

**PLAN OF MANAGEMENT
URBAN BUSHLAND**

VOLUME 1

PITTWATER COUNCIL

Landuse Planning Table (adopted for this plan by council on the 11/2/2001)

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 stabilization 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)	Vehicle access (emergency access, fire breaks and service trails).	Private alienation or encroachment
Minor public drainage and stormwater works		Introduction of exotic flora and fauna
Minor fences		Playground facilities
Compliance, directional, interpretive, 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 stabilization 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

Contents

1. INTRODUCTION	1
1.1. WHAT IS A PLAN OF MANAGEMENT?	1
1.2. SCOPE OF THIS PLAN OF MANAGEMENT	1
1.2.1. LOCAL GOVERNMENT ACT (1993)	1
1.2.2. STRUCTURE OF THIS PLAN OF MANAGEMENT	2
1.2.3. HOW DOES THIS PLAN DIFFER FROM OTHER PLANS AND POLICIES?	2
1.3. GEOGRAPHICAL CONTEXT	3
1.3.1. WHERE DOES THIS PLAN OF MANAGEMENT APPLY?	3
1.4. AIMS AND OBJECTIVES OF THE PLAN OF MANAGEMENT	4
1.4.1. COUNCIL MANAGEMENT OBJECTIVES	4
1.4.2. COUNCIL STATUTORY RESPONSIBILITIES	4
1.4.3. OTHER COMMUNITY AND GOVERNMENT RESPONSIBILITIES	5
1.5. EXTENT OF BUSHLAND INCLUDED IN THIS PLAN OF MANAGEMENT	6
2. VALUE AND MANAGEMENT OF BUSHLAND AREAS	8
2.1. VALUE STATEMENT	8
2.2. ALLOCATION OF RESOURCES FOR MANAGEMENT	8
3. RESOURCE OVERVIEW	9
3.1. SOIL LANDSCAPES	9
3.2. LANDFORM	11
3.3. PLANT COMMUNITIES	12
3.4. FAUNA	14
4. MANAGEMENT ISSUES, POLICIES AND PERFORMANCE TARGETS	15
4.1. EDUCATION AND COMMUNITY PARTICIPATION	15
4.1.1. PUBLIC AWARENESS / EDUCATION / SCIENTIFIC RESEARCH	15
4.1.2. COMMUNITY PARTICIPATION IN MANAGEMENT	18
4.2. URBAN IMPACT MITIGATION	20
4.2.1. URBAN RUN-OFF AND STORMWATER DISCHARGE	22
4.2.2. SOIL EROSION AND SEDIMENTATION	26
4.2.3. BOUNDARY MANAGEMENT	29
4.2.4. DEVELOPMENT ADJOINING BUSHLAND	31
4.2.5. OTHER DISTURBANCES	33
4.3. BIODIVERSITY	35

4.3.1. PLANT COMMUNITIES	36
4.3.2. WEED MANAGEMENT	40
4.3.3. BUSHLAND RESTORATION AND REGENERATION	43
4.3.4. FAUNA MANAGEMENT	46
4.4. FIRE MANAGEMENT	50
4.4.1. ECOLOGICAL AND HAZARD REDUCTION	50
4.5. RECREATION / ACCESS	55
4.5.1. RECREATION STRUCTURES AND FACILITIES IN BUSHLAND	55
4.5.2. ACCESS THROUGH / INTO BUSHLAND	58
4.6. TRAINING / OPERATIONS	60
4.6.1. CONTRACT AND VOLUNTEER LABOUR	60
4.6.2. COUNCIL STAFF	63
4.7. PLANNING AND ADMINISTRATION	64
4.7.1. BUSHLAND IN NEW URBAN RELEASE AREAS	64
4.7.2. LEASES AND LICENCES	67
4.8. LANDS NOT UNDER THE CARE AND CONTROL OF COUNCIL	69
4.8.1. BUSHLAND ON PRIVATE PROPERTY	69
4.9. OTHER AUTHORITIES	71
4.9.1. MITIGATING IMPACTS OF OTHER AUTHORITIES ON BUSHLAND	71
4.10. HERITAGE MANAGEMENT	74
4.10.1. ABORIGINAL AND EUROPEAN SITES	74
5. REFERENCES	77
6. DEFINITIONS	77
7. SUPPORTING MATERIALS	80
7.1. STATE ENVIRONMENTAL PLANNING POLICY 19 - BUSHLAND IN URBAN AREAS	80
7.2. NSW DEPARTMENT OF URBAN AFFAIRS AND PLANNING CIRCULAR B13	86
7.3. PITTWATER TREE PRESERVATION ORDER	93
7.4. NOXIOUS WEEDS OF PITTWATER (AS AT 19 MAY, 1995)	97
8. SCHEDULE OF LAND	98

1. INTRODUCTION

1.1. WHAT IS A PLAN OF MANAGEMENT?

A plan of management is a document that provides a framework for the management of a park or recreation area... the central product that governs the use and management of community land...

Department of Conservation and Land Management
Manidis Roberts 1993.

Plans of Management are required by several Acts of Parliament in NSW (Local Government Act 1993, National Parks and Wildlife Act 1974, Crown Lands Act 1989, Environmental Planning and Assessment Act 1979).

1.2. SCOPE OF THIS PLAN OF MANAGEMENT

1.2.1. LOCAL GOVERNMENT ACT (1993)

Since the establishment of Pittwater Council (formerly a part of the Warringah Shire), the Bushland Plan of Management for Warringah Shire Council has been adopted by Council for all the bushland areas in Pittwater. However, with the introduction of the NSW Local Government Act (1993), a review of the existing Plan of Management was required to bring it up to the requirements of the new Act.

Whilst the existing Plan of Management was used as a base, significant additions and modifications have been included.

This Plan of Management for Bushland in Pittwater has been prepared under the requirements of the NSW Local Government Act (1993).

The land that this Plan addresses is community land listed in Section 8.

The category of the land that this Plan of Management addresses is "natural areas" which is further categorised as "bushland".

The Plan contains objectives and performance targets.

The means by which Council proposes to achieve the plan's objectives and performance targets are through the Action Plan which contains a 3 year program of works to be carried out with actions prioritised, costs and responsibilities identified, and performance targets set.

The manner in which Council proposes to assess its performance with respect to the Plan's objectives and performance targets is through an annual review in the State of the Environment Report.

1.2.2. STRUCTURE OF THIS PLAN OF MANAGEMENT

This plan of management has been prepared in 2 volumes:

1.2.3. HOW DOES THIS PLAN DIFFER FROM OTHER PLANS AND POLICIES?

Other Plans of Management

A key role of the Urban Bushland Plan of Management is to establish clear and consistent management policies across all bushland areas.

In recent years Council has produced several Plans of Management for individual reserves eg. *Angophora Reserve and Hudson Park Plan of Management, McKay Reserve Plan of Management.*

The key difference is in the level that each plan works.

The Urban Bushland Plan of Management can be seen as an “*umbrella*” plan for all bushland areas. In this way, Reserve Management Plans can be produced for significant bushland reserves with a consistent set of policies and performance targets.

Essentially, the Reserve Plans of Management allow for the fine tuning of management strategies and policies established in the Urban Bushland Plan of Management.

Other Policies

Council has developed several policy and guideline documents relating to bushland management. Where possible, most of these policies and guidelines have been incorporated into this Urban Bushland Plan of Management. However, in the event of any inconsistency in policy between this Urban Bushland Plan of Management and other Council policy or guidelines documents, the policies contained in the Urban Bushland Plan of Management shall prevail to the extent of the inconsistency.

1.3. GEOGRAPHICAL CONTEXT

1.3.1. WHERE DOES THIS PLAN OF MANAGEMENT APPLY?

The Urban Bushland Plan of Management applies to the Pittwater Local Government Area.

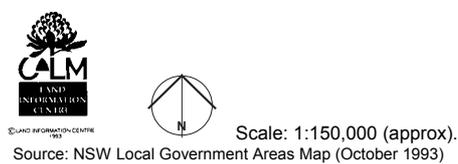


Figure 1 - Pittwater Local Government Area

1.4. AIMS AND OBJECTIVES OF THE PLAN OF MANAGEMENT

The Urban Bushland Plan of Management aims to:

- Fulfil Council's management objectives;
- Fulfil Council's statutory responsibilities under NSW Legislation;
- Fulfil Council's responsibilities under other community and Government programs and policies;
- Manage bushland in such a way as to maintain biodiversity in the long term;
- Manage bushland to maximise its value as part of the natural heritage of Pittwater;
- Manage bushland for its aesthetic, recreational, education and scientific values to the community.

1.4.1. COUNCIL MANAGEMENT OBJECTIVES

The Pittwater Council Management Plan (1994-1997) identifies Council's corporate goals and objectives for environmental management.

Corporate Goals

Pittwater Council will manage its area in a manner consistent with industry best practice within a consultative democratic framework and in accordance with the identified needs of our community by:

- *conserving and enhancing the unique environmental qualities of Pittwater by ensuring that land use and development reflects the expectations of the residents to conserve the natural environment and enhance the heritage, recreational and community values.*

Council Operations - Principal Objective

To manage the environmental resources of Pittwater to meet the land use and development needs of the people in a sustainable manner consistent with the needs to conserve the natural environment and enhance heritage, recreational and community values

1.4.2. COUNCIL STATUTORY RESPONSIBILITIES

Council has many functions conferred or imposed on it by or under several Acts of NSW Parliament, some of which directly or indirectly affect bushland management. These Acts and Government policies include (but are not restricted to):

Local Government Act (1993)

Establishes the new requirements for Council identification, classification and management of land owned or controlled by Council.

Environmental Planning and Assessment Act (1979)

Ensures that the effects on the natural environment, along with social and economic factors, are taken into account by Council in either granting approval for or undertaking works, developments or activities.

The Environmental Planning and Assessment Act (EPAA) is also the enabling legislation for several State Environmental Planning Policies which have a direct influence on bushland management including:

- State Environmental Planning Policy (SEPP) 19 - Bushland in Urban Areas
- State Environmental Planning Policy (SEPP) 44 - Koala Habitat

Bushfires Act (1949)

Clean Waters Act (1970)

NSW Department of Urban Affairs and Planning Circular C10 - Planning in Fire Prone Areas

National Parks and Wildlife Act (1974)

Endangered Fauna (Interim Protection) Act (1991)

1.4.3. OTHER COMMUNITY AND GOVERNMENT RESPONSIBILITIES

Ecologically Sustainable Development Principles

The Inter-governmental Agreement on the Environment has committed all Australian Governments to the concept of ecologically sustainable development in the assessment of natural resources, land use decisions and approval processes.

Ecologically sustainable development is defined as an activity or development which “...*meets the needs of the present without compromising the ability of future generations to meet their own needs.*” (Brudtland, 1987)

A series of principles are applied in the assessment of development within the context of ecological sustainability:

A. Precautionary Principle

If there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

B. Inter-generational Equity

The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.

C. Biological Diversity

The conservation of biological diversity and ecological integrity.

1.5. EXTENT OF BUSHLAND INCLUDED IN THIS PLAN OF MANAGEMENT

Definition of Bushland

Bushland is defined broadly under State Environmental Planning Policy 19 - Bushland in Urban Areas as:

“...land on which there is vegetation which is either a remainder of the natural vegetation of the land or, if altered, is still representative of the structure and floristics of the natural vegetation.” Clause 4 (1)

The Department of Urban Affairs and Planning Circular B13 further discusses the definition of bushland under the Policy, identifying three additional important points required to be considered when determining the status of an area as bushland:

1. The definition reflects the dynamic nature of bushland and the variation in its type and condition in the urban setting;
2. It allows for the fact that many disturbed areas may be restored and regenerated with suitable management;
3. The definition should be interpreted liberally rather than restrictively to exclude areas from the Policy.

In recent years, there has been a considerable shift in the assessment of what constitutes bushland under the Policy. Areas which are extremely modified in their native plant community structure (but which have native soil still dominant) were once considered “non-regenerable” and as such not bushland under the Policy. However, with the development of successful bushland regeneration and restoration techniques and the advancement of the science of restoration ecology, these areas are now usually considered to be bushland under the Policy due to the potential to be regenerated. This is also in keeping with the application of the precautionary principle.

More detailed information on the definition of bushland is contained in Sections 7.1 - State Environmental Planning Policy 19 - Bushland in Urban Areas (pg. 80) and 7.2 - NSW Department of Urban Affairs and Planning Circular B13 (pg. 86).

Bushland Areas Included in this Plan

The management issues, policies and performance targets outlined in this Urban Bushland Plan of Management are largely targeted towards bushland on community lands - as these are the principle areas of Council statutory responsibilities. However, State Government Policies (eg. State Environmental Planning Policy 19 - Bushland in Urban Areas) requires Council, as part of its statutory responsibilities under the Policy, to take into account certain issues relating to bushland and development on private lands adjoining community lands. As such, the policies and performance targets for bushland and development on some private property are also covered in this plan.

A third area of importance in relation to bushland management in the Pittwater Local Government Area is the management of bushland on lands managed by other Authorities (eg. NSW National Parks and Wildlife Service). Whilst Council has no statutory responsibilities or direct management role on these lands, policies and performance targets have been included in this plan where a co-ordinated approach to bushland management is required between Council and these other Authorities.

Detailed maps indicating the extent of all bushland located on community land and lands managed by other authorities is provided in Volume 2 (Inventory and Action Plan) of the Urban Bushland Plan of Management.

Bushland on Community Lands

Pittwater Local Government Area contains approximately 350 hectares of bushland within its boundaries (excluding Ku-ring-gai Chase National Park), which is under the care, control and management of Council. The bushland is distributed throughout the area in reserves which vary greatly in size, shape and plant communities. The Pittwater area as a whole contains a diverse range of remnant bushland, with several large bushland reserves. These are listed in Section 8 of this Plan.

Bushland on Private Lands

Bushland on private lands contributes significantly to the many important issues in Pittwater including:

- maintenance of biodiversity in the region
eg. some regionally rare plant communities present in the area occur only on private lands
- the development of an attractive, visual character for the area;
eg. large sections of residential development in the Pittwater area are on steep, visually prominent lands and foreshores. Bushland remaining on these lands contribute significantly to the visual character of the area whilst assisting with preventing erosion and land-slipping.
- provision of important fauna habitat
eg. Koala food trees.

Bushland Managed by Other Authorities

Large areas of bushland within the Local Government Area are under the management of other Authorities eg. Ku-ring-gai Chase National Park (NSW National Parks and Wildlife Service) and Katandra Sanctuary (Department of Land and Water Conservation)

2. VALUE AND MANAGEMENT OF BUSHLAND AREAS

2.1. VALUE STATEMENT

Bushland is identified to have several general and specific values under State Environmental Planning Policy 19 - Bushland in Urban Areas. These include:

General Values

- value to the community as part of the natural heritage;
- aesthetic values;
- a recreational, education and scientific resource.

Specific Values

- remnants of plant communities which were once characteristic of land now within the urban area;
- areas containing rare and endangered flora and fauna;
- areas containing habitats for native flora and fauna;
- wildlife corridors and vegetation links;
- a stabiliser of the soil surface;
- scenic values - a retainer of the unique visual identity of the landscape;
- areas containing significant geological features, existing natural landforms, archaeological relics;
- an accessible community resource.

Bushland as a Community Asset

Furthermore, Bushland is now identified as a community asset (similar to roads, buildings and playing fields etc.) under the Local Government Act (1993).

2.2. ALLOCATION OF RESOURCES FOR MANAGEMENT

Due to the pattern of development in Pittwater and many other local government areas in the Sydney region, bushland both in and outside of reserves represent fragmented remnants of a once much broader and more diverse ecosystem. If left unmanaged this fragmentation generally leads to a breakdown in natural ecological processes and a gradual degradation of the bushland resource. All remnant bushland within the urban area can be considered to be vulnerable and as such has a high conservation value, especially for the maintenance of local habitat, species and genetic diversity.

The allocation of Council resources for the implementation of urban bushland management work needs to be based on the specific values identified as significant for each reserve. These values may include significant natural features (such as those listed in Section 2.1) or those relating to social or community values. The degree of community involvement in the implementation of bushland management activities may also have considerable bearing on the allocation of Council resources.

Values will vary significantly between reserves, and accordingly the degree of resource allocation. The collation of detailed resource information on each bushland area (included in Volume 2 of the Urban Bushland Plan of Management) will provide specific information upon which Council's resources for bushland management will be applied.

3. RESOURCE OVERVIEW

The following resource overview is a summary of information contained within Volume 2 (Resource Inventory) of the Plan of Management. For more detailed information, refer to Volume 2.

3.1. SOIL LANDSCAPES

The soil landscapes of the Pittwater area (Figure 2 pg. 10) are grouped according to the type of landform which they occur. These groups are:

Residual:

Somersby (So) - Moderately deep to deep soils Examples in Ingleside and Bilgola Plateau

Colluvial:

Hawkesbury (Ha) - shallow and earthy sand soils.
Examples in Bayview Heights, top of Scotland Island, and Bangallay Head

Watagan (Wa) - shallow to deep sandstone based soils.
Examples in Warriewood, Mona Vale, Church Point, and Bayview

Fluvial:

Oxford Falls (Of) - moderately deep to deep soils
Examples in Ingleside

Aeolian:

Tuggerah (Tg) - deep soils
Examples in the western section of Mona Vale

Newport (Np) - shallow
Examples western section of Newport Beach

Marine:

Narrabeen (Na) - deep calcareous sands
Examples: occurs on all beaches in the area

Woy Woy (Ww) - deep siliceous sands
Examples in Palm Beach area only

Erosional:

Erina (Er) - moderately deep to deep soils
Examples in Avalon, Careel Bay, Warriewood, and Newport

Lambert (La) - shallow soils
Examples in Elanora Heights, Ingleside, and Warriewood

Gynea (Gy) - shallow to moderately deep soils
Examples in Palm Beach, Bilgola Plateau, and Elanora Heights

Estuarine:

Mangrove Creek (Mc) - deep waterlogged calcareous sands
Example in Careel Bay only

Swamp:

Warriewood (Wa) - deep sandy humus
Examples in Warriewood, Avalon, and Mona Vale

Disturbed areas:

Disturbed terrain (xx) - fill areas commonly capped with sandy loam soils or compacted clay over fill material.

Pittwater Council, 1994a



Scale 1:100,000

Source: Chapman et al. 1989

Figure 2 - Soil Landscapes of the Pittwater Area



3.2. LANDFORM

The deeply dissected sandstone of the Lambert Peninsula is representative of the Hornsby Plateau, and the Barrenjoey Peninsula is a narrow steep neck of land formed through long shore sand drift which features a well defined sand spit adjoining Barrenjoey Headland called a tombolo. It is a unique configuration on the NSW coast.

The Pittwater estuary is a drowned river valley with former deltas and an island. The coastal headlands are continued in the offshore reef systems which form closed embayments off most of the beaches. Therefore the sand on these beaches are not subject to large amounts of drift.

The southern part of the Council Area features the Ingleside Plateau, escarpment and low lying Warriewood Valley, a partially disturbed estuarine wetland formed through infill of a coastal inlet over the last 6,000 years.

An igneous rock formation called a basaltic dyke occurs in coastal cliffs of the Newport Formation at Saint Michael's Cave which represents an important geological feature of the area.

Landforms in the Pittwater area [which support bushland] include:

- dune systems
- headlands and cliffs
- tidal mudflats and estuaries
- escarpments
- plateaux
- valleys
- sheltered gullies
- island, and
- tombolo

These wide varieties of landforms in turn provide a wide variety of habitats which support a broad range of plant communities and ecosystems.

Pittwater Council, 1994a

3.3. PLANT COMMUNITIES

The Pittwater Local Government Area contains a diverse variety of native plant communities on both community land, private land and land managed by other Authorities. The following is a summary of community information from Benson (1994). A more detailed description of plant communities is provided in Volume 2 (Inventory and Action Plan) of the Urban Bushland Plan of Management.

Coastal Clay Heath (21a)

Coastal Clay Heath vegetation occurs on coastal headlands on shales and sandstones. Vegetation here is low and scrubby, both because of the low nutrient status of its soils, and because it is exposed to winds from the ocean which restrict tree growth. Heath vegetation occurs on the more sandy soils, while those with more clay tend to support grassy vegetation.

Coastal Clay Heath is further divided into 2 communities:

i) Open-heath: *Allocasuarina distyla*

This vegetation community occurs on Barrenjoey Head. The most characteristic canopy species is *Allocasuarina distyla*; other heath species include *Hakea teretifolia*, *Banksia ericifolia*, *Lasiopetalum ferrugineum* and *Platysace linearifolia*. The ground stratum is poorly developed.

ii) Grassland: *Themeda australis*

Grassland dominated by *Themeda australis* occurs on exposed sites below coastal cliffs on the Warringah Peninsula. It varies in height from 0.1 to 1 m with about 70% cover. *Themeda australis* is the main species and generally occurs on the most fertile headland soils possibly reflecting the long history of use and disturbance to which such sites have been subject (Adam, Stricker et al. 1989). Benson et al (1990) also quotes that Governor Phillip noted in the exploration of the coastline in 1788 the presence of "...thick and short sour grass." on the headlands - a reference to what would appear to have been the *Themeda australis* grasslands.

Spotted Gum Forest (9g)

ii) Open-forest: *Corymbia maculata-Eucalyptus paniculata*

Corymbia maculata, Spotted Gum, is the dominant tree, with sub-dominants of *Eucalyptus paniculata*, Grey Ironbark, *Syncarpia glomulifera*, Turpentine, and *Angophora floribunda* Rough-barked Apple. Small trees include *Allocasuarina torulosa*, *Glochidion ferdinandi* and *Livistona australis*. The understorey varies according to aspect. On dry sites there is a very sparse small tree and shrub layer with *Allocasuarina littoralis*, *Dodonaea triquetra*, *Platylobium formosum*, *Macrozamia communis* and *Pultenaea flexilis*. In sheltered aspects the small tree layer is denser, including *Elaeocarpus reticulatus* and *Pittosporum undulatum*, there are few low shrubs, and fern. Small rainforest trees may occur, including *Diospyros australis*, *Synoum glandulosum*, *Cassine australis* var. *australis*, *Euodia micrococca*, *Commersonia fraseri* and *Alphitonia excelsa*. *Livistona australis* is locally abundant around Bilgola.

