

WARRINGAH COUNCIL



# LOCAL HABITAT STRATEGY



Warringah  
Council

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## **EXECUTIVE SUMMARY**

“Local Habitat” is any area which provides food, shelter and opportunities to breed for native plants and animals. This Strategy is concerned with Warringah’s habitat areas. Its objectives are:

- Local habitat is recognised, maintained and improved throughout Warringah.
- The people who live in Warringah value habitat and are actively involved in protecting and improving it.

The Strategy outlines the current state of habitat in Warringah and suggests actions Council can take, in partnership with the community, to preserve, protect and restore our habitat areas. It should be noted that completion of these actions is dependent on available Council resources and funding.

This Strategy is supported by a two part document called ‘Improving Local Habitat in Warringah – Restoration of Habitat in Wildlife Corridors’ which was commissioned as part of this study (Ondinea, 2007). Part 1 of this supporting document explains the principles of protecting and restoring habitat areas and suggests practical ways to do this in Warringah. Part 2 contains Habitat Restoration Plans for a number of areas within Warringah.

# PART 1 – SETTING THE SCENE

## 1 Introduction

### 1.1 Local Habitat – what is it?

For the purposes of this project “Local Habitat” is defined as any area which provides food, shelter and opportunities to breed for native plants and animals. It is a sustainable system, where the plants and animals interact with each other and with their environment. More precisely, it is an area occupied (whether permanently, periodically or occasionally) by species, populations or ecological communities and includes any living or non-living component. Local habitat forms part of the overall biodiversity within an area and contributes significantly to landscape character, amenity, human health and the urban sustainability of an area. In Warringah, local habitat occurs on both public and privately owned land.

Local Habitat can include tracts of bushland, coastal dunes, rocky coastal headlands, streams, creeks and riparian margins, lagoons and estuaries. These areas can provide food and shelter for a diverse range of species ranging from the swamp wallaby and bandicoot, threatened species such as the powerful owl, right down to invertebrates which in turn provide food for a full range of larger animals including birds and other wildlife. Because the seagrass in our lagoons provide habitat for a wide range of animals, they are the basis of the entire aquatic ecosystem. Less ‘natural’ areas such as suburban streetscapes and parks can also provide some level of food and shelter for certain species, although sometimes at the expense of other species. For example, the showy grevilleas and bottlebrushes so popular in landscaping can attract larger, more aggressive birds such as wattle birds, lorikeets and Indian myna birds, at the expense of smaller and more timid birds such as wrens and wagtails. Paradoxically, areas heavily infested with weeds can also have habitat value for certain species. Small birds can find shelter in thickets of lantana. However, this habitat is not sustainable as the weeds will eventually outcompete the natural food sources of these birds and other species. As well, they are not providing appropriate shelter for other species. Built infrastructure can also function as habitat, for example culverts can provide a cave-like environment. The best habitat is diverse in structure (trees/hollows, shrubs, groundcovers, rocks,



leaf-litter etc) and plant species because it provides for a diverse range of animal species and thus supports a resilient, self-sustaining ecosystem.

This habitat is diverse in structure with rocks, leaf litter, trees and shrubs

### **1.1.1 What are Wildlife Corridors?**

Warringah's native vegetation has become fragmented as a result of development and population pressure. It is therefore more important to maintain and to re-establish vegetation links between the larger areas of habitat. Such links are crucial in order to allow native animals to move between areas of remaining habitat. Termed 'wildlife corridors', their significance is now widely recognised and they have become an important consideration in land-use planning (Saunders, Hobbs and Margules 1991).

Wildlife corridors are habitat areas themselves, and so increase the area of habitat available to native fauna and flora. However, by providing a link between larger habitat remnants, their value is much greater than just the additional habitat that they represent. They allow animals to move from one large remnant to another and thus enable outbreeding and genetic exchange between what would otherwise be small, isolated populations of doubtful long-term viability. Animal populations may be able to persist in isolated areas of remnant bushland in the short term, but some movement of individuals between remnants is needed if the isolated populations are to survive over the longer term. Plants also disperse along corridors. This includes plants whose seeds are dispersed either by wind or by animals.

The quality of the corridor as fauna habitat will be a critical factor in its effectiveness. A wide, uninterrupted corridor of bushland in good condition, with a full complement of plant species and vegetation layers, is ideal, and it is important to retain and protect such links where they still exist. However, even corridors consisting only of bushy gardens and street plantings can play a role in maintaining connections between fauna populations. The frequency of use of the corridor may be very low, but the movement of just one or two animals between populations can be critical.

Habitat corridors are very important in linking larger areas of bushland, however all habitat is important and this strategy is concerned with habitat throughout Warringah, not just within the identified corridors.

## **1.2 Why have a Local Habitat Strategy?**

The need for this Strategy has been identified in Warringah's Strategic Plan – Living Warringah: Living Environment, which directs that we produce a plan or strategy to address local habitat (strategy LE1.6). Other strategic documents (including Council's Environment Strategy) also point to the need for a plan or strategy to address local habitat. This Strategy is consistent with the draft Bushland Policy.

