# CROWDY BAY NATIONAL PARK:

# DRAFT PLAN OF MANAGEMENT

NATIONAL PARKS & WILDLIFE SERVICE

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# CROWDY BAY NATIONAL PARK



## DRAFT
## Plan of Management

National Parks and Wildlife Service
New South Wales

October 1983

## NOTES

This is a DRAFT plan of management released for public comment on the proposals it contains. The National Parks and Wildlife Advisory Council will consider all submissions made on this draft plan and submit the plan, together with any recommendations, to the Minister. The Minister will consider the plan and any recommendations submitted to him and either adopt the plan without alterations, adopt the plan with such alterations as he thinks fit or refer it back to the Director and the Advisory Council for further consideration. Therefore the plan of management that is finally adopted may differ from this draft.

Members of the public, whether as private individuals or as members of community-interest groups, are invited to become involved in the planning of Crowdy Bay National Park. Comments and suggestions on this draft plan of management will be carefully considered. It would be appreciated if submissions are in writing, and as detailed and specific as possible; however, any comments, no matter how brief, will be welcomed. Please contact the Regional Planning Officer or Senior Ranger Port Macquarie, if you need more information.

The following definitions are used throughout this document:

* "The Act" means the National Parks and Wildlife Act, 1974

* "The Service" means the National Parks and Wildlife Service of New South Wales.

The closing date for comment on this draft plan is 30th December, 1983.

Comments should be sent to:

The Regional Planning Officer,
National Parks and Wildlife Service,
P.O. Box 97,
GRAFTON. N.S.W. 2460.

Telephone enquiries:

| | |
|---|---|
| District Office, Port Macquarie | (065) 835518 |
| Regional Office, Grafton | (066) 420591 |

8.30am to 4.30pm, Monday to Friday

The procedure for public representations on this draft plan is further explained under the heading "The Planning Process".

After the closing date, copies of all representations received will be available for public inspection in the library of the Service's Regional Office:

Northern Region Office,
National Parks and Wildlife Service,
N.S.W. Government Offices,
49 Victoria Street,
GRAFTON

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## SYNOPSIS

Crowdy Bay National Park is located on the mid-north coast of New South Wales, 230 kilometres north of Sydney and 25 kilometres north-east of Taree. The park, which was reserved in 1972, extends from Crowdy Head/Harrington in the south to Dunbogan/Laurieton in the north.

Major features of the park are Diamond Head, Watson Taylors Lake and long ocean beaches backed by heath plains. The resources summary contained herein identifies these and other values, and the draft plan of management presents strategies to ensure the protection of the park in the long term, whilst simultaneously providing for public use and enjoyment.

The draft plan provides for the maintenance of existing visitor facilities at Diamond Head, Indian Head, Dunbogan Beach and Kylies Car Park, and ultimately, for an upgrading of Kylies Car Park to a rest area.

A new facility area is proposed for Humbug Point on Watson Taylors Lake should this area, which is zoned for ultimate inclusion in the park, be reserved during the plan period.

A graded interpretative walking track is proposed for Diamond Head. This track would also provide access around the headland for recreational fishing.

The draft plan proposes future public recreational use of Crowdy Bay National Park based on vehicular access via the Moorland-Coralville-Dunbogan road, which is a public road maintained between Moorland and Diamond Head by Greater Taree City Council and between Diamond Head and Dunbogan by Hastings Municipal Council.

A commitment by the National Parks and Wildlife Service is given to maintain spur road access off the Moorlands-Dunbogan road to existing facility areas at Diamond Head, Dunbogan Beach and Crowdy Beach.

The draft plan proposes the removal and rehabilitation of the temporary mining road running southwards from Diamond Head and retention, in the short-term, of the temporary mining road running between Coralville and Crowdy Head. The draft plan points out that this latter road is unnecessary for recreational use or for the management of the park, but is of some value to local communities for village access, particularly during floods. A review of the long term future of this road through preparation of a Local Environmental Plan by Greater Taree City Council is foreshadowed in the draft plan. This may ultimately give rise to a transfer of responsibility of the road to some authority other than the Service.

The draft plan proposes that the Service manage recreational use of vehicles on Crowdy Beach in consultation with the Crown Lands Office and Greater Taree City Council, and that this management provide for recreational use of vehicles on

the beach. Such use will, however, be subject to review of its impact on other beach users and the physical beach environment.

To protect the coastal dunes from damage by unrestrained vehicle use, vehicular beach access within the park will be restricted to the existing track at Kylies Parking Area, south of Diamond Head.

It is proposed to initiate discussions over the management of Dunbogan Beach with the other two authorities involved, Hastings Municipal Council and the Crown Lands Office. These discussions will consider the desirability in a regional context, of managing Dunbogan Beach for passive recreation, with access onto and along the beach by walking only. If this proposal is accepted the Service proposes to retain beach vehicular access at Diamond Head for the use of professional fishermen carrying out their traditional netting activities, and for the launching of small boats by recreational fishermen.

The plan also provides for the management of the park environment, looking at such aspects as flora and fauna, soils, fire and Aboriginal sites.

Guidelines for the management of fire are outlined, and include the ecological and protective use of prescribed fire. A commitment is made to the compilation of a detailed fire management plan, and a fire action plan.

## PARK DEFINITION

This plan of management applies to all lands within Crowdy Bay National Park at 30th July, 1982, comprising:

1. Area reserved (5341.84 ha) by gazette notification of 15th December, 1972.
2. Land added (61.02 ha) by gazette notification of 6th April, 1973.
3. Land added (119.0 ha) by gazette notification of 12th July, 1974.
4. Land added (47.85 ha) by gazette notification of 21st March, 1975.
5. Land added (10.75 ha) by gazette notification of 11th July, 1975.
6. Land added (30.5 ha) by gazette notification of 22nd August, 1975.
7. Land added (7082 square metres) by gazette notification of 20th August, 1976.
8. Land added (27.5 ha) by gazette notification of 27th August, 1976.
9. Land added (96 ha) by gazette notification of 27th May, 1977.
10. Land added (0.6 ha) by gazette notification of 19th January, 1979.
11. Land added (1189 ha) by gazette notification of 4th July, 1980.
12. Land added (34.38 ha) by gazette notification of 24th April, 1981.
13. Land added (16.72 ha) by gazette notification of 26th June, 1981.
14. Land added (84 ha) by gazette notification of 26th June, 1981.
15. Land added (45.43 ha) by gazette notification of 16th April, 1982.
16. Land added (26.5 ha) by gazette notification of 9th July, 1982,

to give a park area of approximately 7127 hectares.

## THE PLANNING PROCESS

The functions of the New South Wales National Parks and Wildlife Service as implied by the National Parks and Wildlife Act, 1974, are specified in the Service's Corporate Plan as:

* the acquisition of areas in their natural condition to conserve samples of a complete range of the State's natural environments;

* the acquisition of areas that are the sites of buildings, objects, monuments or events of national significance;

* the management of resources contained within the Service's park, reserve and site system, constituting the Service estate;

* the development of facilities throughout the Service estate to permit appropriate use and enjoyment by the public;

* wildlife management throughout the State;

* protection and preservation, throughout the State, of Aboriginal sites and objects; and

* the promotion of public awareness, understanding and appreciation of wildlife, national parks, and culture conservation, and the importance of these to the overall quality of man's environment.

The National Parks and Wildlife Act, 1974, requires that a plan of management be prepared for each national park. A plan of management includes a written scheme of operations for the protection of the natural and cultural features of the park, and provides for the encouragement and regulation of the appropriate use of the park.

The procedure for the preparation of a plan of management specified in the Act (Section 75) involves five stages. The Director prepares a plan of management which is published and placed on public exhibition for at least one month, during which time any person may make representations about the plan. The plan and copies of all representations from the public are then referred to the National Parks and Wildlife Advisory Council for Council's consideration and advice to the Minister. The Minister may adopt the plan after considering the comments of the Council or he may refer the plan back to the Director and Council for further consideration before adoption.

This plan sets out the objectives and practices, together with something of the philosophy which underlies them, which the Service proposes should guide the management of Crowdy Bay National Park.

Service officers regularly discuss aspects of management with State and local government bodies, user groups and individuals, but the release of the draft plan is an appropriate stage for the widest possible community discussion of these objectives and the means of achieving them.

Service officers are available to discuss details of the draft plan with members of the public. They include:

REGIONAL OFFICE

The Regional Planning Officer,
National Parks and Wildlife Service,
NSW Government Offices,
49 Victoria St.,
GRAFTON (066) 420591

DISTRICT OFFICE

The Senior Ranger,
Port Macquarie District,
Flynn House,
Lord St.,
PORT MACQUARIE (065) 835518

These telephone numbers operate between 8.30am and 4.30pm, Monday to Friday.

Written representations, which should be as specific as possible and identify the parts of the draft to which comments are addressed, should reach the following address by ~~April 29, 1983~~. 30 DEC 1983

The Regional Planning Officer,
National Parks and Wildlife Service,
P.O. Box 97,
GRAFTON NSW 2460.

Everyone interested in the use, conservation and management of Crowdy Bay National Park is encouraged to be involved. Please make your individual views known: the Service looks forward to your constructive criticism.

## STRUCTURE OF THE PLAN

This plan is in three main parts.

* An introduction comprising chapters 1 to 5, provides a summary of community values on which the Service's approach to park planning is based and sets out a rationale for national park management.

* The resources summary and management considerations section (chapters 6 to 12) explores the particular resources and opportunities for recreational, educational and scientific use of the park and the implications for management.

* The scheme of operations (chapters 13 to 23) sets out the proposed management response to these resources values, and opportunities. This involves objectives, policies and programmes necessary to ensure both the protection of the park and the provision of appropriate services and facilities for park users. The scheme of operations also sets out the planning and development control procedures required under the Environmental Planning and Assessment Act, 1979.

## 1. THE NATIONAL PARK CONCEPT

The national park concept was introduced to 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 concept adopted then has evolved over the years, though the basic themes of nature conservation, appropriate use, conservation of aesthetic values and recreation have remained throughout.

For the purposes of preparing plans of management, the 1978 International Union for the Conservation of Nature and Natural Resources (IUCN) definition of a national park has been adopted in New South Wales.

> 'A national park is a relatively large area; (1) where one or several ecosystems are not materially altered by human exploitation and occupation, where plant and animal species, geomorphological sites and habitats are of special scientific, educative and recreative interest or which contains a natural landscape of great beauty; and (2) where the highest competent authority of the country has taken steps to prevent or to eliminate as soon as possible exploitation or occupation in the whole area and to enforce effectively the respect of ecological, geomorphological or aesthetic features which have led to its establishment; and (3) where visitors are allowed

to enter, under special conditions, for inspirational educative, cultural and recreative purposes.'

In 1978 the IUCN Commission on National Parks and Protected Areas (CNPPA) published a paper entitled 'Categories, Objectives and Criteria for Protected Areas'. In developing its classification system the CNPPA had regard to a number of principles which are set out in detail in the report. The more important of these were:

* The national park has in the past been recognised as the most common classification selected for the management of conservation areas. IUCN and CNPPA have placed major attention on the promotion and assessment of national parks around the world.

* During recent years however it has become apparent that the whole of the human environment requires conservation and positive management.

* The conservation of nature can be interwoven into development as conceived by the principles of eco-development. Natural resources can be managed in a variety of ways to support humans and to preserve the human environment.

* Consequently, the national park can be complemented by a number of other conservation management categories.

* Conservation areas should be recognised and categorised by the objectives for which they are managed on a regional basis.

* Categories of conservation area in the CNPPA classification system should be considered as 'members of a family tree' each equally important, but fulfilling a different role. Only together can they be employed to cover national and global conservation needs.

The categories identified by the IUCN classification system relevant to New South Wales are:

I Scientific reserve
II National park
III National landmark
IV Managed nature reserve
V Resource reserve
VI Anthropological reserve
VII Multiple use management area

Each of these categories is briefly described in Appendix A in terms of its broad objectives of management and criteria for selection and management.

Crowdy Bay National Park will be primarily managed in accordance with the objectives and criteria for management set out in the CNPPA classification 'national park'. The CNPPA classification system recognises that a national park can be complemented by other conservation management categories, which taken together, can provide for many human environmental needs while also amplifying the amount of land maintained in a natural or semi-natural state. These aspects of the CNPPA classification system are further detailed throughout this plan.

## 2. NATIONAL PARKS IN NEW SOUTH WALES

Until 1967 most national parks in New South Wales were established under the Crown Land Consolidation Act, 1913 and managed by trusts. Following the passage of the National Parks and Wildlife Act in 1967 the responsibility for management of the State's national parks progressively passed to the National Parks and Wildlife Service.

The National Parks and Wildlife Act, 1974 serves many functions. In a philosophical sense, it gives legal force to a range of community values and expectations about the States natural resources. This is manifested in part by the provisions for the reservation of land as national parks. The Act vests the care, control and management of national parks in the Director of National Parks and Wildlife, and requires the Director to fulfil specific tasks in carrying out this responsibility. One of these is the preparation of a plan of management for each national park established under the Act.

It is necessary, therefore, for all those involved with or interested in the management of national parks to understand not only the management responsibilities specified in the Act, of which more is said later, but also the relevant values held in the community concerning natural areas, and how these are changing through time. This understanding of society is important because the community values the protection of the outstanding scenery or natural features

found in national parks. Hoeever, in our society there are many different values relating to natural and cultural resources, and many different expectations for the use of national parks. For example, some people ascribe value to resources (such as wildlife) only if they consider them useful for something, while others ascribe value to the same resources for their own sake, irrespective of their use by man. This is no more than a reflection of the diversity of our society, but it gives rise to a wide range of options for managing national parks. Hence, management should be 'conservative' in its approach if it is to avoid closing off, perhaps unforeseen, use-opportunities to future generations. There is abundant evidence of the constraints imposed on present and future management of land by past land uses, many of which are incompatible with current attitudes towards national parks.

## 3. THE NATIONAL PARKS AND WILDLIFE ACT 1974

The essential characteristic of national parks under the National Parks and Wildlife Act, 1974 [Section 8(2)(a)] is that they are 'spacious areas containing unique or outstanding scenery or natural phenomena'. Hence the primary management objective for any national park is to preserve and protect its unique or oustanding scenery or natural features.

In addition to requiring that a plan of management be prepared to provide a scheme of operations for the management of each national park, the Act sets out a procedure for involving the public in the preparation of such plans and requires that consideration be given to the following objectives:

* to conserve wildlife;

* to preserve and protect the special features of the park;

* to prevent any works adversely affecting the natural condition or special features of the park;

* to preserve any historic structure or object or any Aboriginal site;

* to encourage and regulate the appropriate use, understanding the enjoyment of the park by the public;

* to provide for the appropriate use of the park by any lessee, licensee or occupant of land therein;

* to preserve the park as a catchment area;

* to protect the park against fire and erosion;

* to set apart the whole or part of the park as a wilderness area.

Some aspects of the management of Crowdy Bay National park involve other government departments and/or local government councils. These responsibilities and functions are referred to in relevant parts of this draft plan of management.

National parks are only a part of the regional pattern of land use, which includes cities, towns, agricultural land, mines, forests and so on. In contrast to management of most other land uses, the management of national parks aims at minimising the impact of use on the natural and cultural resources. Other land uses 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 any region. Further, it should not be expected that national parks will fulfill the same functions as other public lands reserved for public purposes such as nature reserves, state recreation areas, recreation reserves and state forests.

## 4. APPROPRIATE USES OF CROWDY BAY NATIONAL PARK

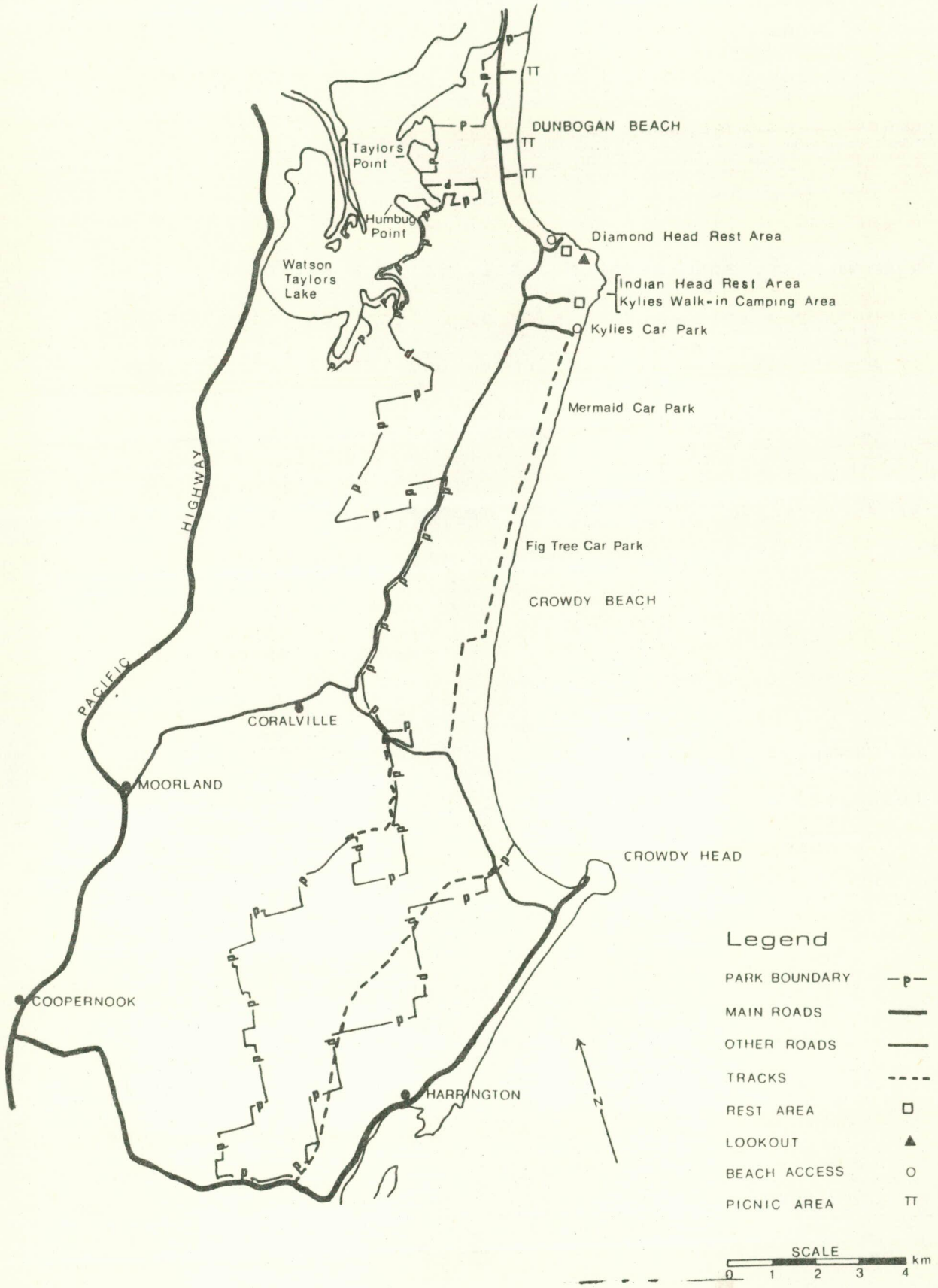
Consistent with Crowdy Bay's classification as a national park, protection of the area's special features must be given high priority, but this objective must be reconciled with the objective of encouraging and regulating the appropriate use, understanding and enjoyment of the park by the public.

The Service will always be faced with a difficult task of balancing conflicting expectations for use and protection of areas under its control. Decisions about what constitutes appropriate use of a national park are most usefully based on defined levels of acceptable environmental and/or social impact, having regard to internationally accepted criteria and policies as expressed in the definitions of the IUCN, Service policies and community expectations. Since the impact of any activity, or modifications of the environment necessary to cater for an activity, will vary depending on the characteristics of the environment and the nature and scale of the activity, it is not possible to prepare a definitive list of appropriate uses which will apply in all places. Furthermore, management and community views on what constitutes 'unacceptable impact' also vary from place to place and through time. It is therefore the role of the Service, in consultation with the community, to define levels of acceptable impact for each park or part of a park. This involves the Service in providing a range of opportunities for visitors to interact with the natural and cultural features of a park, wherever this is compatible with the goal of conserving natural features and processes. One conclusion

from this reasoning is that national park management should avoid creating artificial features or promote the use of features in a way that destroys natural and/or cultural values in a park.

A major objective of this draft plan is to provide visitors with a range of opportunities to use and appreciate Crowdy Bay National Park, whilst protecting its important features.

# CROWDY BAY NATIONAL PARK
## plan of management (Map 1)



## 5. THE VALUES OF CROWDY BAY NATIONAL PARK

The community's expectations of national parks are based on a variety of values, principally aesthetic, scientific, educational and recreational. These expectations and their realisation produce other effects which have tangible economic value, such as tourism.

A particular place or environment may be of importance to a community, and therefore included in a national park, either as a unique example or as a representative sample of a natural feature. In Crowdy Bay this importance may be based on one or more of the following:

| | |
|---|---|
| As scenery: | aesthetic appreciation of of the park's landscape, such as the bays, beaches and headlands of the coast. |
| As examples of natural features, communities or landmarks: | aesthetic appreciation and scientific study of, for example , the geology of the coastline (e.g. Diamond Head, coastal dune formation); scientific enquiry, education and interpretation of, for example, rare or restricted coastal communities such as littoral rainforests. |

| | |
|---|---|
| As examples of natural processes: | scientific enquiry, education and interpretation of, for example, coastal erosion processes; changes in vegetation communities in response to either protection or disturbance and the dynamics of animal communities. |
| As prehistoric features: | aesthetic appreciation, scientific enquiry, education and/or interpretation of, for example, sites (middens, stone working sites) associated with Aboriginal use of the area. |
| As historic sites: | aesthetic appreciation, scientific enquiry, education and/or interpretation of, for example, the exploration of the area by John Oxley in 1818. |
| As opportunities for recreation: | those especially appropriate for Crowdy Bay include angling, diving, swimming, surfing, bush-walking, pack camping, car-based camping, car touring, sight-seeing, picnicking, sun bathing, photography and painting. |

These features and others of Crowdy Bay National Park are summarised and evaluated in the sections which follow under the heading 'Resources Summary and Management Considerations'.

## 6. BASIS OF RESERVATION

Crowdy Bay National Park embraces some 21 kilometres of coastline extending from Crowdy Head in the south to Dunbogan Beach in the north.

The reservation of Crowdy Bay National Park ensures the preservation of the scenic beauty and biological diversity of this attractive coastal area, as well as the preservation of a range of outdoor recreational opportunities which are rapidly being lost to residents of the eastern Australian seaboard.

## 7. LOCATION

Crowdy Bay National park is located on the mid-north coast of New South Wales, approximately 230 kilometres north of Sydney and 25 kilometres north-east of Taree. The park extends from Crowdy Head-Harrington in the south to Laurieton-Dunbogan in the north. Harrington, Crowdy Head, Laurieton, Dunbogan and North Haven are small holiday/fishing villages. Harrington is situated on the northern entrance to the Manning river whilst Crowdy Head village lies on Crowdy Head six kilometres to the north-east. Laurieton, Dunbogan and North Haven, with a combined population of 3400, lie on the Camden Haven inlet immediately to the north of the park.

Other population centres in the region are Port Macquarie (18000) Taree (15000) and Wauchope (3400).

## 8. HISTORY

An appreciation of the impact of proposed management policies on Crowdy Bay National Park necessitates some understanding of the history of the park and the historical development of the region.

