

**DHARUG NATIONAL PARK
PLAN OF MANAGEMENT**

NSW National Parks and Wildlife Service

July 1997

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FOREWORD

Dharug National Park covers about 14 834 ha and is located on the north bank of the Hawkesbury River opposite the small settlement of Wisemans Ferry, some 55 km from the centre of Sydney and 25 km west of Gosford. Established in 1967, the park features spectacular sandstone cliff-lines and gullies, a substantial section of the historic Old Great North Road and a great many Aboriginal sites.

The national park is an important element in the system of conservation areas comprising Marramarra, Popran, Brisbane Water and Ku-ring-gai Chase National Parks along with several nature reserves which protects the very high scenic values of the Hawkesbury River and Broken Bay.

Dharug National Park is also one of a large group of predominantly sandstone parks and reserves that forms a green belt around metropolitan Sydney. The maintenance of 'corridors of green' linking areas of bush land across a wide range of environments is important for the conservation of biodiversity within the Sydney sandstone biogeographical region.

The completion of an inventory of the park's endangered fauna is identified as a high priority to provide a scientific basis for the conservation of the species and their habitat.

This plan of management addresses the management of Aboriginal sites within the park which will be recorded, protected and interpreted in conjunction with the local Aboriginal community.

Priority will be given to the control of whisky grass and blackberry on alluvial flats and lantana on Narrabeen series footslopes. Introduced animals will be progressively controlled with priority given to wild dogs on park boundaries and foxes and goats throughout the park.

The management of the park will provide pack camping and low-impact outdoor recreation opportunities that complement those available through-out the region. The historic Old Great North Road will be conserved, interpreted and promoted for cultural tourism in accordance with the recommendations of the Draft Conservation Plan.

This plan of management establishes the scheme of operations for Dharug National Park. In accordance with the provisions of Section 75 of the National Parks and Wildlife Act, 1974, this plan of management is hereby adopted.

PAM ALLAN

Minister for
the Environment

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1. INTRODUCTION

The National Parks and Wildlife Act, 1974, requires that a plan of management be prepared for each national park. A plan of management is a legal document that outlines how the area will be managed in the years ahead.

The procedure for the adoption of a plan of management is specified in the Act and involves the following:

- * 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 during this period any person may make representations about the plan.
- * The plan and copies of all the representations are referred to the National Parks and Wildlife Advisory Council for its consideration and report to the Minister.
- * The Director-General submits the plan together with any comments and suggestions of the Council to the Minister.
- * The Minister may adopt the plan with or without alteration as may be seen fit after considering the comments of the Advisory Council or may refer the plan back to the Director-General and Council for further consideration before adoption.

A draft plan of management for Dharug National Park was placed on public exhibition for a period of three months ending 12th August 1996. During the period of public exhibition, twenty two representations were received which raised fifteen issues. These representations were referred to the National Parks and Wildlife Advisory Council for review and report to the Minister. The comments and suggestions of the Advisory Council were in turn considered by the Minister when adopting this plan.

Once a plan of management has been adopted by the Minister, no operations may be undertaken within the national park except in accordance with the plan.

For additional information or enquiries on any aspect of the management of Dharug National Park, please contact:

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or telephone **(043) 24 4911** during business hours.

2. MANAGEMENT CONTEXT

2.1 NATIONAL PARKS IN NEW SOUTH WALES

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

The International Union for the Conservation of Nature and Natural Resources (IUCN) in 1994 defined a national park as:

"A natural area of land/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 the spiritual, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible."

National parks are a part of the regional pattern of land use. The management of a national park aims at minimising disturbance to natural and cultural features. Other land uses (eg. agriculture, forestry and mining) are distinguished from national parks by an acceptance or encouragement of environmental modification. National parks provide for only a limited part of the pattern of land use in any region.

2.2 DHARUG NATIONAL PARK

2.2.1 Location and Regional Context

Dharug National Park covers 14 834 ha and is located north of the Hawkesbury River, some 55 km north of the centre of Sydney and 25 km west of Gosford. The park is bounded by Yengo National Park, the Wiseman's Ferry and Old Great North Roads, McPherson State Forest, private land along Mangrove Creek and the townships of Gunderman and Spencer.

Reserved in 1967, the park features spectacular sandstone cliff-lines and gullies, a substantial part of the historic Old Great North Road and a great many Aboriginal sites.

2.2.2 Significance of Dharug National Park

Dharug National Park is one of a large group of predominantly sandstone national parks, state recreation areas and nature reserves surrounding Sydney. Other parks in this group include the extensive areas of Wollemi National Park, Blue Mountains National Park, Yengo National Park, Parr State Recreation Area and the important smaller national parks surrounding metropolitan Sydney and the Central Coast such as Royal, Heathcote, Ku-ring-gai Chase, Marramarra, Brisbane Water, Popran and Bouddi National Parks. Large tracts of protected natural areas which include State forests and the Mangrove Creek Catchment Area lie adjacent to and complement the national park system. Dharug National Park has great aesthetic significance being a naturally vegetated component of the spectacular drowned river-valley landscape of the Hawkesbury River.

Dharug National Park therefore forms part of a corridor of bushland extending from Brisbane Water to the western side of the Blue Mountains. The maintenance of such 'corridors of green' linking areas of bushland across a wide range of environments is important for the conservation of biodiversity.

The diversity of age classes within the vegetation in this corridor also adds value to the biodiversity of the whole region and assists in the conservation of native plant and animal species and communities.

The remnants of native vegetation on the lower shale slopes, volcanic intrusions and alluvial flats protected within Dharug National park are particularly important as many similar communities have been cleared along the Hawkesbury River.

Dharug National Park provides a large area of substantially natural habitats, including nesting and breeding sites, that support a wide range of animal species, some of whose territories range over the surrounding rural areas. In particular, sixteen endangered fauna species and seven rare and restricted plants have been recorded within the park.

The protection within the national park of the undisturbed catchments of tributaries to the Hawkesbury River is also critical to the continuation of aquatic life and natural systems associated with the river.

The park derives its name from the Aboriginal people of the area known as the Daruk. The Aboriginal sites in the national park provide physical evidence of a traditional Aboriginal culture and are a very important example of Hawkesbury Sandstone Aboriginal art sites; the style of which is unique in Australia. The art site known as "Group Six" is listed on the Register of the National Estate.

The Aboriginal sites in Dharug National Park are an important part of contemporary Aboriginal culture.

The Old Great North Road is a feature of cultural significance at a national level and is also listed on the Register of the National Estate. The Great North Road was built using convict labour between 1825 and 1836 and spanned the 250 km between Sydney and the middle reaches of the Hunter Valley. A relatively intact section of the road, approximately sixteen kilometres long, is conserved within Dharug National Park.

The park provides opportunities for scientific research, particularly in the fields of historic and Aboriginal archaeology, herpetology and entomology.

The walking tracks, camping areas and picnic areas of Dharug National Park offer important natural area recreation opportunities for the populations of Gosford and Wyong and the rapidly expanding north-west sector of Sydney. The park is part of a package of tourist destinations within the Hawkesbury River region. In particular, the Old Great North Road is a popular cultural tourist destination within the region.

3. OBJECTIVES OF MANAGEMENT

3.1 GENERAL OBJECTIVES FOR NATIONAL PARKS

The following general objectives relate to the management of national parks in New South Wales:

- * to protect and preserve scenic and natural features;
- * to conserve wildlife;
- * to maintain natural processes as far as is possible;
- * to protect Aboriginal and non-Aboriginal historic heritage;
- * to provide appropriate recreational opportunities; and
- * to encourage scientific and educational inquiry into environmental features and processes, prehistoric features and park use patterns.