Council has a wide range of existing plans, strategies, and studies developed to guide and manage the conservation and restoration of Warringah's bushland, coastal and waterway habitats. These tend to focus on specific locations. Many of these are excellent initiatives and Warringah Council is recognised in the region for its commitment to the natural environment. This Strategy builds on these to focus solely on the management of local habitat on both public and private lands across the whole Council area.

### **1.2.1 Climate Change**

Local habitat will be affected by climate change over the foreseeable future. The risks to our habitat will change over time – we are likely to see fire hazard increasing due to drier conditions; changes to lagoon and coastal habitats as a result of rising sea level; and increased erosion and sedimentation due to increased storm activity. These changes will place further stress upon our local habitat and increase the threat of local plant and animal extinctions. The Strategy can go some way towards building 'habitat robustness' in Warringah in the face of a different climatic regime.

These changes to the physical environment we live in will impact on our quality of life. The actions in this Strategy have been developed with these changes in mind and the need to protect people from their impact, for example, increased bushfire risk.

### 1.3 What does this Strategy do?

The objectives of this Strategy are:

- Local habitat is recognised, maintained and improved throughout Warringah.
- Warringah's community values habitat and is actively involved in its protection and improvement.

This Strategy brings together habitat actions from the Environment Strategy and each of Council's Plans of Management together with other strategic activities currently carried out by relevant sections of Council. It provides a way to prioritise these actions relative to each other. It also contains actions or recommendations to be incorporated into Plans of Management, work programs and other plans as they are reviewed in the future. These actions range from general operational standards for Council activities on Council managed land to strategies to enhance local habitat on private property, including education and incentives. As well, it identifies actions Council can take in its open space network to improve habitat for native flora and fauna through the protection and restoration of existing habitat. The Strategy is based on the extensive information in the Natural Areas Survey carried out by Smith and Smith in 2005 with additional research conducted as part of the preparation of this Strategy.



Good habitat provides animals with opportunities to breed and forage for food safely

## VISION STATEMENT

To recognise the importance of habitat in Warringah and ensure the protection, enhancement and restoration of habitat in identified areas through appropriate management, landuse planning and community involvement.

This Local Habitat Strategy will provide the necessary **authority, strategic guidance** and **co-ordination** to enable better local habitat management.

## 2 Principles of Managing Local Habitat

Information in this section is drawn from 'A Rehabilitation Manual for Australian Streams' (2000). Further detailed principles of local habitat management in Warringah are contained in 'Improving Local Habitat in Warringah – Restoration of Habitat in Wildlife Corridors: Part 1 – Introduction to Warringah Wildlife Corridors' (Ondinea, 2007). This document was written to support this strategy. A number of relevant sections from this document are reproduced in the box on pages 9 to 12.

- Priorities should be set in terms of how much sustainable natural habitat it is possible to achieve for the money or effort.
- In terms of habitat health it is usually more effective to protect (preserve) areas of habitat that remain in good condition, than to spend large amounts of money trying to rehabilitate areas that are already damaged.
- Similarly, it is usually more efficient to stop an area of habitat deteriorating than to try to fix it later.
- When protecting or improving an area, care should be taken to identify any fatal and limiting problems, and treat these first.
- This means that the focus should be on **habitat preservation, then protection, then enhancement and then restoration**, in that order.

### 2.1 Preservation is more effective than repair

It is better to preserve what remains than to try to salvage what is doomed. Firstly, it is very difficult, if not impossible, to artificially recreate a functioning physical and biological system. It is much easier to destroy a natural system than it is to re-create it. Secondly, attempts at re-creation are usually very expensive. It is an issue of long-term efficiency. The aim is to get the maximum natural biodiversity possible over a period of decades. On the assumption that ideally, eventually all areas of habitat in Warringah would be rehabilitated, the relative value of spending money to protect an area now is generally much less than the cost of attempting to rehabilitate it in the future.

## 2.2 Setting Priorities

Priorities for managing habitat:

1. Save areas of habitat that support rare or endangered species or communities before turning to less valuable areas that support common species and communities.
2. Protect the areas of habitat that are in the best general condition before trying to improve those that are in poor condition.
3. Stop areas of habitat deteriorating, rather than waiting for them to stabilise and then trying to accelerate recovery.
4. Improve the condition of habitats that are damaged, beginning with those that are easy to fix.
5. While there are still areas of habitat that need protecting or improving, focus on these rather than trying to fix areas that are already extremely degraded.

This approach will lead to the following priority categories:

**Monitor areas in good condition** – areas in good condition that are already protected do not need any action. Any new or developing threats simply need to be identified and monitored.

**Protect areas of regional conservation value** – protect and prevent decline, including identifying and fixing threatening problems that come from other areas.

