consistent with the FFMP and with Section 5 (Access), assess existing fire trails in the conservation area and adjacent unallocated Crown land in terms of their value for fire management and access to key locations, and maintain them at appropriate standards. Close and rehabilitate un-needed tracks.**
- **Liaise with the local fire brigade and adjacent landowners in the maintenance of fire trails within the conservation area and on operational procedures in the event of wildfire.**
- **In undertaking fire management, give priority to the protection of remnant fire sensitive plant communities where possible (Section 2.5).**
- **In undertaking fire management, protect environmental and heritage values in so far as this is consistent with the protection of human life and property.**
- **Suppress wildfires as quickly as possible, to minimise their extent.**

## **Section 14 Recreation and Tourism**

The conservation area is used by locals (particularly residents of nearby Lady Barron) and visitors alike (see Section 2.11), and it offers a variety of recreation opportunities.

### **14.1 Camping and Day Use Facilities**

There is currently a relatively low level of camping in the reserve. Bushwalkers occasionally do long-distance overnight trips in the area but fresh water is scarce, there are few suitable camping spots and no facilities. The reserve itself has no location that is suitable as a focus for day visitors. In view of the value of the area as a sanctuary for migratory waterbirds and the camping and day-use facilities available elsewhere on Flinders Island, this low level of facilities should be maintained.

- **Because of the close proximity of the conservation area to Lady Barron, where there are ample facilities, formal camping areas**

**and picnic facilities will not be provided.**

## **14.2 Bird Watching**

In optimum conditions, Logan Lagoon hosts large numbers of birds not seen elsewhere, potentially providing a unique bird watching experience for visitors, particularly when combined with high quality interpretation and information about the area and its values (see sections 2.12 and 15.1).

- **Investigate the construction of a bird hide to observe migratory waders. Potential locations could be near the remaining two waterholes: around the southern end of Logan Lagoon, or along the western boundary. Both of these are accessed from Pot Boil Road. Another possible location on the northern edge of Cameron Inlet has more long-lasting water and waterbirds, and may be more useful for bird viewing although it is on unallocated Crown land outside the conservation area.**

## **14.3 Walking and Sightseeing**

At present there are no designated walking tracks within the conservation area. Walking tracks provide an opportunity to appreciate the scenic values of the coastal and lagoon environments as well as the flora and fauna. However, given other opportunities for walking on Flinders Island and the potential for disturbance of wildlife (which is a key reason for designation of the Ramsar site), only minimal walking tracks are appropriate.

- **Investigate the potential for development of a short interpreted walking trail in conjunction with the bird hide (Section 14.2).**
- **Planning of track location will take into consideration disturbance to wildlife, (particularly the migratory waders) and will avoid running parallel to the shore. The standard of construction and maintenance of any tracks will be in accordance with the provisions of the Walking Track Management Manual (Blamey 1987).**
- **Encourage the use of minimal impact bushwalking techniques.**

## **14.4 Tourism**

- **Encourage only those tourist ventures that focus on the natural and cultural values of the conservation area.**
- **Provide assistance and information to operators of tourism ventures so that disturbance to wildlife is minimised and visitor experience is maximised.**

# **Section 15 Interpretation and Education**

Logan Lagoon has not been actively promoted or presented to the public, and is not widely appreciated outside the relatively small groups of local users and bird watchers. There are currently no interpretation signs in the conservation area. The conservation area also has potential as an educational resource for natural science, given its role as a sanctuary for migratory birds, and its other values.

Interpretation and education are intended to: develop pre-visit awareness of the special features of the conservation area; encourage visitors to pursue their interests and explore what the area has to offer; realise its educational values; and canvas management issues related to the area.

## **15.1 Interpretation**

- **Erect interpretive signs at the two main access roads (Logan Lagoon Road and Pot Boil Road) where they enter the conservation area to provide information on:**
  - **the Convention on Wetlands;**
  - **the reasons for the conservation area being included on the Ramsar list;**
  - **the natural and cultural values of the conservation area, in particular the threatened species and birdlife;**
  - **appropriate recreational activities within the conservation area;**
  - and**
  - **any relevant restrictions.**
- **Include interpretive displays in any bird hide constructed in the conservation area or on unallocated Crown land (section 14.2).**
- **Develop and install appropriate interpretation at the roadhead of Logan Lagoon Road, reflecting wetland and flora values (Section 5).**

## **15.2 Education**

- **Liaise with teachers and organisations such as Landcare to encourage educational programs in the conservation area.**
- **Seek a special relationship with the local school in developing educational programs and activities based on the particular values of the conservation area.**
- **Consider the conservation area in the context of all parks and reserves on Flinders Island and their particular values, in developing an interpretation and education strategy.**

## **Section 16 Community Involvement**

Community recognition and support for the conservation area is very important. Members of the local community as well as particular groups regularly use Logan Lagoon Conservation Area. The aim of fostering community support is to develop community appreciation of and support for the area's values; promote a positive image of the conservation area and its contribution to the community; and encourage community involvement in park management.

- **Encourage and support the development of friends and volunteer programs in the conservation area.**
- **Develop good working relations with adjacent land managers, local community groups and the Aboriginal community in matters of mutual interest.**
- **Liaise with the tourism industry, recreational and educational groups regarding visitor uses of the conservation area.**
- **Consult and cooperate with other authorities in relation to fire protection and search and rescue.**
- **Consult with the Flinders Island Council in order to achieve complementary planning for land in the catchment of Logan Lagoon.**

## **Section 17 Research and Monitoring**

To understand the ecological processes involved in the maintenance of the flora and fauna species and communities in the conservation area, it is essential that research and ongoing monitoring is conducted. The data is essential for informed decision making by management, and until studies have been completed, definitive prescriptions cannot be made for particular plant and animal species. Research and monitoring will depend on available resources.

### **17.1 Priorities for Research and Monitoring**

The following are priorities for research and monitoring programs:

- **Establish baseline data on the geomorphology, flora, fauna and cultural heritage of the conservation area.**
- **Establish the erosion status of sandy coastal areas in the conservation area and causes of disturbance.**
- **Survey wetland areas within the conservation area and monitor to establish physico-chemical baseline data.**
- **Encourage and undertake research into the ecological effects of fire on soils, vegetation and habitat of the conservation area. Permanent vegetation plots may be established as study sites.**
- **Research and monitor the distribution, numbers and control of feral animals, weeds and diseases, particularly feral pigs.**
- **Monitor water quality to assess the impacts and extent of activities within or external to the lagoon.**

- Liaise with organisations such as Landcare groups and schools to encourage participation in monitoring programs.

