



**Office of  
Environment & Heritage**  
NSW National Parks & Wildlife Service



**MARRAMARRA NATIONAL PARK  
MUOGAMARRA NATURE RESERVE AND  
MARROTA HISTORIC SITE  
PLAN OF MANAGEMENT**

**NSW National Parks and Wildlife Service**

**December 1998**

**Amended September 2016**

**A plan of management for Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site was adopted by the Minister for the Environment on 14 December 1998.**

**An amendment to the plan was adopted by the Minister for the Environment on 13 September 2016. This document combines the 1998 plan with the amendment.**

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#### **Acknowledgments:**

This plan of management was prepared by the Planning Unit, Field Services Division, in association with staff of the Hornsby Sub-district of the North Metropolitan District of the National Parks and Wildlife Service.

Special acknowledgment is made of the assistance given in the preparation of this plan of management by the North Metropolitan District Advisory Committee and all those who provided submissions on the draft plan.

NPWS would like to thank those people who took the time to make a submission on the draft version of the plan of management amendment that was exhibited in 2013.

Published by:

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ISBN 978-1-76039-556-8

OEH2016/0655

October 2016

Printed on recycled paper

## **FOREWORD**

Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site are located on the northern outskirts of Sydney, in an area west of the Pacific Highway, east of Old Northern Road and south of the Hawkesbury River.

The three reserves are part of a chain of reserves across northern Sydney which provide a scenic backdrop to the lower Hawkesbury River and conserve important plant and animal communities. They also contain interesting geomorphic features, a large number of Aboriginal sites and a range of historic features, all of which make them important areas for environmental education and research.

This plan of management provides for the protection of the important natural values of Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site through weed control, bush regeneration and fire management. It also provides for the protection of cultural heritage through the preparation of conservation assessments and plans and increased involvement of the Aboriginal community.

Existing controls on access to Muogamarra Nature Reserve consistent with its long history as a sanctuary, and to Marramarra National Park so that it complements parks in northern Sydney, will be continued. A Memorandum of Understanding will be developed with local Aboriginal groups in regard to access to Maroota Historic Site.

This plan of management establishes the scheme of operations for Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site. In accordance with the provisions of Sections 75 and 76 of the *National Parks and Wildlife Act 1974*, this plan of management is hereby adopted.

**Pam Allan, MP**

**Minister for the  
Environment**

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## 1. INTRODUCTION

The National Parks and Wildlife Act 1974, (NPW Act) requires that a plan of management be prepared for each national park, nature reserve and historic site. A plan of management is a legal document that outlines how the area will be managed.

The procedures for the adoption of a plan of management are specified in the Act and involve five stages:

- \* The Director-General gives notice that a plan of management has been prepared.
- \* The plan is placed on public exhibition for at least one month and any person may comment on it.
- \* The plan and copies of all representations are referred to the National Parks and Wildlife Advisory Council (Advisory Council) for consideration.
- \* The Director-General submits the plan, together with the recommendations of the Advisory Council, to the Minister.
- \* The Minister may adopt the plan with or without amendment after considering the recommendations of the Advisory Council or may refer the plan back to the Director-General and Council for further consideration.

A plan of management for Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site was placed on public exhibition from the 1 August to 27 October 1997. The exhibition of the new plan attracted 498 submissions which raised a total of 19 issues. All comments received were referred to the Advisory Council for its consideration and advice. The comments and suggestions of the Advisory Council were in turn considered by the Minister before adopting this plan of management for Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site.

An amendment to the plan of management, relating to horse riding access and bush camping, was placed on public exhibition from the 31 May to 26 July 2013. The exhibition of the amendment attracted 28 submissions. All comments received were referred to the Regional Advisory Committee and the Advisory Council for consideration and advice. The comments and suggestions of the Regional Advisory Committee and the Advisory Council were in turn considered by the Minister before adopting the amendment to the plan of management for Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site.

No operations may be undertaken within Marramarra National Park, Muogamarra Nature Reserve or Maroota Historic Site unless they are in accordance with this plan.

For additional information or enquiries on any aspect of the plan or the management of Marramarra National Park, Muogamarra Nature Reserve or Maroota Historic Site, please contact the Valleys Area office in Lane Cove National Park or by phone on (02) 8448 0400.

## **2. MANAGEMENT CONTEXT**

### **2.1 THE PLANNING FRAMEWORK**

#### **2.1.1 National Parks in New South Wales**

The national park concept was introduced into Australia through the establishment of Royal National Park in 1879.

For the purposes of preparing plans of management the National Parks and Wildlife Service has adopted the International Union for the Conservation of Nature and Natural Resources (IUCN) 1994 definition of a national park:

“A natural area of land and/or sea, designated to (a) protect the ecological integrity of one or more ecosystems for present and future generations, (b) exclude exploitation or occupation inimical to the purposes of designation of the area, and (c) provide a foundation for spiritual, scientific, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible.”

National parks are part of the regional pattern of land use. Many land uses throughout the region, for example forestry, mining and agriculture, require substantial modification of the natural environment. Management of national parks, however, aims at minimising disturbances to the natural environment.

#### **2.1.2 Nature Reserves in New South Wales**

Nature reserves in New South Wales arose out of fauna reserves. Fauna reserves were first established under the Fauna Protection Act of 1948. Under the National Parks and Wildlife Act 1967 fauna reserves were reclassified as nature reserves. The 1967 Act has since been replaced by the National Parks and Wildlife Act, 1974 (NPW Act).

Under the NPW Act, nature reserves are areas of special scientific interest containing wildlife or natural environments or natural phenomena.

The purposes of nature reserves are defined in the NPW Act as:

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

The IUCN defines a strict nature reserve as:

“An area of land and/or sea possessing some outstanding or representative ecosystems, geological or physiological features and/or species, available primarily for scientific research and/or environmental monitoring.”

Nature reserves are valuable refuge areas where natural processes, phenomena and wildlife can be studied. Nature reserves differ from national parks which include as a major objective the provision of opportunities for outdoor recreation.

### **2.1.3 Historic Sites in New South Wales**

Historic sites are areas reserved under the NPW Act which are “sites of buildings, objects, monuments or events of national significance or areas in which relics, or Aboriginal places, of special significance are situated”. Such areas are vested in the Director-General and are managed by the National Parks and Wildlife Service.

National Parks and Wildlife Service policies for the management of historic sites, and for the management of historic places within other reserve categories, are based on the Australia ICOMOS Charter for the Conservation of Places of Cultural Significance (the Burra Charter, 1981). This is a set of principles adopted by Australia ICOMOS (International Committee on Monuments and Sites) to guide the conservation and care of cultural heritage.

National Parks and Wildlife Service policies for management of Aboriginal sites are based on a set of principles which include acknowledgment that Aboriginal people should participate in decision making and management of sites and places of cultural importance, and have cultural authority and self-determination to control the protection, preservation and promotion of their culture and heritage.

## **2.2. MARRAMARRA NATIONAL PARK, MUOGAMARRA NATURE RESERVE AND MAROOTA HISTORIC SITE**

### **2.2.1 Location and Regional Context**

Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site (hereafter called “the reserves”) are all located on the northern outskirts of Sydney, in an area west of the Pacific Highway, east of Old Northern Road and south of the Hawkesbury River. All three reserves are within the Hornsby Local Government Area.

**Marramarra National Park** comprises an area of 11,759 hectares and was reserved in 1979 to a depth of 150 metres below the surface. It is about 40 kilometres northwest of the central business district of Sydney. The park is bounded by the Hawkesbury River, Berowra Creek, Old Northern Road and the villages of Arcadia and Berrilee. Marramarra National Park was originally proposed in order to protect the mangroves along Berowra Creek and the Hawkesbury River, but when reserved

in 1979 the park only went down to mean high water and the mangroves were not included within the park.

Access to Marramarra National Park is available along Old Northern Road and Canoelands Road at Glenorie, Bloodwood Road at Arcadia, and along Singleton Road at Wiseman's Ferry. Boat and canoe access to the park is possible along Marramarra Creek, Berowra Creek and the Hawkesbury River. Landing facilities are available at Gentlemans Halt.

**Muogamarra Nature Reserve** covers an area of approximately 2,274 hectares on the eastern side of Berowra Creek opposite Marramarra National Park. The nature reserve lies approximately 40 kilometres north of Sydney and is bounded by the Hawkesbury River, Berowra Creek, the Pacific Highway and the townships of Berowra Heights and Cowan. Muogamarra Nature Reserve was dedicated in 1969 over the Muogamarra Sanctuary, which was established in 1934, and the Sir Edward Hallstrom Faunal Reserve established in 1960. Access to Muogamarra Nature Reserve is off the Old Pacific Highway north of Cowan.

**Maroota Historic Site** was reserved in 1983 to protect Aboriginal art and engravings. It is separated from Marramarra National Park by Laughtondale Road which forms one boundary of the site. On other sides it adjoins Crown land and private property. It is approximately 60 kilometres north-west of Sydney near the township of Wisemans Ferry. Maroota Historic Site covers an area of 32.62 hectares and is reserved to a depth of 150 metres.

Marramarra National Park and Muogamarra Nature Reserve are two of a group of predominantly sandstone national parks and nature reserves protecting the foreshores and islands of the lower Hawkesbury River. Other parks in this group are Ku-ring-gai Chase, Dharug, Brisbane Water, Popran and Bouddi National Parks and Lion Island, Long Island and Spectacle Island Nature Reserves. Large areas of open space managed by Hornsby Council, including the Berowra Valley Bushland Park and Fagan Park, lie adjacent to and complement the national park system.

Approximately 4,000 hectares of Crown land to the south of Marramarra National Park has been proposed at times for addition to the national park. The addition of this area would protect the upper catchments of a number of creeks which flow into the park, expand the area of protected native vegetation, increase the wildlife conservation values of the park and provide increased protection to a number of Aboriginal sites in the area.

The Lower Hawkesbury region is adjacent to both the rapidly expanding Central Coast region and north-west sector of Sydney. Residential communities adjoining the reserves include Canoelands, Arcadia, Maroota, Glenorie, Cowan and Berowra Heights. In addition there are small communities along the Hawkesbury River and Berowra Creek which adjoin the reserves and have water access only, including Sunny Corner, Coba Point, Milsons Passage, Fishermans Point and Pumpkin Point. Housing, recreation, tourism and transport facilities are all growing in or near to the

reserves and it is likely that there will be increasing pressure on the reserves in the future.

### **2.2.2 Importance of Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site**

Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site lie on the Hornsby plateau, a major geological structure consisting almost entirely of horizontally bedded sedimentary rocks. A number of erosion cycles have produced a generally flat surface. A final, vigorous period of erosion by the modern Hawkesbury/Nepean River produced the present spectacular foreshore landscape along the Hawkesbury River, much of which is protected by the national park and nature reserve on the southern side of the river.

In addition, the three reserves are part of a chain of conservation reserves across northern Sydney which demonstrate changes in vegetation along a climatic gradient from the coast to the Blue Mountains within the same geological system (Thomas & Benson, 1985).

Both Marramarra National Park and Muogamarra Nature Reserve contain vegetation types which are not well represented in other national parks or nature reserves in the Sydney Basin, including estuarine and saltmarsh communities and vegetation on alluvial and volcanic soils. Eight threatened plant species and twelve uncommon plant species have been identified in the reserves despite no systematic survey having been undertaken.

Muogamarra Nature Reserve is particularly important as it conserves a relatively undisturbed sample of the Hawkesbury Sandstone environment. It was because of this that it was listed on the Australian Heritage Commission's Register of the National Estate. The reserve has enjoyed strict protection since well before development pressures in the region began to grow. There are few tracks, no major roads and visitor use is lower than for nearby national parks. Most of the nature reserve is therefore relatively free from weeds.

The three reserves contain many interesting native animals, including animals listed as vulnerable under the Threatened Species Conservation Act 1995 such as the koala (*Phascolarctos cinereus*), tiger quoll (*Dasyurus maculatus*), powerful owl (*Ninox strenua*), glossy black cockatoo (*Calyptorhynchus funereus*), red-crowned toadlet (*Pseudophryne australis*) and giant burrowing frog (*Heleioporus australiacus*).

Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site contain a diversity of Aboriginal site types including rock engravings, grinding grooves, scarred trees, cave art, middens, stone arrangements and occupational deposits. Many of these sites are of special importance to the Aboriginal community as well as being of high archaeological value.