**Protect areas of local conservation value** – again, preventing these areas from deteriorating involves dealing with all threatening problems, including those from outside the area.

**Protect and improve deteriorating areas** – these areas are already damaged, but their condition is continuing to deteriorate. Note that they are not currently in extremely bad condition but there is a risk that they may become so.

**Expand good areas** - working from good areas to areas of poorer quality habitat, allowing the good habitat to spread and assist the rehabilitation work.

**Improve areas where natural recovery is impeded** – by ameliorating the factors that impede natural recovery, (such as removal of foxes) the area may be able to recover naturally.

**Improve moderately damaged areas** – these areas will require more input than less damaged areas.

**Improve areas in very poor condition** – there may be cause to give these areas a higher priority if there is strong community interest in them or if they serve as a good educational tool.

## GENERAL BACKGROUND TO NATIVE VEGETATION AND WILDLIFE HABITAT CORRIDORS

*Taken from 'Improving Local Habitat in Warringah – Restoration of Habitat in Wildlife Corridors: Part 1 – Introduction to Warringah Wildlife Corridors', (Ondinea, 2007).*

### NATIVE VEGETATION

There are basically two types of native vegetation:

- *remnant* (or original) native vegetation which existed before European settlement and has continued because of its own natural processes.
- *planted* native vegetation which, as the name implies, exists because people decided to plant it. This may comprise locally native (indigenous) plants or plants from somewhere else in Australia and is sometimes designed to imitate natural bushland.

Remnant and some planted native vegetation provides habitat for birds and other wildlife and is a resource for education, science and recreation. However, remnants contain a greater variety of local plant species of varying ages and in different layers (ground covers, shrubs and trees) and a greater range of other habitat components such as tree hollows, rocks, logs and leaf litter than can usually be obtained through planting. It is **remnant** native vegetation which provides the greatest opportunity for wildlife, the greatest scientific value, a source of locally adapted seed and cutting material for restoration and revegetation projects, a living record of the original flora, and is an important part of our scenic heritage.

When managing sites to restore habitat, two principles are important:

1. The "Three Rs" and the order in which to apply them:
  - a. *Retain* the original or remnant native vegetation wherever possible.
  - b. *Regenerate* areas that have already been degraded (eg. by weed invasion) by using the appropriate bush (or assisted natural) regeneration techniques (eg. weeding, controlled burning, removing silt).
  - c. *Revegetate* very degraded sites, which have little or no ability left to regenerate, by planting appropriate species chosen after considering healthy remnants in the area.
2. When choosing plants to revegetate an area, *locally collected seed* and cutting material should be used because local (indigenous) plants are adapted to local soils and climate and are considered to have higher planting success rates. They are also likely to self regenerate, saving on future replanting costs, and enabling us to recreate some of our original ecosystem and reintroduce some local character into the landscape.

### THE ROLE AND VALUE OF WILDLIFE, HABITAT AND WILDLIFE CORRIDORS

**Wildlife** is important as an essential part of a functioning ecosystem. Native birds such as honeyeaters, mammals such as flying-foxes and small possums, and insects such as beetles and moths, pollinate flowers. Birds such as Figbirds, mammals such as native rats, bandicoots and flying-foxes, and ants disperse plant seeds and spores of beneficial and other fungi. Birds such as Superb Fairy-wrens, mammals such as tiny insectivorous bats and small possums, lizards, frogs and spiders eat and control insect populations. Bandicoots, earthworms and soil micro-organisms aerate and improve the soil. Wildlife is also wonderful to have around, helping city folk reconnect with nature.

**Habitat** describes the place where an animal, plant or micro-organism occurs and includes important areas such as rocky shorelines, beaches, cliffs, still and running water as well as particular vegetation types. Within these habitats plants and animals obtain food, water, shelter and are able to reproduce.

**Wildlife corridors** are important for wildlife that need to migrate or travel further afield to find food and water, for the young to move on to find new home ranges, to escape areas which lose habitat and recolonise areas after bushfires or after loss of animal species through disease or predation. Also free movement of animals reduces inbreeding and maintains vigour in a species. Many plants also move during their reproductive and dispersal stages.

## **PREFERRED ATTRIBUTES OF WILDLIFE CORRIDORS**

To function as a viable wildlife corridor certain attributes are desirable. These include:

- a good vegetation structure, with a range of age classes, heights, a dense understorey, a diversity of species with a range of flowering and fruiting times, and preferably a range of habitats represented (e.g. woodland, heath, dune) throughout the total system.
- other habitat components such as leaf litter, logs, exposed and loose rocks, and unpolluted water.
- habitat at either end of the corridor compatible with the preferred habitat of the fauna intended to move along the corridor.
- absence of elements along the corridor that are detrimental to the movement or survival of the fauna. These can be features such as busy roads, fences, areas of unsuitable habitat, introduced and native predators (e.g. domestic and feral cats and Pied Currawongs), and aggressive native species (e.g. Noisy Miners) along the corridor route.
- a short length to the corridor. The shorter the length the more animals are likely to move along the corridor.
- as few sharp bends within the corridor as possible. Some animals will not travel along a corridor once they encounter a bend, returning from where they came.
- as wide a corridor as possible. The greater the width, the less disturbance from adjoining land uses, humans and animal predators. While there is little firm data on the necessary width for functional wildlife corridors in urban areas, it has been suggested that a corridor 500m wide should be free from most adverse edge effects.

