

RICHMOND RIVER NATURE RESERVE

PLAN OF MANAGEMENT

NSW National Parks and Wildlife Service

Part of the Department of Environment and Conservation (NSW)

May 2005

This plan of management was adopted by the Minister for the Environment on 10 May 2005.

ACKNOWLEDGMENTS

This plan of management is based on a draft plan prepared by Simon Walsh, Craig Hundle and David Edwards, with assistance from Northern Rivers Region and the Northern Directorate Planning Group.

Cover photographs: Pied Oystercatchers by Craig Faulkner (Aspect north, 2004) and beach scene by Rachael Nolan (NPWS, 2005).

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ISBN 0 7313 6634 4

FOREWORD

Richmond River Nature Reserve is approximately 254ha in size and situated on the southern bank of the lower Richmond River at South Ballina, on the far north coast of New South Wales.

The reserve contains significant wetland and coastal vegetation communities. The mangroves and the other vegetation communities of the reserve also provide significant habitat for birds. Of the 160 bird species identified in the reserve and surrounding area, 22 of the shorebirds are protected under international conservation agreements.

The reserve is part of a landscape that is of cultural importance to the Bundjalung Aboriginal people and contains middens and open campsites. The reserve is also an important recreation resource for residents and visitors to the Ballina area. Popular activities include fishing, walking, surfing, swimming and bird watching.

A draft plan of management for Richmond River Nature Reserve was placed on public exhibition from 6 December 2002 until 28 March 2003. The exhibition of the draft plan attracted 5 submissions which raised 6 issues. All submissions received were carefully considered before adopting this plan.

This plan of management for Richmond River Nature Reserve emphasises the conservation and rehabilitation of the diverse habitats within the Reserve, with particular emphasis on the protection and rehabilitation of the wetland habitat of State significance and protection of the habitat of shorebird populations. It also aims to protect the traditional and contemporary Aboriginal cultural heritage values associated with the reserve in partnership with the local Aboriginal community, and to maintain a hydrological regime that allows natural erosion, accretion and hydrological processes to continue. Four-wheel drive access through the reserve to South Ballina Beach will continue to be permitted, subject to monitoring and a review of impacts on shorebird populations and dune systems.

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

Bob Debus

Minister for the Environment

1. NATURE RESERVES IN NEW SOUTH WALES

1.1 LEGISLATIVE AND POLICY FRAMEWORK

The management of nature reserves in New South Wales (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* (TSC Act) and the policies of the National Parks and Wildlife Service (NPWS). The policies arise from the legislative background and internationally accepted principles of park management. They relate to nature conservation, Aboriginal and historic heritage conservation, recreation, commercial use, research and communication.

Other legislation, international agreements and charters may also apply to management of the area. In particular, the NSW *Environmental Planning and Assessment Act 1979* requires the assessment and mitigation of the environmental impacts of any works proposed in this plan.

1.2 GENERAL OBJECTIVES FOR NATURE RESERVES

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.

Nature reserves differ from national parks in that they do not have as a management principle to provide for visitor use.

1.3 SPECIFIC MANAGEMENT OBJECTIVES FOR RICHMOND RIVER NATURE RESERVE

The specific management objectives for Richmond River Nature Reserve are to:

- conserve and rehabilitate the diversity of habitats within the Reserve, with particular emphasis on the protection and rehabilitation of wetland habitat of State significance;
- recognise and protect the traditional and contemporary Aboriginal cultural heritage values associated with the Reserve in partnership with the local Aboriginal community;

- protect habitat and reduce threats to shorebird populations of local, regional and international significance;
- maintain a hydrological regime that allows natural erosion, accretion and hydrological processes to continue;
- manage the Reserve in the context of the regional network of coastal reserves and other public lands along the coast; and
- provide visitor access that is compatible with conservation of the Reserve's natural and cultural values.

2. RICHMOND RIVER NATURE RESERVE

2.1 LOCATION, GAZETTAL AND REGIONAL SETTING

Richmond River Nature Reserve (referred herein as 'the Reserve') is situated on the southern bank of the lower Richmond River at South Ballina on the far north coast of New South Wales. The Reserve is approximately 254ha in size and includes Burns Point to the west, the eastern part of Mobbs Bay, and part of South Ballina Beach including the inter-tidal zone south of the southern break-wall of the Richmond River (referred herein as South Wall) (see map, page 11).

Surrounding land uses include sugar cane cultivation, a private caravan park and crown land to the south managed by the Department of Lands. The Reserve is approximately 400m in a direct line across the river and approximately 5km by road and ferry from the town of Ballina.