3.2 SPECIFIC OBJECTIVES FOR DHARUG NATIONAL PARK

In addition to the above general objectives, the following specific objectives apply to the management of Dharug National Park:

- * to manage Dharug National Park as part of a system of national parks, state recreational areas and nature reserves which together conserve the biodiversity and natural processes of the lower Hawkesbury River system;
- * to protect the park's scenic value as part of the lower Hawkesbury River land system;
- * to protect the catchments that occur within the park;
- * to protect Aboriginal sites within the park in conjunction with the local Aboriginal community;
- * to protect the historic Old Great North Road;
- * to promote the use of the park for environmental education purposes; and
- * to promote the use of the park for low-impact recreation in a natural setting and for appropriate cultural tourism.

3.3 OVERALL STRATEGY

Promote within the local community, particularly neighbours of Dharug National Park, the importance and purpose of management programs relating to the protection of its natural and cultural features and the control of fire, weeds and feral animals.

Recreation management will provide opportunities for public use that are appropriate to a national park and complementary to those offered elsewhere on the lower Hawkesbury River.

4. POLICIES AND FRAMEWORK FOR MANAGEMENT

This section contains the policies and framework for the management of Dharug National Park together with relevant background information. Policies are summarised under the following headings:

- * Dharug National Park: Its Natural and Cultural Landscapes; and
- * Promotion and Use of the Park.

The actions identified are those proposals 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 objectives and policies set out in the plan.

Where not specifically provided for in this plan of management, the management of Dharug National Park will be in accordance with the National Parks and Wildlife Act and with general Service conservation and other management policies.

4.1 Dharug National Park: Its Natural and Cultural Landscapes

4.1.1 Geology, Landforms, Hydrology and Soils

Dharug National Park lies 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 park lies on the northern margin of the Hornsby Plateau; a subdivision of the Sydney Basin.

Dharug National Park demonstrates a number of erosion cycles which have produced distinctive peneplained surfaces. The vigorous erosion cycle of the modern Hawkesbury-Nepean River, at the end of the Pliocene Period (2-3 million years ago) and again during the Pleistocene Period (2 million-10 000 years ago) when sea levels were much lower, deeply entrenched the Hawkesbury River, Broken Bay, Pittwater and the broad basin of Brisbane Water. The present spectacular landscape of the foreshore developed as a result of the progressive drowning of these river valleys by the sea from 18 000 to about 7 000 years ago following the end of the last glacial period.

The park has been divided into four land units:

- **Hawkesbury Sandstone** is the most extensive land unit within Dharug National Park and forms 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.

Landforms present in the park resulting from differential erosion and weathering of Hawkesbury Sandstones include good examples of honeycomb weathering, gnammas (a small sandstone depression which usually holds water), cavernous joint weathering, overhanging sandstone visors and undercut bluffs.

- the **Narrabeen Group of sedimentary rocks** underlies the Hawkesbury Sandstone and consists of laminates, shales and sandstones of the Terrigal formation. Soils derived from this series are relatively deep clay soils with duplex profiles of red podsolics. At higher elevations these

soils are mixed with talus and downwash from the overlying Hawkesbury sandstone.

- **volcanic diatremes and dykes** of early Tertiary (65 to 40 million years ago) and Jurassic (190 to 140 million years ago) ages occur near Spencer and Ten Mile Hollow. The volcanic breccia diatreme at Scotchman's Creek near Spencer has weathered to an extensive area of deep red soil with a uniform profile. Similar highly fertile soils occur at the Ten Mile Hollow dyke.
- **Quaternary alluvium deposits** occur on the river flats at Mill Creek, Roses Creek, Gunderman and Mangrove Creek. These drowned river valley estuaries have a variety of soil formations. Deep loamy soils of fluvial origin occur at Mill Creek and small river terraces of silty-sand occur in the lower reaches of the major freshwater drainage basins, such as at Roses Creek. Estuarine sediments are mainly sandy and saline muds.

A complex of interconnecting ridge systems divides the park into two main catchment systems. The eastern creeks flow into Mangrove Creek via ten linear valley systems. These valleys are deeply incised and are orientated in an east-west direction. By contrast, the southern catchments of Roses, Mill, Cohens, Gunderman and Allens Creeks flow from north to south into the Hawkesbury River and have a dendritic drainage pattern.

The park contains a number of undisturbed creek catchments that lie completely within the park. Undisturbed streams in the lower catchment of the Hawkesbury River are scarce and the continued protection of these features is an important management objective for the park.

A small area of park at Roses Run and the Wetlands of Mill Creek are listed under State Environmental Policy 20. These and all other wetland areas within the park will be protected

The Catchment Management Act came into effect in 1989. Total catchment management provides an umbrella framework to aim for amongst other matters, 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 is the primary authority for protecting the water catchment values of the streams within Dharug National Park.

Where relevant management of Dharug National Park is also consistent with the Sydney Regional Environmental Plan No.20, which covers the Hawkesbury-Nepean River. In accordance with the regional environmental plan, pit toilets at Mills Creek Camping Area are progressively being replaced with composting toilets to protect the catchment area of Mill Creek and the Hawkesbury River.

Service activities to control and suppress fire or provide access and facilities, will be designed and located to minimise impacts on the soil and catchment values of the park.

Policies

- * All development, protection and incident control activities within Dharug National Park will incorporate effective soil erosion and sedimentation control principles and practices.
- * All earthmoving, track construction and incident control activities within the park will be assessed to determine their impact on important geological features.
- * The Service supports the principles of total catchment management within Dharug National Park, will provide input into the Hawkesbury-Nepean Catchment Management Trust and will liaise with local government and other authorities to maintain and improve the water quality of the catchments in the park.
- * Rehabilitation of disturbed areas within the park will use local soils and plants propagated from local genetic stock.
- * Composting toilets will progressively replace pit toilets at Mill Creek camping area.

4.1.2 Native and Introduced Plants

Dharug National Park conserves an important area of natural vegetation fringing the Hawkesbury River. The vegetation of the park was surveyed by the Royal Botanic Gardens (Clark and Benson, 1986) which identified a total of 700 vascular plant species and 21 vegetation communities. The range of different vegetation in Dharug National Park is due to variations in climate, geology, hydrology, aspect and fire history.

On the exposed ridges and slopes of the Hawkesbury Sandstone the vegetation pattern is mainly low open forest, open forest and low woodland with either a dry or moist understorey. The dominant tree species include grey gum *Eucalyptus punctata*, Sydney peppermint *E. piperita*, narrow-leaved apple *Angophora bakeri* and yellow bloodwood *Corymbia eximia*.

Small areas of shrubland also occur on Hawkesbury Sandstone in poorly drained areas on resistant sandstone platforms along valley slopes. Shrubland in the park is dominated by dwarf apple *Angophora hispida*, *Banksia oblingifolia* and *Baeckea diosmifolia*.

Narrabeen group vegetation communities consist of closed forest and open forest with dominant species including rough-barked apple *Angophora floribunda*, thin-leaved stringybark *Eucalyptus eugenioides*, forest red gum *E. tereticornis* and grey ironbark *E. paniculata*.

Closed forest occurs in the deep sheltered valleys on Narrabeen shales and on the rich igneous area near Spencer. Plants that are typical of this community are lillypilly *Acmena smithii*, rusty fig *Ficus rubiginosa* and coachwood *Ceratopetalum apetalum*.