## **PRIORITIES WHEN CREATING WILDLIFE CORRIDORS:**

### **First priority - Identify and protect remnant vegetation and fauna**

This has already begun with the surveying and mapping of Warringah's vegetation communities and fauna. It is most important this process continues.

Remnant vegetation on public land needs to be signposted or otherwise indicated, and, where necessary, fenced and paths rerouted to prevent further degradation.

Remnants on private land (including individual remnant trees) may be protected by education, consultation and by planning regulations (or inclusion on Council's Heritage Register).

Continue to survey and monitor native fauna.

Protective management guidelines must be followed for the long term survival of the indigenous remnant vegetation. Everyone responsible for the remnants must understand the reasons for, and implement, the following management practices in and near the remnants. These practices are:

- **Enter remnants with care and keep to tracks** - it is very easy to trample and destroy seedlings which are regenerating from the remnant plants.
- **No mowing or whipper snipping into remnants** - regenerating seedlings and mature shrubs are easily damaged by mowers and whipper snippers.
- **No dumping lawn clippings or other waste material into remnants** - these add nutrients to the very low nutrient soils, reducing the vigour of plants adapted to these soils and encouraging weed invasion.
- **No planting into remnants** - exotic and alien native plants may act like weeds and compete with the remnant species. Planting non-locally collected species will destroy the scientific value and genetic integrity of the remnant.
- **Prevent irrigation water and fertiliser from entering the remnants** - the plants are often adapted to dry, low nutrient soils.
- **Prevent other chemicals (eg. pesticides and herbicides) from entering the remnants** - many native plants depend on soil organisms known as mycorrhizal fungi which help the plants to absorb nutrients and improve their resistance to drought and disease. These fungi, as well as beneficial insects and other organisms associated with native vegetation, will be adversely affected by many horticultural chemicals.

### **Second priority - Restore remnant vegetation**

Although all areas containing the fast diminishing resource of remnant indigenous vegetation deserve restoration, areas which contain the most diverse and locally rare remnants and which are most under threat of degradation are in the most urgent need of protection and restoration. Priorities can be set to facilitate the restoration process. Remnant restoration must be carried out using personnel or supervisors trained and experienced in bush regeneration techniques.

When planning restoration activities, especially within identified corridors, try to take bird breeding times and flowering and fruiting times into consideration as well as not removing all of a possible food or shelter resource being provided by weeds at one time. Removal, particularly of habitat weed trees, must be staged, preferably over a period of years, and replacement habitat must be being provided concurrently.

### **Third priority - Identify, protect and maintain other important habitat for existing wildlife**

Areas such as parks and reserves which contain planted native and/or exotic vegetation which provide important food resources, shelter and travel routes for existing wildlife must be identified, protected and maintained or gradually replaced with indigenous species before complete removal.

Use the following elements to guide your assessment of isolated and/or degraded potential habitat areas:

Elements that increase the habitat value of an area	Elements that decrease the habitat value of an area
Proximity to bushland reserve	Minimal or single species understorey
Intact understorey particularly indigenous species	Long distance from bushland reserve
Native fauna present	Closeness to busy road
Exposed rock, logs and leaf litter present	Within range of foxes and roaming cats
Clean water present	High populations of territorial native fauna
	Dense canopy of Sweet Pittosporum

#### **Fourth priority - Recreate habitat within the identified Wildlife Corridors**

Appropriate areas within the identified Wildlife Corridors such as Council parks, interested schools and residential gardens, quiet streets with wide road verges can be used to create more habitat and vegetated links between the existing habitat areas in and adjacent to Warringah.

### **3 Warringah's Natural Areas – The State of Local Habitat in Warringah**

#### **3.1 Vegetation Communities**

Warringah's native vegetation has been studied and mapped in the Warringah Natural Area Survey (NAS) (Smith and Smith 2005). This survey identified thirty-seven vegetation communities in Warringah outside Ku-ring-gai Chase and Garigal National Parks. In Warringah these vegetation communities are found in aquatic, foreshore, riparian and terrestrial environments. Each vegetation community is unique and the habitat provided by each community is similarly unique. Just as the distribution of plant species varies with location, so too the habitat requirements of different animals varies.