## 17.2 Approval for Research Programs

- Authority will be required from the Senior Zoologist or Senior Botanist before fieldwork commences for manipulative research or for the collection of specimens, including plant material, within the conservation area.
- All research is to be undertaken in a manner which is consistent with this management plan, and must not have any long term adverse effects on the environmental, heritage or aesthetic values of the conservation area.
- One copy of research reports will be provided to the Director and one copy will be lodged with the library servicing the Parks and Wildlife Service.
- The Aboriginal community will be consulted, and a permit obtained from the Director (under the *Aboriginal Relics Act 1975*), for any project involving Aboriginal heritage.

## Section 18

## Management Arrangements

- Co-ordinate development, protection and conservation work within a five year works program for the conservation area.
- Review the works program annually. Add a further year's program at each annual review.
- Monitor the efficacy of management practices in the conservation area, and where necessary, modify those practices.
- Within the conservation area, authorised staff of the Parks and Wildlife Service will be responsible for enforcing the provisions of the *National Parks and Wildlife Act 1970*, the *National Parks and Reserved Land Regulations 1999*, the *Aboriginal Relics Act 1975*, *Whales Protection Act 1988*, the *Wildlife Regulations 1999*, the *Historic Cultural Heritage Act 1995*, the *Threatened Species Protection Act 1995*, and any other Acts for which staff may be authorised.
- The Director of National Parks and Wildlife has delegated powers to enforce provisions of the Commonwealth of Australia *Historic Shipwrecks Act 1976*.
- Staff may be authorised to enforce provisions of the *Marine and Safety Authority Act 1997* and associated by-laws.
- Other law enforcement will be the responsibility of Tasmania Police.

## **Section 19 Managing Development**

Disturbance to the conservation area for the construction of visitor facilities or other limited forms of development needs to be carefully managed to minimise impact.

- **Mineral exploration and mining will not be permitted (Section 3.2.1).**
- **Ensure that development of facilities and services does not intrude on the landscape values of the conservation area and is in accord with the prescriptions of this management plan and other applicable plans.**
- **Ensure all development of facilities or services is compatible with conservation of environmental and heritage values, protection of water quality in the lagoons, creeks and streams, protection of recreational and tourism character, and maintenance of visual, landscape and scenic quality. In particular, ensure any development requiring earthmoving be first assessed for cultural heritage impact.**
- **Limit developments to those which:**
  - **are complementary to existing facilities and services;**
  - **are clearly directed towards optimising visitor appreciation and understanding of the conservation area and its values, or public safety; and which**
  - **provide efficient, high quality service to the public.**
- **Require all commercial development proposals for facilities or services to submit a detailed business and financial plan showing at least a three year projection of operations which demonstrates economic viability.**
- **Assess all proposals for any development, activity, 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.**
- **Require the proponent of any significant development or activity not directly dealt with by this management plan to prepare a comprehensive environmental and heritage effects assessment in accordance with guidelines established by the Parks and Wildlife Service. Make this assessment available for public scrutiny.**
- **In addition to the requirements of the managing authority for the conservation area, ensure all development complies with any other applicable legislation.**
- **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 Senior Ranger (plus any relevant specialist**

- staff) and if necessary confirmed and approved by the Director.
- 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 which 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.
  - Prepare detailed costing for implementing works in conjunction with preparation of design details for those works.

## **Section 20**

### **Review of the Plan**

- This 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*.
- The plan will be reviewed ten years after the gazettal of the Governor's approval, or earlier if research, environmental monitoring or other circumstances show this to be necessary.

## Part C Implementation

Section	Key Actions from the Plan
<b>Reserve Status of Conservation Area</b>	
4	Support an extension of the conservation area over adjacent unallocated Crown land as recommended by RPDC, including Cameron Inlet and the unallocated Crown land between Logan Lagoon and Cameron Inlet.
4	Seek to upgrade the status of the existing reserve to a State reserve under the <i>National Parks and Wildlife Act 1970</i> .
<b>Access</b>	
5	Assess, monitor and rehabilitate beach erosion and vegetation damage in the conservation area, particularly in relation to use by off-road vehicles.
5, 8	Assess and monitor shorebird populations in the conservation area. Identify areas and populations that may require protection including access restrictions during vulnerable periods such as the breeding season.
5	Terminate Logan Lagoon Road where it enters the conservation area, and construct a turning circle/carpark at this point.
5	Install a gate and maintain the track that continues on through the conservation area as a fire trail with access for management purposes only.
5	Monitor use of Pot Boil Road and maintain it at an appropriate standard according to usage and management needs.
5	In consultation with the community, users of the area and other stakeholders, identify the preferred access points for the conservation area as well as areas and times of restricted access, and promote these and minimal impact behaviour through appropriate strategies.
5	Erect signs identifying restricted areas, prohibiting the use of vehicles on beaches within the conservation area, and off-road use of vehicles.
<b>Flora and Fauna Conservation and Protection</b>	
8	Monitor and protect threatened plant species and communities of high conservation value. In particular, protect the fire sensitive remnant vegetation on the seaward side of the conservation area from fires with a frequency of less than 8 years.
8	Conduct surveys of the aquatic macro and micro invertebrates of the lagoon to establish baseline information.
8	Identify and monitor key indicator species of the lagoon.
8	Monitor and protect threatened animal species.
8	Monitor and protect waterfowl and wader species.
8	Prepare visitor guidelines for the conservation area.
9	As part of a broader program of determining the population of feral pigs in reserves on Flinders Island, develop and implement an eradication/control program.
9	Map the distribution of sea spurge in the conservation area, and develop and implement appropriate strategies to eradicate it or minimise its impact.
9	Continue the program of control/eradication of pampas grass in the conservation area.
<b>Water Quality</b>	
10	Survey and monitor water bodies in the conservation area to establish baseline information.
10	Liaise with organisations and community groups to develop and implement monitoring strategies.
10	Liaise with adjacent land users/owners to develop and implement strategies to reduce runoff of sediment, pesticides and fertilisers into the conservation area.
10	Manage the conservation area to maintain or enhance water quality designated by Protected Environmental Values and Water Quality Objectives.
10	Ensure that the ecological requirements of Logan Lagoon are provided for in establishing environmental flows for the east coast of Flinders Island, and

considered in assessment and development of irrigation infrastructure and water catchment strategies that may have an impact on these requirements.

