

Ramsar site management plans -- Australia, Towra Point, NSW



TOWRA POINT NATURE RESERVE

PLAN OF MANAGEMENT

NSW National Parks and Wildlife Service
July 2001

Acknowledgments

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The draft plan was prepared by the NPWS under the direction of a diverse steering committee established by the NPWS. The steering committee members were: B. Clarke O.A.M. (Botany Bay Planning and Protection Council), P. Medway (Friends of Towra Point Nature Reserve), P. Adam (Coastal Wetlands Society), L. Thorburn (Environment Australia), S. Black (NSW Waterways Authority), M. Matchett, P. Rougellis (NSW Department of Transport), M. Way (National Parks Association), A. Smith, J. Hannan (NSW Fisheries), M. Rogers (Sutherland Shire Council) P. Stevens (NPWS), P. Shadie (NPWS), G. Ross (NPWS), J. Erskine (NPWS), G. Dunnett (NPWS).

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A new plan of management for Towra Point Nature Reserve was adopted by the Minister for the Environment, Bob Debus, on 7th November 2000. Minor amendments to the plan were adopted by the Minister on 12th July 2001. This plan combines the 2000 plan with the amendments adopted in 2001.

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FOREWORD

Towra Point is an icon wetland in NSW and is of international conservation significance. It provides habitats for endangered and migratory wading birds and other wetland species. For that reason, Australia has obligations under three international agreements to protect the Towra wetlands and its endangered or migratory birds.

Within the Sydney region, Towra Point is also remarkable because:

- it survives in a largely natural state within Australia's largest city
- its wetland ecosystems produce rich resources of fish and invertebrates, which are shared by humans and a large diversity of wildlife
- its habitats are crucial for many threatened or endangered plant and animal species
- it contains most of the region's important seagrasses, mangroves and saltmarshes
- it was the site of some of the earliest recorded interactions in Australia between Aboriginal and European societies
- having a nature reserve adjacent to an aquatic reserve provides a rare opportunity for holistic management of an ecosystem.

The main threats to Towra Point's important values arise due to human activity. Migratory bird habitats and wetlands are being rapidly lost or damaged as consequences of development and recreational use. Severe wave action is eroding its unique landforms, forests and wetlands. The nature reserve suffers from the ongoing impacts of introduced plants and animals, camping, horse riding, and boating and other recreational activities in and on the periphery of the reserve.

The reserve is yet to be consolidated, being fragmented by lands in private ownership. Most migratory wading bird habitats are outside the reserve's boundaries. Addition to the reserve of lands of high conservation value, and cooperative management between the relevant agencies, will best protect ecosystems upon which the wildlife depends.

The vision for 'Towra International Wetlands' has been the focus of a broad planning process involving a diverse and expert steering committee and many other key stakeholders and specialists in the Botany Bay environment over two years. This planning process resulted in the development of a draft strategic plan for the Towra International Wetlands.

The strategic plan seeks to identify the core values of the wetlands and the threats to these values and proposes management strategies to address the threats. The strategic plan considers all of the land and water tenures at

Towra Point, including the Towra Point Nature Reserve, the aquatic reserve and the floor and waters of Botany Bay in this area. It argues that the Towra wetlands can only be effectively conserved if management is holistic and integrated, without division by land title or responsible agency.

This draft plan of management has been prepared under section 72 of the *National Parks and Wildlife Act 1974*. The plan has been derived from, and is consistent with, the broader strategic plan, although its focus is solely the Towra Point Nature Reserve. The plan of management is binding on the NPWS and will guide management actions within the reserve.

Management strategies in the plans are based upon the premise that terrestrial and aquatic ecosystems at Towra Point are intrinsically linked and that estuarine wetland systems are dynamic. Where possible, natural environmental processes should be supported. Consequently, the plans recognise the need for holistic management and seek cooperative management with other agencies and the community. In implementing the plan of management NPWS will consult the strategic plan to ensure alignment with the management strategies developed for the entire wetland system.

The plans seek support from the wider community and all levels of government to protect the last substantial habitat in the Sydney region for migratory birds and the myriad of species which depend on the Towra Point ecosystem.

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

Bob Debus
Minister for the Environment

Contents

VISION 7

OVERVIEW 10

TOWRA POINT NATURE RESERVE 10

INTRODUCTION 10

LOCATION AND HISTORY OF THE RESERVE 10

LEGISLATIVE, POLICY AND PLANNING FRAMEWORK 11

INTERNATIONAL CONSERVATION AGREEMENTS 11

ABOUT THE PLAN OF MANAGEMENT 13

BASIS FOR REVIEW OF MANAGEMENT 13

STATUTORY BASIS FOR THE PLAN 14

STEERING COMMITTEE ROLE 14

MANAGEMENT 16

NATURAL HERITAGE CONSERVATION 18

CULTURAL HERITAGE CONSERVATION 30

ABORIGINAL CULTURE AND HERITAGE 30

EUROPEAN CULTURE AND HERITAGE 30

WISE USE AND UNDERSTANDING OF WETLANDS 33

IMPLEMENTATION 36

PERFORMANCE MEASUREMENT 39

REFERENCES 39

VISION

Towra International Wetlands

Within the changing dynamics of Botany Bay, the habitats of Towra Point will be protected and sustained, and better appreciated as a wetland of world significance on the very doorstep of Australia's largest city.

The terrestrial and aquatic ecosystems will be managed holistically, providing a benchmark for conservation of estuarine wetlands and coastal terrestrial ecosystems.

OVERVIEW

TOWRA POINT NATURE RESERVE

Introduction

The Towra Point wetlands are the largest and most diverse estuarine wetland complex remaining in the Sydney region. The nature reserve and adjoining wetlands are critical to the viability of important remnant terrestrial vegetation and wildlife habitats that contain rare or threatened species.

Towra Point has been declared a wetland of international importance under the Ramsar Convention. Under Ramsar, and other inter-governmental agreements, the Federal and NSW governments are obligated to protect the endangered and migratory birds and the wetland habitats at Towra Point.

Towra Point Aquatic Reserve, which is adjacent to the nature reserve, includes much of the remaining important seagrasses, mangroves and migratory wading bird habitats in Botany Bay. It represents major habitat supporting commercial and recreational fish stocks in the coastal Sydney region.

Both reserves aim to protect the most significant wetlands remaining in the Sydney region. The natural resources they aim to conserve are also important contributors to the environmental health of Botany Bay and to the amenity of the Sutherland Shire and Sydney region.

Adjacent wetlands at Kurnell to the east and Shell Point to the west are functionally part of the Towra Point ecosystem and are considered in the strategic plan for Towra International Wetlands.

Threats to this valuable ecosystem, dominated by introduced species, pollution and human induced erosion of wetlands at Towra Point, have been the subject of much concern over recent decades.

Location and history of the reserve

Towra Point is located approximately 16 kilometres south of the centre of Sydney, and is within the Sutherland Shire and the NSW National Parks and Wildlife Service (NPWS) Sydney South Region. It is situated on the Kurnell Peninsula and forms part of the southern shore of Botany Bay (see Locality Map). Towra Point is located at the gateway to Australia for international travellers entering and leaving via Sydney Airport.

Other NPWS reserves nearby are Botany Bay National Park, which includes the northern and southern headlands of the bay, and Royal National Park to the south. In 1975, responding to its obligations under international agreements to protect endangered and migratory birds and important wetlands, the Federal government acquired 281.7 hectares of land at Towra Point for conservation purposes.

In March 1982 these lands were transferred to the NSW State government for dedication as a nature reserve. On 6 August, 1982, Towra Point Nature Reserve was gazetted under the *NSW National Parks and Wildlife Act, 1974*.

Subsequent additions to the reserve have increased its area by 35%. Thus the reserve now comprises 386.4 hectares, including the bed and foreshores of Weeney Bay and lands at Quibray Bay. On 21 February 1984, Towra Point Nature Reserve was designated to the list of Wetlands of International Importance, established under the Ramsar convention.

In 1987, the Towra Point Aquatic Reserve was established adjacent to the nature reserve, under the *NSW Fisheries and Oyster Farms Act, 1935*. A management plan for the aquatic reserve was prepared in 1986 and was amended in 1990.

In 1989, the NPWS prepared a plan of management for the nature reserve. In that year, Sydney Regional Environmental Plan (REP) No.17: Kurnell Peninsula also recognised the environmental significance of all wetlands at Towra Point and elsewhere at Kurnell, and provided for environmental planning and land use controls consistent with their preservation. The REP facilitates the addition of lands of high conservation significance to the reserve.

Legislative, policy and planning framework

Management of the reserve, threatened species and migratory or other fauna in NSW are provided for by the following legislation:

- *National Parks and Wildlife Act, 1974*
- *Threatened Species Conservation Act, 1995*
- *Environmental Planning and Assessment Act, 1979*
- *Fisheries Management Act, 1994*

The NPWS' policy and planning framework implements the NPWS' responsibilities under the National Parks and Wildlife Act. This plan of management establishes the NPWS' specific management strategies for Towra Point Nature Reserve and the international values for which the reserve was established. It is subject to state-wide NPWS policies. This plan of management will be used in conjunction with the strategic plan for Towra International Wetlands and a number of other planning instruments and studies which affect management of the nature reserve. These include:

- Sydney Regional Environmental Plan No.17: Kurnell Peninsula (DUAP)
- State Environmental Planning Policy No. 39: Spit Island Bird Habitat (DUAP)
- NSW Wetlands Management Policy (DLWC)
- Towra Point Aquatic Reserve Plan of Management (NSW Fisheries)
- Coastal Resources Atlas for Oil Spills in Botany Bay (SPC)
- Botany Bay Environmental Management Plan (SACL)
- Botany Bay Regional Policy Guidelines 1992 (DUAP)
- Greater Metropolitan REP no 2: Georges River Catchment (DUAP)
- Fish Habitat Protection Plan no 2: Seagrasses (NSW Fisheries)
- Policy and Guidelines: Aquatic Habitat Management and Fish Conservation (NSW Fisheries).