The Reserve complements a suite of other significant wetlands and coastal reserves in the NPWS Northern Rivers Region including Ukerebagh, Cudgen, Billinudgel, Brunswick Heads, Ballina, Tyagarah, Tuckean, Tabbimoble Swamp and Cumbebin Swamp Nature Reserves and Broadwater and Bundjalung National Parks.

The Reserve was dedicated in 1986 with additions in November 1987, March 1998 and March 1999.

This plan applies both to the land currently reserved as Richmond River Nature Reserve and to any future additions to the reserve. Where management strategies or works are proposed for additions that are not consistent with the plan, an amendment to the plan will be required.

2.2 LANDSCAPE CONTEXT

Natural and cultural heritage and on-going use are strongly inter-related and together form the landscape of an area. Much of the Australian environment has been influenced by past Aboriginal and non-Aboriginal land use practices, and the activities of modern Australians continue to influence bushland through recreational use, cultural practices, the presence of introduced plants and animals and in some cases air and water pollution.

The geology, landform climate and plant and animal communities of the area, plus its location, have determined how it has been used by humans. Both Aboriginal and non-Aboriginal people place cultural values on natural areas, including aesthetic, social, spiritual, recreational and other values. Cultural values may be attached to the landscape as a whole or to individual components, for example to plant and animal species used by Aboriginal people. This plan of management aims to conserve both natural and cultural values. For reasons of clarity and document usefulness natural and cultural

heritage, non-human threats and on-going use are dealt with individually, but their inter-relationships are recognised.

2.3 NATURAL AND CULTURAL HERITAGE

Landscapes, geology and soils

The lower Richmond River estuary has been modified by the construction of break walls and dredging for navigational purposes. These activities are a continuing influence on the geomorphology of the area. Mineral sand mining carried out during the mid 1960s has also impacted on the current geology and soils of the Reserve.

The geology and soils of the area are unconsolidated detrital sediments of Quaternary age, which have formed in a beach/estuarine environment (Pak-Poy and Kneebone, 1995). The shoreline deposits consist mostly of beach sands and wind blown dune sands. Topsoils are generally shallow and can be broadly classified as immature, siliceous sand of low fertility. Other soils in the Reserve are black-grey coastal clays that are typical of coastal wetlands. They consist of estuarine deposits of sands, silts and clay and possibly river gravels at depth. Silurian metamorphosed sediments of the Neranleigh-Fernvale group constitute the basement rocks in the area.

Six terrain units can be identified in the Reserve according to mode of formation, topography and soil conditions. They are beach, dunal, backshore, mangrove, sand spit and sand mined area (Pak-Poy and Kneebone, 1995).

Native flora and fauna

The Reserve contains mangrove, saltmarsh, coastal heath and paperbark swamp with littoral rainforest elements.

The Reserve is approximately 65% marine area (estuary, mangrove, wetland and ocean intertidal). These marine components of the Reserve are also Marine Protected Areas. The Reserve contains approximately 16% (101ha) of the total area of mangroves in the Richmond River system (617ha). These mangrove communities along the Richmond River frontage of the Reserve are important in their contribution to coastal fisheries and their role in stabilising the shoreline and enhancing water quality within the estuary. The mangrove communities have been identified as being of State conservation significance under State Environment Protection Policy 14 (Coastal Wetlands).

Mangroves and the other vegetation communities of the Reserve also provide significant habitat for birds. The Reserve is locally, regionally and internationally significant for shorebirds. Of the 160 bird species identified in the Reserve and surrounding area, 22 of the shorebirds are protected under international conservation agreements. These are the Japan-Australia Migratory Bird Agreement (JAMBA) and the China-Australia Migratory Bird Agreement (CAMBA). The majority of migratory shorebirds visit between September and April after their long journeys from the Northern Hemisphere.

The Reserve is an important part of a mosaic of shorebird habitat in the lower Richmond River estuary and beaches south to Evans Head. The inter-tidal and supra-littoral zone (immediately above the high water mark) of South Ballina Beach and Mobbs Bay are of particular importance as many of these migratory and resident shorebirds are listed as endangered or vulnerable under the *Threatened Species Conservation Act, 1995 (TSC Act)*. These include the beach stone curlew (*Esacus neglectus*), little tern (*Sterna albifrons*), sanderling (*Calidris alba*) and pied oystercatcher (*Haematopus longirostris*). Ospreys (*Pandion haliaetus*) are also a threatened bird species that rely on habitat in the Reserve. An osprey nesting pole and two roosting/feeding poles are provided and used at Mobbs Bay.

A small area of salt marsh to the west of the South Wall car park has the potential to be extended and rehabilitated to provide feeding and roosting habitat for shorebirds. This area is currently subject to inter-tidal activity due to the rock wall which supports the road to South Wall. Research has been undertaken on shorebird habitat enhancement for this area.