A wide range of structural formations from closed forest to heathland occur on the alluvium. Fringe forest occurs on the edge of the alluvial flats, some of which is found inside the park. This community is typified by species adapted to varying levels of salinity and waterlogging such as swamp oak *Casuarina glauca* and reed grass *Phragmites australis*.

The three volcanic intrusions have distinctive vegetation communities. In the large volcanic diatreme depression at the head-waters of Scotchman's Creek, a forest dominated by Gosford wattle *Acacia prominens* and grey ironbark occurs. Large areas of the crater were cleared for pasture and some regeneration is now occurring at the edges of the clearings. Several uncommon shrub species are found in the crater.

Forests on and down slope of the Ten Mile Hollow volcanic breccia dyke are dominated by fern-leaf wattle *Acacia filicifolia*, forest oak *Allocasuarina torulosa*, rough-barked apple and narrow leafed ironbark *Eucalyptus crebra*. The rare *Acacia matthewii* also occurs in this locality.

The following plant communities are not represented in the park and are therefore poorly conserved on the lower Hawkesbury River. Such areas complement the vegetation diversity and habitat values of the park:

- forest communities, notably ironbark forests, on the lower slopes of the Narrabeen group along Mangrove Creek.
- Estuarine wetlands consisting of mangroves, salt marsh and fringe forest of the Hawkesbury River.
- Swampforest of she-oak and paperbark which have been drained and cleared. It is important for the conservation of these areas that their catchments are also conserved.
- Blue gum forest on the lower hillslopes and alluvial valleys.

Of the recorded plant species in the park, seven are considered to be rare and/or restricted in their distribution. These are: *Acacia prominens* (2RCa), *Tetratheca glandulosa* (2VC), *Darwinia procera* (2RCa), *Acacia matthewii* (3RC), *Lissanthe sapida* (3RCa), *Persoonia hirsuta* (3KCi) and *Rhizanthella slateri* (3KC).¹

Under the Threatened Species Conservation Act a recovery plan and/or threat abatement plan must be prepared for endangered and vulnerable flora. The purpose of a recovery plan is to promote the recovery of a threatened species, population or ecological community with the aim of returning the 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.

The Act provides that a recovery plan or threat abatement plan for a plant listed on Schedule 1 must be prepared within five years from December 1995.

The Act also provides that a recovery plan or threat abatement plan for a plant listed on Schedule 2 must be prepared within ten years from December 1995.

Weeds are not presently a significant threat to the conservation of the native flora in the park. Additional nutrients, particularly from agricultural activities, is presently limited as many of the creek catchments in the park are largely undisturbed.

¹ The Briggs and Leigh coding: '2' is very restricted, '3' occurs only in small populations, 'V' is vulnerable, 'R' is rare, 'K' is poorly known, 'C' is within a national park, 'a' is adequately reserved and 'i' is inadequately reserved (Briggs and Leigh 1988).

The Noxious Weeds Act, 1993 places an obligation upon the Service to control noxious weeds on areas that it manages to the extent necessary to prevent such weeds spreading to adjoining lands. The recent supplementation of government funding for weed control programs by the Service will permit increased priority being given to blackberry *Rubus* spp control programs in Dharug National Park.

Blackberry thickets are a major weed problem on the alluvial flats and these will be progressively removed. Other weeds include lantana *Lantana camara* found in previously cleared areas, especially the moister gullies, noogoora burr *Xanthium occidentale* and whisky grass *Andropogon virginicus* which is found on the grass flats of the Mills Creek catchment area.

Bush regeneration programs including the selective use of herbicides, will be undertaken in the park. Preference will be given to weed control techniques that have minimal environmental impact.

Policies

- * Populations of rare, threatened or locally significant species and communities will be identified and protected from disturbance.
- * The Service will encourage the management of lands with high conservation values which are adjacent to Dharug National Park in a manner that complements the management of the national park by such means as local and regional environmental plans and by conservation agreements.
- * Introduced plants will be controlled and where possible eliminated.
- * Priority for control of introduced species will be given to those which:
 - are declared noxious;
 - are a threat to biodiversity;
 - are damaging to cultural heritage;
 - affect neighbouring lands;
 - have a high capacity for dispersal;
 - are new isolated occurrences;
 - are likely to spread along access routes; and/or
 - constitute a fire hazard.
- * Programs to control the invasion and spread of non-native plants within the park will be developed with the cooperation of adjacent landholders.
- * Conservation strategies for lands of special conservation value adjoining the park will be promoted.

Actions

- * The distribution of rare and threatened plant species will be mapped and threatening processes identified.
- * Species management guidelines for endangered plant species will be prepared as information becomes available.
- * A strategy for park-wide weed control will be prepared. Blackberry, lantana and whisky grass in Rose's Run, Gunderman and Mill Creek

catchments will be the priorities for the next 5 years. An environmental assessment of the control methods will be undertaken.

4.1.3 Native and Introduced Animals

Dharug National Park and adjacent protected areas provide a large area of substantially natural habitat, including old hollow trees which are important for shelter and nesting sites. Some animals' territories also range over the surrounding rural areas allowing supplementation of food and resources to those available in the park. Such areas of mostly native vegetation which link national parks provide important corridors for fauna and increase the viability of the national park system.

There are many different micro-habitats within the park. The variety of specialised niches in the area include the rainforest communities, Roses and Mill Creek wetlands, old growth forests and fire free enclaves in more remote areas. They may provide important local habitats for significant species, such as the tiger quoll *Dasyurus maculatus*.

A good record exists of the native animals of Dharug National Park. There is a lot of information on birds and mammals but less information on reptiles and amphibians. Forty six species of mammals, including eleven species of micro-bats and one hundred and eighty species of birds have been recorded in the park.

Seventeen species listed as threatened fauna in the two Schedules of the Threatened Species Conservation Act 1995 have been recorded in and around Dharug National Park. Animals of particular interest include:

Glossy black cockatoo *Calyptorhynchus lathami*: Dharug National Park is significant for the large population of glossy black cockatoos found throughout the park. This species inhabits wet and dry sclerophyll forests and woodlands of eastern NSW. It forages primarily on the seeds of casuarinas, but will also take wood borers from large acacia stems. This species is considered vulnerable and rare because the population is severely reduced, it has a poor recovery potential and it is an ecological specialist.

The contiguous areas of Yengo, Marramarra and Brisbane Waters National Parks provide a large area of natural habitat for this species.

Brush-tailed phascogale *Phascogale tapoatafa*: One of the few recent records in the district of the brush-tailed phascogale is in Dharug National Park. This species is known from a variety of forest types, but is most frequently recorded in drier sclerophyll forest and Dharug National Park provides extensive areas of this habitat.

Common bent-wing bat *Miniopterus schreibersii*: This bat is a cave roosting species that feeds above the forest canopy in wet and dry tall open forests. In Dharug National Park it is known to roost in the honey-comb weathered rock shelters on the ridge tops.

Red-crowned toadlet *Pseudophryne australis*: This species inhabits the sandstone regions around Sydney in small creek beds and in soaks trickling out from the sandstone. Dharug National Park provides habitat for the toadlet in debris beside non-perennial creeks in Hawkesbury sandstone.

These last three species are all considered threatened because their populations are reduced, their distributions are suspected to be contracting, threatening processes upon them are severe and they are ecological specialists.

Under the Threatened Species Conservation Act a recovery plan and/or threat abatement plan must be prepared for endangered and vulnerable fauna. The purpose of a recovery plan is to promote the recovery of a threatened species, population or ecological community with the aim of returning the 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.

The Act provides that a recovery plan or threat abatement plan for an animal listed on Schedule 1 must be prepared within five years from December 1995.