Devils Rock in Maroota Historic Site is listed on the Register of the National Estate. It contains over 60 engravings, 20 grinding grooves and two caves with art and occupational deposits. It was first protected in 1952 under the Crown Lands Consolidation Act as a reserve “for preservation of Aboriginal carvings and drawings”. In 1971 it was proposed as a Protected Archaeological Area or Aboriginal Area, and in 1979 it was considered by the Aboriginal Arts Board as a possible site for an interpretive museum. The museum proposal never eventuated, and since that time access to Maroota Historic Site has been restricted to Aboriginal people and approved educational groups.

Marramarra National Park and Muogamarra Nature Reserve contain a number of European historic sites. These sites include evidence of early pioneers and their endeavours and of the growth of the colony at Sydney. They include the Peats Bight Road which was constructed around 1840 by convict labour, the Peats Ferry Road which was constructed in the early 1850s, an old gatehouse moved to the site from Government House in Sydney, the site of a tent school associated with the construction of the Pacific Highway in 1927, the ruins of a number of buildings and landscape features associated with past agricultural use of the area, and paths and lookouts constructed for visitors in the 1930s. Some of these places are of high historical and archaeological importance.

The nature reserve also has a long history of protection dating from the 1930s when J.D. Tipper, an early conservationist, managed the now northern end of the reserve as a private sanctuary. It was Tipper who named his sanctuary “Muogamarra”, which he believed was an Aboriginal word meaning “preserve for the future”. In the 1960s the area around Cowan, south of Tipper’s sanctuary, was dedicated as the Sir Edward Hallstrom Faunal Reserve and managed by the Fauna Protection Panel. The amalgamation of the two reserves as Muogamarra Nature Reserve in 1969 resulted in the area continuing to be protected for nature conservation purposes with minimal development or human impact except in limited areas.

While the National Parks and Wildlife Service manages a number of national parks with walking tracks and picnic facilities within the Sydney metropolitan area, the supply of more natural areas for bushwalking and camping is minimal. Marramarra National Park provides opportunities for more self-reliant recreation in close proximity to Sydney.

The significance of Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site can be summarised as:

**Landscape and Water Quality Value:**

They are part of a system of national parks and nature reserves which protects regionally significant landscapes along the lower Hawkesbury River.

The reserves protect the catchments of a number of streams which flow into Berowra Creek and the lower Hawkesbury River.

**Nature Conservation Value:**

The national park, nature reserve and historic site protect threatened and restricted native plant species and threatened animal species.

The national park and nature reserve protect small areas of saltmarsh, estuarine communities, and vegetation on alluvial and volcanic soils which are not otherwise well protected in the region.

Muogamarra Nature Reserve is listed on the Register of the National Estate for its value as a representation of Hawkesbury Sandstone ecosystems.

They are part of a chain of conservation reserves across the northern Sydney region which demonstrate variations in vegetation along a climatic gradient from the coast to the mountains within the same geological system.

**Cultural Heritage Value:**

The three reserves protect a large number of Aboriginal sites which are of archaeological value and cultural significance to Aboriginal communities as well as the wider community.

Devils Rock within Maroota Historic Site and a rock shelter within Marramarra National Park are listed on the Register of the National Estate for their Aboriginal art.

The reserves conserve historic features and places which demonstrate aspects of early European settlement, transport and patterns of land use along the lower Hawkesbury River.

Muogamarra Nature Reserve represents an important aspect of the early history of conservation in Australia.

**Environmental Education Value:**

The proximity of the three reserves to northern and north-west Sydney, their geomorphological features, Aboriginal sites, historic features and range of vegetation communities make them important areas for environmental education.

Muogamarra Nature Reserve has a long history of environmental education which is continued through the Muogamarra Field Studies Centre and the annual open days.

**Research Value:**

The nature reserve also has a long history as a site for scientific research, which is continued through the work undertaken at the University of New South Wales Cowan Research Station within Muogamarra Nature Reserve.

**Recreation Value:**

The naturalness, comparative isolation and lack of facilities of Marramarra National Park offer important outdoor recreation opportunities for those people wishing for a more remote bushwalking experience within the Sydney metropolitan area.

### 3. OBJECTIVES OF MANAGEMENT

#### 3.1 GENERAL OBJECTIVES FOR MANAGEMENT

The following general objectives are derived from the National Parks and Wildlife Act and relate to the management of national parks in New South Wales:

- \* the protection and preservation of scenic and natural features;
- \* the conservation of wildlife;
- \* the maintenance of natural processes as far as is possible;
- \* the preservation of Aboriginal sites;
- \* the conservation of historic features;
- \* the encouragement of scientific and educational enquiry into environmental features and process, Aboriginal and historic features and park use patterns; and
- \* the provision of appropriate recreation opportunities.

The general objectives in the NPW Act relating to the management of nature reserves in New South Wales include all but the last of the objectives listed above. Rather than the provision of appropriate recreational opportunities, the general objective is to promote the appropriate use of the nature reserve.

The general objectives relating to the management of historic sites in New South Wales are:

- \* the preservation of the historic site and the preservation of any historic structure or object;
- \* the preservation of any relic or Aboriginal place;
- \* the conservation of wildlife;
- \* the encouragement and regulation of the appropriate use, understanding and enjoyment; and
- \* the encouragement of scientific and educational enquiry.

### 3.2 SPECIFIC OBJECTIVES

In addition to the general objectives outlined in section 3.1, the following more specific objectives will be adopted for Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site:

- \* to manage the three reserves as part of a system of national parks, state recreation areas, nature reserves and historic sites which together protect the natural and cultural heritage, water catchment and scenic values of the lower Hawkesbury River;
- \* to manage the three reserves so that they complement other parks in northern Sydney in regard to public access and use;
- \* to provide opportunities within Marramarra National Park for bushwalking, bush camping and self-reliant recreation in a natural environment; and
- \* to provide opportunities in Muogamarra Nature Reserve and Maroota Historic Site for education and research into the natural environment and cultural heritage on a controlled basis.

### 3.3 OVERALL STRATEGY

In order to implement the above objectives, the following key strategies will be implemented in Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site:

- \* Continue to limit access to Muogamarra Nature Reserve and Maroota Historic Site to Aboriginal people, educational groups, researchers and interested people who attend the open days and guided activities;
- \* Provide a limited number of walking tracks within the three reserves so as to contain impacts;
- \* Provide basic facilities for camping at two sites within Marramarra National Park which are accessible only by walking track and boat;
- \* Control large groups so as to minimise environmental degradation and provide opportunities for enjoyment of the natural qualities of Marramarra National Park; and
- \* Continue to work with Hornsby Council, the Metropolitan Local Aboriginal Land Council, other local Aboriginal groups and individuals including the Darug Tribal Aboriginal Corporation, neighbours, the field studies centre, university research station and other interested organisations and groups to improve understanding and management of the natural and cultural values of the three reserves.

## 4. POLICIES AND FRAMEWORK FOR MANAGEMENT

This section contains the policies and framework for the management of Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site together with relevant background information. Policies are summarised under the following headings:

- \* The Natural and Cultural Landscape; and
- \* Promotion and Use of the Reserves.

The policies established in this plan of management provide the framework for management consistent with anticipated resources available to the National Parks and Wildlife Service and anticipated community trends over the next five to ten years.

The actions identified are those to which priority will be given in the foreseeable future. Other management actions may be developed over the life span of this plan of management consistent with the policies set out in the plan.

Where not specifically provided for in this plan of management, the management of Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site will also be in accordance with the National Parks and Wildlife Act and with general Service policies.

### 4.1 THE NATURAL AND CULTURAL LANDSCAPE

#### 4.1.1 Geology, Soils and Hydrology

Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site lie within the Sydney Basin, a major structural unit of Permian and Triassic age (270-180 million years ago) consisting almost entirely of horizontally bedded sedimentary rocks. The Sydney Basin extends over the central eastern section of New South Wales from about the Hunter Valley in the north to Batemans Bay in the south and includes the Central Tablelands west of Sydney. The three reserves are located on the south-western section of the Hornsby Plateau; a major subdivision of the Sydney Basin.

The reserves underwent a number of erosion cycles during the Tertiary period which produced the distinctive, almost flat plateau surfaces. A final, vigorous period of erosion by the modern Hawkesbury/Nepean River, during the last three million years when sea levels were much lower because of the ice ages, deeply entrenched the Hawkesbury River and its major tributaries including Berowra Creek into the existing land surface. The present spectacular foreshore landscape is a product of the drowning of the river valleys by the sea about 6,000 years ago following the end of the last glacial period.

Marramarra National Park and Muogamarra Nature Reserve contribute significantly to the considerable scenic quality of the lower Hawkesbury River, as seen from within the park and reserve and from the waterways and other vantage points outside the reserves. They also occupy a significant proportion of both the eastern and western shores of the lower reaches of Berowra Creek.

The reserves can be divided into three major land units:

- **Hawkesbury Sandstone** is the most extensive land unit within Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site and forms the extensive plateau surface within the three reserves and the dramatic cliff-lines along the Hawkesbury River. Soil types reflect the topography with deep yellow earths on broad ridges and shallower sandy soils on narrower ridge tops and on valley slopes.
- the **Narrabeen Group of sedimentary rocks** underlies the Hawkesbury Sandstone and only minor outcrops occur along the Hawkesbury River at the lowest elevations within the park and reserve. Soils derived from this series are relatively deep clay soils.
- **volcanic diatremes** occur in Muogamarra Nature Reserve at Peats Crater and Peats Bight. These crater-like depressions were filled with igneous breccia which has since been largely eroded. A volcanic dyke, which may be of different age, connects the two craters. Another dyke cuts west from Muogamarra into Ku-ring-gai Chase National Park. Two diatremes (Blanche Crater and Marramarra Crater) also occur in Marramarra National Park north of the entrance of Marramarra Creek. The volcanic rocks of the diatremes weather to form a deep red soil with a higher nutrient content than the surrounding areas.
- **alluvial deposits** are a major feature of both Marramarra National Park and Muogamarra Nature Reserve. These deposits occur on the river flats at Marramarra Creek, Gentlemans Halt, Pumpkin Point Creek and Coba Bay within Marramarra National Park, and at Joe Crafts Bay, Bujwa Bay, Kimmerikong Bay and Peats Bight within Muogamarra Nature Reserve. These estuarine sediments are mainly sandy and saline muds.

There is also a narrow strip of **Wianamatta Shale** along Coba Ridge in Marramarra National Park. An extensive area of Wianamatta Shale has been cleared and developed along Canoelands Road outside the park.

The sandstone soils which predominate over most of the three reserves are of low fertility and highly susceptible to erosion. When combined with steep slopes, the potential for disturbance causing soil loss and associated impacts increases significantly and imposes significant constraints on recreation and management use of the reserves.

The major stream within Marramarra National Park is Marramarra Creek which flows eastwards into Berowra Creek from the Old Northern Road. A substantial area of the

upper catchment of this creek is developed and excluded from the park, particularly around Canoelands Road and the Old Northern Road. Many of the tributary streams which flow into Marramarra Creek are however totally protected within the park.

To the north of Canoelands Ridge two creek systems drain north into the Hawkesbury River: Dalgetys Creek with its major tributary Coopers Creek, and the Ashdale/Layburys Creek system. Neither of the headwaters of these systems are protected totally within the park.

A small stream, Pumpkin Point Creek, flows into the Hawkesbury River in the northeast sector of Marramarra National Park. It is totally protected within the park, as is most of the drainage system flowing into Coba Bay/Donnybrook. Minor streams fall directly into Berowra Creek and the Hawkesbury River from the escarpment.

Muogamarra Nature Reserve has four streams which flow east to west into Berowra Creek. From north to south these are Muogamarra Creek (and the unnamed tributary flowing through Peats Crater), Kimmerikong Creek, Bujwa Creek and Joe Crafts Creek. Only Muogamarra Creek and its tributaries and some minor streams which fall directly into the Hawkesbury River from the escarpment are totally included and therefore protected within the nature reserve.

Maroota Historic Site contains the headwaters of one branch of Mill Creek.

Substantial portions of catchments in the three reserves are affected by various other land uses, particularly urban development in the case of Muogamarra Nature Reserve and agricultural development and quarrying in relation to Marramarra National Park and Maroota Historic Site. Recently Hornsby Council and the Environmental Protection Agency have been undertaking monitoring of water quality in Marramarra Creek. Whole catchments which have not been developed or disturbed are a very rare occurrence in the immediate area of Sydney and the continued protection of these catchments within Marramarra National Park and Muogamarra Nature Reserve is a high priority.