International conservation agreements

Three international agreements relate to Towra Point and adjacent wetlands. They are: the Ramsar Convention on Wetlands of International Importance, the Japan - Australia Migratory Bird Agreement (JAMBA) and the China - Australia Migratory Bird Agreement (CAMBA). JAMBA and CAMBA are bilateral agreements which commit the governments of Australia, Japan and China to protect endangered and migratory bird species listed in the agreements. These governments agree to establish sanctuaries for the protection of these migratory birds and their habitats, to prevent damage to the listed birds and their habitats, to encourage joint research programs and to share the information gained by research, and to prohibit the removal or trade of the listed species or their eggs. The agreements do not list specific sites for protection.

The Ramsar Convention on Wetlands of International Importance is a multilateral convention which provides for wise use of all wetlands and for individual countries to nominate their significant wetlands for listing as wetlands of international importance. The principal expectation is that listed sites will be managed to protect the ecological character for which they were recognised. Any action that results in a deterioration of these values is considered to be in violation of the treaty.

Integrated management

Strategies are sought to protect the reserve, local populations of endangered and migratory birds and wetlands from present day threats, via a whole of environment approach to management.

The Towra Point nature and aquatic reserves, and adjacent lands and waters, can be considered a single ecosystem that is best managed in a holistic manner. This now represents an 'island' of remnant natural habitat in an expanding 'sea' of urban development and other human activity. The viability of the nature reserve is therefore linked to the condition of the aquatic reserve, and to other wetlands nearby (for example, at Shell Point). Protecting the core values of the ecosystem requires improved management of the nature reserve itself, as well as better regulation of activities taking place outside its boundaries.

The NPWS recognises the inherent ecological interdependence of the nature reserve on surrounding areas. Conservation of Towra Point's values is dependent on whole of ecosystem management. The strategic plan and this plan of management seek to translate this need into holistic action with other agencies and the community. Conservation of the nature reserve and migratory bird habitats on the southern shores of Botany Bay is dependent on a commitment by all tiers of government and the community to support management programs.

Agencies with a role for promoting integrated management of wetlands in the bay include: NSW Fisheries, NSW Department of Transport (DT), NSW Waterways Authority, NSW Department of Urban Affairs and Planning (DUAP), Sutherland Shire Council, Sydney Ports Corporation (SPC), Environmental Protection Authority (EPA), Sydney Airports Corporation Limited (SACL) and Environment Australia (EA).

Community support and involvement in management programs in the reserve is being provided by community based organisations including: the Friends of Towra Point Nature Reserve, Botany Bay Planning and Protection Council, Georges River Catchment Management Committee, Coast and Wetlands Society and the Sutherland Shire Environment Centre. Representatives of others, such as the National Parks Association, Oyster Farmers Association, Wildlife Preservation Society, Cronulla Dunes and Wetlands Alliance and Cronulla Precinct and Progress Association, also contribute to management projects in the reserve.

ABOUT THE PLAN OF MANAGEMENT

Nature reserves in NSW

Nature reserves in NSW are a category of conservation reserve which are provided for by the NSW *National Parks and Wildlife Act, 1974*.

Section 49(3) of the Act defines the purposes of nature reserves as being:

- (a) the care, propagation, preservation and conservation of wildlife
- (b) the care, preservation and conservation of natural environments and phenomena
- (c) the study of wildlife, natural environments and natural phenomena
- (d) the promotion of the appreciation and enjoyment of wildlife, natural environments and natural phenomena.

In NSW, nature reserves differ from national parks in that management emphasis is on environmental conservation, education and research. Recreation is not a primary function of nature reserves in NSW.

For the purpose of preparing plans of management, the NPWS recognises the IUCN - World Conservation Union system of protected area management categories for reserves. The majority of Towra Point Nature Reserve meets the IUCN definition of a Strict Nature (ie Category I) Reserve. The objective of this category is to protect natural processes and ecologically representative samples of the natural environment in an undisturbed, dynamic and evolutionary state for research, education, environmental monitoring and maintenance of biodiversity.

Some parts of the reserve, such as Towra Spit Island, meet the IUCN definition of a Habitat/Species Management (ie Category IV) Reserve, which aims to ensure the natural conditions necessary to protect nationally significant species, groups of species, biotic communities, or physical features of the environment. IUCN Category IV reserves recognise and allow for human manipulation of the environment for their perpetuation (IUCN, 1994).

Basis for review of management

The previous plan of management for Towra Point Nature Reserve was adopted in 1989 and required review to account for additions to the reserve, altered environmental conditions and changes in management priorities.

While the 1989 plan of management notes the desirability of further additions to consolidate the reserve, it did not address the management of significant additions to the reserve. Since 1989 the nature reserve has increased in area by approximately 105 hectares. Towra Spit Island and an area of the intertidal zone making up 43.5 hectares, may also be added to the nature reserve in future.

Some natural environments at Towra Point had undergone dramatic changes since the 1989 plan of management. For example, the reserve and adjacent migratory wading bird habitats needed to be protected from the impacts of developments and other activities in and around Botany Bay. Management of shoreline erosion also needed to be accounted for in the plan of management.

There was growing concern for the protection of wetlands and endangered and migratory birds at Towra Point and in Botany Bay. Obligations under international agreements in this regard necessitated a renewed cooperative effort by all agencies with management responsibility at Towra Point and in Botany Bay.

The new plan of management for the reserve, in conjunction with the strategic plan, aims to accommodate increasing community awareness of the need to protect ecosystems and wildlife at Towra Point. Greater public awareness and support for the reserve and associated ecosystems is critical to their continued viability. Aboriginal involvement in the management of cultural heritage within the reserve is also sought.

There is an identified need to manage demand for public access for environmental education and research.

This plan of management for Towra Point Nature Reserve therefore aims to:

improve protection and conservation of the reserve's natural and cultural heritage values by establishing clear, prioritised management strategies and actions for the nature reserve

- contribute to effective holistic management of the Towra Point wetlands ecosystem by inviting joint management actions with other agencies
- support management actions beyond the reserve to meet Australia's international obligations to protect migratory birds and their habitats at and adjacent to Towra Point
- provide for management of significant additions to the reserve, such as Towra Spit Island
- facilitate Aboriginal and other community participation in the implementation of the plan for its primary nature conservation purpose
- encourage opportunities for low impact, educational activities at the edges of the reserve and Towra Point wetlands
- when environmental impacts can be managed at acceptable levels, provide for existing limited day use of Towra Beach and key interpretation areas
- promote the values of the reserve and wetlands as an ecosystem.

Statutory basis for the plan

Section 72 of the National Parks and Wildlife Act, requires that the NPWS prepare a plan of management for each nature reserve in NSW.

Under the Act, a plan of management is a legal document which outlines the management policies, strategies and actions that NPWS will implement to achieve the objectives identified for each reserve. The Act also requires that each plan of management include a written scheme of operations that will be undertaken by the NPWS.

Preparation of a plan of management, as specified by the Act, requires:

- the Director-General to prepare a draft plan of management
- exhibition of the draft plan for at least one month so that any person may make a submission on it
- the draft plan and any submissions to be referred to the National Parks and Wildlife Advisory Council for consideration
- the Director-General to submit the plan and the council's report to the Minister.

After considering the comments of the Advisory Council, the Minister may adopt the plan of management, or may refer it back to the Director-General and council for further consideration before adoption.

Once adopted, no operations may be undertaken in the nature reserve except in accordance with the plan of management. In addition to the statutory basis for management, the reserve will be managed in accordance with NPWS field management policies as stated in the NPWS Field Management Policy Manual, and in accordance with the strategic plan for Towra International Wetlands.

Steering committee role

Threats to the nature conservation values of Towra Point have been a focus of community and government concern for many years. In 1997, the NSW and Federal governments committed to a cooperative effort to address major environmental threats facing Towra Point. The Federal Government, via the National Wetlands Program, and NPWS subsequently funded two projects which aimed to improve protection of the nature reserve. These were:

- the preparation of a new plan of management for the reserve
- a review of management options to mitigate damage to the nature reserve caused by shoreline erosion.

In October, 1997, NPWS convened the Towra Point Steering Committee, comprising representatives from NPWS and other NSW government agencies, Environment Australia, local government and community groups, to assist with both projects. NPWS also consulted with the community and other stakeholders about the new plan of management, via a workshop which was held at Botany Bay National Park at Kurnell on 20 March, 1998. This process has resulted in the development of the draft Strategic Plan for Towra International Wetlands and the Draft Plan of Management for Towra Point Nature Reserve.

NPWS will facilitate continued partnerships with the community groups such as the Friends of Towra Point Nature Reserve to implement this plan of management.

