

**BUNGAN BEACH
&
HEADLAND RESERVES
(Incorporating Betty Morrison Reserve)**

PLAN OF MANAGEMENT

Pittwater Council

Adopted 21 October 2002

Executive Summary

Pittwater Council is pleased to present the Plan of Management for Bungan Beach and Headland Reserves. This plan has been prepared in accordance with the Local Government Act (1993).

This plan of management provides clear guidelines for the present and future management of the Reserve. It demonstrates Council's commitment to providing and maintaining the best possible conservation management and recreational opportunities for visitors to the Bungan Beach and Headland Reserves.

The Reserves support a range of coastal bushland types, including significant areas of Coastal Scrub, Cliff Face Open Heath (including Littoral rainforest) and Coastal Closed Heath communities. These communities provide suitable habitat for a number of significant fauna species, notably the Long-nosed Bandicoot, Peregrine Falcon, Powerful Owl and Deudorix Butterfly.

The rock platforms of Bungan Headland (including Little Reef) and Mona Vale Headland have been gazetted as Intertidal Protected Areas (IPA's) under N.S.W. Fisheries jurisdiction. These areas have been chosen for protection by N.S.W. Fisheries for biological and ecological reasons, and to protect the areas from impacts of rock platform activities such as fishing and harvesting of organisms for bait and human consumption.

Bungan Beach is one of the most undeveloped of Pittwater's ocean beaches and has a wild and unspoiled character that is highly valued by the community, particularly the rugged beauty of the cliff areas. It is this dramatic coastal scenery which attracts sight-seers, bushwalkers, beach-goers and local residents.

The management objectives for the Bungan Beach and Headland Reserves are to:

- ❖ Protect the natural features of the reserves, particularly populations of significant plant species, Plant

communities and animal species listed in this plan, namely; Coastal Scrub, Cliff-Face Open Heath, Coastal Closed-Heath and Littoral Rainforest; *Cassine australis* (Red Olive Plum), *Pomaderris* sp. B, *Allocasuarina verticillata* (Drooping She-oak); *Perameles nasuta* (Long-nosed Bandicoot), *Ninox strenua* (Powerful Owl), and *Falco peregrinus* (Peregrine Falcon);

- ❖ Maintain the natural, isolated character of the beach reserves;
- ❖ Protect rock platforms and assemblages of species present;
- ❖ Protect the Reserve's value as an important fauna habitat;
- ❖ Prevent weed invasion and control weed species occurring in the reserve;
- ❖ Maintain the structural and floristic diversity of native vegetation within the Reserves;
- ❖ Adequately manage the bushland/urban interface so as to minimise adverse external influences;
- ❖ Identify and conserve items/areas of cultural heritage significance (Aboriginal or European) in the reserves;
- ❖ Prevent further damage to the Reserve from urban run-off, septic seepage, stormwater and pollution and regenerate habitats already degraded;
- ❖ Protect human life and property in and adjacent to the Reserves from wildfire and maintaining ecological processes in the Reserve by seeking to maintain a fire regime that is appropriate to the diversity and type of vegetation communities present on the site.
- ❖ Control and eradicate, where possible, feral animals within the Reserves;
- ❖ Provide opportunities for low impact recreational, scientific and educational use of the Reserves, consistent with other objectives;

- ❖ Encourage community and neighbour participation in bushland management through the Friends of Bungan and Bungan Beach Surf Club;
- ❖ Continue to provide appropriate public amenities and public safety at Bungan Beach; and
- ❖ Ensure that any proposed development within the reserves (e.g. surf club, sewerage scheme) is designed and undertaken with minimal impact on the natural environment.

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1.0 INTRODUCTION

1.1 Overview and Category of Land

Bungan Beach and Bungan Head Reserve cover an area of approximately 4.8 and 2.9 hectares respectively, in the suburb of Newport. Under section 36(4) of the Local Government Act 1993, the Reserves are classified as community land in the category of *Natural Area*, comprising the further categories of *bushland*, *escarpment*, *watercourse* and *foreshore*. It also contains a small area of *General Community Use* land including and immediately surrounding the Surf Life Saving Club.

The Community and categories applying to Bungan Beach Reserves are shown in Figure 1. Under Council's Open Space and Recreation Settings Inventory Bungan Beach and Bungan Head Reserves comprise the setting classifications: *beach and shoreline*, *bushland* and *hilltop/bluff/headland*.

Eight Lots which make up a large portion of the reserve have recently been renamed Betty Morrison Reserve in memory of the lady who bequeathed the land. Betty Morrison Reserve, Bungan head reserve and Bungan beach Reserve will be collectively referred to as Bungan Beach Reserve for the purpose of this Plan of Management.

As a requirement of the Local Government Act, Councils must prepare Plans of Management for community land. This plan provides a framework for the management of the reserves and describes the management objectives, performance targets, actions and performance assessments to be used in the implementation of the Plan. The Plan will ensure that the significant environmental, scenic and recreational values of the reserves are protected and enhanced for the community into the future.

1.2 Need for a Plan of Management

One of the major issues facing bushland management at the Local Government level is the preservation of the qualities of urban bushland. Plans of Management are prepared as part of the process of addressing these issues.

It is important that any plan of management remains sufficiently flexible to allow modification and improvement in response to the changing attitudes and expectations of both Council managers and the public. This Plan of Management has been prepared to guide

Council's management of this unique area and to provide a basis for conservation and future restoration work in the Reserve.

1.3 Planning Context

1.3.1 Crown Land Management Act 1989

Part of Bungan Beach is Crown land and is under the jurisdiction of the Crown land Management Act 1989 (CLMA). The CLMA states that a plan of management may be prepared for Crown land and Section 11 of the CLMA lists the principles of Crown land management as follows:

- ❖ Environmental protection principles be observed in relation to the management and administration of Crown land;
- ❖ The natural resources of Crown land, including water, soil, flora, fauna and scenic quality, be conserved wherever possible;
- ❖ Public use and enjoyment of appropriate Crown land be encouraged;
- ❖ Where appropriate, Crown land should be used and managed in such a way that both the land and its resources are sustained in perpetuity; and
- ❖ Crown land may be occupied, used, sold, leased or otherwise dealt with in the best interests of the State consistent with the above principles.

1.3.2 Local Government Act 1993

Section 36

The Local Government Act 1993 (Section 36) requires Council to prepare a draft plan of management for community land. Such a plan must identify:

- ❖ The category of the land;
- ❖ The objectives and performance targets of the plan with respect to the land;
- ❖ The means by which these objectives and performance targets will be achieved; and
- ❖ The methodology which will be used to assess whether performance targets and objectives are being achieved.

Under this act, community land is to be categorised and Bungan Beach and Headland Reserves would fall within category *Natural Area* and can be further categorised as *bushland*, *escarpment*, *watercourse* and *foreshore*.

Section 37

A plan of management for community land that is not owned by the council:

- ❖ Must identify the owner of the land;
- ❖ Must state whether the land is subject to any trust, estate, interest dedication, condition, restoration or covenant; and
- ❖ Must state whether the use of the land is subject to any condition or restriction imposed by the owner.

Community land covered by this plan of management which is not owned by Council is zoned 9(b) Reservation - County Open Space under the Pittwater Local Environment Plan 1993. This land is privately owned by a number of residents detailed in Appendix 1.

1.3.3 State Environmental Planning Policies

State Environmental Planning Policy No. 19 (SEPP 19) – Bushland in Urban Areas was made to protect remnant bushland in urban areas within New South Wales. The policy applies to land zoned or reserved as Public Open Space.

Bungan Beach and Headland Reserves meets the criteria for inclusion under SEPP 19. Under the Policy, Council may prepare management plans for bushland area within such land.

Circular No. B13 of the Department of Urban Affairs and Planning states that a management plan should:

- ❖ Describe the bushland in light of the aims and objectives of the Policy;
- ❖ Include measures to enable the recreational use of bushland, where appropriate; and
- ❖ Specify the intended methods of bush fire reduction measures to prevent bushland degradation and restore degraded areas.

SEPP 19 requires that Council take into account the effect of future development and building works on urban bushland and, in particular, on soil erosion, the siltation of streams and waterways and the spread of weeds and exotic plants.

The former Department of Urban Affairs and Planning has also published management guidelines for urban bushland. The guidelines identify the need to prepare a resource inventory of the bushland area, to identify management objectives and strategies, and to derive an action plan for the bushland.

1.3.4 Local Planning Policies

Local Environment Plan

The current Pittwater Local Environment Plan 1993 zones Bungan Beach and Headland Reserves as 6(a) Public Open Space. Land currently zoned 9(b) Reservation – County Open Space is also covered by this plan of management.

A landuse-planning table has been prepared to specify developments and activities that can occur within these reserves. This table lists permissible uses, with or without consent, and prohibited activities (Table 2).

Urban Bushland Plan of Management

The Pittwater Urban Bushland Plan of Management 1995 – Volume 1, (UBPM) is a generic plan of management for bushland within the Pittwater local government area. The role of the UBPM is to establish clear and consistent management policies across all bushland areas. The Bungan Beach and Headlands Plan of Management provides details of the management objectives and performance targets specific to Bungan Beach which are consistent with the aims and objectives of the UBPM.

Strategic Management Plan

Council's current management goals and strategies relating to beaches, parks and reserves are contained within Council's *Strategic Management Plan 1998-2001*. Council's Management Plan vision is '*to be leaders in the provision of local government services, to strive to conserve, protect and enhance the natural and built environment of Pittwater and to improve the quality of life for our community and for future generations*'.

Coastal Management Strategy

Council is currently preparing a Coastal Management Strategy to update the existing Coastal Management Strategy prepared for

Warringah Shire Council in 1985. This strategy will address in detail coastal management issues for the Pittwater area as a whole. The Coastal Flora and Fauna Study was undertaken in 1997 to update information for the new plan.

Figure 1, Community Land Categories

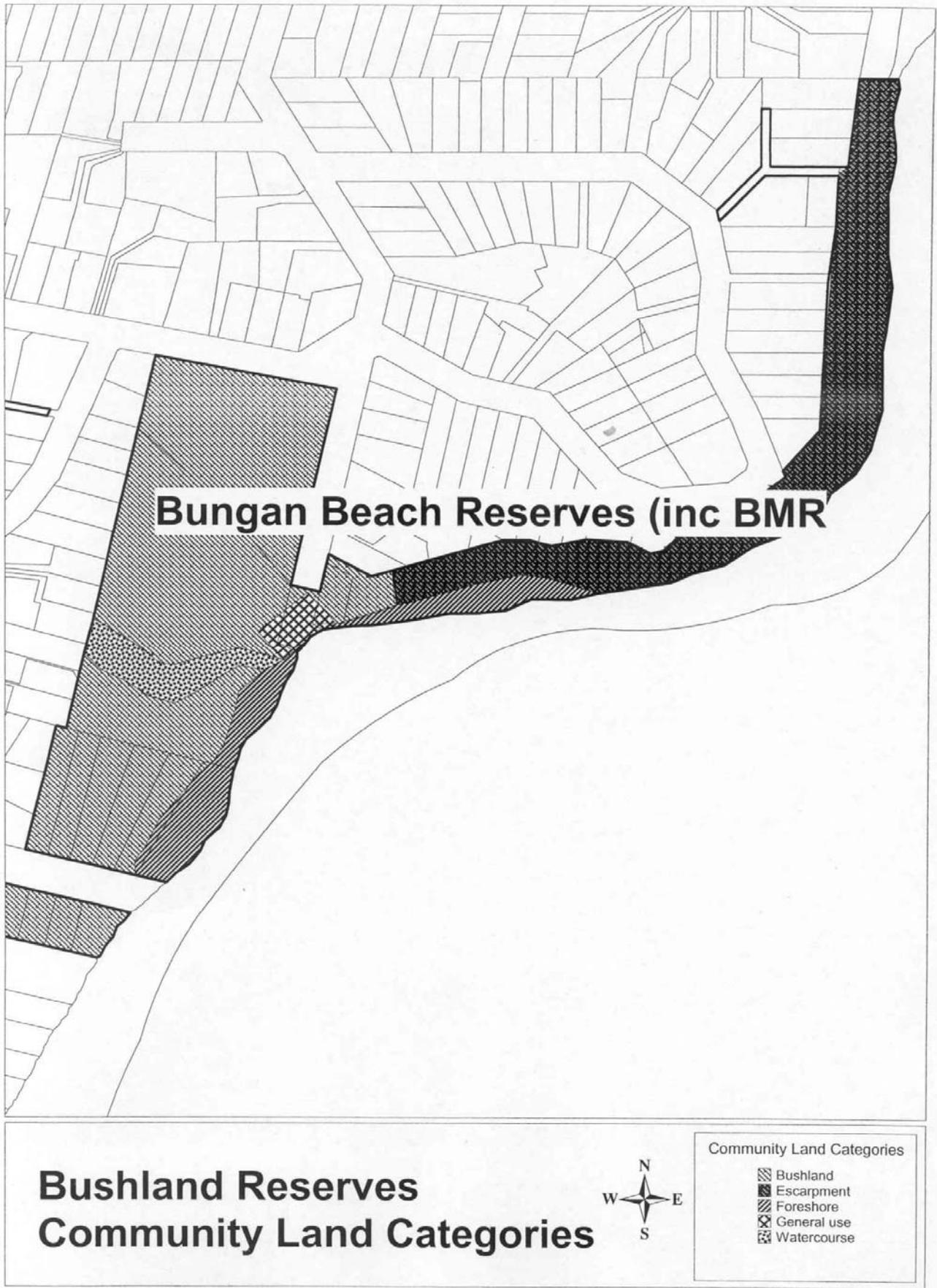


Table 2: Landuse-planning Table

Permissible Uses Exempt (these may be subject to approval under Part 5 of the EPA Act 1979)	Permissible Uses Requiring Development Consent	Prohibited Uses
Bush regeneration, habitat restoration and weed control	Utility installations and similar	Extractive industries and agriculture
Fire hazard reduction activities	Buildings ancillary or incidental to the reserve	Sporting facilities
Ecological burns	Major public drainage works	Permanent private access across a reserve
Multi-use tracks other than motor vehicle	Major rock / soil stabilisation works and earthworks	Commercial signage
Boardwalks and minor bridges	Major facilities (not buildings) being viewing platforms, bridges, educational facilities and the like	Dumping of refuse (including building materials, soil, fill, household wastes, etc.)
Temporary activities or developments requiring a lease or licence under the Local Government Act (1993)	Commercial Eco-tourism Activities	Vegetation removal not in accordance with Councils Tree Preservation and Management Order
Appropriate sustainable low impact recreation activities and facilities (other than buildings)	Vehicles access (emergency access, firebreaks and service trails).	Private alienation or encroachment
Minor public drainage and Stormwater works	Non-intrusive memorials commemorating community members	Introduction of exotic flora and fauna
Minor fences		Playground facilities
Compliance, directional, interpretative, identification and safety signs		Flood structures (damming and reduction of environmental flows)
Environmental education activities		Removal of habitat features such as soil, leaf litter, rocks, stones, pebbles and the like
Any use as permitted under Council's Tree Preservation and Management Order		Recreational motor sports (including 4-wheel driving, motorbike riding, etc.)
Minor rock works and earthworks associated with soil stabilisation and erosion control		Domestic drainage outlets
Any activity as defined in Management Plans consistent with the core objectives and management objectives		Horse riding facilities
Feral animal control and eradication.		Unleashed dog exercise areas
Biodiversity recovery and enhancement		Water extraction

Figure 2 - Long-nosed Bandicoot (*Perameles nasuta*)

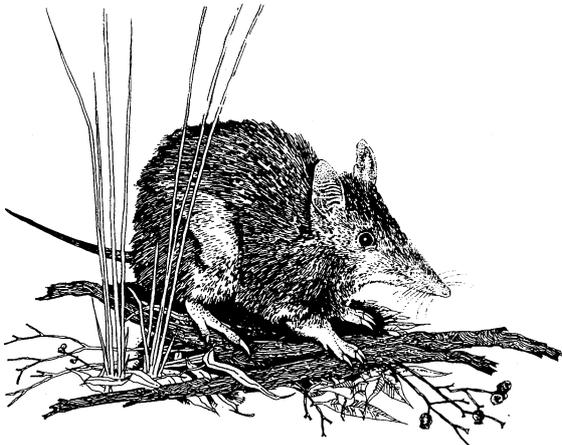
2.0 SIGNIFICANCE AND MANAGEMENT

2.1 Regional Significance of the Reserves

Few major cities the size of Sydney have substantial areas of natural bushland within their boundaries. Sydney's urban bushland makes an important contribution to the city's character as a place of great natural beauty.