Forty-one percent of the native vegetation of the Warringah Local Government Area has been lost since 1750, but the impact of clearing has been very uneven, with some vegetation communities far more affected than others. Three communities typical of Hawkesbury Sandstone make up the majority of the native vegetation in Warringah: Bloodwood-Scribbly Gum Woodland, Peppermint-Angophora Forest and Sandstone Heath. Although these three communities have been reduced in area, they have been relatively less reduced than many other communities, with the result that they now make up an increased proportion of the Warringah vegetation (about 80% of Warringah's vegetation is now made up of these communities). A comparison of the 1750 vegetation map with the 2000 vegetation map (Maps 1 and 2 on pages 45 and 46) shows the extent of the clearing that has taken place.

The majority of the over-cleared communities are ones that are more or less restricted to the vicinity of the coast (such as those associated with wetlands and saltmarshes), or inland communities with limited extent that occurred on flatter areas (such as the Duffys Forest communities). The communities where significant clearing has occurred or where the area reserved is less than 5 ha are the ones most in need of protection or restoration to preserve the unique habitat that each community provides as well as their intrinsic biodiversity values. Generally, these communities are now threatened in NSW or in Warringah.

### **3.2 Wildlife Corridors**

As well as mapping the vegetation types in Warringah, the NAS mapped and prioritised wildlife corridors in Warringah (see Map 3 on page 47). Priority one corridors link areas of core bushland, priority two corridors link significant areas of bushland and priority three corridors either extend out from smaller areas of existing habitat or form more tenuous links. The corridors that have been mapped are either actual corridors or areas where there is a good potential for a corridor to be created or protected.

Creeks and riparian zones are particularly significant corridors as they provide a wide range of habitats. Not only do they provide terrestrial habitat, they also provide aquatic habitat as well. In fact, riparian areas are generally the preferred routes for fauna movement throughout bushland.

Further information on wildlife corridors can be found in the supporting document 'Introduction to Warringah Wildlife Corridors'.

### **3.3 Core Bushland**

Core Bushland in Warringah are those large areas of bushland that function as the major reservoirs of Warringah's biodiversity and significantly contribute to the sustainability of smaller bushland remnants and major landscape elements such as creeks, lagoons and coastlines. They appear on Map 3 as the generally green areas to the north of Mona Vale Road and west of Forest Way/Wakehurst parkway (including the National Parks), the large bushland reserves such as Manly Dam Reserve in the south and the extensive continuous bushland east of Forest Way in the south-western catchment of Narrabeen Lagoon. While these core bushland areas may not be in pristine condition their size allows them to recover from moderate levels of disturbance without species extinction or collapse of ecosystem functions as occurs in smaller, less resilient bushland remnants.

Our areas of core bushland are very important to the long-term survival and health of Warringah's 130 and more small bushland reserves. Core bushland allows genetic exchange to occur between plant and animal populations of small remnant bushland with populations in core bushland. This counters the detrimental impacts of in-breeding and promotes vigour and fitness in these populations allowing them to cope better with environmental changes and disease. Core bushland also provides a refuge for animals from small remnants to use when the habitat of the remnant is affected by fire or a temporary lack of food resources. Naturally core bushland is far more beneficial when it is linked to smaller remnants by a network of wildlife corridors so that fauna and seed movement is easier. As well, areas of core bushland with north/south linkages will become even more important as plant and animal species need to 'migrate' as a result of changing climatic conditions.

### **3.4 Threatened Species**

There are over fifty recorded endangered and vulnerable threatened species and ecological communities found in Warringah. This includes plants and animals that live permanently in Warringah and migratory species that use our habitats seasonally. All are protected under the State *Threatened Species Conservation Act 1995*. Some species have been identified as nationally important and are listed under the Federal Environment Protection and Biodiversity Conservation Act (1999).

Some of our better known threatened animals include the southern brown bandicoot, the powerful owl, regent honeyeater and the green and golden bell frog. Threatened plants include Caley's Grevillea, Heart-Leaved Mallee and Deane's Honeymyrtle.



The powerful owl is one of Warringah's threatened species.

### 3.5 Condition

There are two factors to consider when examining habitat condition. One is the condition of the vegetation communities; the other is the condition of the corridors and core bushland areas.

The NAS mapped the condition of each mapped area of each **vegetation community**. As well as providing three condition categories for each vegetation community, vegetation in very poor condition was mapped as highly disturbed. Typically these stands of vegetation were highly infested with weeds or exotic plantings and no longer retain the characteristics of the original vegetation community. Weeds and other inappropriate species are a major factor affecting habitat condition. While still providing habitat for certain species (such as small birds) weeds eventually out-compete the original vegetation community and habitat will ultimately deteriorate. Also they don't provide habitat for the full range of species that would be provided for if the vegetation community was still in good condition.

Of additional concern is the condition of the **corridors or core bushland areas**. Many local habitat corridors are discontinuous or too narrow. Those that remain may be in danger of fragmentation, either through development pressures or simply by piecemeal clearing. Development or clearing in core bushland areas is also a concern. Riparian corridors, with their aquatic habitat, are particularly vulnerable. The water entering our creeks from urban areas is more polluted, more turbid and contains higher levels of nutrients than water that would have flowed over areas of bushland before reaching the creek. As well, it flows with greater intensity after rain, due to all the hard surfaces in urban areas. These impacts of urban development have resulted in significant habitat losses within creeks.