10 Liaise with landowners and other stakeholders to ensure drains are cleared of vegetation and properly maintained and to encourage planting of salt and flood tolerant species in the expected zone of flooding on adjacent land.

10 Manage the conservation area to maintain or enhance water quality designated by Protected Environmental Values and Water Quality Objectives.

10 Prohibit artificial breaching of Logan Lagoon except under specific circumstances.

#### **Cultural Heritage Conservation**

11 Conduct a preliminary assessment of cultural values.

11 Conduct a systematic survey for historic sites.

11 Conduct a systematic survey for Aboriginal sites and develop appropriate management strategies in consultation with the Aboriginal community.

#### **Protection of Values on Adjacent Land**

12 Investigate and initiate strategies, liaise with landowners to protect natural and cultural values on adjacent land.

12 Provide assistance and advice if required, in the preparation of environmental grant applications to protect or expand the conservation area and adjacent land.

#### **Fire Management**

13 Contribute to development of a Furneaux Fire Management Plan that is approved by the State Fire Commission.

13 Develop a fire management plan for the conservation area and adjacent unallocated Crown land following approval of and consistent with the Furneaux Fire Management Plan.

13 Assess fire trails in the conservation area and maintain them at appropriate standards.

#### **Visitor Use, Facilities and Services**

14 Investigate construction of a bird hide to observe migratory waders.

14 Investigate the potential for a short interpreted walking trail in conjunction with the bird hide.

14 Encourage suitable ecotourism ventures in the conservation area and provide advice to minimise disturbance of wildlife and maximise the tourism experience.

15 Complete and install signs giving information and interpretation on Ramsar sites at entrances to the conservation area.

5, 15 Develop and install interpretive material reflecting wetland and flora values, at the roadhead of Logan Lagoon Road.

15 Develop interpretive material about the conservation area.

15 Include interpretation of the conservation area and its values in the context of a broader interpretation and education strategy for all reserved lands on Flinders Island.

15 Include interpretive displays in any bird hide constructed in the conservation area or on unallocated Crown land.

15 Encourage development of education programs in the conservation area.

#### **Community Partnerships**

16 Encourage community group involvement in management programs.

16 Consult with local council regarding planning and development in the reserve catchment.

#### **Implementation**

18 Co-ordinate development, protection and conservation work within a 5 year works program for the conservation area and incorporate it into relevant Branch programs.

18 Review the works program annually and update relevant Branch programs.

18.1 Encourage community group involvement in management programs in the conservation area.

18.1 Consult with local council regarding development adjacent to the conservation area.

20 Review plan after 10 years.

## 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.

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

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

**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.

**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.

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

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## Appendix 1: Criteria for Identifying Wetlands of International Importance

**Note:** Below are the criteria that were applied at the time of Logan Lagoon's designation as a Ramsar site. A new set of criteria was adopted at the 7<sup>th</sup> Conference of Contracting Parties to the Convention on Wetlands in Costa Rica, May 1999. The new criteria can be found on the Ramsar Convention Bureau website at: [http://ramsar.org/key\\_criteria.htm](http://ramsar.org/key_criteria.htm)

### (Annex to Recommendation C.4.2)

A wetland is identified as being of international importance if it meets at least one of the criteria set out below:

#### 1. Criteria for representative or unique wetlands

A wetland should be considered internationally important if:

- a) it is a particularly good representative example of a natural or near-natural wetland, characteristic of the appropriate biogeographical region; or
- b) it is a particularly good representative example of a natural or near-natural wetland, common to more than one biogeographical region; or
- c) it is a particularly good representative example of a wetland, which plays a substantial hydrological, biological or ecological role in the natural functioning of a major river basin or coastal system, especially where it is located in a trans-border position; or
- d) it is an example of a specific type of wetland, rare or unusual in the appropriate biogeographical region.

#### 2. General criteria based on plants or animals

A wetland should be considered internationally important if:

- a) it supports an appreciable assemblage of rare, vulnerable or endangered species or subspecies of plant or animal, or an appreciable number of individuals of any one or more of these species; or
- b) it is of special value for maintaining the genetic and ecological diversity of a region because of the quality and peculiarities of its flora and fauna; or
- c) it is of special value as the habitat of plants or animals at a critical stage of their biological cycle; or
- d) it is of special value for one or more endemic plant or animal species or communities.

#### 3. Specific Criteria Based on Waterfowl

A wetland should be considered internationally important if:

- a) it regularly supports 20,000 waterfowl; or
- b) it regularly supports substantial numbers of individuals from particular groups of waterfowl, indicative of wetland values, productivity or diversity; or
- c) where data on populations are available it regularly supports 1% of the individuals in a population of one species or subspecies of waterfowl

### Guidelines for Application of the Criteria

To assist Contracting Parties in assessing the suitability of wetlands for inclusion on the List of Wetlands of International Importance, the Conference of the Contracting Parties has formulated the following guidelines for application of the Criteria:

- (a) A wetland could be considered of international importance under Criterion 1 if, because of its outstanding role in natural, biological, ecological or hydrological systems, it is of substantial value in supporting human communities dependant on the wetland. In this context, such support would include:
  - provision of food, fibre or fuel; or
  - maintenance of cultural values;

- support of food chains, water quality, food control or climatic stability.

The support, in all its aspects, should remain within the framework of sustainable use and habitat conservation, and should not change the ecological character of the wetland.

or

- (b) A wetland could be considered of international importance under Criterion 1, 2 or 3 if it conforms to additional guidelines developed at regional (eg Scandinavian or West African) or national level. Elaboration of such regional or national guidelines may be especially appropriate:
- where particular groups of animals (other than waterfowl) or plants are considered more suitable as a basis for evaluation; or
  - where waterfowl and other animals do not occur in large concentrations (particularly in northern latitudes); or
  - where collection of data is difficult (particularly in very large countries);

or

- (c) The 'particular groups of waterfowl, indicative of wetland values, productivity or diversity' in Criterion 3 (b) include any of the following:
- loons or divers: Gaviidae;
  - grebes: Podicipedidae;
  - cormorants: Phalacrocoracidae;
  - pelicans: Pelicanidae;
  - herons, bitterns, storks, ibises and spoonbills: Ciconiiformes;
  - swans, geese and ducks (wildfowl): Anatidae;
  - wetland related raptors: Accipitriformes and Falconiformes;
  - cranes: Gruidae;
  - shorebirds or waders: Charadrii; and
  - terns: Sternidae.

or

- (d) The specific criteria based on waterfowl numbers will apply to wetlands of varying size in different Contracting Parties. While it is impossible to give precise guidance on the size of an area in which these numbers may occur, wetlands identified as being of international importance under Criterion 3 should form an ecological unit, and may thus be made up of a big area or a group of smaller wetlands. Consideration may also be given to turnover of waterfowl at migration periods, so that a cumulative total is reached, if such data are available.