Urban bushland areas throughout the Sydney region are significant for the following reasons:

- ❖ They provide 'green space' in the urban environment, contributing to the amenity of the city and enriching the urban experience for both residents and visitors;
- ❖ They provide a habitat for many species of native flora and fauna that would otherwise disappear from urban areas. Urban bushland is also important when it acts as a wildlife corridor, providing migratory or nomadic species with a refuge while passing through the urban area;
- ❖ Bungan Beach and Headland Reserves have an important function as habitat for the regionally significant plant species *Cassine australis* (Red Olive Plum), *Pomaderris sp. B* and *Allocasuarina verticillata* (Drooping She-Oak);
- ❖ Bungan Beach and Headland Reserves provide suitable habitat for a number of significant fauna species, notably the Long-nosed Bandicoot and Peregrine Falcon which are considered regionally significant; and the Threatened *Ninox strenua* (Powerful Owl);



- ❖ Bungan Beach and Headland Reserves may provide potential habitat for the Osprey, Pied Oyster Catcher and Little Penguin;
 - ❖ They are an important scientific resource, especially as a record of a district's original landscape and vegetation. Even weed invasion and other adverse influences provide opportunities for important research;
 - ❖ They are an important educational resource, as a first point of contact with nature for many urban residents as well as a venue for formal education. They provide nearby schools and other educational institutions with natural areas which can be visited without the need for major excursion, and where it is feasible to carry out studies involving repeated visits; and
 - ❖ They provide recreational opportunities, enabling urban residents to undertake recreational pursuits in a bushland setting.
- ❖ Parks and have only a limited distribution within the Pittwater Council area. Small pockets of Littoral Rainforest are also present;
 - ❖ The reserves have an important function as habitat for rare plants and the locally significant *Allocasuarina verticillata*;
 - ❖ The rock platforms at each end of the beach support significant ecosystems and are Intertidal Protected Areas where all collecting is prohibited. These areas are significant because they provide refuges for breeding populations of invertebrate animals. These communities may reproduce and populate adjoining areas. Rock platforms have also been the site of fossil discovery; and
 - ❖ Bungan Beach Reserve has recreational values, providing opportunities for activities such as swimming, surfing, sunbathing, bush walking and fishing in a scenic, secluded and natural setting.

2.2 Local Significance of the Reserves

In addition to these general features Bungan Beach and Headland Reserves have particular significance at a local and district level for the following reasons:

- ❖ Bungan Beach is one of the most undeveloped of Pittwater's ocean beaches and has a wild and unspoiled character that is highly valued by the community, particularly the rugged beauty of the cliff areas;
- ❖ A natural bushland reserve adjoins the dunes and beach without roadway or car park interruptions;
- ❖ Limited access gives visitors to Bungan a remote experience feeling;
- ❖ The dramatic coastal scenery of Bungan is a great attraction for sight-seers, bush walkers, beach-goers and local residents and is occasionally used as a setting for commercial film making and photography;
- ❖ The reserves support a range of coastal bushland types, including significant areas of Coastal Scrub, Cliff Face Open Heath and Coastal Closed Heath communities. These vegetation communities are regionally significant as they do not occur in either Ku-ringai Chase or Garigal National

The beach is patrolled by volunteers of the Bungan Beach Surf Club during the swimming season. Local residents of Bungan have, for many years, been actively involved in managing and conserving the beach and reserve. A bush regeneration program has been underway for many years led by local volunteers, the Friends of Bungan.

2.3 Management Objectives

Bungan Beach and Headland Reserves are zoned as 6(a) land under the Pittwater Local Environment Plan under the Local Government Act 1993 it is categorised as Natural area

Under the category of natural area Bungan Beach and Headland Reserve is further categorised as

- (a) Bushland
- (b) Escarpment
- (c) Watercourse
- (d) Foreshore

The area including and immediately surrounding the surf club is categorised as general community use.

Under Section 36 E the reserve must be managed in accordance with the following Core Objectives

for **Natural areas:**

- (a) to conserve biodiversity and maintain ecosystem function in respect of land, or the feature or habitat in respect of which the land is categorised as a natural area, and
- (b) to maintain the land, or that feature or habitat, in its natural state and setting, and
- (c) to provide for the restoration and regeneration of the land, and

- (d) to provide for community use of and access to the land in such a manner as will minimise and mitigate and disturbance caused by human intrusion, and
- (e) to assist in and facilitate the implementation of any provision restricting the use and management of the land that are set out in a recovery plan or threat abatement plan prepared under the Threatened Species Conservation Act 1995 or the Fisheries Management Act 1994.

for **Bushland:**

- (a) to ensure the ongoing ecological viability of the land by protecting the ecological biodiversity and habitat values of the land, the flora and fauna (including invertebrates, fungi and micro-organisms) of the land and other ecological values of the land, and
- (b) to protect the aesthetic, heritage, recreational, educational and scientific values of the land, and
- (c) to promote the management of the land in a manner that protects and enhances the values and quality of the land and facilitates public enjoyment of the land, and to implement measures directed to minimising or mitigating and disturbance caused by human intrusion, and
- (d) to restore degraded bushland, and
- (e) to protect existing landforms such as natural drainage lines, watercourses and foreshores, and
- (f) to retain bushland in parcels of a size and configuration that will enable the existing plant and animal communities to survive in the long term, and
- (g) to protect bushland as a natural stabiliser of the soil surface.

for **Escarpment:**

- (a) to protect any important geological, geomorphological or scenic features of the escarpment, and
- (b) to facilitate safe community use and enjoyment of the escarpment.

for **Watercourse:**

- (a) to manage watercourses so as to protect the biodiversity and ecological values of the instream environment, particularly in relation to water quality and water flows, and
- (b) to manage watercourses so as to protect the riparian environment, particularly in relation to riparian vegetation and habitats and bank stability, and
- (c) to restore degraded watercourses, and
- (d) to promote community education, and community access to and use of the watercourse, without compromising the other core objectives.

For **Foreshore:**

- (a) to maintain the foreshore as a transition area between the aquatic and the terrestrial environment, and to protect and enhance all functions associated with the foreshores role as a transition area, and
- (b) to facilitate the ecological sustainable use of the foreshore, and to mitigate impact on the foreshore by community use.

For land categorised as **General Community Use** core objectives are:

To promote, encourage and provide for the use of the land and to provide facilities on the land to meet the current and future needs of the local community and of the wider public.

- (a) In relation to public recreation and the physical, cultural, social and intellectual welfare or development of individual members of the public, and
- (b) In relation to purposes for which the lease, licence or other estate may be granted in respect of the land (other than the provision of public utilities and works associated with or ancillary to public utilities).

The local management objectives for the Bungan Beach and Headland Reserves are to:

- ❖ Protect the natural features of the reserves, particularly populations of significant plant species and communities and animal species listed in this plan, namely Coastal Scrub, Cliff-Face Open Heath, Coastal Closed-Heath, Littoral Rainforest, *Cassine australis* (Red Olive Plum), *Pomaderris sp. B*, *Allocasuarina verticillata* (Drooping Sheoak), *Perameles nasuta* (Long-nosed Bandicoot), *Ninox strenua* (Powerful Owl), and *Falco peregrinus* (Peregrine Falcon);
- ❖ Maintain the natural, isolated character of the beach reserves;
- ❖ Protect rock platforms and assemblages of species present;
- ❖ Protect the Reserve's value as an important fauna habitat;
- ❖ Prevent weed invasion and control weed species occurring in the reserve;
- ❖ Maintain the structural and floristic diversity of native vegetation within the Reserves;
- ❖ Adequately manage the bushland/urban interface so as to minimise adverse external influences;
- ❖ Identify and conserve items/areas of cultural heritage significance (Aboriginal or European) in the reserves;

- ❖ Prevent further damage to the Reserve from urban run-off, Stormwater and pollution and regenerate habitats already degraded;
- ❖ Protect human life and property in and adjacent to the Reserves from wildfire and maintaining ecological processes in the Reserve by seeking to maintain fire regime that is appropriate to the diversity and type of vegetation communities present;
- ❖ Control and eradicate, where possible, feral animals within the Reserves;
- ❖ Provide opportunities for low impact recreational, scientific and educational use of the Reserves, consistent with other objectives;
- ❖ Encourage community and neighbour participation in bushland management through the Friends of Bungan, Bungan Beach Surf Club and other community groups;
- ❖ Continue to provide public amenities and public safety at Bungan Beach; and
- ❖ Ensure that any proposed development within the reserves (e.g. surf club, sewerage scheme) is designed and undertaken with minimal impact on the natural environment.

2.4 Leases and Licences.

The lease and use of community land for permitted purposes is provided for under the Local Government Act 1993. Within the Bungan Beach Reserve there is a small parcel of land leased for the purpose of a Surf Life Saving Club.

Councils often enter into lease or licence agreements with other parties to allow certain development or uses to occur on community land. Leases and licences are the instrument by which the use of community land by groups such as sporting groups, schools or in this case Surf Life Saving Clubs or by commercial organisations and individuals providing facilities or services for public use, is formalised. Formal leases may be granted by Councils for up to 21 years.

A lease on community land may only be granted if:

- It is authorised in a plan of management.
- It is for a purpose consistent with the core objectives for the applicable category(ies) of land.

3.0 RESERVE DESCRIPTION

3.1 Location and Description

Bungan Beach and Headland Reserves are located on the south-eastern extremity of the Barrenjoey Peninsula (Figure 3). The beach is 600m long, running in a south east direction between Bungan Headland to the north and Mona Vale Headland to the south. A single bar runs the length of the beach with two strong rips against the rocks at either end and two or three shifting rips along the beach. Rock platforms at the northern and southern end of Bungan Beach are Intertidal Protected Areas (IPA's).

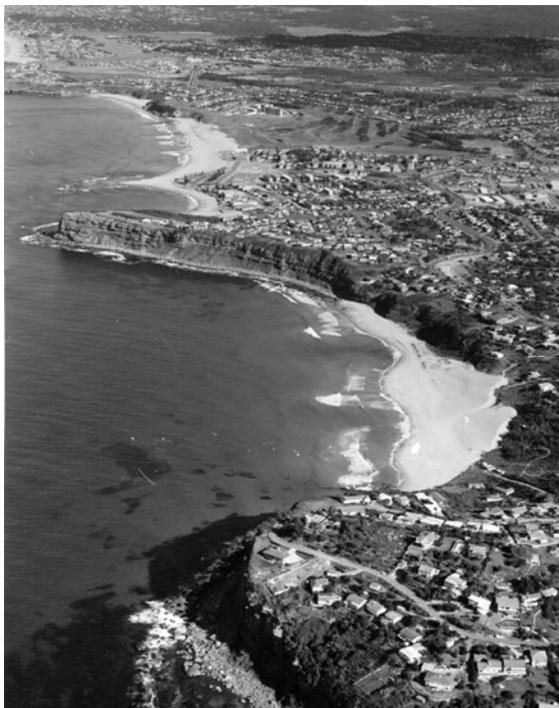


Figure 3 - Oblique aerial photograph showing Bungan Beach and Headlands 11 June 1970 (Source State Planning Authority NSW).

3.2 Tenure of Land

Until recently Planning NSW or the former Department of Urban Affairs and Planning owned a number of lots within the reserves. These have since been transferred to Council's ownership. Council owned land now comprises the following parcels:

Bungan Beach Reserve (No: R 91)

- ❖ Lots 1 and 2 of DP 230883
- ❖ Lot 33, 34, 35, 36, 37 and 38 in DP 12994
- ❖ Lots 4, 5, 6 and 7 in DP 26951
- ❖ Lot 2 in DP 114855

Bungan Headland Reserve

- ❖ Lot 115 in DP 10423
- ❖ Lot 21 in DP 21686
- ❖ Lots 17 and 18 in DP 10423

The following allotments are privately owned and are partially zoned 9(b) Reservation – County Open Space

- ❖ Lot 7 in DP 877736
- ❖ PTA and PTB in DP 389344
- ❖ Lot 1 in DP 940521
- ❖ Lot 1 in DP 659140
- ❖ Lot 1 in DP 656487
- ❖ Lot 2 in DP 656486
- ❖ PT3, PT4, and PT5, section 2 of DP 11651
- ❖ Lot 1 in DP 656488
- ❖ Lot 2 in DP 536058
- ❖ Lot 1 and 2 in DP 539523
- ❖ Lot 4 and 5 in DP 29316
- ❖ Lot 2 in DP 602462

Land covered by this Plan of Management is shown in Figure 5.

The road reserves of Myola Road and Beach Road are both Council owned and function as the public access ways to the beach. For most of the length of Bungan Beach, Council's ownership of land extends to the high water mark. However, Council's management responsibilities extend to the beach. This plan provides for the management of the natural resources with in the area defined by Figure 5. Recreational use of the vacant Crown land falls under the Draft Plan of Management for Ocean Beach Reserves in Pittwater.

Although this plan does include the management of county open space and crown land areas the responsibility for management of these areas does still rest on the land owners and therefore they have the right to prohibit or refuse management action by council.

The road reserves on both the western and eastern sides of Myola Road and the eastern end and northern side of Beach road are contiguous with the Bungan Beach Reserve, and are either naturally vegetated or are being actively regenerated. These areas are to be added to the bushland reserve.

3.3 Zoning

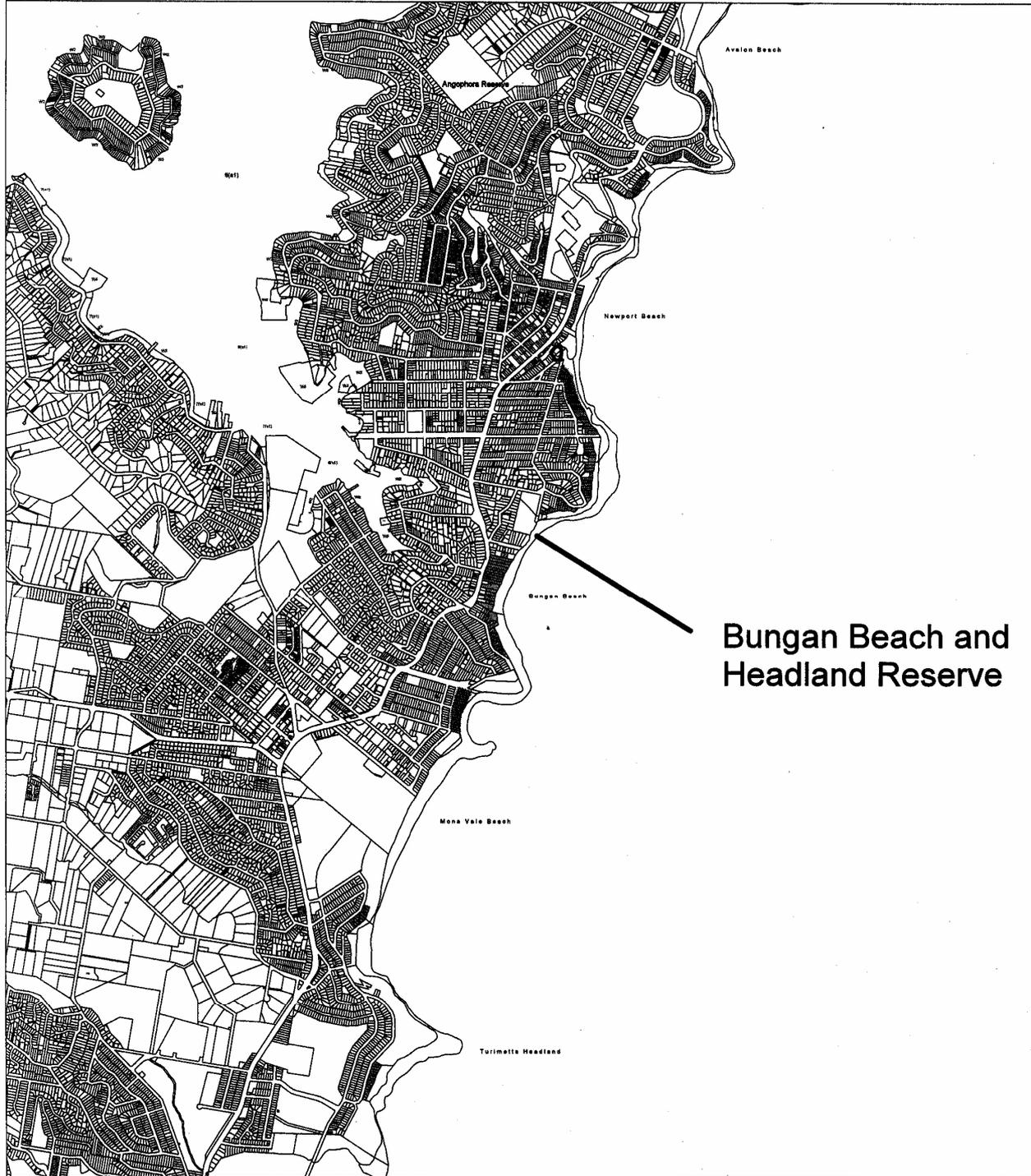
Most of the land assessed in this Plan of Management is zoned 6(a) Existing Recreation under the Pittwater Local Environmental Plan 1993. Some land between Bungan Beach and Barrenjoey Road south of Beach Road is zoned as 9(b) Reservation - County Open Space. This land is privately owned (Figure 5).