Seagrass beds in Mobbs Bay provide an important food source for shorebirds and estuarine fauna. Dugongs (*Dugong dugon*) have occasionally been sighted in Mobbs Bay. Green turtles (*Chelonia mydas*) and loggerhead turtles (*Caretta caretta*) have also been recorded nesting on South Ballina Beach in the Reserve.

Cultural heritage

Aboriginal communities have an association and connection to the land. The land and water biodiversity values within a landscape are central to Aboriginal spirituality and contribute to Aboriginal identity. Aboriginal communities associate natural resources with the use and enjoyment of foods and medicines, caring for the land, passing on cultural knowledge and strengthening social bonds. Aboriginal heritage and nature are inseparable from each other and need to be managed in an integrated manner across the landscape.

The Reserve is part of a landscape that is of cultural importance to the local Aboriginal people of the Bundjalung Nation. The local Aboriginal people maintain strong spiritual and cultural links to this landscape.

Middens and open campsites remain in the Reserve despite a high level of disturbance caused by former land uses and continuing changes to the geomorphology of the area. The Reserve falls within the area of the Jali Local Aboriginal Land Council (LALC).

In the 1860s, the sugar industry became established along the Richmond River and much of the South Ballina area was cleared and drained for sugar cane production with the exception of the Reserve. In the 1960s, mineral sand mining activities severely modified the vegetation and landforms in the area that is now the Reserve. In excess of fifty shipwrecks are also recorded in the lower Richmond River estuary.

2.4 VISITOR USE

The Reserve is of high local scenic value. The fringing mangrove forest of the Reserve along the southern bank of the Richmond River is visually prominent from the nearby township of Ballina. From within the Reserve there are scenic views of the Richmond River estuary, South Ballina Beach, Ballina township and the Alstonville Plateau in the hinterland.

The Reserve is an important recreation resource for the residents and visitors of the Ballina area. Peak visitor use is experienced during the summer months. Popular activities include fishing, walking, surfing, swimming and bird watching. Visitor numbers to the Reserve are likely to increase with growth in tourism in the Ballina area.

The main vehicle access is provided by South Ballina Beach Road, which terminates at a car park at South Wall with a capacity of approximately 14 vehicles. Another similar capacity car park is also provided 1 km to the west on this road at Mobbs Bay.

South Ballina Beach adjacent to South Wall is a popular surfing location. It is one of a few surf breaks on the far north coast of NSW that offers some protection during northerly winds.

Fishing of the Richmond River is particularly popular in Mobbs Bay, off South Ballina Beach Road, from the river 'training walls' and off South Wall. Surf fishing also occurs off South Ballina Beach. Two informal dirt boat ramps at Mobbs Bay provide similar boating access to the Richmond River. Limited vehicle and trailer parking is available at these areas. The waters of the Richmond River adjacent to the Reserve are a Recreational Fishing Haven where commercial fishing is banned.

The Reserve provides four-wheel drive vehicle access to South Ballina Beach. Four-wheel drives are permitted on the beach south of the four-wheel drive beach access point (see map) for some 18 km to Evans Head when tides and exposed coffee rock outcrops permit. The next four-wheel drive beach access is at Patches Beach which is approximately 10 km south of the Reserve.

The 2 km area of South Ballina Beach north of the four-wheel drive beach access point is a vehicle exclusion zone to protect threatened shorebird habitat and for the safety and experience of pedestrian based beach users.

This vehicle exclusion zone was declared in 1991 by Ballina Shire Council, which managed the Reserve at the time. The declaration was made to provide compensatory shorebird habitat for the building of a bridge over North Creek in Ballina.

2.5 RESEARCH AND EDUCATION

The Reserve is used by local education institutions to conduct field studies. This includes ongoing studies and projects by Southern Cross University and Ballina High School.

2.6 THREATS TO THE RESERVE VALUES

Degradation & erosion

Mineral sand mining in the mid 1960s resulted in degradation of the Reserve's dune systems and vegetation communities. Whilst the exact extent of sand mining is unknown, there is evidence of past sand mining in the South Ballina Beach dune system. Rehabilitation of mined areas primarily involved backfilling and revegetation using non-local species such as bitou bush (*Chrysanthemoides monilifera*), horsetail she oak (*Casuarina equisetifolia* var *incana*) and coastal tea tree (*Leptospermum laevigatum*).

Despite past rehabilitation works, erosion of the South Ballina Beach foredune and the Mobbs Bay spit is occurring due to tidal and wave processes. Whilst some erosion in the Reserve can be attributed to natural processes, accelerated rates of erosion has occurred in places due to visitor use such as illegal camping, informal pedestrian tracks and vehicle disturbance to vegetation and dunes.