MANAGEMENT

Objectives of management

The purposes of nature reserves in NSW are set out in the section of this plan entitled 'Nature Reserves in NSW'. Consistent with these, the primary management objectives of this plan of management are to:

- actively conserve and enhance the viability of the reserve as a sanctuary for protected, threatened and migratory species, and to retain and protect the existing landforms and other natural values for the long term
- protect all waterfowl, migratory birds and birds in danger of extinction and their habitats in the Towra Point ecosystem, under the terms of international agreements or conventions to which Australia is a signatory.

Additional management objectives of this plan are to:

- conserve for existing and future generations the reserve's significant Aboriginal, historic and other cultural heritage values, and to encourage public awareness and appreciation of these values, without compromising the primary nature conservation purposes of the reserve
- provide opportunities, compatible with the nature conservation purposes of the reserve, for appropriate community support and participation in management programs.

This plan of management should therefore be viewed as a mechanism to both maintain the values and attributes of the nature reserve and to meet Australia's international obligations to conserve wetlands and endangered or migratory birds dependent on areas adjacent to the reserve.

As a significant number of the wetland habitats used by migratory wading birds are outside the reserve boundaries, this plan recognises that protecting migratory or endangered birds and their wetland habitats at Towra Point must be done through partnerships with other agencies and the community. Holistic management of the Towra Point ecosystem, and a clear understanding of the consequences of inadequate government and community action to protect its values, are essential components of this plan and the broader strategic plan for the Towra International Wetlands.

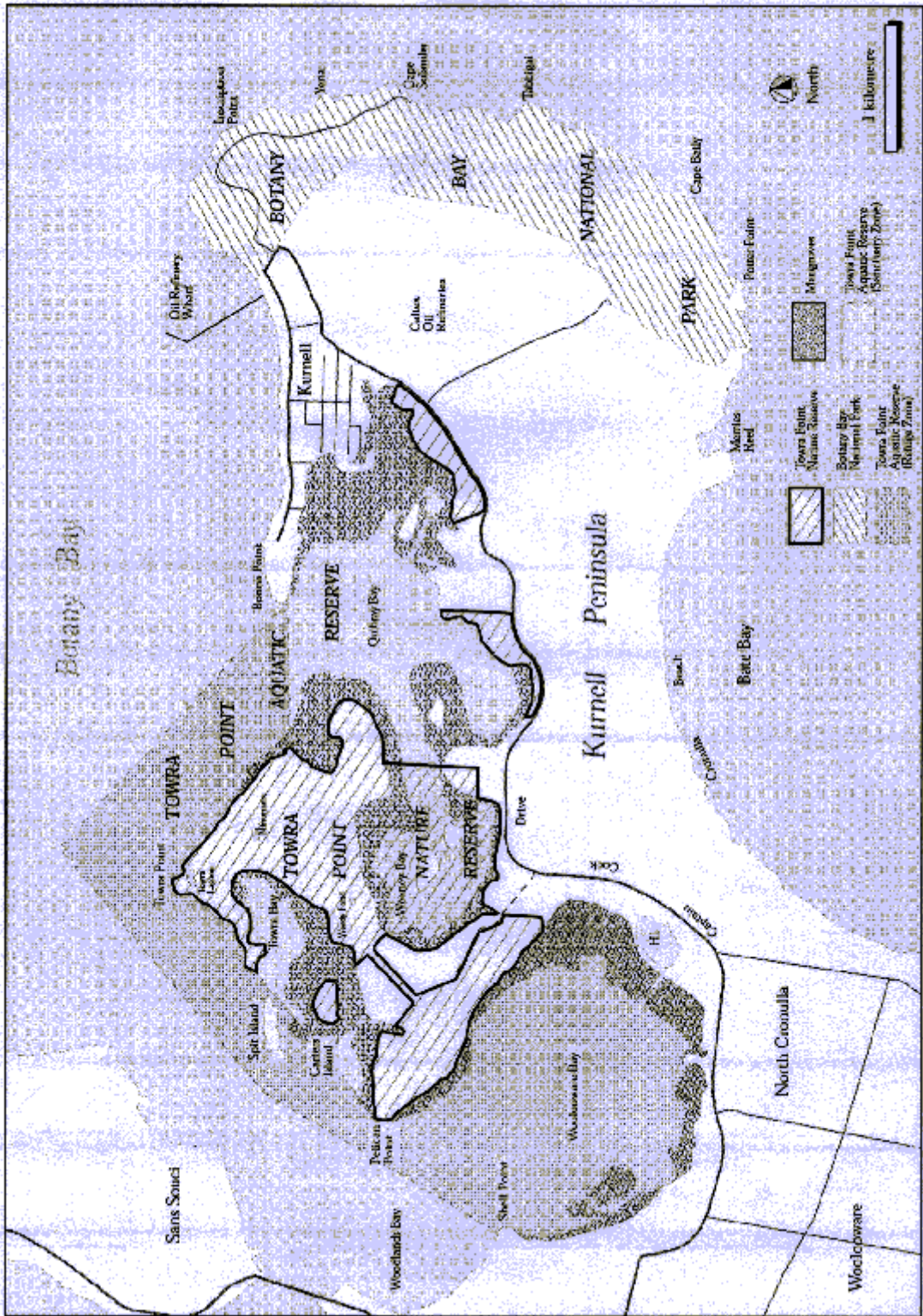
Information provided in this chapter is presented under the following broad categories:

- Natural heritage conservation
- Cultural heritage conservation
- Wise use and understanding of wetlands.

Within each of these categories an assessment of values, a review of threats to those values and a table summarising strategic actions (including priorities and accountabilities for each action) is presented.

The strategies established in this plan of management will provide the framework for future management of the reserve for the next ten years. However, it also aims to consolidate the long term objectives for conservation of the reserve, and threatened species and migratory birds in the Towra Point area.

Kurnell Peninsula and Towra International Wetlands



NATURAL HERITAGE CONSERVATION

Values

Towra Point is representative of a type of ecosystem which is now rare within the Sydney region. Many of the animal and plant communities and habitats there are poorly represented in the region, and a significant number of its species are threatened. Conservation of this area is therefore considered to be crucial to the maintenance of biodiversity in the region.

More than 400 species of native vascular plants and vertebrate fauna have been recorded in the reserve. In 1977 a survey by the Australian Littoral Society recorded more than 200 species of birds, over 200 species of native plants, 8 reptile species, 4 species of frog and some mammals (such as native rats and bats) at Towra Point. NSW Fisheries has described over 230 species of fish and invertebrates. Many species in the Towra wetlands, such as the green and golden bell frog (*Litoria aurea*), magenta brush-cherry (*Syzygium paniculatum*), little tern (*Sterna albifrons*), pied oystercatcher (*Haematopus longirostris*), terek sandpiper (*Tringa terek*), and peregrine falcon (*Falco peregrinus*) are listed as either 'vulnerable' or 'endangered' in NSW.

Towra Point has been described as the productive heart of the Botany Bay catchment and is much more than a regional resource. It is an important nursery, feeding and resting area for birds and fish that migrate intra and inter state and / or internationally. The Towra Point area provides the last remaining habitat in the region for some non-migratory shorebirds.

Wetlands

The wetlands in the Towra Point area are the last of the large tidal and estuarine wetlands in the Sydney region. The Towra wetlands include neighbouring wetland areas at Shell Point (Woodlands Bay) and are a component of the Georges River-Botany Bay estuary.

Because of their size, species and habitat diversity, and landforms, the wetlands at Towra Point are unique on the central coast of NSW. They are critical to the viability of threatened bird, fish and shellfish species in the region and are a vital link in the global chain of habitats used by many migratory waders and shorebirds.

Of the 49 Australian wetlands listed under the Ramsar Convention on Wetlands of International Importance, Towra Point Nature Reserve is one of 53 Ramsar sites in Australia and one of 9 in NSW. The reserve meets the following criteria for listing as an internationally important wetland under the Ramsar Convention:

- it is a particularly good representative example of a natural or near natural wetland, and is characteristic of the bioregion
- it supports an assemblage of rare, vulnerable or endangered plant or animal species, or an appreciable number of individuals of any one or more of those species
- it is of value for maintaining the genetic and ecological diversity of the region, because of the quality and peculiarities of its flora and fauna
- it regularly supports substantial numbers of individuals from particular groups of waterfowl
- it regularly supports 1% of individuals in a population of a species or subspecies of waterfowl.

The Towra wetlands were listed under Ramsar because they supported populations of waders such as the Pacific golden plover (*Pluvialis fulva*), double-banded plover (*Charadrius bicinctus*), eastern curlew (*Numenius*

madagascariensis) and ruddy turnstone (*Arenaria interpres*) which regularly exceed 1% of the entire Australian population. The Towra wetlands include the following important habitats highlighted below.

Tidal mudflats sustain large numbers of many species of aquatic worms and invertebrates and are the preferred feeding and roosting areas for wading birds. Mudflats adjacent to the reserve, at Shell Point, Pelican Point, Quibray Bay and near Fish Creek are the most important feeding areas for wading birds in Botany Bay. As a consequence of the destruction of wading bird habitats elsewhere in Botany Bay, mudflats at Shell Point (Woodlands Bay) are now one of the most important feeding and roosting areas for wading birds in the Sydney region.