The Act also provides that a recovery plan or threat abatement plan for an animal listed on Schedule 2 must be prepared within ten years from December 1995.

Other species listed as threatened which have been recorded in Dharug National Park include the powerful owl *Ninox strenua*, masked owl *Tyto novaehollandia*, sooty owl *T. tenebricosa*, black bittern *Dupetor flavicollis*, Australasian bittern *Botaurus poiciloptilus*, tiger quoll, yellow-bellied glider *Petaurus australis*, squirrel glider *Petaurus norfolcensis*, four species of micro-bats and the green and golden bell frog *Litoria aurea*.

Other species of conservation concern in the park include the locally restricted Lewin's rail *Dryolimnas pectoralis*, barking owl *Ninox connivens*, wedge-tailed eagle *Aquila audax*, brown toadlet *Pseudophryne bibronii* and Jervis Bay tree frog *Litoria jervisiensis*.

Dharug National Park is part of the essential range of habitats available to migratory bird species. Honeyeaters, such as the grey-breasted silvereye *Zosterops lateralis* and yellow-faced honeyeater *Lichenostromus chrysops*, utilise the south-eastern Australian elevated forest lands in the autumn and the nectar rich heathlands along the coast in winter. Specific management practices may be developed to protect the habitats of migratory species.

The wetlands of Mill, Roses and Gunderman Creeks and on the banks of the Hawkesbury River are important in supporting species that require this specialised habitat, such as Lewin's rail. Minimising the impacts of drainage and pollution in this habitat is essential to the long term survival of the local populations of many bird and amphibian species which rely on it.

Powerful and masked owls are found mainly in the tall forests of the wet gullies. The park's brush turkey *Alectura lathamii* population also utilises closed forest type habitats and is at its southern most limit.

The forests on the park's slopes provide habitat for tree-dwelling marsupials such as greater gliders *Petauroides volans*, sugar gliders *Petaurus breviceps* and tiny feather-tailed gliders *Acrobates pygmaeus*. The honey-comb weathered rock shelters on the ridge tops provide habitat for small mammals, bats and reptiles. The brown marsupial mouse *Antechinus stuartii*, builds a ball-shaped nest in rock crevices, the eastern horseshoe bat *Rhinolophus megaphyllus* and the leaf-tailed gecko *Phyllurus platurus* also live in this rocky habitat.

Twenty three species of amphibians and thirty five species of reptiles have been recorded in and around the park. The lack of disturbance and the extensive and

topographically diverse areas of weathered sandstone provide a diversity of micro habitats and niches suitable for both invertebrates and smaller vertebrates. The threatened green and golden bell frog lives in the aquatic habitat on the edge of streams and debris on river flats. A very localised population of the uncommon Jervis Bay tree frog occurs near Gunderman on laterite heaths and associated forests. It is probable that further study will record additional reptile and amphibian species in the park.

The insects of the park are poorly studied; however, two rare dragonflies and an uncommon species of lacewing have been recorded. Invertebrates play an integral role in the food web and often influence plant biology.

Introduced animals of particular concern in the park include foxes *Vulpes vulpes*, goats *Capra hircus*, dogs *Canis familiaris*, cats *Felis catus* and stray cattle *Bos taurus*. Introduced animal control measures used include trapping and aerial shooting. The Service supports a policy of co-operative baiting of wild dogs in perimeter areas where it complements similar controls on adjoining properties. Ground baiting is the preferred practice as it reduces impacts on non-target species and enables accurate data to be collected on baiting success.

Information from fauna and other surveys carried out in NSW is available for park management purposes on the Service's GIS data system. All records of native plants and animals throughout NSW are also collected and stored in the NSW Wildlife Atlas; a database established by the NSW National Parks and Wildlife Service. Information about the locality, habitat and breeding records of species are used to increase the knowledge of, and assist in, the management of native wildlife.

Policies

- * Conservation programs for native animal populations will be based on the maintenance of natural processes and protection of habitat.
- * The habitats of rare, vulnerable and threatened animal species will be identified and protected.
- * Introduced animals will be controlled and where practicable eliminated from the park. Preference will be given to control techniques which have minimal environmental impact.
- * Control programs will be undertaken in conjunction with neighbours where appropriate.
- * Priority for control of introduced animal species will be given to those which:
 - are a threat to the biodiversity of the national park;
 - are damaging cultural heritage;
 - are or may affect neighbouring lands;
 - have a high capacity for dispersal;
 - are new isolated occurrences;
 - are likely to spread disease; and/or
 - are declared noxious.

Actions

- * The distribution of endangered animal species will be recorded on the Service's GIS and Wildlife Atlas databases. Threatening processes will be identified and mitigated where possible.
- * Species management plans for endangered animal species will be prepared as information becomes available.
- * The known occurrence, patterns of distribution and density of introduced species will be mapped and the significance of their environmental impacts assessed.
- * Introduced animal control programs will be implemented where practicable with priority given to the control of wild dogs on park boundaries and goats and foxes throughout the park.
- * Domestic stock found on the park will be removed or impounded.
- * The habitat of endangered animal species will be identified within fire management and pest species management plans and management prescriptions will be designed to assist in the long term conservation of those species.

4.1.4 Bushfire Management

Bushfire can directly affect the conservation of native plants and animals, their habitats and therefore the maintenance of biodiversity. Appropriate fire regimes are necessary to conserve habitats and populations of species. Conversely, inappropriate bushfire regimes can destroy habitats and cause local depletion or extinction of species.

The survival of individual plants and ultimately species is affected by key attributes of a fire regime, particularly the intensity, seasonality, frequency and extent of bushfires. Therefore, the Service regards bushfire as a natural phenomenon; one of the established physical factors of the Australian environment.

The management of fire in Dharug National Park is in accordance with a fire management plan developed by the Central Coast District of the Service for all the national and parks and nature reserves for which the district is responsible. The district fire management plan is reviewed annually.

Under the Bush Fires Act, the Service is a fire authority and is responsible for controlling fires on national parks and to ensure they do not cause damage to neighbouring land or property. This responsibility includes the implementation of fuel management programs. The Service may also assist with the control and suppression of fires adjacent to the national park. An important part of the Service's fire management is participation as a member of local Bush Fire Management Committees including the preparation of the plan of operations and the fuel management plan which are required under section 41AB of the Bush Fire Act and are the basis of fire management planning in the local area. The park is included within the area of the Gosford City District Fire Management Committee, which currently has a fire management plan under the Bush Fire Act.

Outside the national park, fire management is performed by the local bush fire brigades. The Service will continue to co-operate with these organisations and adjoining land holders in fire management operations.

Dharug National Park is bounded on the north and north-east by McPherson State Forest. Accordingly, the Service will co-operate with NSW State Forests to provide for the protection of both the park and the State forest.

Specific fire management objectives will be adopted for Dharug National Park which:

- minimise the risk of bushfire damage to life and property both within and directly adjoining park boundaries;
- protect specific habitats, cultural features and recreation facilities;
- control public use of fires;
- protect scenic landscape values; and
- promote effective and efficient utilisation of district bushfire fighting resources through cooperative planning arrangements.

Fuel reduction is undertaken by a number of techniques to suit different management situations and includes mechanical clearing, mowing or prescribed burning.

In accordance with the Service wide program on fire management planning, a fire management plan for Dharug National Park, Yengo National Park and Parr State Recreation Area will be developed by June 1999 which will identify the bushfire threat, requirements for the conservation of native plants and animals and provide the basis for management strategies and prescriptions. The plan will establish community protection measures in areas where it is identified that fire is a threat to both property and biodiversity.

