

**BALLINA NATURE RESERVE  
PLAN OF MANAGEMENT**

**NATIONAL PARKS AND WILDLIFE SERVICE**

**August 2003**

**This plan of management was adopted by the Minister for the Environment on 4<sup>th</sup> August 2003.**

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## FOREWORD

Ballina Nature Reserve is situated west of Lennox Head, between Byron Bay and Ballina in northern NSW, and occupies an area of 665 hectares.

Ballina Nature Reserve is a wetland that contains mangroves, swamp sclerophyll forest and saltmarsh. A large colony of flying foxes roosts in the Reserve and other threatened fauna species have been recorded. The Reserve also contains at least one Aboriginal site, and the drains that traverse the Reserve may be of historic importance. Due to its swampy nature and frequent inundation after heavy rainfall, recreational use of the Reserve is minimal.

The New South Wales *National Parks and Wildlife Act 1974* requires that a plan of management be prepared for each nature reserve. A plan of management is a legal document that outlines how a reserve will be managed in the years ahead.

Although not a requirement of the NPW Act, a draft plan of management for Ballina Nature Reserve was placed on public exhibition for two months from 16<sup>th</sup> March until 25<sup>th</sup> May 2001. The exhibition of the plan of management attracted 7 submissions which raised 11 issues. All submissions received were carefully considered before adopting this plan of management.

This plan of management aims to preserve the Reserve as part of a regional network of wetlands together with its diverse flora and fauna, maintain a hydrological regime consistent with maintenance of the Reserve's ecosystems, and reduce the distribution and/or spread of introduced species in the Reserve.

This plan of management establishes the scheme of operations for Ballina Nature Reserve. In accordance with section 76 of the *National Parks and Wildlife Act 1974*, this plan of management is hereby adopted.

**Bob Debus**  
**Minister for the Environment**

# MANAGEMENT CONTEXT

## Location and Regional Setting

Ballina Nature Reserve (referred to as the Reserve in this plan) is situated west of Lennox Head, between Byron Bay and Ballina in northern NSW, and occupies an area of 665 hectares. The Reserve was declared on 5 September 1975.

The Reserve is subject to tidal influence and is frequently inundated after heavy rainfall. It is a designated wetland (number 88), pursuant to State Environmental Planning Policy number 14, and complements a suite of other significant and protected wetland ecosystems in the Northern Rivers Region including Ukerebagh, Cudgen, Billinudgel, Brunswick Heads, Tyagarah, Tuckean, Tabbimoble Swamp and Cumbebin Swamp Nature Reserves, and Broadwater and Bundjalung National Parks.

Surrounding land uses include sugar cane and tea tree cultivation, cattle grazing, residential and industrial development, a sand quarry, sewage treatment works, Ballina Shire garbage tip and Ballina airport.

## Legislative and Policy Context

The management of nature reserves in NSW is in the context of the legislative and policy framework, primarily the *National Parks and Wildlife Act 1974* (NPW Act), the *Threatened Species Conservation Act 1995*, and the policies of the National Parks and Wildlife Service (NPWS). These policies relate to nature conservation, Aboriginal and historic site conservation, recreation, commercial use, research and communication.

The NPWS is required to undertake environmental assessment for all proposed management activities on the NPWS estate in accordance with the *Environmental Planning and Assessment Act 1979*.

Nature reserves are reserved under the NPW Act to protect and conserve areas containing outstanding, unique or representative ecosystems, species, communities or natural phenomena.

Under the Act, nature reserves are managed to:

- conserve biodiversity, maintain ecosystem functions, and protect geological and geomorphological features and natural phenomena;
- conserve places, objects, features and landscapes of cultural value;
- promote public appreciation, enjoyment and understanding of the reserve's natural and cultural values; and
- provide for appropriate research and monitoring.

## Natural and cultural heritage values – a summary

### Landform and Geology

The Reserve is situated on a sedimentary basin of mixed estuarine and aeolian origin forming flat to slightly undulating terrain. The Reserve consists of Quaternary estuarine alluvium overlain by, or mixed with, Quaternary sands. Soils are predominantly deep, poorly drained and high in organic matter.

