

**ROYAL NATIONAL PARK, HEATHCOTE NATIONAL PARK
AND GARAWARRA STATE RECREATION AREA
PLAN OF MANAGEMENT**

**NSW National Parks and Wildlife Service
Sydney**

February 2000

This plan of management was adopted by the Minister for the Environment on 4th February 2000.

Acknowledgments: This plan of management is based on a draft plan prepared by the South Metropolitan District of the National Parks and Wildlife Service with assistance from the Planning Unit in Head Office.

Members of the community who provided comments on the exhibited draft plan of management are gratefully acknowledged.

Photograph of Eagle Rock in Royal National Park by Bill Sullivan.

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FOREWORD

This plan relates to three areas; Royal National Park, Heathcote National Park and Garawarra State Recreation Area, which are located on the southern fringe of metropolitan Sydney.

Dedicated in 1879, Royal National Park includes the first area of land to be reserved as national park in Australia. The park encompasses ocean coastline and estuarine foreshore, heaths and woodlands on Hawkesbury sandstone, rainforest on Narrabeen shale and along a number of rivers and streams. The natural values in some sections of the park have been degraded through overuse, particularly in the wetter parts such as the rainforest areas and along the coast. This plan gives priority to the protection of all the natural values of the park from the impacts of overuse. Most notably the present extent of development in the park will not be expanded, the most seriously affected areas of the park will be rehabilitated, and unrestricted camping will be phased out. Another priority is the protection of the upper Hacking River catchment and the submerged and intertidal lands of South West Arm and Cabbage Tree Basin.

A major issue in Royal National Park is the 229 occupancy licences to cabin owners for use of the area occupied by their cabins. These cabins are located in five groups at Bonnie Vale, South Era, Burning Palms, Little Garie and Bulgo and the Service will seek to retain a substantial number of cabins in the park through leasing with stringent conditions which ensure that their cultural heritage values are retained and their environmental impact is considerably reduced by meeting environmental performance standards.

With respect to the provision of recreation opportunities, the plan provides that the standard of facilities and their maintenance will be improved. It will also be promoted as a major environmental education venue.

Heathcote National Park, reserved in 1943, lies to the west of Royal National Park, in the Woronora River catchment. It offers spectacular Hawkesbury sandstone ridge and gully landscapes and open forests. There is no internal public road system and emphasis in its management is on providing bushwalking and camping opportunities.

Garawarra State Recreation Area, reserved in 1987, adjoins the township of Helensburgh to the south of Royal National Park. Although classified as a state recreation area, an important purpose of the area is to protect rainforest in the upper catchment of the Hacking River as an important link between the rainforests of Royal National Park and those of the Illawarra Escarpment and Sydney Water catchment areas to the south and south-west. The plan provides that the state recreation area will be managed as if it was part of Royal National Park and developed with recreational facilities in a manner that ensures the protection of its important natural heritage values.

This plan of management establishes the scheme of operations for Royal National Park, Heathcote National Park and Garawarra State Recreation Area. In accordance with the provisions of Sections 75 and 75A of the *National Parks and Wildlife Act 1974* this plan of management is hereby adopted.

BOB DEBUS
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 and state recreation area. The Act also provides that one plan of management may be prepared for contiguous or related areas. Royal National Park, Heathcote National Park and Garawarra State Recreation Area are considered to be closely related and this plan seeks to integrate natural and cultural resource conservation policies as well as to integrate recreation management and other use. A plan of management is a legal document that outlines how the areas will be managed.

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

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

Once a plan of management has been adopted by the Minister no operations may be carried out on the area except in accordance with the plan.

A draft plan of management for Royal National Park, Heathcote National Park and Garawarra State Recreation Area was placed on public exhibition for a period of four months between October 1994 and February 1995. The draft plan of management attracted 139 representations covering 23 issues. All comments received were referred to the National Parks and Wildlife Advisory Council for its consideration and advice. The comments and suggestions of the Advisory Council were in turn considered by the Minister before adopting this plan.

For additional information or enquiries on any aspect of the management of the three areas, please contact the Service's Sydney South office at Royal National Park, Audley or by phone on (02) 9542 0648.

2. MANAGEMENT CONTEXT

2.1 NATIONAL PARKS AND STATE RECREATION AREAS IN NEW SOUTH WALES

The national park concept was introduced into Australia through the establishment of Royal National Park in 1879, only seven years after the world's first national park was created at Yellowstone in the United States of America.

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

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

National parks are reserved under the National Parks and Wildlife Act 1974 and are part of the regional pattern of land use. The management of a national park aims at minimising disturbance to the natural and cultural heritage. Other land uses such as agriculture, forestry and mining, are distinguished by an acceptance or encouragement of environmental modification. National parks, therefore, provide for only a limited part of the range of land uses in a region.

State recreation areas are also reserved under the National Parks and Wildlife Act 1974. They are regional parks with attractive natural and cultural features of recreational interest.

2.2 Royal National Park, Heathcote National Park and Garawarra State Recreation Area

2.2.1 Location and Regional Context

Royal National Park is situated on the eastern coast of Australia, adjacent to the southern fringe of metropolitan Sydney and about 30 km north of Wollongong. The 15 068 ha park is triangular in shape, bounded to the north by Port Hacking, to the east by the South Pacific Ocean, and to the west by the main transport corridor between Wollongong and Sydney (the F6 Freeway, the Princes Highway and the Illawarra Railway), which roughly follows the watershed between the Hacking and Woronora River catchments. The south-western portion of the park adjoins Garawarra State Recreation Area (900 ha) and the township of Helensburgh. The north-western portion of Royal National Park is contiguous with suburban Sydney. Two suburbs on the Port Hacking foreshore, Bundeena and Maianbar, are enclosed within Royal National Park.

Heathcote National Park (2251 ha) lies to the west of Royal National Park and the main transport corridor, in the Woronora River catchment.

Garawarra State Recreation Area is irregularly shaped and consists of two sections: one is situated between the Southern Freeway, the Illawarra Railway and Helensburgh; and the other is bounded by Royal National Park to the north

and west, by the Illawarra Railway to the south, and by the Hacking River to the east. All of the state recreation area lies within the upper catchment of the Hacking River.

Royal and Heathcote National Parks and Garawarra State Recreation Area cover approximately 18 219 ha of land reserved for conservation and recreation purposes. Regionally they form part of a large tract of natural bushland on the Woronora Plateau which also includes the catchment areas managed by Sydney Water to the south and west, the Department of Defence lands to the north-west, the Illawarra Escarpment State Recreation Area and adjoining escarpment lands to the south and other Crown lands.

2.2.2 Significance of Royal National Park, Heathcote National Park and Garawarra State Recreation Area.

Royal National Park, Heathcote National Park and Garawarra State Recreation Area belong to a large group of sandstone national parks and reserves in the Sydney region. Other parks in this group include the extensive wilderness areas of Yengo, Wollemi, Nattai, Blue Mountains and Morton National Parks and important medium sized parks in and around metropolitan Sydney such as Brisbane Water, Ku-ring-gai Chase, Garigal, Marra Marra, Lane Cove River, Georges River, Dharug and Bouddi National Parks. There are also a number of small parks and state recreation areas within and adjacent to the metropolitan area which complement these national parks.

The three areas which are the subject of this plan lie within the Sydney Basin, a major structural unit of New South Wales. This unit extends over the whole central eastern section of the State from north of the Hunter Valley south to Batemans Bay and includes the Central Tablelands west of Sydney. The Sydney Basin is part of the much larger Sydney-Bowen Basin and is of Permian and Triassic age (270-180 million years ago).

The three areas occupy the Woronora Ramp segment of the Sydney Basin. The ramp is a defined geological feature which rises southwards from the Cumberland Basin to the Illawarra between the coastal cliffs and the low plain to the west around Liverpool, Campbelltown and Picton.

The three reserves are on the north-eastern part of the Woronora Plateau in the southern part of the Sydney Basin. The remainder of the Woronora Plateau is predominantly naturally vegetated land incorporating Sydney Water catchments to the west, the Department of Defence lands to the north and west, the Illawarra escarpment to the south (zoned regional open space or state recreation area) and some minor crown and freehold lands.

The three areas have been recognised as supporting a very rich native vertebrate fauna; a reflection of the diversity of habitats present. There are at least 43 species of mammals recorded of which 16 are bats. There are 241 species of native birds (including 10 species which are believed to be aviary escapees), 40 species of reptiles and 20 species of amphibians including threatened species within each group.

The vegetation of Royal National Park has been well researched and it has as its most outstanding botanical asset a wide range of plant associations, including several types of rainforest, freshwater swamps and estuarine wetlands. There is also a wide range of ecotonal and boundary transitions which create a richness of floristic variation not found within such a small area in other Sydney parks. Along with the West Australian sandplains and South African fynbos (heathland), the park is amongst the most floristically diverse areas of its size in the temperate parts of the world. Well over 1000 plant species have been recorded, including 26 species which are listed as nationally rare or threatened.

Royal National Park is also an important refuge for invertebrates. It has one of the richest native insect faunas of any studied area in the State and is the type locality for hundreds of species. It also has a diverse terrestrial mollusc population and is the type locality for a species (the place from where the first specimen of a species was collected, recognised and described) now considered extinct elsewhere.

Royal National Park is recognised as having high scientific values and this is enhanced by its accessibility on a day visit basis from the various research institutions in Sydney and Wollongong. The park's diversity of natural and cultural heritage, combined with its accessibility, result in it being regularly used for demonstration purposes by scientists. The use of the park for scientific research has been a recurrent feature of its history and provided one of the stated motivations for its dedication in 1879.

The upper Hacking catchment, which includes parts of Royal National Park and all of Garawarra State Recreation Area, contains several endemic plant species. Warm temperate rainforest is found in the sheltered gullies within the state recreation area, while in the most protected locations there are very limited areas of subtropical rainforest. The state recreation area protects several species of plants not found in Royal National Park.

Royal National Park contains significant, localised geomorphic features such the relict cliff-top dunes between Jibbon and Marley beach, which are the most extensive and best preserved examples in the State of aeolian coastal dunes formed during Holocene sea level changes. Associated with these dunes is the only deflation hollow of its type in the State.

Cabbage Tree Basin is one of only two sites in the State where beach ridges have developed under low wave energy conditions. These features provide information on shoreline changes during the last 6000 years since the sea attained roughly its current level.

Garawarra State Recreation Area secures a significant proportion of the wildlife corridor between Royal National Park and the wet sclerophyll forests and rainforests of the Illawarra Escarpment to the south.

Royal National Park's high visitation rate and its resulting high public profile provide unique opportunities for developing community awareness of the park and its management issues and for fostering an appreciation of the wider issues of nature conservation.

Royal National Park is of national historical significance as the oldest national park in Australia. Physical evidence surviving in the park, together with

historical documents, demonstrates the evolving philosophy and practise of recreation and conservation in Australia. This evidence is widespread and ranges from the unobtrusive - the stumps of logged trees and other evidence of timber getting - to the obvious - the cabin groups at Era and the cultural landscape of the Audley precinct.

The three areas contain an important suite of comparatively undisturbed Aboriginal sites. Research into coastal Aboriginal occupation, when archaeology in Australia began to boom in the 1960s, centred on the Sydney - Port Hacking area and two significant occupation sites at Wattamolla and Curracurrang were investigated during that decade. The parks also contain an important sample of the regionally distinctive art and engraving sites that are found south of the Georges River and north of Lake Illawarra.

Aboriginal sites in the parks are of importance to the present day Aboriginal community for cultural revival, educational and historical reasons. Further research may also reveal the presence of places of spiritual or ceremonial importance to Aboriginal people living at La Perouse or on the South Coast.

Royal National Park has exceptional value for education, both of the general public and for schools and universities. Its location within an hour's drive from Sydney or Wollongong, combined with its variety of natural habitats, makes it an excellent venue for field studies. Public schools use the Department of School Education's Field Studies Centre which provides interpretative walks and environmental education activities. It is the most heavily utilised Field Studies Centre in New South Wales, annually catering to approximately 7,000 students and teachers from schools in the south eastern part of the Sydney metropolitan area, and is fully booked every year. In addition, private schools and public schools unable to utilise the Field Studies Centre organise their own excursions in the three reserves.

The scenic diversity of Royal National Park, combined with its close proximity to large population centres, makes it of outstanding value for recreation. The mixture of open ocean, estuarine, freshwater and land environments provide opportunities for a wide range of water and land-based activities. The extensive road network and the many facilities make the park attractive and "safe" to large numbers of people who would either be disinclined or too inexperienced to visit a more rugged, less developed park. The relatively safe and benign nature of the park and its ready accessibility makes it ideal for providing children and youth with their first experience of a national park.

The early efforts of the Mountain Trails Club led to the gazettal in 1943 of 712 hectares as Heathcote Primitive Area, which was later expanded to 2251 hectares and renamed Heathcote National Park. It was one of the first "primitive areas" in New South Wales, that is, a "national park" type reserve having as its objective the retention of natural conditions - a forerunner of the national park system now in place and a precursor of the current concept of wilderness areas. As such it contrasts markedly with the early history and role of Royal National Park as a "recreational" reserve.

The National Parks and Primitive Areas Council and its successors were also instrumental in the protection of important natural areas from the 1930's onward in NSW. The Council represented many small bushwalking clubs and, in particular, was successful in having the Garawarra Primitive Area (along the

Garawarra Ridge in the south-east of the present Royal National Park), established in 1933. The primitive area has subsequently been added to Royal National Park.

The differences in emphasis of management of the two reserves offers opportunities for the development of educational programmes and interpretive facilities to illustrate the impact of different philosophies of land management on the natural environment.

The significance of Royal National Park, Heathcote National Park and Garawarra State Recreation Area is summarised below:

International and national significance

- * Royal National Park is historically significant as the second oldest national park in the world and one of the first areas of land in Australia to be set aside specifically for conservation.
- * Royal National Park encompasses an area recognised as amongst the most floristically diverse for its size in the temperate parts of the world.
- * Royal National Park is used for research and teaching by both international and Australian scientists.

State significance

- * Royal National Park and Garawarra State Recreation Area protect sub-tropical and warm temperate rainforests.
- * Royal National Park is one of only four coastal national parks in the State which protect land below high water mark and associated estuarine habitats.
- * Heathcote National Park was originally reserved as a primitive area, the precursor of the concept of wilderness.
- * Royal National Park contains undisturbed coastal geomorphic features important for the study of Holocene and Recent changes in sea levels.
- * Royal National Park is significant as an education resource for scientific research and one of the state's most important resources for increasing the community's awareness of conservation and its importance for society.
- * Royal National Park demonstrates important developments in conservation and recreation philosophy and national park management since its establishment in 1879.

Regional natural heritage conservation value

- * The three reserves comprise a moderately large area of land protecting important landforms and plant and animal communities which are typical of the coastal and sub-coastal parts of the Sydney Basin.

- * The three reserves are an important link in a corridor of natural lands extending from southern and south-western Sydney southwards to the Illawarra escarpment, the water catchment areas and beyond.
- * Royal National Park is recognised as having a rich invertebrate fauna.

Regional Aboriginal cultural heritage conservation value

- * The three reserves provide protection for a large number of Aboriginal sites, particularly rock engravings stylistically distinct from those north of the Georges River.

Regional historic cultural heritage conservation value

- * Royal National Park protects several cultural landscapes, including the Audley precinct and the Bulgo and South Era cabins.

Regional environmental education value

- * The proximity of the three areas to Sydney and Wollongong present an outstanding opportunity for general environmental education and for education of the public on the Service's responsibilities for the protection of natural and cultural heritage.

Regional recreation value

- * The accessibility and well developed facilities of Royal National Park attract visitors who would not otherwise visit a national park.
- * The three areas provide opportunities for non-motorised outdoor recreation in a natural setting.

Local recreation significance

- * Garawarra State Recreation Area offers opportunities for the development of low key recreation settings which complement those of Royal National Park.
- * Garawarra State Recreation Area is an important recreation resource for the population of Waterfall, Helensburgh, Heathcote, Engadine and the northern suburbs of Wollongong.
- * Several recreation clubs and local schools use Royal National Park for organized events.