3.4 Adjoining Land Uses

The reserves are bounded by residential lots with frontages to Hillcrest Avenue, Barrenjoey Road, Karloo Parade, Beach Road, Myola Road, Lovering Place, Queens Parade East and Bungan Head Road.

Adjoining development consists of single dwelling houses on moderate sized lots many with cliffs and natural vegetation, extensive gardens and lawns.

Figure 4 - Location Map



**Bungan Beach and
Headland Reserve**

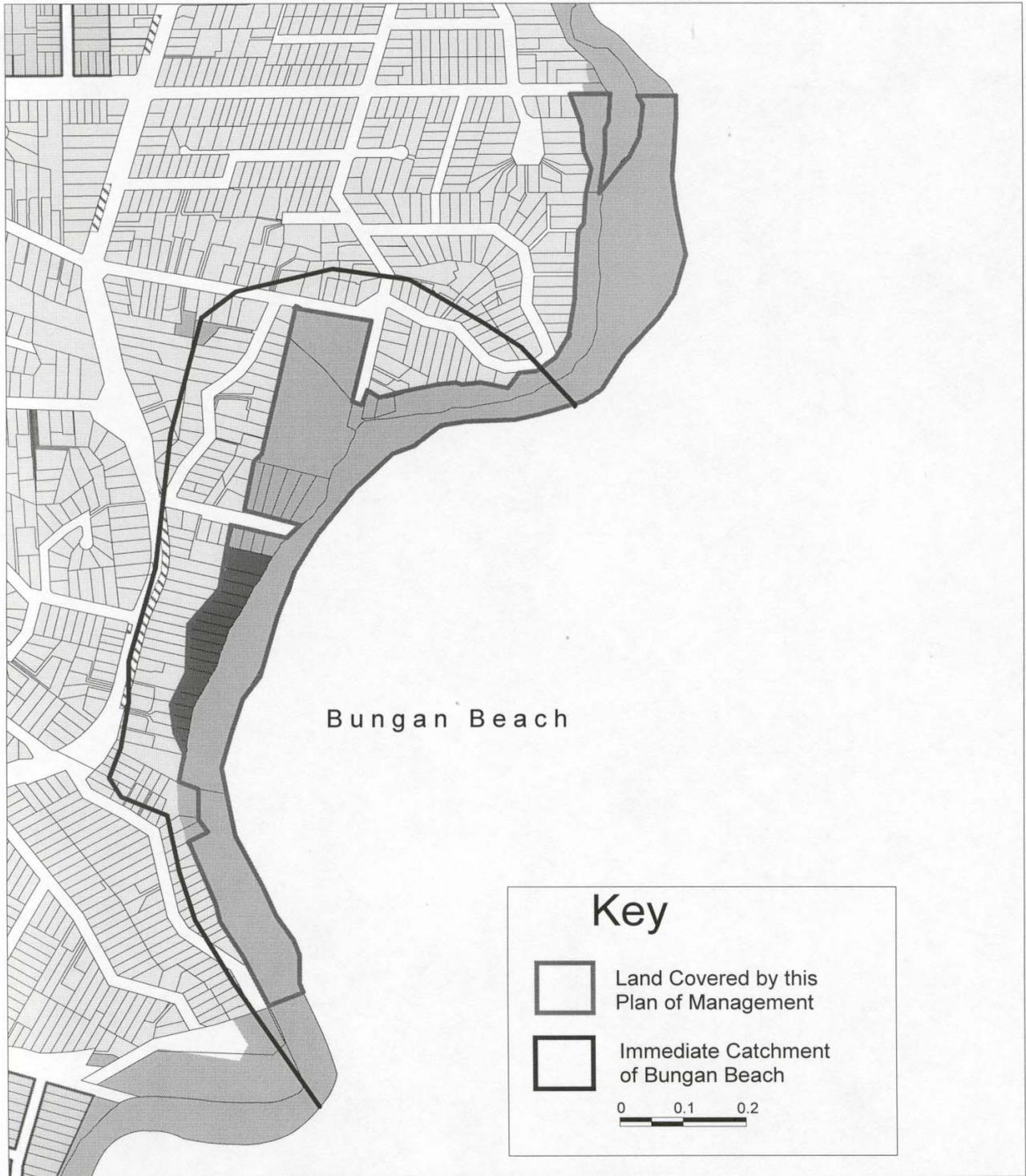
**Bungan Beach and Headland
Reserve Plan of Management**

Map: Reserve Location

Date: Feb, 2001



Figure 5 – Land covered by this Plan of Management and Local Catchment



Bungan Beach and Headland Plan of Management		
Map: Catchment and Reserve Area Map	Date: Feb, 2001	

Figure 6 – Land Tenure.



Bungan Beach and Headland Plan of Management		N
Map: Land Tenure	Date: Feb, 2001	

4.0 PHYSICAL CHARACTERISTICS OF BUNGAN BEACH RESERVES

4.1 Topography

The sandy strip of Bungan Beach is approximately 600 metres long with steep cliffs up to 70 metres high forming the northern and southern headlands. Partially vegetated sand dunes have formed behind the beach. The beach is backed by steep slopes and cliffs, rising to a height of 62 metres in the north-west corner of Bungan Beach Reserve and to over 70 metres on Bungan Headland.

Bungan Beach Reserve is located at the north-western end of the beach where a substantial pocket of native coastal vegetation covers steep east and south facing slopes. Bungan Creek flows through this bushland area.

The beach reserve has a natural undeveloped character, with the only significant developments being the existing Surf Club building and the sewage pumping station. The beach and reserves are overlooked by mostly single dwelling houses of various ages and styles many of which have attached granny flats.

4.2 Geology and Soils

The Pittwater Local Government Area is geologically part of the coastal rim of the Erina Hills, a physiographic unit of the Sydney area. The Barrenjoey Peninsula is largely represented by slopes of exposed interbedded shales and sandstone of the Newport Formation of the Narrabeen Group overlain by smaller areas of Triassic Hawkesbury Sandstone capping (Figure 7).

The landform of Bungan is an erosional basin within beds of Newport formation and Narrabeen group sedimentary rocks. The sandstone bedrock has been exposed by coastal erosion processes to form dramatic cliffs and slopes. Differential weathering of the shale, silt stone and sandstone layers have produced the formation of steep talus slopes at the base of the cliffs. The talus material, comprising soil and rocks of various sizes, is unstable and serious erosion and land slip can be caused by careless disturbance of slopes through activities such as clearing, excavating and building.

Two soil landscape groupings are present at Bungan Beach (Figure 8). The beach itself is categorised as Narrabeen Marine sands which

have low soil fertility, high soil permeability and are an extreme wind and wave erosion hazard. The slopes surrounding the beach belong to the Watagan soil landscape unit, which occurs on rolling to very steep hills on fine-grained Narrabeen Group sediments. This landscape type is subject to mass movement and severe soil erosion hazards and is characterised by clay soils derived from shale sediments.

4.3 Coastal Processes

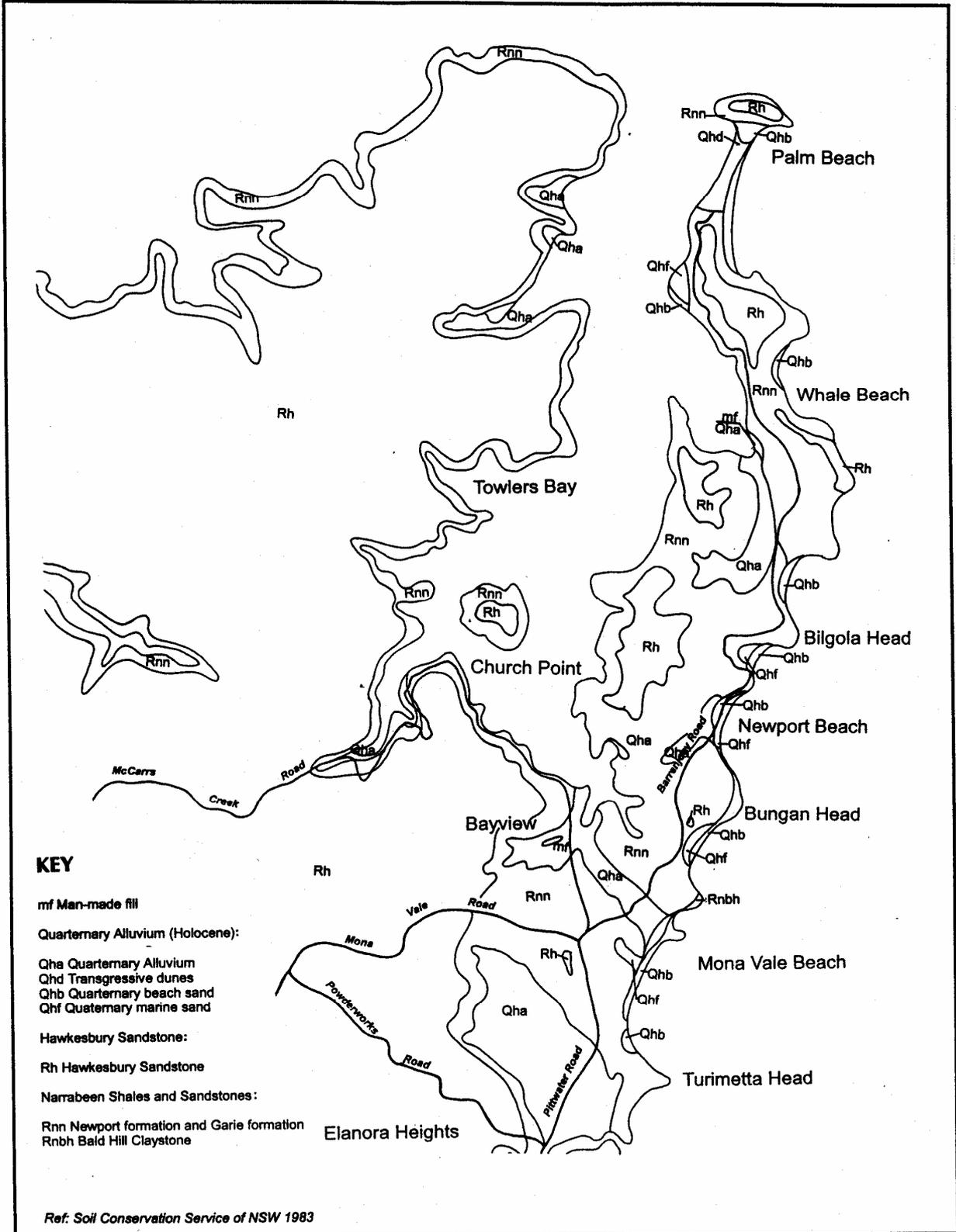
Bungan Beach is subject to coastal processes that are continually reshaping the beach system, including:

- ❖ Beach erosion – the exchange of offshore and onshore sand during calm and storm periods;
- ❖ Shoreline recession – removal of sand creating a net loss from the beach system, causing a land ward shift of the coastline. Shoreline recession is a long-term process caused by natural coastal processes and by an increase in sea levels. The Greenhouse Effect is expected to be the major cause of future rises in sea levels ; and
- ❖ Bluff erosion – a potential problem for the headlands north and south of Bungan Beach (Patterson Britton 1992, and Warringah Shire Council, 1985).

4.4 Catchment Description

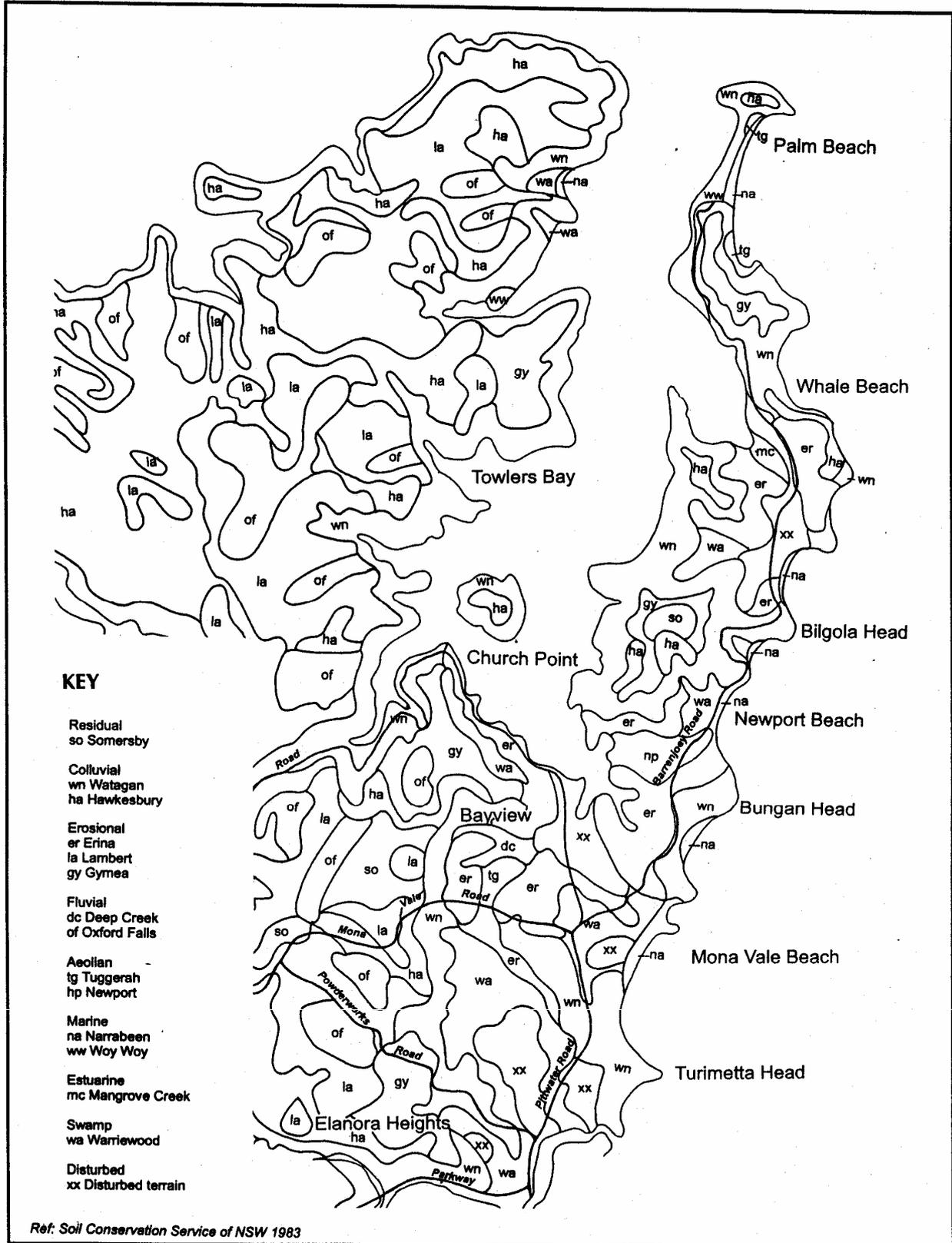
The Bungan Beach Catchment is a relatively small area with its highest point being Bushrangers Hill (103 metres in height) to the northwest, Bungan Headland to the north and Mona Vale headland to the south (Figure 5). The western and southern boundaries of the catchment correspond to Barrenjoey Road and Hillcrest Avenue respectively. Land-use within the catchment is restricted to residential developments and open space.