Policies

- * A proportion of each vegetation community within the national park will be maintained in as old an age class as is possible.
- * Prescribed burning will be undertaken to:
 - reduce the risk of high intensity wildfire within 100 metres of any adjoining property, fire trail or other wildfire control line;
 - protect fire sensitive catchments and soils;
 - promote a diversity of age classes within vegetation communities;
 - protect rare or threatened species;
 - aid the long-term survival of all species native to the area;
 - protect cultural heritage items; and
 - protect recreation and management facilities.
- * Prescribed burning will preferably be carried out during the autumn-winter period. In special circumstances, spring burning will be carried out when weather conditions preclude hazard reduction in autumn or winter and the need for hazard reduction is critical.

- * Fires of moderate to high intensity will be aimed for as this generally assists seed germination.
- * Research programs which provide information on fire behaviour and ecological effects will be encouraged.
- * Bush fire frequency in blue gum forest, closed forest, igneous land unit forest and alluvial vegetation communities will be minimised.
- * Where practicable fire suppression methods will be used which have least adverse environmental impact.
- * The impact of hazard reduction and wildfire suppression activities on road and trail verges and prominent landscapes will be minimised.
- * The Service will participate in the preparation and implementation of the plan of operation and the fuel management plan which are required as part of bush fire management planning for the local area in accordance with section 41AB of the Bush Fires Act 1949.
- * The role of and management of fire within the Dharug National Park will be promoted in the community, particularly neighbours of the park.
- * The co-operation of councils, bushfire brigades and neighbouring land holders will continue to be sought in achieving ecologically and socially responsible fire management for Dharug National Park.

Actions

- * In accordance with Service policy a fire management plan will be prepared for Dharug National Park, Yengo National Park and Parr State Recreation Area by June 1999 detailing fire management for Dharug National Park. The fire management plan will be placed on exhibition for public comment before its final adoption by the Service.
- * In the interim, the Central Coast District Fire Management Plan will be updated annually.
- * Strategic wildfire control lines will be identified and maintained within the national park.
- * Fire hazard reduction will be undertaken by burning or mechanical means as determined by the fuel management plan for Dharug National Park.
- * Fire history records will be maintained.
- * The Old Great North Road will be identified as an item of high cultural significance and vulnerability in the relevant Local Government Area 41AB bush fire management plans and the fire management plan for Central Coast District.

4.1.5. Aboriginal Sites and Places

One of the major reasons for Dharug National Park's establishment was the high density of Aboriginal sites it contains. The Daruk Aboriginal people occupied parts of the area now included in the park for at least 11 000 years (Hughes, Sullivan 1981). Evidence of their habitation is abundant and varied and includes

occupation deposits in sandstone shelters, foreshore middens, rock engravings, stone arrangements, paintings and axe grinding grooves. Aboriginal sites are non-renewable and are subject to deterioration from natural and human induced processes.

Rock engraving is the predominant art form and several hundred have been recorded in the park. The flat, exposed areas of Hawkesbury sandstone provided an ideal "canvas" for the Aboriginal people. Hawkesbury sandstone engravings have a distinctive style, which is unique in Australia. Figurative representations, often life size or larger, are found at art sites throughout the Sydney Basin.

The park is criss-crossed with Aboriginal routes that were used by highland and coastal tribes. They often arranged reciprocal visits to exploit seasonally abundant food. The path of the historic Old Great North Road approximates an Aboriginal travelling route and was first shown to surveyors by Aboriginal people.

The evidence from Aboriginal sites provides a valuable insight into Aboriginal traditions, past lifestyles and interactions with the environment and these sites are an important part of present day Aboriginal culture. However, vandalism of art sites does occur and often the most effective way to protect sites from this kind of damage is not to reveal their location. Although this has been past management approach, the locations of some art sites in the park are widely known and these are regularly visited by interested members of the public. Therefore, some Aboriginal sites within the park will require active protection and management to prolong their existence

To conserve these Aboriginal sites the impacts associated with recreational use must be carefully managed. Signs are installed at some sites that are regularly visited by members of the public to educate them about the site's importance and discourage accidental damage. The active involvement of the Aboriginal community will be sought in these programs.

The most well known and visited art site in the park is "Group Six", an engraving and grinding groove site, which is accessible by foot from the Mill Creek area or the Eastern Commission Trail. To assist in minimising the impact on this site, visitors are informed about the values of the site and their co-operation in protecting the site is encouraged. To educate visitors to this site, interpretive signs have been installed on-site and guided tours are conducted during peak visitation times. Directions on how to find the site are deliberately not well publicised so as to limit visitor numbers and ensure that enquires are channelled through Service staff who can inform visitors about the requirements to protect the site.

Policies

- * The provisions of the Burra Charter (ICOMOS revised 1987) for the conservation of places of cultural significance will guide management decisions for the Aboriginal heritage in the park.
- * Aboriginal sites and places will be recorded, conserved and interpreted in consultation with the Aboriginal Land Councils and Aboriginal community groups.
- * The location of Aboriginal sites will not be publicised.

- * Information will be made available, with the consent of the relevant Aboriginal Land Councils, to relevant authorised researchers and for educational use.

Actions

- * The register of Aboriginal sites will be maintained and updated.
- * The impact of visitor use on Aboriginal sites will be monitored and action taken to restrict access where required to protect the site.
- * The Group Six site will continue to be used for interpreting Aboriginal use of the area subject to such use being sustainable and does not conflict with Aboriginal Land Council requirements for management of the site.

4.1.6 The Old Great North Road

The Old Great North Road is an historic feature of national cultural significance and is listed on the Register of National Estate. The Great North Road was built using convict labour between 1825 and 1836 between Sydney and the central Hunter Valley.

Approximately forty three kilometres of the road is protected within Dharug and Yengo National Parks. In the recent past, this section has been labelled the "Old" Great North Road, to distinguish it from those sections of the road which have been further developed as a modern road.

The four local governments with responsibility for those sections of the the Old Great North Road not reserved as part of Dharug National Park (Hawkesbury, Gosford, Hornsby and Cessnock) have formed a Convict Trail Committee to prepare a plan of management for the entire length of the road.

The Great North Road was part of Governor Darling's extensive public works programs and was intended to provide direct access to the Hunter Valley. The original surveyor was Heneage Finch and "Finch's Line", which commences at Rose's Valley in Dharug National Park is named after him. This section of road was abandoned in 1829 in favour of the more direct route up Devine's Hill, designed by Major Thomas Mitchell, the colony's Surveyor-General.

Lt. Percy Simpson supervised construction works until 1832 and his name has been given to the branch line from Ten Mile Hollow to Mangrove Creek. This was part of "Simpson's track", an alternative route for the Great North Road suggested by Simpson. The road was, however, superseded almost as soon as it was finished, by more direct and practical land routes and the arrival and use of steamships in the Colony.

The road was also part of the motor road from Sydney to Gosford which preceded construction of the Hawkesbury River road bridge and the Pacific Highway.

The road offers unparalleled evidence of convict life, road construction work and the role of convict labour in the development of NSW. There are no comparable convict-built roads of such length in NSW and the three remaining bridges north of the Hawkesbury River are understood to be the oldest surviving stone bridges on mainland Australia.

There are also the foundations of an old inn at Ten Mile Hollow associated with the construction and use of the Old Great North Road."

Sections of the road with massive curved retaining walls and hand smoothed cuttings overlooking rugged bush have considerable aesthetic value. The road was essentially constructed with local stone to form the pavement and local timber or stone for the bridges. Most of the drainage structures were built out of stone, but timber was also used for some of the culverts.