3. OBJECTIVES OF MANAGEMENT

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

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

The following general objectives relate to the management of state recreation areas in New South Wales:

- * the protection of their natural and cultural heritage;
- * the maintenance of their scenic values; and
- * the provision of a range of recreation opportunities consistent with the protection of the natural and cultural heritage.

In addition to the general objectives of management, the following specific objectives apply in the management of Royal National Park, Heathcote National Park and Garawarra State Recreation Area.

- * Royal National Park will be used as a primary venue within the southern Sydney Metropolitan area for the promotion of natural and cultural heritage conservation in NSW generally and for promoting the work of the Service.
- * The protection and where necessary restoration of nature conservation values within Royal National Park, Heathcote National Park and Garawarra State Recreation Area as part of the system of parks and other protected lands of the Woronora Ramp within the Sydney Basin, with emphasis on the protection of biodiversity and maintenance of the ecological relationships between the reserves and adjacent natural lands.
- * Garawarra State Recreation Area will be managed as an extension of Royal National Park for the protection of its nature conservation values.
- * To protect the catchment of the Hacking River and Woronora River.
- * To protect scientifically important coastal features.
- * To protect rainforest in the upper catchment of the Hacking River.

- * The historic recreational settings and cultural landscapes in Royal National Park will be conserved.
- * The three areas will be promoted to increase public awareness of:
 - the reserves as important parts of the system of natural heritage conservation areas on the Woronora Ramp and in the Sydney Basin which contain important refugia for plant and animal communities of the Sydney Region;
 - scientifically important coastal features;
 - the history and development of Royal National Park in respect to changes in the philosophy of recreation and conservation management; and
 - the appropriate use of the two national parks and the state recreation area.
- * The increased use of Royal National Park for environmental education purposes will be promoted.
- * Royal National Park will continue to provide outdoor recreation opportunities at existing levels within the established facility areas.
- * The balance of Royal National Park and Heathcote National Park will continue to provide non-motorised and low key recreational opportunities in a natural setting.
- * Limited development of Garawarra State Recreation Area will be catered for to meet anticipated increases in recreation demand, but only to the extent that the natural and cultural resources of the area are not compromised nor its value as part of the larger conservation area.
- * The promotion within the local community, particularly neighbours of the three areas of the importance and purpose of management programs necessary for the protection of natural features and the control of fire, weeds and feral animals.

4. POLICIES AND FRAMEWORK FOR MANAGEMENT

This chapter contains the policies and framework for the management of Royal National Park, Heathcote National Park and Garawarra State Recreation Area together with relevant background information. Policies are summarised under the following section headings:

- Conservation of Nature;
- Cultural Heritage; and
- Use of the Area

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

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

4.1 CONSERVATION OF NATURE

4.1.1 Geology, Landforms, Soils and Catchments

The land covered by the three areas consists of a Hawkesbury sandstone plateau up to 200m in elevation. The plateau generally slopes downwards to the north and is deeply dissected in the west by the Hacking River system which drains northward to the Port Hacking estuary and the Woronora River which drains into the Georges River. This landscape is characterised by steep valleys and ridges, rocky outcrops and streams, many of which are punctuated by waterfalls and pools. In the east, the plateau is characterised by broad, gently sloping ridges and small eastward flowing drainage lines.

Two areas in Royal National Park are of particular geomorphological interest; the cliff-top sand dunes between Jibbon and Marley and the beach ridges on the eastern side of Cabbage Tree Basin. The Jibbon/Marley sand dunes are relict clifftop dunes formed during the sea level rise of some 6000 to 10 000 years ago and are the most extensive and best preserved examples in New South Wales. They include the State's only described deflation hollow of its type, situated below sea level and supporting a freshwater lagoon and marsh. These dunes are formed of unconsolidated sand and are subject to blowouts if the vegetation cover is removed.

On the eastern side of Cabbage Tree Basin is a system of low beach ridges. These are significant geomorphological features which indicate shoreline changes over the last 6000 years and which have formed in areas of low wave energy. The Cabbage Tree Basin beach ridges are the only known example of this feature on the New South Wales coast. Some of the ridges in the Bonnie Vale area have been modified but others remain in their natural state.

A number of other features of scientific and other interest also exist in Royal National Park including an unusual cave on the south bank of Palona Brook which has stalactites and stalagmites.

Soil conservation is a major management problem in the three areas. The high erodability of soils and high rainfall of the upper Hacking River catchment result

in a significant erosion hazard. Erosion is particularly a problem in areas of heavy visitor use along popular walking tracks, such as the Coast Track and in some camping areas, such as those south of Garie. The Coast Track suffers from wind erosion as well as water erosion which requires specialised construction techniques to repair. Grazing of deer along the coast and the estuarine foreshore is another cause of soil slip and erosion. There are also problems of erosion along some of the maintenance tracks, particularly the Winifred Falls Trail, Wisers Track and Big Marley Trail.

The Hacking River, which rises outside but flows for most of its length through Royal National Park and Garawarra State Recreation Area, is the major freshwater habitat in these reserves. The character of the river changes from being a narrow stream running through deep rainforest gullies in the south, to becoming a relatively wide and navigable river at the mouth of the estuary in the north. Kangaroo Creek, a tributary of the Hacking River, is the other major stream in Royal National Park and flows through open forest sandstone country to the west. Its catchment is almost wholly contained within Royal National Park and is largely undisturbed.

There are major environmental problems associated with the mixed land use in the Hacking River catchment. Although Royal National Park and Garawarra State Recreation Area comprise a large proportion of the Hacking River catchment, the towns of Helensburgh, Otford and Stanwell Tops are also located within the upper catchment. These towns result in urban runoff being discharged into the river including point sources of pollution from a municipal tip, an active colliery, a hospital, horse riding establishments and a variety of small farming enterprises. The water quality has continued to degrade with increased levels of turbidity, siltation, excessive algal growth, and high levels of bacteria of faecal origin. Under the Clean Waters Act 1970 the Hacking River has a "P - Protected Waters" classification, which requires discharge to be of potable quality.

Significant parts of the catchment outside the reserves are still close to their natural condition. These include gullies with rainforest and tall moist eucalypt vegetation which are critical to the survival of much of the vertebrate fauna found in the reserves.

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. An important means of achieving these aims is the formation and support of catchment management committees at a local level.

The Hacking River Catchment Management Committee on which the Service is represented is responsible for co-ordinating total catchment programs within the Hacking River catchment

Heathcote National Park occupies the greater area of Heathcote Creek and is bounded on the west by the Woronora River. Heathcote Creek flows into the Woronora River at the northernmost end of the park. The Woronora River catchment is part of the larger Georges River catchment. The catchment of

Heathcote Creek along the eastern boundary of Heathcote National Park lies partly within urban and semi urban land uses and is a source of pollution to the creek and to the park. The lands to the west and south of the national park are natural lands protected as water catchment and military reserve. Heathcote Creek and the Woronora River lie within the area of the Georges River Catchment Management Committee on which the Service is represented and are classified 'P' (Protected Waters under the Clean Waters Act).

The submerged and intertidal lands of South West Arm and Cabbage Tree Basin, both in Port Hacking, are protected as part of Royal National Park. Both areas are sheltered bodies of water which support nursery grounds for juvenile fish and invertebrates, seagrass beds and a diverse benthic fauna. Cabbage Tree Basin also supports a mangrove community and is an area frequented by migratory birds. Both areas are used for recreation by small boats and jetskiers, each of which cause physical damage to important habitat. This is evident at low tide, when trails criss-crossing the sediments are commonly seen. The major responsibilities of management within these two areas is divided:

- **NSW State Fisheries** has responsibility for the management of fish and all other marine and aquatic life as defined under the Fisheries and Oyster Farms Act;
- **the Waterways Authority** has responsibility for the management of all watercraft using the national park. This responsibility includes regulation of discharges from craft which cause pollution; and
- **the National Parks and Wildlife Service** has responsibility for the management of the beds of South West Arm and Cabbage Tree Basin, including any structures attached to them and responsibility for the management of marine mammals. The Service does not have responsibility for the management of the body of water in either South West Arm or Cabbage Tree Basin, nor of their use.

Matters relating to the various aspects of the protection and use of these areas are outlined in the relevant sections of this plan.

Policies

- * All management activities, where relevant, will incorporate soil erosion management principles and practices developed by the Soil Conservation Service.
- * Geomorphological and landscape features of interest will be protected, including:
 - the Jibbon clifftop dunes;
 - the Cabbage Tree Basin beach ridges; and
 - the cave on the south bank of Palona Brook.
- * Activities that could result in the removal of vegetation from the relict clifftop sand dunes between Jibbon and Marley and cause blowouts will be prohibited.
- * The natural and scientific value of the beach ridges on the eastern side of Cabbage Tree Basin will be protected.

- * The Bonnie Vale area will be surveyed for its geomorphological features before any earthworks are carried out there.
- * The control of soil erosion in the following areas will be given priority:
 - the Jibbon clifftop dunes;
 - the Cabbage Tree Basin beach ridges;
 - walking tracks subject to heavy use in erosion prone areas;
 - camping areas;
 - the Garawarra escarpment;
 - heavily used areas on estuarine foreshores;
 - re-developments and associated earthworks;
 - former quarries or gravel pits not required for management purposes (refer sub-section 4.3.4 Management Operations) and which are in need of revegetation; and
 - fire trails and vehicular management trails.
- * The Service recognises the principle of total catchment management and will liaise with local government and other authorities to maintain and improve the water quality of the catchments of the three areas.
- * The Service will seek the co-operation and involvement of the Hacking River Catchment Management Committee in programs to remedy the environmental problems of the Hacking River, including:
 - pollution of Engadine Creek which flows into Kangaroo Creek;
 - protection of Royal National Park and Garawarra State Recreation Area from road spills of chemicals and other noxious substances;
 - pollution arising from Helensburgh; and
 - the dumping of rubbish in or on the park boundary.
- * The Service will seek the co-operation and involvement of the Georges River Catchment Management Committee in programs to remedy the environmental problems of Heathcote Creek, including:
 - eliminating discharge of sewerage effluent by Sydney Water from installations at Woronora Dam;
 - protection of Heathcote National Park from road spills of chemicals and other noxious substances;
 - prohibiting release of any environmentally damaging substance by Sydney Water during work on the pipes; and
 - stormwater pollution in Heathcote National Park;
- * The Service will seek to have conditions included in any development consent granted by any authority to protect the catchment values and water quality of all streams flowing through Royal National Park, Heathcote National Park and Garawarra State Recreation Area. Such conditions will include treatment of runoff, construction of sediment traps, restoration of the site and landscaping to ensure that the visual amenity of the national parks or state recreation area is not impaired.
- * The bed and the foreshores of South West Arm and Cabbage Tree Basin within Royal National Park will be protected.
- * The Service will not permit these areas to be dredged for the purposes of navigation or for any other purpose.

4.1.2 Native and Introduced Plants

Much of the sandstone plateau of the three areas supports a eucalypt woodland community which in western Royal National Park and Heathcote National Park grades into sandstone gully forest dominated by smooth-barked apple (*Angophora costata*). In moist and sheltered locations such as along the Hacking River valley and in some of the deep gullies around South West Arm Creek, Warumbul and Deer Park, the vegetation is tall open eucalypt forest and contains rainforest elements.

The exposed sandstone plateau surfaces in the eastern section of Royal National Park are covered by a complex mosaic of heaths and mallee. To the north and the north-east, the plateau gradually falls to the sea, forming a coastal plain characterised by heath covered sand dunes. Along the coast, where salt and high winds prevail, the vegetation is typical of the low coastal scrub of south-eastern Australia. In the south the plateau drops abruptly to the coast where it forms a narrow, steep escarpment supporting small patches of littoral rainforest which are dominated by cabbage tree palms (*Livistona australis*) along the streamlines.

In the upper catchment of the Hacking River in both Royal National Park and Garawarra State Recreation Area there are significant stands of subtropical and warm temperate rainforest. This is the result of higher rainfall in the south and the occurrence of richer soils of the Narrabeen Group shales which are exposed in the deep gullies. It is estimated that some 75 per cent of the rainforest of the Illawarra has been cleared since settlement and accordingly, that remaining in the upper Hacking River catchment is of high conservation value.

Within the basic vegetation types found in Royal National Park there are many local variations in structure and floristic composition which are determined by the local geology and soils, physiography, aspect, catchment and fire history. The area is on an east-west climatic gradient derived from the influence of the ocean. It also falls on a bioclimatic gradient between the northern warm-temperate biota and the southern cool-temperate biota. The complexity of physical factors is reflected in the development of a uniquely diverse mosaic of floristic assemblages.

For several years the Service has been undertaking a vegetation survey of Royal National Park, Heathcote National Park and Garawarra State Recreation Area. This survey will allow a comprehensive vegetation map of the three areas to be produced, which can be used for management and planning purposes. The vegetation survey has been undertaken in such a way that data can be added and updated.

The significant features of each major vegetation type are given below.

Rainforests

Areas of subtropical, warm temperate and littoral rainforest occur in Royal National Park and Garawarra State Recreation Area. These areas represent the northernmost extent of the once extensive rainforests of the Illawarra region. Both subtropical and warm temperate rainforest are mainly restricted to sheltered terrain in the Hacking River valley on

Narrabeen shales. The best examples of subtropical rainforest in the area occur in the valleys of Stuarts and Cedar Creeks, just outside the two reserves. Littoral rainforest is found on sand dunes at Jibbon, Marley, Curracurrang and Garie and a somewhat different assemblage of species occurs on the seaward slopes of the Narrabeen Group shales south of Garie. The only similar stand of littoral rainforest in the Sydney region occurs on sand in Towra Point Nature Reserve.

The conservation of rainforest in the upper Hacking River catchment is a priority as a habitat link with the rainforests on the Illawarra escarpment.

Tall moist eucalypt forest

Tall moist eucalypt forests grow on sheltered gully slopes with Narrabeen Group shale soils in the southern part of the Hacking River valley in Royal National Park and Garawarra State Recreation Area. As for the rainforests, Royal National Park represents the northern extent of the Illawarra moist eucalypt forests which extend southwards along the escarpment. Throughout this range, the forests are in a state of regeneration following a long history of logging and clearing which continued in the southern part of what is now Royal National Park until the 1960s.

In Heathcote National Park, wet sclerophyll vegetation occurs on the eastern flank of Scouters Mountain.

Shale forest

Small stands of eucalypt forest which are floristically different to those found in the gullies on Narrabeen Group shales occur on Wianamatta shale outcrops on the Hawkesbury sandstone plateau. These occur along the western edge of Royal National Park, the largest being at Loftus behind the former tram museum. A second patch occurs between the Princes Highway and the F6 Freeway at Helensburgh. These are remnants of a more extensive forest community which stretched along the shale-capped ridge from Sutherland to Cronulla. Due to their limited distribution, they will need to be protected.

Sandstone gully forest

Sheltered sandstone slopes and gullies throughout the three areas support a forest dominated by smooth barked apple (*Angophora costata*) with a few eucalypt species. These forests typify much of the spectacular bushwalking country in western Royal National Park and Heathcote National Park and similar vegetation is found to the south and west on the Woronora Plateau.

Within Heathcote National Park, most of the gullies from Burns Road north to Heathcote Road are dominated by an association of smooth-barked apple, Sydney peppermint (*Eucalyptus piperita*), grey gum (*E. punctata*) and red bloodwood (*E. gummifera*). There are occasional stands of forest she-oak (*Allocasuarina torulosa*) but beaked hakea (*Hakea teretifolia*) is the most common shrub.

Sandstone Plateau Woodland

Much of the sandstone plateau supports a eucalypt woodland community with a diverse shrubby understorey. South of Mt Leighton Bailey in Royal National Park there is a well developed ironstone mantle capping on the sandstone which supports woodland vegetation with rich populations of Gynea lily (*Doryanthes excelsa*), waratah (*Telopea speciocissima*) and woody pear (*Xylomelum pyriforme*), species generally uncommon on sandstone ridges in the Woronora region. Similar stands are found around Garrawarra Hospital and the O'Hares Creek area to the south-west.