Figure 7 – Regional Geology Map



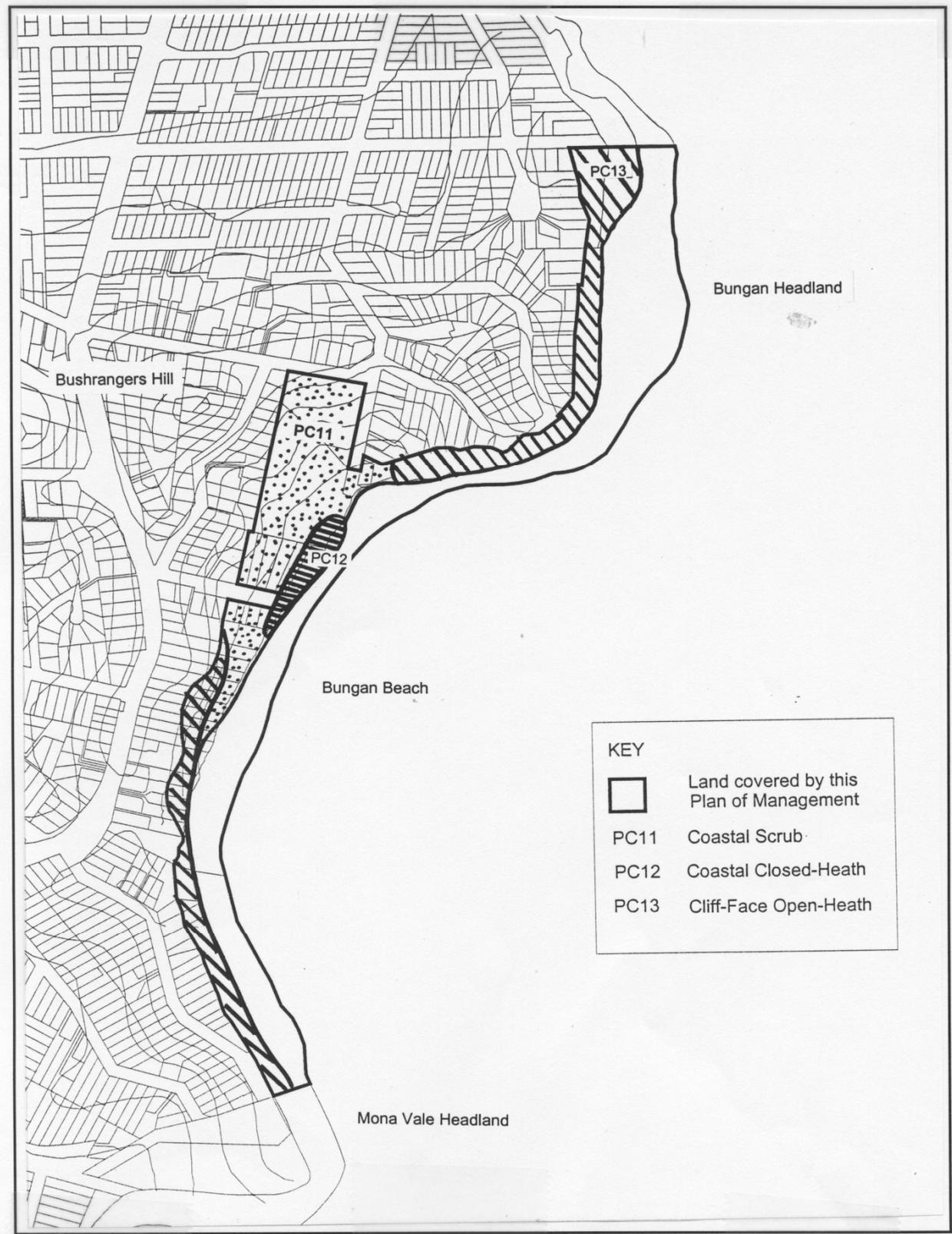
Bungan Beach and Headland Reserves Plan of Management			N 
Map: Regional Geology	Scale: 1:35 000	Date: November 1998	
Locality: Pittwater Local Government Area			

Figure 8 – Soil Landscapes Map



Bungan Beach and Headland Reserves Plan of Management			N 
Map: Soil Landscapes	Scale: 1:35 000	Date: November 1998	
Locality: Pittwater Local Government Area			

Figure 9 – Vegetation Map.



Source: Lembit & Burcher 1997

Bungan Beach and Headland Reserves Plan of Management		<p>N</p>	
Map: Vegetation Map	Scale: 1:35 000		Date: November 1998
Locality: Bungan Beach and Headland Reserves			Contour Interval 10m

4.4 Vegetation

Three broad vegetation types are described and mapped for Bungan Beach and Bungan Head Reserve. These types are described on the basis of the field survey by botanist Roger Lembit and analysis of a Flora and Fauna Investigation of Bungan Beach prepared by Ecotone Ecological Consultants. The vegetation types recorded are Coastal Scrub, Cliff Face Open Heath and Closed Coastal Heath (Figure 9) and are representative of communities described in the Bushland Inventory and Action Plan Volume 2. Small pockets of Littoral Rainforest have been recorded in the coastal scrub. A native flora species list for Bungan Beach Reserve, including Beach Road is given in Appendix 2.

Coastal Scrub (PC11)

The slopes behind Bungan Beach support an open-scrub or closed-scrub community, over 2 metres in height, dominated by Coast Banksia (*Banksia integrifolia*), Drooping She-oak (*Allocasuarina verticillata*), Cheese Tree (*Glochidion ferdinandii*), Coast Rosemary (*Westringia fruticosa*) and Coastal Teatree (*Leptospermum laevigatum*). Emergent trees occur higher up the slope. Tree species present include Turpentine (*Syncarpia glomulifera*), Rough-barked Apple (*Angophora floribunda*) and Bangalay (*Eucalyptus botryoides*).

In more sheltered areas littoral rainforest species are present. Species include Lilly Pilly (*Acmena smithii*), Red Olive Plum (*Cassine australis*), Grey Myrtle (*Backhousia myrtifolia*) and in some areas Port Jackson Fig (*Ficus rubiginosa*). In the absence of fire it is likely that further development of these littoral rainforest patches will occur.

There is typically a ground layer of medium density, with a range of grasses, vines and grass-like plants. These include Kangaroo Grass (*Themeda australis*), Sea Rush (*Juncus kraussii*), Dusky Coral Pea (*Kennedia rubicunda*), *Dianella revoluta*, Spiny Mat-rush (*Lomandra longifolia*), Scented Marsdenia (*Marsdenia suaveolens*) and Old Man's Beard (*Clematis aristata*).

Exotic weeds are common, particularly in disturbed areas or those affected by nutrient charged run-off. Weed species present include Mirror Plant (*Coprosma repens*), Gazania (*Gazania rigens*), Madeira Vine (*Anredera cordifolia*), Blackberry (*Rubus ulmifolius*), Fern Asparagus (*Protasparagus aethiopicus*), Lantana (*Lantana camara*), Bitou Bush (*Chrysanthemoides monilifera*) and Kurnell Curse (*Hydrocotyle bonariensis*).

Coastal Scrub of the type present at Bungan Beach is uncommon in the Sydney area, with examples being restricted to areas of Narrabeen shale geology at locations such as Mona Vale and Bungan Beaches.

Cliff-Face Open-Heath (PC13)

Areas along cliff-faces where soil has collected support an open-heath or low shrubland dominated by Coast Rosemary and Coast Wattle. Associated native shrub species include Scrub She-oak (*Allocasuarina distyla*), Drooping Sheoak (*Allocasuarina verticillata*), Coastal Teatree, Hop Goodenia (*Goodenia ovata*) and Sweet Pittosporum (*Pittosporum undulatum*). The vines, Water Vine (*Cissus antarctica*) and Gum Vine (*Aphanopetalum resinosum*) are also present. Native ground layer species include Kangaroo Grass and Spiny Mat-rush.

Exotic weeds are common and include Mirror Plant, Gazania, Cape Daisy (*Dimorphotheca pluvialis*) and Lantana.

This community is present along coastal cliffs in the Pittwater area and occurs elsewhere along the Central Coast and Illawarra where suitable conditions occur. That at Bungan Head is amongst the more disturbed examples of this community.

Coastal Closed-Heath (PC12)

Stabilised frontal dunes at Bungan Beach support a closed-heath community dominated by Coast Wattle (*Acacia sophorae*). The dominant shrub layer varies between 1 and 2 metres in height.

Tree Broom-heath (*Monotoca elliptica*) and Breyntia (*Breyntia oblongifolia*) are associated shrub species. The ground layer is of low density and dominated by herbs and creepers. Common species include Beach Fan Flower (*Scaevola calandulacea*), Kidney Weed (*Dichondra repens*), Spinifex (*Spinifex hirsutus*), Knobby Club-rush (*Isolepis nodosa*) and Guinea Flower (*Hibbertia scandens*).

Exotic species are common. These include Gazania (*Gazania rigens*), Bitou Bush (*Chrysanthemoides monilifera*), Fern Asparagus (*Protasparagus aethiopicus*), Lantana (*Lantana camara*) and Kurnell Curse (*Hydrocotyle bonariensis*).

This community is of limited extent in the Sydney region as it occupies a particular habitat niche and it has been affected by urban and recreational development.

Significant Plant Species

No plant species listed on the national list of Rare or Threatened Australian Plants (Briggs and Leigh 1988) have been located in the area.

There are 2 species which could be considered to be of regional significance, *Cassine australis* (Red Olive Plum) and *Pomaderris* sp. B. One locally significant species, *Allocasuarina verticillata* has been recorded. Bungan Beach Reserve is one of only three known locations of this species in Pittwater. These are discussed below.

***Cassine australis* (Red Olive Plum)**

Red Olive Plum is normally a small tree with broad, opposite leaves and orange-red berries that ripen in Autumn and Winter. This species is found littoral and sub-tropical rainforests north from Batemans Bay. At Bungan Beach, Red Olive Plum is a shrub or small tree to 8 metres in height, which occurs in small patches of rainforest trees behind the beach. This species has also been recorded from Barrenjoey Headland, Bilgola Beach, Bayview, Mona Vale Headland Reserve Warriewood Beach and Avalon dunes.

This species response to fire is not known. Competition from weed species including Lantana and Small and Large-Leaved Privet pose a threat to this species.

It is considered of regional significance due to its restricted distribution in the Sydney region.

***Pomaderris* sp. B**

This is an undescribed species of *Pomaderris* which occurs on coastal headlands north from Bulli. It is a shrub generally less than 1 metre in height with white flowers in September or October (Fairley & Moore 1995). It was recorded at Bungan Beach by Ecotone in 1995. Other locations in the Pittwater area include Turimetta Headland, Mona Vale Headland, Bushrangers Hill Reserve, 100 Whale Beach Road (Marion Peters recorded in yard) and South Bilgola Headland

Threats to this species include competition from weeds and a high fire frequency. This species apparently resprouts however some plants may be killed by fire.

This species has a restricted distribution with Whale Beach located at its northern limit and a significant population at Bungan Beach Reserve.

***Allocasuarina verticillata* (Drooping She-oak)**

This species is usually found on rocky cliffs above the sea on Narrabeen shales. It is easily distinguished by its drooping, grey-green foliage and fissured bark. *Allocasuarina verticillata* is considered locally significant as it is known only

from three locations in Pittwater, Bungan Beach, Newport and Mona Vale.

4.6 Native Fauna

Fauna habitats in the area include Coastal Scrub, Beach and Rock Platforms which provide a range of habitat resources for native fauna. The range of reptiles and small birds (e.g. Yellow-faced Whip snake and Eastern Whipbird), indicates the reserves' importance for providing habitat to species which are scarce or missing from residential areas.

Within the Coastal Scrub habitat 3 mammal species, 4 reptiles and 18 species of bird were observed during surveys by Ecotone (1995). A list of fauna species for Bungan Beach and Headland Reserves is given in Appendix 5. One of the mammal species, *Perameles nasuta* (Long-nosed Bandicoot) is considered to be of regional significance. Also of note is the regionally significant *Falco peregrinus* (Peregrine Falcon) which has been recorded flying along the cliff lines and *Ninox strenua* (Powerful Owl), a Schedule 12 species, which was probably feeding in the area.

Long-nosed Bandicoot (*Perameles nasuta*)

The *Perameles nasuta* (Long-nosed Bandicoot) is a medium-sized ground dwelling marsupial. It forages at night for invertebrates and plant matter, both of which it usually obtains by digging characteristic conical pits in the soil. It shelters during the day in a nest on the ground.

The Long-nosed Bandicoot is distributed along the east coast of Australia from north Queensland to Tasmania. It is considered a secure species at both national and state levels, however it is a declining species in the Sydney region. It has been listed as an Endangered Population at Manly by the NSW Scientific Committee, and is likely to be of similar conservation status in Pittwater. Described as extremely abundant in the 1950's and 1960's, it has disappeared from a number of suburbs in the last 20 years. It remains reasonably common in some localities, including Barrenjoey Peninsula, but it is a species which needs to be maintained. Possible reasons for its decline include clearing of its bushland habitat, heavy predation by cats, dogs and foxes, and diseases such as toxoplasmosis (Pittwater Council 1994).

Powerful Owl (*Ninox strenua*)

A Powerful Owl was recorded at Bungan Beach in 1994 and at Newport in 1980. This species rarely uses forests of the Coastal Zone for foraging (Lembit & Burcher, 1997), and was probably utilising the habitats at Bungan Beach for hunting.

Identification and protection of nesting sites, and the retention of canopy cover are necessary to maintain this species.

The Powerful Owl is listed as a threatened species (Schedule 2) under the Threatened Species Conservation Act, 1995.

Peregrine Falcon (*Falco peregrinus*)

This regionally significant species has been recorded at Bungan Beach and Bangalley Headland. The Peregrine Falcon preys on small birds and pigeons and favours cliffed areas. The status of this species in Pittwater is thought to be secure as the clifflines suffer little from human disturbance (Lembit & Burcher, 1997).

Terrestrial Invertebrates

One species of terrestrial invertebrate which has conservation significance in the Pittwater has been recorded at Bungan. This species has been observed exhibiting hill topping behaviour at Bushrangers Hill, an extension of its southern limit (State of the Environment Report, 1994). The Deudorix butterfly (*Deudorix epijarbas*) inhabits hind dunes, headlands and forests utilising the Tuckeroo (*Cupaniopsis anacardioides*) as a larvae host. Terrestrial invertebrates play an important role in the cross-pollination and maintenance of genetic diversity with littoral rainforest flora species.

Three cicada species that occur in the Pittwater area are reliant on dunal vegetation for their survival. *Cicadetta arenaria* (Sand Fairy), and *Cicadetta akites* are both reliant on Spinifex, while *Arunta perulata* (White Drummer) is dependant upon Coastal Banksia. Disturbance to this habitat type can lead to localised extinction's, however maintenance or restoration of dunal systems, particularly at Bungan Beach will support the continuation of these species (Lembit & Burcher, 1997).

4.7 Intertidal Assemblages

The Pittwater Council area covers ten major rock platforms from Narrabeen Headland to Barrenjoey Headland. On 9 July 1993 Bungan Headland, including Little Reef, was one of four rock platforms to be gazetted as Intertidal Protected Areas under N.S.W. Fisheries jurisdiction. These areas have been chosen for protection by the N.S.W. Fisheries for biological and ecological reasons.

The assemblages of populations and species on rocky reef platforms are subject to physical disturbances associated with wave action. However, they are also affected by the increasing pressures of human collection and harvesting which has led to a decrease in diversity and size of individuals. All species are at risk to different degrees, with many species, such as Cunjevoi becoming less abundant.

One immediate threat to the rock platforms is their proposed use as sites for stormwater run-off. This was proposed in the Warringah Shire Coastal Management Strategy to avoid the impact beach outfalls were having on sand movement (WSC, 1985). Damage to habits during construction and the introduction of increased nutrients and sediment to the intertidal area has the potential to alter both the abundance and diversity of flora and fauna on the rock platforms. Therefore, the policy should be dropped and alternative methods for stormwater disposal should be investigated (Lembit and Burcher, 1997).

