

**MUNMORAH STATE CONSERVATION AREA AND
BIRD ISLAND NATURE RESERVE**

PLAN OF MANAGEMENT

NSW National Parks and Wildlife Service

Part of the Department of Environment and Climate Change NSW

May 2009

This plan of management was adopted by Bob Debus, Minister for the Environment, on 31st January 2005. Amendments to the plan were adopted by Carmel Tebbutt, Minister for Climate Change and the Environment, on 19th May 2009. This document combines the 2005 plan with the adopted amendments.

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Cover photograph from Wybung Trig by Glenn Gifford, NPWS.

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CONTENTS

	Page
1. INTRODUCTION	1
2. MANAGEMENT CONTEXT	1
2.1 STATE CONSERVATION AREAS AND NATURE RESERVES IN NSW	1
2.1.1 State Conservation Areas	1
2.1.2 Nature Reserves	2
2.2 INTERNATIONAL TREATIES FOR THE PROTECTION OF MIGRATORY	2
2.3 MUNMORAH STATE CONSERVATION AREA AND	3
2.3.1 Location and Regional Context	3
2.3.2 Importance of Munmorah State Conservation Area	3
3. OBJECTIVES OF MANAGEMENT	5
3.1 SPECIFIC OBJECTIVES FOR MUNMORAH STATE CONSERVATION AREA	5
3.2 SPECIFIC OBJECTIVES FOR BIRD ISLAND NATURE RESERVE	5
4. POLICIES AND FRAMEWORK FOR MANAGEMENT	6
4.1 NATURAL AND CULTURAL HERITAGE	6
4.1.1 Geology, Geomorphology, Soils and Catchments	6
4.1.2 Native and Introduced Plants	8
4.1.3 Native and Introduced Animals	12
4.1.4 Cultural Heritage	15
4.1.5 Fire Management	18
4.2 USE OF THE STATE CONSERVATION AREA AND NATURE RESERVE	20
4.2.1 Promotion and Environmental Education	21
4.2.2 Recreation Opportunities	22
4.2.3 Scientific Research	26
4.2.4 Management Operations	28
5. PLAN IMPLEMENTATION	30

MAPS

Munmorah State Conservation Area and
Bird Island Nature Reserve

centre pages

1. INTRODUCTION

The management of state conservation areas in NSW is in the context of a legislative and policy framework, primarily the *National Parks and Wildlife Act 1974*, the National Parks and Wildlife Regulation, the *Threatened Species Conservation Act 1995* and the policies of the National Parks and Wildlife Service. Section 72AA of the NPW Act lists the matters to be considered in the preparation of a plan of management. The policies arise from the legislative background and internationally accepted principles of park management. They relate to nature conservation, Aboriginal and historic heritage conservation, recreation, commercial use, research and communication.

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

The plan of management is a statutory document under the *National Parks and Wildlife Act 1974*. Once the Minister has adopted a plan, no operations may be undertaken within Munmorah State Conservation Area and Bird Island Nature Reserve except in accordance with the plan. The plan will also apply to any future additions to within Munmorah State Conservation Area. Where management strategies or works are proposed for the state conservation area or any additions that are not consistent with the plan, an amendment to the plan will be required.

2. MANAGEMENT CONTEXT

2.1 STATE CONSERVATION AREAS AND NATURE RESERVES IN NSW

2.1.1 State Conservation Areas

Many state conservation areas in New South Wales, including Munmorah State Conservation Area, were first established as state recreation areas. Under amendments to the *National Parks and Wildlife Act 1974* that came into force in 2002, state recreation areas were reclassified as state conservation areas.

State conservation areas are reserved under the *National Parks and Wildlife Act 1974* to protect and conserve areas that contain significant or representative ecosystems, landforms or natural phenomena or places of cultural significance; that are capable of providing opportunities for sustainable visitor use and enjoyment, the sustainable use of buildings and structures or research; and that are capable of providing opportunities for uses permitted under other provisions of the Act.

Under the Act, state conservation areas are managed to:

- conserve biodiversity, maintain ecosystem functions, protect natural phenomena and maintain natural landscapes;
- conserve places, objects and features of cultural value;
- provide for the undertaking of uses permitted under other provisions of the NPW Act (including uses permitted under section 47J such as mineral exploration and mining), having regard to the conservation of the natural and cultural values of the state conservation area;
- provide for sustainable visitor use and enjoyment that is compatible with conservation of the area's natural and cultural values and with uses permitted in the area;

- provide for sustainable use (including adaptive reuse) of any buildings or structures or modified natural areas having regard to conservation of the area's natural and cultural values and with other uses permitted in the area; and
- provide for appropriate research and monitoring.

The Act also requires review of the classification of state conservation areas every 5 years to determine whether or not they should receive either a national park or nature reserve classification. The classification review for state conservation areas is described in section 47M of the *National Parks and Wildlife Act 1974* and is undertaken in consultation with the Minister administering the *Mining Act 1992*.

2.1.2 Nature Reserves

Many nature reserves in New South Wales, including Bird Island, were first established as faunal reserves under the *Fauna Protection Act 1948*. Following the passage of the *National Parks and Wildlife Act 1967*, faunal reserves were reclassified as nature reserves. The 1967 Act was later replaced by the 1974 Act.

Nature reserves are reserved under the *National Parks and Wildlife Act 1974* to protect and conserve areas containing outstanding, unique or representative ecosystems, species, communities or natural phenomena.

Under the Act, nature reserves are managed to:

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

2.2 INTERNATIONAL TREATIES FOR THE PROTECTION OF MIGRATORY SPECIES

The NSW government, and therefore the National Parks and Wildlife Service, have obligations relating to the management of Bird Island Nature Reserve under the Intergovernmental Agreement on the Environment and two international agreements ratified by the Australian Government. These agreements are:

- The Agreement between the Government of Australia and the Government of Japan for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment; and
- The Agreement between the Peoples Republic of China and the Government of Australia for the Protection of Migratory Birds and their Environment.

2.3 MUNMORAH STATE CONSERVATION AREA AND BIRD ISLAND NATURE RESERVE

Location And Regional Context

Munmorah State Conservation Area is located on the Central Coast between Budgewoi and Catherine Hill Bay, approximately 40km north of Gosford. Bird Island Nature Reserve is located about 1.6km offshore of Birdie Beach.

Following lobbying by the North Entrance Peninsula Preservation Society, and others, Munmorah State Recreation Area was established in April 1977 with an area of 997 hectares. This reservation included a number of parcels of land that had been reserved for "Public Recreation and the Preservation of Flora" managed by Wyong Shire Council. Major subsequent additions include the Southern Peninsula (213 hectares) in December 1989, Moonee Beach (224 hectares) in May 1993 and 53 hectares of intertidal zone along the entire length of the coastline of the park in December 2002. The total area of the park is now approximately 1515 hectares. Bird Island is approximately 7.3 hectares in size.

Bird Island Nature Reserve and Munmorah State Conservation Area are both within the Wyong local government area and are therefore covered by the Wyong LEP 1991.

Importance of Munmorah State Conservation Area

Munmorah State Conservation Area is a relatively large, undisturbed coastal area which complements the conservation values of other protected areas, state forests and Crown reserves on the Central Coast.

The state conservation area's coastal topography is the result of erosion and deposition caused by fluctuating sea levels during the Pleistocene. Perched sand masses within the state conservation area demonstrate these changes in sea level and are of scientific interest.

The state conservation area has high scenic value, with 12km of spectacular coastline, rugged cliffs and panoramic views of the Tuggerah Lakes system.

The park contains diverse vegetation communities including woodlands and open forests, wetlands, coastal tea tree shrubland and coastal heath. Two vulnerable *Threatened Species Act 1995* (Schedule 2) species occur within the park being: *Tetratheca juncea* and the magenta lilly pilly *Syzygium paniculatum*. Other species which are limited in distribution, or at the limits of their geographic range within the park, include *Hakea bakeriana*, *Macarthuria neo-cambrica* and hard quondong *Elaeocarpus obovatus*. An unusual species of acacia, the Munmorah wattle *Acacia quadrilateralis*, was described from a locality in the park during the mid 1980s but recent attempts to relocate it have been unsuccessful.

The diverse number of animal species found, or expected to occur, within the park reflects the diversity of habitats. For example 150 birds species have been recorded within the park. A number of animals listed on Schedule 2 of the *Threatened Species Conservation Act 1995* are also present, including the squirrel glider *Petaurus norfolcensis*, osprey *Pandion haliaetus*, sooty oystercatcher *Haematopus fuliginosus* and the wallum froglet *Crinia tinnula*. The occurrence of New Holland mouse *Pseudomys novaehollandiae* in the state conservation area is of local significance.

The park is popular for walking, picnicking, camping, swimming, surfing and fishing.

The area's diverse natural environment makes it a valuable resource for educational organisations including local primary and secondary schools, TAFEs, colleges and universities. Features of educational value used for field studies programs include intertidal landforms and habitats, coastal vegetation communities and evidence of geomorphic processes.

Importance of Bird Island Nature Reserve

Bird Island Nature Reserve is one of a number of offshore island reserves along the Central and Hunter coasts. To the north, at the entrance to Lake Macquarie, is Moon Island and to the south, at the entrance to Broken Bay is Lion Island. They are all important seabird nesting and roosting sites.

