

Macleod Morass and Jones Bay Wildlife Reserves



Management Plan February 2005

This Management Plan for Macleod Morass and Jones Bay Wildlife Reserves is approved for implementation. Its purpose is to direct all aspects of management of the Reserves until the plan is reviewed.

A Draft Management Plan for the areas was published in January 2003. Thirty-one submissions were received and have been considered in preparing this approved Management Plan.

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Copies

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MACLEOD MORASS AND JONES BAY

WILDLIFE RESERVES

MANAGEMENT PLAN

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- Macleod Morass Wildlife Reserve (Vic.) – Management. 6.
- Jones Bay Wildlife Reserve (Vic.) – Management. I. Parks Victoria.
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Disclaimers

This plan is prepared without prejudice to any negotiated or litigated outcome of any native title determination applications covering land or waters within the plan's area.

It is acknowledged that any future outcomes of native title determination applications may necessitate amendment of this plan; and the implementation of this plan may require further notifications under the procedures in Division 3 of Part 2 of the *Native Title Act 1993* (Cwlth).

The plan is also prepared without prejudice to any future negotiated outcomes between the Government/s and Victorian Aboriginal communities. It is acknowledged that such negotiated outcomes may necessitate amendment of this plan.

Every effort has been made to ensure that the information in this plan is accurate. Parks Victoria does not guarantee that the publication is without flaw of any kind and therefore disclaims all liability for any error, loss or other consequence that may arise from you relying on any information in the publication.

Cover: Macleod Morass Wildlife Reserve (Photo: John Hutchison)

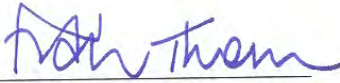
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MANAGEMENT PLAN

This management plan has been prepared under Section 18(1) of the *Wildlife Act 1975* (Vic.) and is consistent with the Gippsland Lakes Ramsar Site Strategic Management Plan.

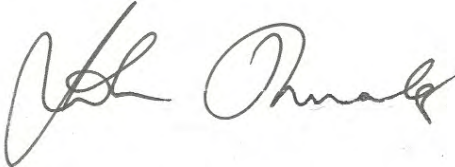
The plan provides the basis and direction for future management and protection of Macleod Morass and Jones Bay Wildlife Reserves.

The plan was finalised following careful consideration of comments received from the public following invitation of public comment on the Draft plan, and from key agency and community stakeholders represented by the Macleod Morass Stakeholder Liaison Group.

Endorsed by: 
FRAN THORN
Acting Secretary


Mark Stone
Chief Executive
Parks Victoria

In accordance with Section 18 of the *Wildlife Act 1975* (Vic.) this management plan is adopted for implementation.


Hon. John Thwaites MP
Minister for Environment

SUMMARY

Macleod Morass and Jones Bay Wildlife Reserves (557 ha and 123 ha respectively) protect valuable examples of freshwater and estuarine wetlands. The Wildlife Reserves are further classified as State Game Reserves, and hunting of certain game birds is permitted.

The reserves are within the Gippsland Lakes Ramsar Site, listed under the Convention on Wetlands (Ramsar, Iran 1971) or Ramsar Convention. The reserves contain a range of threatened vegetation types that provide habitat for a diverse array of wildlife including 23 threatened fauna species. Over 100 bird species, including 53 waterbird species, have been recorded within the vicinity.

Eight migratory bird species found in the reserves are listed under the international Japan Australia Migratory Birds Agreement 1974 (JAMBA), China Australia Migratory Birds Agreement 1987 (CAMBA), and the Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or the Bonn Convention).

Community groups make a valuable contribution to management of the Wildlife Reserves, which attract visitors interested in walking and observing the flora and fauna in an impressive landscape, or hunting for duck species or Stubble Quail in the open season relevant to the particular game.

Constructed wetlands in Macleod Morass Wildlife Reserve serve to further treat effluent from East Gippsland Water's wastewater treatment plant.

The planning area, which includes the Wildlife Reserves and three other small reserves with similar management objectives, is within the Country¹ of the Tatungoloong clan of the Gunai/Kurnai peoples. This area includes cultural places and objects and is associated with folklore² and customs³ in accordance with tradition⁴ of the Gunai/Kurnai peoples.

Key management directions and strategies for the reserves include:

- Maintaining the unique and diverse nature and biodiversity of the Wildlife Reserves in accordance with the Ramsar Convention and JAMBA and CAMBA migratory bird agreements.
- Recognising Indigenous cultural heritage⁵ and nurturing folklore and customs, and protecting Indigenous places and objects associated with the planning area, in accordance with Indigenous tradition.
- Maintaining Macleod Morass Wildlife Reserve predominantly as a fresh water wetland ecosystem and Jones Bay Wildlife Reserve as an estuarine wetland ecosystem.
- Developing a water management strategy for Macleod Morass to prevent the intrusion of saline lake and river water, and providing for a wetting–drying cycle that allows for management objectives to be met.
- Minimising, without compromising environmental objectives, the impacts of high water levels on surrounding private land.
- Controlling pest plant and animal species, including carp.
- Maintaining opportunities for visitors to walk in the reserves and observe and study the natural values, and to hunt for appropriate game birds in the open seasons.
- Working with the relevant Indigenous communities⁶, including the local Aboriginal community⁷ to appropriately reflect and integrate their folklore, customs, interests and rights in the land and aspirations for the planning area in all planning and management.
- Collaborating with East Gippsland Water to maximise the ecological benefits of constructed wetlands in Macleod Morass.
- Continuing the strong cooperative partnerships with key community groups and relevant agency stakeholders to facilitate the implementation of management strategies.

- Encouraging East Gippsland Shire Council to assist in protecting the Wildlife Reserves by working to minimise the impacts of adjacent land use and stormwater discharges on the reserves.

¹Country—all of nature, culture and spirituality relating to an area.

²Folklore—tradition and oral history that are or have been connected with the cultural life of people (includes songs, rituals, ceremonies, dances, art, customs, and spiritual belief) and are significant to the people in accordance with their tradition.

³Customs—observances and practices of people (including land management and resource use) in accordance with their tradition.

⁴Tradition—the body of knowledge orally transmitted from one generation to another.

⁵Cultural heritage—folklore, customs, places and objects of significance to people in accordance with tradition.

⁶Relevant Indigenous communities—the communities of people that assert an association to the area that is reasonably based on direct descent from the original Indigenous custodians and in accordance with Indigenous tradition.

⁷Local Aboriginal community—the community specified in the Schedule of the Aboriginal and Torres Strait Islander Heritage Protection Act.

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1 INTRODUCTION

1.1 Location and planning area

Macleod Morass and Jones Bay Wildlife Reserves are located near the Gippsland Lakes in south-eastern Victoria. Situated approximately 280 km east of Melbourne (figure 1), Macleod Morass lies immediately west of the Mitchell River and extends south from Bairnsdale residential areas to the Eagle Point township. Jones Bay is located immediately east of the Mitchell River and forms the northern limit of Lake King.

The planning area is within the Country of the Tatungoloong Clan of the Gunai/Kurnai peoples of Gippsland.

The planning area (figure 3) (706 ha) covers:

- Macleod Morass Wildlife Reserve (557 ha);
- Jones Bay Wildlife Reserve (123 ha);
- three areas within, abutting, or in close proximity to the reserves:
 - the Mitchell River Water Reserve (known locally as the ‘Farm Hole’) located to the west of Macleod Morass Wildlife Reserve (15 ha)
 - that part of the Natural Interest Reserve abutting Jones Bay Wildlife Reserve to the south (10 ha approx.)
 - an unmade/unused Government road within Jones Bay Wildlife Reserve (i.e. part of Bankins Lane) (1 ha approx.).

The above three areas are currently managed by Parks Victoria primarily to ‘conserve and enhance the habitat of wildlife, especially water birds’ in accordance with the former Land Conservation Council’s recommendations (LCC 1983). These areas have been included within the planning area as they may aid effective management of the primary reserves.

In the text, the expression ‘the reserves’ refers to the Macleod Morass Wildlife Reserve and the Jones Bay Wildlife Reserve.

1.2 Creation of the reserves

Macleod Morass Wildlife Reserve was first reserved on 16 August 1961 under the *Land Act 1958* (Vic.) for the Purposes of the Fisheries and Wildlife Department. The original area of 422.8 hectares has been progressively increased through the addition of freehold land purchased by Government.

Jones Bay Wildlife Reserve was first reserved on 7 April 1961 for the Preservation of Wildlife under the Land Act. This was as a result of recommendations by the then State Wildlife Reserves Investigation Committee. In 1962, 1965 and 1985 the original area of Jones Bay (40.4 ha) was increased through the addition of freehold land purchased by Government.

The Mitchell River Water Reserve was first reserved on 1 April 1870 for watering purposes under the Land Act. The Natural Interest Reserve was first reserved in 1881 for the preservation of an area of natural interest under the Land Act. The section of Government road within Jones Bay Wildlife Reserve covered by the plan (i.e. part of Bankins Lane) was originally set aside as a Government road under the Land Act.

The southern area of Macleod Morass Wildlife Reserve and a component of Jones Bay Wildlife Reserve were also incorporated into the creation of the Gippsland Lakes Reserve following the implementation of the relevant LCC recommendation in 2002.

1.3 Plan development

The Macleod Morass and Jones Bay Wildlife Reserves Management Plan was prepared by Parks Victoria with significant input from stakeholders and the community, taking into account existing information, reports and research findings that relate to the planning area.

Key community and agency groups, including East Gippsland Water, Gippsland Coastal Board, Department of Sustainability and Environment (DSE), Department of Primary Industries (DPI), Environmental Protection

Authority, East Gippsland Shire Council (EGSC), Bairnsdale Field & Game, Friends of the Wetlands, East Gippsland Bird Observers Club, Bairnsdale Field Naturalists, the relevant Indigenous community and two Landcare groups, were invited to join a stakeholder liaison group to discuss management issues relating to the planning area.

Parks Victoria prepared and released a draft management plan for public comment and sought comment from the relevant Indigenous communities. Submissions received were carefully considered in consultation with the stakeholder liaison group and amendments were made to the Draft Plan on the basis of a consensus reached with the group. This approach should serve to ensure that stakeholders better understand and support the plan's implementation.

This Management Plan provides a strategic guide for future management of the planning area. As a public document, the plan establishes how Parks Victoria will protect and conserve the area's natural and cultural values, and describes the services and facilities that will be provided for visitors to enjoy and appreciate the area in a sustainable manner. The plan also serves to inform and encourage cooperative land management with neighbours, and community participation in that area's management.

As a working document, the plan will guide future management of the planning area by informing Parks Victoria's development of Corporate Plans, serving as a framework for subsequent detailed planning and directly governing management activities.

1.4 Plan implementation

The strategies and actions in the Management Plan will be implemented through Corporate Plans, park programs prepared annually as part of statewide prioritised programs, and other park management actions.

Implementation of the plan will be consistent with Parks Victoria's commitment to sustainable practices, which involves the delivery of operations, services and facilities in an ecologically and socially responsible manner with minimal use of expendable resources and generation of waste. To these ends, management techniques will be adapted as further experience is gained.

A review of the plan will be considered 10 years after its publication. Amendments may only be made by the Secretary DSE, following an authorised process, which includes an appropriate level of community consultation.

Circumstances that might lead to amendment of the plan include:

- availability of new information from management experience or as a result of monitoring or research that indicates that management objectives could be better achieved by a change in strategy; e.g. information indicating a new threatening process or a significant change in levels of visitation or particular uses
- change in legislation or Government policy that calls into question a plan objective; e.g. a change of a reserve's boundary or status
- approval by Government of an activity, development or use which conflicts with the provisions of the plan (such as native title outcomes).

2.1 Regional context

Macleod Morass and Jones Bay Wildlife Reserves lie immediately south of Bairnsdale at the head of Lake King and on either side of the Mitchell River.

Adjoining the reserves is private agricultural land, low-density residential areas, Crown foreshore land surrounding Jones Bay, and other reserved Crown land including the Mitchell River.

Popular activities undertaken in the area include:

- boating and sailing on the Gippsland Lakes
- fishing on the Mitchell River and Gippsland Lakes
- sightseeing and nature observation
- hunting of game species.

The nearby townships of Eagle Point and Paynesville are popular holiday destinations on the Gippsland Lakes.

2.2 Reserve values and significance

Macleod Morass and Jones Bay Wildlife Reserves make a valuable contribution to Victoria's parks and reserves system, which aims to protect viable, representative samples of the State's natural environments occurring on public land.

The reserves are an integral part of the Gippsland Lakes system. Macleod Morass is a freshwater marsh forming an extensive wetland on the Mitchell River floodplain. Jones Bay is an estuarine wetland forming the northern limit of Lake King. The wetlands contain a range of vegetation types that provide habitat for a diverse array of wildlife.

The reserves are significant to many people in the community, especially the Tatungoloong and other Gunai/Kurnai peoples who are associated with the area by folklore and customs, and other people with traditional attachments to the areas.

Parks Victoria respects the folklore and customs of community groups, particularly those of Indigenous communities.

The reserves also provide opportunities for visitors to enjoy and appreciate their natural and cultural values, and make an important contribution to tourism.

Significant values of Macleod Morass and Jones Bay Wildlife Reserves are listed below.

Natural values

- Macleod Morass and Jones Bay Wildlife Reserves occur within the Gippsland Lakes Ramsar Site, listed under the Convention on Wetlands (Ramsar, Iran 1971) or Ramsar Convention. The Ramsar Convention is an inter-governmental treaty that provides the framework for international cooperation for the conservation of wetlands, one of the most threatened habitats in the world.
- The reserves are listed in the Directory of Important Wetlands in Australia (Environment Australia 2001).
- Macleod Morass was originally classified as a 'deep freshwater marsh' (Corrick and Norman 1980); a Victorian wetland type substantially reduced since European settlement (Parks Victoria 2003). Unfortunately, only about a third of the Morass could now be classified as belonging to this ecological community, although remaining areas across the State are generally well represented within Victoria's protected area network (Parks Victoria 2003).
- Geomorphologic features associated with Macleod Morass are threatened within the Gippsland Lakes Bioregion.
- A number of Ecological Vegetation Classes occurring within the reserves are threatened in Victoria (appendix 1).
- A diverse range of 141 fauna species has been identified near the reserves, including 23 fauna species listed as threatened in Victoria and three nationally vulnerable

species: Green and Golden Bell Frog (*Litoria aurea*), Warty Bell Frog (*Litoria raniformis*) and Dwarf Galaxias (*Galaxias pusilla*) (appendix 2).