Similar communities to that which is described above also occur along the lower western and eastern foreshore of The Pittwater, the lower slopes of Scotland Island and small residual patches along the Bayview-Church point foreshore area.

Sydney Sandstone Gully Forest (10ag)

Sydney Sandstone Gully Forest is generally confined to gullies and sheltered hillsides, particularly on southern to eastern aspects. Average height of the trees is 25 m, though varying from 18-30 m. Three sub-units are recognised.

- i) **Open-forest/woodland: *Eucalyptus piperita-Angophora costata-Corymbia gummifera***
- ii) **Tall open-forest: *Eucalyptus piperita-Angophora costata-Syncarpia glomulifera***
- iii) **Closed-forest: *Ceratopetalum apetalum-Tristaniopsis laurina***

Sydney Sandstone Ridgetop Woodland (10ar)

Sandstone Ridgetop Woodland is found on the more exposed ridges and plateau tops with shallower soils interrupted by outcrops of rock. Two sub-units are recognised to occur in the Pittwater area:

- i) **Woodland/Low woodland: *Angophora costata-Corymbia gummifera-Eucalyptus haemastoma-Eucalyptus piperita-Eucalyptus punctata-***

Examples of the above community can be found in Angophora and McKay Reserves

- iii) **Open-scrub: *Banksia ericifolia-Hakea teretifolia***

Coastal Swamp Forest Complex (27a)

- i) **Open-forest: *Eucalyptus botryoides-Eucalyptus robusta***

This occurs on poorly-drained sites in the Pittwater area, such as the Warriewood wetlands, but has been extensively disturbed, and very little remains.

- ii) **Open-forest: *Livistona australis***

Localised patches of *Livistona australis*, Cabbage Tree Palm, occur in open-forest along the Warringah Peninsula from Palm Beach to Avalon, and along sections of Deep and Middle Creeks, particularly near Wakehurst Parkway..

- iii) **Scrub: *Melaleuca linariifolia-Melaleuca styphelioides***

Paperbark swamp 5-18 m high with mid-dense to sparse cover of trees of *Melaleuca linariifolia* and *Melaleuca styphelioides*, small trees of *Callicoma serratifolia* and *Acacia longifolia* and sedges and ferns, *Gahnia clarkei*, *Gahnia sieberiana* and *Blechnum camfieldii* are found on floodplain alluvium along Deep Creek on better-drained areas surrounding herbland (Sheringham & Sanders 1993).

- iv) **Reedland: *Phragmites australis-Typha orientalis***

Patches of reedland up to 3 m high, dominated by mainly *Phragmites australis* or *Typha orientalis*, grow on alluvial soils in estuaries and creeks in areas inundated with water for long periods and is often brackish.

Narrabeen Slopes Forest (9h)

Narrabeen Slopes Forest is particularly characteristic of the foreshores of Broken Bay and Pittwater. Similar vegetation is found on lower slopes of the islands of Broken Bay—Lion Island (Benson 1981a) and Scotland Island in Pittwater. Both of these islands have Hawkesbury Sandstone vegetation (map unit 10ar) on their crests.

Vegetation structure and floristic composition are particularly influenced by aspect. South-facing slopes are steeper, cooler and moister than north-facing slopes, which are less steep, but drier and more sunny. Two subunits are recognised, one of which occurs in Pittwater Local Government area:

ii) Open-forest: *Angophora floribunda*-*Allocasuarina torulosa*

Thomas and Benson (1985) indicate that *Eucalyptus botryoides* and *Eucalyptus paniculata* occur with *Angophora floribunda* along the foreshores of Western Pittwater from McCarrs Creek to West Head on deeper, heavier soils in sheltered sites (described as their community 6)

3.4. FAUNA

The Pittwater Council area is rich in faunal species due to the large extent of natural lands in the Ku-ring-gai Chase National Park, the close proximity of Garigal National Park, the large array of diverse habitats derived from a range of soils types including those weathered from sandstone, shale, alluvial and volcanic geologies. The habitats present range from wetland and estuarine areas with large numbers of waterbird species, to tall open forests, forests and woodlands, to heath and rocky heath, which form important habitats for protected fauna and for endangered fauna listed in Schedule 12 of the National Parks and Wildlife Act, 1974.

378 native species of vertebrate fauna and 8 species of exotic fauna have been recorded in the Pittwater area. This includes fauna records for Ku-ring-gai Chase National Park.

Pittwater Council, 1994a

4. MANAGEMENT ISSUES, POLICIES AND PERFORMANCE TARGETS

4.1. EDUCATION AND COMMUNITY PARTICIPATION

4.1.1. PUBLIC AWARENESS / EDUCATION / SCIENTIFIC RESEARCH

4.1.1.1. *Management Objectives*

- Promote sustainable use of bushland areas for education and scientific research;
- Increase community and Council understanding of bushland values and management;
- Fill relevant data gaps identified in Council State of the Environment (SOE) Reports;
- Encourage sustainable management and compatible use of bushland areas through increased community awareness and understanding of human impacts on these vulnerable ecosystems.
- Establish and maintain a high level of service provision in interpretative signage, materials and programs.

See also 4.6 - Training / Operations (pg. 60) for issues relating to Council staff awareness.

4.1.1.2. *Description of Issues*

Education and Scientific Institutions

Pittwater's bushland reserves are a significant resource for school based environmental education and scientific study. These uses need to be recognised and incorporated into the management aims of bushland reserves. It also needs to be recognised that overuse by these users can seriously impact on small bushland remnants.

Educational and scientific institutions can also provide a valuable resource for undertaking ongoing research within reserves and can particularly assist in filling data gaps as identified in the Pittwater State of the Environment (SOE) Reports (1994 and subsequent years).

General Community Awareness

Urban bushland is not only an educational resource for students but is also a valuable educational resource for all those in society who wish to learn more about the natural environment and the effects society has on it. Further to this, for bushland management to be effective, it requires a sympathetic public informed about the attributes of bushland and the impacts society can have on its viability.

The level of awareness and sympathy toward the role of urban bushland and the effects of urban impacts on it is considerably variable in the community. Many bushland reserves adjoining urban areas are impacted upon through encroachments, increased weed infestations, run-off with increased nutrients plus direct destruction of the bush through clearing and dumping.

Some of the more obvious symptoms of the lack of awareness or disregard for bushland values include:

- Dumping of domestic and garden refuse in the bush;
- Encroachment of private properties into bushland or open space;
- Destruction and damage to tracks and signs;
- Lack of control of domestic pets in bushland;
- Unauthorised clearing of bushland understorey;
- Unauthorised poisoning and lopping of trees;
- Planting of inappropriate species in, or on the boundaries of reserves;
- Discharging water from swimming pools into bushland;
- Discharging water from tennis courts, roofs, other hard surfaces and gardens into bushland.

4.1.1.3. Management Policies

General

- A. Develop a comprehensive package of interpretive materials aimed at the community, educational and scientific institutions. These are to be distributed to identified target groups and be made readily available to the public.
- B. Promote bushland areas through the development of a consistent bushland logo for use on signage, interpretive materials and stationery associated with bushland management.

Education and Scientific Institutions

- C. Promote the use of Pittwater's Coastal Environment Centre for bushland education and research programs.
- D. Council to encourage the use of bushland reserves for environmental education and scientific study provided these uses do not significantly impact on other values of bushland. Research projects that are destructive or those which have significant impacts will not be permitted.
- E. Council to liaise directly with educational and scientific institutions to assist with filling data gaps as identified in SOE reports.
- F. Council require that school groups visiting bushland reserves inform the Environmental Officer of all visits and intent of the visit, so that a record of use can be kept.
- G. Scientific researchers wishing to carry out studies in bushland reserves are to notify and obtain approval from the Environmental Officer and obtain permission of the National Parks and Wildlife Service (NPWS) and from their organisation's Animal Ethics Committee if research is carried out on native wildlife.

Community Awareness

- H. Support education programs and disseminate information on Pittwater's unique bushland assets through the use of leaflets, booklets, newsletters display boards, field days and courses covering vegetation, fauna and bushland management.
- I. Promote community awareness through the installation of bushland interpretive signage in association with recreation facilities eg. walking tracks.
- J. Bushland regeneration work undertaken in areas of high recreational use are to be interpreted.

4.1.1.4. Performance Targets

General

Increased levels of use of Pittwater Coastal Environment Centre for bushland, environmental education and scientific research.

Increase quality of services and resources available to the community, educational and scientific institutions.

Reduction in number of data gaps relative to bushland identified in Council's SOE report.

Installation of appropriate and consistent interpretive signage associated with recreation facilities eg. tracks and trails.

Educational and Scientific Institutions

Increased level of use of reserves by education institutions for education, awareness and targeted research aimed to address data gaps as identified in SOE and reserve plans of management.

Impacts associated with educational use remain within acceptable limits for specific reserves.

Community Awareness

Increased community awareness ie. reduction in encroachments, dumping in reserves (see also sections 4.3.2 - Weed Management (pg. 40) and 4.2.1 - Urban Run-off and Stormwater Discharge (pg. 22) for specific policies and performance targets).

Increased number of inquiries relating to bushland management issues.

Increased involvement of community in the active management of bushland areas (see also section 4.3.3 - Bushland Restoration and Regeneration (pg. 43) for additional specific policies and performance targets).

4.1.2. COMMUNITY PARTICIPATION IN MANAGEMENT

4.1.2.1. Management Objectives

- Provide formal, structured opportunities for community representatives to participate in the management of bushland areas.

4.1.2.2. Description of Issues

Statutory Responsibilities

In relation to bushland management, Council has statutory responsibilities under the Local Government Act (1993) to engage in community consultation during the preparation and review of Plans of Management for bushland areas.

Reserve Management Committees

Pittwater Council currently (1995) has 3 management committees established for individual reserves. The formation of these management committees are not a statutory requirement of Council, but rather were formed as a means of facilitating the implementation of reserve management programs.

Each committee comprises representatives from Council and the general community with either a professional responsibility for, or personal interest in, the management of the individual reserves in question.

Establishing individual reserve committees is useful in focusing on the specific issues arising in each reserve, it is essential that the implementation of management policy is consistent across the Local Government area. Whilst the policies and performance targets identified in this plan aim to promote consistent management, the formation of a Bushland Management Advisory Committee for the entire Local Government area, with representatives from Council and the individual reserve management committees can be a useful tool in developing a consistent response to management issues.

4.1.2.3. Management Policies

Statutory Responsibilities

- A. Council will fulfil its statutory responsibilities under the Local Government Act (1993) to integrate community consultation into production of Plans of Management for bushland areas.

Reserve Management Committees

- B. Council supports the formation of a Bushland Management Advisory Committee comprised of both Council (elected representative and staff) and community representatives with the aim of promoting consistent responses to bushland management issues across the Local Government Area.
- C. Council continue to support the individual reserve management committee's under the umbrella of the Bushland Management Advisory Committee.

4.1.2.4. Performance Targets

Statutory Responsibilities

Compliance with all statutory responsibilities under the Local Government Act (1993).

Reserve Management Committees

Establishment of Bushland Management Advisory Committee.

Continued support for existing reserve management committees.



4.2. URBAN IMPACT MITIGATION

Stormwater and Urban Run-off

Urban development results in changes to both the quantity and quality of stormwater run-off. These changes are directly related to the significant increase in the area of impervious surfaces inherent in urban development. These include roadways, paving, footpaths, buildings and parking areas. All of these combine to increase the amount of precipitation that is converted to run-off, as they reduce infiltration, soil storage and evaporation (Bliss et. al 1983). The results of these changes on water flow are, higher peaks during storm events and reduced flow from soil storage during inter storm periods.

Urban stormwater is usually collected and piped to the closest watercourse available. These drainage areas are often the only areas left of the original vegetation after development. This is often the case in Pittwater, where a large portion of the urban bushland remnants are located either in drainage areas or inaccessible terrain.

What effect does urban run-off and stormwater have on bushland?

The concentration of water into bushland areas drastically alters the environmental conditions which had dictated the previous vegetation type. Generally these waters also contain high levels of plant nutrients (especially phosphorus) and pollutants.

Water Borne Nutrients

Phosphorus (P) concentrations in urban stormwater are very important because Australian soils in general, particularly those developed from the Hawkesbury sandstone surrounding Sydney are very low in phosphorus. In response to these low levels of nutrients, plants indigenous to these soils have evolved many adaptations that allow them to thrive. Increases in fertility (particularly phosphorus) are not necessarily advantageous to their growth and if in excess are actually detrimental to certain plant species.

Measurements of Phosphorus in urban stormwater has shown levels of P 50 to 100 times greater than waters drained from natural catchments. In conjunction soil concentrations of Phosphorus in areas affected by stormwater run-off can be 10 to 20 times higher (Wright, 1988).

Changes in Native Plant Communities

The combined effects of increased water and nutrient supply often leads to an environment more conducive to mesic (soft leaves) species such as the natives *Pittosporum undulatum* (native daphne) and *Glochidion ferdinandi* (cheese tree), or the exotic tree species, such as *Ligustrum sinense* (privet) and *Cinnamomum camphora* (camphor laurel) in the Sydney region. The resultant being that the xeromorphic (ie. plants adapted to naturally drier conditions) are replaced as they no longer are able to compete in the changed environmental conditions.

Further adding to the problems for xeromorphs and therefore the dependent wildlife populations are drastic changes in the fire regime brought about by urbanisation. Traditionally small natural reserves in urban areas have been totally protected from fire and the larger areas often subjected to frequent 'control burns' for fire hazard reduction. Neither of these situations are particularly beneficial to eucalypts. A total lack of fire in wetter areas shifts the ecological balance towards mesic (rain forest type) species, thus inhibiting the germination of new eucalypts. If fires are too frequent to allow the young eucalypts to reach sexual maturity or for existing trees to replenish starch resources then they will ultimately be replaced by fire responsive species such as native grasses and bracken fern. The end result of either process is the reduction of plant species diversity and habitat quality of forest and woodland fauna.

These changes in the ecological parameters do not just affect the dominant eucalypts and eucalypt dependent fauna but the entire suite of organisms adapted to the pre-development conditions. Not only

are the eucalypts replaced but also the associated understorey species are unable to compete in the changed conditions.

See also **Eucalyptus Dieback** (pg. 37) for additional discussion on changes in plant communities resulting from urbanisation.

All of these impacts do not happen in isolation. They are cumulative and work synergistically to cause the eventual destruction of the native vegetation.

Increased Weed Invasions

In the Sydney region these impacts are continuing, where once *Eucalyptus* spp. dominated forests and woodlands are being replaced by closed forests of weedy native and exotic species. This has resulted in major impacts on many species of flora and fauna. Therefore even if bushland areas large enough to support viable populations are left in urban zones (through either good planning or, more usually, chance), these areas will not be able to maintain a high level of biodiversity without some form of active management.

Other Urban Impacts

Compounding these impacts is the urban dwellers natural tendency to 'tidy up' the bushland and parks by removing the understorey shrubs and accumulated litter. With this change in vegetation structure and species composition comes corresponding changes in fauna assemblages. Studies from the New England Region (Ford & Bell 1981) have shown that reductions in vegetation structure can lead to reduced habitat for insectivorous bird species. The result of this change is the increased browsing of the tree canopy by insects leading to tree decline. This process further reduces the value of the habitat.

Urban bushland also suffers direct abuse from those who live in adjoining properties. Throughout the Pittwater area there are many examples where weed invasion has been caused by people 'dumping' their garden waste into bushland. This garden waste is often high in nutrients and usually contains the seeds and other propagules of many weed species. According to a recent vegetation study (Cunningham 1993), 23.5% of the plant species occurring in reserves of the Pittwater area are introduced species.

Other abuses of bushland include the clearing of vegetation to promote views or to extend private garden space into the public reserve. Both of these activities have the potential to cause further weed invasion and directly reduce the area of bushland habitat for flora and fauna.

Implications for Fauna Habitat

Exotic weed invasion can lead to significant modification of wildlife habitat eg. it appears that the numbers of small insectivorous birds are greatly reduced in heavily weed infested areas. This has major implications for other eucalypt dependent fauna present, as these small insectivorous birds are significant predators of defoliating insects. Therefore it is very possible that without the control of predated birds, insect populations could reach levels that cause the destruction or dieback of the eucalypts.

In an undisturbed ecosystem the interaction between predator and prey is in a dynamic relationship according to the fluctuating environmental conditions. In the urban situation this dynamic relationship is disrupted, where large numbers of potential predators (eg. the family dog, cat and introduced foxes) exist irrespective of the natural level of resource availability. To explain, in the pre-development period there may have been, say, ten bandicoots for every bandicoot predator. In the urban area there may be ten or more predators (eg. family dogs, cats and introduced foxes) for every individual bandicoot. As family pets are independent of the resource availability within their habitat and are sustained by inputs from outside of the ecosystem, their presence is a continual and almost non varying impact on wildlife populations.

4.2.1. URBAN RUN-OFF AND STORMWATER DISCHARGE

4.2.1.1. Management Objectives

- Maintain water quality and quantity entering reserves at a level which is acceptable for sustainable bushland management.
- Maintain natural hydrological processes where possible and minimise degrading influences of both low flow and peak flow stormwater in natural creeklines.

See also section 4.7.1 - Bushland in New Urban Release Areas (pg. 53) for policies relating to mitigation of urban run-off effects in these areas.

4.2.1.2. Description of Issues

Statutory Responsibilities

Urban run-off and stormwater discharges can cause a departure from the natural condition of bushland and is classified as a “disturbance” under State Environmental Planning Policy 19 - Bushland in Urban Areas. As such, Council cannot consent to a development which directly or indirectly discharges run-off or stormwater into bushland areas without taking into account the aims, objectives and procedures of the policy (particularly Clauses 6 and 9).

Council also has a statutory responsibility under the Clean Waters Act (1970) to ensure that pollutants (ie. chemical, solid or gaseous) do not enter waterways or the stormwater system through either Council or community activities. Furthermore, from 1st July 1995, Council Officers have the authority under the Act to issue on the spot fines (under Sections 16(1), 16(3), 16(4), and 17(1)) for breaches of the Act by individuals or organisations. Breaches of the Act by Public and Local Authorities are policed by the Environmental Protection Authority.

Adverse Impacts of Urban Run-off on Bushland

Urban runoff and stormwater can be divided into two sources:

1. Point sources

eg. stormwater and sewage discharges

2. Diffuse Sources

eg. non-concentrated overland flows and seepage from residential areas.

Urban runoff is the most significant causal factor of weed invasion in bushland areas. Stormwater outlets carry high levels of nutrients and other pollutants which shift the ecological balance towards weed species and cause eutrophication of waterways. Increased amounts and rates of urban run-off can scour out water channels and increasing turbidity and siltation.

- *Increased impervious surfaces (roads, curb and guttering, paved areas generally, driveways, roofs, swimming pools, tennis courts, etc) have resulted in an increase in the overland run-off, due to reduced infiltration, biomass and evaporation. The water is also piped to the watercourse in a hydraulically efficient manner. The net result is that the peak discharge is higher and occurs sooner than from the same area prior to development. This causes erosion problems at the interface of the pipe system and the bushland.*

- *Stormwater is often piped to the edge of the nearest bushland reserve. As water discharges from pipes into the bush, it fans, increasing the moisture content and erodibility of the soil in those areas. This disturbed niche favours weed colonisation.*

Many of the watercourses in the Pittwater bushland also have site-specific erosion at the junction of the drain inlets with the creeks. This is a result of inadequate dissipation of stormwater velocity at this point.

- *Stormwater transports weed and exotic seed propagules, particularly from gardens.*
- *Seepage from septic systems, run-off and stormwater are almost always nutrient enriched particularly during low flows at the ingress points to bushland, from sediment, roadway pollution, dog and cat faeces, breakdown of building products, chemical fertilisers, pesticides, soil and garden litter.*
- *Stormwater, particularly heavy flows, brings gross pollutants (rubbish) and oils into the watercourse.*

Lane Cove Municipal Council, 1990

4.2.1.3. Management Policies

Statutory Responsibilities

- A. The statutory responsibilities and obligations for State Environmental Planning Policy 19 - Bushland in Urban Areas and Clean Waters Act (1970) are acknowledged by Council and will be addressed where necessary and appropriate.

Mitigation and Management of Run-off and Stormwater

- B. Council where practicable to minimise the impact of point and diffuse source stormwater and urban run-off on bushland reserves.
- C. Council will aim to reduce gross pollutant and sediment loads in stormwater through the installation and maintenance of in-line gross pollutant and sediment traps, where practicable. See also section 4.2.2 - Soil Erosion and Sedimentation (pg. 26) for additional sediment control policies and performance targets.
- D. Council will aim to improve water quality through the installation where practicable and the maintenance as required of wetland filters and artificial wetlands in conjunction with gross pollutant traps or similar structures.
- E. Council will aim to reduce urban run-off by:
- Reducing the quantity of stormwater leaving developed areas of the catchment to a level approximating pre-development hydraulic conditions;
 - Maintaining permeable surfaces wherever possible including retention of grassed curbs and gutters;
 - Promotion of on site absorption of stormwater, for example through the installation of absorption trenches, wherever practicable (ie. in non landslip areas).