Mangroves at Towra Point total approximately 50% of those remaining in the Sydney region. They play a key role in wetland systems because of their ability to trap silt and pollutants, stabilise shorelines, supply nutrients (as detritus) to the food chain, and provide shelter for many animals including birds, fish and invertebrates.

Saltmarshes are rare in the Sydney region. Other than small areas on the Parramatta, Georges and Lane Cove rivers, those at Towra Point are the only substantial saltmarsh habitats near Sydney. They are favoured feeding grounds and recruitment areas for fish. They also provide roosting sites for wading birds and important habitat for numerous insect species and insect eating birds. Saltmarshes and mangroves at Kurnell also act as buffer zones which protect the aquatic reserve and wetlands from impacts of land based activities by filtering out noise and pollutants.

Seagrasses also supply nutrients (via detritus) to the food chain of the wetlands and adjacent coastal waters. The two important seagrass species at Towra Point are strapweed (*Posidonia australis*) and eelgrass (*Zostera capricornii*). They provide nutrients and shelter for fish, invertebrates, wading birds and other wetland animals at Towra Point. The importance of seagrasses in aquatic ecosystems is reflected in the protection given to them under the NSW Fisheries Management Act.

Freshwater wetlands, including small ephemeral ponds, reed and cumbungi (*Typha* spp.) swamps, although not widespread at Towra Point, provide important habitat for a number of species of high conservation significance. These include the endangered green and golden bell frog, the migratory Japanese snipe (*Gallinago hardwickii*), and non-migratory birds such as the tawny grass bird (*Megalurus timoriensis*), reed-warblers (*Acrocephalus* sp.) and various species of crakes and rails.

Seagrasses, mangroves and tidal mudflats are the key feeding habitats for migratory wading birds in Botany Bay. The best of these remain adjacent to Towra Point and Shell Point.

Migratory birds

Nearly all of the migratory birds that have used the Towra Point area are wading birds or shorebirds. Approximately 34 of the 80 species of migratory birds listed for protection under the CAMBA and JAMBA agreements have been recorded as using the Towra Point wetlands. Most of these migrate to Australia each year from countries such as China, Japan and Russia.

In 1993, the Towra Point wetlands were recognised as one of the four most important sites for migratory wading birds in NSW. Towra Spit Island is the second most important breeding site in NSW for the little tern. Little terns are dependent on Towra Spit Island as their only breeding site in the Sydney region. Other wetland areas, by virtue of their proximity, supplement migratory wader habitats at Towra Point. Mudflats at Shell Point (which is located 1 kilometre west of Towra Point Nature Reserve), are rich feeding grounds for at least 21 wading bird species, of which 17 species are migratory. One of these species is listed as 'endangered' and 4 are listed as 'vulnerable' in NSW under the *Threatened Species Conservation Act* (TSC Act). The Shell Point wetlands support over 25 species listed in the CAMBA and JAMBA agreements. The wading bird community at Shell Point is designated as an 'endangered ecological community' under the TSC Act.

The importance of the Towra Point wetlands as a sanctuary for migratory and other wetland birds has greatly increased since 1992, when construction of Sydney Airport's third runway destroyed the last substantial wading and shore bird habitats on the northern side of Botany Bay. Many wetland dependent birds, including the little tern and migratory waders, were displaced from the runway site and now rely on the wetland habitats remaining in the Towra Point ecosystem.

Remnant terrestrial vegetation

Plant communities at Towra Point are representative of vegetation types that were once more common in the Sydney region, but which are now poorly represented in this area. Approximately 27% of the Towra land system supports a mosaic of vegetated sand dunes, coastal banksia woodlands, stands of swamp paperbark (*Melaleuca ericifolia*), small stands of littoral rainforest, and bangalay (*Eucalyptus botryoides*) and swamp oak (*Casuarina glauca*) forests. The Bangalay community is rare in the region, as is littoral rainforest, now listed as a threatened community under the Threatened Species Conservation Act 1995. *Cupaniopsis anarcardiodes* (Tuckeroo), a key indicator species of the littoral rainforest, approaches the southern limit of its distribution at Towra Point. The magenta brush cherry (*Syzygium paniculatum*), which is listed as a 'vulnerable' species in NSW, survives in isolated stands within some littoral rainforest remnants at Towra Point. *Gahnia filum*, a sedge which grows at the edges of the saltmarshes in the reserve, is rare in the Sydney region and approaches its northern distribution limit at Towra Point. Towra Point also has great scientific importance as the type locality for native plants which were collected there by the Cook expedition in 1770.

Unique landforms

Landforms at Towra Point consist of alluvial and marine sands deposited in the Holocene period, from about 9,000 years ago during a period of rising sea levels. Landforms at Towra Point are artefacts of a geologically recent period of mass movements of sand which concluded with the formation of the present-day coastal NSW landforms, including those at Kurnell, Botany Bay and Cronulla. Preserved formations at Towra Point are evidence of the migration of ancient river systems, which drained now buried valleys, from their original ocean mouths at Cronulla to the present mouth of Botany Bay. Mudflats at Shell Point are a relict river bank from this ancient landscape and are possibly the oldest visible landform in the Towra Point area. Shell Point therefore has possibly evolved the longest continuous association with migratory birds of any site in the bay.

Threats and opportunities

Native plant and animal species and the natural physical and ecological processes within the reserve are threatened by weeds, feral animals and other human induced changes to its natural environmental regimes. Recreation in and adjacent to the reserve places great pressure on areas also used by wildlife. There are large gaps in our knowledge of the species and ecosystems at Towra Point. The fragmented nature of the reserve, and a lack of coordination by management jurisdictions in and around Botany Bay, threaten to undermine protection of the reserve and the adjacent wetlands.

The nature reserve is susceptible to many negative environmental impacts which arise outside the reserve, and are therefore beyond the direct jurisdiction of the NPWS. Holistic management by all agencies with jurisdiction at Kurnell and in Botany Bay is needed to protect the natural heritage values of the reserve and the Towra wetlands.

Management jurisdiction of the Towra Point wetlands, which comprise most migratory bird habitats at Towra Point, is not with NPWS but with a number of other government agencies. Protection of migratory wading birds and their wetland habitats, and conserving Towra Point's other natural values requires cooperative management.

A proportion of Towra Point exists under private ownership, effectively dividing the Reserve. This fragmentation increases the requirement for management of boundary related issues and reduces the Service's capacity to effectively manage the ecological values of the Reserve.

Nearly all wetlands and migratory bird habitats in Botany Bay have been degraded or reduced in area by development, placing additional pressure on those which remain at Towra Point.

There are indications that animal diversity in the reserve and Towra Point wetlands is also declining, however existing baseline data is insufficient as a basis for environmental monitoring and management. Anecdotal evidence suggests that at least some species, such as swamp wallabies (*Wallabia bicolor*) and other small mammals, have become locally extinct at Towra Point. Others, including the green and golden bell frog (*Litoria aurea*), magenta brush-cherry (*Syzygium paniculatum*), little tern (*Sterna albifrons*), pied oystercatcher (*Haematopus longirostris*), terek sandpiper (*Tringa terek*), and peregrine falcon (*Falco peregrinus*), are listed as threatened species in NSW.

Little terns are suffering a worldwide decline in numbers due to the activities of humans and predators. They are listed in NSW as an endangered species under the *Threatened Species Conservation Act*. The Australian breeding population of little terns now comprises fewer than 500 nesting pairs. In NSW, the breeding population has declined from approximately 350 pairs in 1950, to about 110 pairs in 1997, although intensive management of their breeding habitat at Towra Spit Island by NPWS and volunteers has temporarily halted the decline of the Botany Bay colony. Little terns are most at risk in Botany Bay from disturbance or loss of habitat caused by erosion and recreation, and through predation (foxes, gulls, ravens and European rats).

Animals such as foxes and European rats are not native to Australia and are known predators of native fauna. Foxes are recorded as a key threatening process under the Threatened Species Conservation Act and these animals pose a continual threat to native fauna in the reserve. Unnaturally high populations of native gulls and ravens, which have increased in response to the availability of food from human sources, also pose a significant threat to at least two threatened species - the little tern and pied oystercatcher - at Towra Point.

Approximately 30% of the 300 known plant species at Towra Point are introduced, non-native species. Of these, 10 species are highly invasive weeds. Of immediate concern because of their extreme invasiveness are lantana (*Lantana camara*), bitou bush (*Chrysanthemoides monilifera*), blackberry (*Rubus* spp), prickly pear (*Opuntia stricta*), pampas grass (*Cortaderia selloana*), African olive (*Olea africana*), African box-thorn (*Lycium ferocissimum*) and asparagus fern (*Asparagus sprengeri*). Lantana is widespread in the understorey in the reserve and is inhibiting regeneration of native vegetation. Weeds, particularly Lantana, represent a major threat to the littoral rainforest communities. Bitou bush, pampas grass and asparagus fern are rapidly spreading into the reserve from adjacent lands. Foxes are a known vector for the dispersal of bitou bush seeds.