A number of specialist studies of the road, commissioned by the Service, have been completed. These formed the basis of the **Draft Conservation Plan for the Old Great North Road from Wiseman's Ferry to Ten Mile Hollow**. The Draft Conservation Plan identifies the road section between Devine's Hill and Mt Manning (17 km north of Dharug National Park) as extremely significant because of its relatively intact state. This section demonstrates construction methods and patterns more fully than other early colonial sites, which are more limited or fragmented and has provided opportunities for comparing, identifying and interpreting other historic roads. Its integrity greatly enhances our view of the past and gives the road its historic/cultural significance.

The Shepherds Gully Road, just outside Dharug National Park, is associated with the Great North Road and is also historically significant. This road is also used for access and interpretation of the Old Great North Road.

Threats to the road include natural weathering over 170 years, the impact of motorised, horse and bicycle traffic, stormwater run-off, fire, vandalism, theft of artefacts, lack of maintenance and the action of vegetation roots.

The section of the road through Devine's Hill between Settlers Road and the top of Shepherds Gully Road is particularly fragile. In one location a number of massive stone buttresses and culverts collapsed shortly after construction. Some remedial work was then undertaken but the structure requires strict protection to avoid further collapses. This section of the Great North Road was closed to vehicular traffic in the 1960's.

In December 1992, a total of 43 kms of the Old Great North Road between Settlers Road and Mount Manning was closed by the NSW National Parks and Wildlife Service and other authorities to all unauthorised vehicles. Within Dharug National Park, however, about five kilometers of the road north of the Western Commission Trail is used for access to the Buddhist Retreat at Ten Mile Hollow and for vehicle based Discovery Ranger programs.

The management policies and actions relating to the Old Great North Road are drawn from the draft conservation plan. Those policies and actions from the draft conservation plan relevant to other sections of this plan of management, particularly relating to recreation use, have been incorporated into those sections.

Policies

- * The conservation plan for the Old Great North Road will be finalised and placed on public exhibition.
- * The Service will liaise with the Convict Road Committee to ensure that its management of that part of the road in Dharug National Park is complementary to the management of the other (non-park) sections of the road.

General

- * Pending adoption of the conservation plan, the Old Great North Road will be managed in accordance with:
 - the Draft Conservation Plan for the Old Great North Road from Wiseman's Ferry to Ten Mile Hollow,
 - the Burra Charter; and
 - the relevant State legislation.
- * The Old Great North Road and its setting will be conserved in order to retain or recover its significance which derives from a combination of its:
 - physical evidence and the ability of that evidence to provide essential and unique information;
 - association with historical figures, events and processes;
 - aesthetic values; and
 - integrity as a whole.
- * Only those uses will be permitted that are compatible with the retention or recovery of the significance of the road or which allow appreciation of the significance of the road.
- * Vehicles will not be permitted on the section of the Old Great North Road south of the Western Commission Trail, except for essential management purposes.
- * Vehicle use of that part of the Old Great North Road north of the Western Commission Trail will be permitted for access to the Buddhist Retreat at Ten Mile Hollow and for vehicle based Discovery programs.

Physical conservation

- * Restoration, reconstruction, adaptation and modification will be used only where it will retain or recover the significance of the road.
- * Only those new elements that are compatible with the retention or understanding of the significance of the road will be permitted.
- * Removal of movable relics will only be permitted if they cannot be conserved *in situ* and only in accordance with the approval of the Heritage Council of NSW.
- * An excavation permit under the Heritage Act will be obtained for any work which requires the disturbance or removal of the fabric.

Management of acquisitions

- * In the event that any additional sections of the road are acquired by the Service, the relevant policies of the draft conservation plan and this plan of management will apply to their management.

Actions

Physical conservation

- * A schedule for conservation works will be prepared. Categories of work in priority order will generally be:
 - fabric under immediate threat;
 - fabric under threat over a longer time period (two to ten years); and
 - remaining fabric on a kilometre by kilometre basis.

Within these categories fabric of high integrity, rarity and/or aesthetic value will have priority.

The schedule will identify what work is achievable with present resources.

- * Access for organised events will require the approval of the District Manager. Monitoring will be carried out to determine the effects of the event(s) on the road and future approval for such events will be subject to the results of this monitoring.
- * As sufficient funding becomes available to conserve and maintain the road to a higher standard, public use of the road north of the Shepherds Gully Road junction will be reviewed.

Recording of works

- * A register will be established to record management decisions with regard to conservation works on the Old Great North Road, works proposals, funding applications and detailed documentation of works achieved.

Liaison

- * The Service will advise those neighbours and authorities that use the road of its significance.

4.1.7 Other Non-Aboriginal Cultural Heritage

Most of the alluvial flats along the Hawkesbury River and its associated tributaries were settled in the early 1800's. The land was primarily used for the growing of corn, vegetables and fruit, which was transported to Sydney by small river and coastal boats. The valleys of Roses, Mill and Gunderman Creeks were settled about this time with some land granted to convicts who had served their time. Mill Creek is named after the flour mill that once operated in the area.

Once the area was settled, the first school on the north side of the Hawkesbury was established at Spencer and the foundations of this school are in the park.

Sandstone residences, such as the Meisterham house, were constructed in the area in the early nineteenth century and the foundations of these also are found in the park.

With the decline in farming and the high costs of transporting produce to the markets in the mid 1900's most people moved away from the district and many of these farms were eventually purchased and added to Dharug National Park.

Limited logging activities from the early days of settlement continued until about 1959 when many substantial trees were removed prior to the reservation of the national park.

Evidence of historic structures associated with agriculture and residences, including a system of drains in the river valleys, have been recorded in the Service's historic place register.

Policies

- * Historic places will be recorded, protected and may be interpreted.
- * The landscape setting of historic places will be assessed and protected from unsympathetic development.

Action

- * The park's historic place register will be maintained and updated.

4.2 Promotion and Use of the Park

Dharug National Park will be managed to ensure that its use, whether by the general public, special interest groups, 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 Service areas are:

- environmental and cultural history education;
- promotion of natural and cultural heritage conservation;
- low-impact recreation in a natural setting;
- scientific research; and
- conservation and recreation management operations by the Service and limited operations by other public authorities.

The extent to which these categories of use are appropriate to Dharug National Park are indicated below.

4.2.1 Promotion of the Park

Dharug National Park has remained a relatively natural, isolated area despite the expanding city population within a couple of hours drive of the park. It is estimated that about 20 000 people visit the park each year and Dharug National Park will be managed to retain its low-intensity, isolated recreation qualities similar to the adjoining Yengo National Park and which complement the more intensively used metropolitan and Central Coast parks.

The park has the potential to demonstrate the wider principles of nature conservation, historic site conservation and self-reliant recreation in a natural setting. Information and data sheets on the resources of the park will assist visitors to understand and appreciate its values.

The Old Great North Road offers an exceptional opportunity for interpretation of colonial transport expansion and convict life as well as historic site conservation. With the provision of interpretive signs and the promotion of the Old Great North Road, it is anticipated that cultural tourism will be an increasingly prominent use of Dharug National Park. Whilst such use is appropriate, the potential increasing impact of such use will be monitored and managed.

Mill Creek is easily accessible by vehicle and the most popular facility area in the park. An interpretive display has been provided at Mill Creek which provides information on the whole park.

Policies

- * The Service will promote public understanding and appreciation of the natural and cultural heritage values of the park.
- * The Old Great North Road will be interpreted to the public.
- * The appropriate use of the park for low-impact recreation in a natural setting and cultural tourism will be promoted.