Scientists have expressed concern that people can affect organisms through diverse recreational activities including fishing, gathering of organisms for food, bait or aquarium specimens and fossicking, overturning of boulders and inadvertent trampling (Kingsford, Underwood and Kennelly, 1991).

The ecological consequences of such actions include:

- ❖ the increase or decrease of particular ecological assemblages on local reefs or encouragement of other species;
- ❖ the removal of large, reproductively active organisms from an area can affect the long term size and viability of marine invertebrates - species at risk include gastropods, echinoderms, crustaceans and cunjevoi;

- ❖ many marine invertebrates recruit onto platform areas where open space is available - the removal of large grazing gastropods may allow prolific algal growth making further recruitment difficult for other species; and
- ❖ many marine invertebrates recruited onto the platform rely on the triggered mechanism of the presence of adult populations - removal of entire assemblages of cunjevoi or barnacles can preclude any further population recruitment.

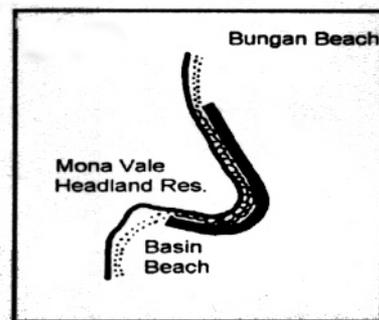


Figure 10: Mona Vale Headland Intertidal Protected Area

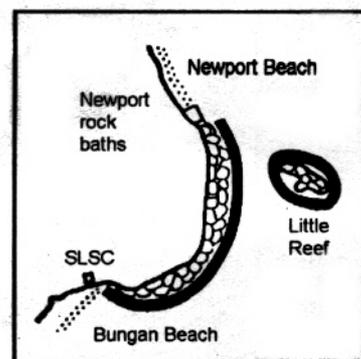


Figure 11: Bungan Headland Intertidal Protected Area

Pittwater Council has undertaken a community awareness programme "Project Aware – On the Rocks!". Community volunteers are trained in this programme in ecology, awareness and conservation of rock platform habitats and component species and threats to their survival. In association with the IPA monitoring programme, students, staff and volunteers organised by Council under *Project Aware – On the Rocks* undertake summer and winter surveys of anglers and foragers using the rock platforms.

The aim of the survey is to quantify user behaviour, identify user groups and canvass and increase their understanding of user impacts.

The IPA monitoring programme has so far indicated that there is no significant difference in the abundance of marine invertebrates in IPA and non-IPA areas. These results indicate that either not enough time has elapsed to allow recolonisation of the IPAs; or, more likely, that the IPAs are not fulfilling their function as quasi-reserves for intertidal invertebrates. If the latter is true, then the focus of the intertidal awareness campaigns will have to be adjusted to better target harvesters of inter-tidal invertebrates. Public awareness efforts are no being focused on foragers from non-English speaking backgrounds (particularly Chinese and Korean) and recreational users from the Hills and Parramatta districts.

5.0 HISTORY

5.1 Aboriginal History

The area was occupied by the Guringai people for many thousands of years before the arrival of European occupation in 1788. Economic activities of Aborigines in the vicinity of Bungan Beach may have included:

- ❖ Fishing and collection of shell fish;
- ❖ Opportunistic exploitation of stranded whales;
- ❖ Collection of reptiles and small animals; and
- ❖ Gathering of plant materials for food and other uses.

Archaeological investigations have been carried out by consultants commissioned by Sydney Water as part of the review of environmental factors for the Bungan Beach Low Level Area 2 Sewerage Scheme. No Aboriginal sites or other archaeological material was found during this survey of the area. These investigations did, however, reveal that there is a possibility that Aboriginal burials may be contained within the sand dune area.

5.2 European History

The Barrenjoey Peninsula experienced very little European settlement until after 1810 when a number of small farms were established in areas of productive soils and suitable topography. The narrow area of the peninsula between Mona Vale and Newport that includes Bungan Beach was made as a large 700 acre land grant to Robert Campbell in 1819.

This area began to experience rapid development following the boom period in the colony of the 1880s. The township of Newport was surveyed and gazetted in 1888 and the local population began to increase. Around this time the Robert Campbell grant was sold to become the Bassett Darley Estate and by 1891 was under the control of the Mona Vale Company. By this time the Pittwater district had become a popular recreation area with wharves, pleasure grounds, tea houses catering for activities such as boating, ferry rides and picnicking. Land on the Pittwater side of the peninsula remained more highly valued than at the ocean side, however this began to change

following the lifting of the ban on daylight bathing in 1903.

Many historical items featuring Bungan have survived from this era. Photographs from as early as the 1890's show Bungan Beach before European development.

A short story titled "Bushrangers' Hill" by A. Metson (1908), described the beauty and attractions that Barrenjoey Peninsula offered to the early settlers.

While recounting the romantic story of two escaped convicts who lived on the peninsula, Metson recalls how Bungan Head was named. While trying to protect the convicts from capture, eight Aborigines were shot by soldiers between Bushrangers' Hill and the headland. From that time onwards, "...the blacks called that headland 'Bung-an Bung-an' their expression for a musket and the sound of the report and its echo from the hill".

By the turn of the century transport to the peninsula was becoming more efficient resulting in increasing land values. The tram line from Manly was extended to its terminus at Narrabeen by 1913 opening the way for further residential development of the peninsula.

The Mona Vale Company land was subdivided and sold in a number of sections. Most of the lots surrounding Bungan Beach were sold between 1907 and 1914. Bungan Head Estate, Newport was actioned on December 27th 1920. Advertised in a Booklet titled "The Call to Bungan", Bungan Head Estate was promoted as having 'an outlook unsurpassed for grandeur' and as being 'one of the finest areas for seaside residences that the most artistic taste could desire'.



Figure 12: The Beety's and Yewen's Picnic at Bungan Beach c1920's. Source: Local History Resource Unit, BGN 8.

During the Second World War military personnel were camped at Bungan Beach. Dunes were bulldozed flat and tank traps installed as a safeguard against enemy invasion from the sea. Removal of vegetation resulted in significant dune erosion and destabilisation. Aerial photos of Bungan from the 1950s and 60s show the dunes denuded of vegetation and subject to substantial erosion processes. Bulldozers were used to reshape the dunes in the early 1960's. The natural watercourses which flowed from the Beach Road area northward behind the dunes, joining up with Bungan Creek and flowing into the ocean near the surf club has been blocked by the sand dune, just north of the gully in the dunes at the centre of the beach. The construction of a dune now causes the water to pond behind it and water percolates through the sand rather than washing out the beach. Bungan Creek (stormwater) is now the only creek that flows through the dunes at the northern end.

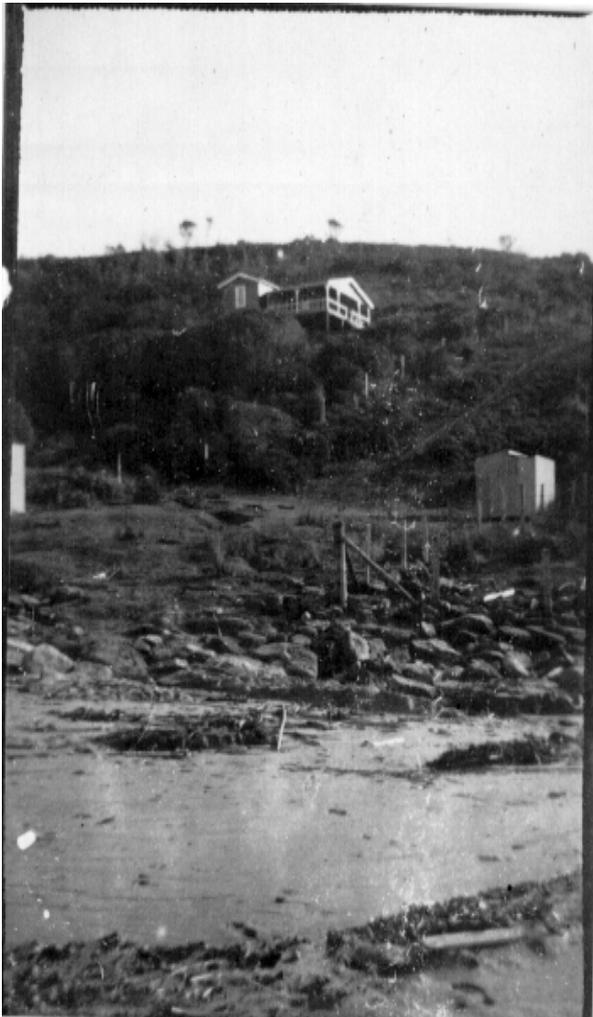


Figure 13: Elise Pollock's Cottage c1914. Demolished in 2001, Source: Local History Resource Unit, BGN 4)

Lots 1 and 2 in DP 230883, Lots 34, 35 and 36 in DP 12994 and Lots 4, 5, and 6 in DP 26951 which comprise the bulk of the Reserve, were donated

to the State of NSW by the owners Elsie Pollock and daughter, Betty Morrison in 1964 and 1976 respectively, for the purpose of preserving the natural bushland, fauna and natural scenery of Bungan. Elsie Pollock acquired these lots prior to the First World War. The small timber cottage built and owned by Mrs Pollock and Mrs Morrison was constructed in 1914 on Lot 2 of the reserve near Myola Road. The cottage incorporated a chimney built from local stone. This land has more recently been transferred to Pittwater Council. The cottage has been removed and is being returned to bushland in accordance with the wishes of Mrs Betty Morrison.

From the 1950s to the 1970s lots were acquired by Warringah Shire Council and the State Planning Authority of NSW for the purposes of creating the Bungan Beach Reserve. From the 1970s to the present, Warringah Shire Council and now Pittwater Council have undertaken a range of works in the reserve including improvements to access paths, dune stabilisation works and bush regeneration works.

The Bungan Beach Surf Life Saving Club was founded in 1953 and the current clubhouse building was constructed in circa 1970.

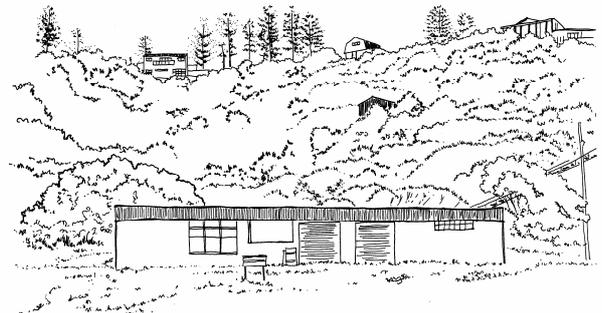


Figure 14: Bungan Beach Surf Club

Bungan Beach was one of the few beaches not to be cleaned by Council or to have garbage bins installed. In 1972, Kim Cooper and the late Ray Price commenced their long-term efforts to keep the beach clean. The now common white bags for rubbish collection were implemented as a result of these efforts by Council along Bungan Beach and many other beaches in Pittwater.

Over the years, residents of the area have been actively involved in the care and management of the reserve, giving local residents a great sense of ownership and pride. Betty Morrison (nee Pollock) was an active conservationist and along with other local residents formed the original Bungan committee in the early 1970's. The Friends of Bungan were formed in 1992.

6.0 MANAGEMENT ISSUES

6.1 Key Management Issues

A range of issues which affect Bungan Beach Reserve have been identified through the planning and community consultation process. The key issues for management addressed in this draft plan are as follows:

- ❖ Dune stabilisation;
- ❖ Bush regeneration and vegetation management;
- ❖ Fauna (Native fauna, Feral and domestic animals)
- ❖ Rock platforms;
- ❖ Landscape character;
- ❖ Recreational Use and Access;
- ❖ Surf Life Saving Club;
- ❖ Low level sewerage scheme;
- ❖ Erosion and Stormwater management;
- ❖ Heritage;
- ❖ Traffic and parking; and
- ❖ Boundaries and development adjacent to reserves.

6.2 Dune Stabilisation

Over the last 20 years efforts have been made to revegetate and stabilise the dunes of Pittwater's beaches. At Bungan Beach the dune areas have been fenced off with narrow access ways defined to minimise the potential for wind erosion and 'blowouts'. A succession of dune vegetation, such as *Spinifex*, *Acacia sophorae*, *Banksia integrifolia* and *Westringia*, has been re-established. Stable dunes provide for more rapid recovery from and resistance to major storm events.

On-going maintenance and monitoring of dune stabilisation works is essential. The repair of fences and revegetation are part of an annual maintenance program that aims to protect the fragile dune system.

Objectives

- ❖ To protect and enhance the dune environment.

Performance Targets

- ❖ The continued protection and restoration of the Bungan Beach dune system.

Action

- ❖ Annual dune monitoring and maintenance program.
- ❖ Installation of board and chain walkways.

Performance Assessments

- ❖ Monitoring and evaluation of dune stabilisation through use of reference points and mapping with periodic walk through assessments.

6.3 Vegetation and Fire Management

Invasion of bushland by introduced, non-indigenous plant species is a particular problem in the Bungan Beach area. Areas of greatest weed cover include the tracks leading to the beach, areas at the top of the slope behind houses fronting Karloo Parade, gullies, roadsides and cliff-faces in the Bungan Head Reserve.

Management problems which need to be addressed to limit weed invasion include control of urban run-off and pollution, dumping of rubbish and garden waste and the impact of access tracks and Sydney Water works. Management of the bushland and significant flora and fauna species present requires that an increased level of resources be devoted to weed control in the area.

The bushland condition on the reserve has been mapped by Cheryl Bate (acting for Friends of Bungan) and including in this report.

Several unplanned fires have occurred in headland vegetation within the Pittwater Council area over the past seven years. These fires have apparently been deliberately lit. The fires have damaged coastal vegetation, including rare plants. Whilst the natural fire regime for these coastal headland communities is poorly known, there is some evidence that the frequency of fires is threatening the regeneration of some plant species including rare species. *Allocasuarina distyla* is killed by fire; there are large examples at Mona Vale Headland, where it has been observed that there is poor regeneration of Scrub She-Oak (*Allocasuarina distyla*) following fires in areas which previously were dominated by this species. Similarly the regeneration of *Pomaderris* sp. B appears to be poor in some patches affected by fire. A number of the species at Bungan Head are killed by fire including the locally significant *Allocasuarina verticillata*, as well as *Acacia sophorae*.

Bush regeneration at Bungan Beach has been carried out by both contractors and volunteers. Contract bush regeneration works have concentrated on primary weed removal along Beach Road and behind private properties north of Beach Road which border Bungan Beach Reserve.

Volunteer bush regeneration undertaken by the Friends of Bungan has been made possible through the extension of grants from Coastcare and Rivercare, environmental trusts jointly funded by Council. Volunteer works have focused on primary clearing of weeds species, erosion

control, regeneration of bushland and revegetation.

The Friends of Bungan play a vital role in the conservation of the urban bushland at Bungan Beach. Their dedication and efforts are greatly appreciated by Pittwater Council and the wider community.

Objectives

- ❖ To control or eradicate weed species in the reserve.
- ❖ To encourage the regeneration of native bushland.
- ❖ To educate the community about native bushland issues and increase volunteer involvement.
- ❖ To manage fire in the reserve to achieve ecological and risk management objectives.

Performance Targets

- ❖ Implementation of necessary means to control exotic weeds in the bushland areas of Bungan Beach reserves in ways that minimise the risk of erosion.
- ❖ The increased awareness of the community in regard to bushland issues.
- ❖ Increase in community involvement.
- ❖ Bushland management program implemented with reduction in weed infested areas.
- ❖ Increased areas of native vegetation successfully regenerated.

Action

- ❖ Continue to implement bushland management practices in the reserve.
- ❖ Encourage local residents to participate in a Bungan Beach Bushcare group through education days and recruitment.
- ❖ Encourage local residents to plant locally indigenous species in gardens and private bushland.
- ❖ Promote use of sediment and erosion control structures, particularly during the construction phase of developments within the catchment and development controls to reduce the impact of urban run-off and pollution.

- ❖ Seek additional funding external to Council to carry out bush regeneration in priority areas.
- ❖ Educate neighbours and beach visitors about the problems caused by weed invasion and dumping of rubbish and garden waste.
- ❖ To monitor bushland condition across the reserve to assess the effectiveness of regeneration and revegetation works (include re-mapping every 3-5 years).