The Catchment Management Act came into effect in 1989. Total catchment management provides an umbrella framework in which to manage land to achieve cleaner water, less soil erosion, improved vegetation cover, the maintenance of ecological processes and a balanced and healthier environment. It also provides a focus to balance conservation needs and development pressures and encourages a more aware and involved community. The Hawkesbury-Nepean Catchment Management Trust and the Berowra Catchment Management Committee, of which the National Parks and Wildlife Service is a member, are an important means of protecting the water catchment values of the streams within Marramarra National Park and Muogamarra Nature Reserve. In addition, the Sydney Regional Environmental Plan No. 20, which covers the Hawkesbury and Nepean Rivers, emphasises the importance of protecting water quality, significant vegetation and habitats, scenic quality and environmental heritage.

Some areas of the national park, nature reserve and historic site were formerly used for grazing, quarrying, soil extraction, access and other purposes which, although they are no longer permitted, have increased soil erosion, catchment degradation and the introduction and spread of weeds. In addition, a number of operating quarries also adjoin the national park, and sometimes encroach on the park, and the use of the reserves for powerlines, pipelines, roads and for various recreational activities have impacted on the protection of the reserves. These include boats travelling at high speed on the creeks and bays within the national park and nature reserve and illegal use of trail bikes on and off tracks. The illegal removal of bush rock has resulted in the loss of most of the loose rock from near the boundaries of the national park, created new tracks into the park, increased erosion and damaged the habitat of a number of animals. Although this activity has declined in recent years, ongoing vigilance and law enforcement is required to ensure no further damage occurs.

### **Policies**

- \* The landscape and scenic qualities of Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site, when viewed from both within and from outside the reserves, will be protected.
- \* Catchments within the national park and nature reserve which have minimal or no development or disturbance will continue to be protected from recreational or management developments. These catchments include:
  - the southern tributaries of Marramarra Creek;
  - Pumpkin Point Creek;
  - streams flowing into Coba Bay and Donnybrook Bay; and
  - streams in Muogamarra flowing north into the Hawkesbury River.
- \* All developments and earth works within Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site will be designed and undertaken in a manner which minimises erosion, use compatible material and incorporate appropriate soil erosion and sedimentation control works.
- \* No further blue metal surfacing will be undertaken on roads within the three reserves.
- \* The National Parks and Wildlife Service will continue to support the Berowra Catchment Management Committee and the principles of total catchment management within Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site.
- \* Controls on recreational and other uses of the national park, nature reserve and historic site will be implemented where an activity is degrading the soil and catchment values of the park.

## Actions

- \* The National Parks and Wildlife Service will work with Hornsby Council and other agencies to monitor and improve the water quality of streams entering the national park and nature reserve.
- \* The National Parks and Wildlife Service will seek the co-operation of the Berowra Catchment Management Committee and Hornsby Council to minimise the impacts of developments which compromise the protection of catchments or the scenic values of the reserves.
- \* The Waterways Authority will be approached to institute a “no wash” zone in Joe Crafts Bay, Bujwa Bay, Big Bay and in Marramarra Creek upstream of Big Bay.
- \* Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site will be surveyed for illegal tracks and other disturbances, and action taken to rehabilitate these areas.

### 4.1.2 Native Plants

The vegetation of Muogamarra Nature Reserve and part of Marramarra National Park has been mapped by the Botanic Gardens (Thomas & Benson 1985 and Benson & Howell 1994 respectively). Over 900 species were identified in Muogamarra as early as 1945, while over 400 species have been identified in Marramarra National Park despite limited survey and research work. Maroota Historic Site has not been formally surveyed. The 1985 survey of Muogamarra Nature Reserve noted that it was important in a local and regional context because it conserved a large area of Hawkesbury Sandstone vegetation which had undergone little disturbance and is in good condition. Marramarra National Park was identified as providing an important link between the coastal sandstone vegetation of Ku-ring-gai Chase and Muogamarra and the more inland vegetation of the Blue Mountains and Wollemi regions.

The vegetation found on the ridges, plateaus and dry exposed hill slopes within Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site is generally typical of that in other sandstone reserves within the sub-region and is dominated by a woodland of red bloodwood (*Corymbia gummifera*), scribbly gum (*Eucalyptus haemastoma*), Sydney red gum (*Angophora costata*) and narrow-leaved stringybark (*E. oblonga*). To the north-west of the national park and in the historic site the vegetation changes to a woodland of red bloodwood, Sydney red gum, yellow bloodwood (*Corymbia eximia*) and grey gum (*E. punctata*). Small patches of open scrub with dwarf apple (*Angophora hispida*) occur on the drier ridges in Marramarra National Park and Maroota Historic Site.

In sandstone gullies and on sheltered south and east facing sandstone hillsides are open forests of Sydney peppermint (*E. piperita*), Sydney red gum (*Angophora costata*), blackbutt (*E. pilularis*) and turpentine (*Syncarpia glomulifera*). The black

sheoak (*Allocasuarina littoralis*) is a common smaller tree of this community. In the deeper gullies are closed forests of coachwood (*Ceratopetalum apetalum*), water gum (*Tristaniopsis laurina*), lilly pilly (*Acmena smithii*) and other rainforest species.

The park also contains a number of communities which are poorly protected in the Hawkesbury Valley. These include:

- **Diatreme vegetation** of Sydney blue gum (*E. saligna*), blue-leaved stringybark (*E. agglomerata*) and rough-barked apple (*Angophora floribunda*). Along the volcanic dyke which connects Peats Bight and Peats Crater, the richer volcanic soils support a closed forest similar to that found in the deeper sandstone gullies. Little remains of the diatreme vegetation of Peats Crater and Peats Bight due to early clearing and use for farming and grazing.
- **Woodlands on Narrabeen shales** are highly influenced by aspect. On sheltered south-facing areas of Narrabeen soils around the edges of Berowra Creek and the Hawkesbury River are found open forests of blue gum (*Eucalyptus deanei*), rough barked apple (*Angophora floribunda*) and associated rainforest species. The dry north-west facing slopes are characterised by rough-barked apple, grey gum (*E. punctata*) and forest oak (*Allocasuarina torulosa*). Forest oak is also found around the base of Peats Crater.
- **Hanging swamp communities** containing sedges, rushes and wet heath occur on wide rock benches with impeded drainage where the thin clay soil retains water. Only two hanging swamps are large enough to be mapped in Muogamarra Nature Reserve and only limited areas occur within Marramarra National Park.
- **Estuarine communities** containing swamp oak (*Casuarina glauca*), rushes (*Juncus kraussii*), saltmarsh and mangroves (*Avicennia marina* and *Aegiceras corniculatum*) occur on alluvial deposits and estuarine mudflats subject to tidal inundation, such as along Marramarra Creek (including Big Bay), Coba Creek and Pumpkin Point Creek in Marramarra National Park and around Peats Bight in Muogamarra Nature Reserve. As most of the national park and nature reserve reach only to high water mark, there are very few mangroves within the reserves.
- **Seagrass communities** - Joe Crafts Bay in Muogamarra Nature Reserve contains the only eelgrass (*Zostera capricornia*) beds within the three reserves.

Eight plant species, which are identified as endangered or vulnerable under the *Threatened Species Conservation Act 1995* have been recorded in the three reserves. These are:

<i>Asterolasia elegans</i>	Endangered species which occurs in moist forest. It is restricted to northern Sydney between Laughtondale and the Colo/Portland area and has been recorded in Marramarra.
<i>Kunzea rupestris</i>	Endangered species which is indigenous to northern Sydney and restricted to the area between West Head and South Maroota. It has been recorded on sandstone ridges in Marramarra.
<i>Darwinia biflora</i>	Vulnerable species indigenous to northern Sydney between Frenchs Forest and Maroota, and to Hillside and Annangrove. Found on the clay/sandstone interface in Marramarra.
<i>Haloragis exalata</i>	Vulnerable species, generally found in damp places near water courses.
<i>Leptospemum deanei</i>	Vulnerable species which is at its known northern and western limit of distribution along Marramarra Creek.
<i>Micromyrtus blakelyi</i>	Vulnerable species restricted to northern Sydney between Muogamarra and South Maroota. Found on rocky outcrops in Marramarra and Muogamarra.
<i>Tetratheca glandulosa</i>	Vulnerable species indigenous to northern Sydney. Found mainly along ridges. Recorded in both Marramarra and Muogamarra.
<i>Zieria involucreta</i>	Vulnerable species, found on sheltered slopes within the reserves.

Under the Threatened Species Conservation Act a recovery plan and/or threat abatement plan must be prepared for endangered and vulnerable plants and animals. The purpose of a recovery plan is to promote the recovery of a threatened species, population or ecological community to a position of viability in nature. A threat abatement plan outlines the management of key threatening processes with a view to their abatement, amelioration or elimination.

Two of the above species, *Kunzea rupestris* and *Asterolasia elegans*, have had recovery plans prepared which pre-date the Threatened Species Conservation Act but still provide valuable guidelines for the management of these species. These plans emphasise restriction of access and protection from burning of the *Kunzea rupestris*, and monitoring of weeds which may threaten the *Asterolasia elegans*.

In addition to the above species listed under the Threatened Species Conservation Act, the following rare and threatened plants (Briggs & Leigh 1996) also occur in the reserves: *Acacia bynoeana*, *Boronia fraseri*, *Darwinia peduncularis*, *Lomandra fluviatilis*, *Persoonia hirsuta* and *Platysace clelandii* in Marramarra National Park; and *Boronia fraseri*, *Epacris purpurascens* var. *purpurascens*, *Lasiopetalum joyceae*, *Lomandra brevis*, *Micromyrtus blakelyi* and *Platysace clelandii* in Muogamarra Nature Reserve.

*Dampiera scottiana*, *Dodonaea multijuga* and *Prostanthera rhombea* are other plants of notable conservation significance found in the national park and nature reserve. It

is likely that further surveys will find more individuals or populations of rare and threatened plants within Marramarra National Park and Muogamarra Nature Reserve.

The National Parks and Wildlife Service is a member of the Hornsby Council Bushland Management Advisory Committee and the council, in conjunction with the Service and other councils in northern Sydney, is proposing to undertake a survey and management program for threatened species within the council's area.

## Policies

- \* As far as possible the natural abundance, structure and diversity of all native plant species and communities will be conserved. Priority will be given to the protection of:
  - threatened and uncommon plants;
  - diatreme vegetation;
  - woodlands on Narrabeen shale;
  - woodlands on Wianamatta and Hawkesbury shale;
  - vegetation occurring on ridgetops at the sandstone/shale interface;
  - hanging swamps;
  - estuarine communities; and
  - seagrass communities.
- \* All activities undertaken in the reserves will be required to minimise disturbance to native vegetation and rehabilitate any damage resulting from the activity.
- \* Only species indigenous to the reserves, and preferably locally collected seed stock, will be used in any planting or bush regeneration programs.
- \* Use of locally indigenous species on lands adjoining the reserves will be encouraged.
- \* Recovery and/or threat abatement plans will be implemented for threatened species found in the three reserves. This will include the restriction of access in the vicinity of *Kunzea rupestris* and the control of weeds in the vicinity of *Asterolasia elegans*.
- \* Research into threatened or uncommon species, or regionally significant plant communities, will be encouraged.
- \* The National Parks and Wildlife Service will continue to support the Hornsby Council Bushland Management Advisory Committee and the proposed threatened species survey and management program.
- \* Recreational use will be restricted in those parts of the reserves where such use impacts on threatened or uncommon plants or communities.
- \* No anchoring will be permitted in Joe Crafts Bay or other areas of the reserves found to contain sea grass beds.

## Actions

- \* The vegetation mapping of Marramarra National Park will be completed and a vegetation map prepared for Maroota Historic Site.
- \* The locations of plant communities with high priority for protection will be identified and recorded.
- \* Barriers will be placed on the Kulpers Track to protect the *Kunzea rupestris* plants adjoining the track.

### 4.1.3 Native Animals

There have been no systematic surveys of native animals within the national park, nature reserve or historic site. Information for all areas is limited to some long term observations within and adjacent to Muogamarra Nature Reserve and incidental observations for Marramarra National Park. No records are available for the historic site but it is likely to contain similar species to those found in the nearby national park.