North Creek flows along the eastern edge of the Reserve, while Deadmans and Roberts Creeks to the south of the Reserve are seasonally intermittent. An extensive network of artificial channels, in which water becomes eutrophic during periods of low flow, also drains the Reserve and catchment.

### Native flora and fauna

The Reserve contains several vegetation communities *viz*:

- mangrove forest-woodland, dominant species Grey Mangrove (*Avicennia marina* var. *australasica*);
- swamp sclerophyll forest, dominant species Broad-leaved Paperbark (*Melaleuca quinquenervia*);
- swamp sclerophyll forest, dominant species Swamp Oak (*Casuarina glauca*);
- swamp sclerophyll forest, dominant associates Broad-leaved Paperbark (*Melaleuca quinquenervia*) and Swamp Oak (*Casuarina glauca*);
- salt marsh complex; and
- cleared/disturbed land.

No threatened flora have been recorded in the Reserve but several threatened flora species have been recorded in the vicinity of the Reserve.

Threatened species recorded in the Reserve include Osprey (*Pandion haliaetus*), Mangrove Honeyeater (*Lichenostomus fasciogularis*), Black Flying Fox (*Pteropus alecto*), Grey-headed Flying Fox (*Pteropus poliocephalus*) and Little Bent-wing Bat (*Miniopterus australis*). A number of threatened and regionally significant fauna species are known to occur in the locality.

### Cultural Heritage

One Aboriginal site, a midden, has been recorded in the Reserve. The drains that traverse the Reserve may have historic significance, otherwise there are no known historic sites in the Reserve.

### Recreational Use

There are no visitor facilities in the Reserve. A Reserve identification and regulatory sign is located at the Ross Lane “entrance”.

Recreational use of the Reserve is minimal, despite its close proximity to Ballina. More suitable areas nearby provide for a diverse range of nature based recreation opportunities, however, self-reliant visitors can continue to access the Reserve as use level are very low.

The Reserve is only readily accessible by small boats. Land-based vehicles are not permitted. Domestic animals (including horses) are prohibited in all nature reserves.

## **Threats to Reserve values**

### **Drainage**

One of the most significant issues confronting the Reserve is the drainage of waters from the North Creek catchment upstream of the Reserve (see map). Drains, constructed over the last 100 years, criss-cross the Reserve to maintain drainage for surrounding grazing and agriculture (mainly sugar cane).

This network of drains was constructed through the Reserve to allow for agricultural production on wetlands and low-lying lands. During periods of heavy rain, floodwaters may cover low-lying farmlands for extended periods. Some nearby landholders would like to re-excavate the drains to promote quicker removal of floodwaters. Of concern, however, is the effect excavation may have on the release of acid-sulphate waters into North Creek and the potential impact such works may have on the hydrology and, in turn, the ecology of the Reserve wetlands. "Improved" drainage could significantly threaten the natural values of the Reserve and North Creek.

The Newrybar Drainage Union (NDU) is responsible for maintaining the Union Drain (North Creek) and Drainline C, which run through the northern section of the Reserve (see map). These drains, which have floodgates installed on them, were constructed in the 1970s and are maintained pursuant to the *Drainage Act 1939*. Other drains in the Reserve are no longer maintained. Richmond River Council Flood Mitigation Authority is expected to take over the drainage maintenance obligations of the NDU.

### **Introduced species**

By altering the hydrology in the Reserve, the drains that traverse the Reserve (see map) have allowed the soils to be drier for longer periods of time, thereby encouraging extensive weed invasion. Wherever possible, it may be necessary to restore the hydrology of the Reserve in order to make the conditions unfavourable for the proliferation of weeds (Joseph, 2000).