## Appendix 2: Logan Lagoon Conservation Area - Ramsar Listing

1. *Date this sheet was completed/updated* 2000
3. *Name of wetland* Logan Lagoon Conservation Area, Tasmania
4. *Geographic coordinates* 40° 10' 30" South, 148° 17' 31" East
5. *Altitude* Less than 20 m ASL.
6. *Area* 2172 ha
7. *Overview*

Logan Lagoon is one of three large estuarine lagoons which make up a coastal lagoon system along the south-east coast of Flinders Island (Bass Strait, Tasmania). It is enclosed within the Logan Lagoon Conservation Area. The lagoon is a significant habitat for a number of threatened waterfowl. Access to the lagoon is by 4-wheel drive only.
8. *Wetland type*

A5: sand or pebble beaches including sand bars, spits and sandy islets  
A10: brackish to saline lagoons and marshes with one or more relatively narrow connections with the sea  
B2: seasonal and irregular rivers and streams
9. *Ramsar criteria*

1a, 2c, 3b (see Appendix 1)
11. *Name and address of the compiler of this form*

Stewart Blackhall, Anne McEntee and Elizabeth Rollins  
Department of Primary Industries, Water and Environment  
134 Macquarie Street  
Hobart 7000
12. *Justification of the criteria selected under point 9*

Logan Lagoon supports large numbers of migratory waterbirds and a number of species which are rare or vulnerable in Tasmania. The site is an important area for birds migrating from south-eastern Australia to Tasmania. The lagoon supports three species (*Calidris ruficollis*, *Numenius madagascariensis* and *Tringa nebularia*) which are listed under both the China - Australia Migratory Bird Agreement (CAMBA) and Japan - Australia Migratory Bird Agreement (JAMBA). For these reasons, the lagoon is not only important on a local scale, but also nationally and internationally. It is an important hydrological feature, and is also listed on the Tasmanian Geoconservation Database because, with other lagoons and dunes in the area, it provides an excellent example of the development of Holocene shorelines.
13. *General location*

Logan Lagoon is situated on the south-east corner of Flinders Island, approximately 6 km north-east of the township of Lady Barron.
14. *Physical features*

The lagoon is contained entirely within Holocene alluvial deposits which, when mobilised by longshore drift, block freshwater drainage to the sea.
15. *Hydrological values*

The water level in the lagoon fluctuates with rainfall and evaporation, with it usually filling during winter rains. Annual rainfall in the area is on average 750-1000 mm. Maximum water depth is 1-1.5 m. On occasion an outlet channel breaches the seaward dunes and drains the lagoon.

**16. Ecological features**

The area is in a relatively natural condition except for some cleared and drained agricultural land on the western shore. The lagoon is fringed with *Juncus* reed beds whilst the surrounding land is covered by savannah grassland with scattered *Eucalyptus*, *Allocasuarina* and *Banksia* trees. Swans and other waterfowl breed in the *Juncus* tussocks during winter. Being a shallow evaporative basin the lagoon is rich in nutrients and provides abundant food for water birds. When the lagoon has been dry, nearby Cameron Inlet has been recorded as supporting the bird populations normally occupying Logan Lagoon.

**17. Noteworthy flora**

The *Selliera radicans* herbfield and *Lamprothamnia* aquatic community present at the site are poorly reserved in Tasmania. There are also representative examples of undisturbed coastal vegetation surrounding the lagoon.

**18. Noteworthy fauna**

When full the lagoon provides refuge for waterfowl during the shooting season and a resting and feeding area for migratory birds. Some of the bird species observed are the red-necked stint (*Calidris ruficollis*), the greenshank (*Tringa nebularia*), the eastern curlew (*Numenius madagascariensis*), and the double-banded plover (*Charadrius bicinctus*).

**19. Social and cultural values**

The reserve is valued as a site for conservation education, scientific research, recreation, and tourism.

**20. Land tenure/ownership**

On site: Logan Lagoon Conservation Area.

Surrounding area: The site is bounded by the sea to the east and south, and by vacant Crown land to the north, with private property along approximately two-thirds of the western shore.

**21. Current land use**

On site: Conservation, recreation and low intensity livestock grazing.

Surrounding area: Residential and agricultural.

**22a. Factors (past and present) adversely affecting the sites ecological characters, including changes in land use and development projects**

In the past the lagoon has been drained by local landowners to improve soil drainage on nearby low-lying pasture.

**22b. Factors (potential) adversely affecting the sites ecological characters, including changes in land use and development projects**

Draining of the lagoon to improve nearby pasture drainage is a threat to the integrity of the area. Increased clearing could result in excessive salinity or contamination from agricultural run-off entering the lagoon through existing drainage ditches.

**23 - 24 Conservation measures taken and measures proposed**

Logan Lagoon is listed as a Ramsar site and is also listed on the Register of the National Estate. The site is a designated Conservation Area. The lagoon has been listed on the East-Asian-Australasian Shorebird Reserve Network due to the presence of the double-banded plover (*Charadrius bicinctus*).

25. **Current scientific research and facilities**

Waterfowl numbers at Logan Lagoon are counted annually and other bird numbers are counted periodically (Sharpe 1995).

26. **Current conservation education**

The sanctuary is valuable to current conservation education in serving as a demonstration of a relatively undisturbed wetland.

27. **Current recreation and tourism**

The area is visited by amateur bird watchers, but no facilities are currently provided on site.

28 - 29 **Jurisdiction and management authority**

Director, Parks & Wildlife Service, Tasmania (134 Macquarie Street, Hobart).

