LITTLE PIMLICO ISLAND NATURE RESERVE

PLAN OF MANAGEMENT

NSW National Parks and Wildlife Service

Part of the Department of Environment and Climate Change

November 2008

This plan of management was adopted by the Minister for Climate Change and the Environment on 28th November 2008.

Acknowledgments

The NPWS acknowledges that this reserve is in the traditional country of the Bundjalung people.

This plan of management is based on a draft plan prepared by the staff of the Northern Rivers Region of the NSW National Parks and Wildlife Service (NPWS), part of the Department of Environment and Climate Change.

For additional information or any inquiries about this reserve or this plan of management, contact the NPWS Richmond River Area Office, 75 Main St Alstonville NSW 2477 or by telephone on 02 6627 0200.

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FOREWORD

Little Pimlico Island Nature Reserve is located on the far north coast of NSW within the Richmond River. It covers an area of 16 hectares.

Little Pimlico Island Nature Reserve supports significant areas of natural habitat, including wetlands and littoral rainforest of State significance. It is notable for the particularly high number of rainforest species of the Big Scrub which reach or approach their southern limit in the reserve.

Little Pimlico Island is within the traditional land of the Bundjalung people and is part of the landscape of particular cultural importance to the Cabbage Tree Island and Ballina Aboriginal communities.

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 an area will be managed in the years ahead.

A draft plan of management for Little Pimlico Island Nature Reserve was placed on public exhibition from 16th March until 18th June 2007. The submissions received were carefully considered before adopting this plan.

This plan contains a number of actions to achieve “Better environmental outcomes for native vegetation, biodiversity, land, rivers, and coastal waterways” (Priority E4 in the State Plan) including protection of the wetland and littoral rainforest habitats, and preparation and implementation of a pest management plan for the reserve.

This plan of management establishes the scheme of operations for Little Pimlico Island Nature Reserve. In accordance with section 73B of the *National Parks and Wildlife Act 1974*, this plan of management is hereby adopted.

Carmel Tebbutt MP

1. LITTLE PIMLICO ISLAND NATURE RESERVE

Little Pimlico Island Nature Reserve (hereafter referred to as “the reserve”) is located on the far north coast of NSW within the Richmond River, approximately 1.5 kilometres from the village of Wardell and 16 kilometres south of Ballina. The reserve extends to mean high water mark and covers an area of 16 hectares. The reserve was gazetted on October 21st 1988.

The reserve complements other wetland and coastal reserves nearby including Richmond River Nature Reserve, Tuckean Nature Reserve, and Broadwater National Park.

Although much of the surrounding area has been cleared for sugar cane, the reserve supports significant areas of natural habitat including wetlands and littoral rainforest of State significance identified under State Environment Planning Policy No.14 Coastal Wetlands (SEPP14) and State Environment Policy No.26 Littoral Rainforest (SEPP26).

The Richmond Floodplain Committee (RFC) is responsible for the coordination and integration of natural resource management actions on the Richmond River floodplain. The RFC is in the process of preparing an estuary management plan for the whole of the Richmond River estuary (refer 4.3 Water quality). NPWS is represented on the RFC.

The reserve is within the Ballina Shire Council local government area, within the Northern Rivers Catchment Management Authority area and within the Jali Local Aboriginal Land Council area.

2. MANAGEMENT CONTEXT

2.1 Legislative and Policy Framework

The management of nature reserves in NSW is in the context of a legislative and policy framework, primarily the *National Parks and Wildlife Act 1974* (NPW Act), the NPW Regulation, the *Threatened Species Conservation Act 1995* (TSC Act) and the policies of the National Parks and Wildlife Service (NPWS). The policies are based on 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 *Environmental Planning and Assessment Act 1979* (EPA Act) may require the assessment and mitigation of the environmental impacts of works proposed in this plan.

A plan of management is a statutory document under the NPW Act. Once the Minister has adopted this plan, no operations may be undertaken within Little Pimlico Island Nature Reserve except in accordance with this plan. Should management strategies or works be proposed for the reserve that are not consistent with the plan, an amendment to the plan will be required.