### HISTORY OF THE CROWDY BAY DISTRICT

Until the mid nineteenth century the area now known as Crowdy Bay National Park was part of the territory of the Ngamba tribe of Aborigines. The most noticeable signs of past Aboriginal activity in the park area are numerous shell middens, the oldest of which probably to date from 6000 years ago, when the present sea level was established. Shellfish, hooks, stones with worked edges, axeheads and debris from stone workings have been found in the middens.

Aboriginal sites known within the park are recorded in the Service's site register held at the Port Macquarie district office. Although many prehistoric sites within the park have been destroyed by past sandmining activities some undisturbed sites do remain. They are potentially important sources of information on the relationship between prehistoric people and their environment.

European knowledge of the area began with the discovery of the east coast of Australia by James Cook in 1770. Cook recorded in his log having sighted natives on a headland

to which he gave the name 'Indian Head'. This headland is still recorded on some maps as Indian Head but is now more commonly known as 'Diamond Head' and lies within Crowdy Bay National Park.

The explorer John Oxley journeyed south through the park in 1818, naming the Camden Haven Inlet and Watson Taylors Lake. He tried to cut across Blackfellows Bog and found in his own words:

> 'the low part of the country was an entire freshwater swamp, interspersed with thick barren bushes, in all respects resembling the country between Syndey and Botany Bay. We therefore returned to the beach and crossing nearer to the point in question found the remains of a hut.'

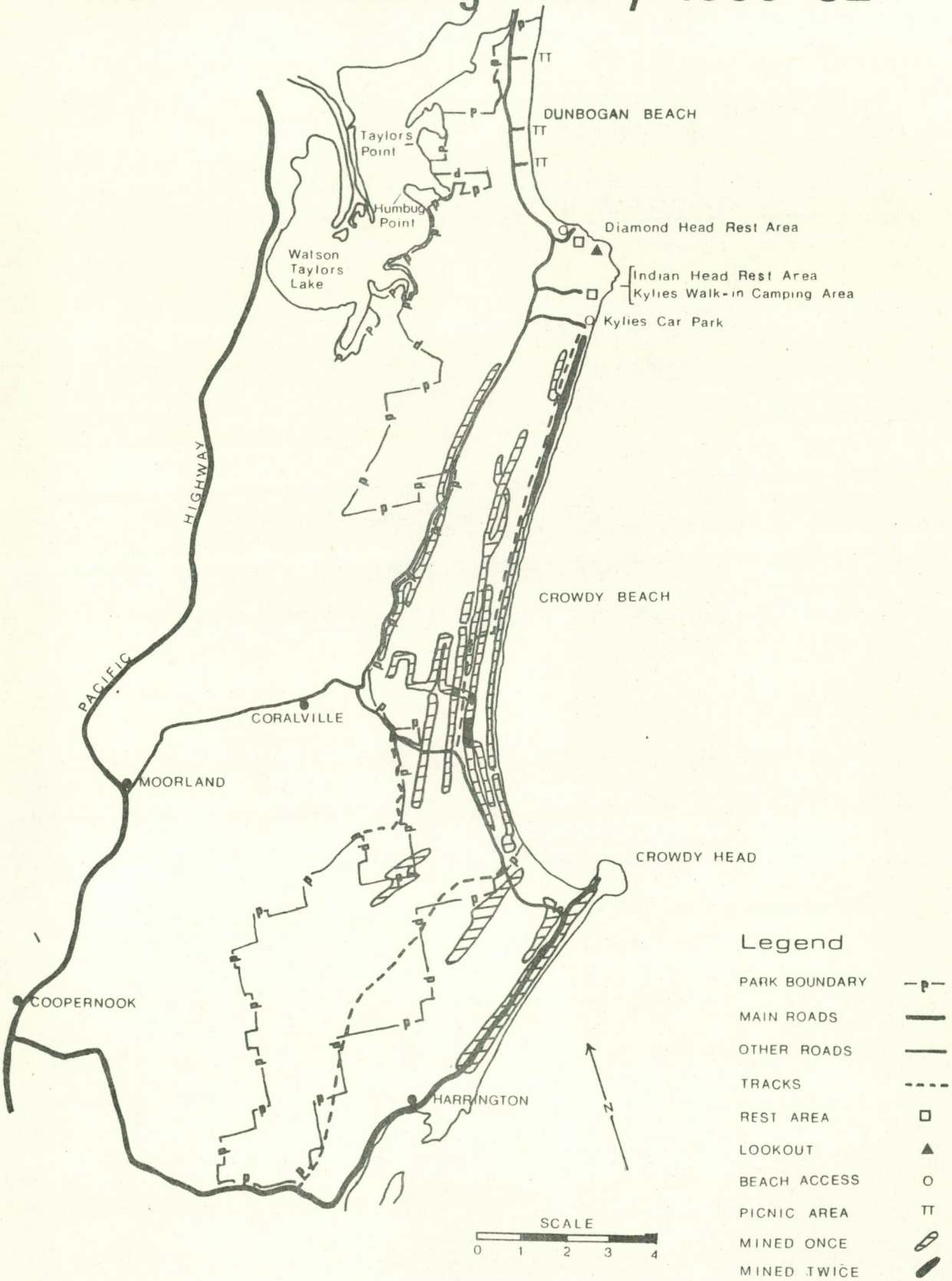
Oxley also named the north arm of the Manning River and Harrington Lake.

European settlement of the north coast began with the establishment of a penal settlement at Port Macquarie in 1821. This was followed immediately by the arrival of cedargetters on the Hastings River and by 1823 this industry was well established in the area. The cedar getters moved to the Manning River about 1828, when settlement commenced on that river. The cedar industry continued to flourish on the Manning for many years afterwards as fresh discoveries of cedar continued to be made on the river's tributaries and headwaters. It was reported in 1842 that the forests on the banks of the river abounded with cedar, rosewood and hardwood

# CROWDY BAY NATIONAL PARK

## plan of management (Map 2)

## mineral sand mining history 1959-82



of every description.

The sawmilling industry has continued to be important in the area to the present day.

Prior to 1892 farmers in the Manning Valley cultivated maize and potatoes, for which the return very often was almost nil due to the poor transport to the Sydney metropolitan market. Dairy farming commenced in 1892 with the establishment of the Manning River Co-operative Dairy Co. Ltd. With the opening up of the north coast railway line the valley moved into a new era of development and prosperity.

The Hastings-Manning region of the 1980s has a diverse economy based on dairying, timber, beef cattle, small crops, fishing, tourism, cottage industries and light industry.

As Crowdy Bay National Park consists largely of extensive heathlands and swamps of little agricultural value behind coastal dunes it has escaped intensive development and, apart from mineral sandmining, past land uses have had little impact on the area.

Activities and uses within the present park area since European settlement included marginal grazing on the heaths, selective logging in the low-quality forests, amateur and professional fishing along the coast and in Watson-Taylors Lake, mineral sandmining, recreational camping, surfing and sightseeing. Several residences and a small farm, including

a small hut owned by the author Kylie Tennant who donated the hut and land for inclusion within the park, were located in the Diamond Head area. Much of the early human history of the park is documented in Kylie Tennant's novel '<u>Man on the Headland</u>'.

Mineral sandmining commenced on Crowdy Beach, immediately south of Diamond Head, in 1959. Mining operations continued in various areas of the park until late 1982, when they ceased. Mineral sandmining operations within the park have been extensive within coastal dunes and heathland plains and are illustrated in the accompanying map (Map 2).

Mining over a 24 year period has had a significant impact on the natural and recreational values of the park and has given rise to an unplanned pattern of recreational usage. Some of the more severe impacts of mining have included destruction of most of the park's littoral rainforest and mature hind-dune woodland/closed forest. Other mining impacts extend beyond the areas actually mined and include for example the spread of exotic weeds, interruption of drainage patterns and changes in watertables, and the establishment of new recreational patterns.

## HISTORY OF RESERVATION OF THE NATIONAL PARK

The reservation of Crowdy Bay National Park resulted from the concern of conservation groups as to the impact of the sandmining industry on the nature conservation and recreational values of important natural areas on the New

South Wales north coast.

The concerns of conservationists were found by the Committee of Enquiry on Differences and Conflicts Between Interests of Parks and Conservation Authorities, Scientific Bodies and Mining Companies (hereafter called the Committee of Enquiry), in its report (14) to be heightened by:

* the fact that there was little indication that nature conservation aims were at all significant in Lands Department policies concerning the use of Crown lands, particularly policies on mining and restoration of Crown lands;

* the prime responsibility of the regulating authority, the Department of Mines, was to ensure the satisfactory working of the sandmining industry. The Department was not concerned with keeping any areas free of mining or protecting nature conservation values.

* there were no significant national parks or nature reserves on the New South Wales north coast.

The Committee of Enquiry was established by the Minister for Lands and Mines in 1965 to inquire into the conflict between conservation interests and the sandmining industry on the north coast of New South Wales. The Committee's report was submitted in January 1968 and its recommendations concerned the following:

* the reservation of specific areas for national parks and nature reserves; and

* the control of mining within these areas.

The Crowdy Bay area was one of 12 areas investigated by the Committee of Enquiry, the report of which included the following recommendations concerning Crowdy Bay:

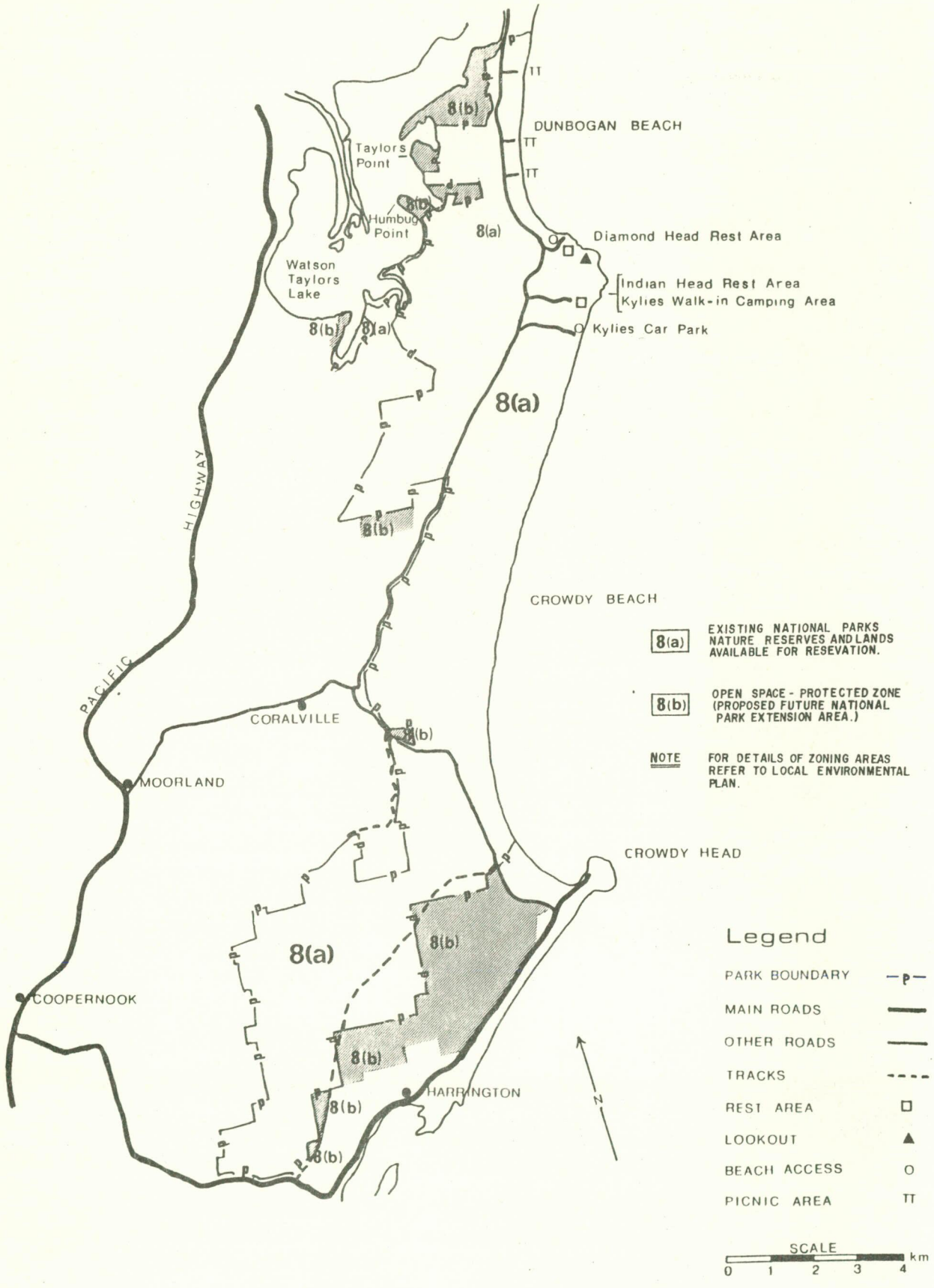
* The area between Diamond Head and Crowdy Bay be reserved as a national park or nature reserve with nature conservation objectives being of primary concern. This to be effected as soon as possible.

* No prospecting or mining be allowed and no further mining titles be granted in the designated scientific areas 1 and 2 between Diamond Head and Crowdy Head and conditions were recommended under which mining of the remainder of the area could continue. One of these conditions was that all mining within the proposed national park cease within 20 years.

* The Committee identified a scientific area no. 3 in the proposed park but reached no resolution on the future of this area. (scientific area no.3 has not been mined.)

* Water for mining purposes was not to be drawn from Blackfellows Bog in scientific area no. 2.

# CROWDY BAY NATIONAL PARK
## plan of management (Map 3)



The National Parks and Wildlife Service systematically investigated the Committee of Enquiry's proposal and the reservation of Crowdy Bay National Park took place in 1972. The bulk of land reserved in 1972 was Crown land which had been leased for grazing purposes.

Since initial reservation, the Service has proceeded with a programme to extend and rationalise the existing boundaries to cater for conservation, recreation and landscape preservation objectives. Some additional areas were included by acquisition through the Coastal Lands Protection Scheme. In December 1977, the New South Wales Planning and Environment Commission gazetted Direction Order boundaries over lands identified as being of potential value for conservation purposes. Maps illustrating the proposed extensions of the park were placed on public exhibition for a period of two months from April 5, 1978, and public submissions invited.

The final park boundaries were determined by the Minister for Planning and Environment and announced on December 21, 1979 when the Minister amended the provisions of the Interim Development Orders for Manning and Hastings Shire Councils to provide for two new zones - 'Existing National Park [8(a)]' and 'Proposed National Park [8(b)]'. The 'Existing National Park Zone' included the existing national park, Crown lands, and lands under negotiation for purchase by the Government. The 'Proposed National Park Zone' encompassed all lands proposed for acquisition by the Government for addition to the national park. These zones are indicated on the

accompanying Map 3. Crown lands north of Diamond Head were reserved as an extension to Crowdy Bay National Park on June 25, 1980.

## MANAGEMENT CONSIDERATIONS: HISTORY AND PAST LAND USE

* Much of the park has, in one way or another, been affected by mineral sandmining operations, which have had an adverse impact on park ecosystems and left a legacy of management problems such as an infrastructure of low quality temporary roads and tracks which have given rise to recreational patterns not necessarily compatible with a national park designation. In addition disturbed areas were invaded by bitou bush and other exotic plants.

* Lands in the proposed national park zone, currently under private ownership or leased from the Crown, may be purchased by the Service and added to Crowdy Bay National Park during the period of this plan of management. This plan will therefore have to provide for their positive management after acquisition.

  One objective in the preparation of a plan of management is to ensure the preservation of any historic structure or object, or an Aboriginal relic or place within a national park.

* The park area has a limited number of cultural

features or places associated with historic events. These include a number of Aboriginal sites.

* Mining, in particular has, destroyed some of these features.

* Therefore, in the management of Crowdy Bay National Park priority will be given to the identification and protection of sites of Aboriginal and European historical significance.

## 9. HISTORY AND ECOLOGICAL EFFECTS OF FIRE MANAGEMENT IN CROWDY BAY NATIONAL PARK

"Fire is a major environmental factor in the modern Australian environment. The effects of fire are evident in almost all the major vegetation types on the continent, although the frequencies of burning vary from region to region, as do fire intensities and the season of major fire occurrence. The apparent adaptation of much of the modern Australian flora to fire and variable fire regimes has long been known". Kemp (8).

Fire was used extensively, by Aborigines both for heating and in their hunting and gathering activities, and is understood to have been a major influence shaping the ecosystems of Crowdy Bay National Park.

Indeed, without the use of fire by the Aborigines, the park's current flora and fauna could well be different. Singh, Kershaw and Clark (18) indicate that the normally dominant families of native vegetation growing on nitrogen deficient, highly leached sandy soils - Myrtaceae and Proteaceae - may not have been so dominant prior to the arrival of Aborigines and their fires. Evidence from research at Lake George indicates that Casuarina sp, together with other nitrogen fixing taxa, probably grew more extensively in pre-Aboriginal times and occupied soils of low nutrient status to possibly the same extent as eucalyptus and myrtaceous shrubs do today.

Singh, Kershaw and Clark (18) suggest that Aboriginal burning, probably with more frequent and less intensive fires than under natural conditions, has been at least in part responsible for the ubiquity of eucalyptus and other fire adapted species.

## FIRE AS AN ENVIRONMENTAL FACTOR

The main vegetation components of the park are its extensive heaths and bordering woodland and forest communities. Generally the important ecological attribute controlling the development of heathland and associated communities is the extremely low level of plant nutrients in the soil. (Specht)(20)

The heaths occur on acid soils, sandy at the surface and generally deficient in most plant nutrients, particularly phosphorous and nitrogen. The nutrient deficiencies may have been exacerbated by frequent fires although the interaction between fire frequency and nutrient cycling in heaths needs further research. (Groves)(6)

Heath vegetation is invariably subject to periodic fire and heath species show an array of responses to fire. Following fire, most species are able regenerate from underground organs such as lignotubers, rhizomes or tubers and a few epicormic buds. Some species can regenerate after fire only from seed, whilst others may reproduce both vegetatively and sexually.

Little is known of the development of heaths in the absence of fire, except that the weight and density of vegetation will increase. Some short lived species will die out but viable seed, often requiring fire for germination, will be retained for some additional time.

Within the park, heaths are not isolated ecosystems. The vegetation grades into woodland and forest as a layer of shrubs. When heathlands are protected from fire and taller shrubs tend to dominate they become less suitable for birds such as the ground parrot. Frequent fires reduce the abundance of fire sensitive plants and profoundly effect the number and kinds of birds present.(Recher) (17)

Evidence on the mammalian fauna of heaths in south-eastern New South Wales indicates that heaths must be regarded as secondary habitats for mammals. As a rule the mammals live in other communities (especially the forests and woodlands) and utilise the heaths either at a low level or at a particular seral stage of the vegetation. Different mammals utilise different stages of the heath vegetation as it develops following disturbance by fire. (Catling & Newsome) (2)

With the exception of the fire-sensitive littoral rainforest remnants (which should be protected from all fire) the park ecosystems require a range of fire regimes involving both high and low intensity fires.

Recent unplanned fires are modifying most of the ecosystems to early successional stages, with little opportunity for the development of advanced successional stages. The opportunities for understanding and applying planned management of fires within to the park ecosystems are enhanced if increased areas are protected from frequent fires.

## FIRE INCIDENCE AND BEHAVIOUR IN THE NATIONAL PARK

Bushfires are a frequent occurrence on the mid-north coast from spring to early summer. In any season fire incidence and intensity may vary considerably, although fire problems are greatly reduced in wetter years. The most important factors leading to serious fires have been drought conditions combined with hot windy weather.

Major fires occurred in Crowdy Bay National Park in 1979 and 1980, both years in which prolonged periods of low rainfall occurred.

Many fires in the park over recent years have been lit to promote fresh grass for illegally grazing cattle and to promote the growth of Christmas bells in the heaths for illegal picking. Most fires occur in September-October and run from either the north-east or south-west, depending on prevailing winds. Characteristically, fires commence under hot conditions and a strong north-easterly sea breeze, which may suddenly change direction to a strong southerly wind with the arrival of a cooling frontal change, thus changing the

direction in which the fire is running.

Heaths carry large quantities of volatile and flammable fuels so heath fires are often intense and spread rapidly under a strong wind. Fire behaviour in the sclerophyll forests is relatively less intense, reflecting lower ground fuel levels and often a damping effect on winds of the taller forest vegetation.

The Service has implemented prescribed burns along the western boundary of the park in recent years to protect the park from fires originating on adjoining lands and to protect these lands from fire originating on the park. Extensive areas on the park itself have also been burnt by unscheduled fire. Records of areas burnt are maintained at the Service's Port Macquarie District Office.

The Forestry Commission carries out regular prescribed burning in John's River State Forest, which adjoins the park to the north-west. This prescribed burning helps protect the State forest from unscheduled fire and provides a measure of protection to the adjoining park.

**MANAGEMENT CONSIDERATIONS: FIRE**

* Much of the park flora is adapted to recover from periodic fire.

* Diversity of heathland flora and habitat is maintained by appropriate fire regimes.

* The nature conservation and other values of the park including the scenic and recreational values require protection from fire.

* Land uses, communities and developments adjoining the park require protection from fire.

* Fire sensitive communities particularly remnant littoral rainforest and older areas of heath should be protected from fire as these are poorly represented within the park and elsewhere.

* Man has been responsible for a recent history of frequent fires throughout the park.

* Prevailing fire season conditions spread fires in a south westerly or north easterly direction.

* Heath vegetation is particularly flammable and heathland fuel accumulations are heavy. Fires in heathlands are therefore intense, fast moving and difficult to control.

* The continuing risk of fires and flammability of the park ecosystems suggest that fire management goals will be best achieved by measures which reduce the frequency of fires.

## 10. NATURAL FEATURES OF CROWDY BAY NATIONAL PARK

### CLIMATE

The mid-north coast of New South Wales is recognised as having a pleasant climate suitable for many types of outdoor recreation activity on a year-round basis. The climate of the area is defined as humid subtropical and features a warm to strong maritime influence.

It is characterised by two seasons, a cooler 'dry' season from May to October and a warmer 'wet' season from December to March. April and November are transitional months.

The major factor determining regional climate is the seasonal pattern of the anti-cyclone and northern trade wind belts. In summer the anti-cyclone belt is well south of the region and warm humid conditions associated with the trade wind belt are experienced. The anti-cyclone belt moves northwards during autumn and lies over the region during winter accompanied by generally clear skies and dry weather.

**AIR TEMPERATURE:** The average annual temperature at Taree is 18°C but significant seasonal variation does occur. Summers tend to be hot, with the hottest month being January which has mean daily maximum temperature of 29°C. Extremely hot days are uncommon, with the highest temperature recorded being 45.5°C. Such high temperatures occur when hot air from inland New South Wales is advected over the area. Winter

days are mild but the nights are cold. The coldest month is July, with a mean daily maximum temperature of 18°C and a coldest recorded temperature of -3.9°C.

Average daily minimum temperatures for months other than summer are below accepted comfort levels. Average maximum temperatures for all months of the year are generally within the comfort zone. However high humidity levels may give rise to daytime discomfort in summer.

**PRECIPITATION:** The average annual rainfall of the park is 1375mm. Fifty-five percent of average annual rainfall occurs during the period December-April. The wettest months are February-March, with an average of 125mm each. The maximum monthly rainfall on record is 1020mm at nearby Moorland in January 1895.