-
- F. Council will undertake a systematic program for stabilisation and monitoring all stormwater outlets which are identified as requiring attention in existing and future area specific Bushland Plans of Management.
- G. Council supports the existing program of water sampling and monitoring for nutrients in creeks and estuaries within the local government area.
- H. In situations where the drainage of urban run-off into bushland is unavoidable, the specific ecological requirements for maintaining the affected vegetation community (as identified by Councils Environmental Officer) will be the overriding consideration used in determining the nature of the stormwater treatment. A policy of adopting as few drainage lines as possible may apply in situations where the native plant community is not adapted to urban influenced hydrological changes. The effect increased water flow on the stability and erosion potential of the bushland area will be considered.
- I. Storm water drains are not to be terminated in natural wetlands or in areas other than creeklines or water bodies.
- J. New stormwater installations in bushland reserves are to be consistent with the aims and objectives of this Urban Bushland Plan of Management.
- K. Council to prohibit and prevent the draining of swimming pools into bushland reserves and to seek the retrospective connection of existing pools to the sewer system through Sydney Water.
- L. Council to ensure that septic tank effluent is effectively treated on private lands to prevent significant impact on adjoining bushland areas.
- M. Where practicable, commence off-site treatments in the upper catchment progressive to the lower catchment of the reserve.
- N. Council to liaise with Sydney Water to reduce where possible the frequency and occurrence of sewage discharges arising from sewer mains.

4.2.1.4. Performance Targets

Statutory Responsibilities

All statutory responsibilities under identified legislation are enacted.

Mitigation and Management of Run-off and Stormwater

Installation where practicable and maintenance of gross pollutant, sediment traps and artificial wetlands on stormwater lines discharging into bushland reserves.

Reduction in levels of gross pollutant, sediment and nutrient enriched stormwater and septic tank effluent entering bushland reserves. Reduction in measurable nutrient levels in stormwater discharges, particularly Nitrogen and Phosphorus.

Amendment of existing Policy and Guidelines for On Site Detention (OSD) of Stormwater (1993) to require application of the OSD policy to:

- wetlands adjoining Narrabeen Lagoon;
- all major and minor watercourses;
- properties located within a catchment which discharges into a bushland area.

The development of a systematic stabilisation and monitoring program for stormwater outlets.

- Reduction in quantity of stormwater leaving developed areas of catchments.
 - Maintenance or improvement of creek line stability and plant community health.
 - Retention or increase in the area of permeable surfaces in bushland catchments.
 - Reduction in volume of stormwater entering reserves during peak flows.
 - Maintenance of, and increases in vertebrate and invertebrate aquatic fauna.
 - No new stormwater outlets which discharge into reserves.
 - Reduction in weed infestations due to urban run-off from both point and diffuse sources.
 - Reduction in the frequency and occurrence of sewage discharges arising from sewer mains.
 - A reduction in the number of swimming pool discharge points which enter bushland areas.
 - An increase in the number of existing swimming pool discharges which are connected to sewer lines.
- 

4.2.2. SOIL EROSION AND SEDIMENTATION

4.2.2.1. Management Objectives

- To create and or maintain conditions in which natural creek and drainage lines are protected from increased erosion and / or sedimentation due to urban impacts.
- To create and or maintain stormwater drains, internal roads, parking areas and tracks which can withstand periods of normal and extraordinary run-off without subjecting bushland to unacceptable levels of erosion and or sedimentation.

4.2.2.2. Description of Issues

Statutory Responsibilities

Council has a statutory responsibility under the NSW Soil Conservation Act (1938) to prevent and rectify sites of significant soil loss.

Also, activities which result in significant soil erosion and sedimentation can be deemed as *disturbance* under State Environmental Planning Policy 19 - Bushland in Urban Areas and as such Council cannot consent to the activity without taking into account the aims, objectives and procedures of the policy (particularly Clauses 6 and 9).

Creekline Soil Erosion

Soil erosion in creeklines is closely linked with the problem of increased stormwater flow due to the increase in impervious surfaces associated with urban development. High velocity water flows have the capacity to dislodge plant material and transport solid matter. This erosive capacity is also variable depending on the soil landscape type present at each site.

Best practice approach to treating creekline soil erosion requires a threefold response:

1. Where possible, the reduction of the quantity of stormwater leaving developed areas of the catchment to a level approximating pre-development hydraulic conditions;
2. Sympathetic treatment of creeklines and discharge points to reduce velocity and stabilise areas of erosion;
3. Retention, establishment and maintenance of riparian vegetation.

Sedimentation Arising from Other Activities

A major source of sedimentation in bushland areas results from activities within the catchment (eg. construction and other activities in residential, commercial, industrial and open space areas) which cause soil disturbance. Stockpiling of building materials and vehicular movement to and from a site of disturbance can also contribute.

Construction activity massively increases the soil erodibility, which is particularly at risk during rainstorms. Other sources are the clearing of vegetation, topsoil removal, quarrying, landshaping, road construction and other infrastructure development such as the installation of power lines, pipelines and telephone lines.

Sediment deposition into watercourses can destroy aquatic habitats.

Run-off depositing sediment on walking and vehicular tracks and trails can change hydrological patterns so that water is retained rather than dissipated, with consequent inundation and further erosion problems. Recreation opportunities, aesthetic amenity and track/trail function are subsequently degraded. Walking tracks often 'evolve' due to use patterns rather than being specifically designed to suit the particular location. Tracks can become drainageways and vice versa. This results in new tracks being created through the bush as people make a passage around the problem areas.

Best practice for sediment control on sites where soil disturbance occurs is the requirement for the development and application of site specific sediment and erosion control plans and measures for each site. Similarly planned construction, maintenance and upgrading of tracks is essential to reduce and ameliorate unacceptable levels of soil loss.

A further situation where soil loss can be significant are areas affected by bushfire, both naturally occurring and planned. Apart from restricting public access, reducing soil erosion potential in situations following extensive natural bushfires is difficult. In planned bushfire events care needs to be taken to ensure hand tool lines avoid creating soil erosion impacts and that buffer or filter strips are maintained to capture soil loss. Also, maximum surface roughness should be maintained in natural areas. The extent of any planned burn should be the minimum size possible to achieve the management objective and the site monitored until the soil surface has stabilised.

4.2.2.3. Management Policies

Statutory Responsibilities

- A. The statutory responsibilities and obligations for State Environmental Planning Policy 19 - Bushland in Urban Areas and Soil Conservation Act (1938) are acknowledged by Council and will be addressed where necessary and appropriate.

Creepline Soil Erosion

- B. Council to undertake a systematic program for stabilisation and monitoring all creek lines which are identified as eroding and requiring attention in existing and future area specific Bushland Plans of Management.

Sedimentation Arising from Other Activities

- C. Council to develop a comprehensive policy on sediment/erosion control for sites both public and private where soil disturbance will occur as a result of construction, development and redevelopment.
- D. Council to maintain a regular street sweeping program within developed catchments with the aim of reducing sediment deposits.
- E. Council require that site specific sediment and erosion control plans be produced to a satisfactory standard for sites prior to construction development or re-development.
- F. Council to ensure that all proposed planned fires within the LGA have considered the implications for soil erosion within the plan and that strategies are in place to mitigate any identified potential for erosion.

- G. Council to rationalise the number and location of tracks and vehicular access within and adjacent to bushland. Track and trail routes identified to be retained in specific area management plans are to be clearly marked and interpreted on site.
- H. All track and vehicular trails within and adjacent to bushland are to be designed, constructed and maintained to minimise soil loss and remedial action taken to address erosion problems should they arise.

4.2.2.4. Performance Targets

Statutory Responsibilities

All statutory responsibilities under identified legislation are enacted.

Creekline Soil Erosion

Reduction in levels of sedimentation and bank instability on creek lines.

Sedimentation Arising from Other Activities

Development and adoption of comprehensive policies on sediment and erosion control which are consistent with the aims and objectives of this plan.

The application and policing of individual soil erosion and sediment plans and measures for all sites of construction, development and re-development.

Minimal soil loss from sites of construction, quarrying, development and re-development for the entire life of the works.

Minimal loss and or movement of soil from or onto bushland areas as a result of fire.

Minimal erosion and soil loss from walking tracks, fire trails and access tracks.

Reduction in the maintenance required for tracks, trails and waterways.

4.2.3. BOUNDARY MANAGEMENT

4.2.3.1. Management Objectives

- To maintain the integrity of bushland reserves through the reduction in boundary impacts.
- To establish clear policies for appropriate location, management and maintenance of boundaries to bushland and bushland reserves which will enable the existing native plant and animal communities to survive in the long term and will enable the protection of wildlife corridors and vegetation links with other nearby bushland.

4.2.3.2. Description of Issues

Statutory Responsibilities

Council has a statutory responsibility under State Environmental Planning Policy 19 - Bushland in Urban Areas to ensure that alienation or disturbance of bushland is not undertaken without Council's consent or an assessment of impacts (Clause 6 (1) and 6 (4)).

Furthermore, Council has responsibilities under the Local Government Act (1993) to manage community lands for community benefit. Encroachments and the private use of community lands can only be subject to the issuing of Leases or Licences for the activity (see Section 4.7.2 - Leases and Licences (pg. 67) for policies relating to the issuing of leases and licences).

Encroachments and Boundary Management

Most bushland reserves in the Pittwater Local Government Area are bounded by urban settlements on at least one if not all sides. These bushland reserves are generally in discrete parcels which are not contiguous with any other bushland.

In some parts of Pittwater, sections of bushland reserves and right of ways have been incorporated into private gardens and living space. This practice is undesirable as it reduces the overall area of bushland and alienates public open space.

There are usually significant weed problems and often unauthorised filling in reserves occurring along the residential boundaries.

4.2.3.3. Management Policies

Statutory Responsibilities

- A. The statutory responsibilities and obligations for State Environmental Planning Policy 19 - Bushland in Urban Areas and Local Government Act (1993) are acknowledged by Council and will be addressed where necessary and appropriate.

Encroachments and Boundary Management

- B. Council does not support private annexation or encroachment on bushland reserves or public open space.

-
- C. All private annexations and encroachments on bushland reserves or public open space are to be treated in accordance with best management practices identified in individual reserve plans of management and in consultation with the community.
 - D. Council supports the maintenance or creation, where possible, of existing buffer zones of appropriate indigenous vegetation on private land adjoining bushland reserves.
 - E. Council supports the establishment of joint management agreements with landholders adjacent to bushland reserves whose properties contain bushland (see also section 4.8.1 - Bushland on Private Property (pg. 69)).
 - F. Council to actively encourage neighbours who border reserves to reduce their impacts on bushland reserves and become involved with Council's Volunteer Bush Regeneration Program.

4.2.3.4. Performance Targets

Statutory Responsibilities

All statutory responsibilities under identified legislation are enacted.

Encroachments and Boundary Management

A reduction in the area and number of encroachments.

Maintenance of existing bushland buffer zones which occur on private land.

An increase in restored or recreated buffer zones on private land.

A reduction in weed infestation attributable to boundary sources.

An increase in the number of neighbours who are actively participating in Council's Volunteer Bush Regeneration Program.

An increase in joint management programs with adjacent landholders.

4.2.4. DEVELOPMENT ADJOINING BUSHLAND

4.2.4.1. Management Objectives

- To ensure that the impact of development adjoining bushland is maintained within acceptable levels for each proposal.

4.2.4.2. Description of Issues

Statutory Responsibilities

Council has a statutory responsibility under State Environmental Planning Policy 19 - Bushland in Urban Areas (Clause 9) to ensure that the impact of development on land adjoining bushland on public open space is taken into consideration when undertaking or granting approval for the development. This includes the need to assess the impact of the development on private property bushland (see section 4.8.1 - Bushland on Private Property (pg. 69)), the impact on bushland on community lands and any other matter deemed relevant to bushland protection and preservation.

Assessment of impacts arising from the proposed development is also required under the Environmental Planning and Assessment Act (1979) to assess the impact of proposed developments on the natural environment in the approval determination process.

In some areas of Pittwater, Building Codes have been adopted by Council which establish, in part, building standards and set-backs which are aimed at reducing the impact of development on bushland.

Impact and Mitigation of Development Adjoining Bushland

Development can have a significant adverse impact, both direct and indirect, on adjoining bushland. These impacts have been identified and discussed in other sections of this document. In summary, development can result in the following impacts on bushland:

Issue	References
Soil Erosion and Sedimentation Nutrient Enrichment	Section 4.2.2 - Soil Erosion and Sedimentation (pg 26) Section 4.2.1 - Urban Run-off and Stormwater Discharge Pg. 22)
Weed Invasion and Degradation of Plant Communities	Sections 4.3.1 - Plant Communities (pg. 36) and 4.3.3 - Bushland Restoration and Regeneration (pg. 49)

Some of these impacts can be mitigated through the adoption and application of sensitive building layout, construction techniques, site management (both during and after development) and the application of best practice techniques. However, in all circumstances the impact of each proposal needs to be assessed based on the individual characteristics of the site and the proposed development. This will determine if mitigation techniques can be used or if the proposed development would, by its proposed nature, cause an unacceptable level of environmental degradation which could not be mitigated by practical means. In these circumstances, the consent to undertaken the proposed development may be rejected by Council.

Of critical importance to Council, residents and developers is the consistent and equitable application of assessment procedures and mitigation techniques / performance targets for development in these situations. Assessment procedures and mitigation techniques may vary

across the Local Government area depending on the nature and use of the land. Establishing (and periodically reviewing) these procedures, combined with a program of developing early awareness and understanding of Council's requirements with developers and the community is essential.

4.2.4.3. Management Policies

Statutory Responsibilities

- A. The statutory responsibilities and obligations for State Environmental Planning Policy 19 - Bushland in Urban Areas and Environmental Planning and Assessment Act (1979) are acknowledged by Council and will be addressed where necessary and appropriate.

Impact and Mitigation of Development Adjoining Bushland

- B. Council will continue to establish, document and disseminate information relating to development application assessment procedures and recommended mitigation techniques / performance targets for development adjoining bushland.
- C. Council will consistently and equitably assess each proposal for development adjoining bushland based on the individual characteristics of the site and the proposed development.
- D. Proposed developments which are deemed to cause and unacceptable level of environmental degradation which cannot be mitigated by practicable means may not be approved.

4.2.4.4. Performance Targets

Statutory Responsibilities

All statutory responsibilities under identified legislation are enacted.

Impact and Mitigation of Development Adjoining Bushland

Consistent and equitable assessment of applications for development adjoining bushland.

Inclusion in Council Planning Instruments, Locality Plans and Building Codes specific policies and procedures relating to the retention and management of urban bushland.

Increase in the number of developments incorporating Councils required impact mitigation procedures at the submission stage of Building and Development Applications

Decrease in direct and indirect impacts on bushland arising from adjoining development.

4.2.5. OTHER DISTURBANCES

4.2.5.1. Management Objectives

- Control and manage activities which result in disturbance of bushland (as defined in State Environmental Planning Policy 19 - Bushland in Urban Areas).
- Restore areas to the highest practicable extent where a disturbance activity is permitted by Council.

4.2.5.2. Description of Issues

Statutory Responsibilities

Council has a statutory responsibility under State Environmental Planning Policy 19 - Bushland in Urban Areas (Clause 6(1)) to control activities which result in disturbance in bushland areas. "*Disturbing*" bushland is not only a reference to direct removal or destruction of bushland but also to any activity which causes a departure from its natural condition. A wide variety of activities act indirectly to degrade bushland (NSW Department of Urban Affairs and Planning Circular B13 - section 7.2 of this policy document (pg. 86)).

Furthermore, Council will need to issue a licence under the Local Government Act (1993) for activities which result in the intermittent or short-term occupation or control of all or part of a bushland area, eg. commercial filming or tour operations (see also section 4.7.2 - Leases and Licences (pg. 67)).

In respect of collection of plant material, Council cannot authorise collection of plant material from species listed as "Protected Plants" under the NSW National Parks and Wildlife Act.

What are Disturbance Activities?

A "*disturbance*" activity is any activity occurring within a bushland reserve which either directly or indirectly causes a change in the natural ecology of the bushland and causes a departure from its natural condition. These activities include the following:

- A. Removal of firewood;
- B. Removal of plant material (both living, dead and propagules);
- C. Removal or deliberate disturbance of not only the vegetation but also the surface and subsurface soils, leaf litter, the seed bed, and any rocks, stones or pebbles;
- D. Operation of commercial tours;
- E. Use of bushland for activities such as commercial filming.

Activities which cause temporary disturbance

Some disturbance activities may be permissible in reserves, subject to Council authorisation and the issuing of a licence (see section 4.7.2 - Leases and Licences (pg. 67)).

These activities include:

- commercial filming;
- collection of plant propagules and similar material;
- other activities as deemed appropriate by Council's Environment Officer.

As these activities may cause disturbance which is reversible, the establishment of appropriate bonds and licensing fees are often applied to fund the cost of potential restoration.

Activities which cause permanent change

Some activities may cause a permanent change in the ecology or natural condition of a bushland area. These activities include the removal of timber, bushrock, soil, leaf litter etc.

These activities are considered to be inconsistent with the aims and objectives of State Environmental Planning Policy 19 - Bushland in Urban Areas and are considered to be inappropriate activities for bushland areas.

4.2.5.3. Management Policies

Statutory Responsibilities

- A. The statutory responsibilities and obligations for State Environmental Planning Policy 19 - Bushland in Urban Areas, Local Government Act (1973), and the National Parks and Wildlife Act (1979) are acknowledged by Council and will be addressed where necessary and appropriate.

Activities which cause temporary disturbance

- B. Activities in bushland which are deemed by Councils Environmental Officer to have the potential to cause temporary disturbance to the bushland will be permitted subject to the establishment of appropriate bonds and fees to cover bushland management and restoration costs.
- C. Where required, Council will licence these activities in accordance with the Local Government Act. Licensing fees will be allocated for Council works in accordance with the policies outlined in section 4.7.2 - Leases and Licences (pg. 67)

Activities which cause permanent change

- D. Activities in bushland which are deemed by Councils Environmental Officer to have a potential to cause permanent change will not be permitted.

4.2.5.4. Performance Targets

Statutory Responsibilities

All statutory responsibilities under identified legislation are enacted.

Activities which cause temporary disturbance

Minimisation of impacts associated with activities deemed to have a minimal potential for permanent change.

Restoration, to the highest practicable extent, of areas disturbed through these activities.

Activities which cause permanent change

Reduction in the number and frequency of activities which cause permanent change.

No Council approval or licensing of these activities.

4.3. BIODIVERSITY

The internationally accepted definition of biodiversity is "*the variety within and among living organisms and of the ecological systems they comprise.*" The increasing awareness of the threat posed by human activities to the planet's biodiversity was recognised by the signing in 1992 of the International Convention on Biological Diversity.

In the lead up to signing this document the Commonwealth Government also developed a draft national strategy for the conservation of Australia's biological diversity which recognised Australia's status as one of the world's megadiverse regions. Although this is yet to be ratified by the New South Wales State Government, the State also has legislation with elements designed to protect biodiversity. The most important of these are the Local Government Act (1993), the Environmental Planning and Assessment Act (1979), the Endangered Fauna (Interim Protection) Act (1991) and the Heritage Act (1977). One of the requirements of the Local Government Act (1993) is the preparation of a State of the Environment report. This must identify strategies and issues relating to the maintenance and enhancement of biodiversity.

The Sydney region is internationally recognised as an area of high biodiversity. The Pittwater Council area, in common with other Sydney municipalities with a bushland character, exhibits a high degree of biodiversity.

Pittwater Council. 1995b.

4.3.1. PLANT COMMUNITIES

4.3.1.1. Management Objectives

- Maintain and enhance, where appropriate, native plant communities and species diversity across lands within the Pittwater Local Government Area (LGA).
- Maintain genetic integrity of native plant communities.
- Maintain natural ecological processes in native plant communities.
- Ameliorate degrading influences on plant communities.

See also Section 4.8.1 - Bushland on Private Property (p. 69) for policies relating to the management of significant plant communities on private lands.

4.3.1.2. Description of Issues

Statutory Responsibilities

Council has a statutory responsibility under the following Government policies and Legislation in relation to the management of native plant communities:

- State Environmental Planning Policy 19 - Bushland in Urban Areas

To protect remnants of plant communities which were once characteristic of land now within an urban area (Clause 2 (2) (a))

- Local Government Act (1993)

To identify and develop strategies for the maintenance on biodiversity as part of the State of the Environment Reporting.

Plant Community and Species Diversity

The varying topography, geology and soils as well as relatively high rainfall in the Pittwater Local Government Area has resulted in a high degree of floristic and plant community diversity.

Six vegetation communities of regional significance occur within the area. One of these - *Spotted Gum Open Forest* which covers large areas of Bayview, Newport, Clareville and Avalon is not represented in any of the State's National Parks and is considered to be of state conservation significance. Other plant communities of regional significance include remnant *Themeda australis* (Kangaroo Grass) coastal headlands and remnant communities occurring on the Somersby Soil Landscape Group.

Although flora records for Pittwater are incomplete, it is likely that 32 nationally listed rare or threatened plant (ROTAP) species occur within the Pittwater Local Government Area. At least 12 regionally or locally significant species and many orchids have also been recorded.

More information on the diverse plant communities of Pittwater are included in Section 3.3 - Plant Communities (pg. 12) and in Volume 2 (Inventory and Action Plan) of the Urban Bushland Plan of Management.

Maintaining diversity in plant species and communities requires the development of appropriate management and restoration practices for individual sites and plant communities. A key component of these practices is the reduction of degrading influences and the maintenance of natural ecological processes associated with the plant community.

Maintaining Genetic Integrity

An individual plant species may have considerable genetic variation across its natural range of occurrence. This genetic diversity is advantageous to the plant in that it assists it to grow a range of environmental conditions. The practical advantage of this natural diversity is that the local populations of native plants are likely to be more genetically adapted to the growing conditions of the Pittwater area.