Twelve species of seabirds and shorebirds have been recorded on Bird Island of these the sooty oystercatcher *Haematopus fuliginosus* is listed under the *Threatened Species Conservation Act 1995*. The wedge-tailed shearwater *Puffinus pacificus*, short-tailed shearwater *Puffinus tenuirostris*, ruddy turnstone *Arenaria interpres*, eastern curlew *Numenius madagascariensis*, whimbrel *Numenius phaeopus*, bar-tailed godwit *Limosa lapponica*, red-necked stint *Calidris ruficollis*, arctic jaeger *Stercorarius pomarinus*, Caspian tern *Sterna caspia*, common tern *Sterna hirundo*, white-fronted tern *Sterna striata* and the little tern *Sterna albifrons* are all listed under both the Japan-Australia Migratory Bird Treaty and the China-Australia Migratory Bird Treaty.

Bird Island, with steep vertical cliffs, is also a spectacular feature of the coastal landscape.

3. OBJECTIVES OF MANAGEMENT

3.1 SPECIFIC OBJECTIVES FOR MUNMORAH STATE CONSERVATION AREA

The specific objectives for the management of Munmorah State Conservation Area are to:

- * conserve the park's biodiversity, with emphasis on protection and restoration of the habitat of threatened species, populations and ecological communities;
- * protect visual and aesthetic values;
- * provide low impact recreational opportunities in a natural setting;
- * promote the importance of the park's natural and cultural values to visitors and neighbours, and promotion of the purpose of management programs; and
- * increase environmental education opportunities for visitors.

3.2 SPECIFIC OBJECTIVE FOR BIRD ISLAND NATURE RESERVE

The specific objective for Bird Island Nature Reserve is to:

- * protect the Island as an important nesting place for migratory sea birds.

4. POLICIES AND FRAMEWORK FOR MANAGEMENT

The policies in this plan provide the framework for future management for the park and reserve and are consistent with anticipated resources and community trends anticipated over the next five to ten years. The table at the end of this plan identifies activities that will be given priority in the medium term.

Policies are summarised under the following headings:

- * Natural and Cultural Heritage; and
- * Use of the State Conservation Area and Nature Reserve.

4.1 NATURAL AND CULTURAL HERITAGE

4.1.1 Geology, Geomorphology, Soils and Catchments

Munmorah State Conservation Area demonstrates aspects of the geological history of the Sydney region. The park is part of the Sydney Basin, comprised mostly of sedimentary rocks deposited during the Permian (between 280-225 million years ago) and Triassic (between 225-190 million years ago). The park is mainly composed of Munmorah conglomerates, overlain in some areas by perched sand bodies, deposited during periods of higher sea level during the past 2 million years.

Sea level rises towards the end of the Pleistocene flooded the then coastal plain and around six to four thousand years ago lead to the deposition of sand barriers, producing the shallow lakes and lagoons of the Central Coast. Bird Island, part of the mainland during low sea levels, was isolated by rising seas. The general topography of the modern coastline consists of rocky headlands interspersed with sandy beaches and barriers.

Murphy and Tille (1993) have described and mapped eight soil landscape groups (unique landforms with a characteristic set of soils) in Munmorah and one on Bird Island. They are:

The Awaba erosional soil landscapes found on low relief, rolling hills on Munmorah Conglomerates and Newcastle Coal Measures. The most common soil landscape in the northern section of the park, characterised by shallow to moderately deep soloths and yellow podzolic soils. This landscape is found on Bird Island also;

Minor examples of the **Tacoma Swamp and Belmont Swamp soil landscapes** in the south-west and north of the state conservation area respectively. The Tacoma Swamp soil landscape occurs on swampy floodplains and depressions on Quaternary sediments, with acid peats and humic gleys. Belmont Swamp soils are associated with level to gently undulating coastal swamps and shallow lakes - they are waterlogged acid peats and siliceous sands;

Aeolian soil landscapes which include the area around Norah Head, with elevated undulating sandsheets and rolling dunes on headlands and which area commonly referred to as perched dunes. These white Pleistocene sands are found south of the Moonee wetland, between Frazer Beach and Wybung Head and adjacent to the Geebung Heath Walking track. The dominant soil type is a deep podsol. The **Tuggerah soil landscapes** which comprise the southern peninsula section of the park and which consist of undulating, rolling coastal dunes with a local relief of up to twenty metres. Deep podsols have developed on the older dunes;

The Narrabeen beach soil landscapes which occur on all coastal beaches and foredunes and are comprised of marine sands;

The Wyong alluvial soil landscapes which occur on poorly drained floodplains and alluvial flats on Quaternary sediments and are found only along Bongon Creek behind Frazer Beach; and

Disturbed soil landscapes which occur at a number of sites throughout Munmorah State Conservation Area.

The Newcastle Coal Measures underlie the state conservation area. The park is gazetted to a depth of twenty metres which allows subsurface mining below that depth. Long wall mining occurs in the north of the park, with extraction under the Moonee Beach area at approximately 130 metres.

The *Catchment Management Act 1989* aims to achieve cleaner water, reduced soil erosion, increased vegetation cover, the maintenance of ecological processes and a healthier environment. There are four catchments in the state conservation area. Three of these (Moonee, Bongon and Birdie Creeks) drain into the South Pacific Ocean while the fourth, Melaleuca Creek, drains into Lake Munmorah.

Policies

- * Hydrological, geological, geomorphic and/or pedological values will be protected by minimising erosion and undertaking, where necessary, rehabilitation to re-establish natural processes.
- * All development and conservation activities will be assessed to determine their impact on geological, geomorphic, pedological, catchment and landscape/ aesthetic values, and will incorporate best practise soil erosion and sedimentation control measures.
- * Areas disturbed by previous land uses will be rehabilitated using local soils and material free of contaminants.
- * Fire management regimes will be developed to minimise threats from erosion.
- * The Service will continue to be actively involved in catchment management with neighbouring land owners and managers in the local community and will continue to actively participate on the Tuggerah Lakes Estuary and Coastal Management Committee and will contribute to the development of the Tuggerah Lakes Catchment Management plan.
- * Efforts will be made to ensure that pollution and run off do not enter the state conservation area.
- * Silt/sediment traps on unsealed roads in the park will be properly maintained.
- * The Service will assist consent and determining authorities to minimise impacts on the catchment values of streams flowing through the state conservation area.

Actions

- * Snapper Point is a high priority for the implementation of erosion control works. All sandmined areas at Birdie Beach, disused tracks at Moonee Beach and Wybung Headland and the quarry on Campbell Drive will be rehabilitated.
- * The unsealed roads to Snapper Point and Wybung Head will be sealed.
- * The Palms picnic area car park will be bitumen sealed.
- * The quality of water from the bore at The Palms picnic area will be regularly monitored, to ensure tank water remains of a potable quality and free of sedimentation and pollution.

4.1.2 Native and Introduced Plants

Munmorah State Conservation Area

There are approximately 212 native plant species recorded in the state conservation area. A vegetation survey of Munmorah State Recreation Area, Wyrabalong National Park and Wamberal Lagoon (Payne 1993) identified thirty different vegetation communities between southern Lake Macquarie and Wamberal Lagoon. These communities were classified with reference to the soil landscapes identified by Murphy and Tille (1993) and described in terms of their structure and main species. Ten of the vegetation communities occur in Munmorah State Conservation Area. The communities in Munmorah are more diverse than those of Wyrabalong and Wamberal, with the majority of communities being found on the perched dunes.

The survey identified the following vegetation communities:

Low forest/forest woodland on Wyong alluvial soil landscapes with red bloodwood *Corymbia gummifera*, Sydney red gum *Angophora costata*, cabbage tree palm *Livistona australis*, swamp oak *Casuarina glauca* and broad-leafed paperbark *Melaleuca quinquenervia* as the main species and a well developed understorey of shrubs, graminoids, grasses and ferns. This community provides threatened species habitat, is the main winter flowering community in the region and is generally weed free. Significant species in this community include *Tetratheca juncea* which is listed on Schedule 2 of the *Threatened Species Act 1995* and *Hakea bakeriana* which is restricted in distribution within the region. This plant is an important food source for the tawny crowned honeyeater *Phylidonyris melanops*.

Low forest/forest woodland which is found on the Munmorah lake foreshore, occurring on estuarine and sub-aqueous quartz sands. Swamp mahogany *E. robusta* and broad-leafed paperbark dominate this community. A dense ground layer of ferns, grasses and graminoids is present in undisturbed areas.

Swampy Scrub/open scrub is found on the Wyong alluvial soil landscapes at the northern end of the park. It is characterised by swamp banksia *Banksia robur*, pink swamp heath *Sprengelia incarnata*, lemon scented bottlebrush *Callistomen citrinus*, hop wattle *Acacia stricta*, slender twine rush *Leptocarpus tenax* and paperbarks *Melaleuca spp.* This community has restricted distribution and is not significantly affected by weed invasion. Macarthur's pink herb *Macarthuria neo-cambrica* is a significant local species. It is a small rigid or wiry perennial that grows only on sand dunes near the sea and which is at its southern limit in the park.

Scrub/open scrub is found on the Tuggerah beach soil landscapes of the coastline. This community is moderately dense to open with tall shrubs and low trees. Dominant species include coastal tea tree *Leptospermum laevigatum*, tea tree broom heath *Monotoca elliptica*, old man banksia *Banksia serrata* and coast banksia. Shrubs, herbs, graminoids and ferns are also present. Much of this area has been sandmined and is invaded by bitou bush *Chrysanthemoides monilifera* and golden wreath wattle *Acacia saligna*.