Actions

- * A range of interpretative techniques will be used in Dharug National Park, including:
 - preparation of information sheets and brochures on its natural and cultural features and on the recreation opportunities offered in the park;
 - provision of an interpretive display for the whole of the park at Mill Creek camping and picnic area;
 - provision of interpretative signs along the Old Great North Road;
 - continuation of licensed guided tours along the Old Great North Road;
 - subject to Aboriginal community requirements, continuation of guided interpretation tours to the Group Six Aboriginal site; and
 - provision of information at track heads.
- * The use of the park will be promoted among the nearby visitor centres and National Parks and Wildlife Service offices.

4.2.2 Recreation Opportunities

Access to Dharug National Park from Sydney's major population centres to the south and Gosford to the east is via Settlers Road and Wiseman's Ferry Road, which crosses the Hawkesbury River and Mangrove Creek.

There are a number of hotels, motels, camping and caravan parks in nearby towns which adequately cater for any demand for more sophisticated accommodation. Most major towns have at least one caravan park and some also have cabins.

The strategy for managing public use in Dharug National Park is to provide recreational opportunities that are appropriate to a national park and complementary to those provided elsewhere in the lower Hawkesbury region. A balance between the conservation of the park and recreation must be found, without compromising the significant values of the park. In catering for recreation, emphasis is on low-intensity, self-sufficient overnight and day use of

the park. The protection of the Old Great North Road is of special concern as it is particularly vulnerable to damage by inappropriate recreation and other use.

The attraction of particular features and the location, type and extent of access and other facilities determines to a great extent, the pattern of visitor use of the park. Thus, while the provision of visitor facilities caters for the appropriate needs of park users, it is at the same time, an important means of influencing visitor use of the park.

Picnic areas are provided in the park at Mill Creek and Hazel Dell. Basic facilities comprising toilets, fire-places, firewood, garbage bins and car parking are provided.

Camping areas are provided within the park at Mill Creek and at Ten Mile Hollow on the Old Great North Road. As with other non coastal parks in the district, the camping areas have limited periods of full occupancy, mainly in autumn and spring which are the most pleasant and popular seasons for camping. A compost toilet complex has been installed in Mill Creek camping area which provides waste management with minimal environmental impact

Mill Creek provides individual car based camping sites and pack camping sites separated from the day use area. Tank water is provided for campers. A camping fee is charged and bookings are necessary. There is a demand for group camping facilities in the park and a separate group camping area is proposed for Mill Creek.

The pack camping area at Ten Mile Hollow is located on the Great North Road, approximately 15 kilometres from the Wiseman's Ferry road.

There are few other sites within the park suitable for development as formal camping sites because of problems with water supply, firewood and access through private property. Monitoring of pack camping, including regularly used informal pack camping areas, such as those at Roses Run and Gunderman will be undertaken and if demand warrants additional formal pack camping areas may be provided at these sites.

The park provides opportunities for bushwalking in natural areas for the appreciation of its natural and cultural heritage and walking tracks are an important means of promoting the environmental awareness and education of visitors. Two short walking tracks and the 8 km Mills Creek circuit track are accessible from Mill Creek. These tracks are proposed to be upgraded.

The management trail system, the historic Old Great North Road and Finches Line are used by bushwalkers. The Finches Line and Shepherds Gully management trails are promoted as loop walks.

There are also many informal walking routes throughout the park. These routes may have unacceptable environmental impact and need local repair or closure and revegetation.

Cycling in a bush setting is available along the park management trails and roads.

There is no horseriding in Dharug National Park except along the Old Great North Road for organised events. The Old Great North Road provides horseriders with through-access between bridle trails in Yengo National Park and adjoining properties. Horseriding is permitted on these trails, subject to the Service's Code of Horseriding. A horseriding management plan for Dharug and

Yengo National Parks and Parr State Recreational Area is proposed to be developed with the local horseriding groups and organisations.

The section of the Old Great North Road through Devine's Hill is steep and susceptible to damage by horses hooves and the surface of this particular section of the road requires stabilisation to prevent accelerated damage by horses. Alternative access for horses via Shepherds Gully Road, outside of the park, is possible.

Groups with a special interest in use of the park include:

- the neighbouring scout troop which has a long tradition of using the park for field studies;
- the Macdonald Valley horseriding community which runs events such as the annual Shazada endurance horse-riding competition. The route for this event includes a section along the Old Great North Road.

Policies

- * Dharug National Park will be managed to provide opportunities for outdoor recreation in a natural, isolated setting.
- * Provision will be made for recreation opportunities that complement those provided elsewhere in the lower Hawkesbury Valley.
- * Conditions on recreation activities including limits on numbers, times and locations may be instituted where necessary to protect the park's natural and cultural heritage and to minimise conflicts of use.
- * All or part of camping areas, walking tracks (formal and informal) and any other area showing evidence of over use may be closed permanently or temporarily to allow for their restoration.
- * Only non-damaging use and access for the purpose of appreciating the Old Great North Road will be permitted.
- * Use of the informal pack camping areas along the Old Great North Road will be monitored and if unacceptable impacts arise through over use of these sites, additional formal pack camping areas may be provided, subject to environmental assessment.
- * Bushwalking in accordance with the Code of Minimum Impact Bushwalking will be promoted.
- * Bicycle touring will be permitted on the Old Great North Road and management trail systems.
- * Horseriding will be permitted only on sections of the Old Great North Road and will be in accordance with a Horseriding Management Plan for Dharug and Yengo National Parks and Parr State Recreational Area and in accordance with the Service's Horse Riding Code.
- * Public vehicle access will be permitted only on public roads.
- * Group activities involving more than 20 people will require consent from the District Manager.

Actions

- * Subject to an environmental impact assessment, the Mill Creek camping area will be extended to provide separate group camping sites.
- * A horse riding management plan for Dharug and Yengo National Parks and Parr State Recreational Area will be prepared and implemented consistent with the above policies for the Park.

4.2.3 Scientific Research

Scientific study in the park is directed towards improving the management of its natural and cultural heritage and the processes which affect them. Research is also used by the Service to establish the requirements for the management of particular species.

Scientific licences are granted for such research in the park. Recent studies included topics such as litter fall in *Casuarina glauca*, the collection of a rare Acacia species for taxonomical classification and specialist surveys of the Old Great North Road.

The Service does not presently have the resources to undertake long term research in the park. A prospectus will be prepared as the basis for the involvement of research organisations in Dharug National Park.

Policies

- * Scientific research to improve understanding and management of the park will be encouraged. Priority will be given to research into:
 - the ecology, status and distribution of plant and animal species and communities, with emphasis placed upon threatened fauna and flora, and the survey and assessment of invertebrate species.
 - assessment of the distribution and abundance of introduced species and their impact upon natural and cultural heritage;
 - biological control of introduced species;
 - comparative studies of conservation values of Dharug National Park and the other major and contiguous conservation areas in the Central Coast, Hunter and Blue Mountains region;
 - the impact of various bush fire regimes on native species, communities and landscapes;
 - better understanding of cultural sites of significance; and
 - furthering understanding of the Old Great North Road.
- * Service conducted research will aim to provide information on the natural and cultural heritage and on visitation and human impacts.
- * All research will be subject to Service policy and procedures for the granting of permits, conduct of research and the reporting of results.
- * Priority will be given to research applications which;

- have the potential to facilitate the better management of the park;
and
 - do not conflict with the objectives of the management of the park.
- * Research on the Old Great North Road which involves disturbance of the fabric or potential disturbance of the fabric may be permitted if it will:
- provide data essential for the conservation of the road, and/or
 - secure evidence about to be lost or made inaccessible through necessary conservation or other unavoidable action.
- * Decisions to allow research on Aboriginal sites will require consultation with the local Aboriginal community.