Maintaining the genetic integrity of urban bushland reserves is considered to be an important component of management. The principles applied to achieving this include:

- the prevention of native species which are non-indigenous to the Pittwater area being introduced or spreading into bushland areas;
- the use of plant material which has been propagated from local sources for revegetation and restoration work in bushland areas.

A Major Threat to Plant Communities - Eucalyptus Dieback

In Pittwater extensive eucalypt dieback has been identified as a major problem in Council reserves and on private lands. Remnant eucalypt woodlands and forest trees are being substantially disrupted by a range of landuse factors.

Dieback or eucalypt tree decline is an Australia-wide phenomenon. It can be described as a natural eucalypt forest community being degraded by a range of natural and man made factors, often resulting in premature death. Most common tree species affected in the Pittwater area are Sydney Peppermint (*Eucalyptus piperita*), Red Bloodwood (*Corymbia gummifera*) and Apple Gum (*Angophora costata*); also affected are Spotted Gum (*Corymbia maculata*), Grey Gum (*Eucalyptus punctata*) and Swamp Mahogany (*Eucalyptus robusta*).

Dieback is considered to be caused by increased soil nutrient levels arising from:

- washing detergents for clothes, dishes and cars containing nutrients such as phosphorous and boron;
- dumped garden rubbish/lawn clippings;
- over application of fertilisers;
- nutrients leached from building materials;
- introduced land fill;
- septic seepage.

Other factors affecting tree health which can contribute to dieback include:

- Damage and disturbance to the roots in the tree's dripline by cutting and loss of roots from construction, loss of water and soil compaction, or the build up of soil.
- Increased water runoff from roads, driveways, pavements and gutters directed into stormwater drains.

- Pool discharges (both chlorine and salt water discharge) into bushland.
- Increased water tables due to excessive use of irrigation systems.
- Tree loss opens the canopy, allowing wind turbulence to damage leaves and branches.
- Removal of understorey plants during urban development can cause wind pruning and tree or limb loss.

Adapted from Dieback in Pittwater (A4 information leaflet)

4.3.1.3. Management Policies

Statutory Responsibilities

- A. The statutory responsibilities and obligations for State Environmental Planning Policy 19 - Bushland in Urban Areas and Local Government Act (1973) are acknowledged by Council and will be addressed where necessary and appropriate.

Plant Community and Species Diversity

- B. Council will aim to manage the bushland areas of Pittwater in such a manner which maintains optimum locally indigenous native species and plant community diversity.
- C. Council will aim to maintain natural ecological processes of bushland areas and mitigate degrading influences.
- D. Council will support the preparation by the National Parks and Wildlife Service of species recovery plans for rare or threatened (ROTAP) native plant species.

Maintaining Genetic Integrity

- E. Council will aim to maintain through its management policies and practices the genetic integrity of bushland remnants.

Eucalyptus Dieback

- F. Council will aim to reduce the known factors influencing dieback through the adoption and implementation of policies relating to Urban Impact Mitigation (Section 4.2 pg 20) and Fire Management (Section 4.4 pg. 56).
- G. Council will support the establishing of a dieback monitoring program and any additional research which directly contributes to the greater understanding of this problem.

4.3.1.4. Performance Targets

Statutory Responsibilities

All statutory responsibilities under identified legislation are enacted.

Plant Community and Species Diversity

Maintenance (and enhancement where appropriate) of current plant community and species diversity in bushland areas.

Maintaining Genetic Integrity

Utilisation of local genetic material Council bushland management programs.

Control of non-indigenous native plants in bushland areas.

Eucalyptus Dieback

Research outcomes identifying additional contributing factors.

Stabilisation and reduction of canopy dieback rates.

Improvement of canopy health.



4.3.2. WEED MANAGEMENT

4.3.2.1. Management Objectives

- To implement measures to control and manage existing and future processes and sources of weeds which are invasive of bushland areas.
- To identify and respond to the occurrence of new plant species which pose a potential threat to bushland areas.

4.3.2.2. Description of Issues

Statutory Responsibilities

Council has a statutory responsibility under Noxious Weed Act (1993) as a **local control authority** to control noxious weeds as identified under the Act on land owned, controlled or managed by Council and on private property through the issuing of **weed control notices**.

Categories of Weeds

Weeds can be broken into several categories. Those which affect:

1. human health;
2. agricultural production;
3. environmental quality.

In relation to bushland management we are particularly interested in those weed species which affect environmental quality.

The Noxious Weed Act (1993) allows for the division of weeds (at both a state and local level) into 4 control categories. Whilst many of the major noxious species declarations are made at a State Government level, the Noxious Weed Act (1993) allows Councils considerable scope to recommend to the Minister of Agriculture local declaration and management strategies for noxious weeds on a local basis. This is particularly achieved through the use of "W4" classifications. This classification enables Councils to differentiate and establish specific control actions in relation to weeds which are a major threat to community health or environmental quality in their area. A list of Noxious Weeds gazetted for Pittwater is included in section 7.4 - Noxious Weeds of Pittwater (as at 19 May, 1995) (pg. 97).

A further group of weeds which have a minor effect on environmental quality are those which, whilst invasive of bushland areas, are not considered to be a significant threat to the maintenance of biodiversity.

Control of Weeds

Weed infestations need to be managed in two ways:

- weed control techniques must be chosen to minimise negative environmental impacts;
- weed control treatments should aim to reduce re-infestation of undesirable species through the establishment of more favourable plant species or communities.

Hence, control needs to be a sustainable management process - not just focussing on the destruction or control of the weed but also the treatment of the cause and replacement of that weed with a plant species which is more desirable.

4.3.2.3. Management Policies

Statutory Responsibilities

- A. The statutory responsibilities and obligations for noxious weed control under the NSW Noxious Weed Act (1993) are acknowledged by Council and will be addressed where necessary and appropriate.

Weed Classifications

- B. Council will periodically review and seek amendments to "W4" weeds as necessary, which will also aim to adopt a consistent classification with adjoining land managers.

Weed Management Programs

- C. In the implementation of weed control, Council will develop weed control programs which aim to address the causes of the weed infestation as well as the infestation itself.
- D. Weed control will be undertaken in a planned fashion which minimises negative environmental impacts and reduces re-infestation of undesirable species through the establishment of more favourable plant species or communities. In bushland areas, the use of bush regeneration treatments may be more appropriate than broadscale herbicide applications (see section 4.3.3 - Bushland Restoration and Regeneration (pg 43).
- E. Council supports an integrated weed control program with adjacent land managers which is based on catchment management principles.

Community Education

- F. Council to implement a public awareness program relating to community responsibility under the new provisions of the Noxious Weed Act (1993)

4.3.2.4. Performance Targets

Statutory Responsibilities

All statutory responsibilities under the Noxious Weeds Act 1993 are enacted.

Weed Classifications

Noxious Weed classifications and control actions for Pittwater Local Government Area are regularly reviewed and application lodged with the Minister for Agriculture for amendment when necessary.

Weed Management Programs

Production of a weed control program for declared Noxious weeds where they occur on community and operational lands.

Reduction in the frequency and spread of declared Noxious Weeds in Pittwater.

Replacement of treated infestations with more desirable species or plant communities.

Community Education

Production of community interpretive materials on Noxious Weeds and their control on private lands.

Reduction in the frequency and spread of declared Noxious Weeds from private land to community, operational or other private lands.

Cessation of sale of declared Noxious Weeds in nurseries in the Pittwater and adjoining Local Government Areas.



4.3.3. BUSHLAND RESTORATION AND REGENERATION

4.3.3.1. Management Objectives

- To maintain bushland in a condition where the maximum area is available for the continuance of a diverse viable indigenous native species ecosystem, with the minimum competition from weed species.
- To reconstruct or fabricate native plant communities on sites where appropriate.

4.3.3.2. Description of Issues

Statutory Responsibilities

Council has a statutory responsibility under State Environmental Planning Policy (SEPP) 19 - Bushland in Urban Areas to ensure that management plans prepared for bushland areas are consistent with the aims and objectives of the Policy (Clause 4 (4)) and identify specific measures to be taken to "...restore and regenerate areas of bushland" (Clause 4 (4) (c))

Why do weeds invade bushland?

Urbanisation results in changes to the ecological processes that operate on bushland ecosystems. The dysfunction of these processes leads to degradation of the bushland resource through invasion by weed species and the loss of vegetation structure and species diversity. Therefore, to simply remove weed species without reference to the cause of the problem and the potential for the natural community to re-establish is an ineffectual and short term response.

Weeds in bushland primarily grow in disturbed areas. The main underlying disturbance factors in urban bushland are:

- Physical disturbance to an area such as construction activities, clearing bushland, mowing;
- Increased soil moisture due to urban run-off;
- Increased nutrients from urban run-off and garden refuse dumping;
- Increased light levels where trees are killed or lopped often for views;
- Increase in weed propagules and seed dispersal agents.

How is Bushland Restoration and Regeneration Applied?

"Bush Regeneration is the practice of restoring bushland by focussing on reinstating and reinforcing the system's ongoing natural regeneration processes." (Australian Association of Bush Regenerators (AABR)). Specific targeting of restoration and regeneration works on a site needs to take into consideration the processes affecting weed spread, and should incorporate programs which reduce the degrading influences affecting weed spread.

Restoration and regeneration strategies can be divided into 3 techniques:

- A. Assisted Natural Regeneration.

- B. Reconstruction.
- C. Fabrication.

The choice of technique used depends upon the natural condition of the site and the likely resilience of any native plant species or propagules on the site. As a general rule, assisted natural regeneration is applied initially to most regeneration sites, with the exception of highly modified areas.

The thorough assessment of sites prior to determining the appropriate restoration or regeneration technique is essential. This needs to be undertaken by suitably skilled and experienced bushland regeneration practitioners and or managers. Similarly, the application of restoration and regeneration techniques needs to be undertaken or closely supervised by skilled and experienced bushland regenerators.

Bushland restoration and regeneration is a progressive process requiring commitment of resources for follow-up and consolidation works.

4.3.3.3. Management Policies

Statutory Responsibilities

- A. Plans of Management prepared for bushland areas will be consistent with the aims and objectives of SEPP19 and will clearly identify the specific measures to restore and regenerate areas of bushland.

Application of Bushland Restoration and Regeneration

- B. The application of bushland regeneration works is only to be undertaken after detailed site assessment and the clear identification of aims, outcomes and techniques to be applied to each site.
- C. Where natural soils are still dominant, assisted natural regeneration techniques are to be applied initially, followed by reconstruction and fabrication techniques if natural regeneration processes are deemed inadequate after a specified period of time (given considerations for adverse environmental conditions).
- D. Bushland restoration and regeneration works are to be integrated with works or actions aimed at mitigating the degrading influences on the bushland site.
- E. Bushland restoration and regeneration works are not to be undertaken if sufficient follow-up weed control and regeneration work cannot be guaranteed.
- F. Maintain, enhance and adequately resource Council's current bush regeneration and weed control programs.
- G. Garden refuse, exotic and native plant material removed during bush regeneration programs shall be stockpiled on site and used for ecological burns only with the consent of Council's Environmental Officer.

4.3.3.4. Performance Targets

Statutory Responsibilities

Plans of Management for bushland areas consistent with the aims and objectives of SEPP19 and clearly identify the specific measures to restore and regenerate areas of bushland.

Application of Bushland Restoration and Regeneration

Implementation of bushland restoration and regeneration programs based on documented aims, objectives, site assessment and application of appropriate techniques.

Increase in the natural resilience to further significant weed infestation of an area treated with bushland restoration or regeneration techniques.

In situations where biophysical attributes have not significantly changed from the natural, the regeneration or reconstruction of a plant community representative in structure and species diversity of the original plant community.

In situations where biophysical attributes have changed significantly from the natural, the fabrication of a native plant community which is representative of a similar plant community found within the region.

Reduction in the effects of weed infestation on restoration and regeneration sites.

Increase in area of bushland requiring maintenance only regeneration treatment.

4.3.4. FAUNA MANAGEMENT

Too often bushland management has only been concerned with the value and function of the vegetation component of bushland ecosystems and has either downgraded or ignored the role and requirements of wildlife.

4.3.4.1. Management Objectives

- Protection, maintenance and enhancement of native fauna populations and habitats.
- Control of domestic and feral animals where impacting upon native fauna populations.

4.3.4.2. Description of Issues

Statutory Responsibilities

Council has statutory obligations to comply with NSW Legislation relating to impacts on fauna in the assessment and granting of approval or development consent and in the implementation of Council activities. This is particularly the case with species listed under Schedule 12 of the NSW National Parks and Wildlife Act (1974).

Fauna Habitat and Populations

"Pittwater has an array of habitats ranging from wetlands to open forests. The range of fauna habitats has resulted in 331 native species (excluding marine fauna and invertebrates) being recorded. This is comprised of 252 bird species, 40 mammals, 23 reptiles and 16 amphibians. Of these 28 are listed as endangered in NSW (under Schedule 12 of the NSW National Parks and Wildlife Act. 1974) and many, such as the long-nosed bandicoot, are of regional significance...

However, the future of Pittwater's diverse biota is not secure. For example, the local koala colony has declined from more than 123 individuals in 1970 to about eight in 1990 Smith and Smith (1990). Due to its high sensitivity to habitat removal and vulnerability to dogs, koalas can be regarded as an indicator of the likely impacts that increased densities of residential development will have on less well-known species. Other species which are likely to decline in the long term are long-nosed bandicoots, squirrel and sugar gliders, and the wide range of smaller bush birds such as fantails, thornbills and whistlers which require structurally diverse native vegetation. More conspicuous and aggressive species such as brushtail possums and lorikeets are more able to cope with increased density of development. A decline in the variety of flora species particularly groundcover and shrub components is also likely. To arrest this decline in biodiversity steps must be taken within the planning process to ensure habitat retention. Rather than reacting to proposed developments an overall strategy to ensure habitat retention should be adopted."

Pittwater Council. 1995b

The fragmented nature of urban bushland, and the considerable impacts affecting these areas, affects the populations of all species of fauna. Therefore, whilst habitat protection is important for Schedule 12 endangered species, it is also essential that species and their habitats currently considered to be well conserved or common are given protective status by Council to ensure that the longterm viability of their populations are not compromised.

Species recovery plans for fauna considered to be endangered are often prepared with the aim of establishing strategies for ensuring that they do not become either locally, regionally or nationally extinct.

Fauna Corridors

Fauna corridors can be loosely defined as any piece of the landscape allowing movement of the biota between large habitat areas. These corridors have a range of benefits as they:

- allow increased migration rates of species / individuals. This maintains species richness and diversity;
- decreases likelihood of local extinctions and prevents inbreeding;
- provide increased foraging area for species with large ranges eg. Koala's
- provide refuge from predators such as domestic pets;
- widen the variety of habitat available;
- provide refuge from disturbed habitat eg. fire affected bushland
- limit urban sprawl and abate noise (Nos. 1987).

Pittwater Council. 1995b.

Feral / domestic animal control

This large expanse of bushland habitat in Pittwater area allows for feral animal invasion due to its favourable shelter, denning facility and food supply. The main feral animals found within Pittwater's boundaries include cats (*Felis catus*) and foxes (*Vulpes vulpes*). Small native mammals, birds, reptiles and amphibians are prey for feral cats and foxes. Cats kill prey up to their own body size; most of NSW's endangered and vulnerable mammals, birds and reptiles, are in the size category known as "critical weight range" such as the Southern Brown Bandicoot and Squirrel Gliders which are found in the Pittwater area.

Cats and foxes may compete with native predators of Pittwater such as the Tiger Quoll and birds of prey (owls, eagles, hawks) and snakes for food supply. They are also responsible for carriage and transmission of infectious diseases such as toxoplasmosis and sarcosporidiosis which can debilitate and kill native animals and possibly affect human health.

The New South Wales Wildlife Information and Rescue Service (WIRES) has statistics available for pet/feral attacks on wildlife for suburbs in the Pittwater area (Pittwater Council. 1994a).

Introduced bird species such as the common starling (*Sturnus vulgaris*), Indian myna (*Acridotheres tristis*) and house sparrow (*Passer domesticus*) pose a lesser threat to most native bird species as preliminary research indicates (P Smith pers comm.) that native species generally out-compete introduced species where native vegetation is dominant. However in developed zones and areas of weed infestation introduced species often out-compete the native birds.

Finally domestic pets allowed to freely roam bushland reserves can not only lead to the destruction of native wildlife but also to the proliferation of weed growth. The reason being that their faeces are high in nutrients, especially phosphorus and (Wright 1988)).

Warringah Shire Council. 1990.

4.3.4.3. Management Policies

Statutory Responsibilities

- A. The statutory responsibilities and obligations for fauna management under the Local Government Act (1993), the NSW National Parks and Wildlife Act (1974), the Environmental Planning and Assessment Act (1979), the Endangered Fauna (Interim Protection) Act (1991) and the Heritage Act (1977) are acknowledged by Council and will be addressed where necessary and appropriate.
- B. Scientific researchers wishing to carry out studies in bushland reserves are to notify and obtain approval from the Environmental Officer and obtain permission of the National Parks and Wildlife Service (NPWS) and their organisations Animal Ethics Committee if research is carried out on native wildlife. Permission to undertake fauna research within Council reserves will be considered on merit and will be conditional on Council receiving a copy of the findings on completion of the research.

Fauna Habitat and Populations

- C. The ongoing compilation, identification and monitoring of species and habitat diversity across the Local Government Area will be supported by Council.
- D. Council will aim to maintain and enhance where appropriate native fauna habitat and species diversity across the Local Government Area.
- E. All plans of management prepared for community lands are to include provision for wildlife habitat creation, enhancement and management.
- F. Impacts on wildlife and habitat are to be taken into consideration whenever any management activity is proposed (such as bushland regeneration, weed control, fire hazard reduction or ecological burns, recreation provision and maintenance).
- G. Council will encourage private landholders to improve / maintain wildlife habitat.
- H. Fauna releases will only be permitted in areas from which the fauna originated or within the expected home range of the species. Releases will not be permitted in bushland reserves without the approval of Council's Environmental Officer.

Fauna Corridors

- I. Council will support the identification, retention and expansion of fauna corridors across the Local Government Area.

Feral / domestic animal control

- J. Council will produce and adopt a target specific, effective, strategic and humane program for the control of feral animals in the Local Government Area.
- K. Council recognises the destructive impacts of uncontrolled domestic animals on fauna in bushland areas and will support and expand existing community education programs aimed at reducing this impact.

-
- L. Council recognises that the use of bushland areas for the exercising or training of domestic animals is an activity which is incompatible with the protection and management of native fauna and habitat.

4.3.4.4. Performance Targets

All statutory responsibilities under identified legislation are enacted.

Filling of identified data gaps and existing information on fauna and habitat (from research and commissioned / Council studies).

Adoption of the Draft Habitat and Wildlife Corridors Plan of Management (Pittwater Council, 1995b).

Reduction in the levels of bushland use for domestic animal exercising and training.

Reduction in the number of fatalities and injuries to native fauna caused by both feral and domestic animals.

Maintenance of viable fauna populations, Schedule 12 species and habitat.

4.4. FIRE MANAGEMENT

4.4.1. ECOLOGICAL AND HAZARD REDUCTION

4.4.1.1. Management Objectives

- Balance the threats to life and property (Council and Private) with the need to protect the biodiversity and heritage values of bushland areas.
- Utilise fire for the maintenance and enhancement (where appropriate) of biodiversity and habitat.
- Fulfil statutory obligations under NSW Government Policies and Legislation.
- Integration of fire management practices and policies with the community and other relevant land and fire management authorities.

4.4.1.2. Description of Issues

Statutory Responsibilities

Council has statutory responsibilities for bushfire management and its impacts under several Acts and policies, including:

- Bushfires Act (1949);
- Environmental Planning and Assessment Act (1979);
- State Environmental Planning Policy 19 - Bushland in Urban Areas (1986);
- Endangered Fauna (Interim Protection) Act (1991);
- Heritage (Amendment) Act (1979);
- National Parks and Wildlife Act (1974);
- Occupational Health and Safety Act (1983);
- Department of Urban Affairs and Planning Circular C10 - Planning and Fire Prone Areas;
- Warringah Pittwater Draft Fuel Management Plan (1994).

Fire in Bushland - Ecological and Social Implications

“Fire management in urban bushland needs to ensure that fire hazard to life or property is minimised whilst protecting the natural features of the bushland. Fires have occurred as a natural disturbance to bushland in the Sydney region for tens of thousands of years. Many of the plant species found in Sydney’s bushland areas have characters which enable them to regenerate after wildfires. Changes to the fire regime (the frequency, intensity and season of fires) can have a severe effect on some species to the point where some species may become locally extinct under an inappropriate fire regime.

In general, urban bushland reserves pose a lesser threat to life and property than larger forested areas as they are often small, isolated areas of bushland in a predominantly urban environment; they are more readily accessed by fire fighters than remote bushland locations; fires are generally observed at an early stage; and, the changes to vegetation caused by nutrient increases and urban runoff act to reduce the flammability of the bushland. On the other hand the remaining bushland is often on steep land, by its nature unsuitable for urban development. The steep nature of the land means that fire hazard is increased. On days of extreme fire danger even small reserves may pose a threat to life and property.

A fuel reduced zone is a zone where fine fuel (material thinner than 6 mm) to the height of 2 metres is reduced by thinning and raking or by low intensity fire. It retains canopy trees but reduces the material which can sustain a fire, leaving scattered shrubs and ground cover to a depth of approximately 250 millimetres.

Fuel reduction can be by use of fuel reduction burns or by manual means. The Council has adopted both techniques in the past in an effort to reduce fuel levels in the fuel reduction zone. Problems also encountered in the Reserve which contribute to increased fuel loadings are dumping of garden refuse, piling of fallen branches and continual lopping for views creating dense bushy growth at low levels as opposed to normal tree form growth. Removal of trees from the edge of the reserve through dieback, poisoning or lopping removes the important role they play as a heat shield and their ability to trap wind borne embers.