The sandstone plateau has had small areas cleared in the past for military purposes, gravel extraction and other uses. Regeneration on sandstone is slow but areas where topsoil was removed were brush matted in the early 1970s and regeneration is gradually taking place.

The region's shale forests and sandstone plateau woodlands on ironstone, such as those found in Menai, scattered along the Heathcote to Helensburgh stretch of the Princes Highway, and in the O'Hares Creek area, have been highlighted as being under greatest threat of destruction because of their location on flat ridgetops suitable for development.

Heathlands and open scrub

Heath vegetation covers the exposed sandstone plateau surface and is prominent in eastern Royal National Park. It consists of a number of distinct communities whose distributions are a function of complex interactions between soil types, moisture availability and fire regimes. Most of the plateau supports closed and open scrub and mallee heath which occur in a complex mosaic together with smaller areas of wet heath. Exposed sections of the coast support a low coastal scrub and the perched sand dunes behind Jibbon Beach support yet a different heath community.

The most extensive vegetation type is open scrub, found on skeletal sandstone soils. Its distribution is related to fire history because the dominant species (*Banksia ericifolia*, *Allocasuarina distyla* and *Hakea teretifolia*) are fire sensitive and would not persist in large numbers under either very frequent or very infrequent fire regimes. Mallee heath, characterised by multi-stemmed eucalypts dominating an open layer of small shrubs and sedges, is also extensive on the sandstone plateau and may owe its occurrence to different fire regimes. Royal National Park contains the largest area of this vegetation type in the Sydney region. Wet heath, composed of sedges and small shrubs amongst an open layer of *Banksia oblongifolia*, is found on patches of poorly drained parts of the plateau.

The relict clifftop dunes to the east and south of Bundeena support an assemblage of large shrub species which once covered the eastern suburbs peninsula of Sydney. This habitat is now restricted in the Sydney region.

Sea cliffs and headlands influenced by high winds and salt spray support low coastal scrub vegetation typical of these habitats in south-eastern Australia.

Mature stands of heath vegetation occur in Heathcote National Park on sites such as at Mt Minda, Mt Mooray and Bondel Rocks.

The Service has been conducting research into the reproduction of heathland species in response to fire in the Sydney region and this will be incorporated into fire management plans.

Wetlands

Although there are no extensive areas of wetlands in the three reserves, there are three distinct types: estuarine wetlands, freshwater lagoons and upland swamps.

Estuarine wetlands in the intertidal zone consist of mud flats with mangroves or saltmarsh. Similar wetlands are found in parts of Botany Bay, Port Jackson, and Broken Bay to the north.

Freshwater lagoons, which are limited to coastal sand sheets, are found at Jibbon and Marley. They are probably the best undisturbed examples of this feature on the central coast of New South Wales.

Upland swamps are found in poorly drained headwater valleys on the sandstone plateau and include Uloola Swamp and others along the Wallumarra Track. These represent the northernmost extent of more extensive and diverse swamps found on the eastern Woronora Plateau. The relative inaccessibility of the upland swamps offers them some protection but the impacts of visitors needs to be monitored.

The freshwater lagoons and upland swamps are of value for research into management of the vegetation in Royal National Park. The palaeontological record found in these wetlands could give clues to the relationships between fire regimes and vegetation dynamics over the last 10 000 years.

Significant upland swamps occur in Heathcote National Park, notably:

- Girronba Swamp and Girronba Vale;
- the swamp on upper Girronba Creek;
- Arbon Valley;
- in Moorabinda Gully; and
- the swamp on upper Heathcote Creek with a rare stand of *Banksia robur*.

The three areas contain populations of many species of plants classified as endangered or vulnerable under the Threatened Species Conservation Act, most of which occur in Royal National Park. They include trees, shrubs, herbs and orchids from a variety of habitats including rainforest, eucalypt forest, heathland and wetlands.

Unusual species found in Heathcote National Park include *Eucalyptus luehmanniana*, *Darwinia diminuta*, *Melaleuca deanei*, *Tetratheca neglecta* and an unconfirmed report of *Eucalyptus camfieldii* which is classified as vulnerable under the Threatened Species Conservation Act.

There is currently limited information on the ecology of some of these species. The first step to preserving these species in the long term is to establish and maintain a basic information base on the location, approximate size and age structure of their populations. The data base would assist in protecting specific areas of such plant populations and could provide information on species behaviour for fire management.

Introduced plants, or weeds, are becoming increasingly common with changes to land use in areas surrounding the reserves; weeds are now estimated to comprise 20% of the local flora. Weeds successfully compete with native plants and are spreading gradually into the reserves from urban boundaries. Weed infestations also occur on sites that were logged, cleared or quarried.

The heaviest infestations occur along watercourses originating in urban catchments which are subject to continued disturbance particularly the upper Hacking River catchment. Urban runoff is a major contributor to the invasion and spread of weeds by increasing the nutrient and moisture content of soils and transporting sediments rich in weed seeds and plant propagules. Whilst it may not be possible to totally eradicate this source of weeds, it is essential to slow their spread through the incorporation of runoff and erosion control works around developments and at major point sources of sediment.

The Service needs to undertake weed eradication and regeneration programs in the most heavily infested areas, preferably jointly with other authorities, neighbours and the community. In addition, the Service has to also ensure that its own management operations, such as the construction of roads and tracks, are not contributing to the spread of weeds. Education programs are required to raise public awareness on the impacts and causes of the spread of weeds.

Research and investigation by other institutions into various aspects of weed establishment, spread and control needs to be encouraged in order to assist with the development of long-term, cost-effective solutions to the weed problem.

Exotic plantings, relics of the Trust period of management in Royal National Park, are concentrated in the Audley precinct and along Lady Carrington Walk. The plantings in the Audley precinct are subject to the management proposals in the Audley Conservation Plan. Other plantings, such as those on the sites of former buildings, need to be assessed for their historical significance, rate of spread and impact on natural values. For example the brush box (*Lophostemon confertus*) along Farnell Avenue is now actively invading adjacent vegetation. Management decisions regarding preservation, removal or control should be carried out in accordance with the results of any assessment.

Policies

- * The Service will participate in regional and local environmental planning to achieve its conservation objectives throughout the Woronora Plateau and the Illawarra Escarpment.

- * The diversity and distribution of native plant communities in the three areas will be maintained.
- * The Service will seek through environmental planning processes to protect wildlife corridors from the three areas to naturally vegetated lands on nearby lands.
- * Specific conservation programs will be prepared and implemented for species, populations and habitats whose conservation status indicates active management is required to ensure their survival.
- * The control and where practicable, eradication of weeds will be undertaken in all three areas.
- * The co-operation of other authorities, park neighbours and other members of the community will be sought in implementing weed control programmes.
- * Exotic plantings identified as being of high historical significance in a conservation plan will be retained provided that they are not having an unacceptable impact on the natural values of the area.

Actions

- * The vegetation mapping for the three areas will be finalised
- * A programme to determine the priorities for preparing specific management plans for significant sites will be established. This will include:
 - the heath on the clifftop sand dunes in the Jibbon area;
 - prolific wildflower areas such as those on ironstone capped sandstone in the Mt Leighton Bailey area;
 - remnant shale forests;
 - wetlands; and
 - rainforests and tall moist eucalypt forests.
- * Surveys will be carried out to determine the location, approximate size and age structure of populations of plants listed as endangered or vulnerable under the Threatened Species Conservation Act.
- * A weed control plan will be prepared and implemented for the three areas which will identify major threats to biodiversity and priorities of control.
- * Pending preparation of the weed control program, priority will be given to the removal of pampas grass, lantana and prickly pear. The assessment of the cultural significance of coral trees in Audley and in other picnic areas and facility areas will be undertaken as a matter of high priority. Coral trees not found to be of cultural significance will be removed.
- * A public education program will be implemented to raise community awareness of the impact and causes of the spread of weeds.

4.1.3 Native and Introduced Animals

The diversity of vegetation communities in the three areas has provided a range of habitats for a rich assemblage of native animals. Although comprehensive surveys have not been carried out, 43 species of mammals, 241 species of birds (including offshore species and vagrants), 30 species of amphibians and 40 species of reptiles have been recorded in Royal National Park. The park is also an important area for invertebrates.

Garawarra State Recreation Area is noted for its birdlife, particularly the diversity and abundance of rainforest birds. Brief mammal surveys in the area have revealed that the area is also capable of supporting a very high diversity of mammals. It is likely that the upper Hacking River catchment supports at least 24 species, and more are likely to be identified following comprehensive surveys for bats.

Mammals

There has not been a systematic survey of mammals in the three areas. A mammal survey was done in the upper Hacking River catchment in 1985 and informal records have been kept over the years. Royal National Park supports at least 29 species of native mammals and up to 10 species of bats are also expected to occur in the park.

Several species are known to have declined in numbers. Species such as the tiger quoll (*Dasyurus maculatus*) which is classified as vulnerable under the Threatened Species Conservation Act, and the red-necked pademelon (*Thylogale thetis*), once common in the Illawarra region, have undergone a marked decrease in numbers. Both species are associated with the moist tall eucalypt forests and rainforests which have been extensively cleared in the region. Maximising continuity of vegetation on a regional basis as wildlife habitats is therefore of critical importance. The long-nosed potoroo (*Potorous tridactylus*) a coastal heathland species which was reported in the park in the 1970s but such sightings are unconfirmed. This species is classified as vulnerable under the Threatened Species Conservation Act. Koalas (*Phascolarctos cinereus*) also classified as vulnerable have been recently sighted in Royal National Park. Platypus (*Ornithorhynchus anatinus*) have not been recorded for many years..

The tall moist eucalypt forests and rainforests of the Hacking River catchment support the majority of the mammals known in the reserves (26 out of 43 species).

There are very few records of native animals in Heathcote National Park. The vegetation communities in Heathcote National Park indicate that sugar gliders (*Petaurus breviceps*), ring tail possums (*Pseudocheirus peregrinus*) and possibly eastern pygmy possums (*Cercartetus nanus*) may occur in both Mirang Creek and Minda Gully. The swamp wallaby (*Wallabia bicolor*) has also been recorded throughout the park.

Birds

Royal National Park has a very rich avifauna. One hundred and forty species have been recorded as resident, nesting or occurring regularly. Another 33

offshore species have been recorded and there are a large number of vagrants, which brings the total of species sighted in the park to 241. Another 14 species are introduced exotics and there are 10 species not native to the Sydney area which are probably aviary escapees. There are historical records of birds which no longer occur in the park or are extremely rare, though once probably regular residents or visitors. These include the emu (*Dromaius novaehollandiae*), speckled warbler (*Chthonicola sagittata*), painted honeyeater (*Grantiella picta*), and diamond firetail finch (*Emblema guttata*). The record of the vulnerable ground parrot (*Pezoporus wallicus*) exists only from a single sighting in the 1960s.

Heathcote National Park and Garawarra State Recreation Area also sample some of the habitats present in Royal National Park and a comparable range of species for these habitats is expected to occur there.

The tall moist eucalypt/rainforest community supports the richest diversity of birds and needs to be protected from wildfire and over-use. Heavy visitor use is considered to be the major factor contributing to many species being less readily observed in these habitats now than two decades ago. Another factor contributing to the decline in bird numbers is the isolation of the park by urbanisation and the consequent loss of vegetated corridors. One species which is particularly sensitive to any diminution of its habitat is the vulnerable powerful owl (*Ninox strenua*), which breeds in the southern end of Royal National Park.

A number of bird species subject to international treaty agreements (The Japan-Australia and the China-Australia Migratory Bird Treaties) occur in Cabbage Tree Basin and the estuarine sandbars off Maianbar. These species include the eastern curlew (*Numenius madagascariensis*), the bar-tailed godwit (*Limosa lapponica*), and the great egret (*Ardea alba*). The vulnerable pied oystercatcher (*Haematopus longirostris*) breeds on the sand dunes in the Maianbar area.

Known nesting sites of species which build conspicuous nests, such as sea eagles and other large birds of prey, need to be secured from disturbance. Lyrebirds nest on the cliff faces on the western side of the Hacking River and access to these areas needs to be controlled.

Reptiles and Amphibians

The herpetofauna (reptiles and frogs) of Royal National Park is abundant and diverse, richer than in any other studied coastal park in New South Wales. This is largely because of the diversity of habitats and the park's location on the junction of the northern warm-temperate biota and the southern cool-temperate biota.

Some 40 species of reptiles and 30 species of amphibians have been recorded from Royal National Park and its immediate vicinity, including the broad-headed snake (*Hoplocephalus bungaroides*), which is classified as endangered under the Threatened Species Conservation Act.

At present, it does appear that the herpetofauna is adequately protected in the three protected areas, although this has not been confirmed with systematic surveys. The heavy use of the surrounding district, the increasing urbanisation and pollution of riparian environments in combination with the high species

diversity and conservation value of the general district for herpetofauna, suggest that the three areas are of great importance but under substantial threat. The most important habitats herpetologically are:

- rainforests along Lady Carrington Walk;
- coastal heaths, particularly above the high cliffs;
- riparian habitats of the smaller creeks, particularly in the upper Hacking River catchment;
- wetter forests on the Garawarra escarpment; and
- freshwater swamps.

Observations from the 1960s indicate that Jibbon Swamp supports a large population of the eastern snake-necked turtle (*Chelodina longicollis*). This may be a regionally significant breeding area for the species.

Amphibians which develop from aquatic larvae are thought to be particularly affected by water pollution and for these animals to survive, the water quality in their habitat needs to be protected from the adverse affects of surrounding land uses.

Invertebrates

Under the National Parks and Wildlife Act the Service is responsible for the protection of invertebrates in reserved areas as these organisms are part of the food web and are integral to the functioning of ecosystems. Royal National Park has one of the richest native insect faunas of any area in the State and is the type locality for some hundreds of species. It also has a diverse terrestrial mollusc population and is the type locality for the land snail (*Meridolum marshalli*) whose range is restricted to the park and which is now considered virtually extinct elsewhere. The rainforests along the Hacking River are the richest and hence most valuable areas for molluscs. Other areas include the littoral rainforest association along Middle Rill (north of Garie Surf Club) and Palm Jungle (north of Werrong).

In the absence of adequate knowledge of specific habitat requirements, it is assumed that the conservation of vegetation communities provides adequate protection for the invertebrates. There is some evidence that the species richness in some areas of the park has declined with vegetation changes probably due to destruction of habitat by deer grazing and fire.

Introduced Species

There are at least nine species of introduced mammals found in the park: cats, dogs, pigs, house mice, brown and black rats, rabbits, foxes, fallow deer (*Dama dama*) and Javan rusa deer (*Cervus timorensis*). There are also a number of species of introduced birds.

Of the bird species, the mallard duck (*Anas platyrhynchos*), muscovy duck (*Cairina moschata*) and various hybrids interbreed with native species and need to be eradicated to prevent further loss of genetic integrity of these native species, notably the black duck (*Anas superciliosa*).

The fallow and Javan rusa deer are the survivors of several species introduced to Royal National Park early this century. The animals have a considerable impact on vegetation structure, regeneration of native species and soil stability.

Their presence in the park is not consistent with the protection of the environment and the conservation of native species. Since October 1988, when a severe wildfire burnt approximately half of the park, several hundred deer have been removed from the park by licensed trappers however a significant number of deer remain in many areas of the park and are continuing to breed. The Service will convene a working party, which will include the RSPCA, National Parks Association and Nature Conservation Council, to assist in developing a deer control plan to achieve the humane eradication of deer from the park.

There is a problem with domestic stock, particularly pigs, gaining entry into areas of the reserves and this needs to be more stringently controlled through liaison with property owners and appropriate follow-up action.

Recent investigations have established that European honeybees compete with and displace native animals, particularly native bees, nectar feeding birds and small mammals and have damaging effects on native plants. There are currently two licences for beekeeping in the park. No new licences will be issued, but existing licences will be extended in accordance with Service policy. Programs to control feral honeybees will be undertaken as methods of feral bee control are developed.