The colder months of the year receive much less rain and dry spells are not uncommon in the period from April to October. However it is unusual for dry spells to persist for more than a few months. The single driest month is October, which receives on average less than 50mm.

Very heavy rainfalls and flooding may be experienced when cyclonic depressions are located off the mid-north coast. During such periods totals of 200mm in 24 hours are not uncommon. The highest total recorded in the vicinity of the park in a 24 hour period ending 9.00 a.m. is 370mm at Moorland on 16th April, 1927.

**WINDS:** The regional wind pattern in this coastal location is strongly modified by land and sea breezes. This phenomenon expresses itself most strongly in the warmer months of the year and is characterised by a marked diurnal variation in wind direction. In the morning when the land is cooler than the sea the most common wind is offshore, from a generally western direction. As the sun heats the land during the day, wind direction switches and cool air flows in from the sea from the east to north-east. These afternoon sea breezes tend to be the strongest winds of the day.
The land breeze component of the wind pattern is most strongly felt in the summertime. In the cooler months the land breeze phenomenon is dominated by winds associated with terrestrial high pressure air masses, and at this time of the year winds tend to come from the land typically from the west to south-west.

Strong north-westerly winds can occur over the period August-December from the passage of continental high pressure systems and their associated cold fronts. Together with rising mean temperatures and low rainfall these winds can produce periods of high to extreme fire danger.

Strong winds usually occur in association with one of the following meteorological conditions:

* Strong east to south east winds associated with deep depressions which develop off the north coast of New South Wales. These depressions which frequently originate as tropical cyclones may still be of cyclonic intensity when they arrive in the park region. Under these conditions wind speeds may exceed 100 kilometres per hour near the coast but moderate in inland areas.

* Violent squalls associated with severe local storms such as thunderstorms or frontal squalls. Wind gusts under these conditions can be about 160 kilometres per hour.

**FROSTS**: Frosts are an extremely rare occurrence.

**SUNSHINE**: Taree receives an yearly average of 7.6 hours of sunlight per day and, as the table shows, the area receives considerably more sunshine than the southern capital cities.

Average Hours of Sunshine per Day

| | Winter | Summer |
|---|---|---|
| Taree | 6.8 | 8.5 |
| Brisbane | 7.2 | 7.6 |
| Sydney | 6.1 | 7.0 |
| Melbourne | 3.9 | 7.3 |

## MANAGEMENT CONSIDERATIONS: CLIMATE AND WEATHER

* The park has a pleasant climate suitable for many types of recreation activity. The mild temperatures permit water oriented recreation activities for much of the year.

* The mild daytime temperatures of the winter months make the area particularly attractive to southern visitors.

* The winter and spring months are likely to be dry. The summer months are likely to be wet.

* Periods of highest fire danger occur during the period August to December.

* Flooding is most likely to occur during December-April.

* The park climate is characterised in the summer by strong afternoon sea breezes which moderate high temperatures.

* Siting and design of recreation facilities should bear in mind the possibility of strong winds and heavy rains associated with low depressions off the coast.

* Large amounts of beach sediment may be removed from the coastline by storm waves and strong wind gusts may damage structures. Thus in these periods the potential for damage to the natural and cultural features and facilities of the park is high. The siting and design of facilities should heed these potential hazards.

* Long hours of sunshine year-round provide potential for the use of solar-powered facilities but backup energy systems may be needed in the wet summer months.

## PHYSIOGRAPHY

Major physiographic units of the park are:

* beaches and rock platforms
* headlands
* outer barrier dune systems (frontal dunes and berms)
* inner barrier dune systems (ridge and swale dunes)
* swamps/lagoons

The narrow two kilometre wide strip lying between the Camden Haven Inlet and the ocean is low lying, flat and swampy, with heath and low woodland cover. At its southern end (i.e. at the southern end of the lake) this strip widens into a sand plain, which further south merges into the extensive delta of the Manning River. These coastal

lowlands are largely swamp and heathlands, broken by occasional low rises, lagoons and belts of woodland.

Rock formations outcrop on the coast in one place forming the high and massive double headland of Diamond Head.

The barrier system of low sand dunes parallel to the coast and extending inland for some distance is evidence of past shorelines.

## MANAGEMENT CONSIDERATIONS: PHYSIOGRAPHY

* Panoramic views of the park and surrounding countryside are best obtained within the park from Diamond Head.

* Most of the park is of a low-lying swampy and/or sandy nature. This presents difficulties in providing access.

* The western section of the park includes areas of country rock more suited to the provision of road access.

## HYDROLOGY

The park is bound to the east by the Pacific Ocean, to the north-west and north by Watson Taylors Lake and the Camden Haven inlet and to the west by the Great Swamp. Much of the park drains into the Great Swamp or Watson-Taylors Lake.

Blackfellows Bog to the south-west is an important swamp area encompassed by the Sim Committee's scientific area no. 2. and sand mining operations were carried out in such a way as not to threaten the integrity of this area. Interference with natural water levels or mineral content is potentially dangerous to the plant communities of Blackfellows Bog.

Between Diamond Head and Crowdy Head the swamps near the coast drain into the ocean via several creeks (e.g. Abbey Creek) and by percolation through the sand. Because of the percolation of water horizontally through the sands and swamps of the park, rather than through well defined streams, construction of roads can have disruptive effects on water tables and can thus modify ecosystems. By concentrating waterflows it can also create erosion. Concentration of water flows along drainage lines after sandmining has accelerated erosion of the coastal creeks.

Immediately to the south is the estuary of the Manning River. The Manning River has a catchment area of about 8000 square kilometres, while the Camden Haven River system has a catchment area of about 560 square kilometres.

**THE WATERWAYS OF CAMDEN HAVEN:** The waterways of Camden Haven consist of two major lakes, Watson-Taylors Lake and Queens Lake and a minor lake Gogleys Lagoon, all of which are connected to the sea by the inlet of Camden Haven. The Camden Haven Inlet and Watson-Taylors Lake adjoin the park to the north-west.

Camden Haven inlet is approximately nine kilometres long from its mouth near Perpendicular Point to Watson-Taylors Lake and varies in width from 350 metres at Watson-Taylors Lake to 100 metres at the sea training wall.

The deep water channel in the inlet is well defined and relatively stable. Aerial photographs indicate that the two large sand bars near Camden Point have been fairly stable in position and size since 1940. Flow velocities in the channel west of Camden Point reach three knots while those between the training walls at North Haven approach six knots. These velocities are in excess of the threshold velocity for sand and so maintain a self scouring but stable channel of a depth appropriate to the flow regime.

Watson-Taylors Lake is the largest lake of the waterway, with an area of 12.7 square kilometres, and has a direct connection with the inlet. The Camden Haven River flows into the lake and over the period of geological development of the coast and lakes a digitate delta of river sediment of some four kilometres in length has built out into the lake . The lake is shallow with a depth of one to 1.3 metres throughout, except for the channels leading to the inlet which are two to three metres deep. The lake acts as a large stilling basin for the sediment load of the river, as evidenced by the shallow depth and silty mud bottom. The land on the southern and eastern perimeter is low lying and forms part of the flood plain of the river and inlet. Middle Brother and North Brother mountains form the western

and northern perimeters of the lake.

**FLOODING:** Major floods in the lower Manning Valley are the result of cyclonic influence over the upriver catchment, within which intense falls of rain may be experienced.

The wettest period of the year is December to April, when about 55% of the annual rainfall is received, and it is at this time that floods are most prevalent, although major flooding has also occurred in the winter months. The two largest floods experienced on the Manning River this century occurred in February 1929 and March 1978.

Maximum flood discharge to the sea occurs during low tide. When the tide is high part of the flood discharge is absorbed by the temporary storage effect in the lower downstream section of the river. Flood levels are highest during high tides. Flooding can be aggravated in coastal areas should a storm surge effect be experienced.

Low lying areas of the park will experience some flooding at times of heavy rainfall from local runoff. The lakes and low lying areas east of Watson-Taylors Lake have a considerable flood mitigation effect on the flood peak of the Camden Haven River as it passes out to sea and undoubtedly prevent inundation of the village areas during most floods.

In times of major flood the access road between Harrington and the Pacific Highway is inundated and the temporary mining road from Crowdy Head to Coralville has served as

an access road for residents of Harrington and Crowdy Head.

**STORM SURGE:** During storms the ocean surface at the coast may be elevated above the normal high tide level due to storm surge and storm wave heights (wave set up). This super-elevation effects the beach by:

* flooding of the beach berm and possible breaching of low dunes with subsequent flooding of back beach areas;

* increased water depths over offshore sandbars allowing larger waves to approach closer to the beach before breaking;

* allowing the waves to directly attack the front of the foredune.

Calculations of the maximum predicted elevation of the ocean during a major storm has been carried out for the Coffs Harbour area (Van Kerkvoort 1980)(16) and are relevant to Crowdy Bay National Park.

The following statistics have been extracted from that report.

Storm Surge - for a design storm with central pressure of 977 millibars is 0.6 metres.

Wave Setup - for a design wave height of 10 metres and a period of 10 seconds is 1.2 metres.

Spring Tide - height 1.0 metre above high tide.

Thus the maximum anticipated water level for a major storm in the Coffs Harbour area is 2.8 m above high tide. Such levels allow the waves to directly attack the foredunes.

## MANAGEMENT CONSIDERATIONS: HYDROLOGY

* Watson Taylors Lake, Camden Haven Inlet and the Pacific Ocean are major recreation resources associated with the park.

* Low lying areas of the park will experience local flooding during periods of heavy rainfall.

* In times of major flood the Crowdy Head - Coralville mining road is the only access road open for residents of Crowdy Head and Harrington.

* Watson Taylors Lake and adjacent low-lying areas are important storage areas for floodwaters from the Camden Haven Inlet. Provision of facilities by the Service on the lake foreshores should recognise that increased water levels of the lake will occur during floods.

* Management of Blackfellows Bog should be directed towards maintaining natural water tables and nutrient content.

* Construction of roads through low lying park areas can have adverse effects on natural water tables and can significantly disrupt and alter ecosystems.

* The ocean surface along the park coastline will be higher during major storms due to storm surge and wave set up. Such elevation will be increased should the storm coincide with spring tides. The maximum anticipated water level for such a major storm event of 2.8 metres above high tide will allow waves to directly attack foredunes and can be expected to cause significant erosion damage to beaches and foredunes and possibly inundate low lying backdune areas.

## GEOLOGY AND GEOMORPHOLOGY

Crowdy Bay National Park and the surrounding coastal plains, lagoons and mountains lie within the Lorne Basin of Triassic age.

The sedimentary rocks of this formation which underlie the district are known as Camden Haven group, and have been co-related in age with rocks belonging to the Narrabeen group of the Sydney Basin by means of plant fossils found

at Camden Head.

The large lagoons of Queens Lake and Watson-Taylors Lake are divided by the North Brother Mountain, which is the dominant feature of the district rising steeply to 487m from the surrounding coastal plains. The South and Middle Brother mountains to the west of Watson-Taylors Lake comprise the other isolated and conspicuous 'Brother' mountains and are well known landmarks of the district, all being of similar volcanic origin. The Queens Lake and Watson Taylors Lake are connected by their inlet waters which converge at the eastern foothills of North Brother into the main river channel.

The river and creek system of the Lorne Basin drains into these two lagoons and the principle river, the Camden Haven, forms a digitate delta where it flows into Watson-Taylors Lake.

Subsequent to the formation of the Lorne Basin, a period of volcanic activity in the Tertiary Era resulted in the folding and faulting of the sedimentary rocks and the implacement of large igneous instrusions (lacoliths) along the zones of weakness. These are the three 'Brother' mountains. At Diamond Head the sedimentary rocks were intruded and completely overcapped by flows of volcanic rhyolitic lava during this period of volcanic activity. Metamorphism of the original sedimentary rocks occurred during this period. The subsequent cooling and contraction, weathering and erosion of the volcanic rocks has produced some interesting natural

features including columnar jointing and plugs of resistant volcanic rock. Weathering of the volcanic rocks has also exposed mineral crystal formations. These include pyrites cubes found in rhyodacite rocks and well formed feldspar crystals contained in igneous dykes. Quartz crystals occurring in veins of outcropping rhyolite rocks on the northern slopes are thought to be responsible for the naming of 'Diamond Head'.

The action of the sea on the cliffs has eroded and subsequently smoothed countless water-worn pebbles which cover cliff enclosed beaches along the headland. Among these pebbles can be found agate, jasper, coloured quartz and petrified wood.

Between the elevated headlands and barrier dunes fringing the beaches and the mountains are low lying areas surrounding the lagoons and inlets. Most of this area has been covered by extensive deposition of sand, silt and mud in the enclosed lagoon system during the Recent Era.

**ECONOMIC GEOLOGY**

The heavy minerals rutile and zircon which occur naturally in the New England tableland over geological time been eroded and washed down in the river systems, and concentrated by wave action onto past and present strand lines. They have been concentrated in lenses of windblown sand some distance inland from the present beach.

A gravel quarry lies within the northerly park extension on portion 166 Parish Camden Haven. A gravel quarry is also located in 8(b) lands south of the park. Sand extraction for construction purposes has taken place over the years in various 8(b) portions in the northern park area.

## MANAGEMENT CONSIDERATIONS: GEOLOGY

* The geological phenomena of Diamond Head are features of interest in the park.

* The rhyolitic soils of Diamond Head are vulnerable to erosion.

* Much of the soil in the park is acid, sandy, low in nutrients and podzolised. These soils support wet and dry heathlands.

* Past mining of heavy minerals has destroyed much of the original water table and surface features within the park. Mining has been extensive, areas which have not been mined are of particular value for future scientific study.

* The gravel quarry on portion 166 Parish Camden Haven requires rehabilitation.

* The southern 8(b) gravel quarry will require rehabilitation when this land is purchased by the Government for addition to the park.

* The northern 8(b) sand quarries will require rehabilitation when land is purchased by the Government and added to the park.

* Crowdy Bay National Park contains an outstanding example of frontal parallel sand dune systems on the north coast.

## NATIVE FLORA

Crowdy Bay National Park has a rich flora reflecting the interaction of environmental factors providing a wide variety of ecological conditions.

The flora of Crowdy Bay National Park is best described as a continuum, segments of which are potentially evolving towards one of several groupings, these trends being definable by topographic position. Alteration in the state of one or more of the operational factors of the environment causes recurring setbacks. If the end point (i.e. the particular climax) is ever reached it has a limited life before drastic alteration is imposed on one or more layers of the community.

Fire is a major factor in the park environment and is responsible for much of the essential instability of the plant communities. Other effects within the ecosystem have been largely confined to human activities through burning, logging and mineral sand mining. The significance of these

is lessening following reservation of the area as national park.

The nutrient status of the generally sandy soils is low and physical differences derived chiefly from topographic control of perched water tables seem to be the main soil factors governing plant distribution. Surface organic matter is minimal in most of the mineral soils, due to rapid destruction of litter by fire.

The southern reaches of Watson-Taylors Lake are particularly important estuarine habitat. The small sheltered bays and inlets are surrounded by a rich variety of shoreline vegetation. Mangroves flourish in the intertidal zone, grading shorewards through successional stages of estuarine meadow to casuarinas and melaleucas to a backdrop of eucalypt forest on the higher ridges.

The land east of Watson-Taylors Lake supports a low stunted heath and scrub of the windswept headland slopes and hind dune forests of blackbutt, angophoras and bloodwoods. Nearby areas support flat treeless bog plains with a low vegetation of red bottlebrush and small grass tree Xanthorrhea minor, which merges into small pockets of Melaleuca spp. and Casuarina spp. forests. Extensive plains of heathland and wildflowers are ablaze with colour in the spring time. A distinctive feature of these plains are the Christmas bells which can be viewed from the Diamond Head road, making an attractive feature for visitors. The flowering of these plants is dependent on frequent fire.

Extending southwards from Diamond Head is a hind dune heath plain with extensive areas of swamp to the west and south (Blackfellows Bog). To the west is a system of old dunes supporting open forest. South of Blackfellows Bog is a mosaic of heath, swamp and forest which reflects a more varied topography.

A brief description of major vegetation units of the park follows. The structural classification system adopted is that of Specht (19).

**LOW CLOSED FOREST**

(Dense canopy with 70-100% foliage) A rare community of littoral subtropical rainforest occurs within the park. This community has a limited and patchy distribution in sheltered locations on the New South Wales north coast. Dominants are tuckeroo, Cupaniopsis anarcadioides, figs, Ficus spp., coast banksia, Banksia integrifolia, and mock olive, Notelaea longifolia.

Significant stands of this community once existed on coastal dunes between Diamond Head and Harrington, but were largely destroyed in sand mining operations.

Remnant stands now remain at Crowdy Gap, Diamond Head and the beach north of Diamond Head. The Crowdy Gap remnant was severely damaged by wildfire on December 2, 1979. Littoral rainforest is very vulnerable to damage or total destruction from fire, exposure to saltwinds grazing cattle and

recreation pressures.

Mangrove communities occupy the muddy intertidal zone where they are protected from wave action and occur in the park on the shores of Watson-Taylors Lake.

Three species of mangrove are found in the park. These are grey mangrove, *Avicennia marina*, river mangrove, Aegiceras *corniculatum*, and milky mangrove, *Excoecaria agallocha*. The milky mangrove is a tropical species and its occurrence in Crowdy Bay National Park is at its southern-most limit. It occupies the inland margin of the mangrove belt and occasionally occurs in open meadow sites. Washtub Inlet is the most significant locality of the remaining mangrove habitat of Watson Taylors Lake.

**OPEN FOREST**

Open forest (or sclerophyll forest) has a more open canopy compared with closed forests, of 30-70% foliage cover. Open forests occur in the park on a variety of soil types and topography, and are often dominated by eucalypts. *Melaleuca quinquenervia* open forests occur on low lying swampy areas subject to a high water table and flooding by freshwater. Soil moisture conditions govern the variations in floristics of the ground cover. As frequency of inundation and soil salinity increase towards Watson-Taylors Lake, *Melaleuca quinquenervia* gives way to open forest dominated solely by swamp oak *Casuarina glauca*.

Swamp mahogany, Eucalyptus robusta, and narrow-leaved red gum, Eucalyptus seeana, occur in swampy situations and on the edges of saltwater estuaries where there may be periodic flooding. E. robusta is frequently found associated with Melaleuca quinquenervia on the margins and rises within the swamps.

Pink bloodwood, E. intermedia, occurs on rises and low slopes often associated with smooth-barked apple, Angophora costata, forest oak, Casuarina torulosa, scribbly gum E. signata, and saw banksia, Banksia serrata.

Blackbutt, E. pilularis, occurs on silica rich soils in more sheltered localities, including areas sheltered by Diamond Head and on the western sand ridges. Associated species are Angophora costata, E. intermedia, E. signata and Casuarina torulosa. Brush box, Tristania conferta occurs with blackbutt in the most favourable locations such as the sheltered Diamond Head gullies, where the forest structure approaches that of a tall open forest.

**WOODLAND**

Woodland has an open canopy with 10-30% foliage cover, and a similar species mix to that of the open forest. Of special botanical interest is the hind dune woodland of blackbutt, E. pilularis, and bastard tallowood, E. planchoniana.

The E. planchoniana stands within the park are among the southern-most recorded occurrences in Australia.

**HEATH**

Heath communities are low, usually less than two metres high with a dense cover of small-leaved shrubs, sedges and restiads with some herbs and grasses. Species belonging to the families Leguminoseae, Myrtaceae, Epacridaceae, Rutaceae, Cyperaceae, Restionaceae and Xanthorrhoeaceae are the most common.

The distribution of heath is edaphically determined; occurring on acid, siliceous soils deficient in most mineral nutrients, particularly phosphorus and nitrogen.

Heath occurs in the park on low undulating country with sand ridges and relatively flat plains interspersed with swamps. Drainage conditions governed by topography and physical characteristics of the soil are important in determining the types of vegetation and species mix present. Two distinct types of heath may be recognised. They have been termed 'wet' and 'dry' heaths because the former are seasonally waterlogged. The two vegetation types correlate with two soil types on a continuum of soil profiles. The wet heath occurs on podzolic or peaty soils in which a relatively shallow A horizon of sand, usually less than 25cm, overlies a relatively impermeable B horizon of cemented clayey sand. Dry heaths occur on deeper, more easily drained sands in which the depth of the A horizon may be 150cm or more.

As a result of the variable depths of the relatively impermeable B horizon, soil moisture relations differ markedly between sites on which these two heaths occur, although the sites themselves may adjoin and receive similar amounts of rain.

Periodic fire is a feature of the heath environment and there is an array of responses of heath species to fire. Most species are able to regenerate from underground organs such as lignotubers, rhyzomes or tubers and few from epicormic buds following fire. Some species can regenerate after fire only from seeds, whilst other species may reproduce both vegetatively and sexually.

The heathlands are a major park attraction with their beautiful and spectacular spring wildflower displays.

**GRASSLANDS**

Eriachne glabrata, a rare species of grass, occurs in dry heath on the western edge of Blackfellows Bog. Other known occurrences of this species are restricted to Queensland.

**SEDGELANDS**

Sedgelands develop on acid peats or humic gley soils with impeded drainage on the broad flats, depressions and drainage lines of the park. Sedgelands are dominated by sedges, reeds and sedge-like plants. Other plants which occur frequently

occurring are ferns and moisture loving shrubs, forbs and grasses. In some localities sphagnum moss may form an extensive spongy covering on the ground. Melaleuca quinquenervia and Eucalyptus robusta are frequent on the margins of these swamps and on higher ground within them. Freshwater lagoons within these swamps carry aquatic vegetation such as water-lilies and algae.

## SALTMARSH, LOW SHRUBLANDS AND LOW-OPEN SHRUBLANDS

These communities occur on the landward side of mangroves and are inundated by only the highest tides. The dominant species are low halophytic shrubs. Bare areas, sometimes extensive, are found in and around salt marsh shrublands. These develop where the concentration of salt in the soil surface reaches a level toxic to other plant life.

## SPOROBOLUS VIRGINICUS CLOSED GRASSLAND

Adjoining the salt marsh shrublands or mangroves on the landward side, prickly couch, Sporobolus virginicus, and beaded glasswort, Salicornia quinqueflora, often form a closed grassland (estuarine meadow) usually less than 0.5m in height. Spring tides may inundate the community and some grasslands show a hummocky micro relief with the depressions or channels holding brackish water for short periods.

## MANAGEMENT CONSIDERATIONS: NATIVE PLANT COMMUNITIES

* Limited information on park flora is available. Further detailed studies are required and will be given high priority for management purposes.

* Native flora is of interest in its own right and is also important in relation to scenery, recreation, fauna habitat, soil stabilisation and flood control.

* There is a need to prepare a basic vegetation map of park flora as a matter of priority.

* Detailed studies are required and should be given high priority to refine burning regimes for park ecosystems.

* Littoral rainforest remnants are vulnerable to damage or destruction from fire, exposure to salt winds or recreational use.

* Recreational development must take into account the possible impact of recreation on plant cover, especially its capacity to withstand trampling.

* There is a need to ensure protection of plant communities in moist environments which provide major fauna habitat.

* An important factor governing plant distribution in the park is the depth to an impermeable "B" soil horizon. Construction of roads has the potential to significantly alter plant communities by changes to water tables.

* The southern and south-eastern areas of Watson Taylors Lake are of special significance because of the occurrence of estuarine communities.