In addition to the fuel reduced zone a fuel free zone should be maintained on properties adjoining the Reserve. Residents adjoining Reserve should be made aware of their responsibility to reduce fire fuel on their own land. Wood piles should not be located adjacent to buildings, roof gutters should be regularly cleared of leaf litter and litter build up around the house should be removed.

*Urban bushland fire management needs to take into consideration the ecological needs of the plants and animals of the bushland, in addition to the risk posed by wildfires to life and property. There is considerable evidence that fire regimes have changed significantly in urban bushland areas since European settlement. In general terms, fires are less frequent, low intensity and controlled more quickly. The changed fire regime is contributing to the loss of species which competed more successfully under the previous fire regime. Such species include members of the families Fabaceae (eg. Eggs and Bacon) and Proteaceae (eg. Grevilleas). In the Barrenjoey Peninsula area it appears that the changed fire regime may also be contributing to dieback of Eucalypts and proliferation of rainforest species such as Cheese Tree (*Glochidion ferdinandi*) and Sweet Pittosporum (*Pittosporum undulatum*).*

In order to meet the dual objectives of ensuring regeneration of the range of species present in the Reserve and ensuring that fuel reduction burns are carried out in a safe manner, burns should occur at a range of intensities, over a variety of seasons in accordance with plant and animal ecological requirements. As fuel reduction burns are often low intensity, it is recommended that medium to high intensity burns be achieved over longer intervals, interspersed with mechanical fuel reduction as necessary. Rainforest gullies should not be burnt as the practice will kill rainforest trees and lead to an increased risk of fire due to drying of the vegetation and fuel layer.

Continued frequent, broad-scale burning could lead to a loss of biodiversity and local extinction of plant and animal species. Each plant community within Pittwater will have an optimum fire frequency. Broad-scale hazard reduction burns should be conducted in a manner that retains patches of unburnt vegetation.

Fire management practices need to be sufficiently flexible to allow this dynamic interaction between various elements of the vegetation to continue. Fires of low intensity may exacerbate weed problems in areas susceptible to invasion.

The assessment of the success of fire protection policies and strategies can only be undertaken by monitoring fire occurrences and their impact. Records of fires occurring in bushland areas in Pittwater LGA and the damage they cause should be maintained. Review of policies and strategies should take place in light of this experience.”

Pittwater Council 1994b

Fire in Bushland - Heritage Implications

Aboriginal Sites

Aboriginal rock engraving sites, stone arrangements, middens, occupational deposits, cave and art sites and axe grinding grooves are the most common site occurring in the area. There are about 1500 recorded sites in the north metropolitan areas with a potential density of up to 20 sites per square kilometre.

Rock engravings and stone arrangements usually occur on sandstone rock outcrops on ridges and are most susceptible to damage from bushland operations such as track and trail construction. Intense bushfires may also cause exfoliation of sandstone outcrops which may also damage engravings, particularly those which are vertically oriented rock outcrops. Although very uncommon, wooden aboriginal implements and scattered trees have been recorded in the area and should be protected where they are known.

Most damage to aboriginal sites is caused indirectly by bushfires through the accelerated weathering and erosion and sedimentation of soils, particularly in areas mapped by Chapman and Murphy (1989).

Conroy, B. 1994.

European Historic Sites

Bushland reserves may contain European historic artefacts (eg. stone graves, features listed at Governor Philip Park (Pittwater Council (1995a)) which can also be damaged by wildfire and hazard reduction / ecological burns.

4.4.1.3. Management Policies

Statutory Responsibilities

- A. The statutory requirements and obligations of the Bushfires Act (1949), the Environmental Planning and Assessment Act (1979), State Environmental Planning Policy 19 - Bushland in Urban Areas (1986), the Occupational Health and Safety Act (1983), the Heritage (Amendment) Act (1979), National Parks and Wildlife (1974) Department of Urban Affairs and Planning Circular C10 - Planning and Fire Prone Areas and the Warringah Pittwater Draft Fuel Management Plan (1994) are acknowledged by Council and will be addressed when necessary and appropriate.

Education, Public Participation and Co-ordination

- B. All fire management activities will be undertaken co-operatively with Warringah/Pittwater Bushfire Committee, adjoining Councils, NSW National Parks and Wildlife Service, volunteer bushfire brigades and the community, particularly those householders whose house blocks adjoin bushland areas.
- C. Encourage local residents to reduce fire hazard on their own properties and provide information on how this can be done.

Planning, Administration, Fuel Management and Statutory Responsibilities

- D. Council supports the participation of Council's Environment Officer in Warringah / Pittwater Bush Fire Management Committee.

- E. Where appropriate bushland reserves in Pittwater will have a fire management plan prepared and adopted. These plans are to be consistent with the objectives and strategies outlined in the Warringah/Pittwater Bushfire Management Committee Draft Fuel Management Plan (Conroy, B. 1994).
- F. Hazard reduction burning will only be implemented if risk assessment identifies a need to undertake the program and all other viable fuel reduction options are deemed inappropriate.
- G. Use of Council's powers under the Bushfire Act to ensure that property owners reduce fire hazard on their own land. This shall include removal of hazardous stores of firewood and undergrowth. Action will be taken against landowners who create fire hazards by dumping of garden waste into the Reserve.
- H. Fuel reduction will be undertaken where potential high wildfire intensities pose a threat to life and property and / or to the natural and cultural values of the reserve. Fuel reduction programs undertaken along property boundaries will be implemented in a manner which protects the biodiversity.
- I. Council will not endorse hazard reduction programs which are not accompanied by an environmental impact assessment, are inconsistent with an adopted plan of management for bushland areas or which are deemed by Council to have an unacceptable impact on the environment.

Adapted from Conroy, B 1994

Ecological Management

- J. The dual aims of fuel reduction and biodiversity conservation will be achieved by:
 - undertaking fuel reduction burns in a manner which will promote germination of a range of native plant species ie. fuel reduction burns will be of a timing and intensity to achieve significant germination of members of the Fabaceae and Proteaceae families.
 - undertaking manual treatment in the fuel reduction zone in a manner which seeks to promote the retention of a native plant ecosystem, this would include targeting of weed species in fuel reduction activities and integration of manual fuel removal into the bushland management program.

Adapted from Pittwater Council 1994b

- K. Hazard reduction or ecological burns will not be undertaken in areas known to contain rare or endangered plant / communities or areas of identified significant native faunal habitat, except where research has already identified that such burning is not detrimental to the survival of the species, communities or associations. See also Section 4.3.3 - Bushland Restoration and Regeneration (pg. 43) for policies relating to the use of regeneration debris for ecological burns.
- L. Broad-scale hazard reduction burns should be conducted in a manner that retains patches of unburnt vegetation.
- M. Hazard reduction programs will be determined and modified based on regular reviews of data collected relating to the ecological impact of programs.

Cultural Management

- N. All fire management activities will require impact assessment where proposed to be undertaken in sites of known or expected cultural or historic value to ensure that impact is minimised.

4.4.1.4. Performance Targets

Biodiversity of plant and animal communities, in hazard reduction areas will be maintained.

Ecological requirements of fire management in Pittwater LGA will be assessed through use of quadrats, photographs, regular observations by bush regeneration contractors, Council staff and volunteers.

Development, adoption and implementation of fire management plans where necessary for bushland reserves in Pittwater.

Continued active participation by Council's Environment Officer in Warringah / Pittwater Bush Fire Management Committee.

Annual review and update of individual fire management plans.

Items of Aboriginal or European cultural heritage are protected from adverse impacts of fire.



4.5. RECREATION / ACCESS

4.5.1. RECREATION STRUCTURES AND FACILITIES IN BUSHLAND

4.5.1.1. Management Objectives

- To plan and provide recreation facilities consistent with the need to facilitate public enjoyment of the bushland compatible with its conservation.
- To limit the nature and provision of recreation structures and facilities in sensitive bushland areas.
- To ensure that recreation structures and facilities in bushland are maintained to the highest possible standard.

4.5.1.2. Description of Issues

Statutory Responsibilities

The specific aims of State Environmental Planning Policy (SEPP) 19 - Bushland in Urban Areas include the aim "...to promote the management of bushland in a manner which protects and enhances the quality of the bushland and facilitates public enjoyment of the bushland compatible with its conservation." (Clause 2 (2) (n))

As a "work" under the definition of "development" contained in the Environmental Planning and Assessment Act (1979), the development of recreation facilities and structures in bushland areas can require the submission of a Development Application (DA) or Building Application (BA) depending on the nature of the work. If the proposed development is for the purpose of facilitating recreational use which is not in accordance with a Plan of Management for the bushland, Council cannot consent to carrying out the development unless:

(a) *it has made an assessment of the need to protect and preserve the bushland having regard to the aims of this Policy;*

(b) *it is satisfied that the disturbance of the bushland is essential for a purpose in the public interest and no reasonable alternative is available to the disturbance of that bushland; and*

(c) *it is satisfied that the amount of bushland proposed to be disturbed is as little as possible and, where bushland is disturbed to allow construction work to be carried out, the bushland will be reinstated upon completion of that work as far as is possible.*

SEPP 19 Clause 6 (4)

Furthermore, such a development would require assessment under sections 84, 85, 86, 87 (1) and 90 of the Environmental Planning and Assessment Act (1979) in the same way as those provisions apply to and in respect of *designated development*. (SEPP19 Clause 6 (4)).

Appropriate Location, Nature and Maintenance of Recreation Facilities and Structures

Recreation facilities generally considered to be compatible with the conservation of bushland include:

- Walking tracks;
- Boardwalks;
- Areas for Nature Study.

Whilst these facilities are generally considered acceptable, there is a need to assess each bushland area or plant community as to its carrying capacity to sustain such a use without permanent deterioration or damage to the area. Each reserve and plant community will have a specific carrying capacity.

Furthermore, when planning for the installation of recreation facilities, the location of the facility should minimise fragmentation of the bushland area and avoid sensitive heritage sites (See Section 4.10 - Heritage Management (pg. 74)). This may require that existing facilities be rationalised or combined to reduce overall impact on an area.

Safety considerations also need to be taken into account when planning for or installing recreation facilities. Some areas (eg. thin, coastal areas) may require special treatment or be excluded from community access due to unacceptable levels of risk to recreational users. The installation of recreation facilities by Council is equivalent to an invitation for the community to enter and use an area, so unless user safety can be reasonably guaranteed, the construction of such facilities in these areas may significantly increase Council liability.

Often the focus of recreational development in bushland areas is weighted towards the initial cost of construction of the facility, however if the community is encouraged to access and utilise bushland areas through the use of the facility, a high standard of on-going maintenance of the bushland itself must be set. The installation of recreation facilities can provide opportunities for weed spread through the introduction of additional site disturbances. Hence, when budgeting for the installation of these facilities, on-going allocation of funding for bushland restoration and regeneration work needs to be included in the estimation of cost for the project.

Active Sporting Facilities

Active sporting facilities (eg. playing fields, courts etc) have serious impacts on bushland areas and are generally considered to be incompatible with the conservation of bushland. Accordingly, active sporting facilities should not be located in bushland areas. Where recreation needs surveys indicate a community need for these facilities, they should be located in non-bushland areas. Sporting fields and other turf based recreation facilities can also have a serious impact on bushland, particularly when located upslope of and adjoining bushland. Due to the need for irrigation and fertilisation of these facilities, leaching of nutrients into bushland areas can have a serious degrading influence (see section 4.2.1 - Urban Run-off and Stormwater Discharge (pg. 22) for a more detailed discussion on these impacts). Hence, the installation of management of such facilities in these locations needs to take into consideration their impact on adjoining bushland areas.

4.5.1.3. Management Policies

Statutory Responsibilities

- A. The installation of recreation facilities in a bushland reserve is to be in accordance with the Plan of Management and consistent with the aims and objectives of SEPP19.
- B. Where a proposed recreation facility is not consistent with the Plan of Management or the aims and objectives of SEPP19, Council will not consent to the development of such a facility without thorough assessment under Clause 6 (3) and 6 (4) of the policy.

Location, Nature and Maintenance of Facilities

- C. Recreation facilities and structures will not be constructed in bushland areas if it is deemed that the direct and indirect adverse impact of those structures is deemed by Council's Environmental Officer to be beyond the carrying capacity of the bushland reserve.
- D. The location and maintenance of existing and proposed recreation facilities will aim to reduce reserve fragmentation and other adverse impacts on the bushland and heritage relics.
- E. Construction materials and techniques for facilities and structures in bushland areas will be visually and environmentally sympathetic with the site.
- F. Council's allocation of funding for ongoing bushland restoration and regeneration work will be integral to the budgeting for the initial construction cost of recreation facilities and structures in bushland.
- G. Active sporting facilities will not be located in bushland areas.
- H. Where active sporting facilities are located upslope of and adjoining bushland reserves, the management practices for those facilities will be reviewed and modified to reduce existing or potential impacts on the bushland area.

4.5.1.4. Performance Targets

Statutory Responsibilities

Fulfilment of requirements of SEPP19 and reserve Plans of Management.

Location, Nature and Maintenance of Facilities

Development of bushland recreation use strategy based on identified carrying capacity for each reserve or plant community.

No unacceptable deterioration of bushland quality as a result of installation or maintenance of recreational facilities.

No unacceptable increase in Council liability due to the installation or inadequate maintenance of recreation facilities in bushland areas.

Where necessary, implementation of bushland restoration and regeneration works in areas adjoining recreation facilities and structures.

Management practices for active sporting recreation facilities modified to be sympathetic with adjoining bushland management.

4.5.2. ACCESS THROUGH / INTO BUSHLAND

4.5.2.1. Management Objectives

- Ensure that essential pedestrian and vehicular access through or into bushland minimises the impact on the area.
- The removal of non-essential pedestrian and vehicular access and the restoration of affected areas.

4.5.2.2. Description of Issues

Statutory Responsibilities

Council has a statutory responsibility under State Environmental Planning Policy 19 - Bushland in Urban Areas to ensure that the management of bushland areas is consistent with the aims and objectives of the Policy. Furthermore, in the production of plans of management for reserves, the assessment and determination of appropriate vehicular and pedestrian access needs to be addressed within the aims and objectives of the policy.

Where private access is provided on community lands, the issuing of leases or licences under the Local Government Act (1993) may be required.

Vehicular and Pedestrian Access

Vehicular and pedestrian access through and into bushland areas can cause considerable management problems. Fragmentation of bushland areas can be a particularly significant problem resulting in the accelerated deterioration of plant communities and fauna habitat.

Vehicular access provided historically or currently through reserves includes:

- Private residential access on informal (but gazetted) roads;
- Private residential access on easements;
- Service vehicle access for park and public authorities service management;
- Temporary access to private lands for essential purposes.

Pedestrian access is generally confined to:

- Formally constructed and managed track networks to facilitate recreational use and reserve management;
- Informal tracks, often arising from adjoining private property.

Informal pedestrian access can result in significant adverse impact on bushland reserves. Formal pedestrian access needs to be adequately planned and maintained to prevent reserve degradation and increased Council liability (see section 4.5.1 - Recreation Structures and Facilities in Bushland (pg. 55) for discussion on the appropriate planning, management and impact mitigation of these facilities).

Generally, it is important for the long term sustainable and cost effective management of bushland areas that the presence of vehicular and pedestrian access be rationalised to those deemed essential for management or recreational purposes.

4.5.2.3. Management Policies

Statutory Responsibilities

- A. In relation to access through and into bushland areas, the statutory responsibilities and obligations of State Environmental Planning Policy 19 - Bushland in Urban Areas and the Local Government Act (1993) are acknowledged by Council and will be addressed when necessary and appropriate.

Vehicular and Pedestrian Access

- B. Council does not support the temporary or permanent use of bushland on community lands for access to private lands.
- C. Individual reserve plans of management are to establish the permissibility of both vehicular and pedestrian access through or adjacent to bushland on community lands. Prior to the production of these plans, the policies relating to access contained within this Urban Bushland Plan of Management will apply.
- D. The standard of construction and maintenance of vehicular and pedestrian access routes into or adjoining bushland will ensure minimal direct or indirect impact on these areas.

4.5.2.4. Performance Targets

Statutory Responsibilities

Compliance with all statutory responsibilities and obligations.

Vehicular and Pedestrian Access

No further provision of permanent private access through bushland on community lands.

No unacceptable adverse environmental impact on bushland on community lands arising from the construction or maintenance of essential vehicular and pedestrian access.

Restoration of non-essential tracks and trails to the highest practicable standard.

4.6. TRAINING / OPERATIONS

4.6.1. CONTRACT AND VOLUNTEER LABOUR

4.6.1.1. Management Objectives

- Ensure compliance with legal and statutory requirements under NSW legislation.
- Ensure that the use of contract and community volunteer labour is consistent with Council's aim to ensure the best conservation practices are implemented in all bushland reserves under Council's care, control and management.
- All contract and community volunteer activities to be undertaken within established guidelines and assessable performance targets.
- Provide a high level of planning, support, training and supervision of existing and future community volunteers.

4.6.1.2. Description of Issues

Statutory and Other Responsibilities

Council has legal responsibilities for the use of volunteers and a responsibility to ensure contractors engaged in bushland management work comply with the Occupational Health and Safety Act (1983).

Furthermore, Council has a moral obligation in respect of volunteer labour to fulfil the recommended practices outlined in the Code of Practice for Agencies involved with Volunteer Staff (Volunteer Centre of NSW).

Community Volunteers

Pittwater Council has a total of approximately 34 volunteer bush regeneration groups working in various reserves throughout the area. Collectively there are 264 volunteers registered with Council (as at 1995), however this number is slowly increasing. Many volunteers work individually, usually in reserves that border their own properties. Others work together in groups scheduling work days every fortnight or once a month.

Some of the larger groups are:

- Friends of Avalon Dunes;
- Friends of Bungan Beach;
- Friends of Browns Bay Rainforest;
- Loquat Valley Regeneration Group;
- Friends of Palmgrove Park;
- Scotland Island Landcare Group;
- Epworth Park Regeneration Group;
- Friends of Kundibah Reserve.

Council supports and provides these groups and individuals with:

- Tools;
- Insurance;
- On site training;
- On site advice and assistance by trained Council staff in bush regeneration;
- Rubbish removal;
- Plant materials and mulch;
- Field Days; 4 per year, which provide information, training, and networking amongst volunteers;
- The Bushland News, a newsletter sent to all volunteers providing flora and fauna information, environmental news, dates for upcoming events, and articles focusing on local regenerators and regeneration projects;
- Council staff to co-ordinate and supervise volunteer groups.

Volunteer groups in bush regeneration are of vital importance in the role of conservation of urban bushland and also in education of the general public about weeds and gardening practices. Their dedication and efforts are greatly appreciated by Council and the greater community.

Whilst volunteer programs are of vital importance, it is essential that Council maintains a sufficient level of trained and qualified staff to ensure that strategic planning and continuity is maintained by community volunteers. Also, Council staff play an essential role in the support, training and supervision of volunteers and are in the most appropriate position to assess the achievement of performance indicators and undertake reporting procedures as required under the Local Government Act (1993).

Contractors

Contractors will be used by Council at various times to implement work in bushland area. This work will include bushland regeneration, weed control and recreation facility installation and maintenance (eg. walking tracks). In reserves where contract labour is engaged, this work must be managed in a manner which is consistent with the aims and objectives of this policy and to a level which is satisfactory to Council.

4.6.1.3. Management Policies

Statutory and Other Responsibilities

- A. The legal requirements of the Occupational Health and Safety Act (1983) are acknowledged by Council and will be addressed when necessary and appropriate.
- B. The Code of Practice for Agencies involved with Volunteer Staff (Volunteer Centre of NSW) is acknowledged by Council and will be applied for the engagement of volunteers.
- C. All contract and volunteer bushland management works are to be implemented in accordance with this plan of management.

Community Volunteers

- D. Council will adequately resource the planning, support, training and supervision of all existing volunteer projects. Further volunteer programs will not be established if adequate resources for planning, support, training and supervision of the projects are unavailable.
- E. Council acknowledges the valuable role community volunteers play in the management of bushland areas and is committed to raising the public profile and support for volunteers.

F. Council's adopted Volunteer Bushland Regeneration Policy is to be used as the basis of establishing and maintaining a professional volunteer program.

Contractors

G. Council will engage contractors based on a planned program to undertake bushland management works in reserves.

H. All contract work is to be in accordance with Councils Contract Bush Regeneration Guidelines document. Specifically, contracts are to be established using (but not restricted to) the following criteria:

- 3 year contracts established by legal tender process;
- All contractors engaged by Council to implement bushland management works to be qualified and / or experienced in the area of work to a level satisfactory to Council's Environmental Officer;
- Measurable performance targets are to be established for all contract bushland management works and contractors assessed on their performance by Council staff during and at the completion of contract work;
- All contractors engaged by Council are to be fully insured to a level determined by Council officers.

4.6.1.4. Performance Targets

Satisfaction of the recommendations contained within the Code of Practice for Agencies involved with Volunteer Staff (Volunteer Centre of NSW)

Satisfaction of legal requirements of Occupational Health and Safety Act (1983).

Community Volunteers

Increase in the number of volunteers participating in fully planned, supported, trained and supervised regeneration programs.

Increase in expressed satisfaction from volunteers about the outcomes of bushland management programs.

Contractors

Achievement of work outcomes and targets as identified in individual contracts.

4.6.2. COUNCIL STAFF

4.6.2.1. Management Objectives

- Ensure that activities undertaken by Council staff minimise their impact on bushland areas.
- Ensure that the functions conferred or imposed on Council and its staff under the Local Government Act (1993) or under any other Act or law with implications for bushland or environmental management are implemented.