- Over 100 bird species, including 53 waterbird species, have been recorded at or near the reserves, including one species listed as critically endangered and four listed as endangered in Victoria.
- Macleod Morass is an important breeding site for Australian White Ibis (*Threskiornis molucca*), Straw-necked Ibis (*Threskiornis spinicollis*) and Black-winged Stilt (*Himantopus himantopus*).
- Seven different bird species are protected under each of the international Japan Australia Migratory Birds Agreement 1974 (JAMBA) and the China Australia Migratory Birds Agreement 1987 (CAMBA). Four bird species are also listed under Appendix 2 of the Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or the Bonn Convention).
- The area forms a distinctive regional landscape comprising wetlands, lakes and coastal plains.

Cultural values

- Indigenous folklore relating to the planning area.
- Two culturally significant scar trees within Macleod Morass Wildlife Reserve.
- Historic values include levee banks and water drainage structures established during early European settlement.
- Tourism and recreational values.
- A boardwalk, two bird hides and interpretive signage in upper Macleod Morass offer passive recreation and wildlife observation opportunities.
- Macleod Morass provides opportunities for the delivery of interpretation of wetland ecology to school groups.
- Informal pedestrian access to Jones Bay offers limited recreational opportunities.
- Macleod Morass and Jones Bay Wildlife Reserves offer considerable duck hunting opportunities during designated times of

the year, in accordance with their State Game Reserve classification under the *Wildlife Act 1975* (Vic.).

2.3 Past land use

According to tradition, the Tatungoloong clan of the Gunai/Kurnai peoples were the custodians of land and waters that include the planning area. The Tatungoloong people used the aquatic and terrestrial habitats of the area as sources of food and the surrounding open forest for shelter, and gave seasonal access for the collection of swan eggs to the Brabuwooloong people who are traditionally associated with areas to the north. The Tatungoloong people used the planning area at the time of European settlement and their descendants maintain a strong association with the area.

Since European settlement land-use activities have impacted on the reserves in a number of ways. Prior to reservation, all of Jones Bay and large areas of Macleod Morass were private land that was mostly cleared of native vegetation and used for cropping and grazing. During the early 1900s, extensive drainage works were established throughout the land now included in Macleod Morass in an attempt to reduce frequent inundations from the Mitchell River and maintain agricultural productivity. Many drains and levees continue to distribute stormwater and treated wastewater and thus influence the hydrology of Macleod Morass.

Since 1939, wastewater that has been treated to varying levels has been discharged to Macleod Morass, resulting in elevated nutrient levels, reductions in water quality and changes in the distribution and abundance of vegetation. Environment Protection Authority licence requirements now control the quality of wastewater permitted to be discharged.

Grazing licences, mostly for cattle, are being progressively phased out in accordance with rehabilitation measures.

2.4 The reserves' visitor

Macleod Morass and Jones Bay Wildlife Reserves attract a range of visitor types, including:

- people seeking to appreciate the flora and fauna characteristics of the reserves

- hunters of duck species and Stubble Quail
- recreational walkers
- student groups.

Accurate data on visits to the planning area is not available, but number of visits is estimated to be up to 3 200. Most visits are made to Macleod Morass rather than Jones Bay.

The majority of visitors are local people who know of the reserves and their attractions. Hunters are attracted in greater numbers to Macleod Morass than to Jones Bay Wildlife Reserve. Many hunters have made many visits over years, and for some, hunting in the reserves is a family custom. Total hunter numbers for both reserves have declined over recent years (Franken pers. comm.). Schools also make frequent visits to the reserves for nature observation and research.

Tourism to the region is increasing at a considerable rate with increasing numbers of local, interstate and international visitors coming to the Gippsland Lakes and nearby lakes and rivers. There is an increasing awareness of the region's natural attractions and cultural history. Many tourists visit Bairnsdale and towns such as Paynesville. Macleod Morass is close to Bairnsdale and Paynesville and visit numbers to the Morass are likely to increase, whereas increases are less likely at Jones Bay Wildlife Reserve. There is scope to integrate visits to the Morass in itineraries linking visitor attractions in the Bairnsdale area.

An improved understanding of potential future visit numbers and impacts of visitor activities on the planning area is needed to facilitate effective protection of the area's natural and cultural values.

East Gippsland Shire Council has a key responsibility to actively promote the region's natural attractions, particularly those associated with the Gippsland Lakes and including Macleod Morass.

2.5 Legislation and LCC recommendations

Legislation

Macleod Morass and Jones Bay Wildlife Reserves are now reserved under the *Crown Land (Reserves) Act 1978* (Vic.). Under the

Wildlife Act, areas reserved for the propagation or management of wildlife or the preservation of wildlife habitat under the Crown Land (Reserves) Act [Section 4 (1)(o)] are State Wildlife Reserves. Macleod Morass and Jones Bay were also permanently classified as State Game Reserves in 1999. The *Wildlife (State Game Reserve) Regulations 2004* apply to both reserves.

The Mitchell River Water Reserve, Natural Interest Reserve and Government road, although reserved or set aside under the Land Act, are managed as State Wildlife Reserves (State Game Reserves) by Parks Victoria in accordance with the Government approved LCC Recommendations (LCC 1983).

The *Flora and Fauna Guarantee Act 1988* (Vic.) (FFG Act) protects all indigenous flora and fauna within the planning area.

The *Coastal Management Act 1995* (Vic.) applies to any Crown land within 200 metres of the high water mark of the coastal waters of Victoria, including parts of the planning area. The Coastal Management Act provides for a coordinated approach to the planning, management and use of coastal Crown land in Victoria.

The provisions of the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) apply to Macleod Morass and Jones Bay Wildlife Reserves with respect to actions that have, will have or are likely to have a significant impact on matters of national environmental significance. Both reserves are part of the Gippsland Lakes Ramsar Site, have records of nationally threatened fauna and support migratory bird species listed under JAMBA, CAMBA and the Bonn Convention. The Environment Protection and Biodiversity Conservation Act applies to actions that have, will have or are likely to have a significant impact on matters of national environmental significance.

Indigenous places and objects, whether registered or not, are protected under the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* (Cwlth) and *Archaeological and Aboriginal Relics Preservation Act 1972* (Vic).

Management activities and issues relating to Native Title are dealt with according to the *Native Title Act 1993* (Cwlth). An application

by the Gunai/ Kurnai peoples for Native Title Determination (No. VG6007/98), covering large areas of Crown land and waters in Gippsland and East Gippsland, including parts of the planning area, was registered with the National Native Title Tribunal at the Federal Court in 1998.

LCC recommendations

In 1983 the Land Conservation Council (LCC) recommended the creation of a Gippsland Lakes Reserve to include most of the public land around the Gippsland Lakes.

The recommendation for a Gippsland Lakes Reserve included the following parts of the planning area in Zone 1:

- the southern section of Macleod Morass Wildlife Reserve (the northern section being outside the study area and within the former City of Bairnsdale)
- Jones Bay Wildlife Reserve
- the Mitchell River Water Reserve to the west of Macleod Morass Wildlife Reserve (Crown allotment 78D, Parish of Bairnsdale)
- the Natural Interest Reserve to the south of Jones Bay Wildlife Reserve (Crown allotment 80, Parish of Broadlands)
- the unmade Government road, within Jones Bay Wildlife Reserve (i.e. part of Bankins Lane).

The LCC recommended that Zone 1 should be used primarily to conserve and enhance the habitat of wildlife, especially waterbirds. Appropriate forms of recreation should be permitted, as should the seasonal hunting of game (except in certain small areas not including the above).

The Governor in Council approved these recommendations on 19 June 1984 and they were implemented by Land Victoria in July 2002.

Consistent with legislation, Government-accepted LCC/ECC recommendations for use of the reserves and the management objectives for Natural Features Reserves (NRE 1999b), the aims for the planning area are as follows.

- Conserve and protect the natural features and values of the reserves, including any

indigenous flora and fauna, scenic features and landscapes, and features of geological and geomorphologic interest.

- Maintain the ecological character of the planning area through conservation and wise use.
- Conserve and protect cultural heritage.
- Provide opportunities for appropriate enjoyment, recreation and education by the public, and research and study where this does not conflict with the primary objective.
- Provide for and encourage scientific research, surveys and monitoring that will contribute to a better understanding and management of the reserves.
- Encourage a greater sense of ownership and custodianship of the reserves in the broader community.
- Encourage respect for, and integrate the folklore, customs, interests and rights in the land, and aspiration of, the relevant Indigenous peoples into the planning area's management.
- Cooperate with local, state and federal authorities in achieving shared goals within the reserves.

2.6 Policies and guidelines

The planning area is managed in accordance with government policies, Parks Victoria's operational policies and strategies, and as appropriate, consistent with other relevant policies and guidelines including:

- Ramsar Strategic Directions Statement (DSE 2002a)
- Gippsland Lakes Ramsar Site Strategic Management Plan (DSE 2003);
- Victorian Coastal Strategy (VCC 2002)
- Integrated Coastal Planning for Gippsland - Coastal Action Plan (GCB 2002a)
- Gippsland Lakes Coastal Action Plan (GCB 1999)
- Gippsland Fire Protection Plan (NRE 1999a)
- East Gippsland Planning Scheme (EGSC 1999)

-
- Code of Practice for Fire Management on Public Land (CNR 1995)
 - Macleod Morass Catchment Waste Management Working Party Final Report (EPA 1995)
 - Heritage Rivers and Natural Catchment Management Plans, Volume 4 – East Gippsland (DSE in preparation)
 - Parks Victoria’s draft Indigenous Partnership Strategy 2004

- Parks Victoria’s Guidelines for Working with Aboriginal Communities and Protection of Cultural Sites 2002.

The Gippsland Lakes Ramsar Site Strategic Management Plan (DSE 2003) lists a number of Site Management Objectives described in the Ramsar Strategic Directions Statement (DSE 2002a). These strategies provide overarching direction for the Gippsland Lakes Ramsar site and guidance for the development of certain specific strategies for the management plan.

3 STRATEGIC DIRECTIONS

3.1 Vision

A future visitor to Macleod Morass and Jones Bay Wildlife Reserves finds freshwater and estuarine wetland ecosystems that typify those that were once widespread in the Gippsland Lakes system.

The biodiversity of habitats and fauna is well protected in accordance with international convention obligations. Water regimes in the wetlands resemble those existing before development of the Mitchell River catchment, and are based on the results of sound and extensive research and monitoring. Water entering the wetlands is of high quality as a result of greatly improved management of the reserves' catchments and stormwater from Bairnsdale, and careful and effective management of the Bairnsdale wastewater treatment plant.

Increased levels of visitor use are sensitively and sustainably managed in accordance with aims for the reserves. Seasonal hunting of game birds continues as appropriate. High-quality, low-key facilities, including signage and interpretive information, are maintained at strategic locations throughout the reserves.

Cultural heritage associated with the planning area is protected or sustainably conserved as appropriate. Relevant Indigenous communities' folklore, customs, interests, aspirations and rights relating to the planning area are promoted, understood and respected among visitors, and appropriately integrated in the area's management.

The broader community has a clear awareness and appreciation of the reserves values. A variety of local groups and individuals including neighbours, and various government agencies, are actively and appropriately engaged with Parks Victoria in achieving a range of desirable outcomes for the Reserves.

3.2 Management directions

Major management directions for the planning area are outlined below:

Conservation

- Macleod Morass will be managed predominantly as a freshwater wetland ecosystem.
- Jones Bay will be managed as an estuarine (i.e. brackish) wetland ecosystem.
- Significant flora, fauna and geological values of the reserves will be protected.
- Degraded vegetation and wildlife habitat will, where appropriate, be re-established, restored and enhanced.
- Water regimes in Macleod Morass will be developed and refined, as monitoring and research data becomes available, to protect and, where appropriate, enhance ecosystem processes.
- The quality of water entering Macleod Morass and Jones Bay will be significantly improved through cooperative arrangements with other government agencies.
- Research and monitoring of significant biological, physical and Indigenous cultural values in the Reserves will be encouraged and supported.
- Indigenous places and objects will be protected.
- Relevant Indigenous communities' folklore, customs, interests, rights and aspirations relating to the planning area, will be respected, promoted, and reflected and integrated into all aspects of the area's planning and management, in accordance with Parks Victoria's operational policies.
- Significant post-settlement heritage will be conserved.
- All management actions will be in accordance with the Native Title Act.

The reserve visit

- Opportunities for recreational activities in the planning area, including nature observation and the hunting of appropriate game birds in open seasons, will continue to be available consistent with the protection of natural and cultural values.
- Visitors will be encouraged to use and enjoy Macleod Morass by the provision of opportunities, and high-quality and adequate facilities and services, that highlight the area's distinctive characteristics, are in keeping with the scale and relatively undeveloped character of Macleod Morass, and consistent with the protection of natural and cultural values. Facilities at Jones Bay will be kept to a minimum.
- Information and interpretive services provided will focus visitors' activities on appreciation of the nature conservation values of Macleod Morass and the Indigenous cultural heritage relating to the planning area.
- An understanding of visitor needs and expectations will be developed by liaising with local educational institutions and community groups and encouraging them to undertake surveys to assess visitor profiles, patterns of behaviour, expectations and preferences.
- Visit numbers and activities will be monitored to assess impacts on natural and cultural values.

Community awareness and involvement

- The broader community's awareness and understanding of the reserves values and management programs will be enhanced, and the community's sense of ownership and custodianship of the reserves further developed.
- Strong consultative relationships will be developed with local communities to inform, enrich and facilitate the planning area's planning and management.
- Strong cooperative relationships will be developed and maintained with the relevant Indigenous communities to reflect and integrate Indigenous knowledge in the planning area's planning and management.
- Community groups with particular interests in the reserves will be encouraged to assist in implementing the management plan.
- A cooperative approach to land management will be developed with the managers of lands adjoining the reserves.
- Government agencies will be encouraged to collaborate with Parks Victoria in achieving shared goals that relate to the planning area.

4 STRATEGIES FOR NATURAL VALUES CONSERVATION

4.1 Geological and landform features

Macleod Morass Wildlife Reserve contains sites of State geological and geomorphological significance (Rosengren 1984). The extensive 'backswamp' forming Macleod Morass, the escarpment ('marginal bluff') along its western boundary, and relict gravel beaches and spits (e.g. Brownlow's Point) are important features providing evidence of once higher sea levels in Bass Strait.

Landforms of the planning area are significant elements the Country of the Gunai/Kurnai peoples.

Macleod Morass formed with and was eventually isolated from Lake King and Jones Bay with the development of the Mitchell River Silt Jetties. The marginal bluff marks the former shoreline position of Lake King and the relict gravel beaches and spits were formed by wave action.