## NON-NATIVE FLORA

Although the park flora is essentially natural, some exotic species are present and reflect a past history of disturbances including fire, sand mining, grazing and logging.

The major exotic plants occurring within Crowdy Bay National Park are lantana, Lantana camara, and bitou bush, Chrysanthemoides monilifera.

Lantana has over the years become established in various north coast ecosystems and occurs within Crowdy Bay National Park as a component of open or closed forest or woodland ecosystems, with heavier infestations reflecting major environmental disturbance. Heavy infestations are expected to diminish in significance as the natural ecosystems recover.

Although the presence of lantana in Crowdy Bay National Park is cause for concern it cannot practically or economically be eradicated by existing control measures. Long term control by biological means may be possible in the future. Past releases of various insects for this purpose are believed to be decreasing the vigour of this species and hence its capacity to remain within park ecosystems.

Bitou bush is currently colonising suitable habitat within Crowdy Bay National Park. At present it occurs largely on foredunes and hinddunes disturbed by sandmining, cattle grazing, fire, erosion and recreation. The heaviest infestation is along sanddunes behind Dunbogan Beach, north of Diamond Head. Bitou bush also occurs on Diamond Head and dunal systems behind Crowdy Beach, but as yet this infestation is relatively light.

Concern has been expressed that bitou bush has the capacity to invade areas of Crowdy Bay National Park away from foredune and hinddune areas and, bearing in mind the sandy soil of much of the park and disturbances caused by sand mining, fire, etc, this is regarded as a possibility. Disturbance resulting from sand mining provides the most favourable conditions for invasion.

Experimental hand pulling of bitou bush by voluntary labor is being implemented under Service supervision on Diamond Head and the foredune running south to Crowdy Head. The method of careful removal of weeds, working from the least disturbed areas has had success in some areas around

Sydney. The long-term success of this approach, which is very labour intensive, is uncertain, especially in areas such as the foredune which have suffered a high level of disturbance from sand mining. In the long-term the invasive capacity of the weed may well overwhelm control based on this method. Trials on hand gun chemical control are taking place on other north coast national parks, and if successful this method of control will be extended to Crowdy Bay National Park.

The successful long-term control of bitou bush on the north coast of New South Wales probably depends on biological control. As bitou bush is not recognised as an agricultural or economic problem no work on biological control has yet been implemented in New South Wales. Bitou bush is a coloniser of disturbed natural coastal areas and is therefore of special concern to the National Parks and Wildlife Service, in that it detracts from the natural qualities of coastal national parks and nature reserves.

## MANAGEMENT CONSIDERATIONS: NON-NATIVE PLANT COMMUNITIES

* Mechanical or chemical eradication of lantana is not practicable or economically possible in large natural areas.

* The presence of lantana within Crowdy Bay National Park is expected to decline as ecosystems recover from past damage, and as insect releases for biological control become more effective.

* Bitou bush is currently colonising suitable habitat within Crowdy Bay National park. To date this has been on disturbed foredune and hind dune areas, but there is concern that bitou bush will extend to other areas within the park.

* An assessment of bitou bush colonisation of the north coast of New South Wales is needed and overall co-ordination of any control programmes implemented.

* Research into suitable mechanical, chemical and biological methods of control for bitou bush is needed. Experimental control programmes should be extended to include the widest range of techniques to allow assessment of the feasibility of control.

* Experimental control in Crowdy Bay National Park should aim at the following, in order of priority:

    * maintenance of Diamond Head free of bitou bush;

    * elimination of bitou bush from the area to the south of Diamond Head.

## NATIVE FAUNA

There is a wide variety of fauna within the park with birds the most numerous. Mammals, reptiles, amphibians and insects are also common but their activities are generally

cryptic and/or nocturnal.

**BIRDS**

Crowdy Bay National Park has a great diversity of bird life, which reflects the pattern of vegetation types within the park.

Birds recorded in the park include ground dwellers such as the rare eastern grass owl; nectar-eating honey-eaters; water birds; oceanic birds and larger birds of prey.

Each species of bird has its own habitat requirements. While some can be found in many types of habitat others have a restricted or specialised requirement. The heathlands, swamps, lagoons, woodlands, forests and sand dunes of the park contain suitable trees and plants to allow feeding and provide nesting and resting sites for the variety of birds that either live in or utilise the park or are migratory visitors. Some birds only utilise the park for one or other of these activities, but require the surrounding farmlands, lakes, forests or oceans for other activities. For example some of the oceanic birds, although feeding at sea are dependant on the adjacent coastline for resting and breeding.

The heath areas of the park are particularly rich in the number of birds present because they offer a dense cover and many flowering shrubs provide nectar and pollen which attract insects. Some wildflowers will be present throughout the

year but they are most abundant during spring and early summer. This is the best season for birdwatching. Honeyeaters, thornbills and heath-wrens are the most common species of the heath.

The prolific aquatic life of Watson-Taylors Lake attracts many species of waterfowl to the area. Hundreds of black swans and pelicans find permanent refuge around the lake, and the shallows are feeding grounds for many wading birds including white ibis, cranes, egrets, herons and occasional spoonbills. Some migratory species which regularly visit the lake and estuarine waters include the whimbrel from north Asia and the Japanese snipe.

Other noteworthy occurrences are several species considered rare or endangered and other species close to the southern or northern limits of their ranges. The black-necked stork, Xenorhynchus asiaticus, Pacific baza, Aviceda subcristata, little tern, Sterna albifrons, pied oyster catcher, Haematopus longirostris, ground parrot Pezoporus wallicus, eastern grass owl, Tyto longimembris, and wompoo fruit-dove, Megaloprepia magnifica, occur within the park and are listed as endangered in schedule 12 of the National Parks and Wildlife Act, 1974. The tawny grass bird, Megalurus timoriensis, is a rare bird which also occurs within the park.

Black-necked storks are regular but uncommon summer and autumn visitors to swamps, flooded pasture and estuarine habitat in the area. They occur usually in pairs but also

occasionally in small groups of up to six. The little tern is an occasional visitor and is seen singly or in twos or threes. The wompoo fruit-dove is uncommon but can be found in the littoral rainforeest.

Swamp areas of the park are habitat for the tawny grassbird and the eastern grass owl. The grass owl is found singly, or in pairs, in areas of tall tussock grass or sedges. It nests and roosts on the ground hidden amongst the tussocks.

Recent research in Victoria (Meredith and Isles) (10) indicates that the ground parrot, a bird of the coastal heaths and sedgelands, is dependant on regular fires in the heaths to maintain suitable habitat. As the ground parrot is absent from these communities for the first two or three years after a fire, too frequent burning provides an unsuitable habitat. In Xanthorroea heaths recent research has shown that maximum population densities occurred at around 17 years after fire, declining so that birds are absent or in very low numbers in heath more than 25 years old (Meredith and Isles). (10). In Casuarina heaths the parrot recolonised after three or four years at high initial densities, declining so that the birds were absent from heaths older than 20 years. Meredith and Isles found that the heaths supported higher population densities than the sedgelands and that the sedgeland habitats did not require burning.

The glossy black cockatoo, although uncommon in New South Wales, is widely distributed in suitable habitat within the

park.

The red-backed button-quail, wompoo fruit-dove, forest kingfisher, noisy pitta, varied triller, pale-yellow robin, spectacled monarch and red-backed fairy-wren are close to the southern limits of their distribution, and the brush bronzewing is a species close to its northern coastal limit of distribution (Milledge) (9).

## MANAGEMENT CONSIDERATIONS: AVIFAUNA

* The avifauna, a major feature of the park, contains a diversity of species some of which are rare. There are seven species listed as endangered in schedule 12 of the National Parks and Wildlife Act, 1974, which occur within the park.

* Two rare species of bird, Tyto longimembris and Megalurus timiriensis, occur in swamp areas of the park. Suitable habitat may depend on the maintenance of an appropriate fire regime.

* Heath areas of the park are particularly rich in avifauna species. This habitat is affected by, and may be dependant on, appropriate fire regimes.

* The endangered ground parrot occurs in heath and sedgeland habitat of the park. Regular fires are needed to maintain the heaths as suitable habitat. However, too frequent burning degrades the habitat,

eventually making it unsuitable for ground parrots. Sedgeland habitat does not appear to require burning for ground parrot habitat.

* Further studies are required, to determine appropriate burning regimes for the park ecosystems to achieve habitat conditions required by the park avifauna.

* Watson-Taylors Lake is an important wetland habitat for avifauna and requires protection.

**MAMMALS**

The mammalian fauna of Crowdy Bay National Park is typical of that of north coastal New South Wales. The most common small mammals are rodents such as the bush rat, Rattus fuscipes. Other rodents are the swamp rat, Rattus lutreolus, water rat, Hydromys chrysogaster, and two feral species, the black rat, Rattus rattus, and house mouse, Mus musculus.

Two species of small marsupials occur in the park. The brown antechnius, Antechinus stuartii, and the common dunnart, Sminthopsis murina.

The common larger kangaroos and wallabies, the grey kangaroo, Macropus giganteus, and red-necked wallaby, Macropus rufogriseus, usually occur in groups in the open forests and woodlands. The swamp wallaby, Wallabia bicolor, is solitary in occurrence and is the only one of the large macropods

likely to be found in wet sclerophyll forest and rainforest. It also occurs in swamp sclerophyll and dry sclerophyll forest.

The carnivores occurring in the park are the dingo, Canis familiaris dingo, brush trailed phascogale, Phascogale tapoatafa, and tiger quoll, Dasyurus maculatus. Two species of bandicoot occur in the park; the northern brown bandicoot, Isoodon macrourus, and the long nosed bandicoot, Perameles nasuta.

The grey-headed fruit-bat, Pteropus poliocephalus, feeds on native and introduced fruit trees as well as flowering ecualypts and rainforest trees.

The koala, Phascolarctos cinereus, occurs in the park. The koala eats a variety of tree leaves, mainly Eucalyptus species but including forest oak, Casuarina torulosa, and broad-leaved paperbark, Melaleuca quinquenervia.

Possums occurring in the park include the common brushtail, Trichosurus vulpecula, greater glider, Schoinobates volans, squirrel glider, Petaurus norfolcensis, sugar glider (Petaurus breviceps) and the feathertail glider Acrobates pygmaeus.

## MANAGEMENT CONSIDERATIONS: NATIVE MAMMALS

* There is a need for a more complete inventory of the park's mammalian fauna.

* There is a need to determine habitat requirements for mammals and to incorporate these into management prescriptions, especially those relating to the management of fire.

* Native mammals are a feature of the park and are of interest to visitors.

## FISH

Ocean and estuarine waters adjoining the park are inhabited by a fish fauna typical of the New South Wales north coast. Many of the fish species are exploited either by amateur or professional fishermen and these activities may either directly or indirectly have an impact on the park.

Commercial fishing in waters adjoining the park falls into two categories - estuary and ocean fishing. The estuary fishermen work the Manning and Camden Haven rivers and the associated coastal lakes of Queens Lake and Watson Taylors Lake. They catch mullet, whiting, flathead, garfish and estuary prawns.

Ocean fishermen work out of Camden Haven, Harrington and Crowdy Head, fishing coastal waters out to 25 kilometres offshore in depths up to 100 metres. The major species fished are snapper, morwong, luderick, kingfish, ocean prawns and crayfish.

Professional fishermen also carry out shore-based netting on Dunbogan and Crowdy Beaches between April and June. The main species sought is mullet, with minor species including blackfish, bream and jewfish. These fishermen require access onto Dunbogan and Crowdy beaches for vehicles, boats and trailers, nets etc.

Recreational fishermen have traditionally been a major user-group of Crowdy Bay National Park. Major fish species caught off rocks and beaches of the park are tailor, mulloway, bream, whiting, flathead and luderick. Watson Taylors Lake is also popular over the summer months for prawning.

Increased access by road to beaches and headlands provided for sand mining together with a considerable increase in off-road vehicle ownership has facilitated the use of park beaches by recreational fishermen in recent years.

## MANAGEMENT CONSIDERATIONS: FISH

* Shore based netting of both Dunbogan and Crowdy Beaches by professional fishermen over the winter months is a traditional activity. These fishermen require vehicular access on to beaches adjoining the park to continue their livelihood.

* Recreational fishermen are a major user-group of beaches adjoining Crowdy Bay National Park. Some recreational fishermen use vehicles for access along

beaches, whilst others prefer to walk.

* Temporary and sometimes substandard mining roads have facilitiated vehicular use of beaches.

* Increasing use of off-road vehicles, together with increased accessibility provided by the temporary mining roads and tracks has resulted in significant damage to coastal dunes of Dunbogan Beach, Crowdy Beach and to Diamond Head. Such usage was well established before Crowdy Bay National park was reserved.

## NON-NATIVE FAUNA

Non-native fauna present in the park include feral dogs and cats, cattle, foxes, the honey bee, and domestic rats and mice.

The domestic rat and mouse have adapted to local habitats and are found throughout the park. They are favoured by disturbance to natural habitats, and are found throughout the region generally.

Cattle are occasionally present on the park and contribute to destabilisation of foredunes and sand mined areas. There is the everpresent threat of deliberate firing of the park by graziers to provide green pick for cattle forage. Cattle are believed to be an important agent in the dispersal of bitou bush seed within the park.

Exotic animals affect the natural ecosystems in a number of ways: some prey on native animals; others provide prey for others; they compete with native animals for food and water; they spread the seeds of some plant species, they destroy some plant species through trampling or browsing; they alter fire patterns by consuming otherwise combustible grasses; they alter ecosystems and cause erosion.

The park flora, particularly heath, provides an attractive overwintering area for apiarists. As the park is narrow and elongated, past practice by the Service has been to encourage the siting of bee hives on private land adjoininjg the park rather than on the park itself. Currently there are no hives in the park.

## MANAGEMENT CONSIDERATIONS: NON-NATIVE FAUNA

* Cattle grazing on the park present a direct threat to stability of foredunes and mined areas, and an indirect threat of wildfire to all park ecosystems. They are also believed to be contributing to the spread of bitou bush.

* There is a need for continuing control of illegally grazed cattle.

* Bee hives should not be introduced into the park.

## 11. OUTDOOR RECREATION

The natural resources of climate, coastline, waterways, lakes, forests and mountain scenery, as well as an historical identity dating back to the convict era, make the Port Macquarie-Manning region one of Australia's important tourist areas. The satisfaction of a visitor to the region is dependent upon the successful interaction of a wide range of facilities including accommodation, information services, shopping and recreational opportunities. Within this context, the reservation of Crowdy Bay National Park ensures that the coastline encompassed within the park will be managed to preserve its natural character and ensure its long term availability for outdoor recreation in an undisturbed, natural setting.

Crowdy Bay National Park provides a range of recreational experiences which complement those provided in nearby towns and villages, and along the adjoining coastline. Activities based on the park's natural resources and features include picnicking, low-key camping, surfing, fishing, walking, boating, canoeing, sightseeing and nature observation.

The Port Macquarie-Manning area has tradionally been a popular tourist destination and the number of visitors to the region is increasing annually by 12%. A survey carried out by the Australian National Travel Association in 1970, 'Establishing Port Macquarie/Hastings Region as a Major Travel Destination', gave the following information on visitors to the area:

| | |
|---|---|
| Origin of Visitors | Sydney 49%; New South Wales north coast 10%; remainder New South Wales 20%; Victoria 10%; Queensland 7%. |
| Travel to Region | Over 90% of visitors arrived by motor car. The majority of visitors arrived from the south via the Pacific Highway. |
| Accommodation | 15% of total visitor nights are spent in motels and hotels, 40% in flats and 36% in camping/caravan parks. |
| Pattern of Visit | For 77% of visitors, the region was their destination. Beach and picnic areas were visited most. |

Visitor numbers to Crowdy Bay National Park were estimated in the calendar year 1081 to be 35000, with peak visitation occuring at Christmas and Easter. The number of camps recorded in the two rest areas in the park over Christmas in 1981 were:

| | |
|---|---|
| Diamond Head | 142 |
| Indian Head | 12 |

## SERVICE FACILITY AREAS

### DIAMOND HEAD REST AREA

The Diamond Head Rest Area is located on the northern side of Diamond Head beside the southern end of Dunbogan Beach. Facilities are provided to cater for both picnicking and short-term camping. Facilities include pit toilets, picnic tables, barbeques, rubbish bins, brochure dispensers and a beach access track for vehicles. Accommodation for about 120 camps is provided.

### INDIAN HEAD REST AREA

The Indian Head Rest Area is located on the southern flanks of Diamond Head and provides walking access to the rocks of Diamond Head for fishing, and to the northern end of Crowdy Beach. Facilities are provided to cater for both picnicking and short-term camping, and include pit toilets, barbeques and rubbish bins. Accommodation for about 10 camps is provided.

### KYLIES WALK-IN CAMP AREA

The slab hut once owned by Kylie Tennant is situated some 300 metres south of Indian Head Rest Area and about 500 metres via a shaded forest walk from Crowdy Beach. This hut was restored by the Service in 1980 to provide a walk-in camp and picnic facility. The surrounding area is mown and a toilet, rubbish bin and barbeques provided.

**CROWDY BEACH**

Kylies, Mermaid and Fig Tree parking areas are located behind Crowdy Beach, south of Diamond Head. Walking tracks provide beach access, and a four wheel drive beach access track is provided at Kylies Car Park.

**DUNBOGAN BEACH**

Blackbutt, Cheese Tree and Geebung picnic areas are situated behind Dunbogan Beach, between Diamond Head and the northern park boundary. These picnic areas provide for passive recreational use of Dunbogan Beach. Facilities include parking areas, pit toilets, barbeques, rubbish bins and picnic tables.

In addition to these areas some camping/picnicking activity takes place in 8(b) land zoned for future park extension at Crowdy Beach and on the Watson-Taylors Lake foreshore. No facilities are presently provided in these areas. Usage of these areas is escalating, resulting in a deterioration of the sites and access tracks.

**MANAGEMENT CONSIDERATIONS: RECREATION USE**

* Recreational management of Crowdy Bay National Park should provide a range of recreational opportunities to complement those provided in nearby towns and villages.

* Visitor facilities provided in Crowdy Bay National Park should either complement or be a low-key alternative to public and private facilities in the adjoining villages of Harrington/Crowdy Bay and Laurieton/Dunbogan/North Haven.

* Recreational activities to be catered for in Crowdy Bay National Park include picnicking, low-key camping, surfing, fishing, walking, boating, canoeing, sightseeing and nature observation.

* It is probable that the trend towards increased visitation to Crowdy Bay National Park and the region generally will continue.

* The opportunity for outdoor coastal recreation in a natural setting will decrease in the area as development of coastal resorts and villages increases. Crowdy Bay National Park will become of greater significance to the region in providing this type of recreation setting.

* Unorganised camping/picnicking takes place at several beach and lake localities in land zoned for future park extension. This usage is escalating and leading to deterioration of the sites and their access tracks. Some of the sites concerned are suited to a formalised development of recreational use which will permit a continuation of usage without site deterioration.

* Sites preferred by visitors to the park for camping and picnicking are associated with natural features such as water, availability of shaded and grassed areas and scenery.

* Picnicking and camping are associated with other activities such as swimming and fishing.

## ACCESS

Access to and within Crowdy Bay National Park involves a system of roads and tracks of various standards, trafficable ocean beaches and the navigable Camden Haven Inlet.

### ROADS

The Pacific Highway runs parallel and about 10 kilometres inland from the coast and sealed roads provide access from the highway to Laurieton/Dunbogan and Harrington/Crowdy Head. A gravel road runs south from Dunbogan along the peninsula between the Camden Haven Inlet and the sea, skirts to the west of Diamond Head and then diverges inland through Coralville to the Pacific Highway at Moorland. This road is a public road maintained from Dunbogan to Diamond Head by Hastings Municipal Council and from Diamond Head to Moorland by the Greater Taree City Council. It provides visitor access to facilities maintained by the Service at Diamond Head, Dunbogan Beach and Crowdy Beach.

A temporary mining road constructed and maintained by sand-mining companies for mining purposes traverses national park and private land between Coralville and Crowdy Head. This road is not covered by public road reservation. Within Crowdy Bay National Park it traverses reserved national park and within the private land it has the status of a private road.

A temporary mining road runs southwards from Kylies Car Park at Diamond Head to link with the Coralville - Crowdy Head mining road. This road, which was constructed in the 1960s, is located for much of its length immediately behind coastal dunes. Following completion of sandmining served by this road, a decision on the road's future was deferred for resolution through the plan of management process. The road is substandard, with poor drainage and a poor running surface, and receives little public use.

A number of other low quality sand tracks within the park are associated with past sand mining, pastoral and recreational activities.

**BEACHES**

The considerable increase in ownership of off-road vehicles during the 1960s and 1970s resulted in an uncontrolled use of off-road vehicles by fishermen and recreationists on beaches, headlands and coastal dunes in the area now reserved as Crowdy Bay National Park. This resulted in extensive damage to the coastal dunes of Dunbogan and

Crowdy Beaches, as well as to the scenic amenity of Diamond Head.

Following the reservation of Crowdy Bay National Park the National Parks and Wildlife Service implemented the following control and restoration measures:

* construction of rest area facilities at Diamond Head, (Diamond Head, Indian Head and Kylies Hut rest areas);

* construction of day-use facilities at Crowdy Beach, (Kylies, Mermaid and Fig Tree parking areas);

* construction of day-use facilities at Dunbogan Beach (Blackbutt, Geebung and Cheese Tree picnic areas);

* restriction of access around Diamond Head to walkers only;

* rehabilitation of off-road vehicle tracks on Diamond Head;

* construction of single off-road vehicle tracks onto Dunbogan Beach at Diamond Head Rest Area, and onto Crowdy Beach at Kylies Car Park;

* closure and rehabilitation of all other off-road vehicle tracks crossing coastal dunes within the park.

Service management of Crowdy Bay National Park has provided roads and facilities for a recreational use of the coastline based on public use of conventional vehicles.

Use of recreational vehicles off formed roads and trails within the park is prohibited and damage caused by the past uncontrolled use of off-road vehicles is being rehabilitated.

Responsibility for management of vehicular use of Dunbogan and Crowdy Beaches rests with the respective Council, the Crown Lands Office and the Service. This situation is complex, but its main components are detailed below.

* National park reservation is to mean high water. Land below mean high water is Crown land, managed by the Crown Lands Office.

* Although the Service does not control movement of vehicles along beaches below mean high water, it does control access across the park and onto the beaches. The Service has closed and rehabitated multiple entry points across the park dunes, providing a single authorised entry point at both Diamond Head Rest Area and Kylies Car Park.

* Entry to the northern section of Dunbogan Beach beyond the park boundary is controlled jointly by the Crown Lands Office and Hastings Municipal Council. To date, entry and use of vehicles onto this section

of beach has been uncontrolled.

* Entry to the southern section of Crowdy Beach beyond the park boundary is controlled jointly by the Crown Lands Office and Greater Taree City Council, with access restricted to north of the Crowdy Head surfing area. Several vehicle entry points exist between Crowdy Head and the park boundary.

**ACCESS BY BOAT**

Although the Camden Haven River itself is navigable for many miles, passage by boat is restricted by the shallow depths on Watson Taylors Lake and the bridge between Dunbogan and Laurieton. The inlet is generally navigable up to Watson Taylors Lake by vessels with drafts of less than 2.5 metres. Existing facilities for small boats consist of six boat ramps, most of which have limited trailer parking facilities. Hire boats are available at three places on the waterway. The marina at North Haven operates approximately ten hire boats and has reasonable mooring facilities. A small number of hire boats are also available at Dunbogan.