Policies

- * Habitats will be protected to maintain the diversity of animal species.
- * Research into the life history and habitat requirements of key species will continue to be encouraged.
- * Habitats of species subject to international treaty agreements will be protected from disturbance.
- * Introduced animals within all three areas will be controlled and where practicable eliminated or removed.
- * The aim of deer control in Royal National Park and adjacent areas is to eliminate their environmental damage by their eventual eradication
- * Domestic animals will not be permitted in the three areas, except for registered guide dogs and dogs on authorised search and rescue exercises.

Actions

- * Fauna surveys will be carried out in the three areas, with priority on threatened or restricted species, including bats and herpetofauna.
- * A feral animal control plan will be prepared and implemented for the three areas which will identify major threats to biodiversity and priorities of control.
- * The Service will foster research into fertility control in deer, as an alternative to culling

- * A deer control plan will be prepared in consultation with key stakeholder groups and will consider the options for deer control taking into account:
 - the past, present and potential impact of deer;
 - fluctuations in deer population and dispersal throughout the park;
 - the cultural significance of deer;
 - options for their eradication from the park; and
 - co-operative arrangements for the eradication of deer both in the park and on adjacent lands.

- * Pending finalisation of the deer control plan, the population of deer in Royal National Park will continue to be controlled.

- * Public education programs highlighting the impact of cats, dogs, deer and other introduced animals on natural areas will be developed and implemented.

4.1.4 Fire Management

Fire has been an important factor influencing the environment of Royal and Heathcote National Parks and Garawarra State Recreation Area for many tens of thousands of years. Fire is regarded by the National Parks and Wildlife Service as a natural phenomenon, one of the established physical factors of the Australian environment to which native plant and animal communities have become adapted. The proper management of fire is essential to avoid the extinction of native plant and animal species while protecting people and their property.

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

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

Much of Royal and Heathcote National Parks and Garawarra State Recreation Area is at risk of periodic fire from natural and man-made causes. Fire records show the most frequent pattern of fire spread is for fires to enter the parks from the west and north-west. Arson is a common cause of fire in the three areas and often originates in areas adjacent to public access and on adjoining lands.

Royal National Park and Garawarra State Recreation Area were two of several metropolitan parks burnt by wildfire during January 1994. Over 90% of Royal National Park was burnt, although not all of these lands were affected to the same degree. The bush will regenerate and the animal populations will re-establish themselves, although it will take many months and in some cases years.

A fire in which over 50% of Royal National Park was burnt also occurred in October 1988. Major fires occurred in Heathcote National Park in 1976, 1977 and 1979 and the last major fire before the 1994 fire in Garawarra State

Recreation area was in 1977 when the area was vacant Crown land. Fire at a frequency experienced in Royal National Park (1988 and 1994) and Heathcote National Park (1976, 1977 and 1979) has an unacceptable impact on native plant and animal communities.

Both the long term and short-term effects of fire on native plant and animal species, including the biota of the surface and sub-surface soil zone, are largely dependent upon fire regimes which consist of three factors; the frequency of fire, the intensity of fire and its seasonality.

Fire management planning on the Woronora Plateau must take into account a number of complex environmental, legal, social, geographical and economic considerations. The intensity at which a fire burns is directly related to the quantity of accumulated dry litter and other plant material. It is also directly related to ground slope and wind speed. The following features characterise fires in the three areas:

- High intensity fires may result from the combination of extreme weather conditions at certain times of the year and the high fuel loads which the vegetation in all three areas has the potential to rapidly develop.
- They may threaten human lives, property and heritage valued by the community. The control of these fires often involves considerable public expenditure and risks to firefighters including volunteers.
- The problem of fire management in all three areas is aggravated by the extent of developed areas adjoining their boundaries and the large number of visitors to the areas, particularly on warm summer days.
- Fires resulting from human activity may be reduced in frequency by effective public awareness and education campaigns.
- Fire at frequent intervals may reduce the diversity of habitats and possibly the diversity of species within natural areas.
- Fires that burn large areas may also reduce the diversity of habitats and possibly the diversity of species. In some circumstances frequent and extensive fires may lead to the local extinction of species.
- Many of the animal species and communities within the three areas are fire sensitive and rely on recolonisation from surrounding areas following fire. The opportunities for such recolonisation are becoming reduced because of the increasing alienation of land for development, thus creating islands of natural lands isolated from each other.

Fire from natural causes and at a frequency and intensity that is consistent with the management of the native plant and animal communities does not take place. An important strategy in fire management is to reduce the occurrence of fires in the three areas. Not until this is achieved can a practical, socially responsible and scientifically based fire regime be implemented.

Protection of Life and Property

Considerable effort has been put in over the last few years by the National Parks and Wildlife Service, bush fire management committees and local bush fire brigades to maximise protection of the developed areas adjoining the three parks. This strategy has a twofold purpose; to minimise the threat of wildfire to developed areas and their residents, and thereby allow greater flexibility in the treatment of fire in the rest of the three areas, whether it be for protection, for ecological management or to mitigate the impacts of arson.

The strategy requires works directed towards reducing the risk of intense fires and improving the capacity of firefighters to safely control wildfires. The perimeter of the three parks, therefore, adjacent to developed areas have their own unique combination of fire radiation zones, perimeter fire trails and hazard reduction zones. Radiation zones are areas managed to protect premises and facilities by regular and intensive reduction of fuel levels. They may contain inner zones which are kept free of combustible fuels and an outer zone where fuel levels periodically reduced. The width of the zones varies according to the bushfire hazard. Hazard reduction involves the burning or removal of litter or combustible vegetation which constitutes an identified bushfire hazard.

It is planned to continue consolidation and improvement of this system of protection in consultation with the respective councils, bush fire management committees, fire control officers, bushfire brigades and the community.

In accordance with the Department of Bush Fire Service's "Development on Fire Prone Lands", fuel reduction zones, including perimeter tracks are required in any new subdivision on lands adjoining areas of bushland which present a fire risk to the development.

Fire can also threaten public recreation and other management facilities throughout the three areas which are isolated and are surrounded or bordered by fire prone vegetation. Such facility areas can be cut off when fire threatens the major public and park roads. During extreme fire events these areas are closed to visitors.

Maintenance of Species Habitat and Diversity .

Contemporary ecological research in fire prone ecosystems, such as those which are represented in Royal and Heathcote National Parks and Garawarra State Recreation Area, has established broad principles about the fire regimes needed to avoid the extinction of species and thus conserve biodiversity:

- groups of plant and animal species which constitute an ecosystem respond similarly to fire according to the characteristics of their life-history. It is not necessary to specify fire regimes for the conservation of every species. Rather fire regimes for groups of species need to be defined; and
- a diversity of fire regimes is needed to maintain natural diversity. Accordingly the management of fire should aim to provide a pattern of fires of high, moderate and low intensity, frequency and extent. Extinctions are most likely when fire regimes of relatively fixed intensity, frequency and extent prevail without variation.

Scientific understanding of the fire requirements for plant communities is generally more advanced than for animal communities, although recent published research demonstrates that the conservation of many animal species also depends upon a mix of fire regimes including occasional high intensity fires. Over reliance on regular and low intensity fires has an unacceptable impact on critical habitat requirements for native animals.

With these general principles as a basis, fire management guidelines are being developed for Royal and Heathcote National Parks and Garawarra State Recreation Area which define fire regime thresholds for several major groups of plant communities. If these thresholds are exceeded either way the decline and extinction of plant species can be expected.

The following significant fire frequency thresholds have been identified for the management of fire in Royal and Heathcote National Parks and Garawarra State Recreation Area:

- Fire will be excluded from rainforest communities.
- The tall moist eucalypt forests support the majority of mammal and bird species found in the three areas; they are also a critical refuge in fire and an important ecological buffer for the rainforest. It is essential to protect moist eucalypt forests against too frequent fire.

Loss of species of woody plants will occur in these forests:

- . if the frequency of fires exceeds two fires in quick succession within a period of twenty years;
- . if two or more high intensity fires with complete scorch of the tree canopy occur within a period of one hundred years; or
- . if no high intensity fire occurs within a period of one hundred to two hundred years.
- Loss of species of woody plants within open forest or woodland communities may occur where the frequency of fires:
 - . exceeds two fires in quick succession within a period of five years;
 - or
 - . is less than one fire every thirty years.
- Fire is an important determinant of species and structural diversity of wet and dry heath on the sandstone plateau.

Loss of species of woody plants will occur in these plant communities if the frequency of fires:

- . exceeds two fires in quick succession within a period of eight years;
- . three fires in quick succession within a period of fifteen to thirty years; or
- . if there are no fires within thirty years.
- Similar fire regimes are required for tall shrubland, swamp forest and sedgeland communities. Loss of species of woody plants will occur where the frequency of fires:
 - . exceeds two fires in quick succession within a period of eight years;

- . three fires in quick succession within a period of fifteen to thirty years; or
- . if there are no fires within thirty years.

Fire management operations

The Service has prepared a fire management plan for Royal and Heathcote National Parks and Garawarra State Recreation Area. This fire management plan is to be extensively reviewed in the near future. When finalised, the new fire management plan will be available for public comment.

In addition, the Service, like other land owners and managers in NSW, is bound by the *Rural Fires Act 1997*, as well as the *National Parks and Wildlife Act 1974* and Service fire policy.

The Sutherland Shire and the Joint Illawarra Bush Fire Management Committees have been established under Section 50 of the Rural Fires Act, to develop and co-ordinate co-operative fire management between fire authorities. The National Parks and Wildlife Service is a member of these committees. The committees are responsible for both the development of co-operative fire fighting and programmes for the reduction of bush fire hazards. Section 52 of the Act requires the preparation of bush fire management plans of two kinds, a plan of operations and a bush fire risk plan.

Fires burning in the heath communities can burn with high intensity and travel particularly fast; up to 12 kilometres an hour under severe fire weather conditions. The park has therefore been divided into a number of fire management units based on the existing internal management track, the park road network and other potential fire lines such as the Hacking River, moist gullies, swamplands and the Pacific Ocean. Most of the park is well served by access trails of a four-wheel drive standard in a north-south direction, but is not well served by tracks in an east-west direction. A review of existing fire trails, their effectiveness and location and the requirement for additional fire trails is to be conducted.

A computerised geographic information system is in place which will increasingly provide information on native plants and animals of relevance to park fire planning.

To give effect to the collection, storage and use of information relevant to the effective management of fire, a record of the history of fire in Royal and Heathcote National Parks and Garawarra State Recreation Area, its occurrence, frequency and extent is kept. An important function of research into fire within the three areas is to ensure that the information thus gained is used to improve fire management.

The populations of a number of indicator species of native plants and animals will be monitored and an evaluation made of the performance of the guidelines outlined in the proposed fire regime thresholds for the several communities of native plants and animals. The threshold guidelines will be modified in the light of appropriate new scientific information.

Policies

- * Liaison will be maintained and co-operative strategies developed with bushfire brigades, local government, and neighbours to ensure co-ordination in fire management in the three areas and on adjoining lands.
- * Fire in the three areas will be managed in accordance with the Section 52 bush fire management plans, the park fire management plans and this plan of management.
- * The co-operation of all relevant authorities, neighbours and visitors will be sought in eliminating unplanned fires.
- * The co-operation of all relevant authorities, neighbours and visitors will continue to be sought in achieving an ecologically and socially responsible fire management regime for Royal and Heathcote National Parks and Garawarra State Recreation Area.
- * Measures to lift the level of community understanding of the role and management of fire within Service areas will be promoted.
- * Research into the effects of fire on the natural environment will be undertaken and encouraged.
- * A fire management information system will be maintained to assist in the identification of high fire risk areas, and trends in fire occurrence.
- * Fire management in Royal and Heathcote National Parks and Garawarra State Recreation Area will aim to:
 - protect human life and property both within the park and adjacent to it;
 - maintain species habitat and diversity, avoid local extinctions of native plant and animal species and enhance the conservation of rare and endangered native plant and animal species; and
 - protect structures, objects and places of cultural heritage significance.
- * Neighbouring developed areas, other property and facility areas within Royal and Heathcote National Parks and Garawarra State Recreation Area will be protected by fire radiation zones or other forms of treatment.
- * Fire will be excluded from rainforest in Royal National Park and Garawarra State Recreation Area.

Actions

- * The park fire management plans will be reviewed before the commencement of the fire season each year.
- * The Service will participate in the preparation and implementation of bush fire management plans under Section 52 of the Rural Fires Act.
- * An education program will be implemented to raise community awareness of fire management in the three areas.

- * The continued consolidation and improvement of the system of radiation zones, perimeter fire trails and hazard reduction zones around village and urban areas adjacent to the three parks will be undertaken in consultation with councils, bush fire management committees, fire control officers, bushfire brigades and the community.
- * Liaison with councils, other land use authorities and neighbouring landholders will be continued to maintain quick response, co-operative fire management arrangements.
- * Records of fire occurrence will be maintained with particular emphasis on mapping and recording of the area, frequency, seasonality and intensity of fire.
- * Information on fuel characteristics and fire hazard will be maintained and upgraded.
- * All fire trails will be maintained and usage restricted to authorised vehicles only.
- * High priority will be given to enforcement of the Bush Fires Act relating to the fire permit system and arson.
- * Fire protection/management works will be rated as a high priority for the next ten years.
- * The ecological consequences of fire regimes will be reviewed each year against criteria for measuring the fire regime thresholds. The results of such review will be used to derive fire management programs for the subsequent year or years.

4.2 CULTURAL HERITAGE

4.2.1 Historic Heritage

Before the proclamation of Royal National Park in 1879, the area was used primarily for timber getting, especially along the rivers which were the main means of transport before road construction. Declaration of the park did not, however, result in the cessation of timber getting and became a focus of dissent between the Trust and conservationists earlier this century.

Around Port Hacking a series of grants of waterside land, on which substantial houses were built, were made in the middle 1800s. These included Gogerleys, Red Jacks Point and Lamonts, all of which continued to be occupied after their incorporation into the park.

On April 26, 1879, an area of just under 7000 ha was proclaimed as "National Park". In 1880 this area nearly doubled in size with a further addition and by March 1883 the area was again increased to total 15,133 ha. The park's name was changed to "Royal National Park" in 1954 after the visit of Queen Elizabeth II.

The creation of the park was an outcome largely of the vision of Sir John Robertson, who at the time headed a coalition government in NSW with Sir Henry Parkes. He responded to a social need to provide "breathing spaces" for urban dwellers living in the unhealthy, polluted conditions of the city. The National Park became known as the "lungs" of Sydney.

The park was originally managed by The National Park Trust who were empowered to develop it for the "recreation of the inhabitants of the colony". They set about turning the area into a metropolitan style park by introducing a multiplicity of "improvements" including buildings, roads, gardens and exotic plantings and animals. In 1887, some 3,700 ornamental trees were planted, some of which are now features of the park, particularly at Audley and along Lady Carrington Walk.

Sections of the park were also used by Acclimatisation Societies concerned with the introduction of exotic animals for economic production.

The Trust focussed its attention on Audley, developing it into a small village offering a variety of amusements. The "pleasure garden" character of the development, dating from the turn of the century, is still apparent today: the extensive lawns and ornamental plantings, the boat hire facilities, and the causeway built to create both navigable water for pleasure craft and freshwater habitats for introduced fish. The old dance hall was built in the 1940s.

The Trust was concerned about the "problem of inaccessibility". The installation of the training walls along the river bank in the 1880s was an attempt to maintain the navigability of the Hacking River as far as Audley. Within a decade of its dedication, the park was also criss-crossed with a network of roads designed to open its attractions to the public.

Other evidence of the Trust's management includes the quarry scars from the excavation of large volumes of gravel, ironstone and claystone for road and rail construction; tree stumps from the logging operations, which continued until the 1920s; and the small dwellings or cabins at several locations in the park. These activities were promoted by the Trust to raise revenue for funding recreation facilities and many continued into the 1960s.