Shoreline erosion of the Gippsland Lakes associated with changing salinity of the Lakes, loss of shoreline vegetation, wave action, increasing populations of carp (*Cyprinus carpio*) and uncontrolled grazing, threatens conservation values (GCB 2002c).

Aims

- Provide for the protection of landforms and geological features of scientific or cultural significance.
- Minimise disturbances to geomorphological processes or features.

Management strategies

- *Monitor impacts on areas of geological and geomorphological significance associated with Macleod Morass and implement management actions to minimise damage as necessary.*
- *Encourage further research into geological and geomorphological aspects of Macleod Morass and Jones Bay.*

- *Encourage research to identify landforms of special significance to Gunai/Kurnai peoples (sections 5.1 and 8.2).*
- *Consider the significance of landforms to the Gunai/Kurnai peoples in planning and interpreting works and providing interpretive services (sections 5.1, 6.1 and 8.2).*
- *Continue to work cooperatively with DSE and the Gippsland Coastal Board to implement remedial actions or prevent further shoreline erosion as guided by the Gippsland Lakes Shore Erosion and Revegetation Strategy (GCB 2002c).*

4.2 Streams and catchments

Stream flow from Cobbler Creek catchment, largely cleared for agriculture, is a potential source of elevated nutrient and sediment levels, particularly during high rainfall events. Stormwater from Bairnsdale discharges into, deposits considerable amounts of solid litter and elevates nutrient and sediment levels in, Macleod Morass via McGees Gully (Schmidt 1997), and into Jones Bay via a drain under Crooke Street. These catchment and stormwater inputs pose a potential threat to water quality and wetland habitat values.

EGSC is responsible for management of stormwater discharges and has installed a gross pollutant trap to reduce litter entering Macleod Morass from one section of the McGees Gully catchment. No mitigating steps exist within the Jones Bay urban stormwater catchment.

Aim

- Improve the quality of water entering Macleod Morass and Jones Bay from rural catchments and urban stormwater.

Management strategies

- *Liase with East Gippsland Catchment Management Authority, Landcare groups, DPI and DSE to further develop cooperative efforts to improve catchment management practices aimed at reducing*

catchment-sourced nutrient inputs to Macleod Morass and Jones Bay.

- *Work cooperatively with EGSC to develop, as an immediate priority, improved stormwater management practices to reduce nutrient and pollution levels in McGees Gully and Crooke Street drains.*

4.3 Water regimes

The water regimes of the planning area are greatly altered from those that existed before European settlement. The establishment of a permanent entrance to the Gippsland Lakes in 1889 resulted in the intrusion of marine saline water throughout the Gippsland Lakes including Jones Bay, and into the lower reaches of rivers including Mitchell River. It also introduced tidal influences to these waters that are frequently reinforced by winds.

Macleod Morass

Approximately 30% of the Morass is still representative of the original classification as a 'deep freshwater marsh' (Corrick and Norman 1980).

Water inflows to the Morass are dominated by catchment run-off from Cobbler Creek and several smaller intermittent streams, urban stormwater from McGees Gully, and direct rainfall. Major floods in the Mitchell River result in complete inundation of Macleod Morass and serve to 'flush' the entire wetland system. Much of the natural water regime has been greatly altered by:

- removal of minor flood events as a result of reduced seasonal fluctuations in the Mitchell River due to establishment of upstream impoundments and weirs;
- variations in local stream flows resulting from past clearing and developments in local catchments
- the presence of drains, levees and floodgates that were established in the Morass to limit its inundation at the time the area was freehold agricultural land
- intrusion of brackish water into the Lower Morass under tidal influences in Mitchell River
- discharges of treated wastewater from East Gippsland Water's Bairnsdale treatment plant that represents approximately 14% of

freshwater input to Macleod Morass in an average year (EGW 1999).

The intrusion of saline water into the Lower Morass impacts adversely on the ecology of the predominantly freshwater wetland system. Saline water also affects the agricultural productivity of adjoining private land.

Due to the presence of drainage channels and levees, and continual year-round input of treated wastewater, the Morass remains wetter for longer periods and sustains elevated nutrient levels, and some areas of the Upper Morass are dominated by Cumbungi at the expense of the naturally dominant Giant Rush (*Juncus ingens*) (Breen 1993; section 4.5).

The regime of wetting–drying of the Morass, which is a common feature of many wetlands, serves to stimulate regeneration of indigenous plant species, limit the invasion of opportunistic plant species such as the native Cumbungi (*Typha orientalis*), limit the invasion of carp and Mosquito Fish in favour of the native Dwarf Galaxias, allow aerobic breakdown of nutrient-rich sediments and organic matter, and increase biological productivity upon refilling, particularly for aquatic plants and invertebrate populations. The Macleod Morass Catchment Waste Management Working Party Final Report (EPA 1995) and Breen (1993) recommended the reintroduction of a more natural wetting – drying regime in the Upper Morass to encourage aerobic breakdown of nutrient rich sediments and organic matter and to limit the further spread of Cumbungi.

Inundations of adjoining private land often occur when water levels in Macleod Morass are elevated following high rainfall and catchment inflows. Historically, it is during these periods that private landholders have pumped water from their freehold lands for irrigation purposes. A licence issued under the *Water Act 1989* (Vic.) by Southern Rural Water is required for this purpose. If lake and river levels are correspondingly high, mainly in winter, water in the Morass is unable to drain away, resulting in private land remaining inundated for extended periods.

The water control structures provide a useful means to manage water levels in the Morass to meet its ecological requirements and assist in minimising the inundation of adjoining

freehold land as sought by some landowners. A weir and a series of drop-boards on the main drain connecting the lower Morass with the Mitchell River (adjacent to Paynesville Road) continue to function, and are managed by Parks Victoria to prevent inflow of river water, which is often of higher salinity than water in the Morass.

If lake and river levels are lower than those in the Morass, as is often the case in summer, Parks Victoria usually removes drop-boards to allow water levels in the Morass to drop, where consistent with management objectives. It is unrealistic however, for landowners to expect repeated draining of the Morass below mean sea level [(approximately 0.18 metres AHD) (EGW 1998; Stephens pers. comm.)] to minimise the inundation of abutting low lying freehold land. Such repeated draining of the Morass has a deleterious impact on its wetland and wildlife values. In prolonged dry-periods, evaporation will lower water levels below those of the Mitchell River, consequently some areas below mean sea level will dry-out.

There is considerable potential to improve control of drainage of the Morass, reduce flooding pressure on Paynesville Road and allow Mathiesons Paddock to be inundated with fresh rather than saline water, by relocating the main water control structure from the main drain under Paynesville Road to its original position further downstream immediately above the Mitchell River confluence.

Additional levees and water control structures have recently been established in connection with the operation of East Gippsland Water's constructed wetlands in Macleod Morass (section 4.4). These structures help to direct all stormwater from McGees Gully into Klopper's Paddock, and allow treated wastewater from the Bairnsdale wastewater treatment plant to be discharged into Macleod Morass at a number of locations (i.e. Long Waterhole, Upper Morass or Klopper's Paddock) rather than solely to the Upper Morass (figure 3).

A strategy is needed to reintroduce a more natural wetting–drying regime in the Upper Morass.

Jones Bay wetlands

Jones Bay is classified as an 'estuarine wetland' (Corrick and Norman 1980). The hydrological link between Lake King, Jones Bay and the Reserve is largely natural, and inundation by lake waters occurs over a broad front. Since the establishment of a permanent entrance to the Gippsland Lakes at Lakes Entrance, the overall salinity of Jones Bay wetland has increased.

Changes in the Lakes catchment has led to erosion of the islands that once existed in Jones Bay. Native vegetation stabilising the islands has declined as a result of increased salinity and hydrological changes that have been accelerated by local development. Consequently the soils from the islands have been distributed on the estuary floor. It is considered likely that this process has decreased the overall water depth of Jones Bay by approximately 20 cm (Verde pers. comm.).

Aims

- Establish an appropriate water regime in Macleod Morass to restore, conserve and enhance wetland values and maintain Jones Bay as an estuarine wetland.
- Minimise adverse impacts of high water levels in Macleod Morass on surrounding private land where this does not compromise wetland management objectives.

Management strategies

- *Manage Macleod Morass as a freshwater wetland ecosystem by preventing intrusion of saline water from the Gippsland Lakes into Macleod Morass via the Mitchell River.*
- *Minimise impacts on surrounding private land by lowering water levels in Macleod Morass, whenever lake and river levels permit and when not contrary to wetland conservation management objectives, to a minimum in summer months of 0.18m AHD (corresponding to mean sea level). Allow water levels to lower further only through evaporation.*
- *Provide for an appropriate wetting – drying regime in the Upper Morass to encourage the aerobic breakdown of nutrient rich sediments and organic*

- matter, and to limit the further spread of Cumbungi.*
- *Develop a water management strategy to deliver an overall water regime to Macleod Morass that:*
 - *facilitates a wetting-drying cycle that more closely represents natural processes and can assist in reducing organic matter that has accumulated in parts of the Morass*
 - *is based on catchment inflows and rainfall, and drainage to a defined minimum water level of—0.18 mAHD*
 - *recognises climatic conditions, including conditions associated with the El Nino dry periods*
 - *prevents intrusion of saline lake and river water*
 - *includes optimum wastewater discharge points over time and limits wastewater discharges when there is a likelihood the Morass will dry out in the short-term*
 - *minimises when possible in summer, and without compromising environmental objectives, the impacts of high water levels on surrounding private land.*
 - *Review the water management model (including discharge points for constructed wetlands and minimum summer water levels) by adopting an adaptive approach to management of Macleod Morass as monitoring data and operational aspects of water control structures associated with East Gippsland Water's constructed wetlands become increasingly better understood.*
 - *Ensure that modified water management regimes implemented within the morass to enhance natural values do not impact on cultural values.*
 - *Investigate options for a new self-regulating water control structure further downstream on the drain linking lower Macleod Morass and the Mitchell River, immediately above the Mitchell River confluence.*

- *Ensure that the existing or any new self-regulating water control structure on the drain linking Macleod Morass and the Mitchell River is monitored and maintained regularly to ensure its operational effectiveness.*
- *Work cooperatively with East Gippsland Water (EGW) to maintain the hydraulic integrity of all drains, levees and water control structures.*

4.4 Water quality

The discharge of wastewater from Bairnsdale to Macleod Morass commenced in 1939. All discharges are now treated by East Gippsland Water's Bairnsdale wastewater treatment plant.

A number of reports (Bibrowska and Robinson 1989; Chessman 1990; Breen 1993) detail the impacts of discharges of wastewater to Macleod Morass. The Macleod Morass Catchment Waste Management Working Party Final Report (EPA 1995) recommended a range of actions, including improved treatment of wastewater and establishment of constructed wetlands within Macleod Morass, both of which have been successfully implemented by EGW.

Parks Victoria and EGW have agreed on a Memorandum of Understanding (MoU) that outlines each party's common commitment to maintain and improve water quality, wildlife habitat and biodiversity in Macleod Morass (Parks Victoria 2001a). The MoU facilitates construction of wetlands and associated water control structures within the Morass.

Construction of wetlands in the Macleod Morass commenced in 2001, following receipt of all necessary planning and environmental approvals, including under the Commonwealth Environment Protection and Biodiversity Conservation Act. The wetlands will further improve the quality of treated wastewater prior to discharge, in accordance with the Environment Protection Authority licence. Associated levees and hydraulic control structures will enable treated wastewater to be discharged to various sections of the Morass (section 4.3).

Untreated effluents from sheep pens and a truck-wash facility at East Gippsland Shire's Bairnsdale regional livestock facility that were originally discharged directly to the Morass are

now discharged to settlement and pre-treatment ponds in Macleod Morass and then pumped to the adjacent waste water treatment facility. The possibility of total inundations of both ponds during floods poses a continuing threat to the water quality of the Morass. The risk has been increased by reduction of the ponds' capacities due to depositions of sediment.

Contaminated drainage from East Gippsland Shire's landfill site at Bosworth Road and McGees Gully is also considered a threat to the water quality of Macleod Morass (EPA 1995). The level of risk to the Morass will be assessed on the basis of results of borehole water monitoring undertaken by the Shire and forwarded to the Environmental Protection Authority.

Urban stormwater and drainage from agricultural land entering Macleod Morass and the Jones Bay wetland contain nutrients, sediments and litter that reduce water quality in these wetlands (section 4.2). Saline water from Mitchell River has a potentially degrading influence on the water quality of the Morass (section 4.3). The effect of these pollutants on the wetlands is greater when the wetlands dry-out, particularly when they become completely dry, as a result of evaporation during prolonged dry weather.

Toxic blue-green algal blooms have occurred in Macleod Morass as a result of degraded water quality. During dry periods in the Upper Morass there is a breakdown of organic matter associated with wetting-drying regimes. On refilling of the Upper Morass there is potential for a 'flush' of nutrients, followed by temporary localised reductions in water quality and the development of algal blooms (Breen 1993; DCE 1992). DSE coordinates the East Gippsland Blue-Green Algae Response Plan, which initiates appropriate health warnings against human contact, contact by pets (particularly dogs), stock watering, and consumption of fish and crustaceans.

Aims

- Improve the water quality of Macleod Morass.
- Maintain the water quality of Jones Bay.

Management strategies

- *Ensure that maximum operational efficiency of the constructed wetlands for treatment of effluent from the Bairnsdale wastewater treatment plant is achieved through ongoing close cooperation between Parks Victoria and East Gippsland Water.*
- *Work cooperatively in developing and implementing East Gippsland Water's comprehensive monitoring program aimed at determining the ecological response of Macleod Morass to varying water regimes and altered nutrient inputs.*
- *Work cooperatively with EGSC to ensure that regular monitoring of the saleyard effluent settlement and pre-treatment ponds occurs, and to ensure their relocation from Macleod Morass by 2007.*
- *Work cooperatively with EGSC to investigate the risk posed by potential contaminants from Bosworth Road landfill site and the former McGees Gully landfill site.*
- *Encourage EGSC to continue monitoring bore holes adjacent to Macleod Morass to test for potential groundwater contamination from the former Bosworth Road and McGees Gully landfill sites; and to continue forwarding of results to EPA.*
- *Continue to work cooperatively with Waterwatch regarding water quality monitoring within Macleod Morass; and develop and implement a future water quality monitoring program for Jones Bay.*
- *Liase with DSE to ensure that the East Gippsland Blue-Green Algae Response Plan includes appropriate health warnings to reserve visitors and surrounding landowners against human contact, contact by pets (particularly dogs), stock watering and consumption of fish, crustacea, eels and ducks.*
- *Continue the work of the Macleod Morass Wastewater Review Panel (with representation from Parks Victoria, East Gippsland Water, EGSC and Environment Protection Authority) in regularly reviewing monitoring results and assessing the effectiveness of the constructed wetlands and saleyard treatment ponds in*

Macleod Morass, and recommending changes as required.