Several Government Departments share the responsibility for administration of the tidal waterways in New South Wales. Within this context their responsibilities are briefly set out below.

Maritime Services Board: Responsible for administering use of waterways and supervision of the regulations relating to water traffic, mooring and navigation.

Department of Public Works: Responsible for the development and construction of works in or to the waterway.

Crown Lands Office: Responsible for the issuing of permissive occupancies in or on the waterway for a number of purposes which include dredging leases, construction of buildings, jetties and moorings.

New South Wales State Fisheries: Responsible for the supervision of fishing grounds, oyster leases, inspection and supervision of fishing methods and catches.

**MANAGEMENT CONSIDERATIONS: ACCESS**

* There is a need for liaison with Hastings Municipal Council and the Crown Lands Office over management of recreational vehicles using Dunbogan Beach.

* There is a need for liaison with Greater Taree City Council and the Crown Lands Office over management of recreational vehicles using Crowdy Beach.

* The national park reservation adjoining Dunbogan and Crowdy Beaches should be extended to low water to allow for complementary management of recreational use of both the area below and the area above mean high water.

* There is a need to review the pattern of road access for Crowdy Bay National Park, and decide whether existing temporary mining roads should be retained and upgraded, or closed and rehabilitated.

* There is conflict on the use of beaches between vehicle-based recreationists and other visitors. Increasingly visitors are objecting to vehicles on beaches interrupting the peace, creating visual ugliness, disturbing activities such as fishing and sunbathing and to the risk of injury which attends vehicle use of beaches. This conflict is exacerbated because often there are few beaches which are unused by vehicles.

## 12. SCIENTIFIC AND EDUCATIONAL STUDIES

Crowdy Bay National Park is of potential value for scientific and education studies. The scientific work done in the park to date has largely focussed on park flora and fauna.

This includes:

* the assessment of the geomorphological and botanical features by scientists advising the Committee of Enquiry (14);

* vegetation surveys carried out by sandmining companies for the purposes of rehabilitating sandmined areas;

* faunal survey work done by Milledge (the Camden Haven Refuge Study (9));

* preparation of a list of avifauna (Service);

* mapping of bitou bush (Service).

## 13. OBJECTIVES OF MANAGEMENT

This scheme of operations sets out a prescription for the management of the park in response to the values, resources and use opportunities identified under the heading 'Resources Summary and Management Considerations' of this plan.

The scheme of operations is not a detailed prescription of all management operations to be undertaken in the park. Where information on resources uses and impacts permits, it is quite specific about operations proposed. However, it is recognised that a plan of management for an area as complex as Crowdy Bay National Park cannot specify in detail all aspects of management of the park. The draft plan therefore also proposes procedures whereby management operations will be developed consistent with the objectives of management.

The responsibility of the Service under the Environmental Planning and Assessment Act, 1979 to undertake environmental planning procedures for new development is acknowledged.

The National Parks and Wildlife Act, 1974 states that national parks are spacious areas containing unique or outstanding scenery or natural phenomona, and that regard shall be had in the preparation of a plan of management for the protection of the special features of the park and the prohibition of any works which will adversely affect its natural condition or special features. However, Crowdy Bay National Park also includes recreational opportunities and prehistoric and historic features which

require protection. This plan recognises this diversity and makes provision for these resources to be identified and managed in terms of their inherent values and appropriate uses.

## MANAGEMENT OBJECTIVES FOR CROWDY BAY NATIONAL PARK

The following general management objectives are proposed in this draft plan, in light of the legislative goals, community values and park resources and opportunities discussed above:

* to preserve and protect the outstanding scenery and natural features;

* to conserve wildlife;

* to maintain the natural environmental processes as far as possible;

* to preserve and protect Aboriginal sites and historic features;

* to provide recreational opportunities;

* to encourage scientific and educational enquiry into environmental features and processes, prehistoric and historic features and park use patterns.

Although all of these objectives reflect values ascribed to Crowdy Bay National Park, some of them conflict with others. It is not possible, for example, to maximise both vehicle access to the coast and protection of outstanding natural scenery in the same place. A range of opportunities for use will be provided wherever possible, but when it is necessary to resolve conflicting expectations it is proposed in this draft plan that the primary objective of protecting the outstanding scenery and natural features of Crowdy Bay will have precedence.

This draft plan seeks to avoid conflicting objectives as much as possible and to resolve such conflict as may still arise in as clear and consistent a way as possible.

## 14. ENVIRONMENTAL MANAGEMENT

Environmental management recognises that the 'environment' includes all aspects of the surroundings of man. Crowdy Bay National Park encompasses both natural and cultural resources. The latter may include prehistoric as well as historical features. This plan emphasises management of the national park so that these resources can be identified and managed in terms of their values and appropriate uses.

Consistent with its land use classification as a national park and the values placed on it by the community, environmental management of Crowdy Bay National Park will be generally based on the objectives of management identified above.

There are however four areas within the national park which have been identified as having special significance. Three of these areas are of high scientific importance and the fourth has high landscape conservation values.

The Committee of Enquiry identified three 'scientific areas' in Crowdy Bay National Park as areas 'of special significance for nature conservation and scientific study purposes'.

The Committee of Enquiry recognised in Crowdy Bay National Park:

> 'The best example in the series of areas F1 to F5 (between Evans Head and Crowdy Bay), of frontal parallelism of sand-dune, contrasting to the

hinterland parallelism of the Jerusalem Creek area (now Bundjalung National Park) with extensive areas of swamp (as constrasted to lagoon) to the west and south (Blackfellows Bog). The area is a hind-dune heath plain which is partly present in the Limeburners Creek Area (F4) but not as distinctively.'

The committee of enquiry reported the following on each of the three scientific areas:

'SCIENTIFIC AREA NO. 1

This area demonstrates heath communities over old strand lines. It is unfortunate that a section such as that which was originally proposed could not be preserved in this vicinity, despite the high mineral values involved. The scientific area, as originally proposed, included a relatively undisturbed sequence of heaths over old strand lines. It was of particular scientific value, because it illustrated the fine ecological balance reflected in significant changes in biological communities over very slight differences in topography.

J. McG.

SCIENTIFIC AREA NO. 2

Blackfellow's Bog is rich in Restionaceae and Cyperaceae, Sphagnum, Blechnum camfieldii, Eriachne glabrata.

Interference with the levels of water and its mineral content through using the bog as a source of water could be highly detrimental to the biological communities of the bog and its surroundings.

J. McG.

SCIENTIFIC AREA NO. 3

Forest with Eucalyptus planchoniana (southern limit).

J. McG.'

These three areas are identified as management units within Crowdy Bay National Park and are deemed to fall within the classification of scientific reserves in accordance with the CNPPA classification of protected areas; viz:

Scientific reserves are areas free of man's impact and are set aside for scientific research and environmental monitoring.

The management objective of scientific reserves is to maintain natural processes in an undisturbed state.

The Committee of Enquiry was limited in its brief to a consideration of 'specific sand-heath areas which appear to offer the greatest potential for large nature conservation parks and reserves on the north coast'. While Committee did not address the nature conservation value of areas other than sand-heath, there are areas of high landscape value such as the Diamond Head complex within the park. This area is deemed to be worthy of classification as a natural landmark under the CNPPA classification system.

Natural landmarks are areas which include outstanding examples of a country's natural heritage. This CNPPA category contains one or more specific natural features of outstanding national significance such as geological formation, a unique natural site, animal or plant species or habitat which, because of uniqueness or rarity, may be threatened and should be protected. The specific feature to be protected ideally has little or no evidence of human activities. These features are not of the size nor do they contain a diversity of features or representative ecosystems which would justify their separate reservation as a national park. They would be of such scenic, scientific, educational and inspirational importance that they merit special designation and protection.

Management objectives of natural landmarks are to protect and preserve nationally significant natural features because of their special interest or unique characteritics and to the extent consistent with this, provide opportunities for

interpretation, education, research, and public appreciation.

These management units are shown on map 5 of this plan of management (following page 185).

## FIRE MANAGEMENT

The Director of National Parks and Wildlife is responsible under the Act for the care, control and management of Crowdy Bay National Park. Additionally, with respect to fire management, the Service as the management authority, is bound by various other Acts, viz:

* the provisions of the Bush Fires Act, 1949 relating to prevention and control of fires on land managed by public authorities;

* the provisions of the Environmental Planning and Assessment Act 1979 relating to environmental effects of management works and programmes.

## OBJECTIVES OF FIRE MANAGEMENT

The primary objective relating to fire management is to minimise the undesirable effects of fires on values within and ajoining the park. This implies the following specific objectives:

* to protect human life;

* to maintain important natural features, especially:

  . littoral rainforest remnants;

  . restricted, rare or endemic plant or animal communities;

* to maintain the catchment values of the park;

* to maintain the diversity of plant and animal communities;

* to protect Aboriginal and historic sites and other features of cultural significance, including the landscape;

* to protect capital works, recreation facilities and neighbouring land;

* to undertake research into the role of fire within Crowdy Bay National Park.

**VALUES TO BE PROTECTED IN FIRE MANAGEMENT**

Too little is known of the effect of fire on the park ecosystems to provide positive guidelines for the management of flora and fauna, so there is a need for basic and applied research into this field. However, some special values are known and need to be protected in the immediate

implementation of a basic fire management policy.

Biological Diversity: Biological diversity is an important natural resource value. The complex of species and age classes, and the associations of vegetation and fauna within the many environments of the park require protection. A basic objective is the preservation of a diversity of communities and age classes.

Animal Communities: There is a considerable diversity of animal communities in the park. At present, the Service's management approach is that by maintaining a mosaic of vegetation age classes and structures, as well as the diversity of plant species, faunal diversity will also be maintained. It is recognised however, that this may not be the case for individual species, especially those which are rare or endangered. Fire management may have to be carefully modified in the light of advances in ecological knowledge.

**FIRE MANAGEMENT PRACTICES**

Fire management of Crowdy Bay National Park recognises the following:

* fire is a major environmental factor in the park;
* much of the park flora has adapted, by a variety of survival mechanisms, to an environment which includes fire;

* Aboriginals of the area used fire to modify ecosystems;

* many fires of recent years have been lit to promote growth of fresh grass for illegally grazed cattle and to promote Christmas bell flowers for picking;

* communities most at risk of total destruction through fire are remnant littoral rainforest stands.

* To eliminate fire from the park would be unnatural, as would too frequent burning. With adequate research, fire regimes designed to ensure the perpetuation of particular ecosystems can be determined.

Increasingly, it is envisaged that fire management will be based on ecological requirements, tempered by the need to protect adjoining farms, forests and villages, and also the scenic and recreational amenity of the park itself.

14.1 High priority will be given in the plan to preparing a specific fire management plan. The fire management plan will include provisions for the control of wildfire and the intentional use of fire consistent with the ecological principles and overall park manangement objectives. The fire management plan will identify specific characteristics of natural communities, the most important factors contributing to

the local fire environment, and management practices to be implemented within the constraints of our limited knowledge of the effects of fire on natural ecosystems. Where impacts are known they will be specified.

The fire management plan will be the basis from which to inform other fire management and control organisations of fire management policies and practices within the park. The fire management plan will form the basis for the preparation of annual fire management works programmes and the action fire plan. The fire management plan will be based on and includes the following:

* Periodic prescribed burning will continue to be implemented along park boundaries, especially near the villages of Harrington and Dunbogan. Prescribed burning reduces the intensity of subsequent fires by the reduction of fuel. Prescribed burning in boundary areas will thus maximise protection to adjoining lands and villages against fire emanating from the park and, conversely, will maximise protection to the park from fire emanating outside the park.

* Because of the past history of extensive burning of the area now reserved as Crowdy Bay National Park, areas unburnt for some time are uncommon. An assessment of areas which can reasonably and desirably be retained unburnt will be undertaken and such areas will be managed as 'no-burn' areas. These

areas will include littoral rainforest remnants.

* It is not proposed that every fire be immediately suppressed. For instance if a fire is burning in a location acceptable to park management requirements, and presents no danger in terms of the Bush Fires Act, the fire may be let burn to defined limits and under supervision.

* Decisions to undertake fire suppression will be based on a thorough assessment of the following factors:

  - the state of the fire season;
  - current fire danger ratings;
  - available weather forecasts;
  - fuel and weather conditions;
  - assessed threats (e.g. distance to private land boundaries);
  - park management requirements.

If an initial attack is not mounted, a monitoring programme will be maintained. Limits based on a predetermined programme of defined boundaries and acceptable fire behaviour will be established, and only if the fire exceeds such limits or the weather detericrates with a suppression operation be undertaken.

* The following are areas where maximum suppression effort is required;

    * areas close to Harrington and Dunbogan;
    * areas close to private property;
    * areas close to Service facilities;
    * other areas where the protection of limited and outstanding values is required (e.g. littoral rainforest remnants).

* The following are sensitive areas where earthmoving equipment is not to be used;

    * littoral rainforest remnants;
    * Aboriginal sites.

These areas are usually of limited extent and only slight alterations to the construction of control lines and tracks will be necessary to avoid damage. Any disturbances which result from fire control operations are to be kept to a minimum. The fire management plan will include information on the occurrence of Aboriginal sites in the park.

The fire controller is responsible for ensuring that the skill of plant operators is utilised not only to construct fuel breaks efficiently, but to keep environmental disturbance to a minimum. The

construction of fuel breaks should take account of the necessity for rehabilitation after the fire. Thoughtful use of earthmoving equipment at the time can not only reduce cost of rehabilitation, but also make it much more successful.

Any large scale backburning or use of heavy machinery should be in consultation with and subject to the authorisation and direction of the District Officer-in-Charge.

* Picnic and rest areas are focal recreation centres of the park. In order to maintain an attractive recreational setting, and to maximise the resiliance of the surrounding vegetation to recreation pressures, prescribed burning will be excluded from the immediate surrounds of facility areas.

* The present fire management track system is developed from the early requirements for access for mining, grazing and recreation activities. Not all the present tracks have a significant fire protection function, and some have adverse effects on aesthetic, scientific and recreation values. Tracks will continue to be an essential component in fire protection, giving access for fire suppression and providing perimeter control lines for prescribed burning. However, the present value of all tracks will be reviewed in the preparation of the fire management plan to determine their purpose, use and maintenance requirements. Any tracks which no

longer serve a fire management function will be closed and rehabilitated.

* Fire places will be provided for public use. Firewood will be provided at fireplaces to remove any need to destroy vegetation by visitors seeking wood. All fires, including those not lit in fire places, will conform with the Bush Fires Act and regulations.

* The control and management of fire within the park will be responsibility of the Officer-in-Charge, Port Macquarie District. Where appropriate and authorised, he may delegate responsibilities for fire management activities in accordance with this plan to representatives of other fire management authorities (for example local councils' fire control officers, the regional forester and the captains of local bushfire brigades). It is recognised that in accordance with Section 41(F) of the Bush Fires Act responsibility for fire control, in accordance with the adopted plan, may be assumed by an emergency controller appointed by the Chief Co-ordinator of Bush Fires.

* The following research programme will be incorporated in the fire management plan:

    * compilation of an inventory of park resources relevant to the management of fire;

    * establishment of a monitoring programme for

all fires to assess the post-fire vegetation changes and the desirability of such changes;

* formulation of objectives for specific vegetation communities and/or fauna habitats;

* mapping of fire history of the park and environs and of all future occurrences of fire.

As research results related to fire behaviour become available there will be a continuing review of management practices, particularly protection, to ensure that they are consistent with long term objectives.

* The development of staff capabilities in fire management requires on-going training programmes. Such programmes will be outlined in the fire management plan.

* Interpretation of fire management in the park will be undertaken and will have the following specific objectives:

  * to develop an awareness by the public of the implications of fire on values be they natural, cultural, social or legal;

* to develop an awareness of public safety with respect to fire, and an awareness of fire management responsibilities.

* Close liaison will be maintained with other land use authorities and planning bodies in order to encourage compatible development adjacent to park boundaries to reduce the impact of unscheduled fire on both the park and adjacent lands and to co-ordinate prescribed burning and fire control within the national park with that carried out in the area generally.

The fire management plan will be regularly revised, and will be available for reference at the district office to individuals and organisations with an interest in fire management of Crowdy Bay National Park.

## FLORA AND FAUNA MANAGEMENT

The management of Crowdy Bay National Park will have as an aim:

* the maintenance of the abundance and diversity of plant and animal communities throughout the park.

As continuing research and surveys provide additional data on the status, distribution and habitat requirements of park flora and fauna, management practices will be modified to achieve this objective.

The following management practices and programmes will be undertaken.

## INVENTORY AND RESEARCH

14.2 There is a need for information on habitat requirements of park flora and fauna to enable more positive management of the resource. In view of the inadequacy of existing data on the status of flora and fauna within the park, a programme will be initiated during the term of this plan to extend the existing inventory of plant and animal communities. Priority will be given to preparing a vegetation map.

There is a need for the translation of scientific knowledge on flora and fauna into practical management guidelines for field officers. This is especially the case with endangered or rare flora and fauna which occur in the park.

## PERMITS FOR SCIENTIFIC COLLECTION OF PLANTS AND ANIMALS

14.3 The collection of flora and fauna is prohibited, except for scientific and educational purposes under licence from the Director.

## ENDANGERED FLORA AND FAUNA

14.4 Some endangered species occur within the park and surveys may reveal others. Disturbance of known habitats of these species by park visitors and management will be avoided. Research and management programmes will be carried out to assist the survival of these species and the ecosystems on which they depend. Habitat requirements of rare or endangered flora or fauna occurring within the park will be determined and if necessary a plan drawn up to ensure the survival of small populations.

## REMOVAL OF PLANTS AND ANIMALS FOR MANAGEMENT PURPOSES

14.5 If populations of any particular flora or fauna species increase to levels considered damaging to other components of the ecosystem, the populations of such species will be reduced.

The selective removal of plants will be necessary for the construction of facilities proposed in chapter two of this plan, and for the maintenance of existing facilities.

## REHABILITATION OF DEGRADED AREAS

The condition of areas damaged by mining, gravel extraction, uncontrolled vehicle use and other land

uses will be monitored. Vegetation propogated from local sources of seeds and cuttings will be planted, if necessary, to assist in rehabilitation.

## NON-NATIVE FLORA AND FAUNA

14.7 Non-native flora and fauna have an impact upon the natural condition of a national park. The following shall apply to the management of introduced plants and animals in Crowdy Bay National Park.

* The status of all exotic plants and animals within the park will be monitored.

* The control of non-native species shall be based upon methods which have the least effect on the park environment.

* The introduction of new species will be tightly controlled. Dogs, cats and other domestic animals are not allowed to be brought into the park except:

  - where a guide dog is taken into the park by a blind person;

  - where the consent of the Director has been obtained.

14.8 No other animals may be taken into the park except for

management purposes. Non-native species may be introduced to the national park for management purposes only under the following circumstances:

* for the purpose of control of other exotics, but only where the introduced species will have less impact on the park environment than the species to be controlled;

* where a plant species is required to achieve a management objective such as grassing of recreation areas, and only where the introduced species can be reasonably expected to not have a long term detrimental effect on the park environment.

Bitou bush has become widely established throughout the park and is considered a threat to native plant and animal communities. A programme of control will be initiated based in the first instance on the following:

14.9 The distribution of bitou bush in the park will be mapped and monitored.

14.10 The voluntary supervised experimental hand pulling of bitou bush will be encouraged.

14.11 Priority will be given to removal of bitou bush from Diamond Head and the coastal dunes behind Crowdy Beach, as these are areas of lowest infestation.

Trials of hand-gun chemical control are taking place on other north coast parks, and if successful this method of control will be introduced to Crowdy Bay National Park. Other control methods may also be used, if feasible and environmentally acceptable. Because of the magnitude of bitou bush invasion, it is probable that any long-term control will be a form of biological control. The Service will therefore investigate the practicability of initiating a biological control programme for bitou bush as part of an overall programme for the New South Wales north coast, in conjunction with other authorities and agencies.

14.12 The exotic pine trees planted in the park will be removed, after consultation with the Forestry Commission.

## INSECTS AND DISEASE

Insects are an important component of the park's fauna and are protected. It is recognised that outbreaks of insects and disease are part of the natural process so, while occurrences will be monitored, control will not be undertaken unless a lack of action endangers lands around the park or endangers other components of the park's ecosystems.

## GRAZING

Illegal grazing is a recurrent problem in the park. The past grazing and related fire practices have had very damaging effects on the conservation values of the park.

Cattle are a major cause of dune destabilisation and are believed to be one of the agents contributing to the spread of bitou bush.

14.13 Livestock grazing within the park will be prohibited at all times. Where stock are found in the park, impounding operations will proceed as soon as practicable. A pound will be established within the park, together with a suitable loading facility, in accordance with the National Parks and Wildlife Act.

## BEEKEEPING

There are no bee hives in Crowdy Bay National Park. As the park is long and elongated, past practice has been to encourage the siting of bee hives on adjoining private lands rather than on the park itself. In this way apiarists can utilise the park flora for honey production with minimal impact on natural and recreational values of the park. This practice will be maintained and no hives will be sited in the park.

## FISHING

Recreational and professional fishing will continue in the park subject to the provisions of the Fisheries and Oyster Farms Act, and to some provisions of this plan concerning vehicle access and the development of facilities.

SOILS

The unconsolidated sandy soils of the park rely largely on vegetation cover for their stability, which is easily disrupted by natural processes or man. Both wind and water erosion may occur when vegetation is removed.

The protection of soils will be in accordance with the following:

14.14 Potentially unstable areas in the park will be identified, mapped and monitored.

14.15 Locations proposed for new development works will be assessed as to their likely impact on soils. Where soil erosion is likely to arise from such works, the works will be amended or relocated to minimise soil erosion.

14.16 Design and maintenance standards for roads, management tracks and other works will include specific provisions to minimise erosion and to stabilise exposed areas following the completion of the work.

14.17 Control of soil erosion resulting from bush fire suppression will receive high priority, and will be part of suppression costs.

14.18 In areas which have been disturbed by past activities such as grazing, quarrying, old roads and former

construction sites, landscaping may be required before the ground surface is rehabilitated.

14.19 Monitoring of sand mined areas will be continued to provide the basis of a satisfactory rehabilitation programme.

14.20 Plantings in any rehabilitation programme will be restricted to native species only, except for the use of grass cover in facility areas.

14.21 Erosion control and rehabilitation measures will take account of other values which may be adversely affected by them.

14.22 Liaison will be maintained with the Soil Conservation Service in the planning and implementation of soil conservation works.

14.23 Rehabilitation costs will be included in the budget for all works proposals.

14.24 Roads, tracks, walking tracks and recreational use in general will be directed away from potentially unstable areas.

As beaches typically build up in fine weather and erode in storms, future development of facilities will be sited well behind the fore dunes. Beach access tracks will be carefully planned, constructed and maintained to protect the fore

dunes.

## ABORIGINAL SITES

Although many prehistoric sites within the park have been destroyed in the past by sand mining and other activities, some undisturbed sites remain. Those undisturbed sites have a high significance.

Guidelines for management of Aboriginal sites within the park are based on current but limited information as to their extent, distribution and relationship to environmental variables. Nevertheless, there are certain requirements of site management within a national park which differ from management of the sites on lands not reserved under the Act. The Service cannot protect all sites in New South Wales and one important strategy that it can employ is the preservation of sites within national parks. Accordingly, the objective of Aboriginal site management within Crowdy Bay National Park will be:

* the preservation of all Aboriginal sites.