Greater opportunities for access to the bay, the reserve and wetlands arising from urban development around the bay poses increased threats to the natural values of the area from introduced plants and animals, and public recreation. Horses, dogs, boats and personal water craft (PWCs) are being increasingly used in the reserve and wetlands, in areas shared by wading birds. Fauna are prone to abandon habitats which are subject to ongoing disruption. When disturbed, migratory birds use up accumulated fat reserves needed for their annual migration. Boats and jet skis can have negative impacts on small fish such as anchovy, which feed close to the water surface, where they in turn provide food for the little terns. Activities such as camping, horseriding and the use of fires, vehicles and dogs are damaging the reserve by dispersing weeds, or by facilitating weed invasion by clearing vegetation, disturbing soil or adding nutrients to the soil. The presence of dogs and horses on intertidal lands adjacent to the reserve is directly inhibiting use of these habitats by wading birds.

Wildfires appear to be uncommon at Towra Point. Recent fires in the reserve have been a consequence of escaped camp fires or arson, however there is little information about natural fire regimes in the reserve. Inappropriate management of fire in the reserve may lead to substantial changes to vegetation communities.

Major developments, such as the construction of oil refineries at Kurnell in the 1950s, the building of port facilities at Botany in the 1970s, and construction of runways at Sydney Airport since the 1970s, have had major environmental impacts due to infilling of wetlands, the destruction of seagrass beds, mudflats and beaches, and changes to water quality by industrial discharges or pollution. Dredging associated with these developments altered natural coastal processes, causing increased erosion of shorelines and the loss of seagrasses, native forests, beaches and wetlands at Towra Point and elsewhere in the bay. Erosion at Towra Point is ongoing at an increasing rate and severity. Without mitigation, major landform changes and losses of habitat are expected. Without coordinated environmental planning and management by all Federal, NSW and local government agencies with responsibilities in the bay, existing and future developments will continue to threaten migratory and threatened species at Towra Point.

Seagrasses in Towra Point Aquatic Reserve are a small and diminished fragment of once more extensive seagrass beds in Botany Bay. They are being rapidly lost due to erosion and the use of boats and anchors off Towra Beach.

Towra Lagoon, which was once the largest freshwater wetland at Towra Point, has been damaged by severe coastal erosion and overtopping by salt water during storms. The lagoon once supported green and golden bell frogs and a number of waterfowl species. It also provides the only physical barrier protecting important wetlands in Towra Bay from the impacts of storm waves.

Groundwater at Kurnell is at risk from nutrients and other pollutants leaching into the Kurnell aquifer. Eutrophication is evident in freshwater wetlands on lands known as 'H1' adjacent to the reserve. Proposals to develop lands at Kurnell for residential or tourism purposes raise potential threats to groundwater and wetlands from nutrients or pesticides.

Of particular concern is potential pollution by oil or chemicals originating from shipping or industries such as nearby oil refineries. Oil spills and the introduction of foreign organisms, such as the algae *Caulerpa scalpelliformis* have caused environmental harm in Botany Bay.

Many threatening processes affecting the reserve are currently either unmanaged, or management is fragmented, conflicting and uncoordinated.

Management authority for the wetlands at Towra Point and Shell Point is spread across many local, NSW and Federal government jurisdictions.

Key among these are:

- NPWS (nature reserve, migratory birds, protected or threatened fauna)
- NSW Fisheries (Towra Point Aquatic Reserve and seagrasses, mangroves and fisheries in the bay)
- NSW Waterways Authority (owner of sea-bed and intertidal lands in the bay, regulation of boating)
- NSW Department of Urban Affairs and Planning (regional planning, approval of some developments)
- Sutherland Shire Council (environmental planning and assessment, development control and regulation of some recreational and other activities in the shire)
- Sydney Ports Corporation (management of Port Botany and Botany Bay)
- Environmental Protection Authority (regulation of environmental quality and pollution in relation to scheduled premises)
- Sydney Airports Corporation (management and development of Sydney Airport)
- Environment Australia (monitoring of international agreements and conventions ratified by Australia).

Despite a history of recognition of the high nature conservation values of Towra Point and its wetlands, no comprehensive strategy existed to coordinate management to protect them.

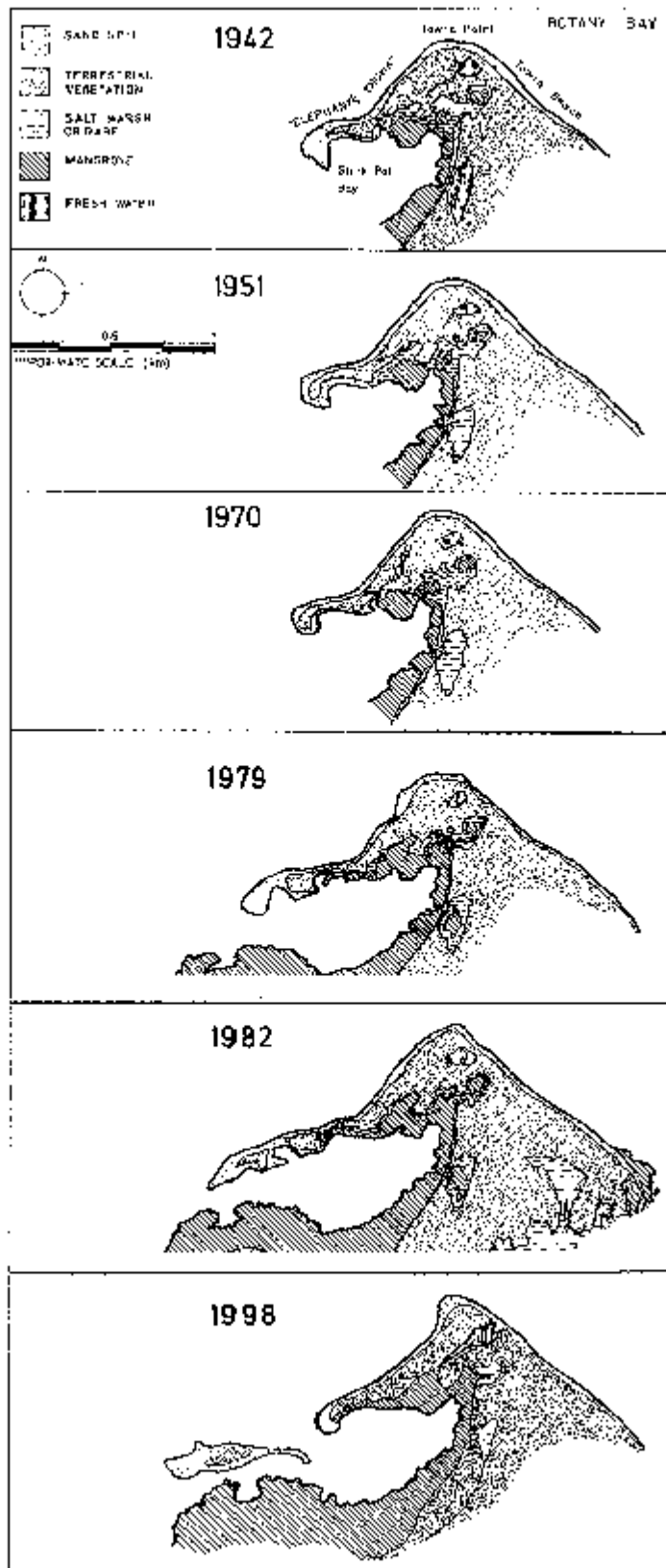


Figure 1. The Elephants Trunk was a relatively stable landform until 1974 at which time it began to elongate due to dramatically increased erosion and sediment transport.

Sediment erosion and accretion at Towra Point

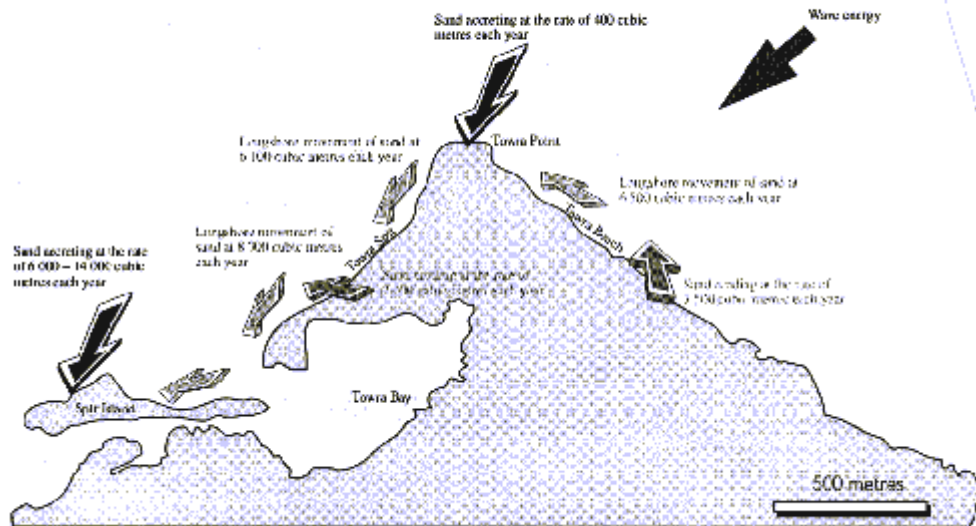


Figure 2. Since 1975, sediment transport due to storms at Towra point has greatly increased erosion and longshore movement of sand from Towra Beach and erosion and deposition of sand at Towra Spit and Spit Island. Previously stable wading bird habitats at Towra Beach have been destroyed by wave erosion and those at Towra Spit have been smothered by accreting sand (diagram after Patterson-Britton 1998)

Opportunities exist to better protect the nature conservation values of the reserve and Towra Point wetlands by:

- improving the knowledge base for management of wildlife, ecosystems and environmental change at Towra Point through scientific research and monitoring of environmental change
- consolidating management of the reserve by adding adjacent lands of high conservation significance. Priorities for acquisition are the intertidal zone where it is contiguous with the reserve (including mudflats and saltmarsh), areas of Sutherland Shire Littoral Rainforest and areas that consolidate the fragmented nature of the reserve.
- protecting the reserve and the Towra Point wetlands by further strengthening development controls at Kurnell and adjacent waterways
- integrated management of the aquatic and terrestrial components of the Towra International Wetlands
- joint management with other NSW agencies and Federal and local government to protect existing values and better regulate those processes which threaten them
- preparing and implementing recovery plans (as specified in the Threatened Species Conservation Act) for all declared threatened species, populations and communities in the Towra Point area.