Fourteen species of native mammals, sixteen reptile species and more than one hundred and forty native birds have been recorded in the nature reserve. Fourteen species of native mammals have also been recorded in the national park as well as seventy five bird species and seven species of reptiles. Coba Bay has a particularly large number of species recorded, including seven frog species and a number of reptiles.

Animals commonly seen in the three reserves include the swamp wallaby (*Wallabia bicolor*), brown antechinus (*Antichinus stuartii*), bush rat (*Rattus fuscipes*), brush tail possum (*Trichosurus vulpecula*), ring tail possum (*Pseudocheirus peregrinus*), eastern pygmy possum (*Cercartetus nanus*), echidna (*Tachyglossus aculeatus*), kookaburra (*Dacelo novaeguineae*), yellow-tailed black cockatoo (*Calyptorhynchus funereus*) and rock warbler (*Origma solitaria*).

Other animals recorded for the reserves include the sugar glider (*Petaurus breviceps*), feathertail glider (*Acrobates pygmeus*), long-nosed bandicoot (*Perameles nasuta*), platypus (*Ornithorhynchus anatinus*), lyrebird (*Menura novaehollandiae*), white-breasted sea eagle (*Haliaeetus leucogaster*) and the regionally uncommon white-throated nightjar (*Caprimulgus mystacalis*).

Of particular interest are the following observations of animals listed as vulnerable under the Threatened Species Conservation Act 1995:

- koala (*Phascolarctos cinereus*);
- tiger quoll (*Dasyurus maculatus*);
- giant burrowing frog (*Heleioporus australiacus*);
- red-crowned toadlet (*Pseudophryne australis*);

glossy black cockatoo (*Calyptorhynchus lathamii*); and powerful owl (*Ninox strenua*).

There have also been recent reports of the vulnerable masked owl (*Tyto novaehollandiae*) and sooty owl (*Tyto tenebricosa*) being sighted in the reserves.

## **Policies**

- \* The three reserves will be managed to conserve their value as habitat for native animals and as a wildlife corridor.
- \* Research into the habitat requirements, status and distribution of native animals in the park, particularly threatened and uncommon species, will be encouraged.
- \* Herbicides will not be used in areas likely to contain red-crowned toadlets or giant burrowing frogs.

### **4.1.4 Aboriginal Heritage**

Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site lie within the area occupied at the time of European settlement by the Kuring-gai and Darug Aboriginal peoples. The Darug Tribal Aboriginal Corporation recognises Berowra as the boundary between the two groups, with the Darug people to the west (Marramarra National Park and Maroota Historic Site) and the Kuring-gai people to the east of the creek (Muogamarra Nature Reserve).

European settlement was devastating to the local people. Land was cleared for farming, trees cut down to provide fuel and building materials, access lost to hunting and food gathering areas, new diseases introduced, and conflicts with the new settlers meant that within 30 years of the arrival of the First Fleet, Aboriginal communities were destroyed.

Much of the evidence of their traditional way of life has been destroyed by the development of the city. Aboriginal sites which have survived provide the only indications of the traditional Aboriginal life within the area.

There has been no systematic survey of Aboriginal sites within either Marramarra National Park or Muogamarra Nature Reserve. Shell middens in the area have been dated to approximately 12 000 years ago. Only eighty sites have been recorded in the two reserves to date. They include cave art, engravings, grinding grooves, middens and other occupational deposits and stone arrangements.

One engraving site in Muogamarra Nature Reserve surrounds a natural ironstone basin and includes over 30 figures, whales, kangaroos and other animals. Grinding grooves are also present on the site. This site is easily accessible and frequently used by educational groups. Another four engraving sites within the nature reserve and middens along the Hawkesbury River are also used by educational groups.

Some interesting cave art sites are found in Marramarra National Park near Canoelands Road where the style of art is significantly different to that found in Muogamarra Nature Reserve and Ku-ring-gai Chase National Park to the east of Berowra Creek. One site, Mondels Cave, has been placed on the Register of the National Estate in recognition not only of the art itself but also of some pioneer conservation work that was undertaken on the site. Another site, Coat of Arms Cave, is near a major road and may need protective works to prevent vandalism.

Maroota Historic Site contains a number of rock platforms with rock engravings and one shelter with art. Devils Rock within Maroota Historic Site has been listed on the Register of the National Estate for its large and impressive grouping of engravings. These include over 60 figures, 20 grinding grooves and an engraving of a sailing ship from the brief period of Aboriginal/European contact. Maroota Historic Site also contains two shelters containing stencils, art and occupational deposits. The historic site is considered to have high scientific potential because it contains such a large number of engravings and other art within a very small area. In 1979 it was proposed to build a domed museum over Devils Rock to protect the engravings and to facilitate interpretation of the site since many of the engravings are very faint and difficult to see. Nothing came of this proposal and public access has been restricted to protect the site.

The Aboriginal sites and places within the reserves are significant to local Aboriginal people, both as evidence of the traditional way of life and for education of their children and the wider public. The National Parks and Wildlife Service has the legislative responsibility for the conservation and management of Aboriginal sites, but its policies recognise that Aboriginal people have the right to make decisions about Aboriginal heritage management and the presentation of information about Aboriginal culture and history.

The three reserves fall within the area of the Metropolitan Local Aboriginal Land Council, and other Aboriginal groups including the Darug Tribal Aboriginal Corporation also have an interest in the area. These groups have a special interest in the management of Aboriginal sites within the reserves and plays an important role in providing advice to the Service about the management and conservation of Aboriginal sites.

Public access to Aboriginal sites within the three reserves has not been promoted by the Service other than for educational or research purposes. This is because the isolation of the sites makes them vulnerable to vandalism, or they are located in a nature reserve which has limited access for other reasons. Access to, and interpretation of, selected Aboriginal sites within nearby Ku-ring-gai Chase National Park and Brisbane Water National Park is promoted as part of a regional interpretation strategy.

## **Policies**

- \* Aboriginal sites within the reserves will be preserved and managed in partnership with Aboriginal people.

- \* Any work with the potential to impact on Aboriginal sites, including fire and pest management works, will be preceded by an archaeological assessment. Works will be modified as necessary to avoid impacting on Aboriginal sites.
- \* Access to Aboriginal sites will only be promoted if the sites can be adequately protected from damage and if access to the sites is endorsed by the Metropolitan Local Aboriginal Land Council and where applicable the Darug Tribal Aboriginal Corporation.
- \* Access to Maroota Historic Site will be restricted to people approved by the Metropolitan Local Aboriginal Land Council and the Darug Tribal Aboriginal Corporation. This will be implemented by means of a Memorandum of Understanding between the Land Council, the Corporation and the National Parks and Wildlife Service.
- \* Access to sites in Muogamarra Nature Reserve will be restricted to Aboriginal people, approved educational/study groups and sites agreed to be interpreted on the annual open days.
- \* Non-destructive research into the Aboriginal heritage of the reserves and recording of Aboriginal sites will be encouraged where supported by the Metropolitan Local Aboriginal Land Council and other relevant groups including the Darug Tribal Aboriginal Corporation.
- \* Site protection works will be undertaken where necessary to protect Aboriginal sites from impacts by people or natural processes in conjunction with the Metropolitan Local Aboriginal Land Council and the Darug Tribal Aboriginal Corporation.

## **Actions**

- \* A program for regular monitoring of the condition of Aboriginal sites will be prepared and implemented, with priority given to those sites near roads and walking tracks.
- \* Discussions will continue to be held with the Metropolitan Local Aboriginal Land Council and the Darug Tribal Aboriginal Corporation regarding conditions of access to Maroota Historic Site, the development of a Memorandum of Understanding, and the management of other Aboriginal sites within the reserves.
- \* Signs will be erected at the gate to Maroota Historic Site explaining the conditions of access and giving a phone number for additional information.
- \* A conservation plan will be prepared for the Aboriginal sites in Maroota Historic Site in conjunction with the Metropolitan Local Aboriginal Land Council and the Darug Tribal Aboriginal Corporation.

- \* Introduced plants will be removed from near the Maroota engravings in conjunction with the Metropolitan Local Aboriginal Land Council and the Darug Tribal Aboriginal Corporation.
- \* Protection works will be undertaken at Coat of Arms Cave if necessary, following consultation with the Metropolitan Local Aboriginal Land Council and the Darug Tribal Aboriginal Corporation.

#### **4.1.5 Historic Heritage**

Non-Aboriginal exploration and use of the land now reserved as Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site began as early as 1789 when Governor Arthur Phillip undertook his second trip up the Hawkesbury River, his first having penetrated only as far as the Mooney Mooney Creek. Gentlemans Halt is believed to be the last point and campsite reached by Phillip during this exploration of the Hawkesbury River.

In the early days of the new colony the Hawkesbury River was a major communication route and supported an active river-based community. The pattern of historic sites within the national park and nature reserve are related to land settlement processes beyond the boundaries of the park and reserve. By 1884 there was a small community at Gentlemans Halt and a provisional school had been established. The foundations of a road and a wharf are all that remains of the settlement within the park. Other historic places within Marramarra National Park include a stone cottage on Sentry Box Reach, remains of orchards along Marramarra Creek and the foundations of a hut, stone walls and a well at Big Bay.

The establishment of Marramarra National Park arose out of proposals in the 1930s to establish a recreation reserve in the area north of Galston. In 1966 groups as diverse as the National Herbarium, Australian Museum, Department of Agriculture, Fisheries and Chief Guardian of Fauna sought to establish a nature reserve over the mangroves of the area, particularly in Big Bay which was described by the Scientific Committee on Parks and Reserves as containing 'the finest area of mangrove in the Central Coast'. The proposal was later extended to include lands north to the Hawkesbury River and south to Glenorie and Calabash Creek. However, when gazetted in 1979, Marramarra National Park encompassed a much smaller area than the once-proposed 17,000 hectares and did not include the Big Bay mangroves which are below the high water level.

Maroota Historic Site was reserved in 1983 over a small Crown reserve established to protect Aboriginal engravings, and over some adjoining lands which also contained Aboriginal sites. Two chimneys and a shed remain from a farm that was included within the historic site.

Much more is known of the history of Muogamarra Nature Reserve. In 1836 George Peat was granted 50 acres at Peats Bight, constructed some huts and a wharf and began farming. Later a dairy farm was established on Peats Crater. Around 1840 a

road was constructed to the property using convict labour. In 1853 a road was constructed to Peats Ferry on the Hawkesbury River along a track which crossed the stone basin Aboriginal site, and by 1925 a fence had been constructed to prevent vehicles damaging the site. In 1927 the Pacific Highway was constructed outside the nature reserve but a tent school for the children of workers on the road was located on the rock platform containing the stone basin Aboriginal site. Muogamarra Nature Reserve still contains a number of sites and structures associated with these early European uses of the reserve, including the foundations of buildings at Peats Bight; dry stone walls, earthenware pipes and flagstones along the Peats Bight Trail; holes which supported the fence and tent school on the rock platform; and engravings dating from the nineteenth century. There are also tunnels constructed during World War II in the nature reserve. A number of osage orange trees (*Maclura pomifera*), which were planted as a hedge at Peats Crater during the period it was used for grazing, are of concern because they are spreading across the crater and into the surrounding bush.

During the early 1930s John Duncan Tipper was concerned by the loss of a great part of the Hawkesbury Sandstone forest as a consequence of the expansion of Sydney and its suburbs. As a means of countering this trend, Tipper took up a lease of 600 acres (240 hectares) of Crown land in 1934 for a private sanctuary. He named the sanctuary "Muogamarra", an Aboriginal word from the Awabakal people on the Central Coast which he believed meant "preserve for the future". Tipper moved the old NSW Government House gatehouse to the reserve to use as an office and constructed gardens around the office. From the outset Tipper adopted a policy of "limited public access" for the sanctuary, to preserve its natural features for educational purposes and for the enjoyment of people appreciative of its natural values.

In 1953 Mr Tipper voluntarily surrendered his lease (now comprising some 2,050 acres or 830 hectares) to enable the area to be dedicated under the *Crown Lands Consolidation Act*. It was gazetted on 29th October, 1954 as Muogamarra Sanctuary, for "the promotion of the study and conservation of native flora and fauna" and placed under the administration of a trust to which Tipper was elected the first President. He remained a trust member and honorary curator until the reserve was vested in the National Parks and Wildlife Service in 1968.