Littoral rainforest remnants occur at several small sites. Tuckeroo *Cupaniopsis anarcardioides*, hard quandong *Elaeocarpus obovatus* and magenta lilly pilly *Syzygium paniculatum* are present. Cheese trees *Glochidion ferdinandi* and broad-leaved paperbark, not normally associated with littoral rainforest, also occur. Magenta lilly pilly, found in one location on the southern boundary of Munmorah, occurs in small, restricted and localised populations, is inadequately represented in reserves, and is considered at serious risk of disappearing (Briggs and Leigh 1995). It is listed as vulnerable on Schedule 2 of the *Threatened Species Conservation Act 1995*. The hard quandong is near its southern limit of distribution.

Low woodland/low open forest community is the dominant vegetation on the Awaba erosional soil landscape unit. Main species here include Sydney red gum, red bloodwood, scribbly gum *E. haemostoma*, brown stringybark *E. capitellata*, Sydney peppermint *E. piperita* and bastard white mahogany *E. umbra*. Snappy gum *E. racemosa*, white mahogany *E. acmenioides*, grey gum *E. punctata* and red mahogany *E. resinifera* occur in some areas. A mid-dense understorey of shrubs, graminoids, grasses, ferns and some herbs is present and this community is important for nectar feeding wildlife. Ridgetops are habitat for *Tetratheca juncea*. The uncommon climbing orchid *Erythrorchis cassythoides* has been found near the Campbell Drive quarry.

Low closed forest occurs in the Little Beach (Ghosties Beach) and Moonee Beach areas on Awaba soil landscape units. This community forms a dense cover of trees to six metres with a moderately dense cover of shrubs to two metres. Main species present include grey ironbark *E. siderophloia*, white mahogany, Sydney red gum and *Hakea bakeriana*. Bitou bush *Chrysanthemoides monilifera* is very invasive in this community.

Closed heathland occurs on the Norah Head aeolian soil landscape unit, is diverse and forms a dense cover of shrubs to one metre. The main species are wallum banksia *Banksia aemula*, *Banksia spinulosa* var. *collina*, mountain devil *Lambertia formosa*, she oak *Allocasuarina distyla*, *Hakea bakeriana*, *Leptospermum attenuatum*, flannel flower *Actinotus helianthi*, drumsticks *Isopogon anemonifolius*, *Dillwynia glaberrima*, wedding bush *Ricinocarpus pinifolius*, coast banksia *Banksia integrifolia*, guinea flower *Hibbertia saligna*, slender riceflower *Pimelia linifolia*, heath parrot pea *Dillwynia retorta*, pink wax flower *Eriostemon australasius* ssp. *australius* and orchid *Duris punctata* var. *alba*. The Munmorah wattle *Acacia quadrilateralis*, a small shrub found by Scanlon (1985) was recorded in this community. This plant is regarded as rare (Benson, 1986) and as attempts to relocate it have been unsuccessful it may now be extinct in Munmorah, although viable seed may be present in the soil and germinate after fire. This community is widely distributed but not large in area, is fragile and easily damaged by inappropriate management and use. Weed infestation here is limited to roadsides.

- **Open to closed heathland** occurs on the Awaba soil landscapes is highly variable due to aspect and proximity to the sea. It is a dense to open cover of shrubs up to

one metre comprising she oak, mountain devil, velvet bush *Lasiopetalum ferrugineum*, slender rice flower *Pimelea linifolia*, red stem wattle *Acacia myrtifolia*, *Hakea dactyloides*, *Melaleuca nodosa*, *Dodonea triquetra*, *Banksia oblongifolia* and *Hakea bakeriana*. This community is weed free.

- **Closed grassland/shrubland/closed heathland** is found in three separate coastal localities: at Desoto Inlet, on Flat Island and above Red Ochre Beach. The main plants include *Melaleuca nodosa*, red stem wattle *Acacia myrtifolia*, *Banksia oblongifolia*, *Hakea dactyloides*, mountain devil and pink spider flower *Grevillea sericea*. Headland edges are dominated by coast rosemary *Westringia fruticosa* and she oak. This community contains the heath wattle *Acacia leiocalyx* which is widespread in NSW, but rare on the Central Coast. Bitou bush is also present as an invasive community.

Currently there are no identified endangered ecological communities, critical habitat or endangered populations under the *Threatened Species Conservation Act 1995* in the park.

Bitou bush *Chrysanthemoides monilifera* is a declared noxious weed, a weed of national significance and due to its invasive character is listed as a key threatening process. It is widespread throughout the park. Other environmental weeds in the park include small patches of lantana *Lantana camara*, blackberry *Rubus fruticosus*, coral trees *Erythrina x sykesii*, crofton weed *Ageratina adenophora*, pampas grass *Cortaderia selloana*, castor oil plant *Ricinus communis* and golden wreath wattle *Acacia saligna*.

The scrub and open scrub communities on beach foredunes were sand mined during the 1960's and 70's. The regeneration of these areas involved the planting of bitou bush and *Acacia saligna* as stabilising species. These species are now widespread throughout the area.

Bitou bush control in the past has included the use of herbicides and the release of biological control agents, including the bitou tip moth *Comostolopsis germana* and the bitou seed fly *Mesoclanis polana*, which are now distributed over most of the range of bitou bush in the park. The tortoise beetle *Cassida sp.* has also been released but seems not to have become successfully established. Herbicide control has included the aerial spraying bitou bush program and vehicle based and spot spraying. Bitou bush in many areas of the park also seems to be affected by a pathogen (probably a fungus not yet identified) that seems to be limiting both growth and spread.

Volunteer programs to eradicate bitou bush and other environmental weeds have been underway in the Birdie Beach area for many years and have been highly successful.

Bird Island Nature Reserve

A vegetation survey has not been completed on Bird Island Nature Reserve but a number of inspections by Service staff have resulted in the preparation of a species list. Extrapolating from Payne it is expected that the Island has two different vegetation communities:

- **Low open heathland** with Sydney golden wattle *Acacia longifolia var. sophorae*, tree broom heath, tuckeroo and coastal tea tree.
- **Open heath/dune** with pigface *Carpobrotus glaucescens*, (monospecific in some areas), *Lomandra longifolia* (a long stalked form) and an unidentified tussock, on sand dunes.

Depending on the season and climatic factors at least twenty percent of the island can be denuded of vegetation. The areas of bare earth seem to be those used by shearwaters for breeding burrows.

Currently there are no identified endangered species, endangered ecological communities, critical habitat or endangered populations under the *Threatened Species Conservation Act 1995* on the island.

The environmental weeds on Bird Island include bitou bush, prickly pear *Opuntia stricta var. stricta*, inkweed *Phytolacca octandra* and trad *Tradescantia albiflora*. The bitou bush on the island also appears to be affected by a pathogen. Prickly pear is the main concern as it potentially reduces the areas available for sea bird roosting, whereas the other weeds seem not to impact on the primary natural values of the Island. Control of prickly pear has been by means of the cochineal insect *Dactylopius spp.*

Policies

- * Native vegetation will be managed to conserve biodiversity, maintain floristic and structural diversity and to conserve species and communities that are threatened, not well represented in the reserve system, or of special conservation significance.
- * Priority for weed control will be given to those declared noxious in Wyong LGA; to weeds of national significance; to key threatening processes; and to weed infestations in significant vegetation communities. Other environmental weeds will be progressively controlled, and where practicable removed.
- * Recovery plans for threatened species or endangered populations which are known to occur in Munmorah will be implemented.
- * Endemic plant species will be used in landscaping and revegetation work, except where non endemic and/or exotic species are essential for initial stabilisation and present no risk of infestation.
- * Volunteer bush regeneration and weed control programs in the state conservation area will be encouraged.
- * Scientific research into the ecology of threatened plant species will be encouraged.
- * All development will be excluded from the closed heathland of the aeolian soil landscape units.
- * An integrated approach to the management of bitou bush will continue with use of aerial spraying, vehicle based and spot spraying, hand removal of seedlings and use of biocontrols. The use of burning to stimulate natural regeneration to remove bitou biomass and/or to stimulate bitou seeding will be trialed.
- * Biocontrols will continue to be the primary approach for the management of prickly pear on Bird Island.
- * The Service will continue to cooperate with other agencies and landholders in implementing joint weed control programs.

Actions

- * An annual program for weed control, rehabilitation and regeneration programs will be prepared and implemented.
- * Current priorities for spraying are bitou control in the Bongon heath, bitou at Tea Tree, lantana and blackberry control in heath communities at Frazer, bitou at Wybung and pampas and castor oil plant at Moonee.
- * Weed control plans will be prepared and implemented in cooperation with Wyong Shire Council and the Tuggerah Lakes Estuary and Coastal Management Committee and the Birdie Beach Dune Care Group. Priority is the development of a site plan for Birdie Beach and Tea Tree.
- * The Service will continue to support the propagation of locally collected seed in the shade houses at the depot, for use in weed control and regeneration programs.
- * A research design for survey and monitoring vegetation communities or species in Munmorah will be prepared and components will be promoted as student projects.
- * The vegetation communities on Bird Island will be surveyed and mapped.

4.1.3 Native and Introduced Animals

Munmorah State Conservation Area

Fauna surveys were undertaken in Munmorah State Conservation Area in early 1995 and again in 1997/98 by Payne and Wellington. One hundred and fifty birds, twenty five mammals, ten reptiles and eleven amphibians have been recorded in the park (Payne and Wellington, 1996).