Strategic actions

Critical issues

- Lack of coordination by management agencies to protect wetlands, threatened and migratory birds.
- Declining species diversity.

- Increasing loss, fragmentation and degradation of remnant vegetation, and key migratory bird and threatened species habitats.
- Loss or deterioration of wetlands of international importance.
- Lack of scientific or ecological data on environment, use and management to guide future management.
- Increasing impacts of shoreline erosion.
- Low level of public awareness of conservation issues and community support and participation in management.
- Private inholdings fragmenting reserve.
- Lack of cooperative resourcing.

Objectives:

To actively conserve and enhance the viability of the nature reserve as a sanctuary for protected, threatened and migratory species and their habitats at Towra Point.

To retain and protect the existing natural vegetation and landforms and other natural values, for the long term, and to protect all waterfowl, migratory birds and birds in danger of extinction and their habitats in the Towra Point ecosystem, under the terms of international agreements or conventions to which Australia is a signatory.

To protect the nature conservation values of Towra Point and its wetlands via joint management with all other jurisdictions, the community and other stakeholders.

Natural Heritage Conservation: Strategic Actions						
1.0	Improve information gathering about the ecology and conservation needs of the reserve and threatened species, migratory birds, wetlands, exotic species at Towra Point	1.1	Undertake habitat mapping to monitor change over time	Research institutions	High	ongoing
		1.2	Develop research prospectus with key research institutions, with priority on the ecology and management requirements of threatened species, wetlands and migratory birds	Steering Committee, key research institutions	High	2 years
		1.3	Conduct biodiversity surveys of all vertebrate animals and vascular plants in the reserve	Friends, NGOs	High	2 years
		1.4	Compile and maintain information on the locations, ecology, status and management requirements of each migratory or threatened species at Towra Point	Friends, NGOs	Medium	5 years
		1.5	Support biodiversity survey of intertidal species	Fisheries, research institutions, Friends, NGOs	Medium	5 years
		1.6	Investigate fire ecology of the reserve. Pending further	Research	High	2 years

			information, aim to keep fire out of the reserve.	institutions		
		1.7	Develop reliable indicators to measure changes in environmental quality at Towra Point	Research institutions	High	2 years
2.0	Protect environments in the reserve by establishing programmes to monitor significant environmental changes, and where practicable remediate or prevent impacts of human induced environmental change on the reserve	2.1	Seek implementation of erosion control measures arising from Towra Steering Committee's 1998 Erosion Mitigation Review for Towra Point and any new scientific investigations	Steering Committee	High	5 years
		2.2	Prepare and implement recovery plans for threatened species, communities and populations as appropriate	Fisheries	High	5 years
		2.3	Include fire management objectives and prescriptions for Towra Point Nature Reserve in the fire management plan for the southern section of Botany Bay National Park.		Medium	5 years
		2.4	Prepare and implement a pest species management plan and bush regeneration plan for the reserve	Friends, NGOs, community	High	2 years
		2.5	Revegetate degraded areas using only native plants grown from seed or cuttings collected within the reserve	Friends, NGOs, community	Medium	10 years
		2.6	Investigate and, where practicable, implement measures to protect freshwater wetlands on Towra Point	Friends, NGOs, community	High	3 years
		2.7	Investigate the value of providing additional tidal exchange structures across the causeway.		High	2 years
		2.8	Implement measures to protect and regenerate Sutherland Shire Littoral Rainforest communities within the reserve	Friends, NGOs, community	High	2 years
		2.9	Consider, and where appropriate implement, opportunities for re-introduction of species which have become locally extinct	Research institutions	Low	10 years

Natural Heritage Conservation: Strategic Actions (continued)

3.0	Prevent environmental damage from air and water borne pollution by liaising with relevant authorities, industries and communities to regulate or manage pollution sources	3.1	Contribute to preparation of a contingency plan for management of oil/chemical spills in consultation	St George Local Emergency Management Committee	High	2 years
		3.2	Advise Disaster Management Committee on oil cleanup procedures which avoid the use of oil dispersants, heavy plant and vehicles within the Towra Point wetlands	St George Local Emergency	High	ongoing

				Management Committee		
		3.3	Establish and maintain oiled fauna rescue and rehabilitation preparedness with other stakeholders	Caltex, Taronga Zoo, ORRCA, WIRES	High	ongoing
		3.4	Contribute to discussions about means of implementing measures to protect wetlands from organisms introduced via ship ballast water	SPC, EPA, Fisheries	High	2 years
		3.5	Develop a strategy to prevent use of chemical or biological agents for insect control at Towra point except in the event of a public health emergency	Dept. Health, Council, EPA	High	2 years
		3.6	Discuss options to prevent aircraft fuel dumping and impacts of flight paths on the reserve, migratory birds, wetlands	SACL	Medium	2 years
		3.7	Contribute to the identification of key locations for the installation of pollution traps and non-structural management techniques for prevention of storm water pollution of waterways at Towra Point	Councils	Medium	5 years
4.0	Protect little terns at Towra Point by maintaining nesting areas at Spit Island	4.1	Prepare and implement a management strategy for little tern nesting habitats at Spit Island	Friends, NGOs	High	2 years
		4.2	Implement Towra Spit habitat protection work	SPC, Fisheries	High	2 years
5.0	Protect nearby wetlands via appropriate recognition and protection of their nature conservation and natural resource values	5.1	Seek addition to the reserve of lands of high conservation value		High	5 years
		5.2	Liaise with Fisheries to extend the boundaries of the Aquatic Reserve	Fisheries	Medium	2 years
		5.3	Seek to have the aquatic reserve and shell Point wetlands included under the Ramsar listing for Towra Point	EA, Fisheries	High	2 years
		5.4	Contribute to preparation of recovery plan for listed endangered ecological community at Shell Point		High	3 years
		5.5	Explore potential for Voluntary Conservation Agreements with owners of adjoining lands of high nature conservation values	Friends	Medium	5 years

Natural Heritage Conservation: Strategic Actions (continued)						
6.0	Improve protection for reserve and wetlands by improving joint management with other authorities	6.1	Contribute to the development of an holistic and co-operative management strategy for the Towra International Wetlands	Steering Committee	High	1 year
		6.2	Discuss options for enforcement of a 4 knot speed limit for all vessels in waters within 100 metres of the boundary of the nature reserve	Waterways	Medium	2 years
		6.3	Seek to exchange law enforcement powers between NPWS, Fisheries, and Waterways for the nature and aquatic reserves, and coordinate staffing to maximise presence	Fisheries, Waterways	Medium	5 years
		6.4	Explore potential for joint signage at key points in both reserves	Fisheries, Waterways	High	2 years
		6.5	Investigate the potential for establishment of a Marine Park to provide integrated management of the aquatic and terrestrial components of the Towra International Wetlands within the context of the Hawkesbury Shelf Bioregional Assessment	Fisheries	Medium	3 years
		6.6	Seek addition of adjacent intertidal lands to the nature reserve		Medium	10 years
		6.7	Contribute to the development of pest management plans for the Kurnell peninsula	Council	High	2 years
		6.8	Investigate the extent of encroachment of mudflats and saltmarshes and develop a strategy to protect Towra's saltmarshes	Fisheries, Research institutions	Medium	5 years
-7.0	Protect migratory birds and adjacent wetlands and buffer zones via appropriate planning and development control	7.1	Promote maintenance of appropriate development controls for 7(a) Waterways and 9(a) Open Space zones at Kurnell	DUAP, Council	High	ongoing
		7.2	Promote strengthening of development controls at Kurnell and adjacent waterways to adequately protect Ramsar values, buffer zones, wildlife corridors, wetlands and migratory bird habitats	DUAP, Council	High	ongoing
		7.3	Promote consideration of cumulative environmental impacts of development activities on migratory birds, as part of the approval process for each proposed development affecting Kurnell or adjacent waterways	DUAP, Council, SPC, SACL	High	ongoing
8.0	Better protect natural	8.1	Plan and facilitate community-based projects within the	Friends, NGOs,	High	ongoing

<p>heritage within the reserve by providing opportunities for community participation in management programs</p>	<p>reserve (eg. Cleanup Australia Day and volunteer bush regeneration programs)</p>	<p>community</p>		
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CULTURAL HERITAGE CONSERVATION

Aboriginal Culture and Heritage

Abundant resources, including water and wildlife, in a diverse landscape has provided for family groups of the various Dharawal, Dharug and Eora nations for whom Botany Bay remains a significant place.