4.6.2.2. Description of Issues

Many activities undertaken by Council will directly or indirectly impact upon bushland areas. These activities may be field or office based. For example, the impact of planning decisions relative to bushland or adjoining areas may have a significant impact on natural areas. Similarly, field maintenance or construction activities may unnecessarily damage or compromise bushland quality. Therefore, whilst the day to day management of bushland may lie jointly with the Environment and Reserves Section, broader bushland management is the responsibility of several divisions or departments within Council. This is in line with the aims, objectives and statutory responsibilities outlined in State Environmental Planning Policy 19 - Bushland in Urban Areas.

Ensuring that staff within each section of Council acquires and maintains adequate knowledge and understanding of bushland management and the implications for their work practices is essential not only to improve management of bushland areas but also to fulfil the statutory obligations of Council under State Environmental Planning Policy 19 - Bushland in Urban Areas.

4.6.2.3. Management Policies

- A. Council will maintain professional staff with appropriate training and experience for bushland management.
- B. Council to ensure that all staff whose actions may impact on bushland are aware of their responsibilities under SEPP19 and techniques for mitigating the impacts of their operations.
- C. Council staff responsible for the mitigation or control of activities which impact on bushland areas are to comply with their responsibilities.

4.6.2.4. Performance Targets

Increased effectiveness and compliance with Councils statutory responsibilities towards bushland management.

Reduction in direct and indirect impacts associated with Council activities and actions.

4.7. PLANNING AND ADMINISTRATION

4.7.1. BUSHLAND IN NEW URBAN RELEASE AREAS

4.7.1.1. Management Objectives

- Retain parcels of bushland in a size and configuration which maximises potential for fauna corridor establishment and sustainable management.
- Retain and maintain viable and representative plant communities, habitat, and viable fauna and flora populations.
- Identify and retain significant biophysical attributes and bushland values.
- Minimise the impact of urban development on bushland.

4.7.1.2. Description of Issues

Statutory Responsibility

Council has a statutory responsibility under Clause 10 of State Environmental Planning Policy 19 - Bushland in Urban areas to have regard to the general and specific aims of the policy and give priority to retaining bushland unless satisfied significant environmental, economic or social benefits outweigh the value of the bushland.

Furthermore, the Council has additional responsibilities under the Department of Urban Affairs and Planning Circular C10 - Planning in Fire Prone Areas to ensure that the application of planning controls either exclude or provide protective measures for developments occurring in fire prone areas.

Protection of Significant Bushland Attributes and Values

As identified in section 2 - Value and Management of Bushland Areas (pg. 8), urban bushland has a variety of important natural and social attributes and values. However, in the sensitive development of new urban release areas which may impact upon bushland, the identification and documentation of these attributes and values needs to be thoroughly undertaken prior to the determination of the extent and nature of the proposed development. This will ensure that the proposed development does not compromise attributes or values which are considered to be of high local, regional, state or national importance.

Minimising Impacts of New Urban Release Areas

As outlined in section 4.2 - Urban Impact Mitigation (pg. 20), urban development has been identified as a major contributing factor to bushland degradation. Unfortunately, most bushland management responses are based on the alleviation or mitigation of impacts which have been in place often for several decades. Today, sensitive urban development in areas where bushland is present has the potential to mitigate or prevent many of the commonly experienced factors of degradation. This can be achieved through limiting development in sensitive areas, the use of appropriate planning and development techniques, new

technologies and the integration of identified natural attributes and values into the planning process.

4.7.1.3. Management Policies

Statutory Responsibilities

- A. The statutory responsibilities and obligations of State Environmental Planning Policy 19 - Bushland in Urban Areas and Circular C10 - Planning in Fire Prone Areas are acknowledged by Council and will be addressed when necessary and appropriate.

Protection of Significant Bushland Attributes and Values

- B. Council recognises the multiple values of sustainably managed bushland within conservation areas, reserves, residential and business precincts of new urban release areas.
- C. Council requires the implementation of a thorough biophysical and heritage assessment of all new land release areas containing bushland and requires that the identified attributes and values are used as an integral part of determining the nature and extent of development consistent with the aims and objectives of SEPP19.
- D. Council supports the retention of bushland parcels in a size and configuration which maximises potential for fauna corridor establishment, significant fauna habitat and plant community protection and sustainable management.
- E. Council will ensure that Section 94 plans contribute to the maintenance of bushland areas.

Minimising Impacts of New Urban Release Areas

- F. Council is committed to the development of new urban release areas in a manner which recognises and, where possible, enhances bushland values whilst allowing for the development of various appropriate residential and associated developments.
- G. To reduce potential adverse impacts of bushland areas, Council requires the implementation of impact mitigation techniques and structures to best practice standards for all new urban release areas which potentially affect bushland areas.

4.7.1.4. Performance Targets

Statutory Responsibilities

Compliance with all statutory responsibilities and obligations.

Protection of Significant Bushland Attributes and Values

Identification and documentation of all significant biophysical and heritage attributes and values of new urban release areas.

Development of new urban release areas consistent with the protection of these significant values.

Minimising Impacts of New Urban Release Areas

Establishment of an adequate network of reserves connected by native vegetation corridors for use by native fauna.

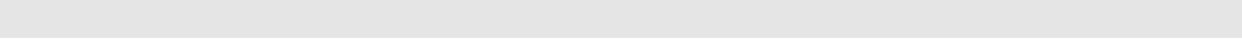
Re-establishment of an improved and useful vegetation cover on previously cleared land using, where possible, local species.

Establishment of native vegetation buffer zones adjacent to sensitive areas.

Establishment of development intensity guidelines to ensure minimal impact on native vegetation.

Development of a vegetation and land management code of practice to minimise impact on native vegetation during development.

Development of an ongoing nutrient and sediment management strategy to minimise impacts on native vegetation.



4.7.2. LEASES AND LICENCES

4.7.2.1. Management Objectives

- To ensure that leases and licences issued for activities undertaken in or adjoining bushland areas are compatible with the sustainable management of the bushland resource.

4.7.2.2. Description of Issues

Statutory Responsibilities

Council has a statutory responsibility under the Local Government Act (1993) to issue leases or licences for activities which either result in exclusive control for a set period or intermittent, short term occupation, control and use of all or part of a bushland area on community land.

Existing leases and licences may apply in some bushland areas. In these circumstances, the aims and objectives of State Environmental Planning Policy 19 - Bushland in Urban Areas still applies. The requirements of the Local Government Act (1993) will apply to existing leases and licences when subject to renewal.

Future Leases and Licences

The assessment of future leases and licences issued for activities in or adjacent to bushland areas need to take into account the direct and indirect adverse impacts of the proposed activity. If the impact is deemed to be beyond the limit of acceptable change for the bushland area, the lease or licence for that activity should not be issued due to the potential for Council to inherit significant management liabilities in excess of potential income.

Furthermore, leases and licences need to be issued conditionally on the minimisation of adverse impact on bushland.

4.7.2.3. Management Policies

Statutory Responsibilities

- A. The statutory responsibilities and obligations of State Environmental Planning Policy 19 - Bushland in Urban Areas and the Local Government Act (1993) are acknowledged by Council and will be addressed when necessary and appropriate.

Future Leases and Licences

- B. Leases and licences for public and non-public activities in bushland will not be issued if the direct or indirect adverse impacts of the activity on the bushland is deemed by Council's Environmental Officer to be beyond the limit of acceptable change for that area.
- C. Leases and licences will clearly identify the extent and nature of approved activity and will not be transferable.
- D. All leases and licences issued will be performance based and will be reviewed in relation to the achievement of such performance criteria.

-
- E. The cost of issued leases and licences will be based on commercial rates and will ensure that adequate return is gained to potentially restore unanticipated impacts to bushland areas. The financial return arising from leases and licences issued for activities undertaken in bushland areas may be directed into Council bushland management and restoration activities.
 - F. The use of public competition in the issuing of leases and licences will be at the discretion of Council.
 - G. The production of leases and licences will be undertaken by skilled staff or engaged professionals.
 - H. All leases and licences will conditionally require full insurance cover on the part of the licensee or lessee. The extent and level of insurance cover will be based on Council legal advice.
 - I. Individual reserve plans of management are to establish the permissibility of leased and licensed activities for reserves. Prior to the production of these plans, the policies contained within this Urban Bushland Plan of Management will apply.

4.7.2.4. Performance Targets

Statutory Responsibilities

Compliance with all statutory responsibilities and obligations.

Future Leases and Licences

No deterioration of bushland conditions as a result of leased or licensed activities.

4.8. LANDS NOT UNDER THE CARE AND CONTROL OF COUNCIL

4.8.1. BUSHLAND ON PRIVATE PROPERTY

4.8.1.1. Management Objectives

- Encourage the retention and appropriate management of bushland on private property.
- Protect bushland on private property which adjoins bushland on public open space in accordance with the aims and objectives of State Environmental Planning Policy 19 - Bushland in Urban Areas.

4.8.1.2. Description of Issues

Statutory Responsibilities

In respect of bushland on private property, Council has a statutory responsibility under clause 9 of State Environmental Planning Policy 19 - Bushland in Urban Areas when proposing to carry out or grant approval for development on that land to take into account the:

1. need to protect bushland on the land;
2. effect of the development on the bushland;
3. any other matters relevant to the protection and preservation of bushland on the adjoining public open space.

Council has additional statutory responsibilities for bushland on private land under State Environmental Planning Policy (SEPP) 44 - Koala habitat.

Council's Tree Preservation Order aims to protect bushland on private property through requiring approval to clear native understorey (bushland).

Role and Value of Bushland on Private Property

Bushland on private property fulfils many beneficial roles within the Pittwater Local Government Area including:

- **Wildlife Habitat and Corridors**

The retention of 'backyard bushland' can play an important part in conserving the wide range of species that exist in the Sydney region. The household species survey and recent records from the area indicate that despite degradation and fragmentation bushland on private land continues to provide habitat for fauna (eg. Powerful Owl - listed as endangered in NSW) as well as linking major reserves. The majority of koala food trees in the peninsula are located outside Council reserves (Smith and Smith, 1990) thus retention and maintenance of non-reserve food trees is vital to the continued survival of the local colony. The importance of private land to the state's koala population has been recognised recently by the implementation of SEPP 44.

The nature of the original residential development of the Pittwater resulted in strips of remnant bushland remaining within large blocks. This is particularly true of Bayview, Bilgola, Avalon, Clareville and Whale and Palm Beach. Over the past few decades as urban growth has intensified, habitat in the area has been

reduced in size. For example, in the area north of Bungan Beach the percentage of forested land dropped from 47% in 1946 to 8% in 1989 (Smith & Smith, 1990). As well as reduction in amount of habitat, fragmentation has also occurred making it more difficult for species to move between prime habitat areas.

- **Biodiversity**

Some plant communities which occur on private land in the Pittwater area are not represented or protected in either national parks or reserves. Hence, the management of these communities on private land is essential in preventing their regional extinction.

- **Scenic and Environmental Protection**

Large sections of residential development in the Pittwater area are on steep, visually prominent lands and foreshores. Bushland remaining on these lands contribute significantly to the visual character of the area whilst assisting with preventing erosion and land-slipping.

4.8.1.3. Management Policies

Statutory Responsibilities

- A. The statutory responsibilities and obligations of State Environmental Planning Policy 19 - Bushland in Urban Areas, State Environmental Planning Policy 44 - Koala Habitat, and Council's Tree Preservation Order are acknowledged by Council and will be addressed when necessary and appropriate.

Role and Value of Bushland on Private Property

- B. Council supports and actively encourages the protection and appropriate management of bushland on private property.

4.8.1.4. Performance Targets

Statutory Responsibilities

Compliance with all statutory responsibilities and obligations.

Role and Value of Bushland on Private Property

Comprehensive identification and documentation of areas of private bushland.

Development of a community based strategy and program to maintain and enhance the function of private bushland for its wildlife corridor and habitat values.

The development of joint bushland conservation and management agreements between Council and private landholders.

4.9. OTHER AUTHORITIES

4.9.1. MITIGATING IMPACTS OF OTHER AUTHORITIES ON BUSHLAND

4.9.1.1. Management Objectives

- Integration of bushland management practices and policies with other land management organisations within the Pittwater Local Government Area.
- To reduce impact on bushland areas through the development of strong and positive working relationships with public authorities and corporations whose activities impact on bushland.

4.9.1.2. Description of Issues

Statutory Responsibilities

Public authorities responsible for the construction, operation or maintenance of lines for electricity or telecommunications, pipelines which carry water, sewage or gas or pipelines licensed under the Pipelines Act (1967), or authorities responsible for the construction and maintenance of main roads do not require development consent of Council under State Environmental Planning Policy 19 - Bushland in Urban Areas to undertake these activities in bushland (SEPP19 Clause 6 (2) (c)-(d)).

However, the public authority must take into account the aims and objectives of SEPP19 prior to undertaking the activity (SEPP19 Clause 7).

Council cannot consent to the carrying out of other activities from public authorities not listed in Clause 6 (2) without undertaking an assessment of the development and its impact on the bushland (SEPP19 Clause 6 (3) and 6(4)).

The Local Government Act (1993) may require utility authorities to obtain the prior approval of Council to the carrying out of any specified activities on community land.

Lands Managed by Other Organisations

Large areas of bushland in the Pittwater Local Government Area are managed by other organisations. These include:

- **NSW National Parks and Wildlife Service**
Ku-ring-gai Chase National Park
Barrenjoey Headland
- **Commonwealth Government**
Sections of Barrenjoey Headland.
- **Department of Land and Water Conservation (formally CaLM)**
Katandra Sanctuary

The natural boundary of plant communities and fauna habitat do not respect artificial land ownership boundaries, and as such it is important to integrate bushland management activities and policies between organisations and across ownership boundaries.

Authorities which Impact Upon Bushland

As identified in *statutory responsibilities*, some activities undertaken by public authorities do not require development consent from Council. However, these authorities must still take into account the aims and objectives of SEPP19 when undertaking their activities.

There is a need and a considerable potential for the development of management and restoration agreements between Council and these authorities.

4.9.1.3. Management Policies

Statutory Responsibilities

- A. The statutory responsibilities and obligations of State Environmental Planning Policy 19 - Bushland in Urban Areas are acknowledged by Council and will be addressed when necessary and appropriate.

Lands Managed by Other Organisations

- B. Council will aim to develop co-operative management practices and policies with other organisations who own or are responsible for the management of bushland in the Pittwater Local Government Area.

Authorities which Impact Upon Bushland

- C. Council may require utility authorities and corporations to obtain approval of Council to the carrying out of activities on the land listed in this plan, including construction, operation and maintenance of lines for electricity or telecommunications, pipelines which carry water, sewage or gas pipelines, the construction and maintenance of main roads.
- D. Council will aim to develop co-operative management agreements (including mitigation and restoration standards) with public authorities and corporations whose activities impact upon bushland.
- E. If required, Council bushland management expertise should be made available to public authorities to plan and implement (on a fee for service basis) impact mitigation works and site restoration procedures.

4.9.1.4. Performance Targets

Statutory Responsibilities

Compliance with all statutory responsibilities and obligations.

Lands Managed by Other Organisations

Integrated bushland management practices and policies with organisations who own or are responsible for the management of bushland in the Pittwater Local Government Area.

Authorities which Impact Upon Bushland

Mitigation of significant impacts and restoration of sites affected by the activities of public authorities and corporations in bushland areas.

Development restoration standards and guidelines for public authorities.



4.10. HERITAGE MANAGEMENT

4.10.1. ABORIGINAL AND EUROPEAN SITES

4.10.1.1. Management Objectives

- Conserve and appropriately manage items of Aboriginal and European heritage significance in bushland areas.
- Increase community appreciation of heritage items through appropriate interpretation.
- Develop a comprehensive register of heritage sites in bushland within the Pittwater Local Government Area.

4.10.1.2. Description of Issues

Statutory Responsibilities

Council has a statutory responsibility under the following Acts in relation to heritage sites:

- Environmental Planning and Assessment Act (1979) - protection of heritage items through the use of local planning instruments (Local Environmental Plans)
- Aims and objectives of State Environmental Planning Policy 19 - Bushland in Urban Areas (Clause 2 (2)).

Specific Aboriginal Sites

- National Parks and Wildlife Act (1974) - to protect Aboriginal relics (deposits, objects or material evidence relating to indigenous or non-european habitation). It is a criminal offence to knowingly destroy, deface or damage a relic or Aboriginal place without consent of the National Parks and Wildlife Service.

Specific European Sites

- Heritage Act (1977) - to protect European relics (any deposit, object or material evidence relating to non-Aboriginal settlement which is at least 50 years old).

Known and Potential Sites

Council has 98 heritage items listed in Schedule 9 of Pittwater Local Environment Plan. These include built items, landscape items, archaeological items and heritage conservation areas. Most of these items lie outside of bushland reserves.

The most frequently recorded heritage items in bushland areas are Aboriginal sites. There are 395 known aboriginal sites located within the Pittwater Council areas (including Ku-ring-gai Chase National Park). Engravings are the most frequently recorded sites and they occur mostly on ridgetops, but occasionally they occur in creeks. Shelters are the next most common site which occur on the slopes. Several of the shelters contain art in the form of drawings and hand stencils.

No systematic studies of aboriginal sites have been undertaken in the Pittwater area, with the exception of the Ingleside Warriewood Urban Land Release Aboriginal Heritage Study (Koetig, 1993).

Direct and Indirect Impacts

Sites of aboriginal or european heritage can be affected directly or indirectly by many activities associated with either urban impact or reserve management:

- Stormwater drains

Concentrated water flows can directly affect aboriginal carvings, artwork, middens and habitation sites through erosion.

- Weed invasion / weed

The control of weed infestations can have a direct physical impact on sites

- Walking tracks

The inappropriate location of walking tracks can directly disturb sites through physical damage or removal, or indirectly through alteration of natural water flow or impact from increased visitation levels.

- Fire

See section 4.4 - Fire Management (pg. 52) for a discussion on fire and its impacts on heritage sites.

Interpretation of Sites

The level of interpretation provided for sites of heritage significance, particularly aboriginal sites, requires considerable planning. Inappropriate access and interpretation can result in serious damage to the relics, in contravention of the NSW National Parks and Wildlife Act (1974).

In planning for the interpretation of sites, discussions with the NSW National Parks and Wildlife Service and the Metropolitan Aboriginal Land Council is essential.

4.10.1.3. Management Policies

Statutory Responsibilities

- A. The statutory responsibilities and obligations of the Environmental Planning and Assessment Act (1979), National Parks and Wildlife (1974) and Heritage Act (1977) are acknowledged by Council and will be addressed when necessary and appropriate.

Known and Potential Sites

- B. Council supports the systematic implementation of archaeological surveys of bushland reserves to identify and record sites of heritage significance.

Direct and Indirect Impacts

- C. Prior to the implementation of management practices, the construction of facilities or the installation of services in and adjacent to bushland areas, the assessment of the site for items of heritage significance will be undertaken and all measures taken to reduce or remove direct and indirect adverse impacts on known heritage items.
- D. All fire management activities will require impact assessment where proposed to be undertaken in sites of known cultural or historic value to ensure that impact is minimised.

Interpretation of Sites

- E. Prior to the implementation of interpretive programs or facilities for items of aboriginal heritage significance in bushland areas, Council will liaise with the NSW National Parks and Wildlife Service and the Metropolitan Aboriginal Land Council to determine the appropriateness of the program or facility.

4.10.1.4. Performance Targets

Statutory Responsibilities

Compliance with all statutory responsibilities and obligations.

Known and Potential Sites

Completion of systematic study of bushland reserves to identify heritage relics.

Direct and Indirect Impacts

No unacceptable direct or indirect impact on known sites of heritage significance.

Adoption of Heritage Development Control Plan for Pittwater Council area.

Interpretation of Sites

Interpretation in accordance with agreed strategy of National Parks and Wildlife Service and Metropolitan Aboriginal Land Council.

5. REFERENCES

- Adam, P., Stricker, P., Wiecek, B. M. & Anderson, D. J. (1989). The vegetation of sea cliffs and headlands in New South Wales, Australia. Australian Journal of Ecology 14: 189-198.
- Australian Association of Bush Regenerators. Undated. Addendum to Model Rules of Association under Corporate Guidelines.
- Benson, D. H. & Howell, J. 1990. Taken for Granted - The Bushland of Sydney and Its Suburbs. Kangaroo Press, Sydney.
- Benson, D. H. & Howell, J. 1994. The Natural Vegetation of the Sydney 1:100,000 Map Sheet. Cunninghamia Vol. 3(4). Royal Botanic Gardens, Sydney.
- Bliss P. J., Riley S. J. and Adamson D. 1983. Towards Rational Guidelines for Urban Stormwater Disposal into Flora Preservation Areas. The Shire and Municipal Record July 1983.
- Brudtland, 1987. Our Common Future. Report of the World Commission on Environment and Development
- Chapman, G. A. and Murphy., C. L. 1989. Soil Landscapes of the Sydney 1:100,000 Sheet. Soil Conservation Service of NSW, Sydney.
- Conroy, B. 1994. Warringah/Pittwater Bushfire Management Committee Draft Fuel Management Plan. Report prepared for the Warringah/Pittwater Bushfire Management Committee.
- Cunningham, G. 1993. Ingleside Warriewood Urban Land Release Vegetation Conservation Study - Interim Report. Prepared for Pittwater Council.
- Department of Conservation and Land Management & Manidis Roberts Consultants. 1993. Local Government Act Land Management Manual. CaLM, Sydney.
- Ford, A. and Bell, H. 1981. Density of birds in eucalypt woodland affected by varying degrees of dieback. Emu 81: 202-8
- Koetig, M. 1993. Ingleside Warriewood Urban Land Release Assessment of Aboriginal Sites. Prepared for Pittwater Council.
- Lane Cove Municipal Council. 1990. Plan of Management for Urban Bushland. Prepared for Lane Cove Council by Manidis Roberts Consultants.
- Nos., R. 1987. Corridors in real landscapes. Conservation Biology Vol 1(2)
- Pittwater Council. 1994a. State of the Environment Report.
- Pittwater Council 1994b McKay Reserve and Dark Gully Park Plan of Management
- Pittwater Council. 1995a. Governor Philip Park Plan of Management.
- Pittwater Council. 1995b. Habitat and Wildlife Corridors Draft Plan of Management. In preparation.
- Smith, P. & Smith, J. 1990. Decline of the Urban Koala (*Phascolarctos cinereus*) Population in Warringah Shire, Sydney. Australian Zoologist, Vol. 26. pp 109-29.
- Warringah Shire Council. 1990. Urban Bushland Management Plan.
- Wright, H. 1988. The longterm threat to bushland from Urban Runoff - Minimising the Damage. Paper presented to the symposium Caring for Warringah's Bushland, 1988.