Development projects and interpretation programmes related to Aboriginal sites will be subject to the Service's environmental impact assessment procedures and proposed works shown to have an impact on Aboriginal sites will be relocated or amended so that the feature will be protected.

To achieve the objective to protect all Aboriginal sites in Crowdy Bay National Park the following guidelines will be implemented:

14.25 To encourage research, to the extent that it increases information about site types and distribution within the park, and to establish cirteria for comparison between sites and areas.

14.26 All sites discovered by or brought to the attention of Service officers in the park will be recorded in the Service site register.

14.27 Field surveys for sites on probable emergency fire break routes and in a variety of ecological zones will be undertaken by qualified Service officers and researchers. Those areas most threatened by development works or other activities will be surveyed in detail as a priority.

14.28 In accordance with Service policy, Service officers will liaise with local aboriginal communities, when engaged on site investigation work or environmental impact assessment in the locality of the community.

14.29 Sites of scientific importance will be given priority for protection and preservation. Suitable sites not of scientific importance or Aboriginal significance

may be incorporated into interpretation programmes which relate the site to the general prehistory of the park.

14.30 Disturbance of sites by visitors is a major threat to their continued existence. Access to sites by park visitors will be controlled. Visitors will only be encouraged to visit those sites which are incorporated into interpretation programmes.

14.31 Protection of sites from disturbance by visitors will make use of fencing, erection of signs, prevention of vehicular access and prohibition of camping.

14.32 The one situation in which normal planning procedures cannot be followed in regard to disturbance of land within the park is emergency fire fighting. Procedures for minimising the impact on sites on this situation are set out in Section 14.5 above.

14.33 No sites of significance to Aborigines are currently known to occur within the park. Skeletal remains may be found in the future and no disturbance of such remains will be permitted, except under conditions worked out in consultation with the local Aboriginal community.

14.34 Information on the rate of erosion and site exposure at sites of scientific importance will be gathered

to assist in management decision making.

14.35 Salvage excavation will only be carried out if a site of scientific importance is damaged by natural or human agencies. A qualified archaeologist will carry out such work and full site recording will precede excavation.

14.36 Collection of artefacts will be carried out by experienced district staff when the material concerned is liable to disturbance by natural or human agencies. Where a site is classified as significant, regional staff will be contacted prior to collection. Collection will be systematic, the methods used will be recorded, the material will be labelled and stored either in the district or at The Australian Museum. Full site recording will precede collection.

14.37 Research into the prehistory of the park will not be permitted where it involves damage to sites and where alternative sites exist outside the park.

## WATER QUALITY MANAGEMENT

14.38 The Service will seek that waters be classified by Regulations made under the Clean Waters Act No. 78, 1970 as follows:

- Surface Water: Class S Specially Protected Waters
- Underground Water: Class U Underground Protected Waters
- Ocean: Class O Ocean Outfall Waters

These are the most protective classifications available.

The Service will ensure that no action it takes will impair the purity of waters within the park.

## MINING

Mineral sand mining commenced within the park area in 1959 immediately south of Diamond Head and has continued in various areas of the park up to 1982.

It was a condition of the reservation of the national park in 1972 that mining would be permitted on the leases then granted. Subsequently, by a decision of the State Government in 1978, sand mining operations in Crowdy Bay National Park then approved were to cease by the end of 1982. The Service co-operated with the sand mining company to ensure that minimum damage was caused to the natural environment and minimum disturbance and inconvenience was caused to visitors to the national park. A record will be compiled by the Service of the mining history of the park.

Mining, other than that already committed by Government decision will only be permitted in accordance with the provisions of Section 41 of the Act.

## EXTRACTION OF MATERIALS

The extraction of sand, clay, rock, gravel or any like substance will not be permitted within the park except for that required for scientific purposes and approved through the environmental impact assessment procedures or by the issue of a scientific licence. The gravel quarry located within the park on portion 166 Parish Camden Haven will continue to be available for Service use only. Should this quarry no longer be required for such use it will be closed and rehabilitated. Various gravel and sand quarries located on 8(b) lands will be closed and rehabilitated should these lands be acquired by the Service and added to the park.

No new gravel quarries will be opened and gravel required for use within the park other than that obtained from portion 166 will be obtained from quarries located outside the park, with careful consideration of the need to match imported gravel type to the park habitats to minimise localised enrichment by minerals or nutrients.

## DISPOSAL OF RUBBISH

In facility areas the Service will provide an adequate number of garbage receptacles for public use. The Service will continue to dispose of this rubbish outside the park. Throughout the remainder of the park visitors will be required to carry out their own rubbish.

## NON-CONFORMING USES

The National Parks and Wildlife Act provides for the maintenance of all easements or rights of way current at the time of establishment of Crowdy Bay National Park including those pertaining to public utilities. Likewise the Act provides for the granting of new easements and rights of way for public utilities.

The location, construction and maintenance of any such new uses will be subject to assessment of impact upon the park and for major proposals, preparation and exhibition of an environmental impact statement.

## 15. MANAGEMENT OF RECREATION OPPORTUNITIES

### OBJECTIVES FOR RECREATION MANAGEMENT

The management of recreation activities is concerned with the objectives set out in sections 72(4)(e) and (g) of the National Parks and Wildlife Act, 1974 viz:

> "the encouragement and regulation of the appropriate use, understanding and enjoyment of each national park .... by the public;" and
>
> "the appropriate use of each national park by any lessee, licensee or occupant of land therein;"

National parks are an important component in the supply of outdoor recreation opportunities within a society which devotes a substantial part of its considerable leisure time to recreation and tourism. This gives rise to one of the most important issues in national park management in New South Wales: the potential conflict between the Director's responsibility to provide for both outdoor recreation and the protection of natural and cultural features.

In contrast to management of most other land uses, the management of national parks aims at minimising the impact of use on natural and cultural features. Other land uses

are distinguished by an acceptance or encouragement of environmental modification. National parks provide for only a limited part of the range of uses in any region; not all of them. The nature conservation and/or recreation expectations of many members of the public are served more appropriately by other categories of reserved lands.

Therefore many recreation activities, particularly those requiring sophisticated facilities, are not appropriate uses of a national park due to their unacceptable impact on the park's natural and/or cultural features. In many cases, opportunities to pursue such activities are provided outside, but close to, the park.

As noted in the introduction to this draft plan, decisions about what constitutes appropriate use of a national park are most usefully based on defined levels of acceptable environmental and/or social impact having regard to internationally accepted criteria and policies as expressed in the ICUN definitions, Service policies and community expectations.

Within each park, the term 'appropriate use' describes a large number of different activities, each of which can take place in a variety of settings. A recreation opportunity setting is defined as:

> 'the combination of social, physical, biological and managerial conditions that give value to a place. Consequently the role of values is central

> in understanding recreation. Different values producing different tastes, interests, and preferences lead to diverse demands for recreation opportunities that array themselves along a continuum of range.' (Stankey and Clark 1979)

The task of national park management is to provide recreation settings consistent with the protection of the park's natural and cultural features.

Thus, in relation to Crowdy Bay National Park, recreational and educational opportunities for visitors will be provided, consistent with the Service's primary management objective directed to the protection of natural environments and Aboriginal and historic resources within the park.

The environmental values of the Crowdy Bay area require that it be considered and managed as something more than just another area of land along the New South Wales coastline.

The fragility of many of the environments within the park and the expectations of many of its users necessitate a redirection to low key, more tranquil forms of recreation both on the land and water. This contrasts sharply with the more disruptive types of use that have developed in recent years, particularly as a result of the high degree of vehicular access afforded by the opening of the temporary mining roads within the present park area.

For this reason, and the existence close at hand of alternative venues for a wide range of recreational activities, Service policy in relation to Crowdy Bay National Park will emphasise peaceful, land and water-based recreation and seek to discontinue or phase out more disruptive aspects of current access and use. This change from the existing situation will have an impact on the type and extent of vehicular access, the types of facilities provided and the type and extent of regulation of visitor activities. These are examined in the sections that follow.

The management of recreation in Crowdy Bay National Park recognises two broad patterns:

Coast orientated: camping, picnicking, and fishing activities related to the ocean beaches and head-lands within the park;

Lake orientated: camping, picnicking, fishing and boating activities related to Watson-Taylor Lake.

The features which attract visitors to Crowdy Bay National Park, the range of activities they pursue and the regional setting of the park were set out in the introduction to this draft plan. Almost all of the activities listed there can take place in a range of settings without causing an unacceptable impact: for example camping in the bush or at a campsite; walking through the bush or along a track; and

fishing from a beach accessible by road and from rocks and beaches remote from vehicular access. Furthermore, some users prefer to participate in the actitivites of their choice either by themselves or in small groups; others prefer to participate as part of a larger group or even a crowd. The activity, and both its physical and social settings, contribute to the recreational experience and satisfaction of park visitors.

However, the pattern of use is not solely the product of park management; the recreational use of the park is influenced by land use and management in adjacent areas, or developed before the park was declared. The most significant of these factors are presented below.

* There are many alternative attractions to those provided within Crowdy Bay National Park within this holiday region. The management of the park will aim to provide opportunities different to, but complementary to, those provided elsewhere in the region.

* The pattern of use, especially camping and recreational fishing which developed prior to the establishment of the park, was characterised by uncontrolled access to many beaches and headlands.

* The park is close to the holiday townships of Taree, Harrington, Crowdy Head, Dunbogan-Laurieton and Port Macquarie, all of which cater for a large number of visitors during the summer holidays.

Given this general approach to 'the encouragement and regulation of appropriate use' by the Service, it is proposed that the primary objective for the management of recreation within Crowdy Bay National Park will be:

* to provide a range of recreation opportunities from the spectrum of 'appropriate uses' of the park, consistent with the area's reservation as a national park.

The task of national park management is to provide recreation settings consistent with the protection of the parks' natural and cultural features.

To provide a basis for recreation management within national parks, the Service has adopted the Outdoor Recreation Opportunity Spectrum. This recreation spectrum is a model used to relate the characteristics of the landscape and management areas used for outdoor recreation and the behaviour of visitors to those areas. The model assumes that it is the goal of recreation managers to furnish 'opportunities'. These opportunities are comprised of the range of possible activities within the variety of possible settings which give rise to experiences for the visitor. Although it is these experiences which are the essential product of recreation, the land manager can do much in manipulating permissible activities and settings to affect the quantity and quality of these experiences.

There are three aspects of outdoor recreation settings: physical, social and management, and a series of criteria have been suggested for the classification of these settings.

## Physical Settings

The essential variables of the physical settings are remoteness, evidence of human interference and size.

### Remoteness

> The effort required to reach a place is a major determinant of both the activities likely to be pursued there and the sort of experience users will be seeking. 'Effort required' revolves around the presence or absence of vehicle access or the distance to be covered after vehicles have to be abandoned. For example, no vehicle access at all is permissible for recreation purposes in wilderness management areas, whilst facility areas are readily accessible by motor vehicle. Other categories of management unit provide intermediate degrees of vehicle access.

### Evidence of Humans

> Presence or absence of evidence of human interference with the landscape is another

major determinant of outdoor recreation settings, and tends to be related to remoteness. Such evidence includes the comparatively subtle visual influences of long-past logging activities or the presence of a few introduced plants and/or animals, through the more noticeable evidence of clearing to the presence of substantial structures and other forms of development.

Size

The significance of the size criteria is its contribution towards the senses of isolation from civilization and the civilized (other than those of one's choosing), and the sense of self-reliance which comes with effort to reach a place.

Social Settings

The essential variables in the social setting of outdoor recreation places is the visitor's freedom of choice in the type, number and duration of contacts he has with people other than those with whom he chose to arrive. The variations are from solitude or contact only with other members of one's party, through brief contact with a small number of others, to unavoidable and protracted contact with large groups. The progression also

tends to vary with the size and complexity of the groups visiting a type of setting. For example, whilst undeveloped settings tend to be visited by small groups of friends and/or relations of a similar age, developed settings can be visited by very large groups comprising several families and friends from several generations.

Managerial Settings

Management can be seen as a special kind of 'evidence of humans'. The major objective of management intervention is to regulate the behaviour of visitors. As one progresses from the undeveloped end of the spectrum towards the developed end, this regulation becomes increasingly dependent on barriers and other forms of on-site regulation, and use of off-site regulation, such as permits, the provision of increasingly specialised and sophisticated facilities and perhaps, with the permanent presence of management or service personnel.

The manager's major tool in adjusting recreation settings is the provision (or non-provision) of facilities and services of varying capacities and degrees of sophistication. Facilities include roads, walking and bridle tracks, picnic areas, toilets, camping areas etc; and services include interpretation programmes, licensed outdoor recreation operations, etc.

Since the acceptability of the environmental and social impact of any use is the major criterion for assessing the 'appropriateness' of recreational use a further objective of the plan of management will be:

* to assess the capacity of predetermined localities within the park to provide recreation opportunities sought by users or potential users, without these opportunities having an unacceptable environmental or social impact.

In many cases the Service lacks both adequately detailed information about the activities, attitudes, expectations and rewards of visitors and the necessary information or criteria for making decisions about site capacity. The Service will, therefore, continue to collect information about the expectations, behaviour and experiences of visitors to the park and the environmental impacts of various facilities and services.

These objectives will be met by:

* provision of access by vehicle and by foot to a variety of coastal features;

* provision of day use facilities catering for appropriate outdoor recreational use; and

* provision of a range of accommodation facilities.

The recreation opportunities provided in the park will be determined by the level of impact on the resource rather than the level of public demand.

The Service will provide facilities of varying types and, where necessary, certain services to implement these objectives. In Crowdy Bay this involves providing the following facilities:

* access (roads, car parking areas, walking tracks);

* day use facilities (tables, toilets, fire places etc); and

* overnight accommodation (caravan and trailer, camping areas, pack camping sites);

and the following services:

* interpretation programmes.

These facilities and services have been combined in Crowdy Bay National Park to provide recreation opportunities varying from the bush settings of the majority of the park, where no facilities other than walking tracks have been provided, to the day use and rest areas of Diamond Head, and Indian Head, where road access, picnic, barbecue and camping facilities are provided. Some extension of this range of opportunities

at Watson Taylors Lake is envisaged in this plan.

At present all facilities within the park are provided and operated directly by the Service. There are no leases or licences currently operating within the park.

## ADDITIONAL OBJECTIVES OF MANAGEMENT CONCERNING OUTDOOR RECREATION

In providing suitable visitor facilities for different activities in appropriate parts of the park, the following objectives are proposed:

* to encourage enjoyment and appropriate use of the park;

* to ensure that opportunities to use the facilities provided are made available on an equitable basis;

* to maximise the functional efficiency of facilities provided;

* to ensure consistency of the provision and use of facilities with the objectives of management of the park;

* to ensure that facilities are primarily used for their intended purpose and that incidental uses do not compromise other park values or their use by other park visitors;

* to provide facilities which complement those in the adjoining coastal villages, and region generally, and other coastal national parks on the New South Wales north coast.

## THE PROVISION OF RECREATION OPPORTUNITIES

Effective implementation of these objectives and decisions on priorities will require information on the issues discussed above.

15.1 The Service will study the behaviour, expectations and experiences of park visitors together with regional recreation characteristics. Such studies will also involve the Service in documenting the criteria on which decisions about the capacity of specific areas of Crowdy Bay National Park are to be based.

The Service will continue to assess both annual and peak visitation to Crowdy Bay National Park.

The National Parks and Wildlife Service will establish and/or maintain visitor facilities at Diamond Head and Indian Head Rest Areas, Kylies Walk-in Camp Area, Dunbogan Beach, Watson Taylors Lake and Crowdy Beach.

Visitor facilities provided will be one of three types:

Picnic Area: limited to day use with provision for vehicle access, car parking, water where available from natural sources, toilets, and facilities for picnicking and cooking.

Rest Area: day-use and limited duration camping, with provision for vehicle access, car parking, water where available from natural sources, toilets and facilities for cooking and picnicking.

Remote Camp Area: limited duration camping, foot or boat access only, toilets, facilities for cooking and picnicking.

All new developments and improvements will conform to standards outlined in National Parks and Wildlife Service codes and manuals and will be designed so as to be appropriate to the chosen national park recreation setting. All facilities will be located and designed to minimise their impact on park values and to blend in aesthetically with the landscape.

The provision and management of major visitor facilities at various localities throughout the park consistent with the objectives and procedures above will be as follows:

## VISITOR MANAGEMENT ON THE OCEAN COAST

As previously stated, the coastline is one of two prime recreation areas within Crowdy Bay National Park. The beaches and headlands in this area are all features of high recreational value and the opportunities for recreational activities offered in the national park will complement those of the surrounding lands.

### Existing Facilities

Diamond Head Rest Area was constructed by the Service in 1978 in response to traditional recreational use of the area and to rehabilitate damage by past unregulated usage.

The facility accommodates up to 120 camps at peak times and includes pit toilets, barbeques, rubbish bins and brochure dispensers.

The following management programme will operate in the Diamond Head Rest Area:

15.2 Diamond Head Rest Area will be maintained for day-use and short-term camping. Camping will be restricted to the developed rest area and prohibited on foredunes of Dunbogan Beach;

15.3 a walk-in camping facility will be provided as an adjunct to the main facility area;

15.4 a tree planting programme will be implemented to enhance the aesthetics and amenity of the rest area.

Indian Head Rest Area was constructed by the Service in 1978 in response to traditional recreational use of the area and to rehabilitate damage caused by past unregulated usage.

The facility provides currently accommodation for up to 10 camps at peak times and facilities include pit toilets, barbeques and rubbish bins.

There is adequate area to enlarge and upgrade facilities significantly should demand warrant. The following management programme will operate in the Indian Head Rest Area:

15.5 Indian Head Rest Area will be maintained, with a capacity increased to 25 sites.

15.6 a tree planting programme will be implemented to enhance the aesthetics and amenity of the rest area.

A slab hut once owned by author Kylie Tennant is situated some 300 metres from Indian Head Rest Area and about 500 metres via a shaded forest walk from Crowdy Beach. Kylies hut was restored by the Service in 1980 and walk-in camping facilities provided to include a pit toilet, barbeques and rubbish bin. This facility will be maintained as a walk-in camping and picnic

area.

Kylies Parking Area was constructed by the Service at the northern end of Crowdy Beach to facilitate recreational use of the beach, to provide car parking, vehicular and pedestrian beach access and to rehabilitate damage caused by past unregulated usage. No picnic or camping facilities have been provided.

The old mining camp site at Kylies Parking Area, recently vacated by the mining company, provides an ideal rest area site. Redevelopment of Kylies Parking Area as a rest area will provide for both picnicking and short term camping associated with the northern end of Crowdy Beach. It will also relieve peak camping loads on Diamond Head Rest Area and Indian Head Rest Area.

15.7 Kylies Parking Area will be redeveloped to provide a rest area facility for short term camping and day use.

Mermaid and Fig Tree Parking Areas are located on the temporary mining road behind Crowdy Beach. Mermaid Parking Area is two kilometres south of Kylies Parking Area and Fig Tree Parking Area is five kilometres south of Kylies Parking Area.

These parking areas were constructed by the Service in 1978 to provide parking and pedestrian access for beach users. No picnic or camping facilities have been

provided.

15.8 In accordance with section 15.16 of this plan, the temporary mining road running behind the beach from Kylies Parking Area to the Coralville-Crowdy Head mining road will be removed. Mermaid and Fig Tree Parking Areas will be removed and rehabilitated at the same time.

Dunbogan Beach

Three picnic areas are located on Dunbogan Beach north of Diamond Head. These picnic areas were constructed by the Service in 1981 to provide facilities and access for visitors and rehabilitate environmental damage from past unregulated usage.

15.9 The Dunbogan Beach picnic areas will be maintained and if necessary, upgraded by the Service.

**VISITOR MANAGEMENT ON THE FORESHORES OF WATSON TAYLOR LAKE**

Crowdy Bay National Park has an extensive frontage to the southern and eastern foreshores of Watson Taylors Lake. Watson-Taylors Lake remains in an essentially natural condition and the recreation setting offered on and beside the lake is characterised by a sense of spaceousness, remoteness and absence of human interference. The Service in

its management of the recreation opportunities within the national park adjacent to Watson-Taylors Lake will aim not to modify this setting.

There are no existing formal facility areas on the lake foreshores of the park. Recreation opportunities to be provided on the lake foreshores within the park will be limited to:

15.10 A location on Humbug Point on Watson-Taylor Lake been identified for development as a rest area. The camping capacity of the rest area will be limited to 25 sites. Vehicle access will be provided but no provision will be made for boat launching facilities but small craft (canoes, small skiffs and rowing boats) can be launched by hand;

15.11 Several locations on the foreshore of the lake which are suitable for pack camping. Access to these sites will be by boat or foot only and no facilities will be provided.

**PUBLIC ROADS**

Decisions on the provision of vehicle access within a national park have more lasting and far reaching effects than any other decision of park management, as use patterns may develop which are difficult to alter and which promote additional demands and pressures on park resources which may be inconsistent with the

national park designation and with objectives of management of the park.

The provision of access within Crowdy Bay National Park must be carefully considered in relation to the resources of the park itself and the region as a whole. These are:

* the impact of road construction on the park's natural and cultural resources;

* the appropriateness of vehicle access to provide the desired activity setting;

* the existence or otherwise of alternative localities both within and outside the park catering for that activity;

* the impact of road construction on other use patterns.

The reservation of Crowdy Bay National Park ensures that the coastline encompassed within the park will be managed to preserve its natural character and to ensure its long term availability for compatible outdoor recreation. Recreational opportunities provided in Crowdy Bay National Park will complement those provided in nearby towns and villages and along the adjoining coastline.

The access plan detailed in this section provides for:

. The maintenance of through access from Coralville to Dunbogan;

. A review of the future of the Coralville - Crowdy Head temporary mining road;

. The maintenance of roads to Service facility areas;

. The construction of roads to certain proposed new facility areas.

The access plan detailed in this section takes cognisance of the following relevant findings of the 1979 Off-Road Vehicles Inquiry in New South Wales:

> 'It is also important to restrict or prohibit vehicle access for recreational purposes into areas with high nature conservation or wilderness value, fragile or valuable environments such as stabilising and vegetated sand dunes and areas of historical, geological or archaeological significance.'

> 'Local Councils, Pastures Protection Boards and other public authorities should fully utilise their statutory powers in relation to the use of vehicles on public reserves, beaches and other foreshores. However due consideration should be given to the needs of professional and amateur

fishermen.'

In recognition of the reservation of Crowdy Bay National Park as a national park and through this action a recognition by the community generally of the high nature conservation, scenic and outdoor recreational values of the park, movement of vehicles by the public within the park will be restricted to:

* registered motor vehicles;

* roads defined in the vehicular access system of this plan;

* beaches in accordance with the provisions of this plan.

15.12 No vehicles of whatever kind will be permitted to travel off the public vehicular access system or as otherwise provided for in this plan, except for emergency purposes.

The Coralville to Dunbogan Road

The Coralville to Dunbogan road is a public road excluded from the national park reservation. It is maintained by Greater Taree City Council from Coralville to Diamond Head, and by Hastings Municipal Council from Diamond Head to Dunbogan.

The Coralville to Crowdy Head Road

A temporary mining road traverses both national park and private land between Coralville and Crowdy Head. Design, construction and maintenance standards of this road reflect this mining purpose. Maintenance of the road is the responsibility of the mining company until determination of the mining purposes lease upon which it is located.

The Coralville - Crowdy Head road is an unreserved road, and is part of either the national park or private land through which it passes.