The heritage of Aboriginal Culture in Towra Point Nature Reserve and the wetlands and dunal systems on the Kurnell Peninsula are the subject of consultation with local indigenous people.

Recognition of these nations and their rich culture based around Towra and the coast is sought through this plan.

Reconciliation between cultures to achieve cultural heritage management in partnership with local Aboriginal people is a key goal of this plan.

Until the processes for this partnership are well established for Towra Point Nature Reserve, education and interpretive detail remain for discussion.

European Culture and heritage

In 1770, the Cook expedition explored Towra Point and mapped Towra Lagoon as a source of freshwater. Botanical and zoological collections made at Kurnell and Towra Point by the expedition comprised the first recognised scientific studies undertaken in Australia. Cook also observed and copied the use the Aboriginal people made of plants (such as *Tetragonia tetragonoides*), fish and invertebrates from the Towra wetlands for food. In 1788, the First Fleet arrived in Botany Bay and repeated Cook's explorations and observations of Towra Point, Kurnell and Botany Bay.

Kurnell Peninsula was colonised by Europeans in 1816, when James Birnie was granted land there which he later called 'Alpha Farm'. European use of Towra Point commenced about 1860 with the failed attempts of a major Kurnell landholder, Thomas Holt, to farm sheep. A split rail fence extending from Towra Bay to Weeney Bay, and infestations of the introduced buffalo grass (*Stenotaphrum secundatum*), are the only known relics of colonial grazing activities at Towra Point. Buffalo grass is an exotic species in the reserve.

Oyster farming followed grazing at Towra Point, and gave rise to a major primary industry in the shire. From 1870, pioneer oyster farmers experimented with rectangular slabs of sandstone placed in rows on the mudflats at and

near Towra Point. This gave birth to the oyster farming industry in Australia. The remains of early oyster farms (buildings, tar pits, oyster racks, wharves) can be found in the reserve.

About 1950, a civil aviation navigation facility and causeway were constructed at Towra Point. The foundations of the site remain.

The activities of the early explorers and colonists on the Kurnell Peninsula are of great historical interest because they date from the earliest period of European scientific investigation and colonisation of the Australian continent.

Of particular interest are early records of the area and its plants and animals. Most cultural heritage items in the reserve are yet to be fully identified and assessed.

Threats and opportunities

Management of cultural heritage items within the reserve is required to protect them from the impacts of natural decay and human induced foreshore erosion.

Aboriginal involvement in the conservation and management of their culture is also needed to appropriately protect this heritage. Landscape erosion threatens Aboriginal sites at Towra Point. Middens, in particular, tend to be located near the coast and are especially vulnerable to shoreline erosion. The risk of site loss is accentuated by the likelihood that many Aboriginal sites at Towra Point remain unidentified, and hence that threats are not necessarily recognised in time to take ameliorative action.

None of the known historic sites are composed of durable materials which can easily resist the harsh conditions which prevail in the area. Metal structures are especially subject to corrosion in coastal environments, however other materials such as timbers tend to also decay rapidly in the humid environments at Towra Point. As a result, many of the historic relics within the reserve are being lost due to decay.

To date, there has been little research, recording or assessment of the historical heritage significance of items or places in the reserve. Conservation of cultural heritage also requires oral, photographic and other records to be preserved. Sources of oral history are becoming rarer. Inter-generational appreciation of cultural heritage at Towra Point relies on community awareness and appreciation of these values.

Opportunities exist to:

- research, collate and preserve documentary, graphic and oral history related to Towra Point
- survey, record and preserve cultural sites, artefacts and other heritage in the Reserve
- utilise community interest, knowledge and expertise in management of cultural heritage in the reserve
- raise public awareness of the cultural heritage values of the reserve.

Strategic actions

Critical Issues

- Information about the extent and significance of cultural heritage is lacking.

- Threats from erosion to Aboriginal and historic heritage.
- Diminishing sources from which to record oral history.
- General awareness of the cultural heritage values of the reserve is low.

Objectives

To conserve for existing and future generations, significant Aboriginal and historic cultural heritage, and to encourage public awareness, appreciation of and participation in protection of cultural heritage values of the reserve.

Cultural Heritage Conservation: Strategic Actions						
1.0	Protect cultural heritage values by identifying, recording, assessing and conserving cultural heritage.	1.1	Undertake research and field surveys to identify, record and assess significance and condition of all cultural heritage	Friends, Aboriginal communities, local communities, NGOs, research institutions	High	2 years
		1.2	Conserve all significant non-indigenous cultural heritage consistent with NPWS cultural heritage standards	Friends, Aboriginal communities, local communities, NGOs, research institutions	High	5 years
		1.3	Retain potential cultural heritage 'in-situ' until significance and condition assessment can be conducted		High	ongoing
		1.4	Record, protect and conserve all Aboriginal sites, relics and cultural heritage in partnership with Aboriginal peoples	Aboriginal communities	Medium	ongoing
		1.5	Record relevant oral histories	Aboriginal communities, local communities	Medium	2 years
2.0	Maintain community awareness of, and involvement in, the cultural heritage values of the reserve	2.1	Manage and interpret cultural heritage, in consultation with local communities	Friends, NGOs, community, Aboriginal community	High	ongoing
		2.2	Provide appropriate access for Aboriginal people with cultural connections to the reserve	Aboriginal community	Medium	ongoing

Some human uses of wetlands cause damage to wetland ecosystems and are ecologically unsustainable. The NPWS aims to manage Towra Point according to the principle of "wise use" established by the Ramsar Convention. In this context, wise use refers to managing human use of wetlands so that there is continuous benefit to present generations, while at the same time maintaining the values and ecological processes for future generations.

Values

Environmental education

Towra Point has great educational value. Education is the main means of increasing public awareness of the values of the reserve, the Towra Point wetlands and wetlands in general. Increased awareness of these values promotes wise use and more lasting protection of these areas.

Towra Point is frequently the subject of teaching programs undertaken by the Department of School Education's Botany Bay Environmental Education Centre at Kurnell, and by universities, colleges and schools in the Sydney region.

The fragility of the area precludes increased access, especially by large groups, however lands adjacent to the reserve provide ideal locations for education about wetlands because of their accessibility to wetlands and their close proximity to transport and roads.

The Service will liaise with other authorities to determine an appropriate location for regional environmental education facilities which will include information about the values of the Towra Point wetlands and the importance of protecting the wetlands and the nature reserve.

Scientific research

The aquatic and terrestrial ecosystems at Towra Point are of great scientific importance. Interactions between the natural systems at Towra Point and the urban, industrial and social environments of south metropolitan Sydney are of substantial scientific interest. Towra Point is an important reference point for botanists, as it is a remnant of a vegetation now rare in the region and is assumed to be the type locality for some plant species, such as *Syzygium paniculatum*, collected by the Cook expedition at Botany Bay in 1770.

Scientific research is a critical means of obtaining information needed to guide environmental management. A number of institutions are engaged in environmental research at Towra Point. These include Sydney, New South Wales and Macquarie Universities, and government authorities such as NPWS, and NSW Fisheries, and research institutions such as the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the Australian Museum, and the National Herbarium.

Recreation

Sydney, a city of national parks, provides a wide variety of recreation opportunities. In keeping with the key values of the nature reserve, minimal infrastructure to support recreation is appropriate. Because of their high conservation significance, recreation is not an identified purpose of nature reserves in NSW.

There are a wide range of opportunities for recreation in natural areas in other local reserves such as Royal, Georges River and Botany Bay National Parks. Many other parts of the shire provide a wide range of recreational opportunities. There is also great scope for the low key private commercial ecotourism in the bay and at the edges of the reserve.

Low-key interpretive signs have been erected at some locations in the reserve and NPWS periodically conducts ranger-guided walks within the nature reserve, however these aim to meet environmental education objectives for the reserve.

Threats and opportunities

Towra Point's primary conservation values are fragile and highly susceptible to disturbance and change. Relative inaccessibility has helped to protect the reserve. Wise use of the reserve requires sustainable low-key uses which are compatible with its high conservation values. Some recreational activities present significant threats to the nature conservation values of the reserve, and to migratory birds and the wetlands at Towra Point.

The use and anchoring of watercraft is damaging seagrasses and other elements of aquatic habitats; litter and fires associated with picnicking and illegal camping in the reserve threaten amenity and nature conservation values. Dogs, horses, pushbikes and motor vehicles are agents which introduce nutrients, weeds and diseases to the reserve; the use of horses, bicycles and motor vehicles in intertidal areas are damaging to soils, soil invertebrates and vegetation and reduce the value of natural areas as habitat for wildlife. Noise associated with powercraft and vehicles can also reduce the value of the area as habitat.

Information resulting from research within the reserve which could assist management has not being routinely provided to the NPWS by researchers.

With sensitive interpretation and infrastructure there are many opportunities for high quality environmentally based tourism at the edges of the reserve (see Towra International Wetlands Concept Plan Map). Unique opportunities for low key ecotourism and interpretation of the Towra Point wetlands exist at the H1 lands, at the road entrance to Kurnell Peninsula. Opportunities for high quality experiences aimed at increasing public experience of natural wetlands and raising awareness of the reasons for conserving them exist at the H1 site. Features such as a large brackish lake surrounded by regenerating native woodlands at H1 provide key elements for development of a wetlands interpretation and ecotourism centre at Kurnell.