2.2 Management Purposes and Principles

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 (Section 30J), 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.

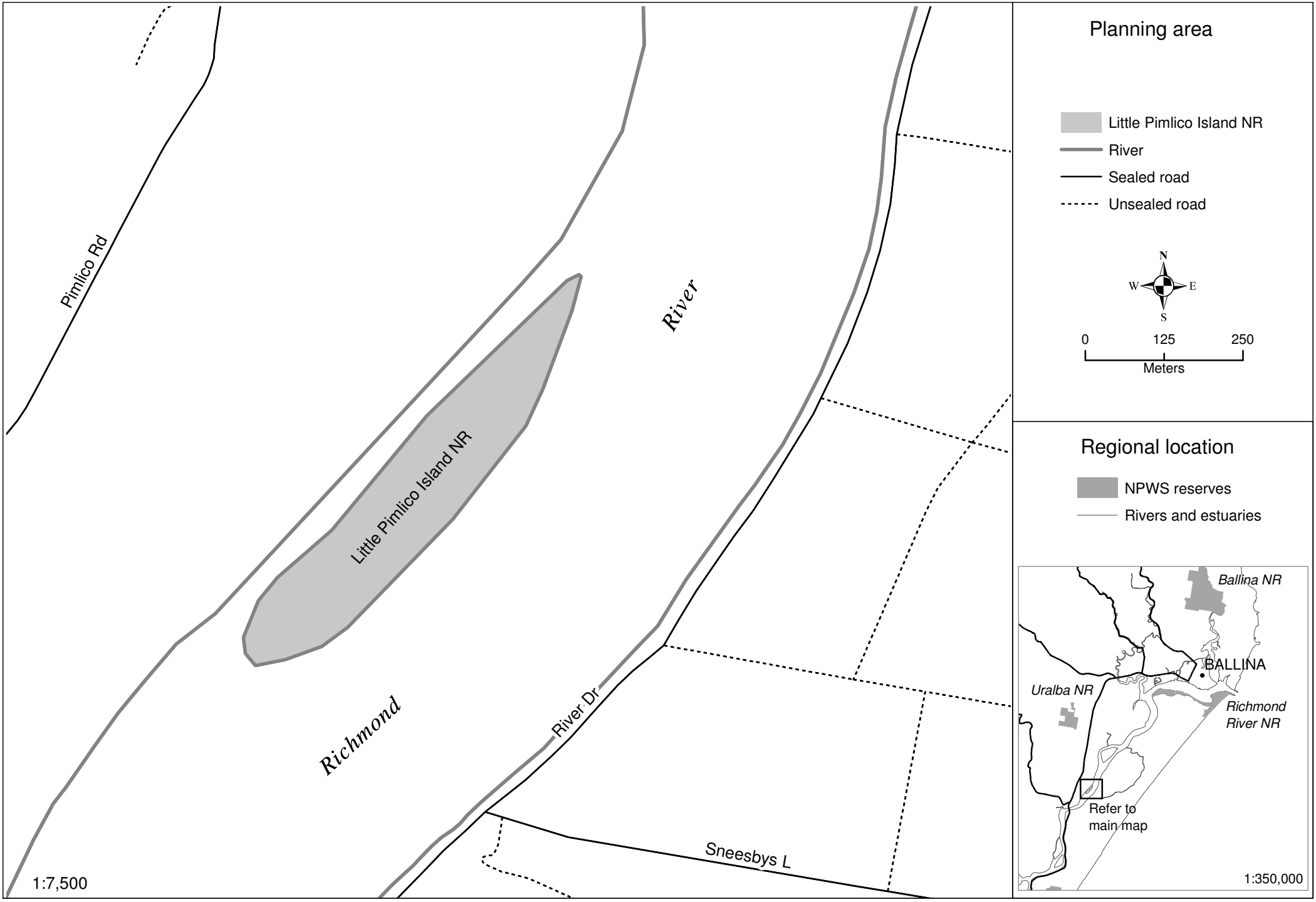
Nature reserves differ from national parks in that they do not have as a management principle to provide for visitor use.