A conservation ethic began to develop in the community around the turn of the century. The Trust came under sharp criticism for its decision to allow timber cutting and milling for pit props. By the 1930s, conservationists began to lobby for a state National Parks Authority. Management of the park was transferred to the National Parks and Wildlife Service in October 1967 with the enactment of the National Parks and Wildlife Act and the reservation of Royal National Park as a national park was made permanent under the provisions of that Act.

The initial management style of the Service was to establish a balance between recreational objectives and nature conservation values. The Service attempted to restore to a natural appearance some of the park's developed areas by demolishing numerous structures, especially within the Audley precinct

With the more recent increase in the community's interest in and awareness of cultural heritage, recognition is now given to the historical influences which shaped the park. The conservation of places of historical significance was made a part of the legislative responsibility of the Service when it was established in

1967. The conservation works to the historic buildings and landscape at Audley, which are subject to the Audley Conservation Plan, reflect this change in management philosophy.

Royal National Park has not been systematically surveyed for historical evidence and there has been no broad program to record or assess the non-Aboriginal heritage of the park.

The Audley precinct was the subject of a conservation planning exercise in 1987 when the Dance Hall and Picnic Pavilion were stabilised. More recently (in 1992) an entire class of historic places - cabins - were recorded as part of a draft Cabins Conservation Plan. Some recording and assessment has also been done at Gogerleys and Hilltop.

The cabins in Royal National Park evolved out of tent camping, with some of the cabins originally having canvas walls which were subsequently replaced with solid walls. Most of the cabins were built between the mid 1930s and mid 1950s, although some at Era are reported to be older. A key aspect of the significance of the cabins and cabin groups is the simple tenting lifestyle that underlies their establishment and their construction as low-cost simple structures without major infrastructure which reflects their isolation and lack of services. Most of the cabins were erected before the land on which they were built was added to the national park. These cabins are located in five groups at Bonnie Vale, South Era, Burning Palms, Little Garie and Bulgo:

Bonnie Vale: It is not clear when cabins at Bonnie Vale were first constructed. An early reference suggests that some 'fishermen's huts' may have been in existence before 1918 but this is unsubstantiated and conflicts with other evidence. One other report proposes the 1930s and it is apparent that there were cabins at Bonnie Vale before the Second World War. When land on the foreshore of Port Hacking was acquired by the National Park Trust in 1947, the Trust seems to have formalised the development of cabins at Bonnie Vale.

South Era, Little Garie and Burning Palms: These three groups of cabins are located on the central coastal section of Royal National Park and were developed on 142 ha of freehold land during the Great Depression of the 1930s. The cabins replaced earlier semi-permanent tents. The land on which the huts are located was resumed in 1950 (following the death of the owner) and added to the park in 1954. The National Park Trust permitted continued occupation of the existing huts but no additional huts were allowed.

Bulgo: The Bulgo cabins are closely associated with the coal mining community in the Helensburgh area and also developed during the Great Depression (most were constructed between 1930 and 1932) on a narrow strip of Crown Reserve and freehold land between Bulgo Beach and the Garawarra Escarpment to the north. The primary interest of the cabin owners at Bulgo was and is still fishing. Part of the freehold land containing cabins was purchased by Wollongong City Council in 1960, and with the Crown Reserve, added to Royal National Park in 1976. Further land containing cabins to the south was acquired by the Department of Planning in 1989 and was also added to the national park.

The cabins are owned by the occupant but the site of the cabin is now national park. The State Government in 1966, therefore, required that occupation of cabins within the national park be formalised by issue of a Permissive Occupancy. These occupancies were subsequently replaced in 1979 by licences issued under section 151(1) of the National Parks and Wildlife Act. The licensee pays a rent to the National Parks and Wildlife Service.

The policy with respect to cabins in Royal National Park which was in force between 1975 and 1996 was outlined in the licence conditions and in the plan of management for Royal National Park adopted in 1975. This policy provided that licences were only available to the original licensee and were not transferable. If the licence was no longer required or a breach of the licence conditions occurred or the licensee died, the cabins were subject to an assessment of their cultural significance and may be removed and the area restored. One hundred and seventeen cabins were removed from Bonnie Vale, South Era, Little Garie and Burning Palms in accordance with this policy between 1971 and 1992. Most of the cabins removed were at Bonnie Vale (92).

A moratorium on cabin demolition was put in place in 1990 until the Service could finalise a draft conservation plan for the cabins. A draft cabins conservation plan was prepared and placed on public exhibition in late 1994-early 1995 which recommended that at a minimum some of the cabins be retained because they are of social, architectural and historical significance. The Service also undertook an economic analysis of management options.

As a result of the public exhibition of the draft conservation plan for the cabins and this plan of management, the moratorium now ceases. The Service will seek to retain a substantial number of cabins along the coast through licensing with stringent conditions which ensure that their cultural heritage values are retained and their environmental impact is considerably reduced by meeting environmental performance standards. Provision will be made for public use of some of the cabins.

There are 229 surviving cabins, the majority of which are occupied under licence from the Minister. The cabins have been listed by the National Trust, and the Bonnie Vale, South Era and Burning Palms cabins are listed by the Australian Heritage Commission. The Bulgo cabins are registered on Wollongong City Council's Heritage List.

A conservation and management policy will be prepared for each group or related group of cabins (with the exception of Bonnie Vale) which will address the issues raised in the conservation plan, including:

- identifying the cultural significance of individual cabins and each group of cabins;
- establishing guidelines for the use and conservation of cabins;
- establishing environmental performance measures under which cabins and cabin groups may be retained or be occupied;
- establishing guidelines for maintaining the social context of the cabin groups; and
- establishing a framework for the management of cabins through the preparation of a review of environmental factors.

The conservation and management policy will also identify unlicensed cabins with heritage significance that may be suitable for public use and determine the

most appropriate and equitable manner to make them available for short-term occupation consistent with the conservation and management policy.

Each conservation and management policy will be placed on public exhibition in accordance with the process outlined in the draft plan of management and the conservation plan. Right of access through cabin areas by visitors to the park will be assured.

All the cabins in Royal National Park have been afforded recognition for their cultural significance. There are also legal, equity, environmental and social questions that require resolution before an environmentally and socially feasible program for the management of the cabins can be finalised. In particular, environmental issues relating to:

- rubbish disposal;
- pollution, notably relating to sewage and water quality;
- soil erosion;
- weed and feral animal, including deer, control;
- beach dune protection;
- regeneration of native vegetation near the cabins;
- protection of scenery;
- fire management; and
- public health and safety

are to be addressed by the conservation and management policies for a group of cabins or related group of cabins.

Cabin owners have formed land care groups and have undertaken environmental and restoration programs addressing some environmental impact matters such as dune care and walking tracks maintenance.

Although survey and recording of all historical evidence has not been carried out there are about 80 other historic places known in the park. These include residences and associated landscape features at Red Jacks Point (a ruin), Lamonts (a ruin) and Gardiners Garage; the sawmill site (early battleground for conservationists); various military installations (camp, trenches); tracks and roads, quarries (including a shell grit and chalcedony quarries), dams and widespread evidence of timber getting and fishing.

The park office also holds documents such as Trust minutes and correspondence, early publications, photographs, maps, oral histories and written records.

There is likely to be a much greater range of evidence, especially archaeological evidence associated with buildings demolished in the early years of the Service's management of the park, and low key evidence relating to the exploitation of the natural resources of the park.

Heathcote National Park is significant as an early illustration of the development of the outdoor recreation philosophy and an early stage in the development of the wilderness concept in Australia.

Little research has been done in relation to historic places in Heathcote National Park. The park contains a number of dams, roads and caves used for non-Aboriginal occupation. The park is also likely to contain sandstone and gravel quarries and evidence of timber getting.

Similarly, there has been little investigation of the historic values of Garawarra State Recreation Area. This park encompasses a number of early farms and land grants and the area is also linked to early conservation movements. It may include the site of a railway construction camp near Cawleys Creek, as well as ephemeral evidence of timber getting and quarrying.

Policies

- * The provisions of the Australia ICOMOS Charter for the Conservation of Places of Cultural Significance (the Burra Charter) will guide management of historical places in Royal and Heathcote National Parks and Garawarra State Recreation Area.
- * Historic places, historic precincts and cultural landscapes will be assessed for their significance using the guidelines of the Burra Charter.
- * Conservation plans will be prepared to guide management of significant historic places, historic precincts and cultural landscapes.
- * Where there is no conservation plan, historic places, historic precincts and cultural landscapes will be protected pending the preparation of a conservation plan.
- * The significance of historic buildings, precincts and cultural landscapes will be retained: uses impacting substantially on the cultural values of these places will be modified or removed.
- * Portable objects of cultural significance will be conserved *in situ* wherever possible.
- * Portable objects which are vulnerable and cannot be conserved *in situ* will be recorded, then collected and stored in accordance with professional advice and storage procedures.
- * Fabric from historic structures which has been removed in accordance with Service policies and procedures will be securely stored to enable future research or reconstruction.
- * The Service will work towards obtaining a complete inventory of historic buildings, precincts and cultural landscapes in the three areas.
- * Historical documents, plans, photographs and drawings relating to the three areas held by the Service will be curated in accordance with professional procedures.
- * The sites included in the Sutherland Shire Council's Heritage Study and the Wollongong City Council's Heritage Study will be included on the Service's historic places register.

- * The Service will interpret the history of Royal National Park.

Bonnie Vale Cabins

- * Bonnie Vale will be redeveloped for day use and camping. To minimise conflict with large numbers of visitors to Bonnie Vale, the cabins will be progressively removed.
- * Pensioners occupying cabins at Bonnie Vale as their only residence will be offered life tenancy.
- * Non-renewable five year licences will be offered to other current licensees.
- * The cabins will be removed when the licences expire.
- * Each cabin will be recorded before it is removed.

South Era, Burning Palms, Little Garie and Bulgo Cabins

- * Cabins will be retained at South Era, Burning Palms, Little Garie and Bulgo.
- * Each cabin will be assessed to ensure conformity with current licence conditions.
- * Bona fide licence holders will be offered a five year licence to occupy their cabins from the date of adoption of this plan of management, with renewal dependent on compliance with the conservation and management policy and environment protection and other provisions as specified in the licence.
- * A conservation and management policy will be prepared for each group of cabins which will:
 - identify the cultural significance of individual cabins and the group of cabins;
 - identify individual cabins which are worthy of special conservation care;
 - establish guidelines for the use and conservation of the cabins;
 - establish environmental performance measures under which cabins and the group of cabins may be retained or be occupied;
 - establish guidelines for maintaining the social context of the group of cabins; and
 - establish a framework for the management of cabins through the preparation of an review of environmental factors.
- * Cabins for which there is no bona fide licence may be managed by the Service for short term public use in accordance with the provisions of the conservation and management policy.
- * Communal toilets may be established in each cabin area to improve environmental conditions.
- * Any cabin that is to be removed will be recorded.

Actions

- * The register of historic sites, precincts and cultural landscapes will be maintained.
- * A program of historic place recording, including condition reporting, will be developed and implemented.
- * A program to monitor the condition of significant sites and precincts will be developed and implemented.
- * A schedule for the preparation of conservation plans for historic places will be prepared.
- * Any work with the potential to damage or destroy historic places will be preceded by an archaeological assessment.

4.2.2 Aboriginal Heritage

The area now covered by Royal National Park, Heathcote National Park and Garawarra State Recreation Area was occupied by the Dharawal people whose territory extended southward from Port Hacking to around Jervis Bay. These people were rapidly displaced by European settlement following British occupation of Port Jackson in 1788, and in the early years of European settlement little effort was made to record information about the language, religion or traditions of the Aboriginal people so comparatively little is known about Dharawal tradition and culture. Some older people with associations with the area may have knowledge about aspects of the traditional use of the area.

Limited information about the Aboriginal use and occupation of the parks is provided by archaeological evidence. No systematic survey or research into Aboriginal sites in Royal National Park has been undertaken. The large number of recorded sites, about 200, reflects site specific (art in particular) investigations. A systematic survey has been undertaken in Heathcote National Park by the Illawarra Prehistory Group which recorded almost 100 sites, including engravings and a large number of shelters with art, some of which have been subject to vandalism. A small area of Garawarra was surveyed in the 1980s when it was acquired but no sites were found.

The kinds of Aboriginal archaeological evidence found closely correlate with environmental land units. Shell midden deposits, some with burials, have been recorded along the shores of Port Hacking, in sand dunes behind the ocean, beaches in Royal National Park and in rock shelters along the coast. Shelter sites with middens were excavated in the 1960s at Wattamolla and Curracurrang and revealed evidence of use of coastal resources over the past few thousand years.

Engraving sites have been recorded on sandstone outcrops along the coast and around Port Hacking and on ridgetops and ridgetops throughout Royal and Heathcote National Park. Shelters with pigment art have been recorded mainly along ridgelines in these two parks. Grinding grooves are the other fairly common site occurring in the parks, sometimes in association with engravings, though more often these are found in creeklines and near waterholes.

On a world scale the art assemblage of the Sydney Basin is significant, mainly because of the nature of the engraved component. The art within the basin is not homogeneous and those sites in Royal and Heathcote National Parks are apparently located at a stylistic boundary. North of the Georges River the art is different; south of the river to about Lake Illawarra it is similar. The parks are in a region where the proportion of open engravings is a much smaller component of the art assemblage and different motifs are represented.

Although engraved whales are found north of the Georges River, they seem to be a particular feature of the art to the south; being known in Royal National Park at a cluster of sites around Port Hacking, at Little Marley Head, as well as being portrayed in the pigment art.

Pigment art sites are also more common south of the Georges River. Those in the park commonly portray anthropomorphic figures, marine and terrestrial animals as well as stencils of hands and objects of Aboriginal material culture.

The sites in the parks are important for Aboriginal cultural reasons to contemporary Aboriginal communities living to the north and south. They are important for research and for education of the general public, especially increasingly for cultural tourism.

Two Aboriginal land councils cover this area: the La Perouse Local Aboriginal Land Council covers the northern part of the park and the Illawarra Local Aboriginal Land Council the south.

While the Service presently has the legal responsibility for the protection of Aboriginal sites it acknowledges the right of Aboriginal people to make decisions about their own heritage. It is therefore policy that Aboriginal communities be consulted about decisions regarding the management of Aboriginal sites and related issues and how the Aboriginal culture and history of an area controlled by the Service will be promoted and presented.

Policies

- * The Provisions of the Australia ICOMOS Charter for the Conservation of Places of Cultural Significance (the Burra Charter) will guide management of Aboriginal sites found in Royal and Heathcote National Park and Garawarra State Recreation Area.
- * All Aboriginal heritage and sites in the three areas will be conserved.
- * The Service shall pursue joint management arrangements with the appropriate Land Council or Aboriginal community group in relation to Aboriginal heritage in the three areas.
- * The Service will work towards obtaining a complete inventory of Aboriginal sites in the three areas.

Actions

- * Site recording, protection, research and promotion of information about Aboriginal history and culture in Royal and Heathcote National Parks and

Garawarra State Recreation Area will only be undertaken in consultation and co-operation with the appropriate Land Council and the Aboriginal community.

- * Any work with the potential to damage or destroy historic places will be preceded by an archaeological assessment.
- * The need for conservation work to be undertaken on the art sites within Heathcote National Park will be assessed in consultation with the local Aboriginal community.
- * The condition of the Jibbon engraving site and associated interpretive facilities will be regularly monitored for deterioration arising from visitor impacts and an assessment made of the need to upgrade or modify protection and interpretation of the site.

4.3 USE OF THE THREE AREAS

It is an important aspect of the management of Royal National Park, Heathcote National Park and Garawarra State Recreation Area to ensure that their use - whether by the general public, special interest groups, Service managers or other authorities - is appropriate, that is in conformity with the National Parks and Wildlife Act, the Corporate Plan and the management objectives and management policies outlined in this plan.

The major categories of use that can be appropriate, to varying degrees, on Service areas are:

- education and promotion of the area, the Service and the conservation of natural and cultural heritage;
- certain types of recreation;
- research; and
- management operations, by the Service itself and other authorities with statutory responsibilities in the area.