Eighteen weed species have been recorded in the Restoration and Rehabilitation Plan for the Reserve (Joseph, 2000). Of particular concern is the presence of weed vines such as Coastal Morning Glory (*Ipomoea cairica*) and White Passionflower (*Passiflora subpeltata*) which smother native vegetation, killing canopy trees. Other

weed species, such as Lantana (*Lantana camara*), Winter Senna (*Senna pendula* var. *glabrata*), Groundsel Bush (*Baccharis halimifolia*) and Hairy Commelina (*Commelina benghalensis*) dominate the mid-storey and ground cover layers. Exotic grasses, such as Carpet Grass (*Axonopus affinis*), have invaded open areas such as the banks of drains (Joseph, 2000).

Groundsel control programs have been on-going for a number of years but control is made difficult due to restricted access to infestations in the Reserve. Currently there are no other control programs for other weed species in the Reserve.

There will be an on-going requirement for weed control within the Reserve due to the close proximity of residential areas that provide a source of environmental weed species.

Pigs were deliberately introduced into the area for recreational hunting prior to the dedication of the Reserve. Pigs cause extensive damage to the native vegetation by rooting up the soil, destroying habitat and competing with native wildlife. Pigs are also vectors of disease. The feral pig population is expanding and disbursing into neighbouring properties. The NPWS and the Tweed-Lismore Rural Lands Protection Board, in cooperation with Ballina Shire Council (airport staff) and neighbours, are undertaking a pig-trapping program.

Foxes and Cane Toads are known to be in the Reserve, however, distribution and density is unknown.

## **Fire**

Fire is a natural feature of many environments and is essential to the survival of some plant communities. Inappropriate fire regimes, however, can lead to loss of particular plant and animal species and communities.

The NPWS approach to fire management planning uses a system of zones which are compatible with the system adopted by the Bushfire Coordinating Committee for use in District Bushfire Management Committee bushfire risk management plans.

NPWS has assessed the reserve for fire management planning purposes and has zoned the reserve as a Heritage Area Management Zone (HAMZ). The primary fire management objectives for this zone are to prevent the extinction of all species that are known to occur naturally within the reserve, and to protect culturally significant sites. The reserve has been designated as a HAMZ because of the sensitivity of the mangrove forest woodland, saltmarsh complex and swamp sclerophyll forest.

The HAMZ does not require intensive management and focuses on those actions appropriate to conserve biodiversity and cultural heritage including exclusion of fire from the reserve.