In 1959 Allen Strom, who was at that time the Chief Guardian of Fauna and Head of the Fauna Protection Panel in New South Wales, proposed a Faunal Reserve for "to ensure continuance of koala colonies as apart from so-called sanctuaries where the animal is viewed in enclosures". With the assistance of Sir Edward Hallstrom, Director of Taronga Park Zoo Trust, 750 acres (304 hectares) of land near Cowan and south of Muogamarra Sanctuary, was reserved in 1961 as the Sir Edward Hallstrom Faunal Reserve. This land was chosen for its reported substantial resident koala population.

With the creation of the New South Wales National Parks and Wildlife Service in 1967, the Hallstrom Reserve and eventually the Muogamarra Sanctuary came under the Service's control. Both reserves were amalgamated to form Muogamarra Nature

Reserve in March 1969. A number of places or features associated with the first management of the area for nature conservation remain in the nature reserve, including Tipper's office, a monument, lookouts and gardens.

### **Policies**

- \* Historic heritage within the reserves will be managed to conserve and maintain significant values.
- \* The provisions of Australia ICOMOS Charter for the Conservation of Places of Cultural Significance (The Burra Charter) will be used as guidelines for the management of historic sites.
- \* Conservation assessments, including where necessary the preparation of conservation plans, will precede any works on a historic place other than urgent stabilisation work.
- \* Work with the potential to impact on sub-surface historic archaeological evidence will be preceded by an archaeological assessment. Any archaeological excavation will require a permit.
- \* Non-destructive research into the history and historic features of the three reserves will be encouraged.
- \* Selected historic sites will be interpreted through signs, brochures and/or guided tours.

### **Actions**

- \* A conservation assessment and management guidelines will be prepared and implemented for the Peats Bight Road, Peats Ferry Road, the Sentry Box Reach house and the stone walls on the eastern side of Big Bay.
- \* A conservation and interpretation plan will be prepared and implemented for Tipper's office and for the area at North Muogamarra associated with Tipper's management and the early Trusts.
- \* The osage orange trees at Peats Crater will be assessed and if not found to be of historic significance removed. If found to be of historic significance, they will be contained by an annual slashing program and removal of seedlings.

#### **4.1.6 Introduced Plants and Animals**

Introduced species are those plant and animal species not native to the area. This definition also includes native species which do not occur naturally within the habitat and which have been introduced; for example the Queensland silver wattle (*Acacia podalyriifolia*) has been introduced into Muogamarra Nature Reserve, and the

Queensland silver wattle and golden wreath wattle (*Acacia saligna*) have been introduced to Maroota Historic Site.

Some introduced plant species or individuals within the national park, nature reserve or historic site may have either historical and/or educational value. Plantings associated with Mr Tipper's management of the sanctuary fall into this category (see section 4.1.5).

Parts of Marramarra National Park are particularly vulnerable to invasion by non-native plant species because of the nature of adjacent land-uses within the catchment areas of the park. Much of the park has also been subject to periodic disturbance from fire which combined with increased nutrients arising from urban and agricultural lands has led to the spread and dominance of species such as privet (*Ligustrum* spp.), pampas grass (*Cortaderia selloana*), lantana (*Lantana camara*), camphor laurel (*Cinnamomum camphora*), crofton weed (*Ageratina* spp.), blackberry (*Rubus* spp.), noogoora burr (*Xanthium occidentale*), fireweed (*Senecio madagascariensis*), mistflower (*Ageratina riparia*) and moth vine (*Araujia hortorum*). These plants pose a major threat to specialised native plant communities such as the coachwood-water gum association in the gullies and may threaten plant species such as *Lomandra fluviatilis*.

Non-native plants also occupy areas of Marramarra National Park disturbed by past land uses. Of particular concern are the infestation of lantana at Gentlemans Halt and around old buildings along the Hawkesbury River; coral trees (*Erythrina sykesii*) at Big Bay; whisky grass (*Andropogon virginicus*) north of Canoelands Road and along Marramarra Ridge; and lantana and privet along part of Marramarra Creek. Fruit trees and grape vines remain in areas of former orchards along Marramarra Creek and may harbour agricultural pests.

Muogamarra Nature Reserve is largely free of introduced plant species except for the edges of some tracks, the Peats Crater and Peats Bight areas, and around the University of New South Wales research station. These latter three areas are however badly disturbed. Species of particular concern include crofton weed, lantana, blackberry, cassia (*Senna pendula*), honeysuckle (*Lonicera japonica*), whisky grass (*Andropogon virginicus*), noogoora burr, couch (*Cynodon dactylon*) and pampas grass as well as osage orange trees (see section 4.1.5).

Most of the ridge within Maroota Historic Site was previously cleared and is now covered with whisky grass and purple top (*Verbena* sp.). Garden plants have also escaped on the site.

The Noxious Weeds Act 1993 places an obligation upon public authorities to control noxious weeds on land that it occupies to the extent necessary to prevent such weeds spreading to adjoining lands. Of the above plants, pampas grass, lantana, privet, blackberry and cassia have been identified as noxious within the Hornsby Council area.

A number of introduced animal species have been recorded in Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site. These include cats (*Felis catus*), dogs (*Canis familiaris*), foxes (*Vulpes vulpes*), rabbits (*Oryctolagus cuniculus*), black rats (*Rattus rattus*) and the house mouse (*Mus musculus*) in all three reserves, and goats (*Capra hircus*) and pigs (*Sus scrofa*) in Marramarra only. European honey bees fly into the reserves from hives on adjoining lands but there are no licensed apiary sites within the three reserves. The last of the cattle left from past grazing use of Peats Crater were removed from Muogamarra Nature Reserve in 1974, but the impact of their presence remains.

Foxes, feral cats and domestic dogs and cats straying from nearby suburbs probably represent the greatest proportion of introduced animals within the three reserves. Predation by these introduced animals has placed heavy pressure on a number of native animals within the reserves. Goats and pigs have an impact on the native vegetation in certain areas of the national park however, due to their smaller numbers and isolation, there is a high probability that these animals can be eradicated from the park.

The eastern grey kangaroo (*Macropus giganteus*) was introduced into the Peats Crater area of the reserve in the 1970s. From the fourteen kangaroos which were originally released, there now appears to be at least 60-70 grey kangaroos in the Peats Crater-Peats Bight area. They appear to congregate on the previously cleared areas and to be inhibiting revegetation of these areas. The eastern grey kangaroo would not naturally occur in the nature reserve and there is a need to control their impact.

## **Policies**

- \* Introduced species will be controlled and where practicable, and where not assessed as being of historic significance, eliminated.
- \* Priority will be assigned in weed control programs to those species and occurrences which:
  - are listed as noxious weeds under the Noxious Weeds Act 1993
  - impact on significant natural or cultural values
  - have a high potential for dispersal
  - are new isolated occurrences.
- \* Priority will be assigned in feral animal control programs to species which:
  - are small, isolated populations
  - pose a threat to threatened or uncommon native species-
  - threaten the general conservation value of an area
  - prey on native species.
- \* Dogs and other introduced animals, including European honey bee hives, will not be permitted in the reserves, with the exception of registered guide dogs and animals held within the university research station (see section 4.2.3).

## Actions

- \* A weed management plan will be prepared and implemented for the three reserves. Priority will be given to removal of lantana and other weeds at Gentlemans Halt, lantana along Marramarra Creek, introduced plants at Peats Crater/Peats Bight and around the University of NSW Research Station in Muogamarra Nature Reserve, and introduced plants around the engravings in Maroota Historic Site.
- \* A bush regeneration program will be implemented for the orchards on Marramarra Creek. This will include regeneration of areas where weeds have been removed, the selective clearing of small areas among the orange trees, and fencing of some areas to prevent trampling of the regenerating native vegetation.
- \* A bush regeneration program will be implemented at Peats Bight and Peats Crater in accordance with a bush regeneration plan for the area and the assessment of the historic significance of the osage oranges.
- \* A feral animal control plan will be prepared and implemented. Priority will be given to the control and if possible eradication of pigs and goats from Marramarra and the control of foxes, cats and dogs in all three reserves.
- \* The introduced grey kangaroo population at Peats Crater will be removed.
- \* The wire and picket fences which were used to impound cattle in the crater will be removed.
- \* An ongoing program of community information addressing problems concerned with introduced species and the actions that neighbours (and others) can take to help alleviate these problems will be undertaken in the local community. Priority will be given to the Cowan and Canoelands areas.

### 4.1.7 Fire Management

Management of fire in national parks, nature reserves and historic sites is an important and complex issue. It must aim to achieve both long term conservation of natural communities and ongoing protection of life and property within and adjacent to the park.

Fire has been an important factor influencing the environment of Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site for many tens of thousands of years. Fire is regarded by the National Parks and Wildlife Service as a natural process, one of the established physical factors of the Australian environment to which native plant and animal communities have become adapted.

Frequent intense bushfires can result in extensive soil erosion, loss of plant and animal species diversity, simplification of structural diversity and weed and exotic

animal invasion. Infrequent fires can also lead to reductions in species diversity, inability to control wildfires and subsequent damage to life and property.

Both Marramarra National Park and Muogamarra Nature Reserve have experienced around one fire every 6-12 years since 1930, with the last major fire being in January 1994. This is a low incidence of large fires in comparison to other nearby conservation reserves, but both the frequency and intensity of fires within the reserves is inconsistent with available knowledge as regards best fire management practices.

Recent ecological research in fire prone ecosystems, such as those which are represented in Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site, has established broad principles about the fire regimes needed to avoid the extinction of species and thus conserve biodiversity:

- Groups of plant and animal species which constitute an ecosystem respond similarly to fire according to the characteristics of their life-history. It is not necessary to specify fire regimes for the conservation of every species. Rather fire regimes for groups of species (vegetation communities) or an ecosystem are required to be developed.
- A diversity of fire regimes is needed to maintain natural biodiversity. Extinctions are most likely when fire regimes of relatively fixed intensity, frequency and extent prevail without variation.
- Frequent fires in most vegetation communities reduce the floristic complexity of the understorey which is a critical habitat requirement for most native animals. Areas burnt too frequently are reduced to highly combustible species such as bladey grass and bracken fern, an understorey which accumulates fuel quickly and is capable of further frequent burning.
- As areas regenerate following fires, different animal species find the habitat suitable at different stages of regeneration. To support the full complement of native animals a range of age classes of vegetation after fire is desirable.
- Some of the species and communities within Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site are fire sensitive and rely on recolonisation from surrounding areas following fire.

Although not all the vegetation of the park is the same and different communities are adapted to different fire frequencies and intensities, research indicates that a fire frequency ranging from 15 to 25 years is appropriate for maintenance of most vegetation communities in the reserves. Shrub land and heathland communities generally require more frequent fire than forest communities in order to maintain structure and species composition. Gully vegetation is however adapted to less frequent fires and closed forest should not be burnt. Research is currently underway on the fire ecology of the threatened species within the reserves.

Common sources of wildfire within the park include lightning strikes, illegally lit camp fires, burning of dumped cars, escaped burn-offs from neighbouring properties and arson. Close to 95% of fires within the three reserves are caused by people.

The reserves are included within the areas of the Hornsby/Ku-ring-gai District Fire Management Committee and are covered by Section 52 (*Rural Fires Act 1997*) plans which detail co-operative arrangements for fire suppression and fuel management within the area. Fire management strategies for the reserves are briefly covered in the National Parks and Wildlife Service North Metropolitan District Fire Management Plan and will be covered in more detail in the Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site Fire Management Plan.

Fire management activities are undertaken with the assistance of local Volunteer Rural Fire Brigades. The Brigades and the Service have a good working relationship and this will be actively fostered for mutual benefit. For effective protection of private property adjacent to the reserves it is also essential that co-operative fire protection arrangements are in place between neighbouring landholders and the Service.

The National Parks and Wildlife Service has adopted a strategy of reducing fire hazard by prescribed burning, mechanical fuel reduction and maintenance of a network of management tracks. Some prescribed burning has been undertaken in previous years in Marramarra National Park but Muogamarra Nature Reserve has for many years been a “no burn” area.

Marramarra National Park contains a network of management tracks maintained for fire control and protection of lands to the south of the reserves. There is also a network of management tracks in Muogamarra Nature Reserve maintained for the protection of the nature reserve and nearby towns. There is one management track through the centre of Maroota Historic Site. The management track system for the three reserves is shown on the map, back page.

The NSW National Parks and Wildlife Service has as its primary aims in fire management:

- to reduce the risk of bushfire damage to life and property both within and immediately adjacent to areas where the Service has a statutory responsibility;
- to effectively manage bushfires for the protection and conservation of the natural, cultural, scenic and recreational features of Service areas; and
- to co-operate and work with other organisations in fire management planning and implementation within the region.