Rock platforms provide important roosting and feeding areas for gulls, terns, migratory waders and herons. Many bird species have been recorded in the park which are listed on the schedules of the Japan-Australian Migratory Bird Treaty and the China-Australian Migratory Bird Treaty. The little tern *Sterna albifrons* which is listed as endangered on Schedule 1 of the *Threatened Species Conservation Act 1995* occurs in Munmorah State Conservation Area. Two vulnerable species listed on Schedule 2 have also been recorded, these are the sooty oystercatcher *Haematopus fuliginosus*, which is found mainly on the coastal rock platforms, and the osprey *Pandion haliaetus*. The lake foreshore also provides refuge and feeding grounds for migratory herons and waders.

Locally restricted species include the white-bellied sea eagle *Haliaeetus leucogaster*, which nests in the littoral rainforest, brush bronzewing *Phaps elegans* and bar-shouldered dove *Geopelia humeralis* which live in the coastal dunes, tawny-crowned honeyeater *Phylidonyris melanops* and southern emu wren *Stipiturus malachurus*, which is resident on the low coastal heaths, and the reef heron *Egretta sacra*, which is present in small numbers on the coastal rock platforms. The coastal forest and tall heaths are important feeding areas for honeyeaters, which overwinter on the Central Coast. Rainforest remnants provide food resources for the uncommon migratory fruit-eating pigeons. Cabbage palm fruit is particularly important for the topknot pigeon *Lopholaimus antarcticus* during late spring and summer.

Twenty five species of mammals have been recorded in the state conservation area. The squirrel glider *Petaurus norfolcensis* which is listed as vulnerable on Schedule 2 of the *Threatened Species Conservation Act 1995* occurs in both the littoral rainforest and eucalypt

woodlands in the northern portion of the park. The ringtail possum *Pseudocheirus peregrinus* and sugar glider *Petaurus breviceps* are common throughout the state recreation area. The cabbage tree palm forest provides summer feeding sites for the grey-headed flying fox *Pteropus poliocephalus* and the swamp mahogany *Eucalyptus robusta* is a major winter food source for the same species.

Small mammal species include a regionally significant population of the New Holland mouse *Pseudomys novaehollandiae* which is associated with aeolian sand-dunes; brown antechinus *Antechinus stuartii*; swamp rat *Rattus lutreolus* and swamp wallaby *Wallabia bicolor*. Two species of micro bats, the little forest bat *Eptesicus vulturinus* and Gould's long-eared bat *Nyctophilus gouldi*, have been recorded in recent surveys. Additionally it is likely that the eastern chestnut mouse *Pseudomys gracilicaudatus* occurs in communities of scrub and open scrub.

A number of introduced species are present in the park including the rabbit *Oryctolagus cuniculus*, black rat *Rattus rattus*, red fox *Vulpes vulpes*, pig *Sus scrofa* and cat *Felis catus*. The proximity of urban development to the state conservation area also means that dogs and pet cats enter the park. Rabbits and foxes are of particular concern because of their impact on vegetation, species diversity and native rodents.

Control programs undertaken include poisoning of rabbits and rats and trapping rats and feral cats. Calicivirus has been released for the control of rabbits to the south of the State Conservation Area. The feasibility of undertaking a pig trapping and fox shooting and/or baiting program is to be assessed. There are no bee hives in the state conservation area.

Bird Island Nature Reserve

Nineteen birds (Morris, 1996) and two reptile species have been recorded on Bird Island. The island's size and location limits the diversity of species and recruitment of non-flying species from the mainland.

Twelve species of seabirds and shorebirds have been recorded on Bird Island. The sooty oystercatcher is listed under the *Threatened Species Conservation Act 1995*. The wedge-tailed shearwater, short-tailed shearwater, ruddy turnstone, eastern curlew, whimbrel, bar-tailed godwit, red-necked stint, artic jaegar, Caspian tern, common tern, white-fronted tern, and little tern are listed under both the Japan-Australia Migratory Bird Treaty and the China-Australia Migratory Bird Treaty.

Up to 7,000 breeding pairs of wedge-tailed shearwaters *Puffinus pacificus* and short-tailed shearwaters *Puffinus tenuirostris* have been recorded on the island. The white-faced storm petrel *Pelagodroma marina* is a common breeding visitor. The endangered sooty oystercatcher *Haematopus fuliginosus* has also been observed on the rock ledges and a pair of peregrine falcons *Falco peregrinus* are resident and are thought to be the main predator on white faced storm petrel chicks. Sooty shearwaters *Puffinus griseus* and the eastern reef egret *Egretta sacra* have been recorded on the Island.

The reptiles are a jacky lizard *Amphibolurus muricatus* (an unusual pink mouth form) and an unidentified skink. No mammals or amphibians have been recorded on the island.

There are no known introduced animals on Bird Island Nature Reserve.

Policies

- * Management priority will be given to threatened species and habitat for threatened species, critical habitat, endangered populations and regionally significant species.
- * Improve knowledge of the fauna of both parks to allow assessment of the effectiveness of management and species specific programs to be developed.
- * Research and survey will be encouraged into the distribution, habitat requirements and ecology of threatened species or endangered populations within the parks.
- * Recovery plans will be implemented for threatened species or endangered populations which are known or expected to occur within the reserves.
- * The Service will assist the long term viability of fauna populations by controlling, and eradicating where possible, feral animals in the state conservation area, with priority to rabbits and foxes.
- * Dogs, cats, horses and other introduced animals will not be permitted within the state conservation area and nature reserve with the exception of guide dogs and registered assistance dogs (eg. hearing assistance dogs).
- * No bee hives will be permitted in the state conservation area.

Actions

- * Fauna surveys will be undertaken to update wildlife species lists.
- * A research program of survey and monitoring in the park will be prepared and components will be promoted as student research projects each year.
- * Species profiles (distribution/habitat requirements) and management guidelines will progressively be prepared for wildlife in the park and reserve.
- * Vertebrate pest control plans, with annual control targets, will be implemented within the park.
- * An assessment of options for pig and fox control will be undertaken and implemented if feasible, including baiting programs where necessary to protect threatened species.

4.1.4 Cultural Heritage

Aboriginal Sites and Places

The Awabakal people were the original inhabitants of the Munmorah area, occupying a coastal territory between Tuggerah Lakes and the Hunter River. People lived mainly in huts, large enough for six to eight people, with fires built at the entrance. Settlements of eight or nine huts were recorded by early settlers.

The area was rich in food resources. Shell fish were collected from rock platforms and beaches and fish were obtained from rivers and lakes, using lines and spears. Fishing canoes usually contained small hearths and fish were cooked soon after capture. Fish weirs were built on small tidal channels near camp sites. The lagoons, swamps and lakes were a plentiful source of birds, caught in nets or with throwing sticks. There are historical accounts of Awabakal people visiting Moon Island to collect muttonbird chicks and eggs. Wallabies, kangaroos, possums, bandicoots, wombats, fruit bats, rats, snakes and lizards were all hunted. Neighbouring Darkinjung people are believed to have visited Awabakal land for fishing in the summer and the Awabakal went inland for hunting in winter. Plant foods included fruit (eg cabbage palm, macrozamia, lilly pilly, geebung), seeds (eg acacias), leaves (eg of grass trees, rushes and sedges), roots/tubers (eg orchids, bracken fern), yams and flower nectar (from banksias, grass trees etc).

Not a great deal is known of the traditions and religion of the Awabakal. On the east coast of NSW people believed a god or deity, called Baiami or Bunjil, created the world and gave Aboriginal people their laws. There is a local story about a monster living in Lake Macquarie who would eat people on the lake, including their canoes, and Pulbah Island is a place of known cultural significance. People on the Central Coast, Lake Macquarie and the Hunter had similar initiation ceremonies and it appears that joint ceremonies were held, with historical accounts of large gatherings on the coast in the Tuggerah Lakes – Lake Macquarie area.

Settlement of Newcastle – Lake Macquarie by Europeans began in the 1820s and dispossessed Aboriginal people were forced into fringe camps, or church or government missions. The Reverend Threlkeld established a mission on Lake Macquarie near Belmont in c 1823. He moved to a new land grant on the western side of the lake near Toronto in the late 1820s. More government reserves were established in the 1860s and church groups

continued to establish missions in the 1870s: police were given powers as “official protectors” to “encourage” Aboriginal people to settle on reserves.

Archaeological investigation of Aboriginal sites in the wider region (Loggers Shelter, Mangrove Creek) indicates that people were probably living on the Central Coast about 11,000 years ago. The majority of recorded sites along the Central Coast (north of the Hawkesbury sandstone country) are shell midden deposits, mostly with a small range of species with no other associated evidence and nearly all are disturbed by recent land uses. Open beach middens are uncommon, probably because of sand mining: rocky headland middens are more common. Budgewoi, Munmorah and Tuggerah Lakes have few middens recorded on their foreshores, whereas Lake Macquarie has numerous middens on its margins.

Surprisingly few sites have been recorded in Munmorah given its size and diversity of environments and resources. A survey of the coastline from Lake Macquarie to Broken Bay was undertaken by Stockton in 1975 and 1976 (extent of coverage unclear), who recorded an average of one site per two kilometres of coastline, with beaches in close proximity to reefs or rock platforms, the most likely location for sites to occur. No sites were found on the Budgewoi Peninsular which was attributed to mining of the foreshore dunes. He recorded a midden with stone artefacts at Moonee Beach – Flat Rock. Ochre deposits at the northern end of Birdie Beach are reported to have been mined by Aborigines.