4.5 Groundwater salinity

Saline groundwater occurs as a seep below the adjacent escarpment near the northern boundary of Macleod Morass Wildlife Reserve. Evidence for this is in the surrounding plant species composition, which is generally more saline tolerant.

Further research is needed to determine the extent and management implications of saline groundwater within the planning area.

Aim

- Determine the extent and impact of saline groundwater on reserve values.

Management strategies

- *Encourage research to determine the extent and impact of saline groundwater on wetland conservation values in Macleod Morass.*
- *Ensure that suitable saline-tolerant indigenous native plant species are used in revegetating the northern section of Klopper's paddock.*

4.6 Vegetation

Macleod Morass and Jones Bay support a rich flora assemblage of over 50 plant species with several significant Ecological Vegetation Communities (appendix 1). No threatened flora species have been recorded within the reserves, although there has not been a comprehensive flora survey.

The vegetation within the planning area provided substantial sources of food such as tubers from Cumbungi roots and fruiting bodies, and materials such as bark for canoes and utensils, for the Tatungoloong people.

The extent and relative abundance of different vegetation types has changed considerably over the past 150 years as a result of clearing for agriculture, grazing, modified water regimes and decreased water quality.

Preliminary mapping has identified a range of Ecological Vegetation Classes occurring within the planning area (Peel pers. comm.), including:

- Deep Freshwater Marsh
- Swamp Scrub
- Estuarine Wetland
- Floodplain Reed Bed
- Coastal Salt Marsh
- Damp Sands Herb-rich Woodland
- Plains Grassy Woodland
- Valley Grassy Forest/Swamp Scrub Mosaic
- Dry Valley Forest/Swamp Scrub/Warm Temperate Rainforest Mosaic.

Vegetation mapping is incomplete and, for Jones Bay, is based partly on interpretation of aerial photographs.

In Macleod Morass Cumbungi, which is a native species and has some habitat value, has come to dominate the vegetation because of increased nutrients and organic matter from wastewater and stormwater discharges (Breen 1993; EPA 1995). This increase has occurred at the expense of the naturally dominant Giant Rush, which provides important breeding habitat for a large (2–3000 birds) colony of Australian White Ibis and Straw-necked Ibis (section 4.3).

The spread of Cumbungi will be limited to some extent by a reduction in the total nutrient content of discharged effluent (a principal cause) as a result of further treatment by East Gippsland Water's constructed wetlands and by the re-introduction of a more natural water regime in the Upper Morass (section 4.3). However, additional action is likely to be necessary to achieve the desired result. Physical removal or chemical control of Cumbungi may well cause unacceptable impacts to wetland values. Investigation into more appropriate means is needed.

Extensive areas fringing Macleod Morass have been revegetated as part of an ongoing program to restore habitat values and increase biodiversity. Natural revegetation of more favourable species will be stimulated by the re-introduction of a more natural water regime in the Upper Morass (section 4.3). However, further revegetation is needed at both Macleod Morass and Jones Bay Wildlife Reserves.

The collection of firewood for campfires within the reserves, and the use of chainsaws, are incompatible with the ongoing program to restore habitat values and increase biodiversity. The presence of dead and decaying vegetation, even though minimal within the reserves, offers integral habitat for fauna, particularly reptiles, amphibians and avifauna.

East Gippsland Catchment Management Authority obtains Common Reed from Mathiesons Paddock for revegetation programs along the Mitchell River and other local riparian restoration works.

Aims

- Protect and conserve native flora and vegetation communities, particularly significant species and communities.
- Restore habitat values of native vegetation communities.
- Improve knowledge of native flora and vegetation communities, their management requirements and traditional uses.

Management strategies

- *Undertake a comprehensive flora survey and update vegetation mapping for Macleod Morass and Jones Bay.*
- *Seek to limit the further expansion of Cumbungi by reducing point-source nutrient inputs and allowing for more natural water regimes in the Upper Morass (section 4.3).*
- *Undertake a comparative analysis and ongoing monitoring of vegetation distribution patterns using historical information and updated mapping to determine the response of vegetation, particularly Cumbungi, to reduced nutrient levels and altered water regimes in Macleod Morass.*
- *Encourage research to identify Gunai/Kurnai peoples' folklore and customs relating to flora of the planning area (sections 5.1 and 7.2). In accordance with Parks Victoria's policies, reflect and integrate knowledge gained in all management programs (sections 4.10, 5.1, 6.1 and 8.2).*

- *Encourage investigations into appropriate techniques to reduce the unnatural spread of select native plants within Macleod Morass based on vegetation distribution monitoring results.*
- *Prepare and implement, in cooperation with community groups and in accordance with Parks Victoria's guidelines, a comprehensive revegetation program using local provenance indigenous species, focusing on areas as follows:*
 - *north and east side of Klopper's Paddock*
 - *western shoreline and boundary of Macleod Morass*
 - *Mathiesons Paddock*
 - *northern and north-western shoreline of Jones Bay*
 - *section of track along eastern boundary of Jones Bay.*
- *Encourage community groups to continue their involvement in revegetation and restoration programs within the Reserves.*
- *Monitor the success of all existing and future revegetation work.*
- *Encourage campers to bring firewood from outside the reserves for campfires.*
- *Encourage the restoration of wildlife habitat by prohibiting the collection of firewood and use of chainsaws within the reserves.*
- *Continue to allow East Gippsland Catchment Management Authority to remove limited amounts of Common Reed for beneficial re-use in the Mitchell River and surrounds, subject to annual reviews showing no evidence of threat to natural or cultural values and approval by Parks Victoria.*

4.7 Fauna

Macleod Morass and Jones Bay Wildlife Reserves offer a diverse range of important habitats for 141 fauna species, of which 23 are listed as vulnerable in Victoria and twelve are listed under the FFG Act (appendix 2).

Over 100 bird species, including 53 waterbird species, have been identified. One bird

species, Intermediate Egret (*Ardea intermedia*) is listed as critically endangered in Victoria. Four species are listed as endangered in Victoria: Great Egret (*Egretta alba*), White-bellied Sea-eagle (*Haliaeetus leucogaster*), Lewins Rail (*Rallus pectoralis*) and Freckled Duck (*Stictonetta naevosa*) (appendix 2).

Macleod Morass contains three nationally vulnerable fauna species protected under the Environment Protection and Biodiversity Conservation Act: Green and Golden Bell Frog (*Litoria aurea*), Warty Bell Frog (*Litoria raniformis*), Dwarf Galaxias (*Galaxias pusilla*).

Seven migratory bird species are protected under both the JAMBA and CAMBA. Three bird species are listed on the Bonn Convention.

Macleod Morass is a locally important breeding site for Australian White Ibis, Straw-necked Ibis and Black-winged Stilt (Norris and Mansergh 1981).

Shortfinned Eel (*Anguilla australis*) and Longfinned Eel (*Anguilla reinhardtii*) are found in both Macleod Morass and Jones Bay Wildlife Reserves and are commercially harvested in Macleod Morass. An increase in the proportion of large migratory Longfinned Eel within Macleod Morass in recent years is thought to be linked to the establishment of carp exclusion grates, which may inhibit annual seaward migration patterns (Elton and McKinnon pers. comm.). By-catch issues associated with commercial eel fishing are discussed in section 7.1.

The fauna of the planning area, including the diversity and abundance of waterbirds and aquatic species which provide seasonal food sources, are of significant interest to Tatungoloong people and other peoples with a traditional association with the planning area. Key species such as the White-bellied Sea-eagle form totem species for the Gunai/Kurnai peoples and possess great spiritual significance.

Threats to fauna values include habitat depletion through changing vegetation distribution and pest plants, reduced water quality, altered water regimes, pest animals and human disturbance.

Mosquitos are a native species integral to wetland ecology but are often regarded as a

nuisance by members of the community. Mosquitos are known vectors for arbovirus (e.g. Ross River virus). East Gippsland Shire Council, acting as agent for the Department of Human Services, until recently undertook measures to control mosquitoes at selected locations throughout the Gippsland Lakes, including Macleod Morass and Jones Bay.

Aims

- Protect native fauna species and maintain genetic diversity of fauna populations.
- Enhance the long-term survival prospects of threatened or significant species, including colonial breeding waterbirds.
- Comply with international obligations under the Ramsar and Bonn Conventions, and JAMBA and CAMBA migratory bird agreements.
- Increase knowledge of the distribution, migratory patterns and management requirements of native fauna species, particularly species of significance to conservation or the Gunai/Kurnai peoples.

Management strategies

- *Protect known sites of significant fauna and colonial breeding waterbirds from unnecessary disturbance, particularly the following species:*
 - *White-bellied Sea Eagle (*Haliaeetus leucogaster*)*
 - *Green and Golden Bell Frog (*Litoria aurea*)*
 - *Warty Bell Frog (*Litoria raniformis*);*
 - *Black Winged Stilt*
 - *Australian White Ibis, Straw Necked Ibis.*
- *Improve breeding and habitat conditions for Black-winged Stilt by appropriate water level manipulation in Macleod Morass, including Klopper's and Ellison's paddocks.*
- *Encourage further research to better understand management requirements of significant fauna and faunal habitats.*
- *Manage FFG Act listed species in accordance with approved action*

statements. Encourage regular surveys by community groups of:

- numbers by species of colonial breeding waterbirds
- numbers by species of significant fauna species
- numbers by species of migratory birds listed on the Bonn Convention and JAMBA and CAMBA migratory bird agreements
- waterfowl.
- Encourage research into Indigenous peoples' folklore and customs relating to fauna of the planning area (sections 5.1 and 7.2). Reflect and integrate knowledge gained in all management programs in accordance with Parks Victoria's operational policies (chapters 4, 5, 6 and section 8.2).
- Encourage community groups to submit fauna survey records to the Wildlife Atlas of Victoria.
- Adopt an adaptive approach to fauna management in response to increasing knowledge and changing conditions in Macleod Morass (section 4.3).
- Encourage research into populations of the Shortfinned Eel and Longfinned Eel and their patterns of movement throughout Macleod Morass to determine the impact of carp exclusion grates and water control structures on migrating eels. Develop, if necessary, appropriate management practices to overcome impediments to migrating eels (e.g. fishways).
- Ensure that mosquito control programs, where warranted, are undertaken in accordance with statewide guidelines and Parks Victoria's and DSE's policies and management strategies.

4.8 Pest plants and animals

Non-native plant species are found within the planning area but are not widespread. The more prevalent species include Bridal Creeper, willows, Desert Ash, Poplar, Asparagus, Boxthorn, exotic pasture species, invasive garden escapees, and Blackberry.

Most have been introduced through previous land-clearing practices, grazing, flood events and stormwater discharges, or from adjacent private land. Some species (e.g. Desert Ash, willows) have been inappropriately planted within the reserves. Occasional instances of agricultural weeds being dumped within the reserves have also been noted.

Control methods for non-native plant species include physical removal and chemical treatment.

Cats and foxes pose a significant threat to native wildlife. Cats, both domestic and feral, originate from nearby urban areas and the former and current Bairnsdale landfill sites. Control programs for foxes consist of baiting and community education.

Carp are well established in Macleod Morass, resulting in uprooting of aquatic vegetation, increased turbidity and reduced water quality. Carp exclusion trials have demonstrated the full impact of carp on vegetation in the Morass and highlighted the benefits of carp removal (Crisp and Brumley 2001). Total eradication of carp from Macleod Morass is an unrealistic goal, particularly considering that inundation of the morass during major floods often reintroduces carp to areas where numbers may have decreased during dry periods. A strategy of actively managing carp numbers through modified water regimes and extended dry periods (section 4.3), together with harvesting (section 7.1) is likely to have the most favourable result (GCB 2002b).

A range of community groups have historically been involved in assisting with pest plant and animal control programs within the reserves.

Hog Deer have been recorded in Macleod Morass, and although an exotic species are protected as wildlife under the Wildlife Act. Hog Deer are not proclaimed as a game species for hunting in either reserve. The impact of Hog Deer on wetland values is not fully understood.

Illegal cattle grazing occurs within the reserves, causing degradation by trampling and removal of biomass. There is also concern about the potential for damage to occur to sensitive significant cultural places and objects.

Aim

- Eradicate or control pest plants and animals using methods which minimise the disturbance to natural systems and effects on park values.

Management strategies

- *Prepare and implement an integrated program of monitoring and control of pest plant and animal species and pathogens, giving priority to:*
 - *the control of pest plant infestations close to populations of threatened flora species*
 - *areas of high conservation significance*
 - *the control of Blackberry, Bridal Creeper, willows, Desert Ash, Poplar, Asparagus, Boxthorn, exotic pasture species, and invasive garden escapees*
 - *the control of new pest plant infestations and pest plants with a high potential for invasion*
 - *the eradication of new pest animal populations as they are identified*
 - *the active management of carp numbers*
 - *the control of foxes and feral cats.*
- *Minimise the impact of control programs on native flora, native fauna, cultural values and neighbouring land.*
- *Use control methods that minimise impacts on natural systems and effects on reserve values. Minimise the use of chemicals for control of pest plants in sensitive wetland areas.*
- *Take special care to avoid soil disturbance and use of chemicals that could impact on Indigenous places and objects.*
- *Continue cooperation with adjoining landowners and community groups to coordinate pest plant and animal control efforts.*
- *Work cooperatively with EGSC to minimise weed infestations originating from stormwater discharges to the reserves.*

- *Work cooperatively with DPI, DSE, EGW and commercial carp fishermen to facilitate trapping and removal of carp within Macleod Morass (section 7.1).*
- *Investigate an appropriate water management strategy that considers the ecological requirements of the natural system and facilitates the natural decline in carp abundances within Macleod Morass.*
- *Encourage continued research into the effects of carp on wetland ecosystems.*
- *Investigate the impact of Hog Deer on native flora and fauna in Macleod Morass.*
- *Work cooperatively with DSE to determine future management options for Hog Deer populations within Macleod Morass in the context of the Hog Deer Management Strategy currently being prepared (NRE, in preparation).*
- *Prevent illegal grazing through consultation with landowners, construction and appropriate maintenance of fences, patrols and enforcement.*
- *Inform visitors and adjacent landholders about relevant pest plant and animal control programs.*

4.9 Landscape

The broad open wetland expanse of Macleod Morass and Jones Bay, backed by rural agricultural land, built-up areas of Bairnsdale, the waters of Lake King, and distant foothills, all contribute to the appeal and visual quality of the landscape.