## Policies

### Fire prevention

- \* Fires may be lit by the public only in authorised fireplaces at Marramarra Creek, Gentlemans Halt and near the Muogamarra Field Study Centre.
- \* Park fire bans and closures may be imposed when a total fire ban has been imposed, or when weather conditions and fuel loads are such as to present fire control problems and a total fire ban has not been imposed.
- \* The National Parks and Wildlife Service will seek to improve the level of community understanding of the role and management of fire within the park and the importance of fire prevention measures outside of Service areas.
- \* Where appropriate the Service will seek to involve neighbours in co-operative hazard reduction works for mutual protection through the Community Fireguard program.

### Prescribed burning

- \* Prescribed burning will be used where appropriate to reduce fire hazard and will be of moderate to high intensity wherever possible.
- \* Before fire and post fire weeding will be included as part of any prescribed burning program.
- \* Prescribed burning may be undertaken to:
  - reduce the risk of high intensity fire close to any property or major visitor area, consistent with the criteria for determining fire hazard and associated fuel reduction zones;
  - protect areas where there are fire sensitive soils, communities, habitats or species (e.g. koalas, *Kunzea rupestris*, closed forest, vegetation more than 30 years old);
  - assist in the control of wildfires at strategic locations;
  - provide, maintain or protect the diversity of age classes;
  - promote or protect threatened plant or animal species;
  - ensure the long-term survival of all species indigenous to the park; and
  - for approved experimental purposes where the results can be demonstrated to be directly useful to park management.

- \* A program of prescription burning will continue within Marramarra National Park, and will be progressively re-introduced within Muogamarra Nature Reserve and Maroota Historic Site, with the aim of establishing a mosaic of vegetation communities of different age classes.

#### Fire frequency

- \* The average period between fires for any area will as far as possible not be less than 15 years unless otherwise required for the conservation of a species or community or for the protection of life and property.
- \* At least 50% of each vegetation type in the park will be maintained in as old an age class condition as possible.
- \* As far as possible fire will be excluded from:
  - closed forest communities;
  - estuarine communities; and
  - communities of threatened plants and animals which may be threatened by fire (e.g. koalas, *Kunzea rupestris*).

#### Fire suppression

- \* The control of wildfires within the park will be given priority over all other activities within the District and the protection of life and property will have the highest priority.
- \* All wildfires will be contained as soon as practicable.
- \* The use of heavy machinery for fire suppression will be avoided where possible in the vicinity of threatened plants, Aboriginal sites and historic places and in heathland.
- \* Prolonged use of chemical retardants will be avoided if possible.
- \* Management tracks will be maintained in accordance with their classification under the reserves fire management plan. Use of fire management tracks will be restricted to authorised vehicles only.
- \* New tracks and temporary wildfire control lines may be constructed if necessary for fire control or other emergency operations. All new tracks constructed for emergency operations and areas disturbed by fire suppression operations will be closed and rehabilitated as soon as possible after each emergency.
- \* Care will be taken in maintaining management tracks to ensure threatened plants and animals, Aboriginal sites and historic values are protected.

- \* Existing management tracks no longer required for fire or other management purposes will be closed, any necessary stabilisation works undertaken and the track allowed to revegetate.
- \* Close contacts will be maintained with volunteer bushfire brigades, local council, Fire Control and Deputy Fire Control Officers, local police units and neighbours. The National Parks and Wildlife Service will continue to actively participate in local Rural Fire Management Committees and sub-committees.

### Research

- \* The District will encourage research into:
  - the effects of fire regimes on communities and species, particularly threatened species or communities;
  - the effects of fire regimes on weed establishment and control;
  - fire behaviour in Hawkesbury Sandstone vegetation types; and
  - bushfire hazard assessment and mapping.

### **Actions**

- \* A fire management plan will be prepared for Murrumbidgee National Park, Muogamarra Nature Reserve and Maroota Historic Site by early 1999.
- \* The National Parks and Wildlife Service will encourage the formation of "Community Fireguard" groups to enhance the protection of nearby properties.
- \* Management tracks will be categorised and a minimum maintenance standard developed for each of these categories.
- \* The Kimmerikong Track in Muogamarra Nature Reserve, and the Smugglers Ridge Track and that section of the Coba Ridge Track past the turnoff to Collingridge Point in Murrumbidgee National Park are not required for fire management. The Kimmerikong Track will be closed and allowed to revegetate. The Smugglers Ridge Track and the Coba Ridge Track past the Collingridge Point turnoff will be retained as walking tracks.

## **4.2 USE OF MURRUMBIDGEE NATIONAL PARK, MUOGAMARRA NATURE RESERVE AND MAROOTA HISTORIC SITE**

Murrumbidgee National Park, Muogamarra Nature Reserve and Maroota Historic Site will be managed to ensure that their use, whether by the general public, special interest groups, National Parks and Wildlife Service managers or other authorities, is appropriate and conforms with the management objectives and strategy of this plan.

The major categories of use that may be appropriate within National Parks and Wildlife Service areas are:

- \* promotion of natural and cultural heritage conservation;
- \* environmental education;
- \* recreation in a natural setting;
- \* scientific research; and
- \* management operations by the Service and other authorities.

The extent to which these categories of use are appropriate to Marramorra National Park, Muogamarra Nature Reserve and Maroota Historic Site are indicated below.

#### **4.2.1 Promotion, Education and Interpretation**

Promoting public awareness of the National Parks and Wildlife Service's conservation responsibilities, the values of the area and the recreational opportunities available is a major aspect of management of parks and reserves. It assists in the protection of the natural and cultural heritage and increases the understanding, enjoyment and satisfaction of visitors.

Muogamarra Nature Reserve has a long history of environmental education and promotion of the importance of conserving native plants and animals. This was a primary purpose of Tipper when seeking the original lease for the area in the 1930s, was strongly emphasised by the Fauna Protection Panel, and has more recently been undertaken through the reserve's open days and activities of the Muogamarra Field Studies Centre.

The Muogamarra Field Studies Centre was founded in 1971 as a joint co-operative program between the Department of School Education and the National Parks and Wildlife Service. After the Gibberagong Field Studies Centre was established in Kuring-gai Chase National Park in the 1990s, Muogamarra ceased to operate as a separate entity although Gibberagong still operates programs within Muogamarra Nature Reserve. The Field Studies Centre, which is staffed by teachers employed by the Department of School Education, provides a valuable educational resource which is used by over 3,000 school children and their teachers that attend the centre each year. The Field Studies Centre has one classroom/storeroom on the reserve and emphasises:

- Aboriginal heritage;
- European history;
- nature studies;
- geology; and
- geomorphology.

Groups of up to 40 students are permitted to camp in a clearing near the classroom on a limited number of nights each year. A campfire spot and flush toilets are provided nearby. There is also a corrugated iron shed built around 1980 to house a generator on a concrete pad in the vicinity of the field studies classroom. The Field

Studies Centre have requested permission to replace the shed with a small weatherproof building and to construct composting toilets and install solar panels to supply power.

The northern end of the reserve has traditionally been opened to the public on weekends each year during spring. This dates from Tipper's time when opening the reserve for a period each year was a condition of his lease. The open period became a popular annual event and the Service has maintained the tradition with open days on two weekends in August and each weekend in September each year. In recent years the NSW National Parks Association and the National Parks and Wildlife Service's "Chase Alive" volunteer program have provided assistance in organising the open period and conducting walks and talks on the reserve. The open days provide for visitors to enjoy the reserve under supervision, and to understand the importance of the reserve and the need for its protection. If numbers attending the open days continue to increase, bookings may be required for the open days and/or the reserve may be opened for additional days during spring.

Chase Alive also occasionally runs walks in Muogamarra at other times of the year, conduct the occasional evening activity for visitors and hold training camps in the reserve. These programs provide another means for visitors to gain access to the reserve and will be encouraged. Chase Alive activities will however be required to have an educational or training focus and any overnight activities must be approved in advance by the District Manager.

Permits, subject to certain standard conditions, may also be obtained from the Hornsby Sub-district office for visits by special groups for educational or scientific purposes.

A number of walking tracks within Muogamarra Nature Reserve are used by the Field Studies Centre and other groups for educational walks. These include the Peats Crater Track, Lloyds Trig Track, Bird Gully Track and Muogamarra Ridge Track. Some of these tracks are in poor condition and need upgrading.

Marramarra National Park will be promoted as a remote area which provides opportunities for solitude and self-reliance. Minimal facilities and signage will be provided to maintain a different experience from that provided in other nearby parks such as Ku-ring-gai Chase and Lane Cove National Parks. The emphasis will be on off-site interpretation through information sheets and brochures.

Maroota Historic Site has never been promoted for general public access and only receives some 500 visits a year. It will remain available for Aboriginal groups and scientific, educational and study purposes, including approved guided educational tours.

## **Policies**

- \* Muogamarra Nature Reserve will be promoted as an area for scientific and education activities.

- \* Access to Muogamarra Nature Reserve will be available for authorised scientific and education activities, for Aboriginal groups to access the Aboriginal sites, and for the general public on the specified open days.
- \* A booking system will be instituted for open days if it is found necessary to limit numbers of visitors.
- \* Use of the nature reserve by Chase Alive for educational programs will be encouraged.
- \* The continued operation of the Field Studies Centre in association with the Department of School Education will be encouraged.
- \* The Field Studies Centre will be permitted to have up to 40 students camping near the Field Studies building in the nature reserve on a limited number of nights each year with the permission of the District Manager.
- \* Lighting of camp or cooking fires in Muogamarra will require the approval of the District Manager.
- \* The Field Studies Centre will be permitted to replace the iron shed and other facilities associated with the field studies centre with similar facilities of a more energy efficient and environmentally sustainable design.
- \* Marramarra National Park will be promoted as an area for solitude and self-reliance with the minimum of on-site interpretation.
- \* Maroota Historic Site will be promoted in partnership with Aboriginal people as an area for scientific and educational purposes and for guided walks.
- \* All promotion, education and interpretive programs relating to Aboriginal heritage will be determined in consultation with the Metropolitan Local Aboriginal Land Council and the Darug Tribal Aboriginal Corporation.

### **Actions**

- \* The walking tracks in Muogamarra Nature Reserve used by the field studies centre and Chase Alive will be upgraded, particularly the Peats Bight Track, Lloyds Trig Track and Bird Gully Track.
- \* Signs will be erected at the entrance gates and major access points to Muogamarra Nature Reserve (including Peats Bight) explaining restrictions on access to the reserve and how access may be obtained.
- \* A formal agreement will be negotiated with the Field Studies Centre for use of the nature reserve, classroom and other facilities used by the centre. The agreement will include limits on camping, use of tracks and other areas, restrictions on use during the bushfire season and encouragement of environmentally sensitive practices.

- \* Signs will be erected at the start of walking tracks in Marramarra National Park giving information on the track, promoting minimum impact bushwalking and camping practices, and noting any restrictions on visitor use.

## 4.2.2 Recreation Opportunities

### Marramarra National Park

Marramarra National Park is one of the least developed national parks in the Sydney metropolitan area. Only around 8000 people visit the national park each year. This is mainly because of its rugged terrain, relative inaccessibility for vehicles and its comparatively recent date of reservation. Accordingly, most recreational activity has occurred around the edges although walking and bush camping are becoming increasingly popular.

Visitor use patterns and expectations in Marramarra National Park were surveyed by staff in 1986. Visitors indicated that they would prefer to see the park managed to provide low key opportunities for activities such as bushwalking, camping, nature study and canoeing. There have been no recent surveys of park visitors.

The National Parks and Wildlife Service attempts to manage recreation within national parks in a context of available recreational opportunities within the region as a whole. Marramarra National Park is surrounded by a large and diverse system of parks, reserves and other lands which provide opportunities for picnicking, barbecues, short walks, horse riding and similar recreation activities. It is therefore proposed to manage Marramarra National Park to provide settings at the unmodified end of the recreational spectrum and thus cater for those wanting a more natural, low impact, bush experience close to Sydney.