6. DEFINITIONS

Adopted definitions of terms used in this policy document.

Fire Management

Bushfire Hazard

A relative assessment of a site based on its fuel condition, slope and aspect and resulting difficulty of control and suppression if a bushfire should occur.

Ecological burns

Use of planned fire events to maintain or enhance habitat and biodiversity. Intensity and frequency of ecological burns will be determined by the desired ecological outcome of each site.

Fuel Reduction

Fuel reduction is the physical removal of fine fuel (material thinner than 6 mm) to a height of 2 metres is reduced by thinning and raking or by low intensity fire. It retains canopy trees but reduces the materials which can sustain fire, leaving scattered shrubs and groundcovers to a depth of approximately 250 mm. It may also include the selective removal of weeds and garden refuse and the removal of exotic plant material during bush regeneration programs.

Fuel Reduced Zone

A zone where fuel reduction techniques are applied.

Fuel Free Zone

A zone which is kept largely free of fuel.

Prescribed burning

Synonymous with controlled burn, prescribed fire, scheduled fire and management burn. A bushfire burning in accordance with specific management objectives for that area. The management objectives will usually be expressed in terms of a fire regime for the area.

Bushland Restoration and Regeneration

Assisted Natural Regeneration

The application of regeneration techniques to sites where the native vegetation and/or seed bank is still present. The aim of this technique is to initially stimulate the germination of native plant propagules already present on site and to manage the area in such a way as to allow natural processes of regeneration to occur.

Reconstruction

Where a native plant community has been lost, and the biophysical attributes of the site (eg. soil type, soil nutrient status) remain within levels which are tolerable by the original plant community, the reconstruction of the original community can usually be undertaken.

Reconstruction techniques revolve largely around the planting of locally indigenous species in the proportions and diversity which are present in the original plant community with the aim of establishing a plant community in which sufficient natural regeneration processes will occur to maintain species diversity and community structure.

Fabrication

Where the original native plant community is no longer present, and where the site's biophysical attributes have changed to the point where the original plant community cannot be reconstructed or regenerated, the fabrication of a new plant community on the site is the recommended treatment

The new plant community should be one which is represented in the region, and preferably the local area.

7. SUPPORTING MATERIALS

7.1. STATE ENVIRONMENTAL PLANNING POLICY 19 - BUSHLAND IN URBAN AREAS

INCORPORATING AMENDMENT NO. 1 GG 178 2 December 1988

THE POLICY - (Gazetted 24 October 1986)

Citation .

1. The Policy may be cited as "State Environmental Planning Policy No. 19 - Bushland in Urban Areas".

Aims, objectives, etc.

2. (1) The general aim of this policy is to protect and preserve bushland within the urban areas referred to in Schedule 1 because of -
 - (a) its value to the community as part of the natural heritage;
 - (b) its aesthetic value; and
 - (c) its value as a recreational, education and scientific resource.
- (2) The specific aims of this policy are -
 - (a) to protect the remnants of plant communities which were once characteristic of land now within an urban area;
 - (b) to retain bushland in parcels of a size and configuration which will enable the existing plant and animal communities to survive in the long term;
 - (c) to protect rare and endangered flora and fauna species;
 - (d) to protect habitats for native flora and fauna;
 - (e) to protect wildlife corridors and vegetation links with other nearby bushland;
 - (f) to protect bushland as a natural stabiliser of the soil surface;
 - (g) to protect bushland for its scenic values, and to retain the unique visual identity of the landscape;
 - (h) to protect significant geological features;
 - (i) to protect existing landforms, such as natural drainage lines, watercourses and foreshores;
 - (j) to protect archaeological relics;
 - (k) to protect the recreational potential of bushland;
 - (l) to protect the educational potential of bushland;
 - (m) to maintain bushland in locations which are readily accessible to the community; and

(n) to promote the management of bushland in a manner which protects and enhances the quality of the bushland and facilitates public enjoyment of the bushland compatible with its conservation.

Application of Policy

3. (1) Subject to subclause (2), this Policy applies to the areas and parts of areas specified in Schedule 1.
- (2) This Policy does not apply to -
 - (a) land reserved or dedicated under the National Parks and Wildlife 1974 as an Aboriginal area, historic site, national park, nature reserve, state game reserve or state recreation area; or
 - (b) land within a State forest, flora reserve or timber reserve under the Forestry Act 1916.

Interpretation

4. (1) In this Policy, except in so far as the context or subject matter otherwise indicates or requires-
 - "bushland" means land on which there is vegetation which is either a remainder of the natural vegetation of the land or, if altered, is still representative of the structure and floristics of the natural vegetation;
 - "council", in relation to the carrying out of any proposed development, means the council of the area in which the development is proposed to be carried out;
 - "main road" means a main road within the meaning of the Main Roads Act 1924;
 - "the Act" means the Environmental Planning and Assessment Act 1979.
- (2) A reference in this Policy to bushland zoned or reserved for public open space purposes is a reference to bushland within an area or zone identified by an environmental planning instrument as open space (other than for private recreation).
- (3) A reference in this Policy to disturbing bushland is a reference to removing vegetation from the bushland or causing a change in the natural ecology of the bushland resulting in the destruction or degradation of that bushland.

Relationship with other environmental planning instruments

5. (1) Subject to section 74(1) of the Act and subclause-(3), in the event of an inconsistency between this Policy and another environmental planning instrument, whether made before, on, or after the date on which this Policy is made, this Policy shall prevail to the extent of the inconsistency.
- (2) Without affecting the generality of subclause (1), in the event of an inconsistency between this policy and State Environmental Planning Policy No.4 Development Without Consent, this Policy shall prevail to the extent of the inconsistency.
- (3) Nothing in this Policy shall affect the operation of State Environmental Planning Policy No. 14 Coastal Wetlands.

Consent to disturb bushland zoned or reserved for public open space

6. (1) A person shall not disturb bushland zoned or reserved for public open space purposes without the consent of the council.
- (2) Nothing in subclause (1) requires development consent for the disturbance of bushland where it is being disturbed -
- (a) for the purposes of bushfire hazard reduction;
 - (b) for the purpose of facilitating recreational use of the bushland in accordance with a plan of management referred to in clause 8 of this Policy;
 - (c) for the purpose of constructing, operating or maintaining
 - (i) lines for electricity or telecommunication purposes; or
 - (ii) pipelines to carry water, sewage or gas or pipelines licensed under the Pipelines Act 1967; or
 - (d) for the purpose of constructing or maintaining main roads.
- (3) Pursuant to section 30(4) of the Act, the provisions sections 84, 85, 86, 87(1) and 90 of the Act apply to and in respect of development referred to in subclause (1) in the same way as those provisions apply to and in respect of designated development.
- (4) A consent authority shall not consent to the carrying out of development referred to in subclause (1) unless -
- (a) it has made an assessment of the need to protect and preserve the bushland having regard to the aims of this Policy;
 - (b) it is satisfied that the disturbance of the bushland is essential for a purpose in the public interest and no reasonable alternative is available to the disturbance of that bushland; and
 - (c) it is satisfied that the amount of bushland proposed to be disturbed is as little as possible and, where bushland is disturbed to allow construction work to be carried out, the bushland will be reinstated upon completion of that work as far as is possible.

Public authorities

7. (1) This clause applies to bushland zoned or reserved for public open space purposes.
- (2) A public authority shall not disturb bushland for a purpose referred to in clause 6(2) unless it has first had regard to the aims of this Policy.

Plans of Management

8. (1) This clause applies to bushland zoned or reserved for public open space purposes.
- (2) Where the council considers it necessary or desirable to provide more detailed provisions than are contained in this policy, it may prepare or cause to be prepared a plan of management in respect of bushland to which this clause applies.
- (3) The format, structure and procedures for the preparation, public exhibition, approval, amendment and repeal of any such plan of management shall be in accordance with Part III of the Environmental Planning and Assessment Regulation 1980, which shall, for the purpose of its application under this subclause, be construed as if -

(a) each reference to a development control plan were a reference to a plan of management prepared under this clause; and

(b) the reference to a local environmental plan in clause 19(2) of that Regulation where a reference to this plan.

(4) The plan of management shall not be inconsistent with the aims of this Policy and, in respect of bushland to which it applies, it shall

(a) identify the bushland to which the plan applies;

(b) describe and analyse the bushland taking into consideration the matters listed in clause-2(2)(a) - (m); and

(c) specify measures to be taken -

(i) to implement the specific aims of this Policy;

(ii) to enable recreational use of the bushland;

(iii) to reduce hazard from bushfire;

(iv) to prevent degradation of bushland, including degradation through alteration of drainage patterns, rubbish dumping, infestation with weeds and exotic plants or the intrusion of vehicles; and

(v) to restore and regenerate degraded areas of bushland.

(5) A plan of management prepared in accordance with this clause shall be available for public inspection, without charge at -

(a) the office of the council during ordinary office hours; and

(b) such other premises operated or controlled-by the council and at such times as are determined by the council.

Land adjoining land zoned or reserved for public open space

9. (1) This clause applies to land which adjoins bushland zoned or reserved for public open space purposes.

(2) Where a public authority -

(a) proposes to carry out development on land to which this clause applies; or

(b) proposes to grant an approval or development consent in relation to development on land to which this clause applies,

the public authority shall not carry out that development or grant the approval or development consent unless it has taken into account

(c) the need to retain any bushland on the land;

(d) the effect of the proposed development on bushland zoned or reserved for public open space purposes and, in particular, on the erosion of soils, the siltation of streams and waterways and the spread of weeds and exotic plants within the bushland; and

(e) any other matters which, in the opinion of the approving or consent authority, are relevant to the protection and preservation of bushland zoned or reserved for public open space purposes.

Preparation of local environmental plans

10. When preparing draft local environmental plans for any land to which this Policy applies, other than rural land, the council shall -
 - (a) have regard to the general and specific aims of the Policy; and
 - (b) give priority to retaining bushland, unless it is satisfied that significant environmental, economic or social benefits will arise which outweigh the value of the bushland.

SCHEDULE 1

(cl. 2(1), 3(1))

AREAS AND PART AREAS TO WHICH THE POLICY APPLIES

Ashfield
 Auburn
 Bankstown
 Baulkham Hills
 Blacktown
 Botany
 Burwood
 Camden
 Campbelltown
 Canterbury
 Concord
 Drummoyne
 Fairfield
 Gosford
 Hawkesbury, excluding all of that part of the Shire which is north of the Colo River
 Holroyd
 Hornsby
 Hunters Hill
 Hurstville
 Kogarah
 Ku-ring-gai
 Lake Macquarie
 Lane Cove
 Leichhardt
 Liverpool
 Manly
 Marrickville
 Mosman
 North Sydney
 Parramatta
 Penrith
 Pittwater
 Randwick
 Rockdale
 Ryde
 Strathfield
 Sutherland
 Sydney
 Warringah
 Waverley
 Willoughby
 Woollahra

7.2. NSW DEPARTMENT OF URBAN AFFAIRS AND PLANNING CIRCULAR B13

17th March 1989

STATE ENVIRONMENTAL PLANNING POLICY NO. 19 — BUSHLAND IN URBAN AREAS

1. Bushland within urban areas is a resource of great value to the community, both as part of the natural heritage and from a recreational, psychological, educational and scientific point of view. Bushland areas form a valuable addition to a region's recreational opportunities, including bushwalking, the study of natural history, or simply sitting and picnicking in natural surroundings. Aesthetically they contribute to the landscape quality of an area, and may provide a buffer between residential development and sources of noise or pollution.

2. Remnant bushland areas can play an important part in the conservation of plant and animal species, particularly in maintaining representative samples of plant communities over their whole range. They provide permanent or temporary habitat for wildlife, particularly for birds. While their habitat value depends on the area's size, location and general condition, numbers of small bushland areas linked together can act as wildlife corridors, allowing for the movement of many species, particularly non-flying mammals.

3. Natural areas may be used as living laboratories for the study of subjects such as biology, zoology, ecology and biogeography. Some contain important geological formations. The existence of these areas within cities and towns is valuable for educational purposes since they are readily accessible to schools, universities and adult education centres. They have considerable historical and archaeological value, containing many relics of earlier aboriginal settlement.

4. Bushland is a natural stabiliser of the soil surface, preventing erosion and protecting watercourses and estuaries from siltation and consequent damage to the ecology of these areas. It may also contribute to climatic control, acting as a buffer against wind and lessening extreme weather conditions.

5. While large areas of natural bushland have been retained in National Parks on the perimeter of the Sydney metropolitan area conservation groups and many local aldermen and council officers have expressed concern that within the metropolitan area bushland is diminishing, being under threat from urban development. Sydney is fortunate that much natural bushland has been retained on land dedicated as public open space. To ensure that these areas are protected and preserved, and further areas retained in the planning for urban development, a State Environmental Planning Policy has been prepared applying to local government areas in the Sydney Region. The Policy does not apply to land administered by the National Parks and Wildlife Service or the Forestry Commission of N.S.W. since these areas are protected under the National Parks and Wildlife Act and by the management policies of the Commission for State forests within urban areas.

6. While the Policy at present applies only to land within the Sydney Region it may be adopted in any urban area of the State.

CONTENTS OF THE POLICY

Clause 1: This clause gives the name of the Policy.

Clause 2: This clause sets out the general and specific aims of the Policy and contains the principles which underlie the need to protect bushland in urban areas.

Clause 3: The Policy applies to the local government areas in the Sydney Region and Lake Macquarie listed in Schedule 1. It does not apply to areas administered by the National Parks and Wildlife Service or the Forestry Commission of N.S.W.

Clause 4: This clause contains definitions of terms used in the Policy.

The definition of "bushland" applies to the whole ecosystem which encompasses not only the vegetation but also the surface and subsurface soils, leaf litter, the seed bed, and any rocks, stones or pebbles.

Within urban areas a great deal of bushland is disturbed or degraded by the infiltration of weeds or exotic plants, by rubbish dumping, or by other sources of disturbance. In order to determine whether a stand of vegetation may be regarded as "bushland" for the purposes of the policy it should exhibit all of the following attributes:

- (i) Indigenous native species comprise the canopy (ie., the topmost stratum). Typical canopy species of the Sydney Region include the following genera:

Eucalyptus
 Angophora
 Acacia
 Acmena
 Allocasuarina
 Avicennia and Aegiceras
 Banksia
 Casuarina
 Ceratopetalum
 Elaeocarpus
 Ficus
 Leptospermum
 Livistona
 Melaleuca
 Pittosporum
 Syncarpia
 Tristaniopsis

Canopy species may also include herbs, grasses, rushes, sedges, reeds, mosses and lichen where they comprise the tallest naturally occurring stratum.

- (ii) The understorey stratum (if a natural characteristic of the bushland type) and the ground over stratum comprise indigenous native species or, - if disturbed, contain a component of indigenous native species sufficient to re-establish those strata should the disturbance be arrested or reversed by management.

(Some bushland types eg. woodland, do not have an understorey only a canopy and ground cover).

- (iii) The structure of the vegetation is recognisably a remnant of a natural bushland type or is a regrowth which has achieved a near natural structure or a seral stage towards that structure.

"Structure" refers to the height and density of each stratum and the number and relationship of these strata.

The definition of bushland is designed to protect remnant areas of the original natural vegetation. These cover a wide variety of plant associations, ranging from dune thickets and coastal heaths, through various forest and woodland types, to mangroves and swamp forests. The definition reflects the dynamic nature of bushland and the variation in its type and condition in the urban setting. It allows for the fact that many disturbed areas may be restored and regenerated with suitable management. The definition should be interpreted liberally rather than restrictively to exclude areas from the Policy.

The definition does not apply -to parkland in which native species have been retained as a canopy and mown grass forms the ground cover, or to "urban forests" which have been wholly replanted with indigenous species

Subclause (3) indicates that a reference in the policy to "disturbing" bushland is not only a reference to direct removal or destruction but also to any activity which causes a departure from its natural condition. A wide variety of activities act indirectly to degrade bushland. For example, poorly designed development, either within bushland or on land nearby, may affect drainage patterns, causing soil erosion, the siltation of streams and waterways, and infestation of bushland by weeds and exotics. Chemical agencies may also cause a deterioration in its condition.

Clause 5: If there is an inconsistency between the Policy and another environmental planning instrument this Policy overrides the other instrument, with the exception of State Environmental Planning Policy No. 14 (Coastal Wetlands). If there is an inconsistency between this policy and State Environmental Planning Policy No. 14, State Environmental Planning Policy No. 14 will prevail.

Where development is permitted without development consent under State Environmental Planning Policy No. 4 - Development Without Consent, this policy will override SEPP No. 4 if the development involves the removal of bushland on land zoned or reserved for public open space.

Clause 6: Clause 6 applies to land zoned or reserved for public open space.

Subclauses (1) and (2) provide that development consent is required for the disturbance of any part of bushland within land zoned or reserved for public open space, except where it is disturbed:

- (a) for the purpose of bushfire hazard reduction; or
- (b) to enable recreational use of the bushland, provided this is carried out in accordance with a plan of management prepared in accordance with clause 8 of the Policy; or
- (c) in order to construct, operate and maintain:
 - (i) lines for electricity or telecommunication purposes; or
 - (ii) pipelines to carry water, sewage or gas and pipelines licensed under the Pipelines Act, 1967;
- (d) in order to construct and maintain main roads.

Subclauses (1) and (2) apply only to those situations where it is proposed that bushland within land zoned or reserved for public open space be disturbed. It does not address the general issue of whether, in other situations or locations, development consent is required for the activity. For example, where there is a proposal to construct a local road within public open space the consent requirements of the Policy will apply only to that segment of the road which disturbs bushland within open space.

Subclause (3) provides that all development applications for the disturbance of bushland within public open space zones or reservations must be advertised for public comment before the council may make a decision.

Subclause (4): When making a decision on an application to disturb bushland the council must first make an assessment of the importance of preserving it in terms of the aims of the policy. The council may only consent to removal of bushland where the development is essential in the public interest and no reasonable alternative site for the development or means of accommodating it is available.

Conditions in different local government areas vary widely, ranging from the older intensely developed inner suburbs of the Sydney metropolitan area to new urban

releases. within the inner suburbs bushland falling within the definition in the Policy is scarce. Where these remnants survive their preservation is likely to be of paramount importance in order to maintain bushland which is readily accessible to the local community, in addition to other reasons listed in the aims of the Policy.

In newly developing areas where councils have the responsibility of providing a range of recreational facilities to meet the needs of a new community a council may only approve an application to remove bushland for other recreational purposes if it can demonstrate that the recreational facility is essential to the community and no reasonable alternative site or means of providing the facility exists. In creating open space zones councils should preserve key areas of bushland, based on the principles contained in clause 2(2) of this Policy, and as far as possible accommodate other recreational needs on land not occupied by bushland.

In all urban areas, both old and new, decisions on the provision of recreational facilities should be made on the basis of a recreation plan for the local government area as a whole. This principle underlies the s.117 direction concerning development in open space zones which was issued on 21 August 1984.

Subclause 4(c) provides that, where there is no alternative to removing bushland, the amount removed should be kept to a minimum, and any areas disturbed during construction but not later required for the development should be restored to the natural bushland condition.

Clause 7: Clause 7 applies to those instances listed in clause 6(2)(a)-(d) where the disturbance of bushland within land zoned or reserved for public open space does not require development consent. A public authority considering carrying out development for these purposes must take into account the aims of the Policy. In the majority of these cases the activity will also be subject to the environmental assessment procedures of Part V of the Environmental Planning and Assessment Act. Part V requires the determining authority to examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment. Any activity that is likely to significantly affect the environment will require an environmental impact statement.

Clause 8: The manner in which bushland areas are managed is of key importance to the ultimate effectiveness of the Policy. Clause 8 provides for the preparation of plans of management for bushland within land zoned or reserved for public open space. Councils are responsible for preparing the plan which must be advertised for public comment before adoption.

The plan should identify the bushland concerned, preferably by means of a map, and should describe the bushland in the light of the aims and objectives of the Policy. It should set out the measures to be taken to implement the aims and objectives of the Policy, and measures to enable the recreational use of bushland, where appropriate, including the location of entry areas, picnic areas and pathways. It must specify the intended methods of bushfire hazard reduction, together with measures to prevent degradation of bushland and restore degraded areas.

While preparation of a plan of management is not a mandatory requirement, plans should be prepared at the earliest opportunity in order to provide a sound basis of decisions on the management of bushland. Where no plan of management exists, development of the bushland for recreational purposes will be subject to the consent provisions of Clause 6 of the Policy.

Clause 9: The manner in which development is carried out on land adjoining bushland within public open space significantly affects the quality of the bushland. For example, alteration in drainage patterns on adjacent land may cause erosion of soils within bushland, the siltation of streams and waterways, and the spread of weeds and exotic plants by the transmission of seeds and plant material along flow lines. Clause 9 of the Policy requires any authority granting an approval for development on land adjoining bushland within public open space

to ensure that the development is carried out in a manner which is compatible with protection and preservation of the bushland.