2.3 Management Directions

The primary emphasis of this plan is the conservation of the natural and cultural values of the reserve.

Conservation of the reserve's values will be achieved through the following:

- Management of the reserve as a part of a regional network of coastal and estuarine reserves;
- Conservation of natural habitats within the reserve, with emphasis on the protection of wetland and littoral rainforest habitat of State significance;
- Maintaining minimal use of the reserve for recreation activities; and
- Recognition and protection of the traditional and contemporary Aboriginal cultural heritage values in partnership with the local Aboriginal community.


Pimlico Rd
River
Little Pimlico Island NR
Richmond
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Planning area
Little Pimlico Island NR
River
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Regional location
NPWS reserves
Rivers and estuaries
Ballina NR
BALLINA
Uralba NR
Richmond
River NR
Refer to
main map
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3. VALUES OF THE RESERVE

The location, landforms and plant and animal communities of an area have determined how it has been used and valued. Both Aboriginal and non-Aboriginal people place values on natural areas, including aesthetic, social, spiritual and recreational values. These 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 heritage, cultural heritage, threats and on-going use are dealt with individually, but their inter-relationships are recognised.

3.1 Landform, Hydrology, Geology and Soils

The reserve is subject to tidal inundation and flooding. The majority of rain within the Richmond River catchment falls in the summer and autumn months (approximately 65% of the yearly total) with regular intense rain periods in summer. This results in highly variable catchment flows, with flooding during periods of high rainfall (WBM Oceanics Australia, 2006).

The reserve is a 'level to very gently inclined island, with minimal relief and slopes that are typically less than 1%' (Morand 1994). The reserve is located on the Deltaic floodplain of the Richmond River, formed from Quaternary alluvium deposits of sand and clay. Soils in the reserve are moderately well-drained with a dense clay overlaying poorly drained mixed sediments. Soil in the reserve have been identified as having a high risk for acid sulfate soils (WBM Oceanics Australia, 2006).

3.2 Natural Biodiversity

The reserve supports significant areas of natural habitat including SEPP14 Coastal Wetlands and SEPP26 Littoral Rainforest.

A special significance of the reserve is the number of rainforest species of the Big Scrub which reach or approach their southern limit in the reserve. They include white lace flower (*Archidendron hendersonii),* thin-leaved coondoo *(Planchonella chartacea),* red-fruited kurrajong *(Sterculia quadrifida),* currant bush (*Carissa ovata),* twin leaved coogera (*Arytera distylis),* and *Ancana stenopetala* sp (Floyd, A 1990).

Mangroves in the reserve provide important habitat for fish and invertebrates. Grey mangrove (*Avicennia marina*) is the most common mangrove species in the reserve. Other mangrove species include: river mangrove *(Aegiceras corniculatum)*, blind-your-eye or milky mangrove (*Exoecaria agallocha*) and large leaved mangrove (*Bruguiera gymnorrhiza*). Mangroves are protected under the NSW *Fisheries Management Act 1994.*

No comprehensive flora survey has been conducted in the reserve. The following threatened and significant plant species have been recorded in the reserve (Floyd. 1990; NPWS Wildlife Atlas).

Table 1. Threatened and significant plant species recorded in reserve

Common name	Scientific name	Status
Scented Acronychia	*Acronychia littoralis*	Endangered *
Cordyline	*Cordyline congesta*	ROTAP 2RC-
Stinking Cryptocarya	*Cryptocarya foetida*	Vulnerable *
	Peristeranthus hillii	Vulnerable *

* Status under TSC Act

ROTAP 2RC- refers to Rare or Threatened Australian Plants conservation code

No fauna survey has been conducted but species recorded in the reserve include the osprey (*Pandion haliaetus*) which is scheduled as Vulnerable under the TSC Act, the white-bellied sea eagle (*Haliaeetus leucogaster*), regent bowerbird (*Sericulus chrysocephalus*) and the carpet python (*Morelia spilota)*.