Opportunities exist to:

- work with local government, educational institutions and the community to provide environmental education, ecotourism and appropriate recreational opportunities without harming the reserve, the wetlands, or their wildlife
- facilitate wise use and management of the reserve and Towra Point wetlands by raising awareness of their values through skilful interpretation
- exclude activities which harm the reserve and wetlands ecosystem
- Increase community support of management actions by involving the community in management programs.

Strategic actions

Critical Issues

- Lack of information about environmental impacts of access and use to adequately guide management
- Impacts on wildlife and habitats from recreational uses, but particularly dogs, horses, watercraft, vehicles and camping
- Protecting the reserve by encouraging opportunities for quality experiences of wetlands outside the reserve
- Poor return to NPWS of research data which may assist management of the reserve
- General awareness of the education and research purposes of the reserve is low

Objectives

To provide opportunities for people to learn about and appreciate Towra Point's unique natural and cultural values, so that those values are retained and enhanced, and to provide a benchmark for an holistic management of other areas of high ecological value.

Wise Use and Understanding of Wetlands: Strategic Actions						
1.0	Provide opportunities for environmental education, while protecting the values of the reserve, via planned educational activities located on the edges of the reserve	1.0	A walking track and interpretation may be provided at an appropriate location near the southern edge of the nature reserve	Friends, EEdC	Medium	2 years
		1.2	Assist Botany Bay Environmental Education Centre to develop planned educational programs for the edges of the reserve	EEdC	Medium	5 years
		1.3	Liaise with councils and the community to encourage off-reserve development of educational opportunities in a bay-wide context	Friends, Councils, NGOs, community	Medium	Ongoing
		1.4	Encourage exploration of external funding sources for off-park interpretation	Friends, Councils, NGOs, community	Low	Ongoing
2.0	Increase awareness of values of the reserve by developing relevant interpretive information	2.1	Promote the value of Towra International Wetlands via appropriate signage, leaflets, teaching kit and guided tours, in consultation with environmental education centres, other agencies and the community	EEdC, Friends, Fisheries, Waterways, NGOs	High	2 years
3.0	Improve knowledge of the reserve and associated ecosystems by facilitating relevant research activities in the reserve	3.1	Develop and implement approvals procedure for research activities	Steering Committee, key research institutions	High	2 years
		3.2	Licence and monitor research in reserve via a steering committee	Steering Committee	High	Ongoing
		3.3	Maintain database of research licences		High	Ongoing

4.0	Increase public awareness of the core values of the reserve while providing for the protection of sensitive areas by providing opportunities for limited access to the reserve	4.1	Regulate public access via a requirement for prior written consent (permit)`		High	Ongoing
		4.2	Restrict public access to education and research purposes only		High	Ongoing
		4.3	Conduct guided activities	Friends	Medium	Ongoing
5.0	Protect values of the reserve by excluding activities which threaten or damage its values by improving signage and enforcement	5.1	Provide educational and regulatory signage at the main access points, advising of the following prohibitions: camping; littering; lighting of fires; horses, dogs and other domestic animals, use of mountain bikes and watercraft within the reserve. Advise of Discovery programs and the rationale for controls.	Waterways, Fisheries, Friends	High	2 years
		5.2	Structure patrols to advise and enforce regulations in the reserve	Waterways, Fisheries	High	
		5.3	NPWS will seek sponsorship or other mechanisms to establish an on-site presence at Towra Point, with the role being to include monitoring, education and controlling access	Friends, NGOs, community	High	1 year

Wise Use and Understanding of Wetlands: Strategic Actions (continued)

6.0	Improve implementation of management actions, an increase community and political awareness and support of management requirements and objectives	6.1	Convene regular meetings of a consultative committee comprising representatives of all relevant levels of government, the community and other stakeholders, to provide input to the implementation of the management plan	Steering Committee	High	twice yearly
		6.2	Encourage and facilitate community participation in management programmes eg. via "Friends of TPNR" and other volunteer programmes	Friends, NGOs, community	Medium	ongoing
		6.3	Promote and facilitate a scheme of training and opportunities for volunteers in bush regeneration programmes	Friends, community	High	monthly

IMPLEMENTATION

Implementation of this plan will be undertaken within the annual programmes of NPWS Sydney South Region, via the Regional Operations Plan which is prepared annually and reviewed quarterly. Priorities, determined in the context of regional and directorate strategic planning, will be subject to the availability of necessary staff and funds and to any special requirements of the NPWS Director-General or the Minister administering the Act.

Regional programmes are subject to ongoing review, within which works programs and other activities carried out in the reserve are evaluated in relation to the objectives laid out in this plan.

The environmental impact of all of the NPWS' activities within the reserve will be considered at all stages of the activity and any necessary appraisal of environmental impacts will be undertaken in accordance with established environmental assessment procedures.

Section 81 of the *National Parks and Wildlife Act* requires that this plan shall be carried out and given effect to, and that no operations shall be undertaken in relation to the nature reserve unless they are in accordance with this plan.

However, if after adequate investigations, operations not included in the plan are found justified, this plan may be amended in accordance with section 76(6) of the Act.

Implementation of cooperative actions between NPWS and other agencies will occur through the provision of letters of support and commitment to implementation by the participating stakeholders, signed off by each agency at an appropriate level.

As a guide to the orderly implementation of this plan, relative priorities for activities are summarised in the section entitled 'Management' in the plan. NPWS will provide and support a regular forum for the steering committee and 'Friends of Towra Point Nature Reserve' to input to and assist implementation of this plan of management and to monitor progress on an annual basis.

This plan of management is part of a management system developed by the NPWS. The system includes the *National Parks and Wildlife Act, 1974*, NPWS management policies (manifested as NPWS policy manuals) which are based on established conservation and recreation philosophies, and strategic planning at NPWS corporate, directorate, and regional levels (manifested as NPWS Corporate, Central Directorate, and Sydney South Region Plans).

Performance measurement

One of the key performance measures for this plan of management will be the rate of implementation of the actions listed above in this document. In addition, there is a need for broad environmental indicators which can be used to gauge the effectiveness of NPWS management practices in maintaining and improving the environmental values of the reserve.

Standard environmental indicators are currently being developed by the NPWS for the recently introduced NPWS 'State of the Parks' reporting process. When these measures are available they will be employed in relation to the reserve. In the interim, and recognising that the standard measures will not meet all of the specific requirements of Towra Point Nature Reserve, the following attributes will be measured by NPWS Sydney South Region staff on an annual basis. Some of these will require the prior establishment of 'baseline' state of the environment information as a reference point for management success.

ATTRIBUTE	ACTION	PERFORMANCE MEASURE
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Animal diversity and abundance	Biodiversity survey	Regular counts of numbers of species and individuals
	Establish database	Database established
Plant and vegetation diversity	Biodiversity study (primarily vascular plants)	At least 1 survey conducted during first 2 years
	Establish data on GIS	Vegetation maps on GIS
Stability of Towra Beach and associated intertidal areas	Map position of shoreline over time and monitor at regular intervals (via aerial photographs and established datum)	Rate of erosion is reduced
Invasive weeds	Map areas of infestations of invasive weed species	Areas mapped and regularly updated
	Implement weed control programme	Weed management undertaken at least 2 days/month Meet annual weed reduction/control targets
Feral animals	Establish pest monitoring stations	Feral species and activity identified in the reserve
	Identify areas/species sensitive to impacts of feral animals	Control of feral species underway at identified locations
	Undertake fox baiting at Spit Island and at least twice monthly between August and February each year	Little tern colony not significantly affected by predator activity
Aboriginal cultural heritage	Establish Aboriginal stakeholders group/forum	Group/forum established
Restriction of prohibited activities	Implement signage and increase law enforcement activities	Reduction in illegal use of the reserve

Abbreviations

- ALS - Australian Littoral Society
- AMSA - Australian Maritime Safety Authority
- ANPWS - Australian National Parks and Wildlife Service
- CAMBA - China - Australia Migratory Bird Agreement
- Council - Sutherland Shire Council
- DLWC - NSW Department of Land and Water Conservation

- DT - Department of Transport
- DUAP - NSW Department of Urban Affairs and Planning
- EA - Environment Australia
- EPA - NSW Environmental Protection Authority
- Fisheries - NSW Fisheries
- Friends - Friends of Towra Point Nature Reserve
- EEdC - NSW Department of School Education Botany Bay Environmental Education Centre
- GIS - Geographical Information System
- IUCN - International Union for the Conservation of Nature
- JAMBA - Japan - Australia Migratory Bird Agreement
- NGO - non-government organisation
- NPA - National Parks Association
- NPWS - NSW National Parks and Wildlife Service
- NSW - New South Wales
- ORRCA - Organisation for the Rescue and Rehabilitation of Cetaceans, Australia
- REP - Regional Environmental Plan
- SACL - Sydney Airports Corporation Limited
- SPC - Sydney Ports Corporation
- SPCC - NSW State Pollution Control Commission
- Steering Ctee/TPSC - Towra Point Steering Committee
- TEC - Total Environment Centre
- TPNR - Towra Point Nature Reserve
- TSC Act - Threatened Species Conservation Act 1995 (NSW)
- Waterways - NSW Waterways
- WIRES - Wildlife Information, Rescue and Emergency Service

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