### Vehicle and Boat Access

Public vehicle access into the park is possible for approximately four kilometres along the Marramarra Ridge Track off Bloodwood Road, Arcadia, in the south of the park. Vehicle access is also possible to the boundaries of Marramarra National Park:

- from the end of Bloodwood Road and Cobah Road in the south of the park;
- from the end of Canoelands Road which runs west to east from the Old Northern Road between private property in the middle of the park;
- from Singleton Road which runs from Wisemans Ferry along the Hawkesbury River to the north of the park; and
- from Loughtondale Gully Road which runs along the northern boundary of the park.

Other public roads terminate at private property or Crown land some distance from the edge of the park. Only three parking spaces are available at the end of Canoelands Road to cater for walkers using the Canoelands Ridge Track. Additional parking will be provided at this location but parking appears to be sufficient at all other track heads.

The roads and tracks in and adjoining the park are used for illegal activities such as rubbish dumping and to provide access for off-road riding. The Marramarra Ridge Track is a particular problem as it is in the centre of the park. Attempts will be made to control such activities however it may be necessary in future to move the gate on this track back closer to the park boundary to control illegal activities and to limit damage to the park.

Access is also available to the park by boat from the Hawkesbury River, Berowra Creek and Marramarra Creek. A wharf has been constructed at Gentlemans Halt to facilitate access by larger boats. Access to the Marramarra Creek area is restricted by the shallow nature of the creek to small boats at or near the time of the high tide. As previously stated (section 4.1.2), the Waterways Authority will be approached to institute a “no wash” zone in Big Bay and Marramarra Creek upstream of Big Bay. Jet skis also create a lot of noise and disturb other users of these areas.

### Picnicking and Camping

The two most popular areas in the park are Marramarra Creek and Gentlemans Halt. Both picnicking and camping takes place at these localities and a pit toilet and barbecues are provided at each location. Access to both locations is by either boat or walking as there is no vehicular access to these sites. As both areas increase in popularity additional toilet facilities may be required. These will be of a composting or similar type so as to minimise impacts on the water quality of the areas. Neither camping area will be expanded beyond its current area.

Camping also frequently occurs behind two beaches along Berowra Creek (Twin Beaches) which have water access only. In 1998 the area around the beaches was being damaged by unmanaged recreational use. Recreational impacts are currently being managed through visitor education, regular maintenance visits and the installation in 2008 of composting toilets. Short-stay camping will be permitted at Twin Beaches.

Car-based picnic facilities are not provided in the park. Such facilities are available at nearby Council-managed reserves such as Fagan Park, Rofe Park and Berowra Valley Bushland Park, and in Ku-ring-gai Chase, Dharug, Lane Cove and Cattai National Parks. Camping areas are also provided in the above four national parks and in many privately-owned caravan parks along the Hawkesbury River, although the settings are very different to the camping provided in Marramarra National Park.

### Bush Walking

Bush walking is a popular recreational activity in Marramarra National Park. Tracks used by walkers include:

- the Canoelands Ridge Track from the end of Canoelands Road to Gentlemans Halt;
- the Blake Ridge Track from Canoelands Road to Blake Trig;
- the Big Bay Track from Canoelands Road to Big Bay;

- the Smugglers Ridge Track from Bloodwood Road down to Marramarra Creek;
- the Marramarra Ridge Track from Bloodwood Road down to Marramarra Creek; and
- the Coba Ridge Track from Bloodwood Road to near Coba Point.

Of these, the Big Bay Track and Smugglers Track both require upgrading and marking in places so that walkers can find the route. The Blake Ridge Track also requires marking and a small section of the track needs re-routing so that it does not cross private property.

### Horse Riding

Horse riding has not previously been permitted in Marramarra National Park, although some unauthorised horse riding has occurred along the Smugglers Ridge, Marramarra Ridge and Coba Ridge trails. In 1998, evidence suggested that horses had also been ridden off management trails within the park, causing accelerated erosion, redirection of water drainage and damage to vegetation.

In 2012 the Office of Environment and Heritage (OEH) endorsed a new approach to horse riding entitled *Strategic Directions for Horse Riding in NSW National Parks* (OEH 2012). The strategy was developed to guide the provision of improved horse riding opportunities in national parks, in particular, in eight priority regions including the National Parks and Wildlife Service Metro North East Region (the region). The National Parks and Wildlife Service formed a horse riding consultative group to identify and prioritise new horse riding opportunities within the region and to assist in the development of a work plan to implement these priorities.

The Coba Ridge trail and Canoelands Ridge trail (as far as a barrier to be installed before the cliffs at the end of the trail) will progressively be made available for horse riding pending minor works, environmental assessment and negotiations with other land managers.

Current trail maintenance regimes for low gradient trails are likely to be sufficient to support low to moderate frequency horse riding. However, monitoring of the condition of trails and surrounding areas, will be carried out prior to and during at least the first three years of horse riding. Trails may be closed if the change in usage is demonstrated to be having an unsustainable impact.

### Cycling

Marramarra National Park is not heavily used by cyclists due to its steep terrain however some cycling does occur on the management tracks. Cycling is not permitted on walking tracks but is currently permitted on all management tracks within the park. However, if cycling is found to be causing unacceptable damage on the steeper tracks, signs may be erected prohibiting cycling on these tracks.

## Group Use

Use of parks by large groups has a greater potential to impact on park management than use by small groups. User conflicts, risks of accidents and injuries, and impact on natural and cultural heritage values all rise in direct proportion to the size of the group. Camp Knox is the main group currently using Marramarra National Park and can have up to 300 students a month camping within the park. This level of use places great strain on those camp sites where no toilet facilities are provided, as well as having an impact on walking tracks and other park users. All groups will be required to have a licence or consent from the National Parks and Wildlife Service in accordance with the National Parks and Wildlife Regulations and numbers will be restricted to minimise impacts.

### **Muogamarra Nature Reserve**

No recreation is permitted in Muogamarra Nature Reserve. It is only available for authorised research, education activities, open days and guided tours consistent with its status as a heritage-listed nature reserve.

### **Maroota Historic Site**

No recreation is permitted in Maroota Historic Site due to its small size and the importance and vulnerability of its Aboriginal sites.

## **Policies**

- \* Minimum impact bushwalking and camping will be promoted in Marramarra National Park.
- \* Camping facilities, including toilets, will be provided only at Gentlemans Halt, Marramarra Creek camping area and Twin Beaches within Marramarra National Park.
- \* Camping will not be permitted within 300 metres of public access roads or at Big Bay. Bush camping will be permitted at other sites within Marramarra National Park, provided that it complies with the other policies in this plan and visitors adopt minimum impact practices.
- \* Camping will not be permitted in Muogamarra Nature Reserve except as part of an approved education program.
- \* Camping will not be permitted in Maroota Historic Site except in accordance with the Memorandum of Understanding to be negotiated between the Metropolitan Local Aboriginal Land Council, the Darug Tribal Aboriginal Corporation and the National Parks and Wildlife Service.
- \* Wood fires will be permitted only in authorised fireplaces at Gentlemans Halt, Marramarra Creek and Twin Beaches. Portable fuel stoves are to be used in all other areas of Marramarra National Park.

- \* Impacts of wood collection at Gentlemans Halt, Marramarra Creek and Twin Beaches will be monitored and fires may also be prohibited in these locations if necessary.
- \* Recreational use of the park will be regulated where necessary so as to minimise conflicts between users, protect visitor safety and welfare, minimise nuisance to neighbours and other visitors, and protect the natural and cultural heritage values of the park.
- \* Cycling will be permitted on management tracks within the park unless specifically prohibited by a sign at the start of the track. Cycling will not be permitted on walking tracks.
- \* Horse riding will be permitted on management trails sign-posted as such within Marramarra National Park. Riders will be required to abide by the *Code of Practice for Horse Riding in Parks*, or any such replacement documents as they are made. No tracks or trails will be constructed specifically for horse riding nor be modified to cater specifically for any one recreational use.
- \* Horse riding will not be permitted within Muogamarra Nature Reserve or Maroota Historic Site.
- \* Trail bikes and four wheel drive vehicles will not be permitted on management tracks or off tracks within the three reserves.
- \* The maximum group size for all activities within the park will be 15 persons unless otherwise approved by the District Manager.
- \* All school, community, commercial and other organised groups will be required to have an appropriate licence or consent from the National Parks and Wildlife Service.
- \* Activities by schools, community and commercial organisations will only be considered within the park where:
  - the activity is ecologically sustainable, has a minimal short term impact on the environment and is consistent with park management objectives;
  - the activity promotes natural and/or cultural heritage conservation and minimal impact use;
  - the operator and guides have skills, knowledge and experience which are appropriate to the activity, the recreation setting and the needs of their clients;
  - prior notice has been given to the District of routes, activities, frequency, group sizes and any other information deemed necessary; and
  - the operator and guides comply with any requirements of the National Parks and Wildlife Service in regard to use of specific tracks, camping

areas, lighting of fires and other measures to minimise impacts on the park.

- \* A camping permit system may be instituted to obtain information on where bush camping is occurring in the park and, if necessary, to control numbers and locations of campers.
- \* The NPWS District Manager may restrict recreational use of the park during periods of high to extreme fire danger or in the event of bushfires (see section 4.1.7).
- \* Visitor use of and impacts on Marramarra National Park will be monitored.

### **Actions**

- \* The carpark at the start of the Canoelands Ridge Track will be expanded to provide parking for up to 5 additional cars.
- \* The Big Bay and Smugglers Ridge Tracks will be upgraded and the tracks marked where necessary.
- \* A small section of the Blake Ridge Track will be re-routed so that it does not cross private property and the track marked where necessary.
- \* A number of small clearings will be created among the orange trees at Marramarra Creek to provide additional camping sites. These will be well separated from each other so as to continue to provide a sense of isolation from other groups.
- \* An additional toilet, or two toilets if demand warrants, will be provided for campers on Marramarra Creek and at Gentlemans Halt. These will use either composting or alternative closed systems.
- \* The use of the Marramarra Ridge Track will be controlled and monitored to ensure that unacceptable impacts do not occur. If damage continues to occur the gate and car park will be relocated closer to the park boundary.
- \* As identified in the *Metropolitan North East Region Horse Riding Work Plan 2013* for Marramarra National Park, investigate the potential for Coba Ridge Trail and Canoelands Ridge Trail to be made available for horse riding. These two trails will be progressively opened pending satisfaction of prerequisites including cross-tenure approvals, environmental assessment, implementation of monitoring, and minor works.

The following will be installed, dependent upon the above prerequisites, to facilitate sustainable and shared-use horse riding on designated management trails in Marramarra National Park:

- signage at main park entry points indicating the locations where different recreational opportunities are available and permitted;

- signage at access points of all management trails indicating whether they are authorised for horse riding. Note that signage may incorporate additional information including safety issues, length, trail grading, associated facilities (where they exist), and emergency procedures;
- increased parking to accommodate trailer turning and saddling up at the start of the Coba Ridge Trail;
- formalised parking to accommodate trailer turning and saddling up at the end of Canoelands Road;
- gating or similar barrier at the end of the Canoelands Ridge Trail prior to the final transmission line staunchion;
- cavaletti gates or similar to provide horse riding access to authorised trails as required;

Note that facilities such as parking and saddling areas will be provided for off-park where feasible and permissible, but will otherwise be provided on-park.

- \* Partnerships with local horse riding groups and other interested groups and individuals will be pursued to assist with park management activities such as: reporting on trail condition or other observations; undertaking weed control; and keeping trails and access points clean and clear of obstacles.
- \* The impact of recreational use, including horse riding, on management trail condition and conservation values, will be monitored prior to and during at least the first three years of horse riding being permitted in Marramarra National Park, with potential for extension of monitoring based on the findings of the first three years. Monitoring will be designed and implemented by appropriately qualified people.
- \* Management trails may be closed to all or specific recreational uses in the following circumstances:
  - a particular use results in significant erosion or other damage to the natural and cultural heritage of the park, or jeopardises the capacity of the trail to serve its primary purpose of fire management and other essential management activities;
  - use creates unacceptable risks to safety or unmanageable conflicts with other recreational users;
  - there is evidence of ongoing unauthorised use of other trails;
  - park operational considerations, including resource and project priorities;
  - temporary closure is necessary during and after significant wet weather events, local emergency incidents or extreme fire conditions.

Prior to any proposed trail restrictions or closures, consultation with user groups will be undertaken where practical.