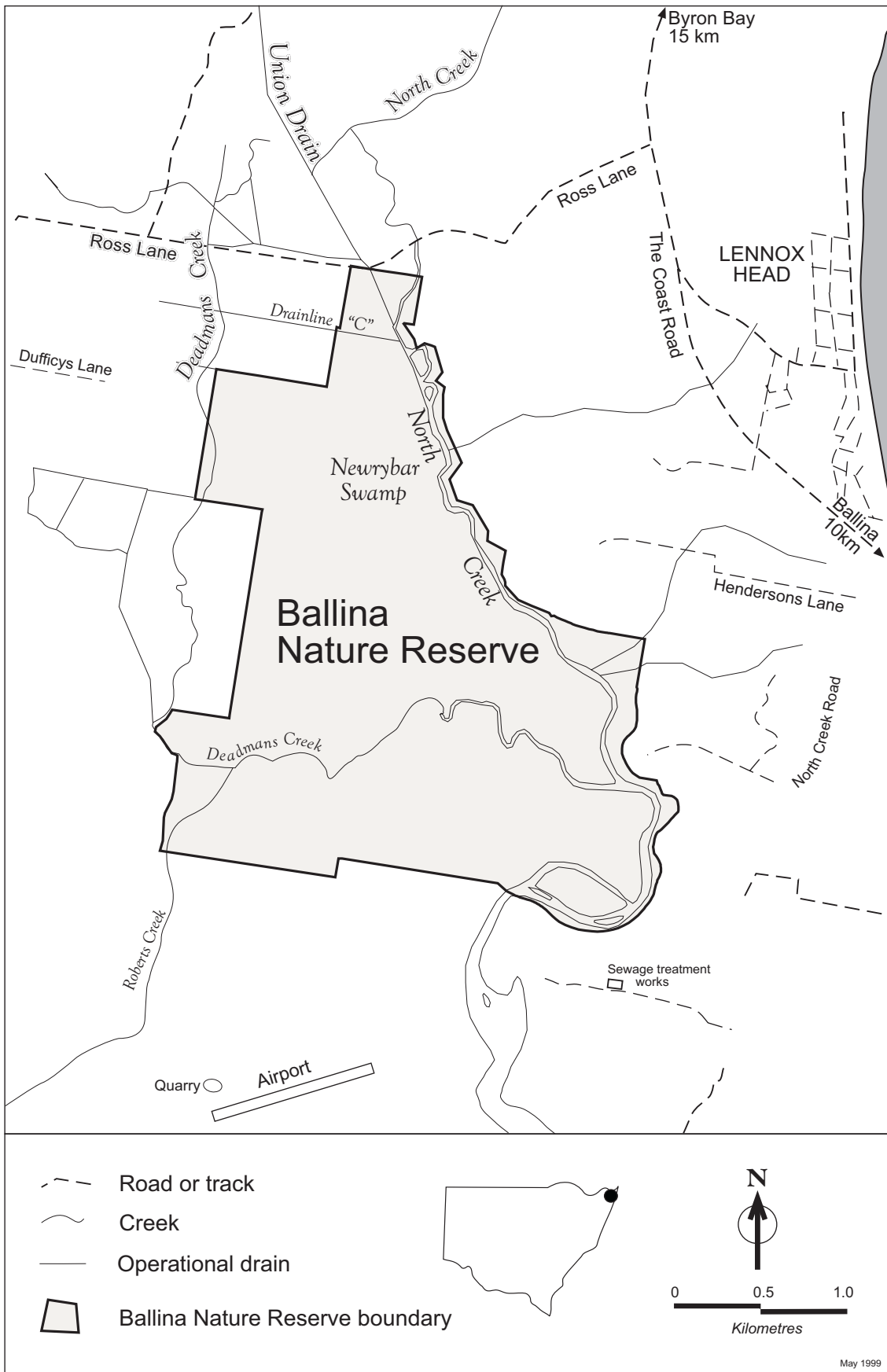
## **SPECIFIC MANAGEMENT OBJECTIVES**

The management objectives for Ballina Nature Reserve are to:

- preserve the Reserve as part of a regional network of wetland Parks and Reserves;
- conserve the diversity of habitat types within the Reserve, with particular emphasis on the protection of the wetland habitat;
- seek to maintain a hydrological regime in the Reserve that maintains Reserve ecosystems;
- enhance the viability of habitats by encouraging vegetation corridors off the Reserve where possible;
- conserve the Reserve's diverse native flora and fauna, including vulnerable and endangered species and regionally significant species;
- protect the native flora and fauna habitats in the Reserve from processes, uses and pest species threatening its integrity;
- reduce the distribution and/or spread of introduced species in the Reserve, and
- encourage Reserve neighbours in conserving adjoining natural areas.



# Map of Ballina Nature Reserve and environs



## MANAGEMENT STRATEGIES

Current Situation	Desired Outcomes	Proposed Actions and Guidelines	Priority
<p><b>Soil and Hydrology</b>                      Drain clearing and excavation has the potential to cause soil erosion and disturb acid sulphate soils, which can result in downstream fish kills. Extraction of ground water, to a depth of about twenty metres, at the Ballina Shire Council sand quarry south of the Reserve may affect the hydrological status of the Reserve.</p>	<ul style="list-style-type: none"> <li>• Effective hydrological regimes and adequate ground and surface water quality are managed within the Reserve to ensure adequate diversity of native vegetation communities.</li> <li>• Soil disturbance, erosion and compaction are minimised.</li> <li>• Any runoff from the Reserve does not adversely affect aquatic and marine organisms.</li> </ul>	<ul style="list-style-type: none"> <li>• A hydrological assessment will be undertaken for the Reserve to examine the feasibility of restoring or improving hydrological regimes to the greater part of the Reserve. This assessment will also examine the environmental effects of the drains in the Reserve.</li> <li>• A whole of catchment study will be encouraged for the North Creek catchment if any changes to the current hydrological regime are proposed that may adversely affect the Reserve.</li> <li>• Approval will be granted for the maintenance of the Union Drain and Drainline C in the Reserve, subject to a prior assessment of the hydrological and other environmental implications of these works.</li> <li>• For drains other than those referred to above, maintenance works will only be licensed if they constitute an existing interest pursuant to Section 39 of the <i>NPW Act</i> and will not be detrimental to Reserve ecosystems.</li> <li>• NPWS will seek the cooperation of relevant government agencies and Ballina Shire Council to monitor quality of water runoff from surrounding residential, industrial, extractive and agricultural land uses into the Reserve.</li> </ul>	<p>High</p> <p>High</p> <p>High</p> <p>High</p> <p>Low</p>