30. **Bibliographical references**

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### Appendix 3: Plant Species Observed or Expected to be Found in Logan Lagoon Conservation Area

e	=	endemic to Tasmania
i	=	introduced to Tasmania
t	=	listed in the schedules of the <i>Threatened Species Protection Act 1995</i>

Family, Scientific Name	Code	Common Name
<b>ANGIOSPERMAE: DICOTYLEDONS</b>		
<i>Acacia mucronata</i>		Variable Sallow Wattle
<i>Acacia sophorae</i>		Coast Wattle, False Boobyalla
<i>Acacia verticillata var. verticillata</i>		Prickly Mimosa, Echidna Wattle
<i>Acaena novae-zelandiae</i>		Buzzy, Biddy-widdy
<i>Acetosella vulgaris</i>	i	Sheep Sorrel
<i>Allocasuarina monilifera</i>		Sheoak, Drooping Sheoak
<i>Amperea xiphoclada</i>		Broom Spurge
<i>Anagallis arvensis</i>	i	Scarlet Pimpernell
<i>Angianthus preissianus</i>	t	Salt Angianthus
<i>Aotus ericoides</i>		Golden Pea
<i>Atriplex prostrata</i>		Hastate Saltbush
<i>Baeckea ramosissima</i>		Baeckea, Rosy Heath-myrtle
<i>Banksia marginata</i>		Silver Banksia, Honeysuckle
<i>Billardiera longifolia</i>		Climbing Blueberry
<i>Billardiera scandens</i>		Apple-berry
<i>Boronia anemonifolia</i>		Stinking Boronia
<i>Cassinia aculeata</i>		Dolly Bush
<i>Cassytha melantha</i>		Large Dodder-laurel
<i>Cassytha pubescens</i>		Hairy Dodder-laurel
<i>Centaurium erythraea</i>	i	Australian Centaury
<i>Cirsium vulgare</i>	i	Spear Thistle
<i>Conyza floribunda</i>	i	Fleabane
<i>Cotula australis</i>		Cotula
<i>Cyathodes sp</i>		
<i>Dichondra repens</i>		Kidney Weed
<i>Dillwynia sp.</i>		Parrot Pea
<i>Drosera pygmaea</i>		Dwarf Sundew
<i>Epacris impressa</i>		Common Heath
<i>Epilobium sp.</i>		Willowherb
<i>Eryngium vesiculosum</i>		Prostrate Blue Devil
<i>Eucalyptus globulus ssp. globulus</i>		Tasmanian Blue Gum
<i>Eucalyptus nitida</i>		Smithton Peppermint
<i>Eucalyptus ovata</i>		Swamp, Black or Marrawah Gum
<i>Eucalyptus viminalis</i>		White Gum
<i>Exocarpos syrticola</i>		Coast Ballart
<i>Gompholobium huegelii</i>		Bladder-pea, Karella
<i>Gonocarpus micranthus.</i>		Common or Creeping Raspwort
<i>Gonocarpus teucrioides</i>		Raspwort
<i>Goodenia lanata sp.</i>		Native Primrose
<i>Hakea teretifolia sp.</i>		Bushy Needlewood

<i>Hibbertia empetrifolia</i>		Scrambling Guinea-flower
<i>Hibbertia prostrata</i>		Prostrate Guinea-flower
<i>Hydrocotyle hirta</i>		Pennywort
<i>Hypochoeris radicata</i>	i	Flatweed Cats Ear
<i>Kunzea ambigua</i>		White Kunzea, Tick bush
<i>Lasiopetalum macrophyllum</i>		Shrubby Velvet Bush
<i>Lawrenzia spicata</i>		Salt Lawrenzia
<i>Leontodon taraxacoides</i>	i	Hawkbit
<i>Leptospermum glaucescens</i>		Smoky Tea-tree
<i>Leptospermum laevigatum</i>		Coast Tea-tree
<i>Leptospermum scoparium</i> var. <i>scoparium</i>		Tea-tree, Manuka
<i>Leucopogon collinus</i>		White Beard-heath
<i>Leucopogon ericoides</i>		Beard Heath
<i>Leucopogon parviflorus</i>		Currant Bush, Coast Beard-heath
<i>Lilaeopsis polyantha</i>		Australian Liliaopsis
<i>Lobelia alata</i>		Angled Lobelia
<i>Melaleuca ericifolia</i>		Swamp Paperbark
<i>Melaleuca squamea</i>		Scented Paperbark
<i>Melaleuca squarrosa</i>		Scented Paperbark
<i>Monotoca glauca</i>		Broom-heath
<i>Muehlenbeckia adpressa</i>		Climbing Lignum
<i>Myoporum insulare</i>		Boobyalla
<i>Myriophyllum</i> sp.		Water-milfoil
<i>Olearia floribunda</i>		Heath Daisy-bush
<i>Oxalis perennans</i>		Yellow Wood Sorrel
<i>Persoonia juniperina</i>		Prickly Geebung
<i>Plantago coronopus</i>		Plantago
<i>Plantago triantha</i>		Native Plantain
<i>Pomaderris apetala</i>		Dogwood, Native Hazel
<i>Pratia irrigua</i>		Pratia
<i>Ranunculus</i> sp.		Buttercup
<i>Rumex</i> sp.	i	Sorrel
<i>Sarcocornia quinqueflora</i>		Beaded Glasswort
<i>Sebaea albidiflora</i>		White Sebaea
<i>Selliera radicans</i>		Swamp-weed
<i>Senecio linearifolius</i>		Fireweed, Fireweed Groundsel
<i>Senecio</i> sp.		Groundsel
<i>Solanum nigrum</i>	i	Black Nightshade
<i>Sprengelia incarnata</i>		Pink Swamp Heath
<i>Spyridium parvifolium</i> var. <i>molle</i>	e, t	Dusty Miller
<i>Stylidium graminifolium</i>		Common or Grass Trigger Plant
<i>Trifolium</i> sp.		Clover
<i>Urtica incisa</i>		
<i>Vellereophyton dealbatum</i>		White Cudweed
<i>Veronica gracilis</i>		Slender Speedwell
<i>Villarsia reniformis</i>		Yellow or Running Marsh Flower
<i>Viola hederacea</i>		Ivy-leaf Violet
<i>Wilsonia backhousei</i>		Narrow-leaf Wilsonia