The impact of adjacent land uses can also reduce habitat value. These can be direct impacts on animals such as noise and light, or the presence of domestic animals. They can also be impacts on vegetation such as weed encroachment or dumping.

### 3.6 Tenure and Management

Much of the habitat in Warringah is preserved in National Parks. These are described as areas of core bushland in the NAS. Other areas of core bushland are similarly protected, including the Manly Warringah War Memorial Reserve (Manly Dam) and Allenby Park. Each of these areas is managed for habitat and other natural values, either under the *National Parks and Wildlife Act 1974* or under the *Crown Lands Act 1989* and any Plans of Management prepared under that Act or the Local Government Act. Many areas of aquatic habitat are reserved and therefore protected under the above Acts. However, they are very vulnerable to impact from adjoining land uses.

The central area of core bushland in Warringah is in mixed ownership and as such is currently not securely reserved. Any protection afforded to habitat in this or other areas with habitat value is largely through the Warringah Local Environmental Plan (LEP) and the locality controls and development control principles that are applied to the parcel of land. An additional level of protection may occur over certain parcels of land if there is a covenant over the management of habitat on that land. The application of a covenant is done with the consent of the owner and is enforced during the development application or sub-division process.

Approximately 20% of Warringah's bushland occurs outside national parks and public reserves and is threatened by vegetation clearance for development. The NAS identifies that 22 of the 37 vegetation communities occurring in Warringah area are poorly represented in reserves. This means that the protection and sympathetic management of land supporting these vegetation communities is crucial to the ongoing preservation of habitat within Warringah.



Small native mammals such as the Long-nosed Bandicoot can move between local habitat areas along wildlife corridors

Photo: Ken Griffiths

### 3.7 Land Use Planning

Warringah Local Environmental Plan 2000 (WLEP 2000) contains many provisions that relate to the protection of habitat in the Warringah Local Government Area. Some of these are outlined below:

Relevant Clauses	Description
<b>Clause 17</b> – <i>How will the use of public open space be controlled</i>	Clause 17 (5) states that ‘If public open space contains bushland, any development which will disturb that bushland should be carried out only if a plan of management has been prepared which specifically assesses the need to preserve and protect that bushland, having regard to the matters set out in Schedule 6’.
<b>Clause 36</b> – <i>Can development be allowed on reserved land?</i>	Clause 36 (3) states that ‘If the land is reserved for public open space or regional open space and contains bushland, the consent authority must, before granting consent, also assess the need to preserve and protect that bushland, having regard to the matters set out in Schedule 6 (Preservation of bushland), and be satisfied that disturbance of the bushland is essential for proposed development that is in the public interest and that no reasonable alternative is available to the disturbance of that bushland’.
<b>Clause 52</b> – <i>Development near park, bushland reserves and other public open spaces</i>	Clause 52 states that ‘Development adjacent to parks, bushland reserves and other public open spaces, including land reserved for public open space, is to complement the landscape character and public use and enjoyment of that land. ...If public open space or land reserved for public open space contains bushland, development on that land is not to threaten the protection or preservation of the bushland.’
<b>Clause 56</b> – <i>Retaining unique environmental features</i>	Clause 56 states that ‘Development is to be designed to retain and complement any distinctive environmental features of its site and on adjoining and nearby land. In particular, development is to be designed to incorporate or be sympathetic to environmental features such as rock outcrops, remnant bushland and watercourses.’
<b>Clause 58</b> – <i>Protection of existing flora</i>	Clause 58 states that ‘Development is to be sited and designed to minimize the impact on remnant indigenous flora, including canopy trees and understorey vegetation, and on remnant native ground cover species.’
<b>Clause 59</b> – <i>Koala habitat protection</i>	This General Principle of Development Control aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas. The principle only applies to parcels of land that are greater than one hectare in area and are potential koala habitat.
<b>Clause 60</b> – <i>Watercourses and aquatic habitat</i>	Clause 60 states that ‘Development is to be sited and designed to maintain and enhance natural watercourses and aquatic habitat.’
<b>Clause 79</b> – <i>Heritage Control</i>	This clause states that development is to conserve and not adversely affect various significant natural environmental areas which have been listed as conservation areas. Future development within these areas of environmental heritage significance must ‘conserve the environmental heritage and cultural significance of Warringah’, and ‘ensure that heritage conservation areas throughout Warringah retain their heritage significance’. Some of

<b>Relevant Clauses</b>	<b>Description</b>
	these mapped areas include a range of coastal cliffs, the Oxford Falls Conservation area (adjacent to Wakehurst Parkway), and Long Reef Aquatic Reserve.
<b>Schedule 5 – State Policies</b>	Schedule 5 identifies criteria for the preservation and protection of bushland in urban areas, in accordance with State Environmental Planning Policy 19
<b>Schedule 6 – Preservation of bushland</b>	Schedule 6 outlines the context for the need to preserve and protect bushland.