Current Situation	Desired Outcomes	Proposed Actions and Guidelines	Priority
<p><b>Native Flora</b> A comprehensive vegetation survey has not been undertaken for the Reserve. Vegetation within the Reserve has regrown since the early 1900s when Newrybar Swamp was extensively cleared for agriculture. Illegal removal of some plants has been reported. Significant areas of wetland vegetation are also maintained on surrounding, adjoining private and Council owned properties, providing additional habitat and a buffer to the Reserve.</p>	<ul style="list-style-type: none"> <li>• Increased knowledge of existing flora and its ecological requirements.</li> <li>• Diversity of existing native flora is maintained, and vulnerable or endangered species are not further threatened.</li> <li>• There are no reported thefts of native flora from the Reserve.</li> </ul>	<ul style="list-style-type: none"> <li>• A vegetation survey will be conducted to update knowledge of existing vegetation of the Reserve.</li> <li>• In cooperation with relevant agencies, the community and Ballina Shire Council, the feasibility of establishing vegetation corridors to connect the Reserve with nearby native vegetation remnants and other protected areas will be investigated.</li> <li>• Neighbours will be encouraged to protect high quality native vegetation on nearby and adjoining private lands, particularly where such lands provide a vegetation corridor.</li> </ul>	<p>High</p> <p>Low</p> <p>Medium</p>
<p><b>Native Fauna</b> Fauna species within the Reserve are representative of those occurring in wetland vegetation in northern NSW. A large colony of flying foxes roosts in the Reserve and other threatened fauna species have been recorded.</p>	<ul style="list-style-type: none"> <li>• Increased knowledge of existing fauna and its ecological requirements.</li> <li>• Diversity of existing native fauna is maintained, and vulnerable, endangered and regionally significant species are not further threatened.</li> </ul>	<ul style="list-style-type: none"> <li>• A fauna survey will be conducted to update knowledge of fauna existing in the Reserve.</li> </ul>	<p>High</p>