It is considered likely that additional shell middens occur, particularly on the rocky headlands in the centre of the park. The conglomerate geology of the state recreation area makes it unlikely that painting or engraving sites occur because the rock surfaces are uneven and are highly erodable.

The Darkinjung Local Aboriginal Land Council were consulted regarding any sites of significance during the preparation of this plan. No places of traditional or contemporary cultural significance have been reported to the National Parks and Wildlife Service.

Bird Island Nature Reserve has not been surveyed for Aboriginal sites. The nature of the shoreline makes landing difficult and also precludes the accumulation of archaeological deposits. Exploitation of food resources on off shore islands has been well documented elsewhere on the NSW coast and it is possible that people were able to make their way to the Island to collect eggs and sea bird chicks.

The National Parks and Wildlife Service recognises the right of Aboriginal people to make decisions about their heritage and will ensure that people are fully consulted and have input to work with potential to impact on Aboriginal cultural values, Aboriginal heritage research and in the development and implementation of any programs that interpret or promote the Aboriginal cultural heritage or history of the park.

Policies

- * Aboriginal people are considered by the Service to be the primary guardians and interpreters of the Aboriginal history and heritage.
- * Sites and places will be protected and managed in consultation with Darkinjung Local Aboriginal Land Council.
- * Work with the potential to impact on Aboriginal sites will be preceded by an Aboriginal heritage assessment undertaken in consultation with Darkinjung LALC.

- * Involvement of Aboriginal people in interpretation of the state recreation area's Aboriginal heritage will be encouraged.
- * Research into the Aboriginal heritage of the state recreation area will be encouraged.

Actions

- * The adequacy of previous survey coverage of Munmorah will be assessed.
- * Additional surveys and recording will be undertaken as gaps are identified, with priority to areas potentially impacted by visitor and management activities.
- * Aboriginal sites and places will be recorded, conserved and interpreted in consultation with the relevant Aboriginal Land Councils and community groups.
- * Aboriginal people will be invited to have input to any Discovery programs which interpret Aboriginal heritage or use of Munmorah.
- * A monitoring program to track the condition of the sites recorded in Munmorah will be developed and implemented.

Historic Places

The main historical uses of the park were recreation and extraction, with a variety of mostly small-scale, short-lived extractive enterprises carried out. Conglomerate gravels were taken from two quarries – one of which has been “rehabilitated”, the other is near Campbell Drive. Eroded and sorted gravels deposited in a sea cave at Snapper Point and on the beach at Wybung Head were collected, using a gantry at Snapper Point, the foundations of which survive. Clay was extracted from a pit near the northern entrance and sand from a pit near the southern entrance of the cave. Larger scale mineral sand mining took place at Birdie Beach, between Red Ochre and Tea Tree and the Budgewoi Peninsula was mined on both sides of Elizabeth Bay Drive. The Lakes Area office and depot were the office and operations centre of Associated Minerals Consolidated. Coal extraction occurred in the northern section of the park by long wall means so there is little associated evidence, other than access tracks and a dam.

During the Depression a small squatters camp grew up around Frazer Beach. The best known and longest resident of the camp was Dave Campbell, who lived in a shack near the beach, became a caretaker for Wyong Council when they managed Munmorah (then called Frazer Park), and lived there until his death in 1984. His shack was then removed, although associated archaeological deposits are likely to survive.

The park has been used for unclad bathing for over 80 years. On ANZAC day in 1958 the Red Ochre Swimming Club (ROSCO) was founded at the northern end of Birdie Beach and used the beach until the club transferred to Dora Creek. Unclad bathing is still a popular activity at the beach.

In September 1951 the “*SS Allenwood*” stranded at the northern end of Birdie Beach. Attempts to salvage the vessel were eventually abandoned and remains of the ship can be seen when the sand is transported offshore during periods of heavy rain, high seas and/or king tides.

During WW11, Bird Island, Birdie Beach and the surrounding area was used by the Royal Australian Air Force as a practice range.

The low key and / or marginal land uses of Munmorah have resulted in little physical evidence and the park is considered to have little potential for significant historical evidence to be present. There are no known historic places on Bird Island Nature Reserve and little potential given its history.

Policies

- * Any significant historic heritage found within the park will be conserved in accordance with the Burra Charter of Australia ICOMOS.
- * Physical evidence of marginal land uses will not be removed, unless contributing to erosion, but will not be actively conserved.
- * Research into the history of the park will be encouraged.

4.1.5 Fire Management

Under the *Rural Fires Act 1997* the Service is a fire authority and is responsible for controlling fires on parks and reserves so as to protecting life, property and natural and cultural heritage. The Service may also assist with the control and suppression of fires adjacent to parks and reserves

The Service also participates, as a member of local Bushfire Management Committees, in the preparation of bush fire risk management plans and plans of operations, required under S 52 of the Rural Fires Act. Munmorah State Conservation Area and Bird Island Nature Reserve are included in the Wyong bush fire district, which has a bush fire risk management plan and plan of operations. The Service is committed to co-operative fire management and will prepare reserve fire plans which complement the Wyong bush fire risk management plan and plan of operations.

The Service regards periodic fire as a natural phenomenon in many Australian landscapes. Native plant and animal communities have adapted to particular fire regimes. Proper management of fire is essential to the conservation of biodiversity and the protection of life and property.

Munmorah State Conservation Area has some particular challenges for fire management as it incorporates extensive areas of fire sensitive communities such as woodlands, palm dominated gullies, coastal heathland, a littoral remnant rainforest on the parks southern boundary and SEPP14 wetlands areas.

Fire history and frequency

Munmorah has a history of periodic wildfires caused by arson, with the majority lit along road sides, fire trails and walking tracks. Burning off, camp cooking, motor vehicle accidents and car arson are other lesser causes of wildfire. The fire history database for the park covers the period from November 1980. 69 fires (wildfires and prescribed burns) were recorded to 2000. Only 22.4% of the park was not burned in this time.

The main causes of fires in Munmorah SRA are arson, illegal burning off and other miscellaneous causes including camp cooking and motor vehicle accidents. Ignition points for the majority of fires are associated with access roads, trails, camping areas and adjacent properties neighbouring the reserve

A fire history database established for Munmorah State Conservation Area has been compiled based on 20 years of fire records commencing in November 1980 and is derived from incident reports, original maps, and anecdotal accounts from local fire brigade members and park neighbours.

A total of 69 fires (ie wildfires and prescribed burns) have been recorded in Munmorah SRA in the period between 1980 to 2000. Almost all of the SRA has experienced fires in this period, with 22.4% remaining unburnt since records began.

Management of fire in Munmorah SRA is targeted towards achieving desirable fire regimes which will conserve the biodiversity of the park. This will be achieved by remaining as far as possible within the threshold values for fire frequency, intensity and season of burning outlined in the reserve fire plan. As no local research has been undertaken into the fire regime requirements of the communities in the park and reserve, data collected from research into communities in the Sydney Basin, with a similar climate and vegetation communities, will be used to establish fire regimes in the reserve fire management plan.

The *Rural Fires Act 1997* requires each Bush Fire Management Committee to prepare and submit a Bush Fire Risk Management Plan and Operational Plan, to co-ordinate the activities of organisations for the prevention, control and suppression of bushfires.

The Wyong Shire Bush Fire Management Committee has adopted co-ordinated fire fighting policies based on the Policy Statement of the Co-ordinating Committee and the Manual of Procedures for Co-ordinated Fire Fighting. The Munmorah SRA Fire Management Plan will form part of the NPWS input into these plans.

Policies

- * Fire management will aim to protect life and property within and adjacent to Munmorah State Conservation Area and to achieve the earliest practical control of fires.
- * The management of fire in the park and reserve will be in accordance with the reserve fire management plan for Munmorah State Conservation Area and Bird Island Nature Reserve, when prepared, and the Wyong bush fire risk management plan and plan of operations.
- * The effective and efficient use of bushfire fighting resources through co-operative arrangements will be promoted.
- * Fire regimes in Munmorah State Conservation Area will be managed to:

- remain within identified fire regime thresholds for maintaining the biodiversity of communities within the park;
 - protect natural assets, including fire sensitive habitats; and
 - protect cultural assets and visitor facilities.
- * Wildfires, wildfire suppression operations and prescribed burning activities will be excluded as far as possible from littoral rain forest communities.
 - * The Service will continue to work cooperatively with other fire management authorities and the community in strategic planning for the protection of life and property and natural and cultural heritage.

Actions

- * Detailed fire history of Munmorah will continue to be collected and included in the fire information system to assist with fire management planning of the park.
- * The Service will continue to assist with the preparation and implementation of the Wyong risk management plan and plan of operations.
- * An annual fire management works program will be developed and implemented. Hazard reduction works will be conducted as specified in the works program, reserve fire management plan and bush fire risk management plan.
- * Fire awareness and education will be promoted by the Service particularly through the development of community fireguard programs.

4.2 USE OF THE STATE CONSERVATION AREA AND NATURE RESERVE

Munmorah State Conservation Area and Bird Island Nature Reserve will be managed to ensure that use, by the general public, special interest groups, Service managers or other authorities, is appropriate and conforms with the *National Parks and Wildlife Act 1974* and the management objectives and policies of this plan.

The uses that are appropriate in Munmorah State Conservation Area are:
 activities related to the promotion of the area's natural values;
 nature based outdoor recreation;
 scientific research; and
 management operations by the Service and other authorities and organisations.