- ❖ Undertake appropriate control measures for weeds declared as Noxious within Pittwater, in accordance with the Noxious Weeds Act, 1993.
- ❖ Development of or continuation of weed control strategies for known problem weeds in the Reserves.
- ❖ Investigate the use of fire within the vegetation communities as a tool for weed control and native regeneration.
- ❖ To undertaken the development of a fire action plan/strategy in consultation with the Rural Fire Service, to be approved by the bushland management committee. This should consider ecology and community safety.

Performance Assessments

- ❖ Monitor abundance, distribution and spread of weed species through periodic mapping of vegetation including weeds.
- ❖ Attitudes of neighbors will be monitored through response to information provided, written complaints and compliments.
- ❖ The implementation of a fire action plan/strategy.
- ❖ Formal survey of attitudes and understanding will be considered every 5 years.

Figure 15: Weed Map for Bungan Beach Reserve (refer to Appendix 6 for explanation and weed details)

6.4 Fauna

Native Fauna

Threats to native fauna at Bungan Beach include predators such as domestic dogs and cats, competition with exotic species, wildfire or inappropriate hazard reduction burns and weed invasion. The intensity of nearby urban development, the relatively small size of bushland and multiple tracks mean that local populations of native fauna may be threatened with long-term decline and vulnerable to local extinction. One threatened species *Ninox strenua* (Powerful Owl) and two regionally significant species *Perameles nasuta* (Long-nosed Bandicoot) and *Falco peregrinus* (Peregrine Falcon) have been recorded at Bungan Beach.

Feral and Domestic Animals

Domestic and feral animals are a major threat to native fauna in the reserves of Bungan Beach. Residents of private properties adjoining the reserves should be informed of the adverse impacts domestic animals have on the wildlife of the reserves.

Dogs are prohibited on Bungan Beach. Irresponsible dog owners and their dogs are a major source of conflict on various sections of the Reserve, particularly on the sand and on the grassed open space areas along the beachfront. Lifeguards report dog owners who ignore signs which prohibit dogs and are found to be illegally using the beach. To overcome this problem, Council has provided unleashed dog exercise areas, three of which (Dearin Park, Rowland Reserve and South Mona Vale Headland) are located near Bungan Beach.

Objectives

- ❖ Conservation of native fauna habitats, resources and populations in the reserve.
- ❖ The education of community about fauna issues.
- ❖ To prohibit domestic animals from the reserve.
- ❖ To reduce the numbers of feral and domestic animals in the reserves of Bungan Beach.

Performance Targets

- ❖ Implementation of necessary means to conserve native fauna populations within the reserves.

- ❖ Habitats and resources for species/populations of fauna are to be maintained or enhanced, particularly for species with local and regional significance.
- ❖ To successfully prohibit dogs from Bungan Beach.
- ❖ Decrease in the number of feral and domestic animals within the reserves of Bungan Beach.
- ❖ Risk to native fauna from predation by feral and domestic animals is reduced.
- ❖ Continued and increased utilisation of Council designated unleashed dog exercise areas in Pittwater LGA.

Actions

- ❖ Maintain suitable habitat through a weed control and bush regeneration program.
- ❖ Monitor the fauna to obtain additional knowledge of the abundance, diversity and habitat requirements of the species which use the Reserves.
- ❖ Maintain habitat features such as logs, stags and bush rock.
- ❖ Investigate strategies to maintain and enhance habitats for native fauna.
- ❖ Promote an education program aimed at local residents for the control of predators including domestic dogs and cats.
- ❖ To provide information to local residents regarding the impacts feral animals and domestic pets on wildlife within the reserves.
- ❖ To provide information to local residents and visitors regarding the location of dog exercise areas.
- ❖ To support Rangers and Lifeguards in the strict enforcement of dog restrictions and fines.

Performance Assessments

- ❖ Undertaken target surveys for threatened and significant fauna.
- ❖ To assess community attitudes to fauna issues through feedback and periodic survey.

6.5 Rock Platforms

Discussion

The rock platforms at the north and south end of Bungan Beach have been gazetted as Intertidal Protected Areas (IPA's). These rock platforms are relatively accessible and flat, and are therefore under greater pressure from human activities than the majority of rock platforms in the Pittwater Council Area.

All Rock Platforms in Pittwater LGA are vacant Crown land and are not under the direct control or ownership of Pittwater Council.

A wide range of habitats are observed in the rock platforms of the Bungan Beach area, including littoral areas consisting of the barnacle and *Galeolaria*, the infralittoral areas commonly called the *Pyura* (Cunjevoi), which is occupied by the cunjevoi and seaweeds. Habitats include rock pools, gutters, and exposed areas where the cunjevoi *Pyura stolonifera* is prolific. Some large Tritons are present, as are Sea Hares and Feather-duster Worms, two species of sea-urchins, limpets, false limpets and a range of species of periwinkles, anemones and barnacles. A list of Intertidal Species on Mona Vale Headland and Mona Vale Beach rock platforms is given in Appendix 3.

A number of members of the Friends of Bungan Beach have been trained by Council under the 'Project Aware - On The Rocks' community awareness course on rock platform issues. These trainers are continuing their outreach to the wider community.

Fossils at both the north and south of Bungan's rock platforms should also be studied to determine their significance.

Objectives

- ❖ To encourage the protection of the intertidal areas and rock platform environments.
- ❖ To educate the community about rock platforms issues.

Performance Targets

- ❖ The increased public awareness of rock platform issues.

Action

- ❖ Council environmental staff to maintain support of Project Aware trainers.

- ❖ Continued liaison with government agencies including N.S.W. Fisheries and DLWC to enforce regulations protecting marine invertebrates in the intertidal zone.
- ❖ Council Rangers to enforce regulations regarding the collection of intertidal organisms.
- ❖ Install or replace educational or compliance signs where appropriate.

Performance Assessments

- ❖ Support periodic assessments of impact on intertidal zones.
- ❖ Periodic assessment of community awareness and attitudes.
- ❖ Assess involvement in community education Programs such as "AWARE on the Rocks"

- ❖ The evaluation of landscaping and revegetation associated with the essential works developments.

6.6 Landscape Character

One of the main values of Bungan Beach Reserve is its predominantly natural landscape character with extensive areas of native vegetation enclosed by high hills and cliffs. The quality of the landscape can easily be degraded by weed invasion, dune erosion and insensitive development.

As a significant amount of development has taken place in the reserve, such as the surf club and sewerage works, it was of great importance that these works were designed and sited to cause minimal physical or visual impact on the natural qualities of the reserve. Future development in and adjoining the reserve needs to be subservient to the natural environment with areas to be modified kept to a minimum and disturbed areas restored.

Objectives

- ❖ To maintain the natural and cultural landscape character of the reserve and surrounds.

Performance Targets

- ❖ The natural landscape character of Bungan Beach Reserve is to be preserved with new development confined only to essential works that are designed and sited to cause minimal disturbance of natural areas and blend successfully with the setting. Landscape works are to incorporate local native plant species to promote a natural landscape character.
- ❖ Landscape plans indicating the extent of development, environmental protection measures and bushland/landscape restoration work are to be submitted with development applications consistent with Councils development controls.
- ❖ Appropriate landscaping and revegetation implemented following development activity.

Actions

- ❖ Prepare landscape revegetation plans for any future development within the reserve in accordance with the objectives of this plan.

Performance Assessments

6.7 Recreational Use and Access

Recreation Use

Bungan Beach is one of the least visited of Pittwater's ocean beaches. Recreational use of the reserve is strongly seasonal, with weekends during the summer swimming season recording the highest level of visitation with an average of about 200 to 400 people visiting during fine weather. Bungan Beach is patrolled by volunteer lifesavers of the Bungan Beach Surf Life Saving Club on weekends during the swimming season.

The most popular recreational activities taking place in Bungan Beach Reserve are board riding, swimming, sunbathing, surf club activities, walking/sightseeing, Bushcare activities and fishing.

There are no shops or food outlets in the vicinity of the beach and visitors generally stay for no more than 2 - 3 hours. With steep access and very limited parking available, Bungan Beach Reserve is not well suited for use by families with young children. A high proportion of visitors are in the 20 to 40 year age bracket.

Those who make the effort to descend the steep vegetated slopes down to the beach are rewarded by a fine recreation experience heightened by the sense of seclusion created by the dramatic headlands and cliffs with a backdrop of natural bushland.

Access

Public access to Bungan Beach Reserve is from pathways and steps at Myola Road to the north, and Beach Road from the west. These access corridors also serve as driveways to private lots overlooking the beach reserve. The Myola Road access currently exists as a 3 metre wide bitumen and concrete driveway with steps and handrails on the eastern side.

The surface of Myola Road has been upgraded by Sydney Water to provide access for the maintenance of the pumping station located adjacent to the surf club. This driveway will provide vehicular access to the surf club and beach for emergency, maintenance and delivery vehicles. No public parking or turning area is provided at the beach, however a car parking space will be provided for people with disabilities. The concrete steps and galvanised steel handrails are in good condition and will be maintained.

The Beach Road access begins near the corner of Barrenjoey Road and Karloo Parade and is the main pedestrian access route to Bungan Beach due to its close proximity to Barrenjoey Road and

bus stops. This access way was upgraded under Council's 1994 reserves landscape improvement programme. These works included the upgrading of pathways, erosion and dune stabilisation, installation of shower, fencing and handrails. The restored and revegetated section of Beach Road will be added to Bungan Beach Reserve.

A narrow strip of council owned land follows the cliff line of Bungan Head. The precipitous nature of the land and its environmental sensitivity means further public access is not appropriate.

A number of walking tracks are located in the reserve primarily providing access to the beach. Risk management and vegetation rehabilitation are being assessed prior to the formalisation of tracks in the reserve. It would be desirable to formalise and manage a number of these as bushland walking tracks where appropriate and to revegetate and rationalise the remaining informal tracks.

Objectives

- ❖ To provide opportunities for low impact recreational, scientific and educational use of the reserves while maintaining bushland conservation as priority.
- ❖ To minimise the impacts of access and recreation on the reserve.
- ❖ Conserve the scenic and secluded quality of Bungan Beach.
- ❖ To provide appropriate public amenities and public safety at Bungan Beach reserves.

Performance Targets

- ❖ The continued access via Beach Road to be encouraged as the main pedestrian access to the reserve;
- ❖ Restricted vehicular access will be provided from Myola Road for residents and services.
- ❖ Maintain public access and public facilities at Bungan Beach and bushland reserves.
- ❖ Naturally vegetated, or revegetated sections of Myola Road and Beach Road that are adjacent to the Bungan Beach Reserve will be incorporated into the Reserve management.
- ❖ The reduction in the impacts associated with recreation and access on the reserve.

- ❖ Access paths that pass through dune areas be restricted to board and chain walkways to minimise risk of erosion.

Action

- ❖ Upgrade and maintain public access to the reserves where appropriate.
- ❖ Rationalisation and maintenance where appropriate of bushland tracks through the Bungan Beach Reserves.

Performance Assessment

- ❖ Undertake periodic walk through assessment of access and recreation facilities in Bungan Beach Reserves.
- ❖ Undertake periodic surveys of community use and attitudes to provide basis for future management actions.

6.9 Surf Life Saving Club

Bungan Beach Surf Life Saving Club has operated since 1953 with the current club-house having been constructed in circa 1970 and recently undergone renovation (2001). Severe damage occurred to the building during the 1974 storms highlighting the problems associated with structures that are sited in the active wave zone.

The 1985 Coastal Management Strategy identified the need for the surf club to be sited outside the active wave zone. The surf club has been actively involved for many years in raising funds to facilitate this course of action.

The alterations and extensions to the existing surf club involved:

- ❖ the retention of the existing structure which is partially located within the active wave zone.
- ❖ construction of the new club house above and behind the existing building, clear of the active wave zone and with a floor level of 8.0m AHD.

Following completion of the upgraded facility, the lower level will be utilised as a wet storage area for surf boats and will contain a surf guard room, change rooms and showers. The first floor component of the club contains an office, bunk room, public amenities, toilets, kitchen, caretaker/bed sit room and clubroom.

The building is owned by Council on Council land and is available for use by the community. Community use of this facility is however restricted by on site parking for emergency vehicles only and car parking for people with disabilities, with the only parking availability being in Bungan Head Road and upper Myola Road.

Local residents have indicated the use of such a building for regular community or private functions would not be acceptable given the sound amplification by the local topography (generally an amphitheatre) and the restricted parking.

The land containing the Surf Life Saving Club is leased for this purpose under the provisions for General Community Use in the Local Government Act, 1993 section 46.

Objectives

- ❖ To provide for the maintenance of appropriate surf club facilities.
- ❖ To maintain the conditions of the lease.

- ❖ To maintain landscaping and vegetation associated with the surf club facilities.

Performance Targets

- ❖ Council to provide clear definition of responsibilities for surf clubs.
- ❖ The successful maintenance of the landscaping and vegetation associated with the surf club and facilities in line with landscape character.

Actions

- ❖ Council to continue to act as facilitator to assist Bungan Beach Surf Life Saving Club in seeking grant funding for maintenance of surf club and facilities.
- ❖ Ongoing management of the open space areas surrounding the club.
- ❖ Continue to provide appropriate car parking and access for maintenance, delivery, and emergency/ lifesaving vehicles. A car parking space for people with disabilities will need to be provided adjacent to the upgraded facility in accordance with the Disability Discrimination Act.
- ❖ Installation of bollards to inhibit the incursion of other vehicles onto the grass or sand.

Performance Assessments

- ❖ Assess impacts of surf club and surf club activities on the reserve through ongoing monitoring.

6.10 Low Level Sewerage Scheme

Many residential lots within the Bungan Creek catchment were unsewered and used a combination of septic systems and pump out tanks. Connection to the sewer was undertaken in the late 1990's. Years of poorly maintained onsite wastewater systems contributed to problems of weed invasion in Bungan Beach Reserve.

Negotiations between resident groups, Council and Sydney Water resulted in the installation of sewerage pipes draining to a pumping station located on lots adjoining the reserve near the present surf club building. Some pipes are located within Bungan Beach Reserve involving excavation and some temporary clearing. In conjunction with these works, Sydney Water constructed a new roadway along the Myola Road reserve, from Bungan Head Road through to the clubhouse and pumping station.

Objectives

- ❖ To support and allow for essential sewerage works by Sydney water and ensure the protection of the natural heritage.

Performance Target

- ❖ Affected areas successfully regenerated.
- ❖ Sewage services are effectively managed in and around the reserve to minimise impacts.

Actions

- ❖ Continue liaison with Sydney Water and residents to seek successful outcomes.

Performance Assessments

- ❖ Sydney Water are to monitor and maintain the sewage services in the reserve.

6.11 Erosion and Stormwater Management

Discussion

Urbanisation of the Bungan area over last century has exacerbated the problems of urban stormwater management. Urban runoff has the potential to erode and pollute the natural environment and therefore must be managed carefully. Piping of urban stormwater often results in problems at the main outlet such as soil erosion caused by water flowing at high velocity and the discharge of litter, weed propagules and toxic pollutants. Uncontrolled urban run-off is leading to weed invasion and soil erosion problems at Bungan Beach.

The Friends of Bungan have undertaken a program which involved marking stormwater inlets within the road reserve for the catchment with "Drains to Bungan Beach" signs. This initiative, in place in many sensitive areas in Sydney, aims to raise public awareness of stormwater pipes as a major source of pollution of our beaches and watercourses. Council in conjunction with the Sydney Northern Beaches Catchment Management Committee, who provided \$500 of funding, supported this initiative by local residents.

Local Bushcare volunteers and bush regeneration contractors are currently in the process of restoring the bushland along Bungan Creek within the reserve. This will have long term benefits for the health and management of the reserve as a whole.

Objectives

- ❖ To protect reserve from impacts associated with storm water run off.
- ❖ To reduce erosion in the reserve.

Performance Targets

- ❖ To reduce concentrations of pollution in the reserve e.g. phosphorus levels.
- ❖ To reduce water velocity and volume in and entering the reserve.
- ❖ Improvements in water quality at Bungan Beach.
- ❖ A reduction in soil erosion and weed infestations with the reserves.