Action

- * A prospectus will be prepared and circulated to research and education institutions as a guide to preferred research projects in the park and will be reviewed annually.

4.2.4 Management Operations

Dharug National Park is part of the Central Coast District of the National Parks and Wildlife Service. The sub-district workshop, located at Mill Creek, is the centre for on-park maintenance. The workshop currently is powered by generator and it is proposed to upgrade the power supply to grid power. Staff accommodation is provided at Mill Creek for emergency and park protection purposes.

The park contains a network of management trails used primarily for bush fire management. The management trail system also provides access to utilities such as powerlines and telephone lines constructed and operated by other authorities. Part of the Great North Road in the northern section of the park is used by TransGrid as a track for the maintenance of the power lines in the park. Some access to neighbouring properties and inholdings is also permitted along management trails. The management trail system is shown on the map, centre pages.

A number of small quarries occur along the Old Great North Road, Simpson Track and Western Commission Trail. These are used for the maintenance of the management trail system and the Old Great North Road.

Upgrading of current non-park uses may only be permitted where no alternative exists and will be subject to an environmental impact assessment. All existing non-park uses within the park will be formalised by way of a licence or easement issued in accordance with Section 151 of the National Parks and Wildlife Act.

Policies

- * The Service will oppose further non-park uses within Dharug National Park.
- * It is a long term aim of the Service to reduce, and if possible eliminate, the number of non-park occupancies held under lease, license or other form of consent within the park. Such occupancies will be kept under

regular review and where appropriate the facility or occupancy will be relocated, closed or terminated and the site rehabilitated.

- * Non-park uses will be managed in accordance with the principles and objectives of this plan of management and in accordance with the conditions of a lease or licence granted under the National Parks and Wildlife Act.
- * The system of management trails outlined on the map, centre pages, will be maintained by the Service or other authorities for authorised management purposes.
- * Management use of and access via the Old Great North Road for non-emergency purposes will be restricted to a level which does not damage the fabric of the road.
- * Subject to environmental assessment, continued use of existing quarries to obtain construction material will be permitted in accordance with an approved extraction plan and will be limited to that required for the Service's own use in the park.
- * Staff accommodation will continue to be provided and maintained to satisfactory standards at Mill Creek.
- * Subject to an environmental impact assessment the power supply of the Mill Creek workshop will be upgraded.

5. PLAN IMPLEMENTATION

This plan of management is part of the system of management developed by the National Parks and Wildlife Service. The system includes the National Parks and Wildlife Act, the Service's Corporate Plan, associated strategies and management policies. It also includes regional and district operational planning.

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

District programs are subject to on-going review within which works and any other activities carried out in Dharug National Park 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 this plan shall be carried out and given effect to and no operations shall be undertaken in relation to Dharug National Park 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 75 of the Act.

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

High	Imperative to achieve the plan's stated objectives;
Medium	Very important to achieve the plan's objectives or part of a sequence of operations but subject to the availability of resources;
Low	Desirable, but will be undertaken only if the necessary resources are available.

The management proposals outlined in the plan have been summarised and their priorities for implementation are set out in the following table.

PRIORITIES FOR THE IMPLEMENTATION OF ACTIONS IN THE PLAN

Action	Plan Reference
High Priority:	
Control introduced animals	4.1.3
Prepare Fire Management Plan for Dharug National Park, Yengo National Park and Parr State Recreation Area	4.1.4
Update fire District Management Plan.	4.1.4
Undertake fire management liaison with neighbours	4.1.4

Maintain strategic wildfire control lines.	4.1.4
Undertake fire hazard reduction.	4.1.4
Maintain fire history records.	4.1.4
Prepare schedule for Old Great North Road conservation works.	4.1.6
Liaise with Convict Trail Committee	4.1.6
Identify the high cultural significance and vulnerability of the Old Great North Road in the relevant 41AB fire plans	4.1.4
Monitor approved events on Old Great North Road	4.1.6
Monitor impact of recreation activities	4.2.2
Prepare a prospectus for research projects	4.2.3
Finalise conservation plan for the Great North Road	4.1.6
Moderate Priority	
Provide input into Hawkesbury Nepean Catchment Management Trust programs	4.1.1
Review fire management prescriptions to identify slopes prone to accelerated soil erosion	4.1.1
Assess impact of management operations on geomorphological features	4.1.1
Prepare management plans as required for threatened species	4.1.2/3
Develop programs to control non-native plants	4.1.2
Develop horse riding management plan	4.2.2
Upgrade power supply at Mill Ck Workshop	4.2.4
Instal composting toilets at Mill Creek camping area	4.1.1
Low Priority:	
Maintain historic place register.	4.1.7
Provide group camping area at Mill Creek	4.2.2
Investigate improving parking at Old Great North Road access points.	4.2.2

6. SELECTED REFERENCES

- Aitken, R. (ed.) (1993) **Draft Conservation Plan for the Old Great North Road**. NPWS. Unpub.
- Carolin, R.C., and Tindale, M.D. (1993) **Flora of the Sydney Region**. Reed. 4th Edition
- Blakers, M., Davies, S.J.J.F. and Reilly, P.N. (1984) **The Atlas of Australian Birds** Royal Australian Ornithologists Union. Melbourne University Press.
- Broadbent, J. and Cranwell, I. (1979) **Faunal Studies for the Proposed Mount White-Kariong-Ourimbah Sections of the Sydney-Newcastle Freeway (No. 3)**. Environmental and Urban Studies Report No. 45, Macquarie University, December, 1979.
- Clark, P. J. and Benson, D. H. (1986) **Vegetation Survey Of Dharug National Park**. National Herbarium of NSW Royal Botanic Gardens, Sydney.
- Galloway, M. C. (1967) **The stratigraphy of the Putty-Upper Colo area, Sydney Basin, NSW**. Proc. Roy. Soc. NSW, 101, 23-36.
- Gill, A. M. (1981) **Fire and the Australian Biota**. Aust. Academy of Science, Canberra.
- Hughes, P.J. and Sullivan, M.E. (1981) **Aboriginal Burning and Late Holocene Geomorphic Events in Eastern NSW**. Search Vol. 12, No.8, pp.277-278.
- Leigh, J., Boden, R., Briggs, J., (1984), **Extinct and Endangered Plants of Australia**. Sun.
- Marquis-Kyle, P., Walker, M., (1992) **Australia ICOMOS The Illustrated Burra Charter**. Australia ICOMOS
- National Herbarium of NSW. (1986) **The Conservation Value of Natural Vegetation Along the Hawkesbury-Nepean River**. Ecology Section, Royal Botanic Gardens, Sydney.
- National Herbarium of NSW. (1993) **Register Of Threatened Australian Plants**.
- Pyke, G.H. (1983) **Relationships Between Time Since the Last Fire and Flowering in *Telopea speciosissima* R. Br. and *Lambertia formosa***. Aust. Journal of Bot. 31: 293-6.
- Sheaffe, R. (1993) **National Parks and Wildlife Service Central Coast District Fire Management Plan**. NPWS.
- Strahan, R. (1983) **Complete Book of Australian Mammals** The Australian Museum. Angus and Robertson
- Veal, A. J. (1991) **National Parks and Recreation Demand Current and Future National Park Visitation in the Sydney Metropolitan Area**. Uni. of Technology, Sydney.