Under the TSC Act recovery plans may be prepared to identify actions and priorities for threatened species, populations or ecological communities. Additionally, a threatened species Priorities Action Statement (PAS) must be prepared which outlines the broad strategies and detailed priority action in NSW to promote the recovery of threatened species, populations and endangered ecological communities and to manage key threatening processes. The PAS and recovery plans will be used to guide management of threatened species in the reserve.

Recovery actions are included in the Priorities Action Statement for the scented acronychia and the osprey. Recovery plans have not been prepared for any of the threatened species recorded in the reserve.

3.3 Aboriginal Heritage

Aboriginal communities have an association and connection to the land. The land and water 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, kinship systems and strengthening social bonds. Aboriginal heritage and connection to nature are inseparable from each other and need to be managed in an integrated manner across the landscape.

The reserve is in the traditional country of the Bundjalung people and within the area of the Jali Local Aboriginal Land Council. The language group in and around the reserve is Bundjalung. The Aboriginal name of the reserve is unknown (pers comm. Jali Elder). The Cabbage Tree Island Aboriginal community is located approximately 4 kilometres south of the reserve. Fishing in the Richmond River is popular with the Cabbage Tree Island and Ballina Aboriginal communities. In the past the reserve was used for camping and the community has a long association with the reserve.

There are no known Aboriginal sites or places in the reserve.

3.4 Historic Heritage

The nearby village of Wardell was originally a cedar getters camp with sawmills and busy river trade dating back to the 1850s. Sailing ships loaded timber from Wardell, leaving their sandstone ballast along the river banks. A regular steamboat service ran from Ballina to Lismore stopping off at Wardell (Ballina & Richmond River Genweb 2006). There are no known historic sites in the reserve.

3.5 Education and Recreation Values

Popular recreation activities on the Richmond River include fishing, boating and water skiing.

Recreational use of the reserve is minimal despite its close proximity to surrounding towns and villages. The fringing mangrove vegetation limits access and the reserve is only accessible by small boat. There are no visitor facilities in the reserve.

Visitor access to the reserve is not encouraged because of its small size and fragility, in particular the susceptibility to damage to wetlands and littoral rainforest communities. Disturbance to native vegetation would also expose acid sulphate soils and potentially cause erosion.

More suitable areas for nature based recreation and education activities in an estuarine environment are available nearby at Richmond River Nature Reserve and Broadwater National Park.

4. THREATS TO RESERVE VALUES

4.1 Pest Species

There has been no comprehensive survey of introduced plants and animals in the reserve. A number of introduced species are known to occur and some of these are listed as Key Threatening Processes under the TSC Act such as lantana (*Lantana camara*) and exotic vines and scramblers including asparagus fern (*Protoasparagus africannus)*; ground asparagus (*Protoasparagus densifloris (aethiopicus)*); climbing nightshade (*Solanum seaforthianum*); coastal (five-leaved) morning glory (*Ipomoea cairica*) and wandering jew (*Tradescentia fluminensis (albiflora)*). Other species known to occur include: smooth leaved senna (*Senna* X *floribunda*); large leaved umbrella tree (*Schefflera actinophylla*); and castor oil plant (*Ricinus communis*).

The reserve is prone to ongoing weed incursion from upstream sources and especially following floods.

Cane toads (*Bufo marinus*) are likely to occur in the reserve and are also listed as a Key Threatening Process under the TSC Act. Because of their intolerance of salt water, cane toads are largely confined by the surrounding estuarine waters.

4.2 Fire Management

Fire is a natural feature of many environments and is essential for the survival of some plant communities. However, inappropriate fire regimes, related to fire frequency, season and intensity, can lead to loss of particular plant and animal species and communities. The ecological consequences of high frequency fire have been listed as a key threatening process under the TSC Act.

The primary fire management objectives of the NPWS are to protect life, property and community assets from the adverse impacts of fire, whilst managing fire regimes to maintain and protect biodiversity and cultural heritage (NPWS, 2005).

The NPWS Strategy for Fire Management (NPWS 2003) uses a zoning system for bushfire management in NPWS reserves. This zoning system is compatible with the zoning used by the Bush Fire Coordinating Committee in District Bush Fire Management Committee (DBFMC) bushfire risk management plans.