The extent to which these categories of use are appropriate to the three areas is indicated in the following sections.

4.3.1 Promotion of the Three Areas

In 1990, it was estimated that there were about three million visitors to Royal National Park per annum. The pattern of this use has been surveyed a number of times in recent years, the more important being a survey of visitors to Audley by Cameron McNamara Consultants in 1987; a survey of visitors to the park by the Service in 1988, the results for which were written up by Bateson and Nyman; a survey of Sydney residents into current and future use of national parks in the Sydney area by Veal of the University of Technology, Sydney in 1990; and a survey of ethnic diversity by Bolwell over the 1998-99 summer holiday.

The promotion of the three areas will be primarily directed to achieving the objectives of management outlined in this plan. In particular priority will be given to the following programs:

- promoting the work of the Service and nature conservation and cultural heritage conservation in NSW generally;
- promoting the three reserves as important parts of the system of nature conservation areas on the Woronora Ramp and in the Sydney Basin which contain important refugia for plant and animal communities of the Sydney Region;
- promoting an awareness of scientifically important coastal features;
- promoting an awareness of the historical recreational setting of Royal National Park;
- promoting the appropriate use of the two national parks and the state recreation area; and
- promoting an awareness within the local community, particularly neighbours of the three areas of the importance and purpose of management programs necessary for the protection of natural features and the control of fire, weeds and feral animals.

Important information for a public awareness and promotion program has been identified from the visitor surveys noted above, including:

- most visitors to Royal National Park seek communal recreation opportunities and are attracted to the developed picnic areas;
- there is a high ethnic diversity, with visitors speaking 39 different languages;
- there is a very high incidence of frequent return visits - well over half the visitors surveyed visit Royal National Park several times each year;
- there is a high expectation that information will be available on both the natural and cultural features of the park; and
- there is also a strong interest in and appreciation of the history of Royal National Park as a conservation and recreation area and an expectation that structures of historic interest will be conserved.

As no surveys on the specific use of Heathcote National Park and Garawarra State Recreation Area have been conducted, there is limited information available on the patterns of use of these areas.

This plan also has as an important objective, increased use of Royal National Park for environmental education purposes.

Royal National Park therefore occupies a special place in any program to promote the appropriate use, public awareness and appreciation of the three areas and conservation generally by the Service. The popularity of Royal

National Park within the State context presents an outstanding opportunity for public education on the broader issues of conservation and management and on the responsibilities of the Service in the protection of natural and cultural heritage. It is one of the world's most biologically diverse national parks; one of the most accessible and one of the most highly visited national parks in New South Wales. These and other factors combined with its prestige of being the oldest in Australia, make Royal National Park uniquely suited to playing an important and far-reaching educational role in the State.

The large local community also needs to be encouraged to know their park and to participate in its care through responsible user-attitude programs.

Visitors to Royal National Park are a diverse group. However in relation to promoting the three areas the following user groups have been identified:

- large numbers of picnickers who are concentrated at the major facility areas - this group is a "captured audience" and is relatively sedentary;
- groups such as schools and community organisations with a particular interest in environmental education - these visitors come seeking information at the facility areas;
- sporting and similar groups which may be disinterested in the park, but which require formal authority from the Director-General to undertake their activity - the Director-General's approval is often conditional;
- groups and individuals involved in activities such as walking, horse riding, fishing and car touring - these visitors are mobile but will often actively seek out information; and
- community groups with an outdoor activity purpose such as scouts, Church youth groups, youth hostels and Duke of Edinburgh award participants.

The main techniques utilised by the Service in promoting Royal and Heathcote National Parks and Garawarra State Recreation Area include:

- A visitors' centre at Audley Heights with displays, trained staff and a sales outlet. This is the main distribution point for park information.
- A field studies centre at Audley Heights which is available for use by school groups. The centre is equipped with a range of resource teaching aids and is staffed by the Department of School Education. Most of the centre's programs are undertaken outdoor in other parts of the park and are generally integrated with other public awareness programs in the park.
- Discovery ranger programs which are run during school holidays.
- Guided tours by ranger staff may be available at other times on request, subject to the availability of suitable staff.

- Development of the Forest Path at the southern end of Lady Carrington Drive, the Bungoona Path at Audley Heights, and the Red Cedar Track at Red Cedar Flat as self-guided walking tracks.
- Development of the Bungoona Path has been specifically designed for use by wheelchairs.
- Presentations to local community organisations are occasionally given, subject to the availability of suitable staff.
- Brochures and other publications on the three areas and their special features.
- Important features of all three areas are signposted.
- The three areas are promoted in the local media.

In addition to the above, the Sydney South office handles a large volume of telephone and counter inquiries.

A volunteer program, based on the successful introduction of a similar program in Ku-ring-gai Chase National Park, is currently being developed. This volunteer program will be a major extension to the existing public awareness function of the parks.

Increasing emphasis in the promotion of the three areas will be given to:

- more closely integrating the promotion of Royal National Park, Heathcote National Park and Garawarra State Recreation Area; and
- local community programs by further use of the local media and greater involvement in community relations programs.

The 1994 fires destroyed over 250 signs in Royal National Park. The opportunity is being taken therefore to replace the destroyed signs with signs more appropriate to the multicultural pattern of visitor use in the park. The use of symbol signs in lieu of signs expressed in English will be given priority.

Policies

- * Programs will be developed in Royal National Park to promote the Service's responsibilities for the protection of nature and of the State's cultural heritage, and the broader principles of national park management.
- * The mission and objectives of the Service will be explained in promotion programs for the three areas.
- * Minimal impact practices will be promoted in the three areas.

Actions

- * A program for the promotion of Royal and Heathcote National Parks and Garawarra State Recreation Area will be continued utilising the following techniques:
 - displays at the visitors centre near Audley;

- natural and cultural heritage information sheets, brochures, and booklets;
- ranger and volunteer guided walks; and
- self-guided walking tracks.

* Signs will be replaced where appropriate with multilingual signs or symbol signs.

4.3.2 Recreation opportunities

General

The survey in 1990 into visitation to national parks in the Sydney area, found that on average 4.4% of the population of metropolitan Sydney visits Royal National Park in a month, a rate of use which is exceptionally heavy when related to the park's small size.

The heaviest use periods are fine weekends, public holidays and school holidays when the popular areas are often full to capacity or over-crowded. Weekdays and rainy weekends are periods of comparatively light visitor use. Organised groups favour weekdays. Use is higher in summer than winter.

Whilst overall visitation to national parks in New South Wales has increased in the last decade to an estimated 24 million visitors in 1992, the number of vehicles paying the daily entry fee (excluding vehicles with annual entry permits) to Royal National Park has generally declined from approximately 173,000 in 1982 to 118,000 in 1991, with a low of 103,000 in 1988.

The Audley Visitor Survey in 1987 found that 65% of visitors to Audley came from the southern suburbs of Sydney comprising the Sutherland, Hurstville, Rockdale, Canterbury, Bankstown, Kogarah and Botany local government areas. A further 9% came from the eastern suburbs of Sydney. Seventy three per cent of visitors travelled less than 35 minutes to reach Audley and 91% lived within one hour of the park.

Only 4% of visitors to Audley came from the Illawarra region although the southern picnic areas and beaches would be expected to cater for a higher proportion of visitors from that region.

The pattern of visitor use of Royal National Park is characterised by a very high incidence of return visits. This is supported by recent surveys, which indicate that 58% of visitors had visited the park more than 10 times; and that 58% of visitors at Audley visit the park at least monthly.

By far the most popular means of travel to Royal National Park is by private car (94%), with bus (4.8%) and train (1.2%) making up the balance. A small proportion of visitors use the ferry to Bundeena and private boats to travel to the park.

The surveys that have been done of visitor expectations in Royal National Park have emphasised the high value placed on the park's quiet and restful atmosphere and its scenic and natural qualities.

There are no comparable statistics on the use of either Heathcote National Park or Garawarra State Recreation Area. The establishment of a visitor use monitoring program over all three areas is essential to the understanding and management of visitor use.

The majority of visitors are car-based day visitors preferring communal recreation focussed on developed facilities. The most popular activities are car touring, picnics and short walks. The park, however, is also extensively used by specialist groups such as naturalists, bushwalkers, schools and bushcampers. The beaches and waterways are used by large numbers of surfers, swimmers, and watercraft users. Jogging is a prominent activity especially adjacent to residential areas.

The highest user pressure occurs in three main corridors: along the Hacking River, the foreshores of Port Hacking and the coastline. The intensity of use decreases with increasing distance from car or boat access points and is most concentrated around developments.

The catchment of Kangaroo Creek is the largest relatively undeveloped area in Royal National Park and as such is appropriate for activities involving low densities of visitors.

Royal National Park's most popular destination is Audley, a family picnic site for over a century on the Hacking River. It has native and introduced trees, lawns and various facilities including picnic sites, car parking, a kiosk, boat hire and a hall.

Lady Carrington Drive provides access from Audley to picnic spots along the Hacking River and short walks through tall eucalypt forest and rainforest. The upper Hacking River is dotted with picnic facilities with the Upper Causeway, Karingal and Red Cedar Flat areas being the largest. The southern end of the park is less popular than the northern except along the coast.

The concentration of use on the estuarine foreshores of Port Hacking is greatest where there is access by car at Warumbul, Bonnie Vale and Jibbon Beach. The northern shore is only minutes away from the southern suburbs of Sydney by boat and use is heavy along the length of the foreshore wherever local topography permits access. Popular areas for boating in Port Hacking include Deer Park, South West Arm, Warrumbul and Jibbon Beach.

The coast is popular with walkers, surfers and fishers and road access is now available to Wattamolla and Garie. These areas also now attract sightseers and picnickers. However, before these roads were constructed the beaches had become popular recreation destinations, particularly for surfing, camping and weekender cabins. Accordingly, three surf life saving clubs were established before the Second World War (Garie in 1938, South Era also in 1938 and Burning Palms in 1939) to provide protection to surfers.

The proximity of Royal National Park to urban development has many social consequences. The incidence of anti-social behaviour and vandalism is significant, and this has to be dealt with through internal management practices and co-operation with other law enforcement authorities.

Litter is a major factor in the impairment of visitor experience, especially in more remote areas. One of the recent visitor surveys indicates that 86% of visitors agreed with the proposal that they should be required to take their litter out with them when they leave the park.

Visitor numbers to the developed parts of the park are already high enough at times to endanger the very quality of experience which visitors seek by coming to a natural environment. Moreover, it is presently operating either at capacity or beyond with respect to the resilience of the natural environment to sustain human impact.

In 1990 the University of Technology Sydney estimated that annual visits to the park would increase by 427,000 between 1989 and 2001, a rise of 14.7%, based on the projected population growth for the metropolitan area of Sydney of 18% or 630,000 people over this period.

Co-operative recreation planning with local government authorities and other organisations on a regional scale will provide opportunities for specialisation in the provision of recreation facilities and services, the development of complementary facilities and for the spreading of recreational demand more equitably.

The image which Royal National Park projects to the visiting public needs to reflect its status as one of the nation's most important and high profile parks. To help achieve this, overcrowding needs to be minimised.

The landscape in Royal National Park has been modified during the past 120 years by ad hoc developments, particularly with respect to bush camping, walking tracks and management tracks including fire trails. Many of these facilities no longer serve the purposes for which they were created.

Royal National Park was one of several metropolitan national parks burnt by wildfire during January 1994. These fires gave an opportunity to review the pattern of facilities and assess their impact upon the landscape of Royal National Park. Where a facility no longer serves the purpose for which it was created, or is inappropriately located or designed, the facility will be removed, relocated or redesigned.

Policies

- * Management of recreational use of the three areas will be integrated on the following basis:
 - visitation to the most popular facilities in Royal National Park will be managed to minimise over-crowding and unacceptable impacts on heritage values; and
 - some under-utilised developed areas will be promoted as alternatives to more heavily utilised areas.
- * The Service will contribute to co-ordinated regional recreation planning.
- * Recycling stations will be introduced in all popular day use areas.

- * In all other areas of Royal National Park, Heathcote National Park and Garawarra State Recreation Area visitors will be encouraged to take their rubbish away with them.
- * Access to the three areas at night will be restricted to minimise damage to facilities and protect visitors.

Actions

- * A recreation plan will be prepared and implemented.
- * The Service will encourage visitors to take their rubbish home through signs at facility areas, printed leaflets and displays at the Visitors' Centre.
- * A basic visitor use survey and monitoring program will be instituted for all areas.
- * The impact on natural and cultural values of the three areas by visitors will be monitored and access and use of sites by visitors controlled, restricted or closed where necessary to protect these values.

Vehicle Access

The location of Royal National Park, Heathcote National Park and Garawarra State Recreation Area between Sydney and Wollongong place them at the doorstep of more than four million people. This coupled with easy accessibility by train from seven stations along the western boundary of Royal National Park and Garawarra State Recreation Area and by car from the Princes Highway makes the three areas amongst the most visited and accessible conservation and recreation areas in Australia. In addition Royal National Park can be reached by the ferry service from Cronulla to Bundeena and by private vessels in Port Hacking.

Internal access within Royal National Park is also particularly well developed as this was a major thrust of early management. The main road entrance to the park is on Farnell Avenue in the north, with other entrances at Waterfall in the west and near Otford in the south. The park is dissected by five public roads: Sir Bertram Stevens Drive, Lady Wakehurst Drive, McKell Avenue, Bundeena Drive and Maianbar Road. There are also a number of other park roads maintained by the Service.

The status of public roads within the external boundaries of the park covers a wide range:

- Main Road 68 which comprises Farnell Avenue, Lady Wakehurst Drive, Sir Bertram Stevens Drive and McKell Avenue is maintained by the Roads and Traffic Authority.
- Bundeena Drive and Maianbar Road are maintained by Sutherland Shire Council.
- Roads in the Audley area are park roads maintained by the Service.

- The roads to Garawarra Farm and Warumbul are park roads which are unsealed and maintained by the Service.
- Wattamolla Road and Garie Beach Road are part of the park but are maintained by the Roads and Traffic Authority.

Roads maintained by the Roads and Traffic Authority and Sutherland Shire Council are located on road reserves of variable and often undefined width. This creates significant management difficulties, particularly with respect to law enforcement and potential encroachment on the park by road authorities during road maintenance operations.

Lady Carrington Drive has been closed to vehicular traffic since 1987. It is however a popular cycling route. Access to the four Anglican Youth Department Camps is via the Warumbul road.

Car parking is provided at all the facility areas accessible by private or public vehicles, except Jibbon Beach where visitors park in the nearby streets of Bundeena.

Garawarra State Recreation Area is traversed by Cawley Road, which is defined as a non-public Crown road and is not included in the dedicated area. This road is the primary vehicle access to the state recreation area and, together with two other roads in the area, provides access to parts of the Illawarra Railway. The Service upgraded and stabilised the road using funds contributed by the State Rail Authority. Whilst the Service has informally assumed responsibility for maintaining the road, it must be formally closed under the provisions of the Public Roads Act 1902 before it can be added to the state recreation area.

The only road, other than park management trails in Heathcote National Park is a short access road to the Civil Aviation Authority's air navigation facility at Sarahs Knob. Sydney Water maintains a road through the park to service its water pipeline from Woronora Dam. There is currently no formal easement for this road or for the pipeline.

Over 90% of visitors to Royal National Park travel by private vehicle. Sunday is the most popular day, attracting 35% of total visitation for an average of 20 250 visitors throughout the year. Fifty per cent of those interviewed specified car touring ("just drove through") and/or sightseeing as their major activities in Royal National Park.

The road system is therefore a major determinant of visitor use patterns. The roads within the park are used in addition to car touring for access to a wide range of features in Royal National Park and Garawarra State Recreation Area.

Overcrowding of facility areas in Royal National Park on fine weekends or holidays creates management difficulties, particularly with respect to traffic control, which would be a potential disaster in the event of an emergency such as wildfire.