Paynesville Road, Eagle Point Bluff and the top of the escarpment along Bosworth Road offer striking scenic views of Macleod Morass. Jones Bay is less accessible, although Bankins Lane and surrounding private land offer scenic views.

The landscape is an intrinsic element of the Country of the Gunai/Kurnai peoples in accordance with tradition (section 4.1).

Aim

- Protect and conserve the natural landscape.

Management strategies

- *Minimise the impact of reserve and adjacent land management activities on landscape values.*
- *Take into account the need to conserve the natural landscape in the siting and design of all visitor facilities.*
- *Carefully consider the traditional significance of landscape to the Gunai/Kurnai peoples in planning and implementing works (chapters 4, 6 and 8).*
- *Liaise with DSE and planning authorities to minimise impacts on the aesthetics of the reserves.*
- *Improve landscape values and aesthetic appeal along Bosworth Road by rehabilitating the 'boardwalk entrance', and repairing and improving the post-and-rail boundary fence.*
- *Seek funding, in conjunction with other agencies, to improve views and landscape values from the escarpment along Bosworth Road by partial relocation of overhead powerlines in the event that the former Bairnsdale landfill site is rehabilitated and a new integrated entrance to Macleod Morass is established (section 4.3).*
- *Encourage prompt rehabilitation of all disturbed sites associated with the establishment of constructed wetlands in Macleod Morass.*

4.10 Fire management

Fire, whether prescribed or wild, occurs infrequently, as would be expected within and surrounding freshwater and estuarine wetlands. Fire events have previously originated from both within the reserves and from surrounding private land.

A major fire in the late 1970s caused extensive damage to private land west and south of Macleod Morass but did not ignite the Morass itself. Several small localised fires have been deliberately lit within the lower Morass adjacent to Paynesville Road, the most recent being an area of approximately 30 ha in March 2004. Historically, areas of Macleod Morass were purposely burnt to stimulate young plant

growth for grazing within the reserve (Brownlow pers. comm.).

Fire management issues on Crown land are addressed in the Gippsland Fire Protection Plan (NRE 1999a), and for surrounding private land in the East Gippsland Municipal Fire Prevention Plan (EGSC 2001). Country Fire Authority brigades from Paynesville and Sarsfield respond to fires in the surroundings of Macleod Morass and Jones Bay Wildlife Reserves respectively.

The likelihood of intense fires within the reserves is greatest when wetland water levels are low and vegetation, particularly reeds and rushes, is not in its green growth phase. Fire risk is least when water levels are high and vegetation is green.

Parks Victoria creates strategic fire control lines by slashing high-risk sections of the reserve boundary where access is available or not impeded by vegetation. Adjoining landowners are encouraged to slash private/public reserve boundaries within their property if they perceive a risk to their property. Designated campsites within Macleod Morass are slashed before the opening of the duck hunting season to minimise the risk of campfire escapes (section 6.4).

Prescribed burning is poorly understood as an ecological management tool in wetlands. It was trialled on two occasions within the reserves but has not been employed extensively. Further study is required to determine its appropriateness. Little is known of the Tatungoloong people's traditional uses of fire in and adjacent to wetland areas.

Aims

- Protect life, property and wetland values from injury by fire.
- Minimise the adverse effects of fire and fire suppression methods.
- Establish fire regimes appropriate to the conservation of native flora and fauna.

Management strategies

- *Liaise with DSE and the Municipal Fire Prevention Committee to ensure that operational matters within and surrounding Macleod Morass and Jones*

Bay Wildlife Reserves are understood by all organisations.

- *Ensure that the reserves' natural and cultural values are taken into consideration when planning and implementing fire protection, management and suppression operations.*
- *Continue to slash areas along the reserves' boundaries (where access is available or not impeded by vegetation) to maintain strategic control lines and fire access.*
- *Continue to slash regularly-used camping areas before the opening of the duck hunting season to minimise the risk of campfire escapes.*
- *Encourage the maintenance of firebreaks, where required, within adjacent roadsides and private land rather than Macleod Morass and Jones Bay Wildlife Reserves.*
- *Adopt minimum impact fire suppression techniques in all suppression operations, including helicopter/fixed wing aircraft, and use of existing tracks and water bodies as control lines, rather than suppression methods that disturb soil and vegetation.*
- *Encourage research to determine the requirements, if any, of ecological burning regimes within Macleod Morass and Jones Bay Wildlife Reserves.*
- *Encourage research into Indigenous peoples' folklore and customs relating to fire in the planning area (sections 5.1 and 7.2). In accordance with Parks Victoria's operational policies, reflect and integrate knowledge gained in all management programs (chapters 4, 5, 6 and section 8.2).*

5 STRATEGIES FOR CULTURAL VALUES CONSERVATION

5.1 Indigenous cultural heritage

The landscapes and landforms of the planning area are intrinsic elements of the Country of the Tatungoloong people and certain places will have special significance to their descendants in accordance with tradition. Two scar trees from which the bark was removed for construction of a canoe or for shelter are recorded for the planning area by Aboriginal Affairs Victoria (AAV 2001). Additional cultural heritage information is not readily available, although oral history may be available from contemporary Tatungoloong people.

All Indigenous places and objects are protected under the Archaeological and Aboriginal Relics Preservation Act and the Aboriginal and Torres Strait Islander Heritage Protection Act. Parks Victoria has statutory responsibilities for protecting and recording the Indigenous places and objects of the planning area. Under the Commonwealth legislation, Gippsland and East Gippsland Aboriginal Council (GEGAC) is designated as the 'local Aboriginal community' with powers and responsibilities relating to the identification, care and management of Indigenous places and objects in the area.

Issues relating to the protection of Indigenous places and objects are dealt with in accordance with directions given by GEGAC and advice received from Aboriginal Affairs Victoria (AAV). Advice on other Indigenous cultural heritage issues is sought from the relevant Indigenous communities, and AAV.

There are places within the reserves that may be threatened by a number of natural and non-natural processes, including:

- erosion and disturbance accelerated by flood events
- visitor activities and some management activities, and illegal grazing
- lack of knowledge and recognition
- lack of respect, pillaging and vandalism.

Issues relating to native title are dealt with according to the Native Title Act (section 2.5).

Implementation of this plan will take into account the existence of the native title application by the Gunai/ Kurnai peoples for Native Title determination (No. VG6007/98), which includes parts of the planning area.

Aims

- Protect Indigenous places and objects.
- Nurture Indigenous folklore and customs relating to the planning area.

Management strategies

- *Protect Indigenous places and objects from disturbance or damage in collaboration with the relevant Indigenous communities and AAV (section 7.2), and in accordance with:*
 - *provisions of relevant legislation including the Archaeological and Aboriginal Relics Preservation Act and Aboriginal and Torres Strait Islander Heritage Protection Act*
 - *Parks Victoria's Guidelines for Working with Aboriginal Communities and Protection of Cultural Sites.*
- *Respect relevant Indigenous communities' folklore, customs, interests, rights and aspirations relating to the planning area, and collaborate with the communities to reflect and integrate these considerations in all planning and management in accordance with Parks Victoria's operational policies (chapters 4, 5, 6, 7 and section 8.2).*
- *Encourage research into Indigenous cultural heritage relating to the planning area in liaison with AAV and cooperation with the relevant Indigenous communities. Use results to inform heritage protection and other management activities (chapters 4, 5, 6, 7 and section 8.2).*
- *Annually assess risks to Indigenous cultural heritage values of proposed management activities and visitor*

activities. Implement actions as necessary to minimise impacts on values, in consultation with relevant Indigenous communities (chapters 4, 5, 6, 7 and section 8.2).

- *Maintain confidentiality in respect of Indigenous folklore, customs, places and objects in accordance with Indigenous tradition and the wishes of relevant Indigenous communities (sections 6.1 and 8.2).*
- *Provide appropriate opportunities for visitors to learn about and understand the reserves' significance to relevant Indigenous communities (section 6.1).*

5.2 Non-indigenous cultural heritage

The establishment of drains, levees and water management control structures in Macleod Morass dates back to the early settlement of Bairnsdale and the expansion of agriculture throughout the district. These features have not been assessed for their cultural heritage values.

Aim

- Conserve significant non-Indigenous cultural heritage places and objects.

Management strategy

- *Assess the cultural significance of early drainage and land management features in the planning area and conserve features with cultural heritage values.*

6 STRATEGIES FOR VISITORS

6.1 Information, interpretation and education

The provision of relevant and appropriate information can help orientate visitors, enhance their visit, foster an understanding and appreciation of special features and values, encourage appropriate visitor use, reduce potential management problems and contribute to a broader understanding of natural environments and management objectives.

Macleod Morass and Jones Bay Wildlife Reserves provide opportunities for the delivery of useful messages to the public about the natural, and Indigenous and non-Indigenous cultural values of the planning area, and about the purposes of management activities and the role of facilities such as the constructed wetlands in Macleod Morass that improve the quality of water discharged to the Morass.

Interpretive material provided at present is limited to an updated information shelter on the Main Drain Track in Macleod Morass, which presents general information about the reserves' features and East Gippsland Water's constructed wetlands (figure 2), and an updated Park Note that assists self-guided visits to the reserves. Guided interpretive programs are regularly delivered to local school groups.

Interpretive information and signage is being improved to meet current standards and visitor expectations

Aims

- Enhance visitors' understanding, enjoyment and appreciation of the reserves' natural and cultural values.
- Establish and maintain facilities and services that enhance visitor enjoyment and are consistent with the protection of natural and cultural values.

Management strategies

- *Complete replacement of low-key visitor information and interpretation signage within Macleod Morass.*

- *Replace existing reserve entrance/ boundary signs at:*
 - *the end of Bankins Lane, Jones Bay*
 - *the Girl Guides Plantation in Macleod Morass*
 - *the end of Hollis Rd, Macleod Morass (unmade track).*
- *Install additional 'Macleod Morass Wildlife Reserve' signs at:*
 - *Paynesville Road near Mathiesons Paddock*
 - *Forge Creek Road on Cobbler Creek.*
- *Include information to indicate all the visitor activities permitted within the reserves (including hunting in open seasons) at key entry points to the planning area and in relevant education and interpretation information provided.*
- *Encourage all visitors to adopt minimum impact techniques and adhere to Codes of Conduct appropriate to their activity.*
- *Promote greater public understanding and appreciation of, and respect for, Indigenous culture by incorporating information about Indigenous folklore, customs, places and objects in information, interpretation and education programs in collaboration and accordance with the wishes of relevant Indigenous communities (sections 5.1 and 8.2).*
- *Inform visitors about non-Indigenous cultural heritage in the planning area through interpretive signage as appropriate (section 5.2).*
- *Ensure that interpretive information contains adequate recognition of natural and cultural values, both Indigenous and non-Indigenous, within the reserves.*
- *Provide appropriate opportunities for relevant Indigenous communities to participate in interpreting Indigenous cultural heritage relating to the reserves, and encourage the communities to participate (sections 5.1 and 8.2).*

- *Liaise with EGSC to investigate potential use of the bluff at the Bairnsdale landfill site (once rehabilitated) as a location for additional information and interpretation signage for Macleod Morass.*
- *Ensure that Park Notes are maintained up to date and available in print form and on Parks Victoria's website.*

6.2 Visitor access

Public access to the perimeter of Macleod Morass Wildlife Reserve is provided at a number of locations. These include Bosworth Road, Suding Lane, Paynesville Road and the now-closed section of Bairnsdale–Eagle Point Road, at Cobbler Creek on Forge Creek Road, and via several Government roads and tracks.

Vehicle access to Macleod Morass is permitted to the southern section of the Upper Morass, a track off Suding Lane and several tracks from Paynesville Road. A locked gate on the Main Drain Track leading to a boardwalk and bird hides allows access only to pedestrians, bicycles, management vehicles and a limited number of authorised users (e.g. licensed commercial fishermen and EGW staff).

The Main Drain Track, boardwalk and bird hides are the most popular access and destination points for visitors seeking to experience the environmental attributes of Macleod Morass. The track entrance and adjoining small car park on Bosworth Road would benefit from landscape enhancement (section 4.9). Any use of Bosworth Road as an alternate heavy vehicle route may pose a threat to the ecological integrity of the morass and potentially place reserve visitors at risk.

Any long-term improvements to access to the planning area should be considered holistically. Once the former Bairnsdale landfill site managed by EGSC and the adjacent EGW land have been rehabilitated (section 4.3), consideration could be given to establishing a new 'gateway to Macleod Morass' centred on the northern escarpment overlooking the wetlands. Potential walking track links via McGees Gully to the centre of Bairnsdale would further increase the accessibility of the reserve.

Pedestrian access to Jones Bay Wildlife Reserve is possible from the end of Bankins

Lane, off Crooke Street in East Bairnsdale. A small gravel turning bowl allows for car parking. An unmade 4WD track through estuarine rushes along the eastern boundary of the reserve offers access for duck hunters. This track can at times be partially inundated. Although not used frequently, ongoing use of the track will result in further degradation. Boat access is also possible from Jones Bay and Lake King.

The end of Bankins Lane within Jones Bay Wildlife Reserve extends into inundated wetland areas and is not required for public vehicle access. Closure of this Government road and addition of the land to the reserve would simplify regulation of activities (section 7.3).

The Mitchell River Water Reserve adjacent to Macleod Morass is only accessible by 4WD via an unmade Government road that traverses private property.

Aim

- Provide and maintain appropriate access for recreation and management purposes which is consistent with the protection of natural and cultural values.

Management strategies

- *Maintain and permit use of roads and vehicle tracks in the reserves in accordance with table 1, minimising damage to natural and cultural values. Retain access to the planning area from Long Waterhole Track.*
- *Maintain and permit use of walking tracks in accordance with table 2, minimising damage to natural and cultural values.*
- *Continue to allow pedestrian and bicycle access on all roads identified in table 1, including Management Vehicle Only tracks.*
- *Relocate the existing Girl Guide Plantation Track in Macleod Morass to under the powerlines, and revegetate the abandoned alignment.*
- *Maintain wheelchair standard access to the boardwalk and bird hides in Macleod Morass.*

TABLE 1 MANAGEMENT OF VEHICLE ROADS AND TRACKS

ROAD	PLANNED CLASS	COMMENT/USES	MANAGEMENT ACTION
Macleod Morass Wildlife Reserve			
Constructed Wetland Lagoon Track	4, D, MVO	Provides access for Parks Victoria and EGW to constructed wetland lagoons for water sampling and maintenance.	Maintain current access.
Main Drain Track	4, D, MVO	Provides access for Parks Victoria and EGW to floodway and water flow control devices. Access by licensed commercial fishers also permitted.	Maintain current access.
South Boundary Track (Upper Morass)	5, E, S	Provides access to southern side of Upper Morass during relevant open seasons for game. Track closed at other times due to track conditions and low visitor demand. Access to track is available through private property and only during relevant open seasons for game.	Maintain current access.
Suding Lane Track	5, E, S	Provides access from Suding Lane to Klopper's Paddock.	Maintain current access from Paynesville Road to Kloppers Paddock.
Girl Guide Plantation Track	5, E, O	Provides access to Lower Morass and designated campsites.	Relocate section of track to below powerlines and allow revegetation of existing track.
Jones Bay Wildlife Reserve			
East Boundary Track	5, E, MVO	Traverses areas of wetland that are regularly inundated. Continued use will further degrade sensitive wetland environment. Not required for public vehicle access.	Close track.