The NPWS approach to fire management planning is based on the level of complexity and risk to the reserve. In regard to Little Pimlico Island Nature Reserve, a fire management strategy has been approved for the reserve and is summarised in this plan of management.

NPWS has assessed the reserve for fire management planning purposes and has zoned the reserve as a Land Management Zone (LMZ). The primary fire management objective for a LMZ is to manage fire to conserve biodiversity and protect cultural heritage, through the application of prescribed fire consistent with fire thresholds. The reserve has been designated as a LMZ as it is an isolated island with no built assets and has no history of bushfire ignitions. The reserve is isolated from other vegetated land by the Richmond River. The likelihood of fire spreading into or from the reserve is very low and an assessment of the fire environment indicates a low level of fire risk.

Requirements for most plant species can be summarised on the basis of vegetation communities and there is a threshold in fire regime variability, which marks a critical change from a high species diversity to low species diversity. The following regime guidelines have been identified for the reserve.

Table 2. Fire Interval Guidelines for Protection of Vegetation Communities.

Vegetation Community	Minimum Interval	Maximum Interval	Notes
Rainforest	n/a	n/a	Fire should be avoided
Saline wetland	n/a	n/a	Fire should be avoided
Wet sclerophyll forest	25	60	Crown fires should be avoided at the lower end of the interval range
Swamp sclerophyll forest	7	35	
Scrubby dry sclerophyll forest	7	30	

Source: Bradstock *et al* (2003). * intervals given are tentative due to insufficient data.

NPWS maintains cooperative arrangements with surrounding landowners and the Rural Fire Service (RFS) brigades and is actively involved with the Northern Rivers DBFMC. Cooperative arrangements include fire planning, fuel management and information sharing.

4.3 Water quality

The combination of flood events, high summer temperatures, drainage channels outside the reserve, acid sulphate soils and sediment runoff from surrounding lands have the potential to impact on the water quality in the vicinity of the reserve.

Declines in water quality resulting in a major fish kill occurred in the Richmond River at Wardell in 2006 following flooding rains in the catchment combined with high temperatures resulting in extremely low dissolved oxygen levels in the river. Major fish kills also occurred in the Richmond River in 2001 following flooding and effected 35 kilometres of riverine, estuarine habitats and coastal ecosystems on the Richmond River (Dawson 2002).

In 2000 the Richmond Floodplain Committee was established under the Richmond River County Council to coordinate and integrate natural resource management actions on the Richmond River floodplain. These actions include acid sulfate soil management, wetlands management, water quality monitoring, riparian vegetation and estuary management. Through this committee it is proposed to prepare a management plan for

the whole Richmond River estuary. Key issues that will be addressed through the estuary planning process include: ecological health of the estuary; water quality; riverbank erosion; sedimentation; aquatic habitat; fish kills; riparian vegetation; flooding; fishing and fishery management; cultural and heritage values; foreshore access; and community education.

4.4 Climate change/sea-level rise

Sea-level rise is one of the projected outcomes of climate change documented over the last decade by the Intergovernmental Panel on Climate Change (IPCC). The most recent IPCC projections (January 2001) are for a sea-level rise of between 9 and 88cm between 1900 and 2100. The rate and magnitude of sea-level change is likely to vary from region to region and to date there is little agreement as to the pattern of sea-level rise. Changes in sea level will be felt through: increases and intensity and frequency of storm surges; increased erosion; loss of important wetlands and mangroves; impact on coastal ecosystems and impact on human settlements (CSIRO 2005).

On the Australian coast, impacts of sea-level rise and storm surges could be expected along the full length of the tropical coast. On the NSW coast, where narrow continental shelf limits the size of storm surges, large wind driven waves can have significant impacts (CSIRO 2005).

Climate change may significantly affect biodiversity by changing population size and distribution of species, modifying species composition, and altering the geographical extent of habitats and ecosystems. The potential impact of climate change is difficult to assess since it depends on the compounding effects of other pressures, particularly barriers to migration. Species most at risk are those unable to migrate or adapt, particularly those with small population sizes or with slow growth rates. For the reserve the most direct impact would be on the extent of the coastal mangroves, which are already under threat from a range of pressures.