Because of its proximity to large centres of population the park suffers from vandalism and other criminal activities, particularly dumping and burning of stolen cars. The park road system facilitates such anti-social behaviour and

consequently large sections of the park have been closed to vehicles at night for many years.

Any proposals to close roads in Garawarra State Recreation Area for security purposes are subject to consultation with the State Rail Authority regarding access to the Illawarra Railway.

Trains to Royal National Park station were discontinued by the State Rail Authority in 1991. The South Pacific Electric Railway Co-Operative Society, which operates the Sydney Tramway Museum at Loftus, now operates trams to the park along the disused railway line. The tram service, which commenced in May 1993, usually operates on weekends and public holidays.

Policies

- * No additional roads will be constructed in the three areas.
- * The use of public transport will be promoted as a convenient and environmentally sound method of access to the three areas.

Actions

- * Gates on the following roads in Royal National Park will be closed at night:
 - the road to Bonnie Vale;
 - all roads in the Audley precinct;
 - Warumbul Road;
 - Wattamolla Road; and
 - Garie Road.
- * The Service will seek to have the road reserves for Main Road 68, Bundeena Drive and Maianbar Road surveyed and defined.
- * The Service will formally seek closure of Cawley Road in Garawarra State Recreation under the Public Roads Act.
- * Unreserved roads within Garawarra State Recreation Area will be closed to public vehicles.
- * The agreement of the Geographic Names Board will be sought for the renaming of Lady Carrington Drive as Lady Carrington Way.

Walking Tracks

The walking track system is a major attraction in Royal National Park. Thirty eight per cent of visitors in the 1988 visitor survey identified walking as their major activity.

The walking track system includes tracks specifically provided for that purpose plus a number of other tracks constructed for other purposes. The latter include in particular, the management track system. Despite its long history as a national park, the walking track system in Royal National Park has evolved in an *ad hoc* manner.

Many early tracks simply evolved along routes used by visitors to features of interest, especially on the coast or the Hacking River, and were subsequently consolidated and maintained as formal walks. These include:

- the Coast Walk;
- the tracks in the Kangaroo Creek valley;
- the Couranga Track;
- the Curra Moors Track; and
- the Uloola Track.

Some of these are of historical interest.

Lady Carrington Drive was closed to vehicular traffic in 1987 and has become a popular walking and cycling track. The Audley Visitor Survey in 1987 revealed that keeping Lady Carrington Drive closed to vehicles was the most supported improvement in the Audley area. This survey of Audley visitors also found that 46% of the use of Lady Carrington Drive was by walkers and 22% was by joggers.

In more recent years there have been additional short walks in Royal and Heathcote National Parks constructed with the specific aim of providing access to features of interest. These walks include:

- the tracks at Red Cedar Flat;
- the Wallumarra Track;
- the Forest Path;
- the Robertsons Roundabout;
- the Werong Track
- the Winifred Falls Track;
- the Mooray Track;
- the Bullawarring Track; and
- the Bungoona Path.

The 1994 fires damaged many of the walking tracks in Royal National Park and accentuated soil erosion and drainage problems along tracks. A review of the purpose, pattern of use, location and design of walking tracks damaged by fire during January 1994 has been undertaken. Where no longer required or poorly located, walking tracks will be closed, realigned or relocated. Designated walking tracks will be reconstructed as necessary, including construction of elevated walkways and hardening the track surface in certain areas of high visitor use. Priority has been given to the Coast Walk.

Jogging has become a popular activity in the park adjacent to residential areas, particularly Grays Point, Heathcote and Bundeena. The runners have created a network of tracks without regard to soil stability or topography.

The walking track system is outlined on the map (centre pages).

Policies

- * The walking track system will be maintained so that soil erosion and impacts on natural and cultural heritage are minimised.

- * The walking track system will be promoted as a primary means for visitors to appreciate and understand the natural and cultural significance of the three areas.
- * Minor extension of the walking track system will be undertaken only for the following purposes:
 - relocation of an existing track to avoid or minimise environmental damage or to improve visitor safety;
 - for disabled access or use;
 - to provide a short link track; or
 - to re-open an historic track.
- * Bicycles are not permitted on walking tracks.

Actions

- * A review of the purpose, pattern of use, location and design of walking tracks will continue to be undertaken. Designated walking tracks will be reconstructed as necessary, including construction of elevated walkways and hardening the track surface in certain areas.
- * The sections of the Burgh Track within the state recreation area and national park will be restored to provide access to the coast from Helensburgh.
- * Non-designated walking tracks (including the unauthorised network of jogging tracks) will be rationalised in consultation with local users and, where necessary, closed and rehabilitated.

Day Use Areas

Royal National Park is serviced by a number of facility areas which cater for day use. On the Hacking River, Audley is by far the largest and comprises a group of separate localities:

- Allambie Flat;
- Bus Stop Flat;
- Pool Flat;
- Reids Flat;
- Ironbark Flat;
- Currawaong Flat;
- Willow Tree Flat; and
- Wattle Forest Flat.

All these areas are accessible by vehicle. The Audley Visitor Survey in 1987 revealed that the area attracts about 411,000 visits per annum, of which 94% are made in private vehicles.

In the upper Hacking River area of the park, there are several smaller picnic areas with vehicle access:

- Upper Causeway;
- Red Cedar Flat; and
- Karingal.

There are a number of informal picnic sites along Lady Carrington Drive accessible by walking or by bicycle.

The major areas on the coast accessible by vehicle are Garie Beach and Wattamola. Other popular picnic sites along the Coast Track, accessible only by walking, include:

- Big and Little Marley Beaches;
- Curracurrang;
- Curracurrong;
- Era Beach;
- Burning Palms; and
- Werrong.

The major picnic site on Port Hacking is at Bonnie Vale. A picnic area at Warumbul is also accessible by vehicle. Jibbon Beach is accessible by foot from Bundeena.

Minor roadside picnicking areas are located along Sir Bertram Stevens Drive at Flat Rock Creek, Crystal Pools and Curra Moors. Small picnic areas are also located at National Falls, Waterfall Flat and Gunjulla Flat on McKell Avenue.

The 1994 fires destroyed a number of picnicking and car parking facilities in Royal National Park. The opportunity has been taken, therefore, to review the purpose, pattern of use, location and design of minor picnic and parking areas. In particular, the car park at Crystal Pools was considered to be in a poor location and have a poor line of sight for vehicles leaving and entering Sir Bertram Stevens Drive. It has been redesigned to give a safer entry and exit for visitors and permit easy surveillance of the facility.

The Royal National Park Visitor Survey in 1988 found that almost 44% of visitors surveyed identified swimming/ sunbathing as their main activity, followed by picnicking/barbecues (38%) and relaxing/sleeping/resting (20%). Visitors to Royal National Park tend to stay for lengthy periods. Over 65% of visitors to Audley stay at least four hours.

There are three surf life saving clubs within Royal National Park at Garie, South Era and Burning Palms.

The progressive upgrading, restoration or repair of the landscape, facilities, and structures in Royal National Park was commenced in the mid-1980s, with the largest project being the restoration of Audley.

The principal picnic areas in Heathcote National Park are located at Sarahs Knob in the south-west of the park, and near Girronba Creek on Sydney Water's pipeline maintenance road. Both are small, low key facilities.

Garawarra State Recreation Area is as yet undeveloped for recreation use apart from some recently constructed day use areas at Cawley Creek and The Ridge. Both these developments are accessible from Cawley Road.

Wood barbecues are provided at a number of the major facility areas in Royal National Park. The Service provides firewood, in the form of offcuts obtained free of charge from local joineries, to some of these areas. In the areas where firewood is not provided because of the high delivery cost, visitors obtain both

living and dead wood from the vicinity of these facility areas to burn in barbecues. Theft and illegal burning of wood in bonfires when the park is closed at night is also prevalent. These practices have a detrimental effect on the natural environment and diminish the quality of experience for other park visitors.

Policies

- * Facilities for disabled persons will be provided in appropriate areas which are accessible by vehicles.
- * The major facilities in Royal National Park will be progressively upgraded or repaired to improve utility and appearance, and in a manner consistent with their cultural heritage significance.
- * Alternatives to the use of firewood for barbecues will be encouraged.
- * Any firewood supplied to visitor facilities will be obtained outside the park or from timber obtained from management operations.
- * Campfires and wood cooking fires will not be permitted except where fireplaces and wood are provided.

Actions

- * The following redevelopment works will be undertaken:
 - completion of the restoration of the Audley precinct and adjacent picnic areas;
 - Garie Beach area; and
 - picnic area at Wattamolla.
- * A standardised system of directional, information and safety signs will be provided throughout the three areas.
- * Wood fired barbecues will be progressively removed from Royal National Park and will be replaced with gas fired barbecues. Priority will be given to providing gas fired barbecues in popular day use areas.
- * A review of toilets and waste treatment systems will be undertaken.

Camping

There is one formal camping area in Royal National Park, at Bonnie Vale which currently offers 40 campsites, nine of which are for tents only. Occupation of any one site is limited to 21 consecutive nights or 6 consecutive nights in the case of school holiday periods if demand for sites exceeds the number of sites available. A booking system for camp sites will be introduced for school holiday periods. This area provides 15,000-20,000 visitor nights per annum and is usually booked out during school holiday periods.

A permit system for bush camping has been operating in Royal National Park whereby campers are required to obtain a permit, at no cost, and adhere to the conditions of the permit. Popular bush camping areas have developed through

an *ad hoc* historical use of camping sites. Over 300 separate camping sites have been identified and mapped, including 160 on the coast and 80 on the Port Hacking estuary.

In recent years 10,000 permits have been issued for Royal and Heathcote National Parks. Limited ranger patrols indicate that only 30% of bush campers have permits. It is therefore a reasonable assumption that at least 25,000 visitors camp in Royal and Heathcote National Parks each year.

Because of the haphazard evolution of bush camping in the two parks and the increasing number of bush campers expected in the future, a bush camping policy was developed and released as a discussion paper during 1993 which proposed a number of alternative strategies for managing bush camping and related issues such as pollution, fire, user conflicts and vandalism. The preferred strategy is to mitigate the impacts of camping on the natural environment in Royal National Park by closing *ad hoc* campsites but to provide a similar recreational opportunity by providing a number of formal pack camping areas at specific localities.

In accordance with the preferred option of this policy, bush camping at Burning Palms has been prohibited to allow the vegetation to regenerate after indiscriminate camping and illegal removal of vegetation had degraded the area.

The 1994 fires destroyed many of sites used by bushcampers in Royal National Park. The park was subsequently closed to all bushcamping pending revegetation and other restoration of the sites.

Bush camping needs to be restricted to minimise its impact. It is proposed to progressively restrict bush camping to North Era and Uloola Falls in Royal National Park and to Heathcote National Park. Camping will not be permitted outside designated camping areas.

Bush camping will be prohibited elsewhere in Royal National Park. Bush camping will continue to be permitted subject to conditions in Heathcote National Park. No camping is permitted in Garawarra State Recreation Area.

Policies

- * Car based camping facilities will continue to be provided at Bonnie Vale.
- * Bush camping will be permitted at North Era and Uloola in Royal National Park.
- * Bush camping will be permitted in Heathcote National Park.
- * The Service will promote the code of minimal impact bush camping.
- * No camping will be permitted in Garawarra State Recreation Area.

Actions

- * A bush camping fee will be introduced, along with conditions concerning responsible bush camping within Royal and Heathcote National Parks.

- * A limited number of sites will be developed in Royal National Park for bush camping at:
 - North Era; and
 - Uloola Falls.
- * Areas closed to bush camping will be rehabilitated.
- * Bush camping in Heathcote National Park will be monitored for its effects on the natural and social environment.
- * An educational kit on responsible bush camping will be developed and distributed to schools and community groups and displayed at the Visitors' Centre.
- * The bush camping policy and regulations will be comprehensively reviewed five years after implementation to ascertain the effects on the natural and social environment, management operations and users.

Horse Riding

The incidence of horse riding in the parks is not high, except in the Helensburgh area where there are two riding schools. Horse riding is not encouraged in the parks for reasons of soil erosion, weed infestation and conflict with other users.

Horse riding will be restricted to designated bridal tracks in the section of Garawarra State Recreation Area west of Helensburgh. The impact of horse riding on nature conservation values and the enjoyment of the state recreation area by other users will be regularly monitored and horse riding restricted or prohibited where such impact is unacceptable.

Policies

- * Horse riding will be prohibited throughout Royal National Park, Heathcote National Park and eastern Garawarra State Recreation Area.
- * Horse riding will be restricted to designated bridle tracks. The impact of horse riding on nature conservation values and the enjoyment of the state recreation area by other users will be regularly monitored and horse riding restricted or prohibited where such impact is unacceptable.
- * The Service will permit individuals and groups to ride horses on specified management tracks in the western section of Garawarra State Recreation Area only by written consent. A licensing system may be introduced to maintain use of designated bridle tracks at current levels or regulate use of certain areas if natural values are being significantly degraded.
- * Designated bridle tracks may be closed at any time to riders depending on track conditions or management needs. Consultation with user groups prior to such action will be undertaken where practical.
- * The Service will liaise with Sutherland Shire Council and Wollongong City Council regarding environmental consent when approval is sought to

establish stables and other horse riding facilities adjacent to the three areas.

Actions

- * A local horse riding recreation management plan will be developed by the Service, in consultation with horse riding groups and the community.
- * Signposting will be established to mark designated horse trails.
- * The Service's horse riding code of practice will be promoted.

Boating

The Port Hacking foreshore of Royal National Park is readily accessible by water. The safe waterways attract many visitors and provide opportunity for diffuse entry to remote parts of the park.

South West Arm is a popular destination for boat owners on Port Hacking. Six boat moorings are located in the Arm of which four were previously licensed to the Royal Motor Yacht Club of New South Wales (Port Hacking). Vessels anchoring in the bay can destroy bottom dwelling algae and other marine life. The moorings therefore will be retained and available to the public on a 'first in first served' basis with a limitation of 24 hours occupation.

Through the hull discharge of human and other wastes is a growing concern but is one primarily for the Environmental Protection Authority and the Waterways Authority. The Service will, however, seek that the Waterways Authority impose a control or prohibition of waste discharge into South West Arm and the lower reaches of the Hacking River.

It is proposed to seek the agreement of the Waterways Authority to an extension of the speed restriction zone to include the whole of the South West Arm to reduce damage to the foreshore of South West Arm and the disturbance of sea grasses. This is in line with the other section of the Hacking River whose bed is also part of the park and is a 4 knot zone.

The current launching of boats from trailers driven across the beach at Bonnie Vale is not appropriate because of damage to important sea grass beds, damage to the foredune, and conflicts with swimmers and other users of the area. The Service will encourage discussions between Sutherland Shire Council and the Department of Land and Water Conservation to resolve the issue of a boat ramp near the wharf at Bundeena. The Bonnie Vale beach will however continue to be available for launching small boats that can be carried across the dune.

Policies

- * The natural setting of waterways in Royal National Park will be protected.
- * The six moorings in South West Arm will be available to the public on a 'first in first served' basis with a limitation of 24 hours occupation.

- * The beach at Bonnie Vale will be available for launching of small boats which can be carried across the foredune. Vehicles and trailers will not be permitted to be drive across the dune.

Actions

- * The Service will seek that the Waterways Authority impose a control or prohibition of waste discharge into South West Arm and the lower reaches of the Hacking River.
- * The Service will seek the co-operation of the Waterways Authority in controlling power boats on South West Arm by means of an extension of the water speed restriction zone to encompass the whole of South West Arm from Grahams Point south.

Cycling

Bicycle riding is considered an appropriate use in all three areas on the vehicle access system. It is a very popular activity in Royal National Park where weekend family bicycle riding, for example, comprises 15% of the use of Lady Carrington Drive. Cycles are available for hire from the boatshed at Audley.

Bicycles are permitted on the vehicle access system serving the park which includes roads maintained by the Roads and Traffic Authority, Wollongong City Council and Sutherland Shire Council, public roads maintained by the Service and management tracks. Bicycles are not permitted on walking tracks or off road (including beaches). The roads of the park are used extensively by groups and individuals seven days a week for cycling training. Mountain bikes are a relatively new phenomenon and are now appearing in all three areas on walking tracks and management roads and causing environmental damage in some areas.