Note: Brownlows Track, a class 5,E,O track that provides access to Long Waterhole, is not within the planning area.

KEY:

Function:

- 4 Provide for reserve access, and additional functions such as commercial uses, through access to other location (outside the reserves), or access to private property or utilities.
- 5 Exclusively provide access for visitors into reserves for recreational activities, or exclusive use for reserve management.

Development:

- D Access Track — single lane, dry weather formed (from natural materials)
- E Rough Track — single lane, unformed earth track at or near the natural surface

Status:

- O Open to public vehicles
- S Open to public during relevant open seasons for game
- MVO Management Vehicles Only

TABLE 2 MANAGEMENT OF WALKING TRACKS

TRACK	LENGTH (KMS)	PROPOSED CLASS	COMMENTS
Macleod Morass Wildlife Reserve			
Boardwalk	0.5	3	Raised boardwalk over wetland with bird hide at end. Interpretation provided in Park Note and on Information Board.
Bittern Walk	0.3	3	Interpretation provided in Park Note and on Information Board.

KEY:

Australian Standards Classification for walking tracks (AS 2156.1—2001)

Grade 3 For visitors to walk in slightly disturbed natural environments, requiring moderate levels of fitness with occasional encounters with other visitors and perhaps signage—interpretation and facilities are not common.

- *Investigate the feasibility of additional walking tracks consistent with the level of services provided and with no detriment to natural landscape values within the reserves.*
- *Revegetate and landscape the Macleod Morass ‘entrance’ and car park on Bosworth Road.*
- *Liaise with EGSC to investigate potential use of Bairnsdale landfill site (once rehabilitated) as an alternative access, parking, viewing and ‘gateway’ point to Macleod Morass.*
- *Prevent unnecessary vehicle access through estuarine vegetation at Jones Bay by closing East Boundary Track to public vehicles. Liaise with EGSC to formalise and landscape parking at the end of Bankins Lane, Jones Bay.*
- *Encourage the EGSC to investigate more appropriate heavy vehicle alternate routes away from areas of ecological significance.*
- *Encourage DSE and EGSC to review, and if appropriate, close that section of Bankins Lane within Jones Bay Wildlife Reserve.*

6.3 Camping

There are few suitable campsites within Macleod Morass Wildlife Reserve. Camping usually occurs only at a few sites within the reserve, and in Government road and other areas of Crown land adjacent to the reserve, immediately before and during the open

seasons for duck species and Stubble Quail (figure 2). No camping occurs in Jones Bay Wildlife Reserve. No formal camping facilities are provided in either reserve.

Campers often light campfires near campsites.

Most campers are hunters who adopt sensible camping practices, which result in very little adverse impact on the reserve.

Camping by non-hunters during other times of the year is incompatible with reserve management objectives.

Aim

- Allow camping that is consistent with protecting the natural and cultural values of the reserves and accords with regulations.

Management strategies

- *Allow camping in the Wildlife Reserves only in designated campsites during relevant open seasons for game and the 24 hour period preceding the game seasons (section 6.4).*
- *Maintain designated campsites by slashing grass before the relevant open season for duck hunting (section 4.6, 5.1, 5.2 and 6.4).*
- *Limit campfires to designated campsites and ensure that campfires are lit and maintained in accordance with fire regulations.*
- *Foster continued support for minimum impact camping practices among hunters.*

6.4 Game hunting

Hunting for certain duck species and Stubble Quail is permitted during open seasons for the species in wetland areas of the Macleod Morass Wildlife Reserve (including the constructed wetlands managed by East Gippsland Water) and the Jones Bay Wildlife Reserve. Such hunting is also permitted in wetland areas of Mitchell River Water Reserve (adjacent to Macleod Morass) and the Natural Interest Reserve south of Jones Bay and Government road within the reserve, in accordance with LCC recommendations (LCC 1983). Hunting of Hog Deer is not permitted in the planning area (section 4.8).

Most hunters visit the reserves on opening weekends, when about 60 hunters visit Macleod Morass and 20 hunters visit Jones Bay Wildlife Reserve. In other periods of open seasons, hunting is infrequent. Hunter numbers have decreased considerably over the past decade (Elliot pers. comm.; Verde pers. comm.). Game hunting in Jones Bay is sometimes prevented by a lack of water following prolonged dry periods.

Macleod Morass and Jones Bay Wildlife Reserves were not included in the areas in which quail hunting is permitted until recently. Low population abundances, limited available habitat and minimal suitable terrain raise an issue as to whether or not such hunting is appropriate.

Within the reserves, disturbance of colonies of breeding waterbirds and their habitat by bird hide construction and maintenance activities is of concern. Under the *Wildlife (State Game Reserve) Regulations 2004*, duck hides may be erected. Persons are required to use minimum amounts of vegetation to construct hides. Areas may be set aside where no vegetation may be gathered.

There is potential for conflicts to arise between the interests of hunters and other visitors to the planning area, who include increasing numbers of visitors to walking tracks, the boardwalk and bird hides of the Morass, and Parks Victoria and EGW operational staff. Conflicts could also arise between hunters and the residents of dwellings, and rural land under sub-division close to the planning area.

Careful management is needed to ensure that all visitors are aware of the multiple uses

permitted within Macleod Morass and Jones Bay Wildlife Reserves, and that there is cooperation between all parties.

DSE's Game Management Unit is responsible for ensuring that impacts of game hunting on the conservation of native flora and fauna are minimised. Adverse effects can be managed using provisions under the Wildlife Act and regulations such as temporary closures, limiting hunter numbers or management of access.

Bairnsdale Field and Game Association has erected duck nesting boxes in many locations throughout the reserves. Nest boxes have been shown to be effective only when designed properly and monitored regularly for removal of vermin such as starlings (Walker 2001).

Aims

- Allow for hunting of proclaimed game species, consistent with the protection of natural and cultural values.
- Minimise impacts of hunting on the environment.
- Minimise public risk associated with hunting.

Management strategies

- *Continue to allow for hunting of game within Macleod Morass and Jones Bay Wildlife Reserves during the proclaimed open seasons.*
- *Continue to prohibit hunting of Hog Deer within Macleod Morass and Jones Bay Wildlife Reserves.*
- *Monitor impacts of game hunting on flora and fauna conservation values, particularly removal of vegetation for duck hides and disturbance to breeding waterbirds, and review management strategies as required.*
- *Work cooperatively with DSE to assess the appropriateness of Stubble Quail as a proclaimed game species in Macleod Morass and Jones Bay Wildlife Reserves.*
- *Work cooperatively with EGW and Bairnsdale Field and Game Association to establish protocols allowing for active hunting on constructed wetlands in*

Macleod Morass while preventing adverse impacts to water quality monitoring sites.

- *Work cooperatively with EGW and Bairnsdale Field and Game Association to establish protocols ensuring the continued safety of operational staff on the constructed wetlands in Macleod Morass.*
- *Work cooperatively with DSE and the Bairnsdale Field and Game Association to promote increased hunter awareness of firearm regulations and the risks associated with hunting near rural-residential dwellings.*
- *Establish appropriate signage to increase public awareness of the legitimate right to hunt game on Macleod Morass and Jones Bay Wildlife Reserves during game seasons and to alert the public to potential risks.*
- *Ensure that the EGSC is aware of game hunting activities in the planning area when the Council makes planning decisions relating to nearby areas (section 8.3).*
- *Liaise with Bairnsdale Field and Game Association to monitor and record success of duck breeding boxes and review their location.*
- *Encourage monitoring of the construction and maintenance of game bird hides and manage activities in accordance with the regulations.*
- *Encourage regular maintenance and monitoring of duck nesting boxes during duck breeding season and repair or remove unused and dilapidated structures.*

6.5 Commercial visitor services

No tour operators have been licensed to conduct tours in the planning area. However, given the proximity of the area to Bairnsdale, the natural values of Macleod Morass may be capable of supporting a limited range of nature-based and educational tourism activities.

Aim

- Provide opportunities for licensed tour operators consistent with protecting natural and cultural values.

Management strategies

- *Investigate opportunities for providing low-key guided tours in Macleod Morass. Encourage provision of appropriate tours by tour operators, particularly Indigenous tour operators (section 6.1 and 8.2).*
- *Encourage licensed tour operators to deliver appropriate messages and information about the natural and cultural values of the reserves in consultation with appropriate authorities and the relevant Indigenous communities.*
- *Ensure that facilities such as parking are of suitable standard to cater for use by licensed tour operators.*
- *Encourage Lakes and Wilderness Tourism Inc. to promote Macleod Morass through the Bairnsdale Tourist Information Centre.*

7 STRATEGIES FOR AUTHORISED AND ADJACENT USES

7.1 Authorised uses

Commercial fishing

Shortfinned Eels and Longfinned Eels are commercially harvested in Macleod Morass under a General Permit issued by DPI (formerly NRE) under the Fisheries Act. The Permit allows use of up to 50 fyke nets and associated equipment with restrictions on mesh size as specified in Section 105 of the Act. The bunt (tail section) of fyke nets must be set at least 200 mm out of the water to reduce incidental catch (by-catch) and prevent drowning of native wildlife.

There is some concern within the community regarding the by-catch of aquatic animals that may occur within Macleod Morass, including fish, mammals, reptiles, amphibians and birds. A current review of Victoria's eel fishery by the Marine & Freshwater Resources Institute (MAFRI) concludes that the type of fyke net used is relatively benign in terms of damage or destruction of fish species (NRE 2001). Most fish by-catch caught in fyke nets will remain alive and generally uninjured for extended periods of time. Some smaller and juvenile fish species may become meshed in the fyke net material itself and hence may consequently perish. Other potential by-catch species such as platypuses, water rats, tortoises and water birds may not survive extended immersion in water while trapped inside fyke nets. However, by-catch reduction grids are required as a permit condition on all fyke nets used in Wildlife Reserves for the purpose of preventing the capture of aquatic animals other than eels. Sustainable eel fishing in terms of by-catch minimisation is achieved through control over the type of fishing gear used and assessment of the risk of by-catch in particular waters (NRE 2001). By-catch management will be further addressed through the development of a by-catch action plan for the eel fisheries in Victoria (NRE 2001).

An increased proportion of large migratory Longfinned Eels in Macleod Morass in recent years is thought to be linked to the establishment of carp exclusion grates, which

may inhibit annual seaward migration patterns (Elton and McKinnon pers. com.). Little is known about the potential impact on migration patterns of establishing additional carp exclusion grates on water control structures in the Upper Morass.

Carp are harvested in Macleod Morass under a Noxious Aquatic Species Permit issued by DPI. This entitles the holder to take carp from all Victorian waters subject to a range of conditions. All species other than carp must be released immediately on capture. The integration of temporary carp traps into areas of the constructed wetlands has renewed interest in commercial harvesting as it is now a more efficient and viable process.

Because of the establishment of constructed wetlands in Macleod Morass, there is a need to review the availability of access by commercial eel fishermen to suitable boat launching sites. Access by commercial carp fishermen to carp traps will be via levee banks within the morass.

Other occupations

A site within Macleod Morass Wildlife Reserve is occupied by a saleyard effluent pond managed by EGSC. The Shire is responsible for the operation of the adjacent saleyards and the discharge of the effluent wastewater to the Wildlife Reserve in accordance with the terms of an Environment Protection Authority (EPA) licence (figure 3).

The north-eastern corner of Klopper's Paddock, which was previously cleared private land, and Mitchell River Water Reserve (figure 3), are grazed under Licences issued under the Crown Land (Reserves) Act by DSE. The ongoing grazing compromises management objectives for the Macleod Morass Wildlife Reserve.

Aims

- Manage authorised commercial fishing in accordance with relevant legislative requirements.

- Minimise the impact of commercial fishing on wetland values.
- Ensure appropriate use and licensing of occupations consistent with the relevant legislation.

Management strategies

Commercial fishing

- *Continue to permit commercial harvesting of eels and carp from Macleod Morass in accordance with permit conditions and consistent with the protection of natural values.*
- *Initiate requirements for monitoring and reporting to Parks Victoria of by-catch associated with commercial eel fishing within Macleod Morass.*
- *Assist MAFRI in preparation of a by-catch action plan to enable review of the impact of commercial eel fishing in Macleod Morass consistent with the Victorian Eel Fishery Management Plan.*
- *Encourage research into Shortfinned Eel and Longfinned Eel populations and movement patterns throughout Macleod Morass to determine the impact of carp exclusion grates and water control structures on migrating eels. Develop, if necessary, appropriate management practices (e.g. fishways) to overcome impediments to migrating eels.*
- *Work cooperatively with DPI, EGW and commercial carp fishermen to facilitate trapping and removal of carp at water control structures in Macleod Morass.*
- *Liaise with DSE and DPI to ensure that appropriate conditions are incorporated in all licenses and permits issued for authorised uses within the reserves.*
- *Liaise with licensees/permit holders to ensure that authorised uses have minimal impact on reserve values.*
- *Liaise with licensees and EGW to determine the most appropriate access points for launch of vessels for commercial eel fishing and for harvesting of carp.*

Occupations

- *Collaborate with DSE, EPA and EGSC to ensure that saleyard effluent ponds within the Macleod Morass are:*
 - *monitored*
 - *operated in accordance with current legislation and licence conditions to protect the ecological integrity of the morass and alleviate public concerns*
 - *relocated out of Macleod Morass Wildlife Reserve as soon as practicable, and no later than 2007.*
- *Phase out stock grazing over the north-eastern corner of Klopper's Paddock and the Mitchell River Water Reserve in accordance with revegetation strategies (section 4.6).*

7.2 Reservation of Crown land

The LCC recommendation for a Gippsland Lakes Reserve (1983; section 2.5) included the planning area, except for the northern section which was outside the LCC study area, in Zone 1 of the Reserve. The LCC recommended that Zone 1 be used primarily to conserve and enhance the habitat of wildlife, especially waterbirds, and that appropriate forms of recreation should be permitted, as should the seasonal hunting of game.