The use of Bird Island Nature Reserve will be limited to scientific research because of its restricted access and its high value for the conservation of seabirds.

4.2.1 Promotion and Environmental Education

There is currently limited promotion of the state conservation area within the local and wider community and people visit with a diverse range of expectations and understanding of appropriate behaviour. To improve the community's understanding of the importance of the park, programs need to be undertaken to encourage support and a sense of "local ownership". These will be based on promotion of the following key values of the park:

- the scenic landscape;
- the diversity of native plant communities and the spectacular wildflower display;
- the importance of animal communities; and
- coastal processes, including those of the intertidal zone.

The promotion of programs to protect nature conservation and recreation values by the control of fire, weeds and feral animals will also be high priority.

The natural features of the state conservation area make it valuable for education and Munmorah has a long tradition of use for field studies by educational groups including primary and secondary schools, TAFE colleges and universities. The primary educational interest is in the littoral rainforest, coastal heath and wetland vegetation. Other areas of study include fauna survey and management, geography, geology, geomorphological processes, coastal zone management, the intertidal zone, dune care, weed control and the impact of sand mining activities.

Information is currently provided by staff at visitor entry stations when are operational (usually on weekends, school holidays and the peak summer season) and by Rangers when on duty within the park. There are currently no static displays and for much of the time no park information is available. The redevelopment of the southern entry station provides an opportunity to rationalise all signage (directional, regulatory and warning signs) within the park.

Inside the park, information and some interpretation of natural values is provided in displays at Freemans and Frazer Park camping areas, Tea Tree picnic area and Birdie Beach. The interpretive displays are somewhat dated and require upgrading. It is proposed to install new displays which provide locality specific information and interpretation of the features of those areas, eg LandCare at Birdie Beach.

Information about Munmorah and other parks in the region and state is provided at the Lakes Area office. The current office is located off Elizabeth Bay Drive, Lake Munmorah, with a new office proposed for construction adjacent to the northern park entry, on Blue Wren Drive". (refer section 4.2.4).

The focus on Bird Island Nature Reserve will scientific research rather than environmental education, although information will be provided off-park on the values of the island.

Policies

- * Munmorah State Conservation Area will be promoted with an emphasis on scenic and landscape values, vegetation communities and nature based recreational opportunities.
- * The Service will liaise with educational groups to promote the key values of the reserve and broader conservation goals.
- * The purpose and techniques used in management programs for the control of fire and pest species, will be promoted within the local community.

- * The NPWS *Discovery* interpretation program will be promoted in the state conservation area throughout the year with a range of activities relating to the key values of the reserve and the purpose of management programs.
- * The Service will support local tourism organisations to promote Munmorah State Conservation Area.
- * Greater community involvement in Discovery, LandCare and DuneCare activities will be promoted.

Actions

- * Interpretive displays will be progressively upgraded at key visitor contact points throughout Munmorah State Conservation Area.
- * Signs and brochures will be provided to interpret features of interest and assist with the orientation of visitor throughout the state conservation area.
- * Signage will be rationalised and upgraded in line with the Services design standards to improve traffic movement, to be more generally welcoming, to provide guidance on acceptable activities and information on facilities and attractions.
- * Educational resource kits will be developed for use in Munmorah State Conservation Area.
- * Information displays will be provided at the southern entrance station and on Elizabeth Bay Drive.
- * Existing information bays throughout the park will be upgraded to provide locality specific information.
- * Information about the recreation opportunities provided and suitable behaviour will be presented on each information display and by means of brochures.
- * Management activities will be promoted by means of fliers, pamphlets, press releases, signs etc at key times of the year (ie when aerial spraying, or hazard reductions etc are planned).
- * Signs will be upgraded with priority to the park entrances and the camping areas.
- * A new park office will be constructed adjacent to the northern park entry on Blue Wren Drive, which will offer a broad range of visitor information and resources.
- * The Service will liaise with and provide brochures and Discovery program information to local tourist information centres.

4.2.2 Recreation Opportunities

Munmorah State Conservation Area forms part of a larger outdoor recreation and tourism region that stretches from the Hawkesbury River to Lake Macquarie. It offers recreational opportunities that are different to those provided elsewhere on this coast and provides alternative outdoor recreation opportunities to those provided by the commercial and local government recreation and tourism sector.

Surveys indicate that there are about 350,000 visits per annum, though numbers vary considerably according to weather conditions. Visitor numbers are highest during the summer and concentrated at the main day use areas of Frazer and Birdie Beaches. Surveys also show that visitors are attracted primarily for the area's naturalness and the variety of outdoor recreation, such as fishing and surfing. It is anticipated that continuing urban expansion on the Central Coast will lead to an increase in use of the state conservation area, resulting particularly in additional demands for day use facilities.

Vehicle Access

Public access to Munmorah State Conservation Area is from the Pacific Highway (south bound vehicles only), via Blue Wren Drive (a park road); and from Elizabeth Bay Drive.

The National Parks and Wildlife Service restricted night time access to the park commencing in 2006. This was due to a significant and ongoing increase in vandalism and anti-social behaviour in the reserve over the previous five years. The southern entry to the park, on Birdie Beach Drive east of the 'Birdie Sands' housing estate was gated, as was the northern entry to the park, and closed to night time access.

Overnight camping will continue to be provided for at Frazer and Freemans camping areas even though both access gates are locked at night. A security firm has been contracted to undertake daily gate opening/closure and also to provide egress to campers (at their expense) if required

Internal park roads include:

- Birdie Beach Drive which provides access to Freemans camping area, Tea Tree picnic area and Birdie Beach;
- Campbell Drive and Wybung Head Road to Wybung Trig and Wybung Head;
- Campbell Drive and Frazer Beach Road to Frazer Beach and Frazer Camping Area; and
- Campbell Drive and Snapper Point Road to Snapper Point.

Parking is provided at Snapper Point, Wybung Head, Frazer Beach, Birdie Beach, Tea Tree and The Palms.

There are two vehicle entrance stations where entry fees are collected: the northern entry off the Pacific Highway to Blue Wren Drive and the southern entry off Elizabeth Bay Drive. This latter access is along a section of public road, Birdie Beach Drive.

The Lakes Area office and depot is served by a short road from Elizabeth Bay Drive. The turn is considered dangerous and liaison will be undertaken with Wyong Council in relation to provision of turning lanes as part of the proposed upgrading of Elizabeth Bay Drive. It is also proposed to upgrade this section of road to the Office and Depot.

There are numerous sand mining roads on the southern peninsula which will be closed and rehabilitated, except for the old rutile road which will be retained for management purposes. Three existing tracks will be retained and formalised to provide pedestrian access from Elizabeth Bay Drive to southern Birdie Beach.

The existing and proposed road network shown on map, centre pages.

Lookouts

A number of informal lookouts are located on park roads, providing panoramic views of the coastline from Wybung Trig and two sites along Snapper Point Road at Flat Island Lookout and Timber Beach Lookout. These sites are proposed to be formalised as “pull over” areas to allow sightseers, including bus touring groups and the aged and disabled, an opportunity to experience the state conservation area in safety. A viewing platform at Wybung Trig may be considered to alleviate current vehicle movements and subsequent erosion problems occurring around the Trig and impacting on the adjacent heath vegetation.

The proposed lookouts are shown on the map, centre pages.

Camping Areas

Camping, as with wider park use, is affected by seasonal conditions. In 1992-93 there were 14,000 camper nights recorded for the state conservation area. In 1993-94 this dropped to 8,000 because of the fires on the Central Coast and in 1994-95 a wet spring reduced camping to only 5,200 nights. Camping is provided at Freemans camping area with 50 sites and Frazer camping area with 6 sites. Both have gas BBQs, septic toilets and cold showers.

Frazer camping area is extremely popular and booked out well in advance. The location is constrained by the surrounding steep topography and the need to provide parking and picnicking facilities for the large number of day visitors at Frazer Beach.

Each area offers a different experience and setting for campers. Rotation of over-used sites and landscaping is proposed for both Frazer and Freemans camping areas but the capacity of these camping areas will not be increased. Apart from Frazer and Freemans, no other camping areas will be established and camping will only be permitted in these two areas of the park.

Day Use Areas

Day use areas, with tables, seats, water, rubbish bins, gas BBQs and carparking are provided at Tea Tree Picnic Area near Birdie Beach, Elizabeth Bay Drive and the Palms Picnic Area on Frazer Beach Road.

Toilets are available at Birdie Beach and Frazer Beach carparks, consideration may be given to further develop these sites into picnic areas by providing tables, seats and gas BBQs.

In May 1993 the Moonee Beach area was added to the state conservation area. Its use has been limited because of a absence of legal road access from Catherine Hill Bay and walking is the only access. It is proposed to continue to promote walking track access only to Moonee Beach, as opportunities for bushwalks in the park are limited and as an alternative to the more highly developed areas to the south.

Walking Tracks

Walking tracks are an important means of providing opportunities for visitors to experience the state conservation area's features. The inland or western area of the state conservation area is relatively under-utilized and the existing Geebung Heath and Grasstree walking track system is an important means of providing diverse experiences for walkers. These tracks are currently unmarked, eroded and overgrown in some sections and will require upgrading. It is proposed to develop the existing Geebung Heath and Grasstree tracks to form part of the coastal walking track linking Budgewoi in the south to Catherine Hill Bay in the north.

Currently no public access from the Freeman's camping area to the coastal walking track system exists. It is proposed to provide access for campers to this section of the track by constructing a bridge across the Birdie Beach lagoon linking up with the Geebung Heath Track.