Actions

- ❖ Require new developments in the catchment to control the rate of release of water in line with Council's On Site Detention Policy.
- ❖ Identify points of discharge into the Reserves.
- ❖ Undertake the necessary actions needed to reduce the impact of urban run-off and stormwater.
- ❖ Construct, where appropriate, sediment and run-off control measures such as energy dissipaters.
- ❖ Co-ordinate bush regeneration with stormwater control construction activities to maximise benefits.
- ❖ Educate residents and reserve users on the detrimental impacts of uncontrolled urban run-off.
- ❖ Action will be taken against any illegal discharge of effluent, grey water or pool water into the Reserves.
- ❖ Ensure regular removal of accumulated sediment and gross pollutants from sediment traps and basins.

Performance Assessments

- ❖ Monitoring of erosion in the reserve through photographic history and mapping.
- ❖ Assess effectiveness of structures in reducing impacts.

6.12 Heritage

Cottage

A small cottage, known locally as Mrs Pollock's Cottage, existed in Bungan Beach Reserve on Lot 2 of DP 230883 and was located a short distance west of the Myola Road access path. The cottage was built in 1914 by Mrs Elsie Pollock and her son and until recent years was occupied by Mrs Pollock's daughter, Bette Morrison. The cottage showed evidence of improvements and modifications dating from the 1920s and 30s.

Lots 1 and 2 of DP 230883 (and six smaller lots), which make up the bulk of the Bungan Beach Reserves (approximately 3-4 hectares), were transferred to the State Planning Authority of NSW (now Planning NSW) by Betty Morrison and Elsie Pollock in 1967 and 1976 respectively. Their wish was for the land to be used for open space and the protection and encouragement of flora and fauna.

The cottage was a timber, fibro and metal roof construction situated on a moderately steep, south facing slope overlooking the beach. The cottage was clad with a combination of timber weather boards and flat fibro-asbestos sheeting. The structure consisted of a wide veranda to the north-east and south-east with two bedrooms to the south-west and a kitchen and laundry to the north-west. The lounge room was surrounded on three sides by the veranda and had a natural local stone fireplace at the northern end.

An inspection of the cottage was carried out by Council's Building Services Manager on 6 October 1995. A number of observations and recommendations for necessary repairs and maintenance were made with the major item being the replacement of the roof and guttering.

In accordance with the wishes of Mrs Betty Morrison who donated 8 lots of the reserve, the cottage has since been removed and the site is being restored as bushland. The nature of the cottage in the landscape has been documented and archived in accordance with State Government Guidelines.

In memory of Mrs Morrison's generosity the 8 lots bequeathed by her have since been renamed Betty Morrison Reserve. This name was formally recognised by the Geographical Names Board in August, 2001.

Archaeological Investigations and Aboriginal Sites

Archaeological investigations have been carried out at Bungan Beach, however no Aboriginal sites or other archaeological material has been found. These investigations did, however, reveal that

there is a possibility that Aboriginal burials may be contained within the sand dune area.

Further investigations into Aboriginal sites, including the alleged destruction of an Aboriginal shelter, described as a rock overhang at the base of Bungan Headland, should be carried out.

Objectives

- ❖ To conserve and record areas of archaeological and Aboriginal heritage within the Reserve where considered appropriate.

Performance Targets

- ❖ The recording of heritage sites.
- ❖ The protection of significant heritage sites in the reserve.

Actions

- ❖ Investigate potential archaeological and Aboriginal sites as required.
- ❖ To regenerate and revegetate the site of the cottage in accordance to the Bushland Management Plan approved for demolition.

Performance Assessments

- ❖ The collating of archaeological and Aboriginal heritage data to provide basis for management.

6.14 Traffic and Parking

Demand for car parking spaces in the streets surrounding Bungan Beach Reserve greatly outweighs the supply, especially on weekends during the swimming season. Very limited on-street parking is available and there is no opportunity for a public parking area in the vicinity of the beach due to the steep topography.

The Friends of Bungan have raised concerns to Council in relation to safety and parking, particularly in Karloo Parade at its intersections with Barrenjoey Road and Bungan Head Road. These concerns have been addressed by Council through the Pittwater Traffic Committee. Council has identified a range of works in this regard, including the maintenance of vegetation on road reserves to improve sight distances; local widening and centre line marking of Karloo Parade and Bungan Head Road and continued enforcement by Council's Rangers of local parking restrictions.

Sections of Karloo Parade and Bungan Head Road may require kerb and guttering and footpath construction to improve safety and access. These works should be considered in future works improvements programs.

Myola Road was upgraded by Sydney Water in conjunction with the installation of a sewerage pumping station adjacent to the surf club. Public car parking will not be provided along or at the southern end of Myola Road with the exception of car spaces for people with disabilities.

Objectives

- ❖ The provision of traffic control and parking facilities if appropriate or possible.

Performance Target

- ❖ Traffic and parking issues in the vicinity of Bungan Beach Reserve continue to be addressed by Council in consultation with the Pittwater Traffic Committee as required.
- ❖ Decrease in reports to council of traffic conflicts in the vicinity of Bungan Beach.

Actions

- ❖ Council continues to monitor and address traffic and parking issues in the vicinity of Bungan Beach Reserve in consultation with the Pittwater Traffic Committee.

Performance Assessments

- ❖ Decrease in reports to Council of traffic conflicts in the vicinity of Bungan Beach.

6.15 Boundaries and Development Adjacent to the Reserves

The Reserves of Bungan are adversely impacted by adjoining urban development, including urban run-off and stormwater, dumping, garden escapes and by straying domestic pets. Illegal encroachment into the Reserves is also an issue that needs to be addressed.

Co-operation between Council staff, contract bush regenerators, volunteers and resident groups is necessary to achieve effective management of the Reserve boundaries.

A range of other measures, including clear definition of private boundaries, can be implemented to reduce impacts from neighbouring properties. Most rely on public education.

Whilst urban areas adjacent to the Reserves are established residential areas they will undoubtedly be subject to future development and building works. Under State Environmental Planning Policy No 19, Council is required to take into account the effect of development on urban bushland, in particular on soil erosion, siltation of streams and waterways and the spread of weeds/exotic plants.

In approving such development in areas adjacent to the Reserves of Bungan Beach, the Council will seek to prevent future impact on the Reserves.

Objectives

- ❖ To protect the reserve from impacts associated with boundary effects and neighbours.

Performance Target

- ❖ The reduction in the impacts on the Reserves of Bungan Beach from neighbouring properties.
- ❖ Reclaim land encroachments in the reserve

Actions

- ❖ Educate the residents of Bungan in relation to the impacts of encroachments and dumping into the reserve.
- ❖ Removal of encroachments into the reserve through the clear definition of boundaries.

Performance Assessments

- ❖ Monitor Boundaries of the reserve to identify encroachments.
- ❖ Monitor community understanding and attitudes through feed back and periodic survey.

7.0 References

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Pittwater Council (1998) Strategic Management Plan.

Pittwater Council (1998) Urban Bushland Inventory and Action Plan, Vol. 2, Central Ward Reserves.

APPENDIX 1

Ownership of Land Zoned 9(b) Reservation – County Open Space

Legal Description	Property Address	Land Ownership
Lot 7 DP 877736	13 Beach Road, Newport NSW 2106	Acemadon Pty Ltd
Part A, DP 389344	192 Barrenjoey Road, Newport NSW 2106	T S Lamond
Part B, DP 389344	194 Barrenjoey Road, Newport NSW 2106	J F Delohery
Lot 1 DP 940521	190 Barrenjoey Road, Newport NSW 2106	Mr P S Mabey; Y L Mabey
Lot 1 DP 659140	188 Barrenjoey Road, Newport NSW 2106	A B Nesbitt
Lot 1 DP 656487	186 Barrenjoey Road, Newport NSW 2106	M P Caruana
Lot 2 DP 656486	184 Barrenjoey Road, Newport NSW 2106	R A Gow; J M Gow
Part Lot 3, Section 2, DP 11651	182 Barrenjoey Road, Newport NSW 2106	G H Cooksley
Part Lot 4, Section 2, DP 11651	180 Barrenjoey Road, Newport NSW 2106	B Nesbitt; J Nesbitt
Part Lot 5, Section 2, DP 11651	178 Barrenjoey Road, Newport NSW 2106	P J Shelley
Lot 1 DP 656488	176 Barrenjoey Road, Newport NSW 2106	W K Makin; N M Makin
Lot 2 DP 536058	172 Barrenjoey Road, Newport NSW 2106	R P Hobbs
Lot 1 DP 539523	170 Barrenjoey Road, Newport NSW 2106	P Schott; K M Schott
Lot 2 DP 539523	168A Barrenjoey Road, Newport NSW 2106	R E Jorgensen
Lot 4 DP 29316	166 Barrenjoey Road, Newport NSW 2106	T Bohm
Lot 5 DP 29316	164 Barrenjoey Road, Newport NSW 2106	Mullugeen Pty Ltd.
Lot 2 DP 602462	160 Barrenjoey Road, Newport NSW 2106	Sitil Management Pty Ltd

APPENDIX 2

Key: SH – Species recorded by Susan Horner, March 1997.
EEC – Additional species recorded by Ecotone Ecological Consultants.

SCIENTIFIC NAME	COMMON NAME	SOURCE
FERNS		
ADIANTACEAE		
<i>Adiantum aethiopicum</i>	Common Maidenhair	SH
<i>Adiantum formosum</i>	Giant Maidenhair	SH
BLECHNACEAE		
<i>Blechnum sp.</i>		SH
<i>Doodia aspera</i>	Rasp Fern	SH
DENNSTAEDTIACEAE		
<i>Hypolepis muelleri</i>	Harsh Ground Fern	SH
<i>Pteridium esculentum</i>	Braken	SH
GLEICHENIACEAE		
<i>Gleichenia rupestris</i>	Coral Fern	SH
ANGIOSPERMS		
ACANTHACEAE		
<i>Pseuderanthemum variabile</i>	Pastel Flower	SH
AIZOACEAE		
<i>Tetragonia tetragonioides</i>	Warrigal Cabbage	SH
APIACEAE		
<i>Centella asiatica</i>		SH
ARALIACEAE		
<i>Polyscias sambucifolia</i>	Elderberry Panax	SH
ASCLEPIADACEAE		
<i>Marsdenia rostrata</i>	Common Milk Vine	SH
<i>Marsdenia suaveolens</i>	Sweet-scented Doubah	SH
<i>Tylophora barbata</i>		SH
ASTERACEAE		
<i>Brachycome sp.</i>		SH
<i>Craspedia variabilis</i>	Billy Buttons	SH
<i>Sigesbeckia orientalis</i>	Indian Weed	SH
BIGNONIACEAE		
<i>Pandorea pandorana</i>	Wonga-Wonga Vine	SH
CASUARINACEAE		
<i>Allocasuarina distyla</i>		SH
<i>Allocasuarina verticillata</i>	Drooping She-Oak	SH
CARYOPHYLLACEAE		
* <i>Cassine australis</i>	Red-fruited Olive Plum	EEC

CASSYTHACEAE		
<i>Cassytha pubescens</i>	Common Devil's Twine	SH
CHENOPODIACEAE		
<i>Einadia hastata</i>		SH
CONVOLVULACEAE		
<i>Dichondra repens</i>	Kidney Weed	SH
<i>Polymeria calycina</i>	Swamp Bindweed	SH
DILLENIACEAE		
<i>Hibbertia aspera</i>	Rough Guinea Flower	SH
<i>Hibbertia dentata</i>	Twining Guinea Flower	SH
<i>Hibbertia scandens</i>	Golden Guinea Flower	SH
EPACRIDACEAE		
<i>Acrotriche divaricata</i>		SH
<i>Epacris pulchella</i>	NSW Coral Heath	SH
<i>Leucopogon parviflorus</i>		SH
<i>Leucopogon muticus</i>		EEC
EUPHORBIACEAE		
<i>Breynia oblongifolia</i>	Breynia	SH
<i>Glochidion ferdinandi</i>	Cheese tree	SH
<i>Omalanthus populifolius</i>	Bleeding Heart	SH
FABACEAE		
<i>Glycine sp.</i>	Love Creeper	SH
<i>Hardenbergia violacea</i>	False Sarsaparilla	SH
<i>Kennedia rubicunda</i>	Dusky Coral Pea	SH
<i>Pultenaea sp.</i>	Bush Pea	SH
GERANIACEAE		
<i>Geranium sp.</i>	Cranesbill	SH
<i>Pelargonium australe</i>	Coastal Geranium	SH
GOODENIACEAE		
<i>Goodenia ovata</i>	Hop-Goodenia	SH
<i>Scaevola ramosissima</i>	Snake-flower	SH
HALORAGACEAE		
<i>Gonocarpus teucrioides</i>	Germander Raspwort	SH
LAMIACEAE		
<i>Prostanthera denticulata</i>		SH
<i>Westringia fruticosa</i>	Coast Westringia	SH
LOBELIACEAE		
<i>Lobelia alata</i>		SH
<i>Pratia purpurascens</i>	White Root	SH
MENISPERMACEAE		
<i>Sarcopetalum harveyanum</i>	Pearl Vine	SH
<i>Stephania japonica</i>	Stephania	SH
MIMOSACEAE		
<i>Acacia longifolia</i>	Sydney Golden Wattle	SH
<i>Acacia myrtifolia</i>	Myrtle Wattle	SH

<i>Acacia sophorae</i>		SH
<i>Angophora floribunda</i>	Rough-barked Apple	SH
MORACEAE		
<i>Ficus coronata</i>	Sandpaper Fig	SH
MYRSINACEAE		
<i>Rapanea variabilis</i>	Mutton Wood	SH
MYRTACEAE		
<i>Acmena smithii</i>	Lillypilly	SH
<i>Backhousia myrtifolia</i>	Grey Myrtle	EEC
<i>Callistemon salignus</i>	Willow Bottlebrush	EEC
<i>Eucalyptus botryoides</i>	Bangalay	SH
<i>Kunzea ambigua</i>	Tick Bush	SH
<i>Melaleuca armillaris</i>	Giant Honeymyrtle	SH
<i>Melaleuca hypericifolia</i>		SH
<i>Leptospermum laevigatum</i>	Coastal Tea-tree	SH
<i>Syncarpia glomulifera</i>	Turpentine	SH
OLEACEAE		
<i>Notelaea longifolia</i>	Mock Olive	SH
ONAGRACEAE		
<i>Epilobium sp.</i>	Willow Herb	SH
PASSIFLORACEAE		
<i>Passiflora herbertiana</i>		EEC
PITTOSPORACEAE		
<i>Billardiera scandens</i>	Apple Berry	SH
<i>Pittosporum undulatum</i>	Sweet Pittosporum	SH
PROTEACEAE		
<i>Banksia integrifolia</i>	Coastal Banksia	SH
<i>Banksia serrata</i>	Old Man Banksia	EEC
<i>Hakea gibbosa</i>		SH
<i>Hakea teretifolia</i>	Dagger Hakea	SH
<i>Persoonia levis</i>	Smooth Geebung	
RANUNCULACEAE		
<i>Clematis aristata</i>	Old Man's Beard	SH
<i>Clematis glycinoides</i>	Forest Clematis	SH
RHAMNACEAE		
<i>Pomaderris sp. aff. phyllicifolia</i>		SH
RUBIACEAE		
<i>Morinda jasminoides</i>	Jasmine Morinda	SH
RUTACEAE		
<i>Zieria smithii</i>	Sandfly Zieria	SH
SMILACACEAE		
<i>Smilax glycyphylla</i>	Native Sarsaparilla	SH
STERCULIACEAE		
<i>Lasiopetalum ferruginum var. ferruginum</i>	Rusty Petals	SH