The Sydney to Wollongong Bike Ride, which has approximately 5000 participants and raises money for the Multiple Sclerosis Society, takes place on a Sunday in November every year and passes along McKell Avenue and Lady Wakehurst Drive. The participants also use one or more of the facility areas in the southern part of Royal National Park as a rest and refreshment stop. The event is supervised and controlled by the organisers with the assistance of the Police.

Policies

- * Bicycles are permitted in the three areas on roads maintained by the Roads and Traffic Authority, Wollongong City Council and Sutherland Shire Council, public roads maintained by the Service and management tracks.
- * Cyclists must keep to formed roads, management tracks and carparks at all times. Cycling off track or on walking tracks is not permitted.
- * Bicycle riding on Lady Carrington Drive will be promoted.

- * The Service will liaise with the organisers of the Sydney to Wollongong Bike Ride to ensure that inconvenience to other park users and interference with park management activities are minimised.

Group Activities

Non-competitive organised parties or events (e.g. weddings, family picnics, Christmas parties) are catered for on a first come-first served basis. No exclusive areas are provided for these events.

A hostel run by the Youth Hostels Association is located north of Garie Beach in Royal National Park. This facility is leased under the National Parks and Wildlife Act and provides a community service and, provided that the buildings and facilities included in the lease area are maintained to the required standard, the use of the area is considered as appropriate in the park.

"Telford" is an Anglican Youth Department camp located near Warumbul in Royal National Park. A lease agreement is in place for this site with the Church of England Property Trust. The Trust is also responsible for the management of three other nearby camps ("Rathane", "Deer Park" and "Chaldercott") on land adjoining the park.

Two scout camps are located on Crown land reserved for scouting purposes adjoining Heathcote National Park. Scouts from these areas use the surrounding park areas for scouting activities.

Royal National Park is used from time to time by the Police, Army and other search and rescue organisations for search and rescue and similar training events. These are organised with the co-operation of the Service and are subject to Service policy which requires that such activity be non-destructive of natural and cultural heritage and generally in accordance with what is recognised as the appropriate use of the park. The National Parks and Wildlife (Land Management) Regulation 1987 applies to these events.

Policies

- * Written permission from the Service will be required for the following:
 - group activities involving more than 20 people;
 - organised training activities;
 - school activities; and
 - organised group camps.

Competitive Events

Royal National Park is a popular venue for organised sporting events, including orienteering, fun runs, triathlons, cycling and surfing events.

Permission for any sporting activity which forms part of an organised competition or tournament, and/or is for money and/or other consideration of any kind may be given by the Service, subject to any conditions and fees considered necessary.

Policies

- * Organised competitions are permitted in the three areas where they are in accordance with the appropriate use of the area and with the objectives and policies outlined in this plan of management.
- * Such activities will require the approval of the Service and will be subject to any conditions considered necessary.
- * The Service will charge fees calculated on a commercial basis for organised competitions permitted in the areas.

Adventure Activities

Occasionally adventure activities such as hang gliding, rock climbing and abseiling occur within the Royal National Park. Hang gliders regularly land within the park after taking off from Lawrence Hargraves Memorial Lookout near Stanwell Tops.

Adventure activities are generally considered to be appropriate within the three areas, depending on the site, but require the permission of the Director-General (or delegate) and are subject to any necessary fees and conditions.

Policies

- * Adventure activities are permitted in Royal National Park with the consent of the Director-General (or delegate).
- * Written permission to conduct adventure activities must be obtained from the Service and will be subject to payment of fees and any conditions considered necessary.

Commercial Activities

There are several existing commercial activities in Royal National Park which are licensed by the Service. These include the kiosks at Audley, Wattamolla and Garie, which are covered by one licence; the boatshed at Audley; apiary sites near the northern end of the Wisers Track in Royal National Park, for which a licence has been issued; and a ferry charter service to Audley provided by Cronulla and Port Hacking River Cruises.

The kiosks are considered an appropriate facility in a park with high visitation and provide a service which the Service is unable to provide.

A boat hire concession operates from the boat shed located at Audley. The use of row boats and canoes has been a traditional activity on the Hacking River above the weir and is considered an appropriate activity. The current licence prohibits members of the public from using private water craft above the weir.

The ferry charter service provides an alternative means of transport to Royal National Park and is considered appropriate.

The Service also licences commercial activities in the three areas which occur for short periods of time where use by park visitors and the natural and cultural heritage of the areas are not affected. Examples of this activity are filming of documentaries, advertisements and feature films, and tours and guided walks conducted by private companies.

Several buildings which housed a former commercial motor vehicle repair garage are located in Royal National Park at Loftus. The licence to occupy the site expired in 1991. Although the buildings are in poor condition, their historic significance needs to be assessed before they are removed and the site is rehabilitated.

Policy

- * The Service may licence appropriate commercial activities in the three areas which do not affect the natural and cultural heritage and the public's use of the areas.

Action

- * The former motor vehicle repair garage and residence at Loftus will be recorded and their historical significance assessed.

4.3.3 Research

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

Royal National Park in particular has a long history of scientific research. Sections 4.1 and 4.2 of this plan of management highlight the high scientific values of Royal National Park and of the other two areas.

The Service is currently undertaking research into the regeneration of selected plant species following fire within Royal National Park. This research will assist the Service in its management of fire in all three areas by providing information on the requirements of species for maturation and for production, dispersal and longevity of seed, and the relationship of fire regimes with the management of the mosaic of vegetation communities in the three areas.

New or further work is required on the following research projects:

- continuation of the vegetation survey;
- distribution, abundance and life history of rare and threatened plants;
- distribution and abundance of plant species considered to be regionally significant and requiring special management;
- the relationship between fire regimes and vegetation dynamics;
- the Quaternary history of fire and its relationship with vegetation dynamics using the stratigraphic record of wetlands;
- a mammal survey to provide information on the distribution and abundance of species in the three areas;
- distribution and abundance of endangered fauna;

- identification of key fauna habitats, with particular reference to fire regimes;
- an herpetofauna survey to provide information on the distribution and abundance of species in the three areas;
- investigation and description of the weed problem in the three areas to provide information for control measures;
- research into weed establishment, spread and control to assist with the development of long-term, cost-effective solutions to weed problems;
- control of feral bees;
- control of deer; and
- research into the historical, social, archaeological and architectural significance of historic structures, objects, sites and documents.

Service policy is to encourage research into natural and cultural heritage by scientific research and survey organisations and the Service normally provides assistance with access and information. However, where a research topic is directly applicable to particular management problems, the Service may also provide financial and other logistic support.

The Service does not presently have the resources to undertake all the long term research needed for the management of the park. As part of the proposed Central Region Nature Conservation Strategy a prospectus will be prepared as the basis for the involvement of scientific research and survey organisations in research in Royal and Heathcote National Parks and Garawarra State Recreation Area.

Policies

- * Priority will be given to research into:
 - the ecology, status and distribution of plant and animal species and communities; and
 - the impact of management on the ecology of the park.
- * Service conducted research will aim to provide information on the natural and cultural heritage, and on human use to facilitate management of the three areas.
- * All research will be subject to Service policy and procedures for the granting of permits, conduct of research and the production of results.
- * Research applications will only be granted where:
 - the research has the potential to facilitate the better management of the park;
 - the research does not conflict with the objectives of park management.

Action

- * A prospectus will be prepared as a guide to preferred research projects in the park. Preferred topics will be those of direct relevance to management and will include:
 - biodiversity surveys, including:
 - . the distribution, abundance and life history of rare and threatened plants in the three areas;

- . distribution and abundance of plant species considered to be regionally significant and requiring special management;
- . the relationship between fire regimes and vegetation dynamics;
- . a mammal survey to provide information on the distribution and abundance of species in the three areas;
- . the distribution and abundance of endangered fauna;
- . identification of key fauna habitats, with particular reference to fire regimes; and
- . an herpetofauna survey to provide information on the distribution and abundance of species in the three areas.
- investigation and description of the weed problem in the three areas to provide information for control measures;
- research into the historical, social, archaeological and architectural significance of historic structures, objects, sites and documents; and
- research into visitor use and the impact of visitors on the park.

4.3.4 Management Operations

A moderately large national park such as Royal National Park which is surrounded by urban agglomerations and receives up to three million visitors each year requires a sophisticated management infrastructure.

In addition, in its early history Royal National Park was subject to a number of non-park occupations by State and Commonwealth governments, local government and private organisations and individuals.

Heathcote National Park and Garawarra State Recreation Area also have a number of non-park occupations.

Service Use

Royal National Park, Heathcote National Park and Garawarra State Recreation Area are all served by a network of management roads and facilities which are required for fire management and other operations such as search and rescue and weed control. These facilities include the management track system; and helipads at Audley Heights, Garawarra Farm, Chinamans Hill and on Garie Road.

There are 12 residences in Royal National Park which were constructed by earlier management regimes or which were acquired as part of the program of boundary rationalisation for the park. These provide the on-park presence of Service staff considered necessary for the protection of the three areas and the control of visitor behaviour. Five residences are located in the Audley precinct: three in the Warumbul precinct; two at Bonnie Vale; and one each at Garawarra Farm and Garie.

Following its destruction by fire, the park workshop was relocated to a site near the park office, in the vicinity of Farnell Avenue and the former railway line to Audley. There are also two fenced compounds used for storing materials in

Royal National Park. One is located at Audley Heights and the other is adjacent to the Princes Highway at Loftus.

An area at Artillery Hill in Royal National Park, previously a garbage tip, is currently used for storing materials for maintenance and construction works in the three areas.

Audley and Bonnie Vale are serviced by town water. Garie and Wattamolla are both serviced by local catchments and water is stored and treated at sites in the park. Warumbul is on town water.

A declared pound exists at Garawarra Farm for the holding of domestic animals found on the three areas. From there they are taken to local council pounds or the RSPCA shelter at Yagoona. Impounded vehicles are kept in the compound at Audley Heights.

There are a number of disused quarries in Royal National Park. These quarries will be closed and rehabilitated.

Policies

- * Public vehicle access (other than bicycles) is prohibited on the management track system.
- * Extractive sites will be closed and rehabilitated. Where extractive sites are closed and rehabilitated any surplus gravel may be used for park management purposes.
- * Gravel will be extracted in accordance with an approved extraction program. Rehabilitation of worked areas will use local soils and plants propagated from local genetic stock.

Action

- * Former extractive sites within the park will be closed and rehabilitated.

Local Council Use

Sutherland Shire Council has a number of occupancies within Royal National Park. These include:

- the Fire Control Centre at East Heathcote;
- Waterfall Bush Fire Brigade Headquarters; and
- sports fields at Loftus, Grays Point, Heathcote and Waterfall.

The Fire Control Centre and the Waterfall Bush Fire Brigade Headquarters are considered to be appropriate uses of the park as they assist the Service in fire management activities in the three areas. Both facilities are occupied under licences from the Service.

The sports fields at Loftus, Grays Point and Heathcote are predominantly used for organised sporting activities and are licensed to Sutherland Shire Council for this purpose. As the use of these areas is not consistent with the purposes for

which the park is reserved, the Service will review all options for their future use, status and management prior to the licences expiring.

The sports field at Waterfall was also licensed to Sutherland Shire Council for use as a sports field, but the licence expired in 1989 and has not been renewed. This field is seldom used for organised sporting activities.

There are several cases of unauthorised access across Royal National Park to freehold properties at West Fishermans Bay, Maianbar; in Woodville Road, Bundeena; and adjoining the Bonnie Vale picnic area in Bundeena. These situations arose following the granting of approval to build houses on land that had no practical access except across the park. Recent court decisions preclude the granting easements or licences for access to private properties.

Policy

- * Uses not consistent with the purposes for which the park is reserved will be terminated.

Actions

- * The Service will negotiate with Sutherland Shire Council to resolve the future management of the sports fields at Grays Point, Loftus and Heathcote prior to the expiry of the current licences.
- * The former sports field at Waterfall will be revegetated.

State and Commonwealth Government Use

There are several occupancies by various State and Commonwealth authorities in the three areas:

- State Rail Authority's commuter carpark at Waterfall station;
- Sydney Water's water supply system to Bundeena and Maianbar, consisting of pipelines, a reservoir and access tracks in Royal National Park;
- Sydney Water's pipeline from Woronora Dam, associated access tracks and water pH buffering plant in Heathcote National Park;
- Sydney Water's sewer main from Helensburgh in Garawarra State Recreation Area;
- Energy Australia's power lines and associated access tracks in Heathcote National Park;
- the Civil Aviation Authority's navigation facility in Heathcote National Park; and
- Energy Australia's power lines in Royal National Park.

Policies

- * It is a long term aim of the Service to reduce, and if possible eliminate, the number of non-park power lines and other utilities (including roads used for their maintenance) held under lease or license within the three areas.
- * For those works, facilities and operations considered essential and for which no formal agreements with the Director-General or Minister are

current, action will be taken to lease or licence the works, facilities or operations under the National Parks and Wildlife Act.

- * For those works, facilities and operations where leases or licences are not granted, action will be taken to terminate or remove them.
- * New works, facilities or operations proposed by any organisation or individual will not be permitted unless they are consistent with the purposes of reservation of the two national parks and the state recreation area and this plan of management.

Action

- A schedule of leases, licences, easements and other occupancies within the three areas will be maintained.

5. PLAN IMPLEMENTATION

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

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

Programs are subject to ongoing review, within which, works and other activities carried out at Royal National Park, Heathcote National Park and Garawarra State Recreation Area are evaluated in relation to the objectives laid out in this plan.

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

Section 81 of the Act requires that this plan shall be carried out and given effect to, and that no operations shall be undertaken in relation to the national parks and the state recreation area unless they are in accordance with the plan. However, if after adequate investigation, operations not included in the plan are found to be justified, this plan may be amended in accordance with section 76(6) of the Act.

Action	Plan Reference

High Priority	
Finalise vegetation mapping	4.1.2
Prepare weed control plan	4.1.2
Undertake public education program on weed control	4.1.2
Undertake fauna surveys	4.1.3
Prepare feral animal control plan	4.1.3
Undertake deer control	4.1.3
Undertake public awareness programs for feral animal control, particularly concerning deer	4.1.3
Review fire management plan	4.1.4

Undertake public education program on fire management in the three areas	4.1.4
Develop a program to monitor the condition of significant sites and precincts	4.2.1
Prepare conservation plans for historic places	4.2.1
Prepare conservation and management policies for cabins	4.2.1
Monitor and assess the condition of the Jibbon engraving site.	4.2.2
Undertake a public education program on encouraging visitors to remove their rubbish from the three areas	4.3.2
Restore the Coast Walk	4.3.2
Complete the restoration of the Audley Precinct	4.3.2
Redevelop Garie Visitor Area	4.3.2
Progressively establish a standardised system of directional, information and safety signs	4.3.2
Review system of walking tracks	4.3.2
Rehabilitate former bush camping sites	4.3.2
Prohibit horse riding in Royal National Park and the eastern section of Garawarra State Recreation Area	
Prepare scientific research prospectus	4.3.3
Determine future management of sports fields at Greys Point, Loftus, Heathcote and Waterfall	4.3.4
Moderate Priority	
Prepare management plans for specific vegetation communities and species	4.1.3
Monitor feral bee control research	4.1.4
Undertake surveys of rare plants	4.1.3
Undertake basic visitor use monitoring	4.3.2
Promote minimal impact bush camping code	4.3.2
Introduce bush camping fee	4.3.2

Define road reserve boundaries for Road 393, Bundeena Drive and Maianbar Road	4.3.2
Seek closure of Cawley Road	4.3.2
Redevelop Wattamolla	4.3.2
Close and rehabilitate former extraction sites	4.3.4

Low Priority

Interpret Bonnie Vale sanddune system	4.1.1
Record and assess the significance of the Loftus garage	4.3.2
Revegetate former sports field at Waterfall	4.3.4

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