The walking track system is shown on the map, centre pages.

Other Uses

The state conservation area is used by many organised groups for a variety of activities including surfing and wave ski competitions, wind powered model aircraft, hang gliding, guided tours and walks, weddings and commercial filming; all of which require consent under the National Parks and Wildlife Regulation.

Munmorah State Conservation Area is widely recognised as a popular beach and rock fishing location. There have been a number of fatalities in the park of rock fishers and there is a need to alert the public to the dangers of rock fishing in this area.

The northern area of Birdie Beach locally known as Red Ochre Beach has been used since 1958 for nude bathing. The *Local Government Act 1993* currently places responsibility for providing areas for nude bathing with the local council. Council may permit nude bathing by erecting notices with the consent of the person who owns or occupies the land. Nude bathing at Red Ochre Beach has been endorsed by Wyong Shire Council and is permitted in the park.

Horse riding is only permitted on public roads and has not been permitted in the park for some years.

No recreation opportunities are provided on Bird Island Nature Reserve.

Policies

- * The Service will encourage sustainable and minimal impact recreational use within the area.
- * The Service will upgrade some informal lookouts to minimise safety problems.
- * Public vehicle access will be confined to existing public roads and car parks in the state conservation area. No vehicles will be permitted on the beaches in the park.
- * Cycling will be permitted on all roads and management trails in the park.
- * Visitors will be encouraged to remove their own rubbish from the park.

Actions

- * The southern and northern park entries will be upgraded.
- * Liaison will be undertaken with Wyong Shire Council regarding construction of turning lanes off Elizabeth Bay Drive to provide safer access to the state conservation area office and depot.
- * Both the southern and northern entry roads to the park will be closed at night.

- * Signage clearly outlining gate opening and closing times and after hours fees for gate openings will be erected at both visitor entry points.
- * A viewing platform and a formalised pull over area may be constructed at Wybung Trig.
- * The Service will consider formalising the lookouts and car parking along Snapper Point Road.
- * Landscaping with endemic vegetation will be undertaken to provide shade and to improve the aesthetics of camping, picnic and day use areas, with priority to Freemans camping area.
- * The Birdie Beach parking area will be upgraded and landscaped. A picnic area will be provided adjacent to the carpark.
- * The Frazer Beach car parking area picnic facilities will be upgraded.
- * A picnic facility will be provided adjacent to the Geebung Heath walking track parking area.
- * The coastal walking track system will be upgraded with track head signage installed at the Geebung and Grasstree walking tracks.
- * Wheelchair/stroller access may be provided from Snapper Point car park to the headland, by construction of a platform/boardwalk.
- * A walking track and bridge will be constructed from Freemans Camping Area to the Geebung Heath section of the coastal walking track.
- * Three walking tracks to Birdie Beach utilising existing tracks will be maintained along the southern peninsula.
- * The Geebung Heath, Grass Tree and Melaleuca walking tracks will be signposted and upgraded as necessary. Only pedestrian access will be allowed.
- * The Moonee Beach Trail will be maintained as a management trail and will be promoted as a walking track to the beach.
- * All walks will be signposted and will display the distance and time taken to complete the walk.
- * Visitors will be encouraged to remove their own rubbish by signs and through park information. Rubbish bins will progressively be reduced in number or removed from some locations.
- * "No horse riding" symbol signs will be placed at specific track heads as required.
- * Information about the state conservation area will promote awareness of safety issues including rockfishing.

4.2.3 Scientific Research

Research in the park and reserve aims to improve the management of natural and cultural

features and the processes which affect them. The park and reserve offer a number of opportunities for scientific research - of particular interest is the diversity of native plant communities.

All scientific research is required to be authorised in accordance with *the National Parks and Wildlife Act 1974*.

The Service does not presently have the resources to undertake long term monitoring or research in either Munmorah State Conservation Area or Bird Island Nature Reserve and relies on work undertaken by outside institutions. As part of a strategy to encourage scientific use of the park, liaison will be maintained with the University of Newcastle and other research and educational institutions and individuals.

Munmorah State Conservation Area

Research undertaken in the park includes an orchid survey by the Royal Botanic Gardens and a study of the regent honeyeater by a Newcastle University student.

Information has been made available by other agencies, such as Energy Australia and Wyong Shire Council, through environmental impact assessments undertaken in the park or on nearby lands. This includes details on plant and animal species and communities, particularly small mammals, reptiles and amphibians.

Coal Operations Australia has the right to mine coal from under the park which often requires access to surface facilities. As part of its operations, the company has undertaken a number of environmental impact assessments and other surveys of the park and nearby natural lands, which have provided information on the flora, fauna and geology of the area.

Records of visitor and camping use of the park are kept. However, further research and survey work is required to provide an improved profile of state conservation area visitors.

Bird Island

Apart from a study on the birds of Bird Island Nature Reserve by Service staff and members of the Australian Bird Study Association, no other studies have been conducted on the island.

Policies

- * Research will be encouraged at both Munmorah State Conservation Area and Bird Island Nature Reserve.
- * Research on Bird Island Nature Reserve will be encouraged into the relationships between breeding bird colonies and their habitat.

Actions

- * The Service will develop a research prospectus which will identify annual priorities and funding arrangements for research projects within the area and nature reserve. Priority for research projects on Munmorah State Conservation Area will be given to:
 - the identification and management of threatened native plant and animal communities;
 - the effect of fire on native plant and animal communities, in particular those containing threatened species such as *Tetratheca juncea*; and
 - a visitor survey to assist in the preparation of a state conservation area visitor profile.

4.2.4 Management Operations

Munmorah State Conservation Area is located within the NPWS Central Coast / Hunter Range Region and is currently administered from the Lakes Area office off Elizabeth Bay Drive. The Area's works depot adjoins and contains workshops, a nursery, fuel and chemical store, wash down bay and whale rescue equipment store. A new management administration building and works depot will be constructed adjacent to the existing northern park entry, on Blue Wren Drive.

The residence built by the Trust for the Park Manager off Elizabeth Bay Drive will continue to be used for staff accommodation.

There are two easements within or adjacent to Munmorah State Conservation Area:

- an easement granted to Energy Australia for an electricity line along the Rutile Road; and
- an easement to Wyong Shire Council for a temporary access road along Elizabeth Bay Drive between Budgewoi and Elizabeth Bay.

A small number of management tracks are maintained for fire and weed control. The “rutile road” is used by Energy Australia for powerline maintenance purposes. Management tracks are outlined on the map, centre pages.

As part of the Region's involvement in marine mammal incidents a cemetery has been established in Munmorah State Conservation Area for the autopsy and disposal of marine mammal carcasses.

The park is reserved to a depth of 20 metres because of coal mining interests. The recent Moonee Beach addition was added to the park as a result of negotiations between the mining company and the Department of Urban Affairs and Planning. In accordance with the

conditions of transfer of lands to the Service a number of existing mining rights were permitted by agreement under a special coal mining lease. This allows the existing mining operations to continue.

A small quarry is located in the park adjacent to Campbell Drive and is currently used for the extraction of gravel for the maintenance of roads, tracks and other facilities within the park . It is proposed to rehabilitate the quarry once extraction has ceased.

Two community programs are current within the park:

- the Budgewoi/Birdie Beach dune care group undertakes a dune maintenance program at Birdie Beach and propagation activities at the depot; and
- a Community Service Order program run by NSW Probation and Parole Service of the NSW Department of Corrective Services which assists with ground maintenance.

Access to Birdie Beach via Ocean Street Budgewoi was previously permitted for professional fishing in accordance with a consent provided jointly by the Service and Wyong Shire Council. No other access is provided to Birdie Beach or other areas of the park for professional fishing purposes.

Policies

- * The management trails outlined on the map, centre pages, will be maintained for use by the Service or other agencies for authorised management purposes.
- * Access to management trails by private vehicles unless for management purposes will be prohibited.
- * No additional roads or trails will be constructed in the park.
- * Extraction of gravel from the quarry for road and track maintenance will be limited to that required for the Service's own use in the state conservation area.
- * Commercial fishers with pre-existing access rights will continue to be licensed by the Service to access Birdie Beach.

Actions

- * All trails which are not part of the public access or management trail system will be closed and rehabilitated.
- * Construct a new Lakes Area Management/ Administration and Works Depot adjacent to the visitor entry station on Blue Wren Drive.
- * Remove existing office and depot from old location off Elizabeth Bay Drive, and rehabilitate site.
- * The quarry will be rehabilitated following the removal of useable gravel.

5. PLAN IMPLEMENTATION

This plan of management is part of a system of management policy and planning developed by the National Parks and Wildlife Service. The system includes the *National Parks and Wildlife Act 1974*, corporate planning, and associated strategies and management policies. It also includes regional operational planning.

The orderly implementation of this plan of management will be undertaken within the annual programs of the Service's Central Coast/Hunter Range Region. Priorities will be subject to regional priorities, the availability of funding and staff and to any specific requirements of the Director-General or the Minister.

Regional programs are subject to on-going review within which works and any other activities carried out in Munmorah State Conservation Area and Bird Island Nature Reserve will be evaluated in relation to objectives laid down in this plan.

The environmental impact of all development proposals will be assessed in accordance with established environmental assessment procedures.

In accordance with Section 81 of the *National Parks and Wildlife Act 1974*, this plan shall be carried out and given effect to and no operations shall be undertaken in relation to Munmorah State Conservation Area and Bird Island Nature Reserve unless those operations are in accordance with the plan of management. If after adequate investigation, operations not included in the plan are found to be justified, the plan may be amended in accordance with Section 73B of the Act.