Anthropogenic Climate Change was listed as a key threatening process under the TSC Act. Loss of climatic habitat caused by anthropogenic emissions of greenhouse gases is listed as a key threatening process under the Commonwealth *Environmental Protection and Biodiversity Conservation (EPBC) Act 1999*.

There is evidence suggesting that the rate of climate change will be faster than the rate at which most species can adapt, either by migration or by changing their behaviour, physiology or form. Hence, one short term goal for management is to ensure the survival of species in spite of additional threats from climate change. Some existing programs designed to manage threatening processes may also enhance species adaptability or resilience to impacts from climate change, examples include management programs for pest animals and weeds (Department of Environment and Heritage 2007).

5. MANAGEMENT STRATEGIES AND ACTIONS

Current Situation	Desired Outcomes	Management Strategies / Actions	Priority
5.1 Soil and water conservation There is no significant erosion in the reserve, but there is a high potential for acid sulfate soils. The Richmond River is subject to flooding and when combined with high summer temperatures and runoff from surrounding lands can adversely impact on water quality. This may result in large fish kills events such as occurred in 2001 and 2006. NPWS is represented on the Richmond Floodplain Committee responsible for overseeing the preparation and implementation of an estuary management plan for the Richmond River estuary. A range of issues relevant to ecological health of the estuary; water quality; and soil conservation will be addressed in the estuary management plan.	Soils in the reserve remain undisturbed by human activities. Natural hydrological processes continue with minimal disturbance. Improved water quality in the Richmond River.	5.1.1 Participate on the Richmond Floodplain Committee in the preparation of an estuary management plan for the Richmond River estuary. 5.1.2 Support the Richmond River County Council and the Northern Rivers Catchment Management Authority to maintain and improve water quality in the Richmond River catchment.	High Medium
5.2 Natural Biodiversity The reserve conserves areas of SEPP14 Coastal Wetlands and SEPP26 Littoral Rainforest. The reserve currently extends to mean high water mark only. The mangroves within the intertidal zone provide important fish habitat as well as a rich diversity of invertebrates and it would be desirable to include them within the reserve. A Priorities Action Statement has been prepared for the scented acronychia and osprey. The PAS identifies strategies and actions to promote the recovery of threatened species, populations and ecological communities and manage key threatening processes.	Native flora and fauna species and communities are conserved.	5.2.1 Investigate opportunities to include the intertidal zone into the reserve. 5.2.2 Implement relevant strategies in the Priorities Action Statement and recovery plans for threatened species as prepared. 5.2.3 Protect native plant and animals from visitor impacts and introduced species (refer Visitor use and Introduced plants and animals).	Medium Medium Medium

Current Situation	Desired Outcomes	Management Strategies / Actions	Priority
Climate change is also recognised as a key threatening process. Appropriate fire and pest management may improve the ecological resilience of species (refer 5.4 Introduced Species and 5.5 Fire Management).			
5.3 Cultural Heritage The reserve is within the Jali Local Aboriginal Land Council. It is within the traditional land of the Bundjalung people and is part of the landscape of particular cultural importance to the Cabbage Tree Island and Ballina Aboriginal communities. No Aboriginal sites or historic heritage sites have been recorded within the reserve.	The significance of the reserve to the local Aboriginal community is recognised and preserved.	5.3.1 Consult and involve the Jali Local Aboriginal Land Council, the Bundjalung Elders group and other relevant Aboriginal community organisations in the management of Aboriginal sites, places and values.	High
5.4 Introduced Plants and Animals No formal pest species survey has been conducted in the reserve but it is prone to ongoing weed incursion from upstream sources and especially following floods. Introduced species in the reserve include asparagus species; climbing nightshade; lantana; coastal morning glory; smooth senna; wandering jew; and large leaved umbrella tree. Cane toads are also likely to occur. Northern Branch is currently preparing a Management Strategy for the management of cane toads.	Pest species are controlled and where possible eliminated.	5.4.1 Survey the reserve to determine the presence and extent of introduced species in the reserve. 5.4.2 Prepare and implement a Pest Management Plan for the reserve. 5.4.3 Implement actions in accordance with the Northern Branch Strategy for the management of cane toads.	Medium Medium Medium