- \* Signs will be erected on the wharf at Gentlemans Halt requesting vessels to anchor off the wharf so that it is available for use by others.
- \* A licence will be negotiated with Camp Knox and other commercial groups using the park which will include fees to cover administration and maintenance costs, restrictions on group sizes and camping locations, and limitations on wood fires.
- \* Signs will be erected at the beaches along Berowra Creek (Twin Beaches) indicating that short-stay camping and wood fires are permitted, provided that visitors bring their own firewood and take their rubbish home.
- \* The Waterways Authority will be requested to prohibit jet skis on Marramarra Creek upstream of the entrance to Big Bay.

### **4.2.3 Scientific Research**

The purpose of scientific study in the national park and nature reserve is to improve the understanding of their natural and cultural features and the processes which affect them. Research will also establish the requirements for the management of particular species or phenomenon. Data and findings from research studies and surveys will be utilised in park management.

The National Parks and Wildlife Service does not have the resources to undertake long term research in the park. A prospectus will therefore be prepared as the basis for the involvement of scientific organisations in research in Marramarra National Park and Muogamarra Nature Reserve. Discussions will be held with the Metropolitan Aboriginal Land Council and the Darug Tribal Aboriginal Corporation regarding research in Maroota Historic Site.

The University of New South Wales operates the Cowan Field Research Station within Muogamarra Nature Reserve under a licence from the National Parks and Wildlife Service which expires in 2014. The research station, which covers approximately six hectares, was originally established in the mid 1960s under a lease from the Fauna Protection Panel and consists of a laboratory, water tank for fire fighting, store rooms, and a number of yards, pens and cages for the housing and observation of animals used in the research projects.

The licence for the research station provides for an annual report on the operations of the research station, that appropriate licences be obtained from the Service in regard to the native animals, that it be insured, and that the university be responsible for all repairs and maintenance in regard to the station. The responsibility for all research undertaken within the research station lies with the University of New South Wales.

The research station currently contains a number of animals not native to the area, including a variety of wallabies and emus. Escapes from the station are therefore of

concern. Also of concern are the increased nutrients and run-off from the research station and the rats attracted to the area by feed left for the animals within the pens.

### **Policies**

- \* The use of Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site for non-destructive research which is of assistance in managing the reserves will be encouraged.
- \* Priority will be given to research into:
  - threatened and uncommon plants and communities;
  - threatened animals;
  - Aboriginal culture;
  - historic features in Muogamarra Nature Reserve; and
  - recreational use of Marramarra National Park.
- \* In addition to its requirements under the lease, the research station will be required to remove weeds immediately surrounding the station and replant with locally indigenous species, prevent increased nutrients from the animal pens entering the bush surrounding the station, control feral animals within the station, and replace fencing as necessary to prevent escapes of animals.
- \* All research (other than that within the research station which is subject to university requirements) will be subject to National Parks and Wildlife Service policy and procedures for the granting of permits, conduct of research and the production of results.
- \* The erection of any field apparatus or structure (other than within the research station) will not be permitted without specific authorisation from the District Manager:

### **Actions**

- \* A prospectus will be prepared as a guide to preferred research projects in the park. Preferred topics will be those of direct relevance to management.
- \* The continued use of the research station in Muogamarra Nature Reserve beyond its current term will be assessed for its impact and its contribution to the protection and management of the nature reserve.

#### **4.2.4 Management Operations**

The management track system is described in sub-section 4.1.6 of this plan of management and is primarily maintained for fire management purposes. As stated earlier in the plan, a number of these tracks are no longer required for management purposes and will be closed and allowed to revegetate. The Blake Ridge and Canoelands Ridge management tracks in Marramarra National Park pass in part through private property. This can cause conflicts with the neighbours whose

property is traversed by the tracks. Therefore those sections of the tracks which traverse private property will where possible be re-routed so that the management tracks are totally on the park.

In addition to the management track system, the National Parks and Wildlife Service maintains one staff residence in Marramarra National Park and two staff residences in Muogamarra Nature Reserve, and power, water and telephone lines to service these residences. In addition, a remote weather station, helipad for emergency purposes and a radio mast are located at Canoelands in Marramarra.

There are also tracks within the reserves which provide access to installations constructed and operated by other authorities such as the Sydney-Newcastle Gas Pipeline, Telecom and Energy Australia's high tension power lines. These facilities and associated tracks, which are established under a variety of legislation and maintained by the relevant authorities, create clearings which are a barrier to some wildlife and the disturbed soil is subject to erosion and weed invasion. It is a long term aim of the Service to reduce, and if possible eliminate, the number of non-park power lines and other utilities, including roads used for their maintenance, within the park. To this end such occupancies will be kept under regular review and where warranted the facility and associated roads will be relocated off the reserves and/or closed and the site rehabilitated.

Removal of garbage is a major expense for the National Parks and Wildlife Service, especially from beaches which only have water access. All bins will be removed from the three reserves and visitors will be requested to remove their own garbage.

Land has recently been added to Marramarra National Park and additional land may be added to the reserves in future. Any additions to the three reserves will be managed consistent with this plan of management. A recent acquisition of land at Milsons Passage (Portion 14) contains a water tank, remains of a house and the remains of a jetty which are separated from the other houses and surrounded by Muogamarra Nature Reserve. Maroota Historic Site contains a tin shed from when the area was used as farm. The structures on Portion 14 encourage people to land boats in a remote area of the reserve while the shed entices people into Maroota. They will be recorded and demolished, unless it is determined that the shed at Maroota is necessary for storage of materials to be used on the site.

## **Policies**

- \* Only vehicles on authorised management operations or those covered by a lease, licence, easement or agreement, will be permitted to use management tracks within the reserve.
- \* All management tracks and facilities will be kept under review in terms of their function, maintenance requirements and impact. Tracks and other facilities which are no longer essential or whose impact exceed their management value will be closed and/or removed and the site rehabilitated.
- \* No additional management tracks will be constructed except for:

- the re-alignment of an existing track off private property;
  - the re-alignment of an existing track to a more environmentally acceptable location; and
  - during emergency situations where there is no practical alternative, and such tracks will be closed and rehabilitated as soon as possible.
- \* No garbage bins will be provided within the three reserves and visitors will be requested to remove their own rubbish.
  - \* Environmental assessments will be required for the maintenance and upgrading of facilities, which will potentially impact on the reserves.
  - \* Where a non-park use is identified as not being currently covered by a formal agreement with either the Minister or the Director-General, the need for the facility will be reviewed and if essential, action will be taken to lease or licence the works, facilities or structures as soon as possible.
  - \* Any land added to Marramarra National Park, Muogamarra Nature Reserve or Maroota Historic Site will be managed in accordance with the objectives and policies outlined in this plan of management.

## **Actions**

- \* The Blake Ridge and Canoelands Ridge management tracks will be re-routed where practical so that they do not traverse private property.
- \* Agreements will be negotiated with the managers of the electricity lines, telephone lines and gas and oil pipelines which cross the reserves to ensure access tracks and easements are licensed, and maintained to National Parks and Wildlife Service specifications and in accordance with Soil Conservation Service guidelines.
- \* Erosion control works will be negotiated with Telstra to stabilise the old access track through Maroota Historic Site.
- \* The garbage bins on Berowra Creek and at Marramarra Creek will be removed.
- \* The house and jetty remains at Portion 14 near Milsons Passage will be recorded and removed.
- \* The shed on Maroota Historic Site will be recorded and removed unless it is determined that it is necessary for management operations.
- \* The tracks in the north-west of Marramarra will be reviewed to determine if any are no longer required and can be closed.

## 5 PLAN IMPLEMENTATION

This plan of management is part of a system of management developed by the National Parks and Wildlife Service. The system includes the NPW Act, management policies, established conservation and recreation philosophies, and strategic planning at corporate, regional and district levels.

The implementation of this plan will be undertaken within the annual programmes of the Service's North Metropolitan District. Priorities, determined in the context of district and regional strategic planning, will be subject to the availability of necessary staff and funds and to any special requirements of the Director-General or Minister.

District programmes are subject to ongoing review, within which works and other activities carried out at Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site will be evaluated in relation to the objectives laid out in this plan.

The environmental impact of all development proposals will continue to be assessed at all stages of the development and any necessary investigations undertaken in accordance with established environmental assessment procedures.

Section 81 of the NPW Act requires that this plan shall be carried out and given effect to, and that no operations shall be undertaken in relation to the national park unless they are in accordance with the plan. However, if after adequate investigation, operations not included in the plan are found to be justified, this plan may be amended in accordance with sections 75 and 76 of the NPW Act.

As a guide to the implementation of this plan, relative priorities for identified activities are summarised below:

<b>Activity</b>	<b>Plan Reference</b>
<b>High Priority</b>	
Survey reserves for illegal tracks and other disturbances	4.1.1
Map locations of plants with priority for protection	4.1.2
Erect barriers on Kulpers Track	4.1.2
Develop Aboriginal sites monitoring program	4.1.4
Liaise with MLALC regarding access to Maroota and develop MOU	4.1.4
Erect signs at the gate to Maroota Historic Site	4.1.4
Prepare and implement weed management plan	4.1.6

<b>High Priority (continued)</b>	<b>Plan Reference</b>
Prepare and implement feral animal control plan	4.1.6
Prepare fire management plan	4.1.7
Encourage formation of "Community Fireguard"	4.1.7
Erect signs at major access points to Muogamarra Nature Reserve	4.2.1
Control and monitor use of Marramarra Ridge Track	4.2.2
License Camp Knox and other commercial groups using the park	4.2.2
Erect signs at Twin Beaches permitting camping	4.2.2
Investigate and implement opening of the Coba Ridge Trail and Canoelands Ridge Trail to horse riding	4.2.2
Install signage and gates as required for horse riding	4.2.2
Undertake parking improvements as required for horse riding	4.2.2
Monitor the impacts of horse riding	4.2.2
Pursue partnerships with horse riding groups and other interested groups and individuals	4.2.2
Negotiate with Telstra re erosion control at Maroota Historic Site	4.2.4
Remove garbage bins from Berowra Creek beaches & Marramarra Creek	4.2.4
<b>Medium Priority</b>	
Work with council and others to monitor water quality	4.1.1
Seek co-operation to minimise impacts of developments which compromise catchments or scenic values	4.1.1
Complete vegetation mapping	4.1.2
Prepare conservation plan for Aboriginal sites in Maroota Historic Site	4.1.4
Remove introduced plants from near the Maroota engravings	4.1.4
Prepare conservation and interpretation plan for north Muogamarra	4.1.5
Assess conservation significance of osage oranges	4.1.5
Prepare conservation guidelines for Peats Bight Road	4.1.5
Prepare conservation guidelines for Sentry Box Reach house	4.1.5

<b>Medium Priority (continued)</b>	<b>Plan Reference</b>
Undertake bush regeneration for orchards at Marramarra Creek	4.1.6
Remove kangaroos from Peats Crater	4.1.6
Undertake bush regeneration at Peats Crater and Peats Bight	4.1.6
Implement community information program re introduced species	4.1.6
Categorise fire management tracks for maintenance	4.1.7
Upgrade Peats Bight, Lloyds Trig & Bird Gully walking tracks	4.2.1
Negotiate agreement with Field Studies Centre	4.2.1
Erect signs at start of walking tracks in Marramarra	4.2.1
Upgrade Big Bay and Smugglers Ridge walking tracks where necessary	4.2.2
Create small camping areas at Marramarra Creek	4.2.2
Provide additional toilet on Marramarra Creek	4.2.2
Prepare prospectus for research projects	4.2.3
Re-route Blake Ridge and Canoelands Ridge management tracks	4.2.4
Review management tracks in north-west of Marramarra	4.2.4
<b>Low Priority</b>	
Approach Waterways Authority re no wash zones	4.1.2
Undertake protection works if necessary on Coat of Arms Cave	4.1.4
Prepare conservation guidelines for Peats Ferry Road	4.1.5
Prepare conservation guidelines for stone walls at Big Bay	4.1.5
Remove wire and picket fences from Peats Crater	4.1.5
Provide increased car parking at end of Canoelands Road	4.2.2
Investigate pulling back of vehicular access on Marramarra Ridge	4.2.2
Erect signs on the wharf at Gentlemans Halt re vessels anchor off	4.2.2
Investigate continued use of UNSW research station	4.2.3
Record and remove house and jetty remains at Portion 14	4.2.4

**Low Priority (continued)****Plan Reference**

Assess shed on Maroota Historic Site, record and remove if unnecessary 4.2.4

Negotiate agreements re power lines etc across park 4.2.4

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MAP: Marramarra National Park, Muogamarra Nature Reserve and Maroota Historic Site