Vehicle-based recreational use of Crowdy Bay National Park is focussed largely in the northern end of the park, on Dunbogan Beach, Diamond Head and the northern end of Crowdy Beach. Access to these areas is via the Coralville-Dunbogan road.

The Service believes this pattern of recreational use is the desirable long term pattern for the park, and sees the capital investment required to upgrade the temporary Coralville-Crowdy Head mining road as part of the park access as undesirable, and unnecessary for either public recreation or management within Crowdy Bay National Park.

However, this road is of some value to the local community as an alternative route to Crowdy Head and to Harrington, particularly during periods of flood, and the Service

proposes to continue to make that section of road within the national park available as an alternative route to Crowdy Head and Harrington.

The longer term future of the road will be decided as a response to changes in the local community, particularly those of Crowdy Head and Harrington. Such developments may give rise to a transfer of responsibility of the road to some authority other than the National Parks and Wildlife Service when the company ceases mining upon determination of the mining purposes leases.

15.13 The Service will participate in this development of any relevant local environment plan which in due course will review the future development of these villages and hence the road on the basis of the following:

* the present character of the villages and their relationship to the park as part of the tourist/ holiday pattern;

* the development of recreation opportunities on the park adjacent to the villages;

* the possible development of Harrington Beach with day use facilities to accommodate recreational use associated with Harrington and Crowdy Head;

* the future development of the tourist industry on the coastline of the Manning and Hastings river

areas; and

* consideration of the transfer of responsibility for maintaining the road to some other authority.

It is recognised, however, that the further development of Crowdy Head and Harrington may be of such a nature that the upgrading of the Coralville Road and its transfer to another authority is not warranted. The decision concerning the longer term future of the road will be made consistent with the conclusions arising out of such planning action.

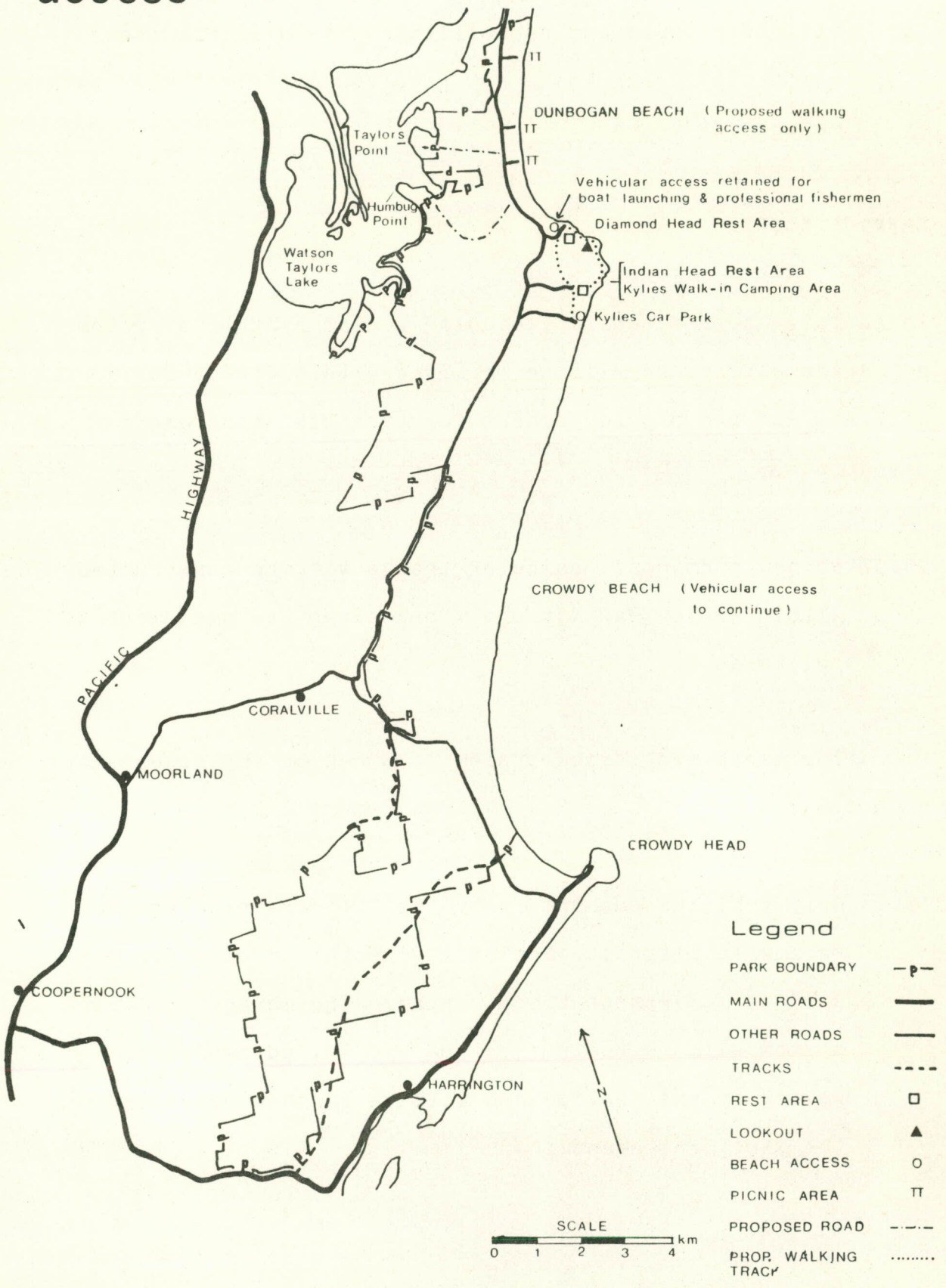
Other Roads

The Coralville-Dunbogan road provides both through access and access within the park.

15.14 Spur roads to Diamond Head Rest Area, Indian Head Rest Area, Kylie's Car Park and the Dunbogan beach picnic areas will continue to be maintained by the Service. Spur roads will also be constructed by the Service to proposed facility areas outlined in sections 15.10 and 15.11.

The public road system within the park is shown on the access map (map 4). There will be no additional roads constructed in the park without amendment to this plan.

# CROWDY BAY NATIONAL PARK
## plan of management (Map 4)
## access



15.15 Roads within the park, other than those shown on the access map, will be closed and revegetated.

15.16 The temporary mining road running southwards from Kylie's Car Park, immediately behind the fore dunes, will be removed and rehabilitated, as will all other temporary mining roads not required for visitor or park management access.

**SERVICE ACCESS**

In addition to the public vehicular access system, a system of management tracks will be provided within Crowdy Bay National Park to provide access for essential management operations.

15.17 No new permanent vehicular tracks will be constructed within Crowdy Bay National Park except by amendment to this plan.

The management track system is shown on the access map (map 4).

15.18 Only vehicles authorised by the Officer-in-Charge Port Macquarie District, Regional Director or Director may use the management track system. The management track system will be the subject of a detailed management review by the Service and will be further specified in the fire management plan.

## BEACH VEHICLE ACCESS

As outlined in chapter six of this plan, responsibility for management of vehicles on the intertidal zone of Crowdy and Dunbogan beaches rests with the Crown Land Office. Responsibility for management of access across the national park onto each beach rests with the Service. The Service has provided a single lane vehicular entry to Dunbogan Beach at Diamond Head Rest Area, and a single lane entry to Crowdy Beach at Kylies Car Park. All other off-road vehicle tracks crossing coastal dunes within the park have been closed and rehabilitated by the Service.

Access to Dunbogan Beach, north of the park boundary, is controlled jointly by the Crown Lands Office and Hastings Municipal Council. Several access points are utilised by recreational vehicles.

Access to Crowdy Beach, south of the park boundary, is controlled jointly by the Crown Lands Office and Greater Taree City Council. Several access points are utilised by recreational vehicles.

Desirably, recreational use of vehicles on Dunbogan and Crowdy beaches should be co-ordinated between the Service, Crown Lands Office and the relevant Council.

The Service believes it is in the community interest to have at least some beaches in the region with a natural setting free of vehicles, so that both visitors and

residents may relax in peace and quiet.

15.19 To this end, the Service will put a proposal to the Crown Lands Office and Hastings Municipal Council that Dunbogan Beach be managed as a vehicle-free beach. The Service will continue to maintain Blackbutt, Geebung and Cheese Tree Picnic Areas, and Diamond Head Rest Area, for recreational use of Dunbogan Beach associated with the park.

15.20 The Service will also continue to provide access to Dunbogan Beach for the use only of professional fishermen carrying out traditional ocean beach netting during the autumn-winter months, and for the launching of small boats off the beach by recreational fishermen.

In contrast to the extensive road access and facilities provided behind Dunbogan Beach, access and facilities are provided only at the southern and northern ends of Crowdy Beach. Access and facilities are provided at the southern end (outside the park) by Greater Taree City Council and at the northern end (within the park) by the Service.

15.21 The Service will seek to manage access by recreational vehicles to Crowdy Beach in a co-ordinated approach with the Crown Lands Office and Greater Taree City Council. To this end the Service will put a proposal to these authorities that the use of recreational vehicles on Crowdy beach continue, subject to a regular review of

the impact of such use on other beach users, and the physical beach environment.

15.22 The Service will seek the reservation and addition to Crowdy Bay National Park of those sections of Crowdy and Dunbogan Beaches between mean high water and low water which adjoin the park, to provide for complimentary management of recreational use of the beach both above and below mean high water mark.

**AIRCRAFT:** The Service has no control over the use of airspace over national parks but has full control over the landing of aircraft in the park. No private or commercial aircraft, including ultra-light aircraft, will be permitted to land at any location in the park, except in emergencies or as approved by the Officer-in-Charge Port Macquarie District, the Regional Director or Director.

**WALKING TRACKS**

The walking track system includes walking tracks, lookouts, signs and other ancillary furniture. It is the primary means both of dispersing visitors to features of interest outside the developed areas and away from roads, and of providing opportunities for those visitors who seek satisfaction in self-reliant forms of recreation. The walking track system is also an extension of the access provided by the public use roads, since tracks run from several car parks to features of interest such as beaches and headlands.

One major addition to the walking track system is proposed in this draft plan.

15.23 A graded walking circuit track will be constructed from Diamond Head Rest Area to Indian Head Rest Area via Diamond Head Trig. This track will provide access to the various rock fishing platforms for fishermen, and will be signposted as an interpretive walk. An inland return loop will connect Indian Head Rest Area with Diamond Head Rest Area.

15.24 It is proposed that there be further development and maintenance of the walking track system in the park where justified by existing or demonstrated potential use. Such tracks will be constructed, marked or maintained in a way which is consistent with the objectives of management.

## THE MANAGEMENT OF RECREATION ACTIVITIES

Some specific controls over various activities in particular parts of the park are proposed:

### Camping

Camping within the national park is subject to the following conditions:

* a maximum stay of six weeks at rest areas within the park is permitted. This condition of camping will be periodically reviewed and will be reduced if levels of use increase during peak times such as school vacations;

* walk-in camping areas will be provided at Kylies Hut and Diamond Head;

* pack camping will be permitted throughout the park.

Cooking and Camp Fires

The lighting of cooking and camp fires will be subject to the following conditions:

* the lighting or use of any fire in the park is subject to the Bushires Act, 1949 and any additional restrictions which may be imposed by the Director at any time;

* subject to any total fire ban, the use of portable gas, liquid or solid fuel stoves will be permitted;

* no fire may be lit or used on any roadside or at any picnic, rest area or walk-in camping area except in a fireplace provided by the Service;

* the lighting or use of fires may be prohibited in any area of environmental disturbance or at

any rehabilitation site.

Horseriding

Horseriding will be permitted in the park on the public road and management track system and beaches. Horseriding will not be permitted off roads, tracks or beaches.

15.25 The pattern of horseriding activity in the park will be periodically reviewed to assess the impact or horseriding on the natural features of the park and on the experience of other park users. Where these impacts are considered unacceptable, restrictions will be placed on the size and number of horseriding parties or areas of the park will be closed to horseriding.

Hang Gliding

Hang gliding is a permissible activity in the park, subject to prior authorisation from the District Officer-in-Charge and subject to any conditions specified by him.

User Regulation

The provisions of the National Parks and Wildlife Act, 1974 and by-laws apply to activities undertaken in the park at all times and nothing in the adopted plan of management shall be taken as authorising any activity or operation unless it is consistent with the Act and by-laws.

For the purposes of the Act and regulations, it is proposed that any visitor may undertake the following activities without the need for any permit or other authority: camping, bushwalking, recreational fishing, canoeing, boating, horseriding, car touring and other activities of a similar nature. Specific prior approval will be required for hang gliding.

All or part of the park may be temporarily closed to all or some activities during such contingencies as severe fire weather conditions.

## 16. ENVIRONMENTAL EDUCATION

The Director has a statutory responsibility for education with respect to lands under his control, wildlife and Aboriginal relics. The Service can only carry out its functions in the conservation of the State's natural, historic and prehistoric heritage and the encouragement of appropriate use of national parks if it has the support of an environmentally aware public. The Service must, therefore, actively seek to foster environmental awarenewss within the community at large.

The Service accepts the definition of environmental education given by the IUCN, which is:

> 'Environmental education is the process of recognising values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter-relatedness among man, his culture and his biophysical surroundings. Environmental education also entails practice in decision-making and self-formulating of a code of behaviour about issues concerning environmental quality.'

The Service also accepts a series of goals, objectives and guiding principles for environmental education which were adopted at the Intergovernmental Conference on Environmental Education held in the USSR in 1977 and attended by delegates from 66 nations.

These goals were:

* to foster clear awareness of, and concern about, the economic, social, political and ecological interdependence in urban and rural areas;

* to provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment; and

* to create new patterns of behaviour of individuals, groups and society as a whole towards the environment.

These are adopted as the objectives for environmental education in Crowdy Bay National Park, and will be pursued by implementing the general management practices outlined below.

16.1 Information on the natural and cultural features and recreation facilities, including maps of walking tracks, of the park will be collated and printed as leaflets.

16.2 Resource material for interpretation and environmental eduction will be collected and catalogued. This will include photogrpahic slides, film catalogues, writing and drawing materials, samples of natural and human items such as aboriginal artefacts and tools. This resource

will also include notes references and data on varicus subjects.

Environmental education will be part of a district-wide programme, and will be co-ordinated, in particular, with activities related to nature reserves and other national parks in the district.

This programme will be limited for the foreseeable future by the availability of staff to collect and catalogue the information and material proposed to be gathered. In due course, it is hoped that the collection will be stored in the district office and made available not only to Service staff but accredited educationists for teaching purposes. The resource material will also, in due course, be available for reference purposes to interested members of the public.

As an extension of the above commitment to environmental education, the Service will provide information for, and establish or maintain opportunities for communication with park users and other members of the public. Opportunities for public comment on important management programmes will be provided. Assessments of community responses to the management of the park provide, and will continue to provide, part of the basis for management.

These practices will be pursued in order to achieve the following objectives:

* to assist management in its awareness of the changing attitudes, expectations and needs of users; and

* to assist users in their awareness of the facilities and services provided by, and other practices of, management, and the reasons for changes in any of these.

## INTERPRETATION PROGRAMME

Interpretation and environmental education within Crowdy Bay National Park is directed to providing visitors with an appreciation of the resources of the park, and special natural values.

The main themes of interpretation within Crowdy Bay National Park will be:

* The Park and the visitor use opportunities it provides.

  Information concerning the resources of the park, features of interest, activities and other attractions will be prepared. The natural and cultural history and the present condition of the park will be explained, along with a summary of the broad range of opportunities available to visitors in the park.

* The Management of Crowdy Bay National Park

It is important that the public be aware of park management programmes and this interpretation theme will include subjects such as policy decisions of the Service and the reasons for them.

In addition, interpretation emphasis will be given to assisting managers in meeting the pressures of visitor use. This will be done by:

16.3 providing the public with basic information on access, facilities and opportunities;

16.4 establishing effective communication with field managers as much as possible;

16.5 providing the public with an understanding of the reasons underlying particular management practices.

The objectives of the interpretation and information programme will be achieved by the following means:

16.6 an informed staff maintaining personal contact with the public;

16.7 leaflets and other publications. Existing park brochures will be revised and updated where necessary;

16.8 exhibits and signs at features of interest;

16.9 construction and maintenance of interpretative walking tracks;

16.10 co-operation with agencies with an interest in the park;

16.11 publicity through local radio, television and newspaper media.

A regular review of the effectiveness of interpretation and information programmes will be undertaken.

In maintaining a basic public awareness of the activities within the park, special consideration will be given to the region surrounding the park. Emphasis will be given to:

16.12 providing regular reports to the local media of events occurring within the park;

16.13 maintaining contact with local education authorities, to promote the study of the park and its natural environments and its management;

16.14 maintaining contact with local community groups and organisations through lectures and talks and/or field days within the park.

Basic information services about the park will be distributed to the appropriate authorities and public contact centres.

## 17. SCIENTIFIC VALUES

The landforms, native plant and animal communities, and the cultural features of Crowdy Bay National Park are important for scientific as well as aesthetic, educational and recreational reasons. Section 72(4) of the Act states that a plan of management shall have regard for the following objectives:

* the conservation of wildlife;

* the preservation of each national park and the protection of its special features; and

* the preservation of any historic structure or object, or any relic or Aboriginal place.

Managers therefore need to know not only the present distribution of these communities and features, but also how the ecological relationships between them are changing through time. Many of the details of both the distributions and relationships have yet to be documented and/or interpreted for management purposes. A programme of management-oriented research is therefore an essential element in the maintenance of the scientific values of the park.

## SCIENTIFIC INVESTIGATION

Crowdy Bay National Park provides opportunities for research into various natural and cultural features and processes. The proposed research programme which follows complements the requirement to prepare resource material for environmental education and the management of fire, flora and fauna, Aboriginal sites and recreation opportunities outlined earlier in this plan.

Section 8(3)(c) of the Act provides that in the case of any national park the Director may:

> "undertake such scientific research as he considers necessary for or in connection with the preservation, protection, management and use thereof."

The proposed objectives of scientific research in Crowdy Bay National Park are:

* to provide an inventory (capable of up-dating) of the cultural and natural resources as a basis for allocation of priorities in managing the park;

* to provide information for the implementation of management practices; and

* to provide additional knowledge of the natural features and processes, cultural features and visitor-use of the park.

The research programme to achieve these objectives may be undertaken by the Director, or on his behalf by scientists authorised by permit. Encouragement will be given to the following scientific research projects.

17.1 A study of visitor numbers (including peak visitor numbers);

17.2 A systematic survey and documentation of Aboriginal and historic sites;

17.3 The documentation of the historic resources of the park, especially those aspects available from people's memories and that related to various disturbances;

17.4 A study of fire behaviour and ecology of plant and animal communities, especially the coastal heath ecosystems;

17.5 A study of the status, distribution and habitat requirements of park fauna and flora;

17.6 An inventory of park flora and fauna;

17.7 The preparation of a vegetation map;

17.8 The monitoring of bitou bush infestations;

17.9 The monitoring of bitou bush control;

17.10 An investigation of the feasibility of a biological control programme for bitou bush, in conjunction with an overall programme for the New South Wales coast;

17.11 The monitoring of potentially unstable areas;

17.12 The monitoring of erosional trends on park beaches;

17.13 The monitoring of sand mining rehabilitation.

The investigations identified here and in the other sections of the draft plan above all form part of the research programme for the park.

17.13 A comprehensive research programme for Crowdy Bay National park will be drawn up by the district officer-in-charge in conjunction with any person or authority with an interest in the management of, or undertaking research in, the park. This programme will be based on the requirements of this plan of management but may also include additional projects. The research programme will be used to:

* allocate priorities for research undertaken by the Service; and

* provide guidelines on preferred research projects for non-Service researches.

The research programme will be available for reference by any person or authority with an interest in the management of Crowdy Bay National Park or undertaking research in the park.

The impact of scientific research on the resources of the park will be kept under review. If an activity is considered to be having an unacceptable effect on the features being studied, or if one or more projects are affecting others, the research programme will be modified.

## MANAGEMENT OF SCIENTIFIC VALUES

The primary objective of management proposed in this draft plan to maintain the scientific values of the park is:

* to maintain the natural environmental processes, subject only to the modifications foreshadowed elsewhere in this draft plan.

The secondary objectives arising from this are:

* to conserve the existing range of wildlife habitats in the park; and

* to conserve the native plant and animal species in the park.

It is possible that more detailed knowledge provided by research into the changes taking place in the native plant communities, and associated animal communities, will demonstrate that some species and habitats will disappear through natural processes. In such cases the natural processes will be allowed to proceed, unless there are overriding scientific reasons (such as the rarity of a species or habitat) for management practices to maintain the plant and animal communities in some pre-determined condition. In the event of such circumstances, the Officer-in-Charge of Port Macquarie District will be responsible for preparing a special environmental management plan for inclusion in the Port Macquarie District annual blueprint.

The natural communities and cultural features of the park are not currently considered to be under threat, subject to both the implementation of the environmental control measures outlined in this draft plan and rigorous control of access other than that permitted by this plan. However, inventories and research prescribed elswhere in this draft plan may reveal natural communities and/or natural and cultural features in need of special management practices for their conservation.

17.15 Where inventory or research within the park reveals natural communities, natural features, or cultural features of scientific significance requiring special management for their conservation, the Officer-in-Charge of Port Macquarie District will prepare a special

environmental management plan for inclusion in the Port Macquarie District annual blueprint.

## 18. ENVIRONMENTAL PLANNING

For the purposes of determining objectives of management, Crowdy Bay National Park is deemed to fall into the classification 'national park' in the CNPPA Categories, Objectives and Criteria for Protected Areas (Chapter 1 "The National Park Concept").

This system of classification emphasises that the management of national parks can be complemented by other conservation management categories, which taken together, 'can provide for many human and environmental needs yet amplify the amount of land maintained in a natural or semi-natural state'.

Accordingly, Crowdy Bay National Park is one element only in the regional pattern of natural and semi-natural lands which are important for nature conservation and which includes other national parks, nature reserves, state forests, state recreation areas and reserved or vacant Crown lands.

Each of the lands reserved as national park or dedicated as nature reserves in the Crowdy Bay area will in due course be classified according to the CNPPA classification and plans of management prepared. The Service will also encourage other land management authorities to recognise nature conservation values and objectives on lands under their control and incorporate these in relevant plans of management.

This plan of management for Crowdy Bay National Park will, therefore, comprise one part of the documentation of a comprehensive regional pattern of protected areas based on the CNPPA Categories, Objectives and Criteria for Protected Areas.

Crowdy Bay National Park is located within the local government areas of Greater Taree City Council and Hastings Municipal Council and these local government areas are subject to planning schemes.

The following landscape and land use features are of importance in the context of planning Crowdy Bay National Park and its immediate surrounding district:

* the high landscape values of the coastline between Crowdy Head and Dunbogan;

* the high landscape values of Watson Taylors Lake and the Brother Mountains;

* the character of villages adjacent to the national park with a predominantly recreation - holiday use; and

* the importance of tourism to the local economy.

The high landscape value of Crowdy Bay National Park and the adjacent forested areas has been recognised by their

inclusion on the register of the national estate.

In addition, the Coastal Lands Protection Scheme identified various parcels of land for acquisition or strict planning control to protect the coastal scenery and to provide public access to the coastline for recreation purposes. Many of these lands identified for acquisition have been acquired.

On the other hand, substantial pressures do exist for the extension of the village areas adjacent to the park and increases in recreation use patterns which could affect the scenic values of the area.