Current Situation	Desired Outcomes	Proposed Actions and Guidelines	Priority
<p><b>Introduced Flora and Fauna</b>            Introduced plants appear to be widespread and areas of infestation expanding. Introduced animal populations may also be increasing. Due to the swampy nature of the Reserve, access for pest control is difficult.</p>	<ul style="list-style-type: none"> <li>• Area of the Reserve affected by introduced plants is reduced.</li> <li>• Feral animal populations are reduced or brought under control.</li> <li>• Domestic animals do not enter the Reserve.</li> </ul>	<ul style="list-style-type: none"> <li>• The Restoration and Rehabilitation Plan (Joseph, 2000) will be progressively implemented.</li> <li>• Restoring or improving the hydrological regimes to the greater part of the Reserve will be investigated (refer to action in “<i>Soil and Hydrology</i>” section above.</li> <li>• Domestic animals and stock will be excluded from the Reserve by ensuring adequate boundary fences are provided in cooperation with neighbours.</li> <li>• In cooperation with the Rural Lands Protection Board, undertake a feral pig control program in the Reserve.</li> <li>• Work with the community to ensure garden waste is not dumped in the Reserve.</li> <li>• If a wildfire occurs in the Reserve, ensure follow-up weed control is undertaken to prevent severe weed infestations.</li> <li>• The control of foxes and other introduced species will be undertaken in accordance with the Regional Pest Management Strategy.</li> </ul>	High High Medium High High High High
<p><b>Fire Management</b>            The reserve has been designated as a HAMZ because of the sensitivity of the mangrove forest woodland, saltmarsh complex and swamp sclerophyll forest.</p>	<ul style="list-style-type: none"> <li>• Fire is excluded from the Reserve.</li> <li>• Reserve neighbours adequately protect the Reserve by providing fire breaks and reducing fuel loads where appropriate.</li> </ul>	<ul style="list-style-type: none"> <li>• Manage the reserve as a Heritage Management Zone where unplanned fire is excluded from the reserve.</li> <li>• Prescribed burning will not be undertaken on the reserve unless research indicates that fire is necessary to protect biodiversity values.</li> <li>• Liaise with the community, Ballina Shire Council, fire management authorities, Ballina airport and neighbours regarding fire protection procedures as outlined in the proposed Fire Management Plan.</li> </ul>	High High Medium
<p><b>Cultural Heritage</b>            Little is known of the cultural and historical heritage values of the Reserve. One Aboriginal site has been identified.</p>	<ul style="list-style-type: none"> <li>• Involvement of the local Indigenous community is encouraged in the identification and protection of Aboriginal sites.</li> </ul>	<ul style="list-style-type: none"> <li>• Cultural heritage sites encountered will be recorded on the NPWS Sites Register.</li> <li>• Local Aboriginal people will be encouraged to assist in the protection of any Aboriginal sites identified.</li> </ul>	High Medium

Current Situation	Desired Outcomes	Proposed Actions and Guidelines	Priority
<p><b>Recreation</b> No recreational facilities are provided in the Reserve. Foot access is from Ross Lane along drain levees while small boats can access via waterways. Any potential hazard to visitors from feral pigs is minimised by not encouraging recreational use in the Reserve.</p>	<ul style="list-style-type: none"> <li>No facilities, including land access, are provided for visitors.</li> </ul>	<ul style="list-style-type: none"> <li>Public recreational use of the Reserve will be discouraged.</li> <li>Visitor facilities will not be provided in the Reserve.</li> <li>Small boat access will be allowed but no facilities will be developed.</li> </ul>	<p>Medium High</p>
<p><b>Scientific and Educational</b> Scientific study by local tertiary institutions is occasionally conducted in the Reserve.</p>	<ul style="list-style-type: none"> <li>Increased knowledge of the status of Reserve habitats, flora and fauna communities and their ecological requirements.</li> <li>Greater community awareness and appreciation of the natural and cultural values of the Reserve and NPWS's role in its management.</li> </ul>	<ul style="list-style-type: none"> <li>Permit researchers and educational institutions to use the Reserve for relevant educational and research purposes, subject to public safety considerations relating to access, feral pigs and mosquitoes being met.</li> <li>Inform and invite input from the local community, and particularly Reserve neighbours, regarding Reserve values, management strategies and upcoming works through the neighbour's newsletter "Over The Fence" and other forms of communication.</li> </ul>	<p>Medium  High</p>

### Legend for priorities

**High** priority actions are those that are imperative to the achievement of management objectives identified in this Plan and need to be implemented in the near future to prevent degradation of the natural and cultural values or physical resources of the Reserve, significant costs associated with rehabilitation at a later date, and/ or unacceptable risk to the public.

**Medium** priority actions are those that are necessary to achieve management objectives but will be implemented as resources become available because the time frame for their implementation is not urgent.

**Low** priority actions are desirable to achieve management objectives but can wait until resources become available.

## **KEY REFERENCE:**

Joseph, Rosemary (2000), *Restoration and rehabilitation project incorporating weed control strategies – Ballina Nature Reserve*, report prepared for NSW NPWS.

## **FURTHER INQUIRIES:**

Inquiries about this draft plan of management or Ballina Nature Reserve should be directed to the Richmond River Area Office, Colonial Arcade, Alstonville, on (02) 6627 0200.

Lisa King is the principal author of this plan, with assistance from Northern Rivers Region staff and the Northern Directorate planning staff.