Drainage

The western part of the Reserve is traversed by waterways that drain rural land in the Mosquito Creek catchment to the south. Two of these waterways are on easements adjoining the Reserve (see Map). A number of informal waterways exist in the Reserve. Clearing of mangroves fringing these waterways has occurred in the past as part of de-silting works to maintain drainage. This activity has fragmented the mangrove community and has introduced weeds.

There is evidence that the seagrass beds within Mobbs Bay are slowly declining. This may be caused by high turbidity, deoxygenation of the water and nutrients and chemical residues associated with drainage from the cane farm land to the south following periods of heavy rainfall (Summers, 1997).

Introduced species

A large proportion of the vegetation of the Reserve is subject to weed infestation. Thirty-two (32) weed species has been recorded in the Reserve (Joseph, 1999). The most common weed species include bitou bush, lantana (*Lantana camara*), asparagus fern (*Protasparagus africanus*), morning glory (*Ipomoea indica*), prickly pear (*Opuntia stricta*), winter senna (*Senna pendula* var. *glabrata*) and camphor laurel (*Cinnamomum camphora*). Ballina High School and local Coastcare groups undertake weed control and rehabilitation works in the Reserve.

The construction and maintenance of drainage canals in the Reserve for run-off from nearby cane farms has exposed bare ground, providing the opportunity for weeds to encroach and spread into the Reserve.

Predation by foxes (*Vulpes vulpes*), dogs (*Canis familiaris*) and cats (*Felis catis*) are a particular threat to shorebirds in the Reserve. These introduced

animals can also disturb feeding, roosting and nesting birds and the fox can spread weed species throughout the Reserve.

Foxes are listed as a key threatening process to the threatened pied oystercatcher under the TSC Act. A Threat Abatement Plan has been prepared which includes an annual fox baiting program at South Ballina Beach and areas adjoining the beaches to protect pied oystercatcher populations. The Tweed-Lismore Rural Lands Protection Board in conjunction with NPWS, undertake fox baiting on the Reserve as a part of the Pied Oystercatcher Protection Program.

Fire

Fire is a natural feature of the environment and is essential to the survival of some Australian plant communities. Inappropriate fire regimes have been identified as a key threatening process affecting the biological diversity of NSW. Frequent or regular fire can cause loss of particular plant and animal species and communities and could also damage cultural features and infrastructure and threaten neighbouring land.

A recent review of fire management planning by NPWS has resulted in a modified approach to fire planning based on the level of complexity involved. In regard to Richmond River Nature Reserve, the NPWS considers that it is appropriate to include the specific fire management strategies for the Reserve in this plan of management. The NPWS approach to fire management planning uses a system of zones which are compatible with district bushfire risk management. Programs are also submitted to the district Bush Fire Management Committee.

The NPWS approach to fire management emphasises the protection of life and property as well as providing direction for the protection of natural and cultural heritage. The Reserve is a low potential bush fire hazard but is an environmental asset at major risk from bush fire. 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 within this zone is to prevent the extinction of 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 majority of vegetation in the Reserve, including mangrove, saltmarsh and paperbark swamp with littoral rainforest elements.

The HAMZ does not require intensive management, and focuses on those actions appropriate to conserve biodiversity and cultural heritage including exclusion of fire from mangrove, saltmarsh and paperbark swamp vegetation.

The southern boundary of the Reserve west of the South Ballina Beach Road is adjoined by a caravan park. Under the Ballina Bush Fire Risk Management Plan, the caravan park is managed as an asset protection zone.

Visitor impacts

Whilst many recreation activities are accommodated in the Reserve, the provision of recreation opportunities is not a primary management objective for nature reserves under the NPW Act. Recreation activities not consistent with the study of nature and natural environment are generally considered inappropriate uses of a nature reserve. Although prohibited, activities such as camping, four-wheel driving in the vehicle exclusion zone, trail bike riding, horse riding and the taking of domestic animals into the Reserve occur on occasions.