Current Situation	Desired Outcomes	Management Strategies / Actions	Priority
5.5 Fire Management The reserve has no history of fire and has a very low bushfire potential due to its location within the Richmond River. The reserve has been designated as an LMZ because of the sensitivity of the rainforest/mangrove vegetation complex. NPWS is an active member of the Northern Rivers Bush Fire Management Committee.	Life and property and cultural values are protected from fire. Fire regimes are appropriate for conservation of the reserves native plant and animal communities. Unplanned fire is excluded from the reserve.	5.5.1 Manage the reserve to protect biodiversity in accordance with the identified fire interval guidelines for vegetation communities.	High
5.6 Education and Recreation No recreational facilities are provided in the reserve and visitor use levels are low. Access to the reserve is by boat. No landing facilities or other facilities are provided. Visitor access is not encouraged because of the small size of the reserve and the risk to vulnerable mangrove and rainforest habitat.	Public access to the reserve is maintained at a low level.	5.6.1 Promote visitor use and education activities at alternate locations such as Richmond River Nature Reserve and Broadwater National Park. 5.6.2 Prohibit commercial use, group activities (defined as 10 or more people), camping and lighting of fires. 5.6.3 No facilities will be provided in the reserve.	Medium Medium High
5.7 Research and Monitoring A comprehensive cultural heritage, flora and fauna survey has not been conducted for the reserve. Baseline data would assist in the future management and would assist in identifying any cultural heritage sites and threatened species in the reserve.	Research enhances management of the reserve and has minimal environmental impact.	5.7.1 Encourage research to improve knowledge of the species diversity and ecology within the reserve in-conjunction with educational institutions and other relevant organisations. 5.7.2 Encourage investigation into the Aboriginal heritage values of the reserve in consultation with the Jali LALC and Bundjalung Elders.	Low Medium

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.

REFERENCES

Ballina & Richmond River Genweb www.rootsweb.com/nswballi/settlements/wardwell.htm [Accessed 27/7/06].

Bradstock, R., Kenny, B. & Tasker, E. (2003). *Guidelines for Ecological Sustainable Management. Final Report for NSW Biodiversity Strategy.* Department of Environment and Conservation, Hurstville.

Briggs, J.D. & Leigh, J.H. (1996). *Rare Or Threatened Australian Plants*. Revised edition. CSIRO, Melbourne.

CSIRO Australia, (2005) http://www.marine.csiro.au/LeafletsFolder/45sleeve/45.html [Accessed 29/5/06].

Department of Environment and Climate Change NSW http://www.environment.nsw.gov.au

Department of Environment and Heritage (2007) Website: www.deh.gov.au/biodiversity/ publications/ greenhouse/ summary.html Climate Change Impacts on Biodiversity in Australia – Summary [accessed 15/02/2007]

Department of Land and Water Conservation (2000) http//: www.dlwc.nsw.gov.au/care/water/estuaries/Inventory/richmond.html [Accessed 27/07/2006].

Floyd, A.G. (1990). *Australian Rainforests in NSW, Volume 2*, Surrey Beatty & Sons Pty Ltd, Chipping Norton.

Morand, D.T. (1994). *Soil Landscape of the Lismore-Ballina 1:100 000 Sheet* Report, Soil Conservation Service of NSW, Sydney.

NPWS (2003). *Strategy for Fire Management*. NSW National Parks and Wildlife Service, Hurstville, NSW.

NPWS (2005). *Fire Management Manual.* NSW National Parks and Wildlife Service, Hurstville, NSW.

NPWS (2006). *Little Pimlico Island Nature Reserve – Reserve Fire Management Strategy*. NSW National Parks and Wildlife Service, Northern Branch, NSW.

WBM Oceanics Australia (2006). Richmond River Estuary Processes Study Final Report.