The management proposals outlined in the plan have been prioritised into the following categories:

Activities	Reference (in plan)
HIGH PRIORITY	
* Prepare and implement annual weed control and regeneration program	4.1.2
* Prepare weed control site plan for Birdie Beach and Tea Tree	4.1.2
* Prepare and implement vertebrate pest control plans	4.1.3
* Assess options for pig and fox control and implement if feasible	4.1.3
* Invite Aboriginal people to participate in Discovery programs	4.1.4
* A fire management plan will be prepared and regularly reviewed	4.1.5
* An annual fire management works program will be developed and implemented	4.1.5
* The Service will continue its representation on the Wyong bush fire management committee	4.1.58

*	The fire management information system will be further developed and maintained	4.1.5
*	Provide interpretive displays at key visitor locations throughout the state conservation area	4.2.1
*	Provide interpretive and orientation signs and brochures	4.2.1
*	Close the southern and northern entry roads to the park at night	4.2.2
*	Erect signage clearly outlining gate opening and closing times and after hours fees for gate openings at both visitor entry points	4.2.2
*	Undertake landscaping, with priority to Freemans camping area	4.2.2
*	Upgrade Birdie Beach parking area and provide picnic area	4.2.2
*	Seek construction of turning lanes off Elizabeth Bay Drive to the State Conservation Area office	4.2.2
*	Upgrade northern and southern entrances to the park	4.2.2
*	Upgrade Frazer Beach Picnic Area	4.2.2
*	Upgrade Geebung, Grass Tree and Melaleuca walking tracks as part of the Coastal Walk.	4.2.2
*	Construct walking track and bridge from Freeman's camping area to Coastal walking track	4.2.2
*	Promote Moonee Beach Trail as access to Moonee Beach	4.2.2
*	Close and rehabilitate trails not part of the access system	4.2.2
*	Develop prospectus of research projects	4.2.3
*	Construct a new Management/ Administration and Works Depot adjacent to the visitor entry station on Blue Wren Drive.	4.2.4
*	Remove existing office and depot from old location off Elizabeth Bay Drive, and rehabilitate site	4.2.4

MODERATE PRIORITY

*	Rehabilitate disturbed areas, with priority to Snapper Point and the sandmined areas at Birdie Beach	4.1.1
*	Seal roads to Snapper Point and Wybung Head and the carpark at The Palms	4.1.1
*	Monitor water quality at The Palms	4.1.1
*	Prepare research design and encourage scientific enquiry into the ecology of endangered plant species	4.1.2

- * Survey and map the vegetation on Bird Island 4.1.2
- * Prepare research design and encourage scientific and educational studies into habitat requirements of animal species 4.1.3
- * Assess adequacy of Aboriginal surveys and undertake additional surveys and recording where necessary 4.1.4
- * Develop and implement an Aboriginal site monitoring program 4.1.4
- * Record, conserve and interpret Aboriginal sites and places in consultation with the relevant Aboriginal Land Councils and community groups 4.1.4
- * Promote increased community understanding of the role and management of fire within the state conservation area 4.1.5
- * Establish a scheme of community and volunteer support 4.2.1
- * Provide information to the public on management programs and recreation opportunities 4.2.1
- * Develop educational resource kits for use in environmental education programs 4.2.1
- * Provide information to local tourist information centres 4.2.1
- * Provide information on rubbish removal and safety 4.2.2
- * Erect “no horse riding” symbol signs where necessary 4.2.2

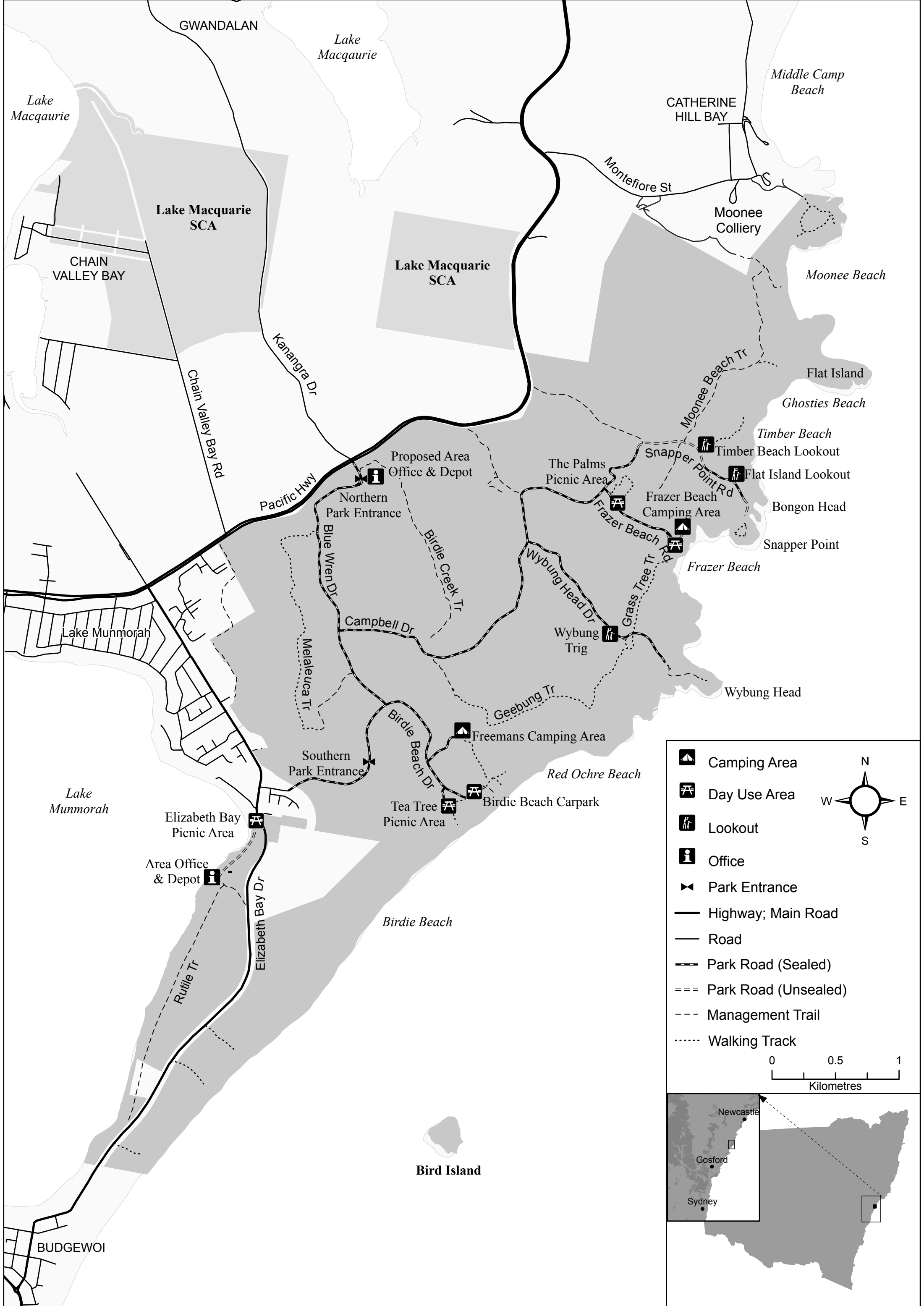
LOW PRIORITY

- * Develop picnic area at Geebung Picnic Area 4.2.2
- * Provide three walking tracks to Birdie Beach along the southern peninsula 4.2.2
- * Construct viewing platform and car park at Wybung Trig if needed 4.2.2
- * Construct disabled access to Snapper Point headland if needed 4.2.2
- * Provide four car parking areas and lookouts along Snapper Point Road if needed 4.2.2
- * Rehabilitate the quarry following the extraction of useable gravel 4.2.4

SELECTED REFERENCES

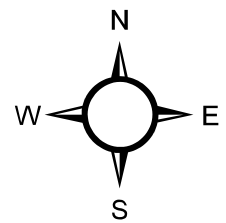
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	Camping Area
	Day Use Area
	Lookout
	Office
	Park Entrance
	Highway; Main Road
	Road
	Park Road (Sealed)
	Park Road (Unsealed)
	Management Trail
	Walking Track

0 0.5 1
Kilometres



Bird Island

BUDGEWOI

GWANDALAN

CATHERINE HILL BAY

Lake Macquarie SCA

Lake Macquarie SCA

Moonee Colliery

CHAIN VALLEY BAY

Moonee Beach

Chain Valley Bay Rd

Kanangra Dr

Pacific Hwy

Proposed Area Office & Depot

Northern Park Entrance

Blue Wren Dr

Birdie Creek Tr

Campbell Dr

Melaleuca Tr

Wybung Head Dr

Wybung Trig

Geebung Tr

Southern Park Entrance

Birdie Beach Dr

Freemans Camping Area

Red Ochre Beach

Tea Tree Picnic Area

Birdie Beach Carpark

Elizabeth Bay Picnic Area

Area Office & Depot

Elizabeth Bay Dr

Ruttie Tr

Birdie Beach

Middle Camp Beach

Flat Island

Ghosties Beach

Timber Beach

Timber Beach Lookout

Flat Island Lookout

Bongon Head

Snapper Point

Frazer Beach

Wybung Head

Montefiore St

Moonee Beach Tr

Snapper Point Rd

Frazer Beach Rd

Grass Tree Tr