Clause 10: Clause 10 recognises that when planning for urban development a variety of social, economic and environmental issues must be resolved. The clause provides that, when resolving these issues in the preparation of local environment plans, a high priority be given to preserving bushland having regard to its value as set out in the general and specific aims of the Policy.

This clause applies to land which is within an area, zone or reservation, or proposed to be included within an area, zone or reservation, identified in an environmental planning instrument by the description:

- (i) Residential, Village, Industrial or Business; or
- (ii) Special Uses, Open Space, Roads, Environment Protection, Coastal Lands Association, Coastal Lands Protection, Conservation, Scenic or Wetlands, where these are adjacent to, or in close proximity with the zones specified in (i) above.

Schedule 1: The schedule lists the local government areas to which the Policy applies.

LIST OF REFERENCES ON BUSHLAND MANAGEMENT

Prepared by the Nature Conservation Council of New South Wales.

Adamson, D. Monaghan, N.M. and Smith, L.W. (1985) Caring for Australian Bushland in Urban Areas. Agfacts. Department of Agriculture N.S.W. ISSN 0725-7759.

Becroft-Cheltenham Civic Trust (1976) A Plan of Management for Pennant Hills Park and Some surrounding Bushland. Becroft Cheltenham Civic Trust.

Benson, D.H. (1985) Maturation Periods for Fire Sensitive Shrub Species in Hawkesbury Sandstone Vegetation. Cunningham Vol. 1(3) 1985 Royal Botanic Gardens, Sydney. National Herbarium of N.S.W.

Bliss P. J., Riley S.J. and Adamson D. (1983) Towards Rational Guidelines for Urban Stormwater Disposal into Flora Preservation Areas. The Shire and Municipal Record July 1983.

Bradley, J. (1971) Bush Regeneration. Mosman Parklands and Ashton Park Association, Mosman.

Buchanan, R.A. (1983) Bushland Management Survey, Vol. I Results and Discussion, Vol. II - Field Report. For Ku-ring-gai Municipal Council. Ku-ring-gai Municipal Council .

Buchanan, R.A. (1981) Common Weeds of Sydney Bushland. Inkata Press, Melbourne.

Buchanan, R.A. (1979) Edge Disturbance in Natural Areas. Australian Parks and Recreation, August 1979.

Dick, M. (1980) Native Plants of Inner Western Sydney. The Leichhardt Association. N.S.W. Planning and Environment Commission Publication No. 79/26 N.S.W. Department of Environment and Planning.

Elouera Bushland Natural Park Trust (1983). A Guide to Elouera Bushland Natural Park. Rotary Club of Thornleigh.

Fairley, A.T. Oatley Park. Oatley Flora and Fauna Conservation Society.

Fairley, A.T. Headland Nature Walk. Oatley Flora and Fauna Conservation Society.

Fox, A. and Associates (1984) Plan of Management for Bushland Reserves, Parts I and II. For Willoughby Municipal Council. Willoughby Municipal Council, Sydney.

Good, R. (1983) Fire Ecology with Reference to Urban Bushland. Urban Bushland Management Symposium Speeches and Discussion. Willoughby Municipal Council, Sydney.

House of Representatives Standing Committee on Environment and Conservation 1983/84 Environmental Impact of Bushfires.

Ku-ring-gai Municipal Council (1984) Bushland Management Plan. November.

Ku-ring-gai Municipal Council (1984) The Bush Beyond Your Garden. 30 minute colour film on bushland preservation.

Ku-ring-gai Municipal Council (1980) Symposium on Management of Urban Bushland, North Turrumurra, 11 October 1980. Ku-ring-gai Municipal Council.

Lane Cove Bushland and Conservation Society (1978) Lane Cove Bushland Park, Outline of Management Plan. (Basis for designation as Wildlife Refuge).

Lane Cove Bushland and Conservation Society (1980) Guidelines on Bushfire Prevention and Remedial Measures after Fire.

- Lembit, R. & Wise, T. (1984) How to Manage Your Bushland Reserves a practical manual for local government, urban-Rural. Nature Conservation Council of N.S.W.
- Lembit, R. and Pratten, C.H. (1983), Urban Bushland Management and Fire Protection, Nature Conservation Council of N.S.W., Sydney.
- National Trust of Australia (N.S.W.) (1984) Small Natural Areas Their Conservation and Management. Proceedings of symposium held at the University of Newcastle on 21, 22 July 1984.
- National Trust of Australia (N.S.W.) (1983) Bush Regeneration Information Sheet.
- National Trust of Australia (1983) Urban Bushland Parks Resident's Leaflet.
- Main, A.R. (1984) Rare Species: Problems of Conservation. Search, Vol.15, No.3-4, April-May, 1984.
- Pallin, P. (1959) Bushwalking around Sydney. Contains details of bushwalks in the Lane Cove Valley between Cheltenham, Turramurra and Epping.
- Peterson, H.M. (1983) The S.T.E.P. Method of Selective Hand Clearing. Urban Bushland Management Symposium Speeches and Discussion. Willoughby Municipal Council, Sydney.
- Quilty, J.A. Hunt, J.S. and Hicks, R.W. (1978) Urban Erosion and Sediment Control. Soil Conservation Service of New South Wales, Sydney.
- Rodgie, B. & Hartnell, E. (1986) Dalrymple Hay Nature Reserve: A Twelve Month Bush Regeneration Project. Ku-ring-gai Bushland and Environmental Society.
- Ryde - Hunters Hill Flora and Fauna Preservation Society (1976 as amended) "Field of Mars Wildlife Refuge Plan of Management". Ryde Hunters Hill Flora and Fauna Preservation Society.
- Schoer, G. (1984) The Future of Remnant Bushland in urban Areas, National Parks Journal V28(1) March, 1984.
- Schoer, G. (1983) The Biological 'Pros and Cons' of Urban Bushland, National Parks Journal V27(6) December, 1983.
- South Turramurra Environment Protection (1980) South Turramurra Bushland, a plan of management for bushland on the eastern side of the Upper Lane Cove River! adjoining Fox Valley and South Turramurra. south Turramurra Environment Protection.
- Stockard, J. (1983) Rainforest regeneration. National Park Journal, 27 pp. 18-19.
- Sturrock, R. (1981) Nature Walks in Mosman. Keymaster Printing, Sydney.
- Upper Middle Harbour Conservation Society (1974), Bantry Bay, the Case for Conservation. Upper Middle Harbour Conservation Society.
- Warringah Shire Council (1981) Manly Dam-Manly Warringah War Memorial Park. Proposed Policies or Future Use and Management. Manly and Warringah District Parks Joint Committee, E.S. and S. Consultants.
- Willoughby Municipal Council Parks Department (1983) Speeches and Discussion, Urban Bushland Management Symposium, 26 March 1983. Willoughby Municipal Council.
- Wyatt, R. (1982) Bushland Walks in Ku-ring-gai. Stafford Productions, North Turramurra, N.S.W. ISBN 0 9593932 0 0.

7.3. PITTWATER TREE PRESERVATION ORDER

Notice is hereby given that on the 21st June 1993 Pittwater Council resolved to make a Tree Preservation Order in the following terms

1. Citation

Council considers it expedient for the purpose of securing amenity and preserving existing amenity to rescind all tree preservation orders presently in force in the Pittwater Council area and to make a new Tree Preservation Order to be known as the Pittwater Tree Preservation Order, 1993, to apply to the whole area.

That all tree preservation orders presently in force in the area are hereby rescinded.

That this Order shall apply to all land being publicly or privately owned throughout the Pittwater Council area.

2. Land to which this order applies

This Order applies to all land within the area of Pittwater, to which Pittwater Local Environmental Plan 1993 applies.

3. Trees to which the Order applies

This Order applies to:

a) any tree including shrub, whether endemic, exotic or introduced species, not being a cycad or mangrove which has

i) a height exceeding 3m, or

ii) a trunk, bole or branch girth exceeding 0.5m or which has a combined girth or each of two or more trunks or boles exceeding 0.5m, or

iii) a branch canopy width exceeding 3m; b) any cycad or mangrove irrespective of dimensions c) any bushland

4. Definitions

In this order:

"Council" means the Council of Pittwater or any officer or delegated authority authorised to act on behalf of the Council.

"Height" means the distance measured vertically between the horizontal plane of the lowest point of the base of the tree which is immediately above ground and the horizontal plane of the uppermost point of the tree.

"Injury" includes the administering of a chemical or artificial substance to a tree or any part of a tree or, the mechanical or physical wounding of a tree or any part of a tree or, the alteration of ground level or water table which causes damage to the tree or any part of the tree. This to include physical injury especially by machinery on construction sites.

"Lopping" means any act or acts of severing any part of a tree so as to cause reduction by more than 10% of the air space occupied by the branches and foliage of a tree over a period of less than 12 calendar months.

"Bushland" has the same meaning as that defined in State Environmental Planning Policy No. 19 - Bushland in Urban Areas.

"Owner" has the meaning ascribed to it in the Local Government Act, 1993 No.30.

"Topping" means any act or acts of severing any part of a tree so as to cause the reduction of more than 10% of the height of a tree over a period of less than 12 calendar months.

5. Prohibition

Except as otherwise provided in this order, a person shall not ringbark; cut down; top; lop; remove; injure or wilfully destroy any tree including bushland except with the consent of Council under this order and in accordance with any consent and any conditions thereof.

6. Consents

6.1.1. Public Owned Land including Council Reserves/Road Reserves

An application for a consent to ringbark; cut down; top; lop; remove; injure or wilfully destroy a tree or trees including bushland shall be made on Council's Tree Preservation Order Application form. Only Council or its duly authorised servants or agents are permitted to carry out the ringbarking; cutting down; topping; lopping;

removing; injuring or destroying of a tree or trees including bushland from the said public land. Council will only prune or remove trees for essential tree maintenance. Council will not consider applications for the removal trees including bushland on public land solely for the purpose of improving views from properties in the locality. Any non-essential or cosmetic pruning for view or additional solar access will be required to be approved by Council. All work will be conducted to Council's standards and specifications as determined by the Council. The cost of all non-essential works will be the responsibility of the applicant.

6.1.2. Private Property

An application for consent to ringbark; cut down; top; lop; remove; injure or wilfully destroy a tree or trees including bushland shall be made on Council's Tree Preservation Order Application by the owner of the land on which the act of ringbarking, cutting down, topping, lopping, removing, injuring or destruction is to be carried out by any person with the consent in writing of that owner. A fee applies for such applications. The amount of the fee is to be resolved by Council from time to time.

6.2 Any consent issued under this order, other than a consent referred to in clause 6.3 shall be subject to the condition that the consent shall lapse if the works referred to in the consent have not been carried out within 6 months from the date of consent.

6.3 Any consent issued under this Order in conjunction with a subdivision approval granted under the Local Government Act 1919 or a building approval under the Local Government Act, 1993, or a development consent granted under the Environmental Planning and Assessment Act 1979 shall be subject to the condition that the consent shall lapse if the subdivision approval, building approval or development consent lapses or becomes invalid or void.

6.4 Any consent issued under this Order shall be subject to the condition that the works the subject of consent shall not be carried out unless the consent or a copy of the consent. (a) is displayed on the land on which the works are to be carried out in a position so that it is readable from a public road which has a common boundary to the land prior to the commencement of and during the carrying out of the works and

(b) shall be produced by the person or persons carrying out the work forthwith on demand by Council's duly authorised officers, servants or agents to that officer, servant or agent.

7. Exemptions

7.1 The owner of the land being private property or any person with the consent in writing of that owner may, without the consent of Council on private property only under this order on that land carry out the work of ringbarking; cutting down; topping; lopping; removing; injuring or wilfully destroying a tree including bushland where the tree:

- a) is dead
- b) is of a species that has been declared a noxious plant under the Noxious Weeds Act, 1993;
- c) is of a species referred to in the List of Undesirable Plants in clause 8 of this Order;
- d) is of a species Poplar (*Populus* spp) or Willow (*Salix* spp.) where the trunk of such tree is located within 5 meters of any sewer, dwelling or commercial building (not being an out building); or
- e) is growing within the area of a proposed public work approved by the Council.
- f) is a fruit tree or tree grown for the purpose of fruit production except *Acmena* species, *Syzigium* species and *Elaeocarpus* species.

8.1 The plants identified in clause 8.2 are identified by the botanical name and the common name is provided as a reference only.

8.2 Non-Indigenous Plants

8.2.1 Undesirable Trees

Botanical Name (Common Name)
Acacia baileyana (Cootamundra Wattle)
Acacia salignus (Wattle)
Albizia lophantha (Crested Wattle)
Allanthus altissima (Tree of Heaven)
Cinnamomum camphora (Camphor Laurel)
Erythrina spp (Coral Trees)
Ficus elastica (Rubber Tree)
Gleditsia triacanthos (Honey Locust)
Lagunaria patersonii (Norfolk Island Hibiscus)
Ligustrum lucidum (Large Leaf Privet)
Olea africana (African Olive)
Ricinus communis (Castor Oil Plant)

Robinia pseudoacacia (False Acacia)
Schefflera actinophylla (Umbrella Tree)
Schinus terebinthifolius (Brazilian Mastic)

8.2.2 Undesirable Aquatic Plants

Cyperus eragrostis (Umbrella Sedge)
Egeria dens (Oxygen Weed)
Elodea canadensis (Canadian Pond Weed)
Ludwigia peruviana (Ludwigia)
Myriophyllum spicatum (Watermilfoil)
Rorippa nasturtium-aquaticum (Water Cress)
Sagittaria sagittifolia (Arrow Head)
Tetrapanax papyrifer (Rice Paper Plant)

8.2.3 Undesirable Shrubs and Plants

Acetosa sagittata (Turkey Rhubarb)
Agave americana (Century Plant)
Ageratina adenophora (Crofton Weed)
Ageratina riparia (Mist Flower)
Ageratum houstonianum (Ageratum)
Alocasia macrorrhizos (Elephants Ears)
Alstroemeria psittacina (New Zealand Christmas Bells)
Anredera cordifolia (Madeira Vine)
Araujia hortorum (Moth Vine)
Asparagus asparagoides (Asparagus Fern)
Asparagus fleckeri (Asparagus Fern)
Asparagus sprengeri (Asparagus Fern)
Asclepias spp (Cotton Bushes)
Bambusa spp (Bamboos)
Bryophyllum tubiflora (Kalanchoe - 2 varieties)
Canna indica (Canna Lily)
Cardiospermum grandiflorum (Balloon Vine)
Cassia floribunda (Smooth Cassia, Arsenic Bush)
Cestrum auranticum (Orange Cestrum)
Cestrum nocturnum (Night Cestrum)
Chamaecytisus proliferus (Tree Lucerne)
Chlorophytum comosum (Variegated Spider Lily)
Chrysanthemoides monilifera monilifera (Boneseed)
Chrysanthemoides monilifera rotundata (Bitou Bush)
Conyza spp (Canadian Fleabane)
Coreopsis lanceolata (Coreopsis)
Cotoneaster glaucophylla (Cotoneaster)
Crocasmia aurea (Crocasmia)
Crocasmia x crocosmiiflora (Crocasmia)
Cynodon dactylon (Common Couch)
Cyperus eragrostis (Umbrella Sedge)
Dipogon liznosus (Pink Coral Pea Creeper)
Foeniculum vulgare (Fennel)
Freesia refracta (Freesia)
Genista monspessulana (Cape Broom)
Genista x racemosa (Broom)
Hedera helix (English Ivy)
Hedychium gardnerianum (Ginger Lily, Wild Ginger)

Homeria breyniana (One-Leaf Cape Tulip)
Hydrocotyle bonariensis (Two-Leaf Cape Tulip)
Ipomoea cairica (Morning Glory)
Ipomoea indica (Morning Glory)

Lantana montevidensis (Lantana)
Leonotus leonurus (Leonutus)
Ligustrum sinense (Small Leaf Privet)
Lilium formosanum (Formosa Lily)
Lonicera japonica (Honeysuckle)
Macfadyena unguis-cati (Cats Claw Creeper)
Mentha x cordifolia (Mint)
Mentha x piperita var *piperita* (Mint)
Mentha x piperita (Mint)
Mentha pulegium (Penny Royal)
Mentha x spicata (Mint)
Myrsiphyllum asparagoides (Bridal Veil Creeper)
Narcissus spp (Daffodil)
Nephrolepis cordifolia (Fishbone Fern)
Nothoscordum inodorum (Onion Weed)
Ochna spp (Ochna)
Opuntia spp (Prickly Pear)
Passiflora edulis (Passionfruit)
Pennisetum clandestinum (Kikuyu Grass)
Phyllostachys nigra (Black Bamboo)
Polygonum capitatum (Japanese Knotweed)
Polygala myrtifolia (Polygala)
Psoralea pinnata (Psoralea)
Pyracantha angustifolia (Orange Fire Thorn)
Ranunculus repens (Creeping Buttercup)
Raphiolepis indica (Indian Hawthorn)
Sansevieria grandis (Mother-In-Laws Tongue)
Senecio mikanioides (Cape Ivy)
Senna pendula (Cassia)
Solanum pseudocapsicum (Madeira, Winter Cherry)
Solidago canadensis (Golden Rod)
Stenotaphrum seccundatum (Buffalo Grass)
Thunbergia elata (Black-Eye Susan)
Tradescantia albiflora (Wandering Jew)
Tropaeolum majus (Nasturtium)
Verbena bonariensis (Purpletop, Verbena)
Vinca major (Periwinkle)
Watsonia angusta (Wild Watsonia)
Zantedeschia aethiopica (Arum Lily)

9. Consents, Approvals, Permission

Any consents, approvals or . permission in respect of an application made under Clause 6 of Warringah Tree Preservation Order of 20th July 1990, that is in force shall continue in force and have effect subject to the operation of any provision of the said Warringah Tree Preservation Order governing or relating to the currency or duration or any legal effect of that consent, approval or permission.

9.1 Where prior to the making of the Pittwater Tree Preservation Order Council had resolved to commence proceedings for a breach of Clause 5 of the Warringah Tree Preservation Order of the 20th July 1990 or had already commenced those proceedings, then Clause 5 of the said Warringah Tree Preservation Order shall be deemed to continue in force as if that order had not been rescinded.

Authorised by

Brian Hrnjak, General Manager
Pittwater Council
PO Box 882
MONA VALE NSW 2103

7.4. NOXIOUS WEEDS OF PITTWATER (AS AT 19 MAY, 1995)

Botanical Name	Common Name	Category
<i>Acacia karoo</i>	Karoo thorn	W1
<i>Acetosa sagittata</i>	Turkey rhubarb	W4 ^C
<i>Alternanthera philoxeroides</i>	Alligator weed	W1
<i>Anredera cordifolia</i>	Madeira vine	W4 ^C
<i>Araujia hortorum</i>	Moth vine	W4 ^C
<i>Arundo donax</i>	Giant reed, Elephant grass	W4 ^A
<i>Bambusa</i> spp.	Bamboo	W4 ^A
<i>Cannabis sativa</i>	Indian hemp	W1
<i>Cestrum parqui</i>	Green cestrum	W2
<i>Chromolaena odorata</i>	Siam weed	W1
<i>Chrysanthemoides monilifera</i>	Bitou bush, Boneseed	W2
<i>Cortaderia</i> spp.	Pampas grass	W2
<i>Eichhornia crassipes</i>	Water hyacinth	W1
<i>Equisetum</i> spp.	Horsetail	W1
<i>Erythroxylum coca</i>	Coca leaf	W1
<i>Gymnocoronis spilanthoides</i>	Senegal tea plant	W1
<i>Hypericum perforatum</i>	St John's wort	W2
<i>Ipomea indica</i>	Morning glory	W4 ^C
<i>Ipomea cairica</i>		
<i>Kochia scoparia</i>	Kochia	W1
<i>Lagarosiphon major</i>	Lagarosiphon	W1
<i>Lantana camara</i>	Lantana (red-flowered)	W2
<i>Lantana camara</i>	Lantana (pink-flowered)	W2
<i>Ligustrum lucidum</i>	Privet - broadleaf	W4 ^B
<i>Ligustrum sinense</i>	Privet - narrowleaf	W4 ^B
<i>Lonicera japonica</i>	Honeysuckle	W4 ^C
<i>Ludwigia peruviana</i>	Ludwigia	W2
<i>Ochna serrulata</i>	Ochna	W4 ^B
<i>Papaver somniferum</i>	Opium poppy	W2
<i>Parietaria judaica</i>	Pellitory	W3
<i>Parthenium hysterophorus</i>	Parthenium weed	W1
<i>Phyllostachys</i> spp.	Rhizomatous bamboo	W4 ^A
<i>Pistia stratiotes</i>	Water lettuce	W1
<i>Protasparagus aethiopicus</i>	Asparagus fern	W4 ^C
<i>Ricinus communis</i>	Castor oil plant	W2
<i>Rubus fruticosus</i> (agg.) spp.	Blackberry	W2
<i>Salvinia molesta</i>	Salvinia	W1

Botanical Name	Common Name	Category
<i>Toxicodendron succedaneum</i>	Rhus tree	W2

Control Categories

W1 - A “notifiable weed”, the presence of the weed on land must be notified to the local control authority and the weed must be fully and continuously suppressed and destroyed.

W2 - the weed must be fully and continuously suppressed and destroyed;

W3 - the weed must be prevented from spreading and its numbers and distribution reduced;

W4 - the action specific in the declaration must be taken in respect of the weed.

Specific Actions for W4 Weeds in Pittwater Local Government Area

- ^A - Shall not be sold, propagated or knowingly distributed. No part of the plant can grow within 3 m of property boundary.
- ^B - Shall not be sold, propagated or knowingly distributed. established plantings must be prevented from flowering or fruiting.
- ^C - Shall not be sold, propagated or knowingly distributed. Occupier must prevent spread to adjoining property.