**ANGIOSPERMAE:**

**MONOCOTYLEDONAE**

<i>Acianthus pusillus</i>		Mosquito Orchid
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<i>Agrostis avenacea</i>		Blown Grass
<i>Aira caryophyllea</i>	i	Silvery Hair-grass
<i>Apodasmia brownii</i>		
<i>Centrolepis strigosa</i>		Hairy Centrolepis, Bristlewort
<i>Dianella tasmanica</i>		Flax Lily
<i>Ehrharta distichophylla</i>		Hairy Rice-grass
<i>Empodisma minus</i>		Long Rope-rush
<i>Erharta stipoides</i>		Weeping Grass
<i>Eurychorda complanata</i>		Flat Cord-rush
<i>Gahnia grandis</i>		Cutting Grass
<i>Gahnia sp.</i>		Saw-edge
<i>Gahnia trifida</i>		Coast Saw-edge
<i>Holcus lanatus</i>	i	Yorkshire Fog
<i>Hypolaena fastigiata</i>		Tassel Rope-rush
<i>Isolepis nodosa</i>		Knobby or Knotty Club-rush
<i>Juncus bufonius</i>		Toad Rush
<i>Juncus kraussii</i>		Sea Rush
<i>Juncus pallidus</i>		Pale Rush
<i>Juncus sp.</i>		Rush
<i>Lepidosperma concavum</i>		Sand or Hill Sword-edge
<i>Lepidosperma elatius</i>		Tall Sword-edge
<i>Lepidosperma laterale</i>		Common Sword-Sedge
<i>Lepilaena cylindrocarpa</i>		Long-fruited Water-mat
<i>Leptocarpus tenax</i>		Slender Twin-rush
<i>Lepyrodia muelleri</i>		Common Scale-rush
<i>Luzula sp.</i>		Woodrush
<i>Patersonia fragilis</i>		Blue Iris, Short Purple-flag Iris
<i>Pennisetum clandestinum</i>	i	Kikuyu
<i>Poa labillardierei</i>		Tussock Grass
<i>Poa poiiformis</i>		Blue Tussock Grass
<i>Pterostylis sp</i>		Greenhood
<i>Schoenus apogon</i>		Common Bog-Rush
<i>Schoenus nitens</i>		Shiny Bog-rush
<i>Triglochin striatum</i>		Streaked Arrow-grass
<i>Typha latifolia</i>		Cumbungi
<i>Xanthorrhoea australis</i>		Austral Grass-tree, Black-boy
<i>Xyris sp.</i>		Yellow-eye

#### **GYMNOSPERMAE**

*Callitris rhomboidea*

Oyster Bay Pine

#### **PTERIDOPHYTA**

*Pteridium esculentum*

Bracken

*Lindsaea linearis*

Screw Fern

*Selaginella uliginosa*

Swamp Selaginella

## Appendix 4: Fauna Species List of Flinders Island

i	=	introduced to Tasmania
r, v, e	=	listed in the schedules of the <i>Threatened Species Protection Act 1995</i> as rare, vulnerable or endangered respectively
m	=	migratory species
J	=	listed on the Japan-Australia Migratory Bird Agreement (JAMBA)
C	=	listed on the China-Australia Migratory Bird Agreement (CAMBA)

Note: Bird species names follow the taxonomy of Christidis and Boles (1994)

Common Name	Code	Scientific Name
<b>Birds - Resident</b>		
<b>ORDER ANSERIFORMES</b>		
black swan		<i>Cygnus atratus</i>
Cape Barren goose		<i>Cereopsis novaehollandiae</i>
Australian shelduck		<i>Tadorna tadornoides</i>
black duck		<i>Anas superciliosa</i>
grey teal		<i>Anas gracilis</i>
chestnut teal		<i>Anas castanea</i>
Australasian shoveler		<i>Anas rhynchotis</i>
hardhead		<i>Aythya australis</i>
blue-billed duck		<i>Oxyura australis</i>
musk duck		<i>Biziura lobata</i>
<b>ORDER PODICIPEDIFORMES</b>		
Australasian grebe		<i>Tachypaptus novaehollandiae</i>
hoary-headed grebe		<i>Poliiocephalus poliocephalus</i>
<b>ORDER SPHENISCIFORMES</b>		
little penguin		<i>Eudyptula minor</i>
<b>ORDER PROCELLARIIFORMES</b>		
wandering albatross	e,J	<i>Thalassarche exulans</i>
royal albatross		<i>Thalassarche epomophora</i>
black-browed albatross	v	<i>Thalassarche melanophrys</i>
grey-headed albatross	v	<i>Thalassarche chrysostoma</i>
Yellow-nosed albatross		<i>Thalassarche chlororhynchus</i>
shy albatross	v	<i>Thalassarche cauta</i>
sooty albatross		<i>Phoebastria fusca</i>
southern giant petrel		<i>Macronectes giganteus</i>
southern fulmar		<i>Fulmarus glacialisoides</i>
cape petrel		<i>Daption capense</i>
white-headed petrel	v	<i>Pterodroma lessonii</i>
medium-billed prion		<i>Pachyptila salvini</i>
fairy prion	v	<i>Pachyptila turtur</i>
Antarctic prion		<i>Pachyptila desolata</i>
thin-billed prion		<i>Pachyptila belcheri</i>
short-tailed shearwater	J	<i>Puffinus tenuirostris</i>
sooty shearwater	J,C	<i>Puffinus griseus</i>

Common Name	Code	Scientific Name
<b>Birds - Resident</b>		
fluttering shearwater		<i>Puffinus gavia</i>
Hutton's shearwater		<i>Puffinus huttoni</i>
white-faced storm petrel		<i>Pelagodroma marina dulciae</i>
common diving petrel		<i>Pelecanoides urinatrix</i>
<b>ORDER PELICANIFORMES</b>		
Australian pelican		<i>Pelecanus conspicillatus</i>
Australasian gannet		<i>Morus serrator</i>
black-faced cormorant		<i>Leucocarbo fuscescens</i>
great cormorant		<i>Phalacrocorax carbo</i>
little pied cormorant		<i>Phalacrocorax melanoleucos</i>
little black cormorant		<i>Phalacrocorax sulcirostris</i>
<b>ORDER CICONIIFORMES</b>		
white-faced heron		<i>Egretta novaehollandiae</i>
great egret	J,C	<i>Egretta alba</i>
little egret		<i>Egretta garzetta</i>
eastern reef egret	C	<i>Egretta sacra</i>
white-necked heron		<i>Ardea pacifica</i>
cattle egret	J,C	<i>Ardeola ibis</i>
white-faced heron		<i>Ardea novaehollandiae</i>
Australasian bittern		<i>Botaurus poicilltilus</i>
sacred ibis		<i>Threskiornis aethiopica</i>
straw-necked ibis		<i>Threskiornis spinicollis</i>
royal spoonbill		<i>Platalea regia</i>
yellow-billed spoonbill		<i>Platalea flavipes</i>
<b>ORDER FALCONIFORMES</b>		
black-shouldered kite		<i>Elanus notatus</i>
brown goshawk		<i>Accipiter fasciatus</i>
collared sparrowhawk		<i>Accipiter cirrocephalus</i>
white-bellied sea-eagle		<i>Haliaeetus leucogaster</i>
wedge-tailed eagle	v	<i>Aquila audax</i>
swamp harrier		<i>Circus approximans</i>
peregrine falcon		<i>Falco peregrinus</i>
Australian hobby		<i>Falco longipennis</i>
brown falcon		<i>Falco berigora</i>
Nankeen kestrel		<i>Falco cenchroides</i>
<b>ORDER GRUIFORMES</b>		
Lewin's rail		<i>Rallus pectoralis</i>
spotless crake		<i>Porzana tabuensis</i>
dusky moorhen		<i>Gallinula tenebrosa</i>
purple swamphen		<i>Porphyrio porphyrio</i>
Eurasian coot		<i>Fulica atra</i>
<b>ORDER TURNICIFORMES</b>		
stubble quail		<i>Coturnix pectoralis</i>
swamp quail		<i>Coturnix ypsilophorus</i>
painted button-quail		<i>Turnix varia</i>