THYMELAEACEAE		
<i>Pimelea linifolia</i> ssp. <i>linifolia</i>	Rice Flower	SH
VIOLACEAE		
<i>Viola hederacea</i>	Native Violet	SH
VITACEAE		
<i>Cayratia clematidea</i>	Slender Grape	SH
<i>Cissus antarctica</i>	Kangaroo Grape	SH
<i>Cissus hypoglauca</i>	Water Vine	SH
MONOCOTYLEDONS		
ARACEAE		
<i>Gymnostachys anceps</i>	Settlers Flax	SH
COMMELINACEAE		
<i>Commelina cyanea</i>	Scury Weed	SH
CYPERACEAE		
<i>Baumea</i> sp.	Twig Rush	SH
<i>Bolboschoenus caldwellii</i>		SH
<i>Cyperus laevis</i>		SH
<i>Cyperus difformis</i>		SH
<i>Cyperus polystachyos</i>		SH
<i>Gahnia</i> sp.	Saw Sedge	SH
<i>Isolepis nodosus</i>		SH
<i>Schoenus ? melanostachys</i>		SH
JUNCACEAE		
<i>Juncus bufonius</i>		SH
LILIACEAE		
<i>Burchardia umbellata</i>	Milkmaids	SH
<i>Caesia parviflora</i>	Pale Grass-lily	SH
<i>Dianella caerulea</i>	Blue Flax Lily	SH
<i>Schelhammera undulata</i>	Lilac Lily	SH
<i>Thysanotus</i> sp.	Fringe Lily	SH
PHILESIACEAE		
<i>Eustrephus latifolius</i>	Wombat Berry	SH
<i>Geitonoplesium cymosum</i>	Scrambling Lily	SH
POACEAE		
<i>Agrostis billardieri</i>		SH
<i>Entolasia marginata</i>		SH
<i>Imperata cylindrica</i>	Blady Grass	SH
<i>Microlaena stipoides</i>	Weeping Grass	SH
<i>Oplismenus aemulus</i>	Basket Grass	SH
<i>Phragmites australis</i>	Native Reed	EEC
<i>Poa affinis</i>		SH
<i>Spinifex sericeus</i>	Spinifex	SH
<i>Themeda triandra</i>	Kangaroo Grass	SH
XANTHORRHOEACEAE		
<i>Lomandra longifolia</i>	Mat Rush	SH

APPENDIX 3

Intertidal Species on Mona Vale Headland and Mona Vale Beach rock platforms

Plants

Phylum Chlorophyta (Green Algae)

Family Ulvaceae *Ulva lactuca* (Sea Lettuce)
Enteromorpha intestinalis

Phylum Phaeophyta (Brown Algae)

Family Hormorioiraceae *Hormosira banksii* (Neptunes Necklace)
Family Scytosiphonaceae *Colpomenia sinuosa* (Bubble Weed)
Padina pavonea (Ribbed Fan)
Family Dictyoceae *Dictyota dichotoma* (Brown Weed)

Phylum Rhodophyta (Red Algae)

Family Coralinaceae *Coralina officianalis* (Red coralina algae)

Invertebrates

Phylum Cnidaria

Class Anthozoa
Order Actinaria *Actinia tenebrosa* (Waratah Anemone)
(Anemones) *Cnidopus verata* (Green smooth anemone)
Oulactis muscosa (Red mouthed anemone)

Phylum Annelida

(Segmented Worms)

Class Polychaeta (Tube Worms)
Family Sabellidae *Sabellistarte sp*
Family Serpulidae *Galeolaria caespitosa* (Sydney Coral)

Phylum Arthropoda (Arthropods)

Sub Phylum Crustacea (Crustaceans)

Class Cirripedia (Barnacles)
Chamaesipho tasmanica (Honeycomb barnacle)
Austrobalanus imperator (Imperial Barnacle)
Catomerus polymerus (Surf barnacle)
Tesseroporea rosea (Pink surf barnacle)
Class Decapoda
Family Grapsidae *Leptograpsus variegatus* (Swift-footed crab)
Plagusia chabrus (Red bait crab)

Phylum

Mollusca

Class Gastropoda (Gastropods)
Family Haliotidae *Haliotis rubra* (Abalone)
Family Patellidae *Cellana tramoserica* (Brown/Orange limpet)
Family Trochidae *Austrocochlea constricta* (Zebra periwinkle)
Family Turbinidae *Australium tentoriforme* (Tent shells)
Turbo torquatus (Grey turban)
Turbo undulatus (Green turban)
Family Neritidae *Nerita atramantosa* (Black periwinkle)
Family Littorinidae *Nodilittorina unifasciata*
Nodilittorina pyramidalis
Bembicum nanum (Black/Brown periwinkle)
Family Muricidae *Morula marginalba* (Mulberry shell)
Thais orbita (Cart rut shell)

Family Siphonariidae

Siphonaria denticulata (Flase limpet)

Family Cymatidae	<i>Cabestana spengleri</i> (Triton shell) <i>Cymatium</i> (Septa) <i>parthenopeum</i> (Hairy oyster borer)
Sub-class Ophostobranchia	
Family Aplysidae	<i>Aplysia sydneyensis</i>
Class Bivalvia (Bivalves)	
Family Pectinidae	<i>Scaeoclamys lividus</i> (Scaly Scallop)
Family Ostreidae	<i>Saccostea glomerata</i> (Sydney Rock Oyster)
Phylum Echinodermata	
Class Asteroidea (Seastars)	
Family Asterinidae	<i>Patiriella calcar</i> (8-armed Seastar) <i>Patiriella exigua</i> (5-armed stubby Seastar)
Class Echinoidea (Sea urchins)	
Family Echinometridae	<i>Helicidaris erythrogramma</i> (Common Urchin) <i>Helicidaris tuberculata</i> (Lord Howe Urchin)
Phylum Chordata	
Class Ascidiacea	
Family Pyuridae	<i>Pyura stolonifera</i> (Cunjevoi)

APPENDIX 4

Introduced flora species list for Bungan Beach Reserve

SCIENTIFIC NAME	COMMON NAME	NOXIOUS WEED CATAGORY	SOURCE
<i>Acetosa sagittata</i>	Turkey Rhubarb	W4c	MW
<i>Ageratina adenophora</i>	Crofton Weed		MW
<i>Araujia sericifolia</i>	Moth Vine	W4c	MW
<i>Arundo donax</i>	Giant Reed	W4c	MW
<i>Cakile edentula var. edentula</i>	Sea Rocket		MW
<i>Centuarium tenuiforum</i>	Common Centuary		MW
<i>Cestrum parqui</i>	Green Cestrum	W2	MW
<i>Cinnamomum camphora</i>	Camphor Laurel		MW
<i>Conyza sp.</i>	Fleabane		MW
<i>Coprosma repens</i>	Mirror Plant		MW
<i>Cortaderia selloana</i>	Pampass Grass	W2	MW
<i>Cotoneaster glaucophyllus</i>	Cotoneaster		MW
<i>Delairea odorata</i>	Cape Ivy		MW
<i>Digitaria didactyla</i>	Queensland Blue Couch		MW
<i>Ehrharta erecta</i>			MW
<i>Erythrina x sykesii</i>	Coral Tree		MW
<i>Hedychium gardnerianum</i>	Ginger Lily		MW
<i>Hydrocotyle binariensis</i>	Pennywort		MW
<i>Hypochaeris radicata</i>	Catsear		MW
<i>Ipomoea cairica</i>	Coastal Morning Glory		MW
<i>Ipomea indica</i>	Morning Glory	W4c	MW
<i>Lantana camara</i>	Lantana	W2	MW
<i>Lonicera japonica</i>	Honeysuckle	W4c	MW
<i>Nephrolepis cordifolia</i>	Fishbone Fern		MW
<i>Nothoscordum borbonicum</i>	Onion Weed		MW
<i>Ochna serrulata</i>	Mickey Mouse Plant	W4b	MW
<i>Olea europaea</i>	Mock Olive		MW
<i>Opuntia sp.</i>	Prickly Pear		FoB
<i>Paspalum dilatatum</i>	Paspalum		MW
<i>Plantago lanceolata</i>	Common Plantain		MW
<i>Protasparagus aethiopicus</i>	Asparagus Fern	W4c	MW
<i>Rubus ulmifolius</i>	Blackberry		MW
<i>Senecio madagascariensis</i>	Fire Weed		MW
<i>Senecio tamoides</i>			MW
<i>Senna pendula var. glabra</i>	Cassia Senna		MW
<i>Solanum nigrum</i>	Blackberry Nightshade		MW
<i>Sonchus oleraceus</i>	Common Sowthistle		MW
<i>Stenotaphrum secundatum</i>	Buffalo Grass		MW
<i>Tradescantia albiflora</i>	Wandering Jew		MW
<i>Verbena bonariensis</i>	Purple Top		MW
<i>Vicia spp.</i>	Vetch		MW

KEY:

W2	The weed must be fully & continuously suppressed & destroyed
W4	The action specified in the declaration must be taken in respect of the weed:
b	Shall not be sold, propagated or knowingly distributed. No part of the plant can grow within 3m of property boundary.
c	Shall not be sold, propagated or knowingly distributed. Occupier must prevent spread to adjoining property.
FoB	Additional species reported by Friends of Bungan
MW	Species reported by Mikala Wetzler

APPENDIX 5

Fauna Species List for Bungan Beach and Headland Reserve

KEY	1	Detected during survey by Ecotone Ecological Consultants (1995).
	2	Anecdotal Evidence (listed as occurring in the area by 'Friends of Bungan').
	*	Denotes introduced / non-indigenous species.
	+	Considered to be of regional significance by Pittwater Council.
	?	Species identification requiring confirmation.
	Bold	Threatened Species (listed on Schedule 12 of the Threatened Species Conservation Act, 1995).

SCIENTIFIC NAME	COMMON NAME	SOURCE
TERRESTRIAL INVERTEBRATES		
Family Lycaenidae <i>Deudorix epijarbas</i>	Deudorix Butterfly	2
BIRDS		
ORDER FALCONIFORMS		
Family Accipitridae – Eagles, Goshawks, Harriers, Kites <i>Elanus notatus</i>	Black-shouldered Kite	1, 2
<i>Haliaster sphenurus</i>	Whistling Kite	2
Family Falconidae – Falcons <i>Falco peregrinus</i> + <i>Falco cenchroides</i>	Peregrine Falcon Australian Kestrel	2 1, 2
ORDER CHARADRIIFORMES		
Family Charadriidae – Plovers, Dotterels <i>Vanellus miles</i>	Masked Lapwing	2
ORDER COLUMBIFORMES		
Family Columbidae – Pigeons, Doves <i>Streptopelia chinensis</i> *	Spotted Turtle-dove	1, 2
<i>Geopelia placida</i>	Peaceful Dove	2
<i>Ocyphaps lophotes</i>	Crested Pigeon	2
ORDER PSITTACIFORMES		
Family Cacatuidae – Cockatoos <i>Cacatua roseicapilla</i>	Galah	2
<i>Cacatua sanguinea</i>	Little Corella	2
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	2
Family Loriidae – Lorikeets <i>Trichoglossus haematodus</i>	Rainbow Lorikeet	1, 2
<i>Trichoglossus chlorolepidots</i>	Scaly-breasted Lorikeet	2

SCIENTIFIC NAME	COMMON NAME	SOURCE
Family Polytelitidae – Long-tailed Parrots <i>Polytelis swainsonii</i> ?	Superb Parrot	2
Family Platycercidae – Broad-tailed Parrots <i>Platycercus elegans</i>	Crimson Rosella	2
<i>Platycercus eximius</i>	Eastern Rosella	2
ORDER CUCULIFORMES		
Family Cuculidae – Cuckoos, Coucals <i>Cuculus pallidus</i>	Pallid Cuckoo	2
<i>Cuculus pyrrhophanus</i>	Fan-tailed Cuckoo	2
<i>Chrysococcyx lucidus</i>	Shining Bronze-cuckoo	2
<i>Eudynamys scolopacea</i>	Common Koel	2
<i>Centropus phasianinus</i>	Pheasant Coucal	2
ORDER STRIGIFORMES		
Family Strigidae – Hawk Owls <i>Ninox strenua</i> ?	Powerful Owl	2
<i>Ninox novaeseelandiae</i> ?	Southern Boobook	2
ORDER CAPRIMULGIFORMES		
Family Podargidae – Frogmouths <i>Podargus strigoides</i>	Tawny Frogmouth	2
ORDER CORACIIFORMES		
Family Alcedinidae – Kingfishers, Kookaburras <i>Dacelo novaeguineae</i>	Laughing Kookaburra	2
<i>Halycon sancta</i>	Sacred Kingfisher	2
Family Coraciidae – Rollers <i>Eurystomas orientalis</i>	Dollarbird	2
ORDER PASSERIFORMES		
Family Hirundinidae – Swallows, Martins <i>Hirundo neoxana</i>	Welcome Swallow	1, 2
Family Campephagidae – Cuckoo-shrikes, Trillers <i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	2
Family Pycnonotidae – Bulbuls <i>Pycnonotus jocosus</i> *	Red-whiskered Bulbul	1, 2
Family Muscicapidae – Thrushes, Flycatchers, Monarchs, Fantails <i>Pachycephala pectoralis</i>	Golden Whistler	2
<i>Pachycephala rufiventris</i>	Rufous Whistler	2
<i>Monarcha trivirgatus</i>	Spectacled Flycatcher (Monarch)	2
<i>Rhipidura rufifrons</i>	Rufous Fantail	2
<i>Rhipidura fuliginosa</i>	Grey Fantail	2
<i>Rhipidura leucoprys</i>	Willie Wagtail	2

SCIENTIFIC NAME	COMMON NAME	SOURCE
Family Orthonychidae – Chowchillas, Quails <i>Psophodes olivaceus</i>	Eastern Whipbird	1, 2
Family Maluridae – Fairy Wrens <i>Malurus cyaneus</i> <i>Maurus lamberti</i>	Superb Fairy-wren Variegated Fairy-wren	1, 2 2
Family Acanthizidae- Bristlebirds, Scrubwrens, Gerygones, Thornbills <i>Sericornis frontalis</i> <i>Acanthiza pusilla</i> <i>Acanthiza nana</i>	White-browed Scrub-wren Brown Thornbill Yellow-rumped Thornbill	2 2 1
Family Meliphagidae – Honey-eaters <i>Anthochaera carunculata</i> <i>Anthochaera lunulata</i> <i>Philemon corniculatus</i> <i>Manorina melanocephala</i> <i>Phylidonyris novaehollandiae</i> <i>Phylidonyris nigra</i> <i>Acanthorhynchus tenuirostris</i> <i>Myzomela sanguinolenta</i>	Red Wattlebird Little Wattlebird Noisy Friarbird Noisy Miner New Holland Honeyeater White-cheeked Honeyeater Eastern Spinebill Scarlet Honeyeater	2 1, 2 1 2 2 1, 2 2 2
Family Pardalotidae – Pardalotes <i>Pardalotus punctatus</i>	Spotted Pardalote	2
Family Zosteropidae – White-eyes <i>Zosterops lateralis</i>	Silvereye	2
Family Passeridae – Sparrows <i>Passer domesticus*</i>	House Sparrow	1, 2
Family Sturnidae – Starlings, Mynahs <i>Sturnus vulgaris*</i> <i>Acridotheres tristis*</i>	Common Starling Common Mynahs	2 1, 2
Family Dicruridae – Drongos <i>Dicrurus hottentottus</i>	Spangled Drongo	2
Family Grallinidae – Magpie-larks <i>Grallina cyanoleuca</i>	Australian Magpie-lark	2
Family Artamidae – Woodswallows <i>Artamus cyanopterus</i>	Dusky Woodswallow	2
Family Cracticidae – Butcherbirds, Currawongs <i>Cracticus torquatus</i> <i>Gymnorhina tibicen</i> <i>Strepera graculina</i>	Grey Butcherbird Australian Magpie Pied Currawong	1, 2 1, 2 1, 2
Family Coronoides – Ravens, Crows <i>Corvus coronoides</i>	Australian Raven	2

SCIENTIFIC NAME	COMMON NAME	SOURCE
REPTILES		
Family Agamidae <i>Amphibolurus muricatus</i>	Eastern Water Dragon	2
Family Scincidae	Red-throated Skink	1
<i>Eulamprus quoyii</i>	Eastern Water Skink	1
<i>Lampropholis delicata</i>	Grass Skink	1
<i>Tiliqua scincoides</i>	Eastern Blue-tongued Lizard	1, 2
Family Elapidae	Golden Crowned Snake	1
<i>Cacophis squamulosus</i>	Yellow-faced Whip Snake	2
<i>Demansia psammophis</i>	Red-bellied Black Snake	2
<i>Pseudechis porphyriacus</i>		
MAMMALS		
MONOTREMES		
Family Trachyglossidae <i>Tachyglossus aculeatus</i>	Echidna	2
MARSUPIALS		
Family Peramelidae <i>Perameles nasuta</i> +	Long-nosed Bandicoot	1, 2
Family Petauridae <i>Pseudocheirus peregrinus</i>	Common Ringtail Possum	2
Family Phalangeridae <i>Trichosurus vulpecula</i>	Common Brushtail Possum	1, 2
EUTHERIANS		
Family Muridae <i>Rattus Rattus</i> *	Black Rat	1

For appendix 6 see bungan beach weeds file.