Parks Victoria manages the whole of the planning area in accordance with the LCC recommendation, although the reservation status of the Mitchell River Water Reserve, Natural Interest Reserve (part) adjoining the southern boundary of Jones Bay Wildlife Reserve, and the unmade/unused Government road within the Wildlife Reserve, has not yet been reviewed and aligned with the LCC recommendation.

Addition of the Natural Interest Reserve (part) and the unmade/unused Government road to the Jones Bay Wildlife Reserve would align their reservation status with the LCC recommendation and support current management practices.

It is not yet clear how the Mitchell River Water Reserve area could best be used in the context of the LCC's specific recommendation for Zone 1, and particularly the ecological imperatives for wetland values in the Macleod

Morass Wildlife Reserve. This may be through either addition to the reserve or possible exchange for private land (section 7.3).

The LCC recommendation for a Gippsland Lakes Reserve also included areas outside the planning area, such as the Crown land around the Gippsland Lakes and the water body of Jones Bay, in Zone 1. The reservation status of these areas has also yet to be reviewed in relation to the recommendation, and reserved accordingly. The areas are not included in the planning area as their management is not integral to the management of Macleod Morass Wildlife Reserve or Jones Bay Wildlife Reserve.

Aim

- Encourage a review of the status and appropriate reservation of the Natural Interest Reserve abutting Jones Bay Wildlife Reserve, the unmade/unused road Government road within the boundaries of Jones Bay Wildlife Reserve and the Mitchell River Water Reserve.

Management strategies

- *Encourage DSE and EGSC to review the section of Government road within the boundaries of Jones Bay Wildlife Reserve, and if not required for private access, seek the addition of the area to the reserve (figure 3).*
- *Encourage DSE to review the reservation status of that part of the Natural Interest Reserve (Crown allotment 80, Parish of Broadlands) to the south of Jones Bay Wildlife Reserve, and if appropriate seek the addition of the area to the Wildlife Reserve (figure 3).*
- *Encourage DSE to consider how the Mitchell River Water Reserve (Crown allotment 78D, Parish of Bairnsdale) can best be used in the context of the ecological imperatives for wetland values in the Macleod Morass and the LCC's specific recommendations for Gippsland Lakes Reserve Zone 1. Seek consideration of the possibility that opportunities may arise to exchange the Water Reserve area for freehold land with high wetland conservation value adjoining Macleod*

Morass Wildlife Reserve as a part of the review (section 8.3).

7.3 Boundaries

The boundaries of Macleod Morass and Jones Bay Wildlife Reserves are mostly well marked by fences, some of which were erected by Parks Victoria in 1999–2001 following selective boundary surveys. Some sections of the north-western boundary of Macleod Morass Wildlife Reserve located in open water are generally unfenced or poorly fenced. The sections of the southern sections of Jones Bay Wildlife Reserve that lie in water or wetland are unmarked and unfenced.

The north-western boundary of Macleod Morass Wildlife Reserve is poorly aligned. There are substantial areas of low-lying freehold land that are periodically flooded and have substantial wetland values but little value for stock grazing. The area of freehold land subject to flooding will be reduced as a result of the implementation of planned water regimes (section 4.3), although those areas below mean sea level will remain flooded except after prolonged evaporation. The areas below mean sea level are integral components of the Macleod Morass wetland and should be managed as such where appropriate.

Parks Victoria shares an interest in a range of land management issues with the managers of freehold land abutting the extensive boundaries of the reserves. There is considerable scope to better manage such issues by cooperation, and to further develop the interest of abutting-land managers in the conservation of natural and cultural values. In particular, ongoing cooperation between Parks Victoria and adjoining landowners will be crucial to achieving mutually beneficial management outcomes for low-lying boundary areas.

If low lying areas of freehold land with high conservation values abutting the north-western boundary of Macleod Morass become available for sale or exchange, the Crown could acquire the land for the reserve by purchase or exchange for more elevated Crown land with grazing value but low conservation value. An example of this would be the Mitchell River Water Reserve (section 7.2).

DSE is responsible for the development of the overall system of parks and reserves. Land

purchase and/or exchange priorities are considered according to statewide priorities (section 8.3).

Aims

- Minimise conflict between the management of the planning area and that of adjacent lands.
- Rationalise land use management along the reserves' boundaries and seek boundary adjustments that facilitate the achievement of the aims of Parks Victoria for the planning area and of adjoining landowners for their land.
- Encourage neighbours to take an increased interest in the conservation of local natural and cultural values, to employ sustainable land management practices on lands they manage and to support measures planned for the reserves.

Management strategies

- *Deal with land management issues shared by neighbours through consultation, and cooperation where practicable.*
- *Increase awareness among adjoining landowners of the location of private land boundaries and the elevation of their land relative to mean sea level.*
- *Encourage DSE to investigate any opportunities that arise to acquire, by purchase or exchange, low-lying areas with wetland values along the north-western boundary of Macleod Morass Wildlife Reserve for addition to the reserve.*
- *Apply, and encourage the application of, the Good Neighbour Policy to management issues on or near reserve boundaries.*
- *Liaise with landowners to identify management issues that could relate to their interests, and explore the possibilities for cooperation in the resolution of issues.*
- *Encourage landowners to use covenants and support initiatives such as Landcare and Land for Wildlife to enhance conservation values on adjacent land.*
- *Encourage and cooperate with adjoining landholders in the construction and*

maintenance of fencing along Crown land/freehold land boundaries. Ensure that landowners maintain fences along reserve boundaries as required under the Fences Act 1968 (Vic.).

- *Promote the importance of protecting and nurturing Indigenous cultural heritage in accordance with the wishes of the relevant Indigenous communities to adjacent landowners.*

7.4 Adjacent uses

Flooding usually extends beyond Macleod Morass into low-lying areas of adjoining freehold land after high rainfall in the Mitchell River catchments. Managers of the flooded freehold land often take the opportunity to pump floodwaters from their land for irrigation purposes. Extraction of this water can significantly affect the flooding regime on the low lying areas on both freehold land and in the Macleod Morass Wildlife Reserve.

Under the Water Act, landowners are required to obtain a licence to extract water from Southern Rural Water (SRW). In considering applications for new licences or renewal of existing licences, it is important that conservation of the wetland values of Macleod Morass Wildlife Reserve is the paramount consideration.

Availability of floodwaters cannot be guaranteed, because of the variability of the climate and influences on the Mitchell River catchments. Implementation of planned water regimes (section 4.3) will minimise inundation of private land above mean sea level.

Subdivision and development proposals on adjoining or nearby private land, including for industrial and other purposes, have the potential to impact on conservation values within the planning area. East Gippsland Shire Council, as the planning authority, usually refers planning permit applications to, and seeks advice from DSE, which may notify Parks Victoria and request its comments as the land manager.

Illegal rubbish dumping occurs in both Macleod Morass Wildlife Reserve and Jones Bay Wildlife Reserve as a consequence of their proximity to Bairnsdale and, particularly, to the former landfill site. Rubbish dumping in the reserves has increased as tip fees have

risen, and more so since the relocation of the landfill site further from the urban area.

Aim

- Minimise the impact of adjacent land uses on the wetland values of Macleod Morass Wildlife Reserve.

Management strategies

- *Liaise with SRW and, until an appropriate water regime for Macleod Morass is determined and implemented, ensure that water extraction from Macleod Morass is licensed and that new and renewed licences are for periods not exceeding 12 months and for appropriate quantities of water.*
- *Collaborate with SRW, once an appropriate water regime has been determined for Macleod Morass, to ensure that water extraction from the Morass is consistent with the conservation of its wetland values.*

- *Collaborate with EGSC in encouraging greater awareness of the reserves' values within the Bairnsdale community, and the application of enforcement measures to reduce illegal rubbish dumping in the planning area.*
- *Encourage DSE to advise and seek comments from Parks Victoria on all notifications it receives of planning permit applications for the development of freehold land that could impact on the planning area's values.*
- *Liaise with DSE to ensure that Parks Victoria's views are considered in municipal land use planning decisions for private and Crown lands that could affect the planning area's values (including the disused land-fill site).*

8 STRATEGIES FOR COMMUNITY AWARENESS AND INVOLVEMENT

8.1 Community awareness

Relatively few people venture into the wetlands of the planning area regularly or are aware of their diverse natural or cultural values. They are, however, well known to the hunters and naturalists who visit them. Many residents of Bairnsdale and some tourists are aware of the reserves because of their proximity to Bairnsdale and to several roads. A heightening of the community's awareness of the reserves would lead to greatly improved appreciation of their values.

Aims

- Increase public awareness of the reserves, and the reserve values, regulations and management activities.
- Further enhance a sense of custodianship of the reserves among community groups and individuals.

Management strategies

- *Raise the community's awareness of the reserves and their values, regulations and management activities by providing targeted information and interpretive and educational signage that is consistent with management objectives within the reserve and adjacent areas.*
- *Work with neighbours, relevant Indigenous communities and agencies, including DSE and AAV, to raise the community's awareness of the reserves and build common goals for enhancement and protection of their natural and cultural values.*

8.2 Community participation

A diverse range of community groups have an active or potential interest in implementing the management plan. Community groups' interests in the planning area are often, although not always, complementary. There is considerable scope for groups to work together

and with Parks Victoria to achieve common goals for the planning area.

Over a long period, the Bairnsdale Field and Game Association has made an important contribution to the management of the reserves, and various other local groups, including Friends of the Gippsland Lakes Wetlands, Bairnsdale Field Naturalists Club and East Gippsland Bird Observers Club have also made valuable contributions.

There are opportunities to encourage broader community participation in the planning area's management, particularly by relevant Indigenous communities and residents of Bairnsdale. A strong working relationship with these communities will form a basis for reflecting and integrating traditional knowledge in the area's planning and management, and improved management. Involvement of the Indigenous communities may well also contribute to the reconciliation of their interests and those of the broader community.

Aim

- Encourage and support community groups' participation with each other and Parks Victoria in managing the planning area, consistent with the management plan.

Management strategies

- *Liaise with the Friends of the Gippsland Lakes Wetlands, Bairnsdale Field and Game Association and Bairnsdale Field Naturalists Club to encourage and support their continued assistance in implementing management and research projects for the planning area.*
- *Strengthen relationships with relevant Indigenous communities and explore means to involve and work with the communities to reflect and integrate their folklore, customs, interests, rights and aspirations in the planning area's management in accordance with relevant*

legislation and policy (sections 4.1, 4.6, 4.7, 4.9, 4.10, 5.1, 6.1, 6.5 and 7.1).

- *Endeavour to consult with the relevant Indigenous communities on all substantial management issues that are known to relate to their interests in the planning area.*
- *Explore opportunities for additional community groups and individuals to pursue their interests in the planning area that are consistent with the management plan by assisting Parks Victoria to manage the area.*
- *Encourage further links with local schools to increase their awareness of and involvement in the management of Macleod Morass and Jones Bay Wildlife Reserves.*
- *Develop and evaluate a long-term volunteer strategy that incorporates the skills and interests of community groups and individual volunteers in the management of and research activities for the reserves.*

8.3 Government agency partnerships

A range of government agencies have policy and management responsibilities that relate to the planning area. They include:

- AAV (Section 5.1);
- DPI (Sections 4.2; 4.7; 4.8 and 7.1);
- DSE (Sections 4.1; 4.2; 4.6; 4.8; 4.9; 6.3; 6.4; 7.1; 7.2 and 7.3);
- EGW (Sections 4.3; 4.4; 6.4 and 7.1);
- EGSC (Sections 2.4, 4.2; 4.4; 4.7; 4.9; 6.2; 6.3; 6.5; 6.6; 7.1; 7.2 and 7.4);
- East Gippsland Catchment Management Authority (Sections 4.2; 4.4 and 4.5);
- Environmental Protection Authority (Sections 4.4 and 7.1);
- Southern Rural Water (Section 7.4).

Aim

- Collaborate with relevant local, state and federal government agencies to resolve issues that relate both to the planning area and to other agencies' responsibilities, in accordance with relevant legislation and policies and the management plan.

Management strategies

- *Adopt a collaborative approach with other local municipalities or State or Commonwealth government agencies to issues that relate both to the planning area and to the agencies' responsibilities.*
- *Seek to resolve issues between agency stakeholders in accordance with relevant legislation and policies, and the management plan.*
- *Collaborate with EGW consistent with the provisions of the Memorandum of Understanding (section 4.3 and 4.4).*
- *Liaise with the East Gippsland Catchment Management Authority to ensure appropriate consideration of wetland management requirements associated with the reserves in the development of river flow management strategies for the Mitchell River catchment.*
- *Work cooperatively with EGSC to ensure that land use planning decisions for subdivisions and new dwellings near the planning area recognise game hunting activities in the area.*
- *Encourage EGSC and Waterwatch to reintroduce the 'Drains To The Lakes' community education program to increase public awareness of the impact of stormwater discharges to Macleod Morass and Jones Bay.*

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APPENDIX 1 ECOLOGICAL VEGETATION CLASS - CONSERVATION STATUS

ECOLOGICAL VEGETATION CLASS	CONSERVATION STATUS *	FFG STATUS	COMMENT
Deep Freshwater Marsh (open water)	Vulnerable		
Swamp Scrub	Endangered		
Estuarine Wetland	Naturally Restricted		
Floodplain Reed Bed	Presumed Extinct		Occurs in reserve but recorded as 'Presumed Extinct' based on remote sensing information only.
Coastal Salt Marsh	Naturally Restricted		
Damp Sands Herb-rich Woodland	Vulnerable		
Plains Grassy Woodland	Endangered	L	
Valley Grass Forest/Swamp Scrub Mosaic	Presumed Extinct		Occurs in reserve but recorded as 'Presumed Extinct' based on remote sensing information only.
Dry Valley Forest/Swamp Scrub/Warm Temperate Rainforest Mosaic	Endangered		

Source: Draft East Gippsland Native Vegetation Management Plan, EGCMA, 2000.