Common Name	Code	Scientific Name
<b>Birds - Resident</b>		
<b>ORDER CHARADRIIFORMES</b>		
pieb oystercatcher		<i>Haematopus ostralegus</i>
sooty oystercatcher		<i>Haematopus fuliginpsus</i>
masked lapwing		<i>Vanellus miles</i>
lesser sand plover	J,C	<i>Charadrius mongolus</i>
Pacific golden plover	m	<i>Pluvialis fulva</i>
hooded plover		<i>Charadrius cucullatus</i>
double-banded dotterel	m	<i>Charadrius bicinctus</i>
red-capped dotterel		<i>Charadrius ruficapillus</i>
ruddy turnstone	m,J,C	<i>Arenaria interpres</i>
eastern curlew	m,J,C	<i>Numenius madagascariensis</i>
whimbrel	m,J,C	<i>Numenius phaeopus</i>
common greenshank	m,J,C	<i>Tringia nebularia</i>
marsh sandpiper	m,J,C	<i>Tringia stagnatilis</i>
Latham's snipe	m,J,C	<i>Gallinago hardwickii</i>
bar-tailed godwit	m,J,C	<i>Limosa lapponica</i>
red knot	m,J,C	<i>Calidris canutus</i>
<b>ORDER CHARADRIIFORMES</b>		
sharp-tailed sandpiper	m,J,C	<i>Calidris acuminata</i>
red-necked stint	m,J,C	<i>Calidris ruficollis</i>
curlew sandpiper	J,C	<i>Calidris ferruginea</i>
silver gull		<i>Larus novaehollandiae</i>
kelp gull		<i>Larus dominicanus</i>
whiskered tern		<i>Chlidonias hybridus</i>
white-winged black tern		<i>Chlidonias leucopterus</i>
Caspian tern	J,C	<i>Hydroprogne caspia</i>
white-fronted tern	r	<i>Sterna striata</i>
crested tern		<i>Sterna bergii</i>
little tern	e,J,C	<i>Sterna albifrons</i>
fairy tern	r	<i>Sterna nereis</i>
<b>ORDER COLUMBIFORMES</b>		
brush bronzewing		<i>Phaps elegans</i>
<b>ORDER PSITTACIFORMES</b>		
green rosella		<i>Platycercus caledonicus</i>
blue-winged parrot		<i>Neophema chrysostoma</i>
yellow-tailed black cockatoo		<i>Calyptorhynchus funere</i>
sulphur-crested cockatoo		<i>Cacatua galerita</i>
<b>ORDER CUCULIFORMES</b>		
pallid cuckoo		<i>Cuculis pallidus</i>
fan-tailed cuckoo		<i>Cacomantis pyrrhophanus</i>
Horsfield's bronze-cuckoo		<i>Chrysococcyx basalis</i>
shining bronze-cuckoo		<i>Chrysococcyx plagosus</i>
<b>ORDER STRIGIFORMES</b>		
southern boobook		<i>Ninox novaeseelandiae</i>

Common Name	Code	Scientific Name
<b>Birds - Resident</b>		
<b>ORDER APODIFORMES</b>		
white-throated needletail	J,C	<i>Hirundapus caudacutus</i>
fork-tailed swift		<i>Apus pacificus</i>
<b>ORDER CORACIIFORMES</b>		
azure kingfisher		<i>Alcedo azurea</i>
laughing kookaburra		<i>Dacelo novaeguineae</i>
<b>ORDER PASSERIFORMES</b>		
welcome swallow		<i>Hirundo neoxena</i>
tree martin		<i>Petrochelidon nigricans</i>
black-faced cuckoo-shrike		<i>Coracina novaehollandiae</i>
Australian pipit		<i>Anthus novaeseelandiae</i>
Bassian thrush		<i>Zoothera lunulata</i>
pink robin		<i>Petroica rodinogaster</i>
flame robin		<i>Petroica phoenica</i>
dusky robin		<i>Petroica vittata</i>
golden whistler		<i>Pachycephala pectoralis</i>
olive whistler		<i>Pachycephala pectoralis</i>
grey shrike-thrush		<i>Colluricincla harmonica</i>
satin fly-catcher		<i>Myiagra cyanoleuca</i>
grey fantail		<i>Rhipidura fuliginosa</i>
little grassbird		<i>Megalurus gramineus</i>
<b>ORDER PASSERIFORMES</b>		
superb blue wren		<i>Malurus cyaneus</i>
white-browed scrubwren		<i>Sericornis frontalis</i>
Tasmanian thornbill		<i>Acanthiza ewingii</i>
yellow-throated honeyeater		<i>Meliphaga falvicolis</i>
strong-billed honeyeater		<i>Melithreptus validirostris</i>
black-headed honeyeater		<i>Melithreptus affinis</i>
crescent honeyeater		<i>Phylidonyris pyrrhoptera</i>
New Holland honeyeater		<i>Phylidonyris novaehollandiae</i>
tawny-crowned honeyeater		<i>Phylidonyris melanops</i>
eastern spinebill		<i>Acanthorhynchus tenuirostris</i>
white-fronted chat		<i>Ephthianura albifrons</i>
spotted pardalote		<i>Pardalotus punctatus</i>
striated pardalote		<i>Pardalotus striatus</i>
forty-spotted pardalote	e,J	<i>Pardalotus quadragintus</i>
silveryeye		<i>Zosterops lateralis</i>
beautiful firetail		<i>Emblema bella</i>
magpie lark		<i>Grallina cyanoleuca</i>
dusky woodswallow		<i>Artamus cyanopterus</i>
black currawong		<i>Strepera fuliginosa</i>
Australian magpie		<i>Gymnorhina tibicen</i>
skylark	i	<i>Alauda arvensis</i>
goldfinch	i	<i>Cardelis cardelis</i>
European greenfinch	i	<i>Chloris chloris</i>
house sparrow	i	<i>Passer domesticus</i>