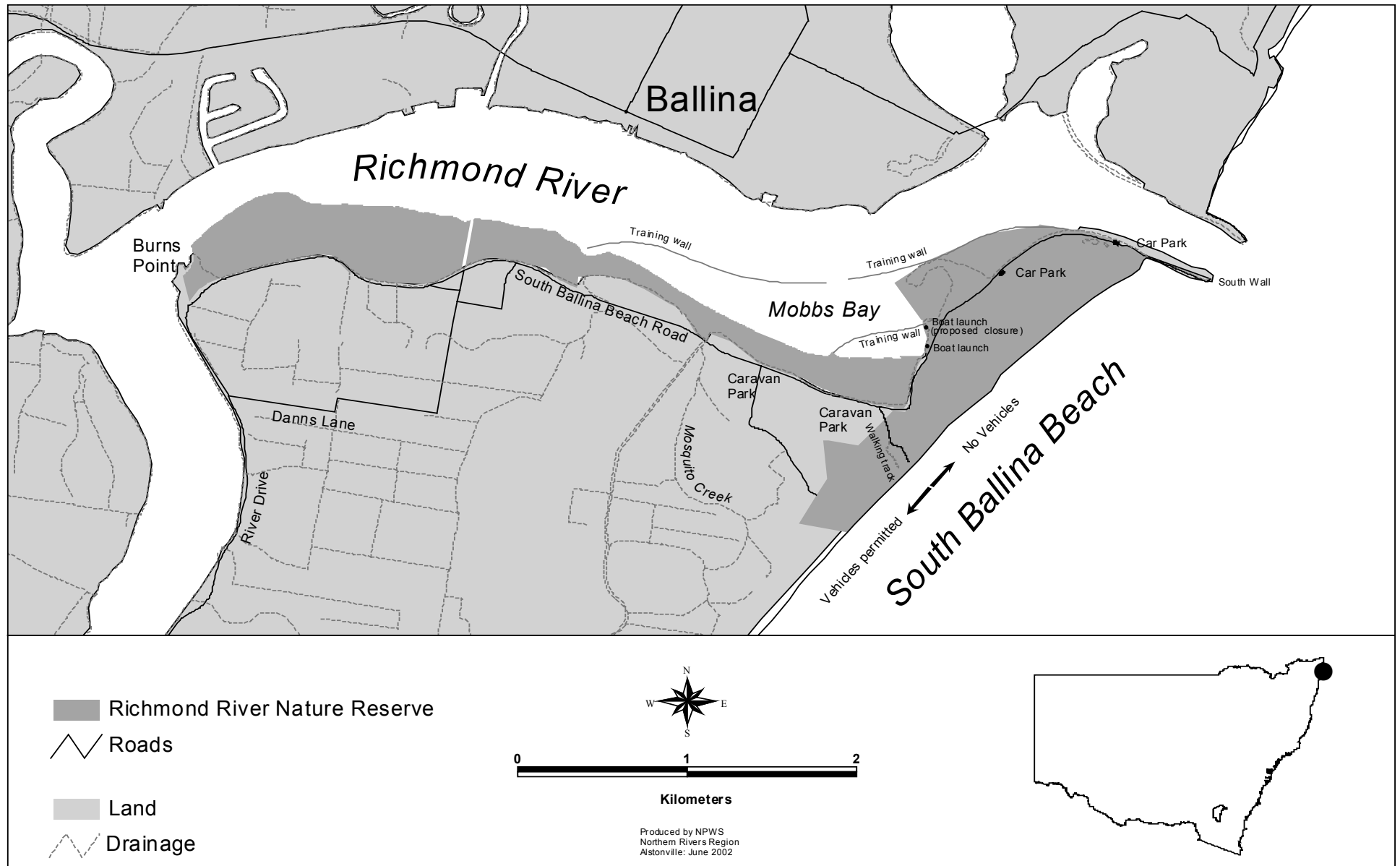
Impacts caused by illegal, inappropriate or increased visitor use include litter, fires, clearing and damage to native vegetation, dune erosion, disturbance to threatened shorebirds and turtle nesting sites. Signage is provided to inform visitors of the nature conservation values and regulations relating to the Reserve and regular NPWS patrols assist with encouraging appropriate visitor use.

Ballina Surf Lifesaving Club conducts seasonal beach patrols on quad bikes in the vehicle exclusion zone on South Ballina Beach adjacent to South Wall.

Commercial activity impacts

Commercial ocean haul fishers and commercial harvesting of bait species such as pippis and sandworms occur within the inter-tidal zone of the Reserve under NSW Fisheries licences. These uses need to be managed to minimise any disturbance to threatened shorebirds.