In addition, various Locality Statements contain clauses in the Desired Future Character Statement that aim to protect areas of natural habitat. These clauses may refer to cross-hatching as well as WLEP 2000 mapping provisions. The following locality statements give an indication of the approach taken by WLEP 2000 to habitat protection:

<b>A2 Locality Statement</b> (includes Duffys Forest)	The desired future character of this area includes the statement: 'Emphasis will be given to protecting and where possible enhancing the natural landscape, including landforms and vegetation. The increased planting of indigenous canopy trees will be strongly encouraged.'
<b>B2 Locality Statement</b> (includes central core bushland area of Oxford Falls)	The desired future character for this area includes the statement: 'The natural landscape including landforms and vegetation will be protected and, where possible, enhanced. Buildings will be located and grouped in areas that will minimise disturbance of vegetation and landforms whether as a result of the buildings themselves or the associated works including access roads and services. ....A dense bushland buffer will be retained or established along Forest Way and Wakehurst Parkway.... Development in the locality will not create siltation or pollution of Narrabeen Lagoon and its catchment and will ensure that ecological values of natural watercourses are maintained.'
<b>C11 Locality Statement</b> (includes Belrose Road Corridor)	The desired future character for this area includes the statement: 'In order to provide for fauna movements through the locality... an ecological corridor, as shown cross-hatched on the map, will be rehabilitated and preserved as a bushland corridor..... Future development other than for the purposes of bushfire hazard reduction and water quality devices is to be excluded within the cross-hatched area....The relationship of the locality to the surrounding bushland will be reinforced by protecting and enhancing the spread of indigenous tree canopy and preserving the natural landscape, including rock outcrops, remnant bushland and natural watercourses.'
<b>D3 Locality Statement</b> (includes Collaroy Escarpment Foothills)	The desired future character for this area states that: 'Development (in the immediate footslopes of the Collaroy Escarpment) will be integrated with the natural landscape including rock outcrops and remnant bushland and topography.'
<b>D4 Locality Statement</b> (includes Collaroy Escarpment)	The desired future character for this area states that: 'Development in (the crests and sideslopes of the Collaroy escarpment) must integrate with the landscape and topography .... Rock outcrops and indigenous tree canopy will be integrated with new development where possible.'

<p><b>G3 Locality Statement</b> (<i>includes Allambie Heights</i>)</p>	<p>The desired future character for this area includes the statement: 'The relationship of the locality with the surrounding bushland will be reinforced by protecting and enhancing the spread of indigenous tree canopy and preserving remnants of the natural landscape such as rock outcrops, bushland and natural watercourses.'</p>
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### **SNAPSHOT: HOW IS WARRINGAH CURRENTLY MANAGING LOCAL HABITAT?**

- Contract and volunteer bush regeneration at numerous sites throughout Warringah including:
  - Riparian vegetation: Five major creeklines and other smaller creeklines in various bushland reserves
  - Council bushland reserves: Major contracts at ten bushland reserves
  - All beach dune areas
  - Schools, parks and other community areas: 40 Friends of the Bush community volunteer sites
- Weed management in bushland:
  - 40 Fire Management Access Zones on Council bushland reserve urban bushland boundaries
  - 65 weed control sites within Council bushland reserves
- Feral animal and domestic pet control programs at various sites including:
  - Fox control activities undertaken twice a year at many sites throughout Warringah (in coordination with other northern Sydney region land management agencies)
  - Three rabbit control programs per year throughout Warringah (undertaken in co-ordination with private landholders)
  - Ongoing cat trapping within designated Wildlife Protection Areas as required
  - Currently trialling feral bird control measures.
  - Targeting dog compliance enforcement in sensitive threatened fauna habitat areas.
- Targeted education programs including:
  - Protecting Our Threatened Species Duffys Forest Education Program for year 3 & 4
  - Manly Dam teaching resource - a chapter on habitat with activities for year 3 & 4
  - Preparing vegetation management strategies for five schools with native habitat within their grounds and assisting in educating school community about their native habitat.
  - Conducting TAFE natural area bushland restoration training at two high schools with native habitat within their grounds.
  - Workshop and lecture program covering wildlife friendly gardens, bats, frogs, etc.
  - Spotlight walks and guided walks cover habitat issues.
  - Signage for road kill
  - Wildlife watch program - encouraging residents to monitor and report wildlife sightings
- Strategic planning to protect habitat including:
  - constraints mapping to determine areas of environmental significance
  - the LEP requires consideration of habitat and other biodiversity values
  - preparation of DCP for landscaping requirements within habitat corridors
  - land management agreement for Brookvale Valley between landowner, community group and Council.
- Standard council maintenance practices such as mowing, weeding, cleaning, and applying fertiliser are conducted with regard for habitat values.