* Conservation Status for Gippsland Plain Bioregion

Flora and Fauna Guarantee Status

L Listed under FFG Act

APPENDIX 2 THREATENED FAUNA

SCIENTIFIC NAME	COMMON NAME	THREATENED STATUS		FFG STATUS	MIGRATORY BIRD STATUS
		VICTORIA	AUSTRALIA		
<i>Accipiter novaehollandiae</i>	Grey Goshawk	Vul			
<i>Anas rhynchos</i>	Australasian Shoveller	Vul			
<i>Anseranas semipalmata</i>	Magpie Goose	Vul			
<i>Ardea intermedia</i>	Intermediate Egret	CEn		L	
<i>Aythya australis</i>	Hardhead	Vul			
<i>Bizjur lobata</i>	Musk Duck	Vul			
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper				J, C, B
<i>Egretta alba</i>	Great Egret	Vul		L	J, C
<i>Egretta garzetta</i>	Little Egret	End		L	
<i>Galaxiella pusilla</i>	Dwarf Galaxias	LR	Vul	L	
<i>Gallinago hardwickii</i>	Latham's Snipe	LR			J, C, B
<i>Haliaeetus leucogaster</i>	White-bellied Sea-eagle	End		L, A	C, B
<i>Hydroprogne caspia</i>	Caspian Tern	LR		L	J, C
<i>Larus pacificus</i>	Pacific Gull	LR			
<i>Litoria aurea</i>	Green and Golden Grass Frog	LR	Vul		
<i>Litoria raniformis</i>	Warty Bell Frog	End	Vul	L	
<i>Oxyura australis</i>	Blue-billed Duck	End		L	
<i>Phalacrocorax varius</i>	Pied Cormorant	LR			
<i>Platalea regia</i>	Royal Spoonbill	Vul			
<i>Porzana pusilla</i>	Baillon's Crake	Vul		L	
<i>Rallus pectoralis</i>	Lewins Rail	Vul		L	
<i>Sterna albifrons</i>	Little Tern	Vul		L, A	J, C, B
<i>Sterna bergii</i>	Crested Tern	LR			J
<i>Stictonetta naevosa</i>	Freckled Duck	End		L, A	
<i>Tringa nebularia</i>	Common Greenshank				J, C

Source: NRE records; Parks Victoria staff; Atlas of Victoria Wildlife; Threatened Vertebrate Fauna in Victoria, NRE 2000.

Threatened Status, Victoria

CEn Critically Endangered
 End Endangered
 Vul Vulnerable
 LR Lower Risk – near threatened

Threatened Status, Australia

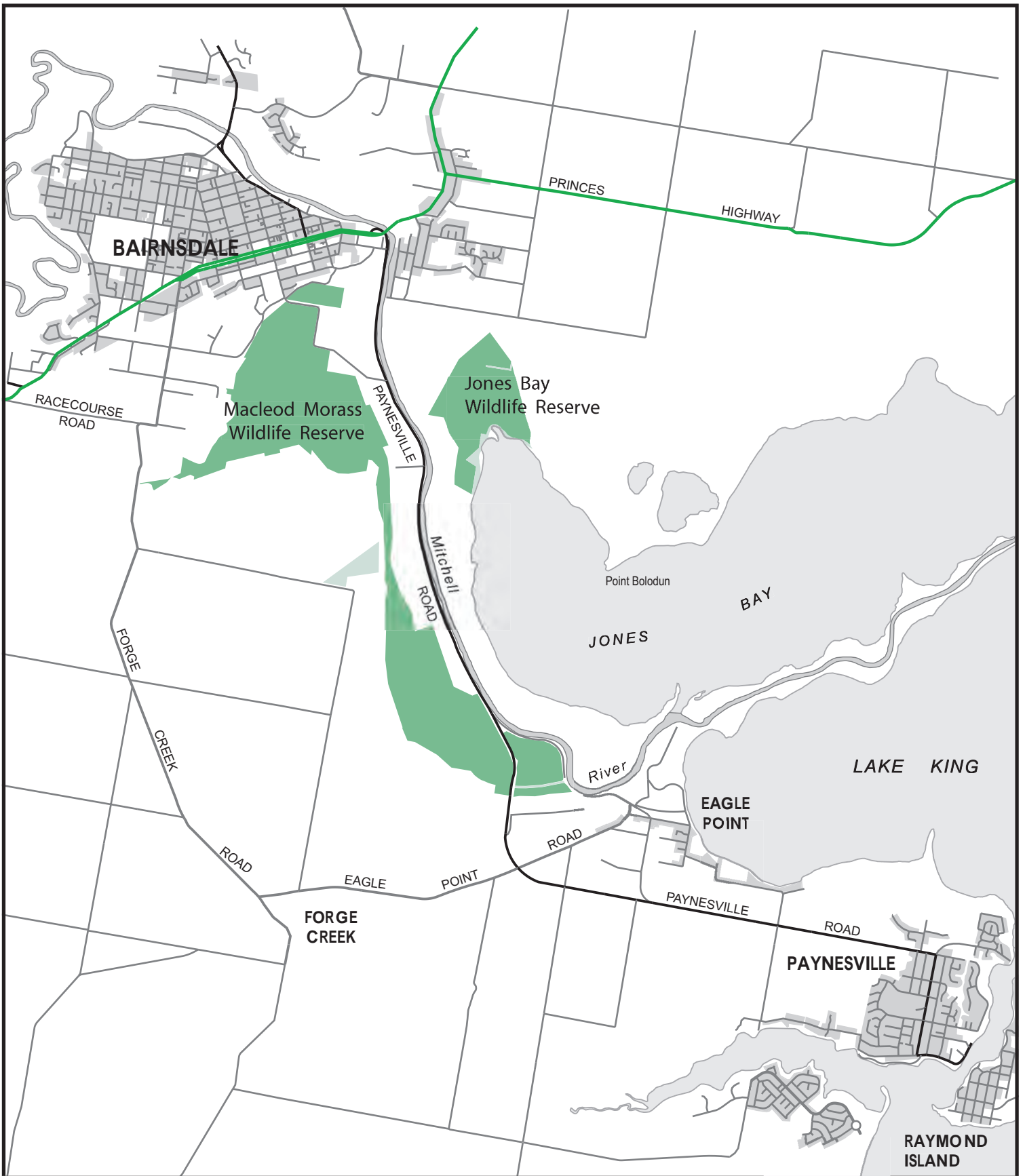
End Endangered
 Vul Vulnerable
 R Rare

Flora and Fauna Guarantee

L Listed under FFG Act
 A Action Statement prepared for species

Migratory Bird Status

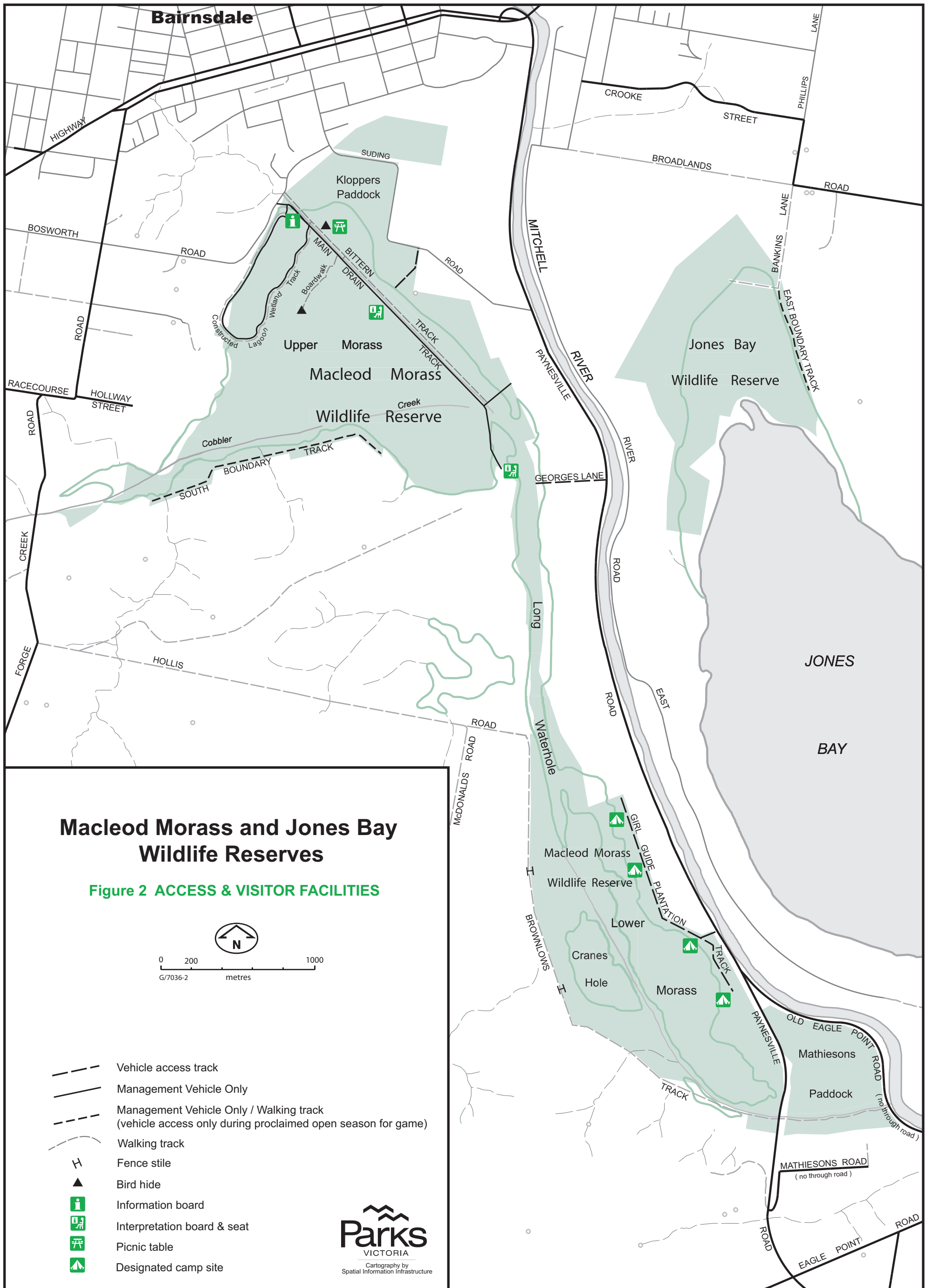
J Japan Australia Migratory Birds Agreement 1974 (JAMBA)
 C China Australia Migratory Birds Agreement 1987 (CAMBA)
 B Bonn Convention for Conservation of Migratory Species (Bonn Convention)

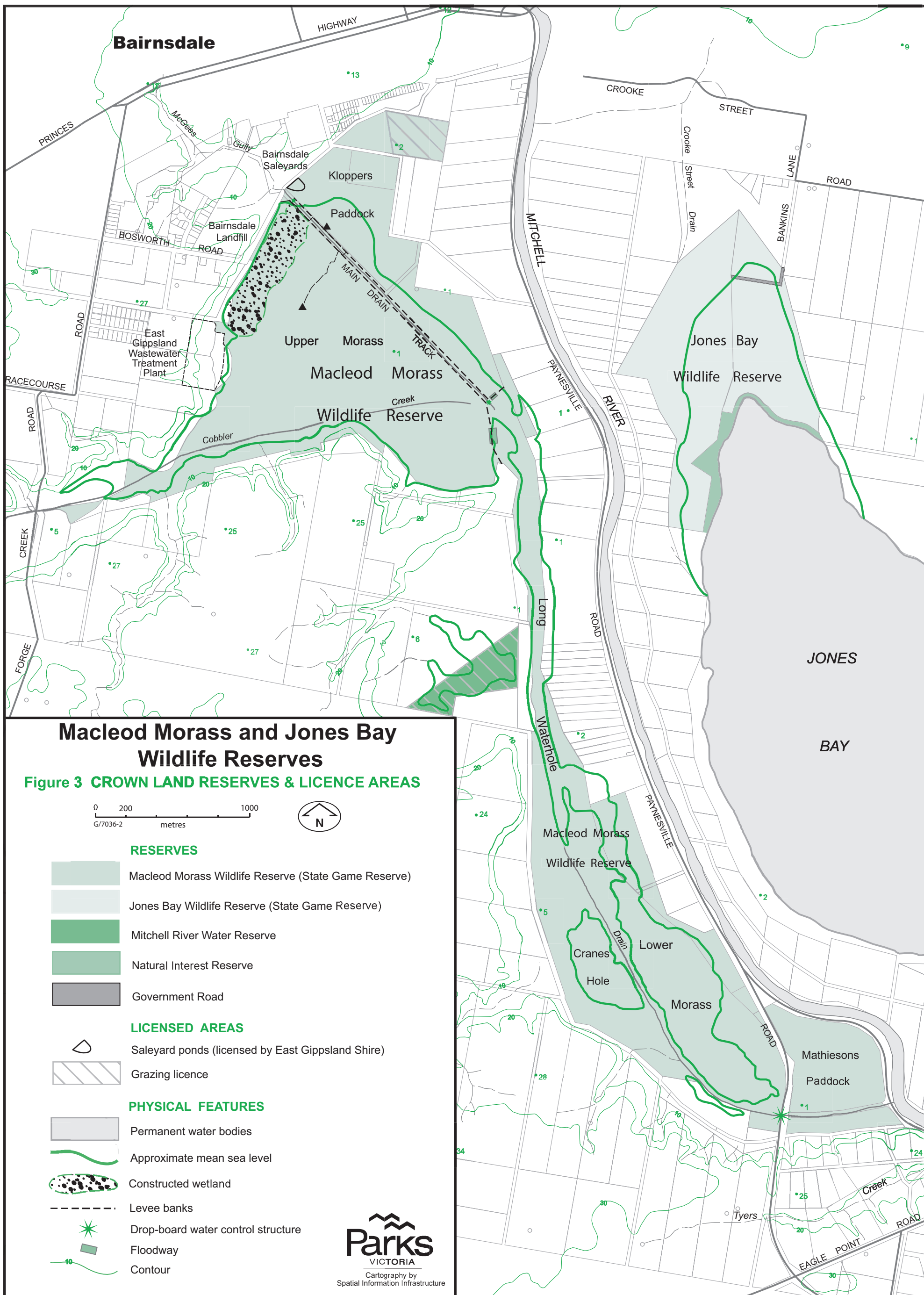


Macleod Morass and Jones Bay Wildlife Reserves

Figure 1 LOCATION







Macleod Morass and Jones Bay Wildlife Reserves

Figure 3 CROWN LAND RESERVES & LICENCE AREAS



0 200 1000
G/7036-2 metres



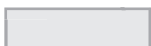




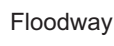

RESERVES

-  Macleod Morass Wildlife Reserve (State Game Reserve)
-  Jones Bay Wildlife Reserve (State Game Reserve)
-  Mitchell River Water Reserve
-  Natural Interest Reserve
-  Government Road

LICENSED AREAS

-  Saleyard ponds (licensed by East Gippsland Shire)
-  Grazing licence

PHYSICAL FEATURES

-  Permanent water bodies
-  Approximate mean sea level
-  Constructed wetland
-  Levee banks
-  Drop-board water control structure
-  Floodway
-  Contour

Parks
VICTORIA

Cartography by
Spatial Information Infrastructure

For more information contact the Parks Victoria Information Centre on 13 1963, or visit www.parkweb.vic.gov.au