3. MAP OF RICHMOND RIVER NATURE RESERVE AND ENVIRONMENTS



4. MANAGEMENT STRATEGIES

Current situation	Desired outcomes	Actions and guidelines	Priority
<p>Native flora and fauna</p> <p>The Reserve is important coastal habitat for threatened bird species including the little tern, pied oystercatcher, beach thick-knee, osprey and sanderling. Recovery plans are being prepared for these species.</p>	<ul style="list-style-type: none"> There is no further decline in local populations of threatened bird species. 	<ul style="list-style-type: none"> Management of the Reserve will be consistent with Recovery Plans to be prepared for threatened species. Encourage monitoring of shorebird populations at Mobbs Bay and South Ballina Beach. Promote codes of practice for beach use to assist in the protection of shorebirds (refer to <i>Visitor Information</i>). 	<p>High</p> <p>Medium</p> <p>Medium</p>
<p>Populations of the threatened pied oystercatcher are declining as a result of visitor impacts and predation by fox and dogs.</p> <p>The beach is closed to vehicle access north of the four-wheel drive access track to help protect nesting, feeding and roosting sites. Vehicles have access to the beach south of this point.</p> <p>A protection program for the pied oystercatcher including annual monitoring and fox baiting has improved breeding success.</p> <p>A brochure on the Oystercatcher has been prepared (refer to <i>Visitor Information</i>).</p>	<ul style="list-style-type: none"> Pied Oystercatcher populations are protected from visitor impacts, in particular four-wheel drive vehicles, fox and dog predation. 	<ul style="list-style-type: none"> Continue the pied oystercatcher protection program including population monitoring and annual fox baiting (refer to <i>Pest Species</i>). Continue to prohibit four-wheel driving on the beach north of the four-wheel drive beach access track to protect important shorebird habitat (refer to <i>Visitor Use</i>). Four-wheel drive vehicles are not permitted above the mean high water mark on the beach south of the beach access trail. 	<p>High</p> <p>High</p> <p>High</p>
<p>One nesting pole and two roosting/feeding poles for osprey are provided at Mobbs Bay.</p>	<ul style="list-style-type: none"> Minimal impact on osprey nesting, roosting and feeding. 	<ul style="list-style-type: none"> Monitor nesting and feeding osprey and provide more poles if determined necessary. Maintain existing nesting and feeding/roosting poles. 	<p>Medium</p> <p>High</p>
<p>A small area of salt marsh is located to the west of the South Wall car park. The size of this area and its proximity to human activity currently restricts its suitability as shorebird habitat.</p>	<ul style="list-style-type: none"> Salt marsh habitat near South Wall is extended and improved. 	<ul style="list-style-type: none"> Investigate habitat enhancement works to extend and improve inter-tidal shorebird habitat in the salt marsh area to the west of the South Wall car park. 	<p>High</p>

Current situation	Desired outcomes	Actions and guidelines	Priority
Clearing of mangroves to maintain drainage canals and polluted run-off from adjoining land uses are key threats to mangrove and seagrass communities. These threats may also be responsible for the decline of sea grass beds in Mobbs Bay (Summers, 1997). Dugongs which feed on seagrass beds have been sighted in this area.	<ul style="list-style-type: none"> Drainage canals have minimal impact on mangroves and sea grass beds in the Reserve. 	<ul style="list-style-type: none"> Protect mangrove communities fringing existing drainage channels through liaison with Ballina Shire Council and NSW Fisheries. Prohibit the installation of any additional artificial drainage systems/canals in the Reserve. Protect sea grass beds in Mobbs Bay in liaison with NSW Fisheries and the Department of Infrastructure, Planning and Natural Resources through supporting upstream catchment management initiatives. 	<p>High</p> <p>High</p> <p>Medium</p>
A number of sea turtle species have been recorded nesting in the Reserve. Visitor use can disturb nesting turtles and impact on nesting sites. Fox and dog predation of hatchlings may occur (refer to <i>Pest Species</i>).	<ul style="list-style-type: none"> Turtle nesting areas are protected from disturbance. 	<ul style="list-style-type: none"> Protect turtle nesting sites from visitor disturbance by focussing use away from the sites and where practicable, not disclosing the location of sites (refer to <i>Visitor Information</i>). As far as possible, introduced species that predate on turtle hatchlings will be controlled. 	<p>High</p> <p>High</p>
<p>Aboriginal Heritage</p> <p>The Reserve is part of the landscape important to the local Aboriginal people of the Bundjalung Nation.</p> <p>A number of Aboriginal cultural sites have been identified in the Reserve, including middens and open campsites.</p>	<ul style="list-style-type: none"> Aboriginal heritage values are protected in partnership with local Aboriginal representatives. 	<ul style="list-style-type: none"> Involve Jali LALC and other local Aboriginal representatives in park management programs including the following: <ul style="list-style-type: none"> progressively identify and record Aboriginal sites and cultural landscapes; prepare management strategies where necessary to protect Aboriginal sites from damage by human activity and fire; undertake cultural heritage assessments for all proposed works/activities; develop a local assessment process for any proposals to gather traditional foods and medicines; and support Aboriginal community proposals for research and interpretation of cultural values (refer to <i>Visitor Information</i>). 	<p>High</p> <p>High</p> <p>High</p> <p>Medium</p> <p>Medium</p>