Common Name	Code	Scientific Name
<b>Birds - Resident</b>		
common starling	i	<i>Sturnus vulgarus</i>
common blackbird	i	<i>Turdus merula</i>
<b>GALLIFORMES</b>		
Indian peafowl	i	<i>Pavo crisatus</i>
common pheasant	i	<i>Phasianus colchicus</i>
wild turkey	i	<i>Meleagris gallopava</i>
<b>Mammals - Resident</b>		
Common Name	Code	Scientific Name
Australian fur seal		<i>Arctocephalus pusilla</i>
echidna		<i>Tachyglossus aculeatus</i>
swamp antechinus		<i>Antechinus minimus</i>
common wombat		<i>Vombatus ursinus</i>
common ringtail possum		<i>Pseudocheirus peregrinus</i>
common brushtail possum		<i>Trichosurus vulpecula</i>
Eastern pigmy-possum		<i>Cercartetus nanus</i>
long-nosed potoroo		<i>Potorous tridactylus</i>
Tasmanian pademelon		<i>Thylogale billardierii</i>
red-necked wallaby		<i>Macropus rufogriseus</i>
lesser long-eared bat		<i>Nyctophilus geoffroyi</i>
chocolate wattled bat		<i>Chalinolobus morio</i>
little forest vespardelus		<i>Vespardelus vulturinus</i>
water rat		<i>Hydromys chrysogaster</i>
New Holland mouse	r	<i>Pseudomys novaehollandiae</i>
swamp rat		<i>Rattus lutreolus</i>
cat	i	<i>Felis catus</i>
black rat	i	<i>Rattus rattus</i>
house mouse	i	<i>Mus musculus</i>
pig	i	
<b>Mammals - Vagrant</b>		
New Zealand fur seal		<i>Arctocephalus forsteri</i>
leopard seal		<i>Hydrurga leptonyx</i>
Southern elephant seal		<i>Mirounga leonina</i>
<b>Reptiles</b>		
common copperhead		<i>Austrelaps superbus</i>
tiger snake		<i>Notechis ater</i>
white-lipped snake		<i>Drysdalia coronoides</i>
mountain dragon		<i>Tympanocryptis diemensis</i>
three-lined skink		<i>Bassiana duperreyi</i>
White's skink		<i>Egernia whiteii</i>
delicate skink		<i>Lampropholis delicata</i>
Bougainville's skink		<i>Lerista bougainvillii</i>
metallic skink		<i>Niveoscincus metallicus</i>
spotted skink		<i>Niveoscincus ocellatus</i>
Southern grass skink		<i>Pseudomoia entrecasteauxii</i>
glossy grass skink		<i>Pseudomoia rawlinsoni</i>

Common Name	Code	Scientific Name
<b>Birds - Resident</b>		
blotched blue-tounge		<i>Tiliqua nigrolutea</i>
Tasmanian tree skink		<i>Niveoscincus pretiosus</i>
<b>Amphibians</b>		
brown tree frog		<i>Litoria ewingi</i>
green and golden frog	v	<i>Litoria raniformis</i>
common froglet		<i>Crinia signifera</i>
Southern toadlet		<i>Pseudophryne semimarmorata</i>
spotted marsh frog		<i>Limnodynastes tasmaniensis</i>
Eastern banjo frog		<i>Limnodynastes dumerili</i>
<b>Freshwater Fish</b>		
short-finned eel		<i>Anguilla australis</i>
long-finned eel		<i>Anguilla reinhardtii</i>
dwarf galaxias	r	<i>Galaxiella pusilla</i>
Tasmanian mudfish		<i>Galaxias cleaveri</i>
spotted galaxias		<i>Galaxias truttaceous</i>
jolleytail		<i>Galaxias maculatus</i>
climbing galaxias		<i>Galaxias brevipinnis</i>
pygmy perch		<i>Nannoperca australis</i>
freshwater flathead		<i>Pseudophritis urvilli</i>

## **Appendix 5: Performance Indicators**

Performance indicators provide a guide for evaluating if the management plan has been implemented, and if the management objectives of the plan have been achieved. During the life of this plan, further, more detailed research and monitoring programs, policies or procedures approved by the managing authority may be applied to evaluation of this plan and its implementation. As a minimum, the following performance indicators will be used when evaluating the plan's implementation and outcomes.

- The natural biological diversity of the indigenous flora and fauna in the conservation area is at least equal to that which occurred at the commencement of the plan.
- Populations of threatened species within the conservation area are stable or increasing upon that which occurred at the commencement of the plan.
- The Ramsar values of the conservation area are maintained or enhanced. In particular, it contains healthy natural or near natural wetlands and habitats for plants and animals, and it regularly supports substantial numbers and a diversity of waterbirds.
- The significant natural landscapes, especially dunes, in the conservation area are intact or restored.
- Water quality in the conservation area has not deteriorated or has improved.
- Geological diversity and sites of geological significance in the conservation area are intact or restored.
- Sites and areas of Aboriginal heritage are protected, managed and, in appropriate circumstances, interpreted in co-operation with the Aboriginal community.
- Co-operative management programs with Aboriginal people are in place in areas of significance to them, consistent with this management plan.
- Research is available which improves the knowledge of the conservation area.
- Research and monitoring results are available which assist effective management decision making on conservation and management of the conservation area and visitors to it.
- Damaged or degraded sites in the conservation area have been stabilised or rehabilitated and restored.
- A fire management program for the conservation area is in place.
- Conservation area values and neighbouring lands have not been adversely impacted upon by fire.
- Introduced flora and fauna are controlled or have been eradicated.
- Recreation and tourism in the conservation area are characterised by low impact, quiet activities in a natural setting. Low-level mechanised access may occur in specified areas where the impact on natural and cultural values is minimal.
- Recreation and tourism opportunities and facilities identified in the management plan have been developed in accordance with the plan.
- Visitor impacts on the conservation area's values are at sustainable levels for the area in which they occur.

- Visitor and community interest and involvement in, and comment upon, the state of the conservation area, and its management, is regular and predominantly favourable.
- Liaison with neighbours has worked well, in managing adjacent land in a manner sympathetic to values of the conservation area.
- Protocols for artificially breaching the lagoon are in place, and appropriately applied.
- Management of the reserve is being monitored and evaluated with reference to these indicators.