To provide for the complementary management of the national park, adjoining coastal villages and surrounding lands the Service will comment on Local Environmental Studies and Plans prepared by Greater Taree City Council and Hastings Municipal Council, drawing Councils' attention to the following:

* the status of Crowdy Bay National Park as an important land-use classification;

* the high landscape values of the coastline between Crowdy Head and Camden Head;

* the high landscape values of Watson Taylors Lake and the Brother Mountains;

* the need to protect other lands in the vicinity of the national park which have high landscape conservation value;

* the need for complementary planning of the national park and adjoining coastal villages;

* the need for complementary planning of the use of recreational vehicles on beaches.

## 19. LIAISON WITH OTHER ORGANISATIONS

In dealing with other organisations, the Service seeks both to fulfill the requirements of the National Parks and Wildlife Act, 1974, and to facilitate the legitimate operations of other organisations within the park. Emphasis is placed on co-operation and negotiation, with a view to establishing and maintaining consistency between the operations of other organisations within Crowdy Bay National Park and the management objectives and practices of the park.

This will be in accordance with the following objectives:

* to maintain active liaison with all other organisations which operate within the park;

* to maintain active liaison with other organisations or individuals who are responsible for the management of lands adjoining the park;

* to facilitate the legitimate operations of other organisations within the park, consistent with this plan of management;

* to minimise any adverse effects on national park values which may result from the operations of other organisations;

* to ensure that all facilities, works and operations undertaken by other authorities are consistent with the Act and the objectives of management of the park;

* to encourage the removal from the park, of such structures, facilities and other materials which are the responsibility of other authorities and which adversely affect the historical and cultural values of the park;

* to ensure the appropriate rehabilitation of any disturbed sites.

Wherever possible, the Service will undertake co-operative management programmes which are aimed at protecting both the park and the interests of neighbours and other organisations.

Soil Conservation Service of New South Wales

The Soil Conservation Service maintains an active involvement in rehabilitation programmes within the park. The main functions of the Soil Conservation Service are to advise on programmes of soil erosion control and restoration, particularly in areas damaged by off-road-vehicles and sand mining.

It is proposed that long term rehabilitation programmes will be continued within Crowdy Bay

National Park. In pursuing these rehabilitation programmes, the Service will be actively seeking the continued involvement of the Soil Conservation Service.

Pastures Protection Board

The Service maintains liaison with the Gloucester and Port Macquarie Pastures Protection Boards in their role of administering the control of noxious animals. The Service's objectives are consistent with those of the pasture protection boards in relation to the removal of introduced species from the park. Park-wide strategies to control introduced species will be documented and implemented in liaison with the pasture protection boards.

Forestry Commission of New South Wales

Close liaison is maintained with the Forestry Commission cocnerning co-ordination of prescribed burning, fire control and fire detection on the park and the adjacent Johns River State Forest. Complementary outdoor recreation planning and the provision of facilities between the Service and the Commission will be promoted on the park and the state forest.

Sub-regional Tourist Associations

Liaison will be maintained with sub-regional tourist associations (The Manning-Forster Tourist Association) and other groups interested in promoting the features and facilities within Crowdy Bay National Park. The aims of the liaison will be:

* to prepare tourist promotional campaigns that are consistent with park management objectives;

* to assist visitors within the park by providing information about features, facilities, activities and management programmes to the tourist association.

In addition the following organisations have responsibilities within the external boundaries of the park:

| | |
|---|---|
| New South Wales State Fisheries | Encouragement and regulation of recreational and commercial fishing within the park. |
| New South Wales Department of Health | Supervision of public health standards. |

| | |
|---|---|
| State Pollution Control Commission | Classification of streams within the park and control of pollution. |
| Department of Motor Transport | Licensing of all forms of public transport. |
| Local Government Councils | Hastings Municipal Council and Greater Taree City Council have the responsibility for the Health Act within the park. |
| Bush Fire Prevention Association | Fire prevention in the region generally. |
| Department of Mineral Resources | Sand mining rehabilitation. |
| Maritime Services Board | Boating safety. Liaison with the Maritime Services Board will assist in planning for the use of water craft. |
| State Emergency Services | Assistance within the park during any major emergency. |

In addition there are private organisations which maintain an active interest in the park. These include progress associations, chambers of commerce, four-wheel-drive clubs, conservation societies, bushwalking clubs, historical societies, youth groups and many others.

## 20. PLAN IMPLEMENTATION

As a guide to the orderly application of the provisions of this plan the foregoing management proposals have been summarised and ranked in Table 1.

This ranking indicates only the relative priority of projects. The implementation of this plan of management will be based on the Service's annual blueprinting procedures, which summarise the resources to be managed and assign priorities to the tasks identified as necessary throughout any Service district (e.g. Port Macquarie District). The priority of work will be determined during the preparation of these blueprints and will be subject to the availability of funding and manpower, and any special requirements of the Minister and/or Director. District blueprints are Service working documents, but non-confidential sections may be available for inspection by members of the general public.

In accordance with Section 81(4) of the National Parks and Wildlife Act, 1974, and notwithstanding anything in any other Act, no operations can be undertaken within Crowdy Bay National Park except in accordance with this plan.

The scheme of operations proposed in the plan constitutes the optimum development for Crowdy Bay National Park considered to be consistent with its reservation and management as a national park. No term is therefore

proposed for this plan of management. If, after adequate investigation, operations not included in the plan are found to be justified, either for the purposes of conserving the park's resources or for their use, this plan will be amended in accordance with section 75(8)(9) of the Act.

An annual review of the district blueprint will be prepared and will compare performance for the year with the objectives and prescriptions laid down in this statutory plan of management.

Alien Tenures, Leases and Licences

There are currently no leases or licences operating within Crowdy Bay National Park, however parts of the park are subject to leases under the Mining Act.

Many of the facilities and services existing or proposed in this plan will be provided by the National Parks and Wildlife Service. These will, in general, be small scale and hence not commercially viable. In some circumstances, however the development and operation of a proposed facility or service may be offered by lease or licence under the Act to private enterprise.

The National Parks and Wildlife Act, 1974 provides for the granting of easements and rights of way for public utilities. The location, construction and maintenance including operation of any such new uses will be subject to an

assessment of impact upon the park and for major proposals, preparation and exhibition of an environmental impact statement.

19.1 A schedule of all leases, licences and superimposed tenures within the park will be maintained at the Service's District Office.

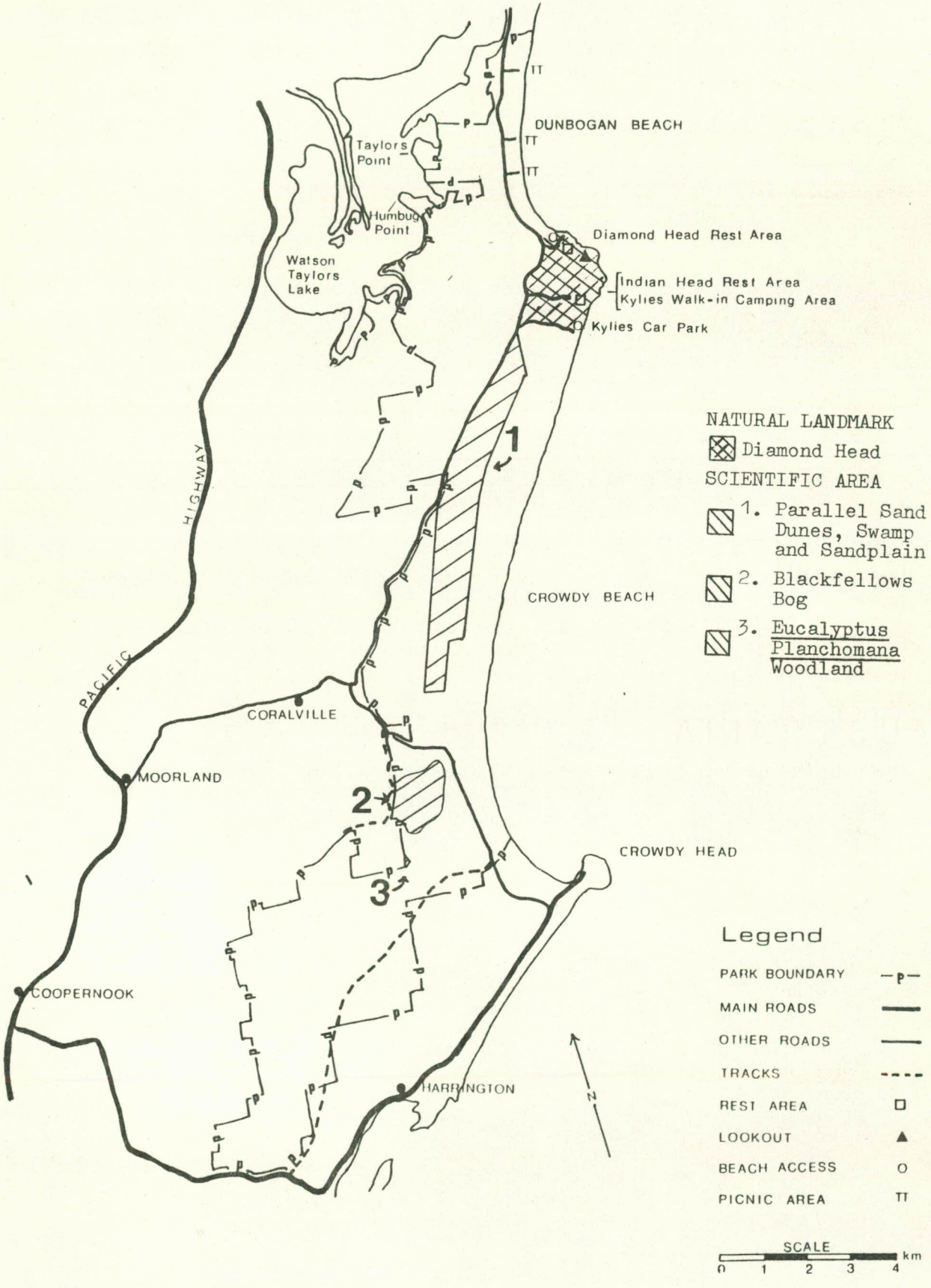
The co-operation of each public authority, lessee or licensee concerned will be required with the objective of minimising their environmental impact consistent with any conditions of the lease, licence or agreement. Operations, leases, licences and agreements will be periodically reviewed to ensure conformity with the conditions laid down in the lease, licence or agreement.

The management of Crowdy Bay National Park will be generally in accordance with the objectives and criteria for management set out in the CNPPA classification 'national park'. (q.v. Appendix A).

By far the greatest area of the park will be subject to this prescription.

On the other hand, one important application of the CNPPA classification system adapted for the management of areas under the care, control and management of the Director, National Parks and Wildlife is the use of these categories where relevant 'within park'. Management units are determined based on these categories. In particular the

# CROWDY BAY NATIONAL PARK
## plan of management (Map 5)



three scientific areas identified by the Committee of Enquiry have been classified as scientific reserves. In addition, Diamond Head area has been designated as a natural landmark.

Scientific reserves are areas free of man's impact and are set aside for scientific research and environmental monitoring.

The management objective of scientific reserves is to maintain natural processes in an undisturbed state. Size will be determined by the area required to maintain its integrity.

Natural landmarks are areas which include outstanding examples of a country's natural heritage.

Management objectives of natural landmarks are to protect and preserve nationally significant natural features because of their special interest or unique characteristics and to the extent consistent with this, provide opportunities for interpretation, education, research, and public appreciation.

## 20. SUMMARY OF MANAGEMENT AND PROPOSALS TO BE IMPLEMENTED

### WORKS AND MAINTENANCE PROGRAMMES

| Priority | Project | Term | Reference |
|---|---|---|---|
| High | Maintenance of facility areas. | Continuing | Ch 15. |
| High | Maintenance of beach access for vehicles at Diamond Head Rest Area and Kylies Car Park. | Continuing | 15.20<br>15.21 |
| High | Close and rehabilitate temporary mining road south of Diamond Head including Fig Tree and Mermaid parking areas. | Short | 15.8/15.16 |
| High | Maintenance of spur roads to facility areas. | Continuing | 15.14 |
| High | Reconstruct Kylies Car Park as a rest area. | Short | 15.7 |
| High | Protect Aboriginal sites | Continuing | 14.25 |
| High | Construct new facility area and associated access road at Watson Taylors Lake. | Subject to acquisition | 15.10/15.11 |
| High | Construction of Diamond Head walking track. | Short | 15.23 |
| High | Preparation and implementation of prescribed burning programme. | Long | 14.1 |
| High | Preparation of action fire plan. | Short | 14.1 |
| High | Preparation of fire management plan. | Short | 14.1 |
| High | Provide wood at fire places. | Continuing | 14.1 |
| High | Implement tree planting programme at Diamond Head and Indian Head rest areas. | Continuing | 15.4/15.6 |

| Priority | Project | Term | Reference |
|---|---|---|---|
| High | Provide walk-in camping area as an adjunct to Diamond Head Rest Area. | Short | 15.2 |
| High | Experimental control of bitou bush. | Medium | 14.10 |
| High | Rehabilitate unplanned fire trails resulting from fire suppression. | Long | 14.1 |
| Medium | Assessment of management trail system. | Short | 15.18 |
| Medium | Rehabilitate existing trails which no longer serve a management function. | Short | 15.15/15.16 |
| Medium | Staff training for fire management. | Continuing | 14.1 |
| Medium | Assessment of "no-burn" areas. | Short | 14.1 |
| Medium | Gazette and construct pound. | Short | 14.13 |
| Medium | Impound illegally grazing cattle. | Short | 14.13 |
| Medium | Control of exotic plants and animals. | Long | 14.7 |
| Medium | Removal of exotic pine trees. | Short | 14.12 |
| Medium | Rehabilitate 8(b) gravel and sand quarries (if added to park). | Short Subject to acquisition | 14.6 |
| Medium | Prepare and/or revise park brochures. | Short/ periodic | 16.1 |
| Low | Interpretation of fire management. | Continuing | 14.1 |
| Low | Rehabilitate gravel quarry on Portion 166. | Short | page 126 |
| Low | Collect and catalogue | Continuing | 16.2 |

| Priority | Project | Term | Reference |
|---|---|---|---|
| | park resource material as a reference collection and for interpretion and environmental education. | | |
| | **LIAISON** | | |
| High | Liaise with Hastings Municipal Council and Crown Lands Office over management of Dunbogan Beach. | Continuing | 15.19 |
| High | Liaise with Crown Lands Office and Greater Taree City Council over management of Crowdy Beach. | Continuing | 15.21 |
| High | Liaise with Hastings Municipal Council and Greater Taree City Council in preparation of Local Environmental Studies and Plans. | On-going as necessary | 15.13/ Ch 19 |
| Medium | Liaise with other land use authorities and planning bodies. | Continuing | Ch 19 |
| Medium | Co-ordinate park prescribed burning and fire control with that of the area generally. | Continuing | 14.14 Ch 19 |
| Medium | Liaise with Public Works Department concerning coastal erosion of park beaches. | Continuing | Ch 19 |
| Medium | Liaise with Soil Conservation Service over erosion control and rehabilitative works. | Continuing | Ch 19 |
| Medium | Liaise with regional tourist and education authorities. | Continuing | Ch 19 |

## RESEARCH/INVENTORY PROJECTS

| | | | |
|---|---|---|---|
| High | Inventory of annual and peak park visitor use. | Continuing | 15.1/17.1 |
| High | Assessment of impacts of developments on park resources. | Continuing | 14.15 |
| High | Draw up a park research programme. | Continuing | 17.14 |
| High | Study fire behaviour and impact on ecological system | Long | 17.4 |
| High | Mapping of fire history. | Continuing | page 125 |
| High | Record sand mining history. | Short | 17.12 |
| High | Monitoring of coastal erosion. | Continuing | 11.3 |
| High | Recording of Aboriginal sites. | Continuing | 17.2/14.26 |
| High | Investigate biological control programme for bitou bush in conjunction with an overall control programme for New South Wales north coast. | Short | 17.10 |
| High | Monitor and map bitou bush distribution. | Continuing | 17.8/17.9/ 14.9 |
| High | Habitat requirements of endangered flora and fauna determined and translated into management guidelines. | Short | 14.4 |
| Medium | Document historic resources. | Continuing | 17.3 |
| Medium | Monitor status of non-native plants and animals. | Continuing | 14.7 |
| Medium | Prepare vegetation map. | Short | 17.7 |

| Priority | Project | Term | Reference |
|---|---|---|---|
| Medium | Monitor sand mining rehabilitation. | Long | 14.19/ 17.13 |
| Medium | Identify, map and monitor potentially unstable areas. | Continuing | 14.14/ 17.11 |
| Medium | Monitor interpretation and information programmes. | Continuing | Ch 16 |
| Medium | Field surveys for aboriginal sites esp. along potential emergency fire break routes. | Short | 14.27 |
| Medium | Complete inventory of park resources. | Continuing | 17.6/ 17.5 |
| Medium | Determine habitat requirements of park flora and fauna. | Long | 14.2 |
| Medium | Prepare flora and fauna management guidelines. | Long | 14.2 |
| Medium | Formulate objectives for specific vegetation communities and fauna habitat. | Long | 14.2 |
| Low | Monitor insect and/or disease outbreak. | Continuing | page 118 |

## 21. DEFINITIONS

The following terminology has been used for the purpose of this draft plan.

| | |
|---|---|
| 'Aboriginal site' | a location containing features resulting from aboriginal occupation or use, or of significance to aboriginal people. |
| 'Act' | the National Parks and Wildlife Act, 1974. |
| 'appropriate use' | those activities which are consistent with Service and community expectations of environmental modification in a national park. |
| 'blueprint' | the annual works programming and budgeting summary prepared by and for a Service district. |
| 'car-camping' | camping with a motor vehicle on the site or within easy walking distance. |
| 'cultural' | resulting from human activity. |
| 'day-use area' | an area where facilities, such as picnic tables and fireplaces, are provided but within which no overnight accommodation (e.g. camping) is permitted. |
| 'feral animal' | non-native animal found in the wild. |
| 'heath' | a plant community dominated by shrubs. |
| 'rubbish bin' | an enclosed rubbish pit comprising an in-ground concrete container with a removal lid. |
| 'pack camping' | a form of camping which requires the camper to carry his or her equipment to the chosen site (i.e. any camping which is not vehicle based). |
| 'pack camp site' | a location recommended for pack camping. |

| | |
|---|---|
| 'park road system' | all the vehicle roads within Crowdy Bay National Park. |
| 'prehistoric' | pertaining to the period before recorded (i.e. written) history. |
| 'public road' | any road within Crowdy Bay National Park which the public can use for vehicular access to the park's features. |
| 'rest area' | an area where facilities such as picnic tables and fireplaces are provided for day-use and short-term camping |
| 'scheme of operations' | section 72(2) of the Act states:<br><br>"The plan of management for a national park ..... shall contain a written scheme of the operations which it is proposed to undertake therein or in relation thereto to carry out the purpose and objects of this Act". |
| 'Service' | the National Parks and Wildlife Service of New South Wales, as established under the Act. |
| 'Service road' | any road within Crowdy Bay National Park which is used exclusively for management purposes. |
| 'vehicle track' | a surface which has not been especially constructed (e.g. graded or hardened) but is used for vehicle access. |
| 'walking track' | a constructed pathway for the exclusive use of pedestrians. |

## 22. APPENDIX

### THE SELECTION AND CLASSIFICATION OF PROTECTED AREAS

The need to develop acceptable world-wide system of classifying areas protected for nature cosnervation purposes has been under consideration for many years by the International Union for the Conservation of Nature and Natural Resources (IUCN).

In the absence of such a system considerable variation has developed throughout the world both in the nomenclature used and in the application of names selected to individual areas. This has resulted in confusion about the value and purpose of nature conservation areas and a lack of uniformity in their management.

In 1978 the IUCN Commission on National Parks and Protected Areas (CNPPA) published a report titled 'Categories, Objectives and Criteria for Selected Areas' which attempted to build on earlier efforts by Hart, Dasman, Miller and others to produce an internationally applicable and acceptable system. The 1978 General Assembly of IUCN directed that this report be referred to member nations for consideration.

In Australia, the Council for Nature Conservation Ministers (CONCOM) appointed a Working Group to examine the report, and subsequently considered that Group's recommendations at its 1980 and 1981 meetings. The examination of the

CNPPA report is continuing.

In developing its proposed system, the CNPPA had regard to a number of principles which are set out in detail in the report. The more important of these were:

(i) The national park is the most common method for the management of conservation areas. IUCN and CNPPA have placed major attention on the promotion and assessment of national parks around the world.

(ii) However, during recent years it has become apparent that many elements of the human habitat require conservation and care.

(iii) The conservation of nature can be interwoven into development proposal and the impact of such developments minimised or controlled. Natural resources can be managed in a variety of ways to support humans and to preserve the human habitat.

(iv) Consequently, the national park can be complemented by a number of other conservation management categories.

(v) If this principle is accepted, nations can establish conservation strategies which reflect their particular resources and requirements.

(vi) Conservation areas should be recognised and categorised by the objectives for which they are managed.

(vii) In this way each nation can establish areas which fulfil functions valid for the nation's particular circumstances yet receive world recognition.

(viii) Categories should be considered as "members of a family tree" free from dominance on by another. All categories are potentially important, each with a different role, and only together can they be employed to cover national and global conservation needs.

The categories proposed as relevant to cover the 'conservation family tree' in New South Wales are:

I Scientific reserve
II National park
III Natural landmark
IV Managed nature reserve
V Protected landscape
VI Resource reserve
VIII Multiple use management area.

I <u>Scientific reserve</u>

The need for reserves free of unnatural influences to be set aside exclusively for scientific research

The management objective will be to maintain natural processes in an undisturbed state. Size will be determined by the area required to maintain its integrity. Use should be restricted to scientific study, environmental monitoring, education and for the maintenance of genetic resources.

II National park

Exploitation has made it necessary to protect the most outstanding examples of each country's natural heritage, and increased urbanisation has increased the need to provide opportunities for outdoor recreation and tourism in natural settings.

National Parks are identified as serving these purposes. Selection aims at setting aside relatively large land or water areas which contain representative samples of major natural regions, features and scenery of national or international significance.

The resource is managed and developed so as to sustain recreation and education activities on a controlled basis.

III Natural landmark

This category normally contains one or more special features of outstanding national significances such as a geological formation, a unique natural site or habitat, etc. The area should be large enought to protect the integrity of the site. They may have particular value for public education and appreciation.

IV Managed nature reserve

It is essential that selected areas be set aside where manipulative management techniques can be applied to guarantee the stability or survival of certain species of plants and animals.

These areas may be developed in limited areas for public education and appreciation of the work of wildlife management.

V Protected landscape

The objectives of this category are to maintain nationally significant natural landscapes which are characteristic of the harmonious interaction of man and land while providing opportunities for public enjoyment through recreation and tourism within the normal life style and economic activity of these areas.

VI Resource reserve

This category is intended for lands for which the most appropriate utilisation has not been determined, but which, if not protected, could be subject to occupation and use on a short term unplanned, economic exploitation basis.

VIII Multiple use management area

There is a need for a category of management for areas which both provide protection to certain natural resource systems, and yet contribute signficantly to the nation's economic, social and material needs.

Multiple use, in the context of Category VIII, is considered to be the management of all renewable surface resources to maintain the overall productivity of the land in perpetuity of the land in perpetuity. Areas managed for the sustained production of water, timber, wildlife, pasture and outdoor recreation with primary orientation towards economic activities would fit into this category.

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