Current situation	Desired outcomes	Actions and guidelines	Priority
Historic Heritage Former land uses, coastal and river changes and the occurrence of shipwrecks in the area are of historic interest. Further research may identify other historic values.	<ul style="list-style-type: none"> Historic heritage values are protected. 	<ul style="list-style-type: none"> Encourage research and interpretation of the Reserve's historic values including former land uses, coastal and river changes and local shipwrecks. 	Low
Erosion Areas Past mineral sand mining and disturbance associated with illegal camping, informal pedestrian tracks and inappropriate vehicle use have caused accelerated rates of erosion. Recent inspection by NPWS of the south wall car park has identified major erosion within the car park.	<ul style="list-style-type: none"> Erosion from visitor use is minimised. The car park is maintained in a safe condition. 	<ul style="list-style-type: none"> Undertake erosion control where necessary including fencing, drainage and stabilisation works in areas such as the South Wall, Mobbs Bay and foredune area of South Ballina Beach. Complete a coastal engineering assessment of the car park to assess the works required to stabilise the area. 	Medium Medium
Pest Species There is a high level of weed invasion in disturbed areas above the tidal zone. A Restoration and Rehabilitation Plan has been prepared to ensure strategic weed control and restoration work. Restoration work is conducted by Ballina High School and the local Coastcare group.	<ul style="list-style-type: none"> Weed control is undertaken to facilitate natural regeneration and succession. 	<ul style="list-style-type: none"> Implement the <i>Restoration and Rehabilitation Plan for Richmond River Nature Reserve</i> (Joseph, 1999.) Encourage and assist Ballina High School, local Coastcare groups and other relevant groups to undertake rehabilitation works. Develop a Memorandum of Understanding or other appropriate agreement with Ballina High School regarding rehabilitation works. 	Medium Medium Medium
Foxes and dogs are known to prey on turtle hatchlings and ground roosting birds, particularly the pied oystercatcher. The Fox Threat Abatement Plan identifies South Ballina Beach as a high priority baiting area to protect pied oystercatchers.	<ul style="list-style-type: none"> Foxes are controlled to reduce predation of shorebirds and turtle hatchlings. 	<ul style="list-style-type: none"> Continue to conduct annual fox baiting as part of the Pied Oystercatcher Protection Program and in accordance with the Fox Threat Abatement Plan (refer to <i>Native Flora and Fauna</i>, <i>Visitor Use</i>; <i>Visitor Information</i>). 	High

Current situation	Desired outcomes	Actions and guidelines	Priority
<p>Fire</p> <p>The reserve is zoned as a Heritage Area Management Zone for fire management planning purposes. The NPWS is an active member of the Ballina Bush Fire Risk Management Committee who has prepared a Bushfire Risk Management Plan for the shire.</p> <p>An asset protection zone exists along the shared boundary with the adjoining caravan park.</p>	<ul style="list-style-type: none"> Life, property and natural and cultural values in and adjacent to the Reserve are protected from fire. 	<ul style="list-style-type: none"> Manage the reserve as a Heritage Area Management Zone. Exclude fire from mangrove, saltmarsh and paperbark swamp communities in the reserve. Prescribed burning may be undertaken on the reserve if research indicates that fire is necessary to protect biodiversity values. Manage bush fire risk in accordance with the Ballina Bush Fire Risk Management Plan. Maintain the asset protection zone along the shared boundary with the caravan park. 	<p>High</p> <p>High</p> <p>High</p> <p>High</p> <p>High</p>
<p>Visitor Use</p> <p>Visitor use must be compatible with the Reserve's natural and cultural values. Existing infrastructure such as roads, trails, tracks, car parks need to be maintained to minimise visitor impacts (see Map).</p>	<ul style="list-style-type: none"> Existing visitor facilities are maintained and recreation use remains 'low key.' 	<ul style="list-style-type: none"> Limit recreation infrastructure to signage and existing four-wheel drive trail and walking track access, car parking and one informal boat ramp (see Map). No additional facilities or access points will be developed. Camping will not be permitted. . 	<p>High</p>
<p>In accordance with the NPW Act and policy, domestic animals (including dogs and horses) are not permitted in the Reserve, which includes the inter-tidal zone.</p>	<ul style="list-style-type: none"> No domestic animals are taken into the Reserve. 	<ul style="list-style-type: none"> Develop and maintain signage and undertake enforcement patrols to ensure domestic animals (including dogs and horses) are not taken into the Reserve (refer to <i>Visitor Information</i>). 	<p>Medium</p>

Current situation	Desired outcomes	Actions and guidelines	Priority
<p>Four-wheel drive access to South Ballina Beach is an established use that is permitted on and to the south of the four-wheel drive beach access trail (see Map). Vehicles are not permitted north of this point to protect threatened shorebirds.</p> <p>Vehicles must keep below mean high water mark to protect shorebird nesting habitat.</p> <p>The reserve's 2.5 kilometres of beach is part of a 20 kilometre beach system and needs to be managed in close consultation with adjoining land managers.</p>	<ul style="list-style-type: none"> Vehicle use on the beach only occurs on and to the south of the four-wheel drive beach access point and with negligible impact on shorebird populations and dune systems. Vehicle use of the beach results in minimal environmental impact. 	<ul style="list-style-type: none"> Continue to provide four-wheel drive access through the reserve to South Ballina Beach subject to monitoring and review of impacts on shorebird populations and dune systems, and take action if deemed necessary. Public vehicles must keep south of the four-wheel drive beach access trail on South Ballina Beach. Only management and emergency vehicles may access the beach north of the four-wheel drive beach access trail. Minor re-alignment of the four-wheel drive beach access trail may be undertaken to improve safety for users and to enhance environmental protection. Maintain signage, liaise with stakeholders and undertake enforcement patrols to ensure compliance with the vehicle exclusion zone north of the four-wheel drive beach access trail up to South Wall. Manage vehicle use on the beach in close liaison with the Department of Lands to increase awareness and understanding of best practices to protect the beach fauna and habitat. Investigate, in consultation with stakeholder groups, strategies to phase out vehicle access through the nature reserve to the beach over time. 	<p>Medium</p> <p>High</p> <p>Medium</p> <p>High</p> <p>High</p> <p>Medium</p>
<p>Two informal boat ramps exist off South Ballina Beach Road at Mobbs Bay (see Map). These ramps are in close proximity and offer similar boat launching opportunities. The parking of vehicles and boat trailers is progressively encroaching onto adjoining mangroves.</p>	<ul style="list-style-type: none"> Vehicle and trailer parking at the informal boat ramp does not encroach on adjoining vegetation. 	<ul style="list-style-type: none"> Continue to allow use of the most southerly existing informal boat ramp (see map). The northern informal boat ramp will be closed and allowed to rehabilitate. Site harden the remaining boat ramp, including installation of bollards to prevent parking encroaching on the adjoining vegetation. 	<p>Medium</p> <p>Medium</p>
<p>Ballina Surf Lifesaving Club conducts seasonal beach patrols at South Ballina Beach and uses a quad bike in the vehicle exclusion zone. This use requires NPWS consent to be provided.</p>	<ul style="list-style-type: none"> Surf lifesaving activities are conducted in liaison with NPWS and have minimal impact on Reserve 	<ul style="list-style-type: none"> Ballina Surf Lifesaving Club may be permitted to use a registered vehicle on the beach north of the beach access trail while involved in beach patrol activities. Formalise arrangements with Ballina Surf Life Saving Club regarding patrols in the vehicle exclusion zone. 	<p>High</p> <p>High</p>

Current situation	Desired outcomes	Actions and guidelines	Priority
The river 'training walls' in the eastern part of Mobbs Bay, the south wall and adjoining access via South Ballina Beach Road are located in the Reserve but are managed by the Department of Lands.	<ul style="list-style-type: none"> Management of the south wall and South Ballina Beach Road by other agencies is undertaken in cooperation with the NPWS. 	<ul style="list-style-type: none"> Liaise with the Department of Lands regarding maintenance of the river 'training walls,' the south wall and associated access via South Ballina Beach Road. 	Medium
Vehicles associated with pre-existing commercial fishing activities may be permitted by NPWS on the beach within the reserve.	<ul style="list-style-type: none"> Vehicle use of the beach results in minimal environmental impact. 	<ul style="list-style-type: none"> Issue licences with relevant conditions for commercial fishers with pre-existing use to access the reserve for commercial fishing activities. The licences may include conditions of use designed to protect the natural and cultural values of the reserves, which will be developed in consultation with NSW Fisheries. 	High
Research Further research is required to assist management such as information on threatened shorebirds and visitor use.	<ul style="list-style-type: none"> Research conducted is compatible with Reserve values and assists management. 	<ul style="list-style-type: none"> Encourage further research and monitoring that will assist Reserve management in: <ul style="list-style-type: none"> the conservation requirements of threatened shorebird species at South Ballina Beach and Mobbs Bay; visitor use, impacts and impact mitigation to protect Reserve values such as threatened shorebird populations; impact of commercial and recreational bait collectors in the reserve; and erosion control and reduction. 	Medium

Legend for priorities:

High priority activities are those imperative to achievement of the objectives and desired outcomes. They must be undertaken in the near future to avoid significant deterioration in natural, cultural or management resources.

Medium priority activities are those that are necessary to achieve the objectives and desired outcomes but are not urgent.

Low priority activities are desirable to achieve management objectives and desired outcomes but can wait until resources become available.

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