## 4 Community Values

This Strategy has used a number of recent consultation exercises and surveys that have all highlighted the importance of a strategic approach to local habitat. The Strategic Plan is the most notable of these, with one of the results of its community consultation being the preparation of this Local Habitat Strategy.

The results of Warringah's 2005 'State of the Environment' survey indicate that a high proportion of the community (89%) are concerned 'a great deal' or 'a fair amount' about environmental problems. The 2007 'Warringah Community Survey' showed that the environment is one of the three major 'top-of-mind' issues of concern identified for Warringah over the next 5 – 10 years. More specifically, management of waterways and lagoons and also caring for bush areas were mentioned among the top environmental concerns.

As well, public comments received in the course of exhibiting the following plans were considered:

- Griffith Park Plan of Management 2005
- Allenby Park Plan of Management 2000
- Draft South Creek Dee Why Valley Plan of Management 2007
- Draft Threatened Bushland Plans of Management 2007
- Draft Bushland Policy 2007
- Belrose Corridor Amendment to Warringah LEP 2000
- Warringah Cultural Plan 2007

An overwhelming theme from these consultation exercises is the importance placed on the natural environment, and in particular the preservation of natural bushland. There is widespread concern regarding development issues in relation to bushland and buffer strips.

## 5 Where are the gaps?

This summary of local habitat in Warringah and how we are currently managing it shows what we know about habitat but also what we need to know more about and where we could improve our approach. The views of the community also help to shape how we could manage habitat in the future.

Broadly, the following areas need to be addressed:

- We need more understanding of:
  - Core bushland areas
  - Certain aspects of corridors
  - What animals currently use the habitat corridors
  - Fauna movement hazards and solutions
- We need more action focussed on:
  - Council reserves within corridors
  - Significant habitat on private property
  - Protection of aquatic habitat
  - Gaining improved commitment to habitat from other landholding agencies
- We need to review our approach to:
  - Coordinating the actions of different sections of council
  - On-ground practices in habitat corridors
  - Prioritising regeneration of council-owned habitat areas
  - Addressing habitat values in land use planning.

## **PART 2 - ADDRESSING THE GAPS IN OUR APPROACH TO LOCAL HABITAT**

The desired outcomes for habitat in Warringah are:

- Routine council activities are carried out in a way that enhances habitat values
- Habitat on public open space in identified corridors is improved
- Habitat in private ownership in identified corridors is improved
- Council's strategic planning activities promote habitat values

This part of the Local Habitat Strategy sets out these outcomes and outlines ways to achieve them.

### **6 Routine Council activities are carried out in a way that enhances habitat**

Council is currently preparing a draft Environmental Management Plan (EMP). This EMP will address the risk posed by Council's operations on the environment, including natural habitat areas. Mowing, landscape maintenance, bush regeneration, feral animal and noxious weed control activities will be covered in the draft EMP. These routine activities have also been addressed in various existing Plans of Management applying to public open space managed by Council. They are addressed here as well as they are integral to the maintenance and enhancement of habitat throughout Warringah. It is important that there is ongoing liaison and consultation with the Rural Fire Service with all these actions, particularly given the likely drier conditions we could experience as our climate changes.



This sandstone heath provides excellent habitat for small birds and other small animals

## 6.1 Landscaping on open space

Local habitat can be enhanced by using appropriate species when landscaping Council managed open spaces. In the past, locally indigenous species have not tended to be widely used, partly due to unavailability of seed or seedlings and partly to ignorance. The following actions will assist in ensuring that habitat is enhanced through landscaping:

- Develop a **Landscape Planting and Design Code** that will apply to all Council managed open space within urban areas (eg urban parkland, reserves, playgrounds) as well as to streets and urban centres. The Code must have regard to Bush Fire legislation and planning guidelines for open space within mapped bush-fire prone land. It will aim to minimise impact on habitat within mapped habitat corridors. It will:
  - recommend a required minimum area of planting for different types of public space.
  - require the use of locally-sourced indigenous local plants only (this includes the replacement of any landscaped areas or replacing any tree which dies or is removed) unless there is a valid reason not to (for example where plantings need to be sympathetic with items of cultural heritage or are required for a purpose that cannot be met by locally indigenous species, such as particular shade, visibility or other needs).
  - promote the creation of dense shrubby and rocky landscapes favoured by a diversity of native animals, and the retention of dead tress (where safe) as habitat.
  - promote the planting of species that provide food, shelter and breeding habitat for threatened and rare fauna species at suitable sites.
  - ensure that plantings provide shade, enhanced visual qualities, habitat value and a safe environment for passive recreation, as applicable.
  - allow the use of appropriate non-endemic/non-invasive species for certain landscape purposes.
  - recommend broad design guidelines for parks within corridors, addressing issues such as:
    - location and size of cleared areas, access points, car parking, etc
    - nature and scale of recreational facilities provided,
    - provision of signs, equipment and furniture with a corridor theme (ranging from information about the local habitat corridor, plant or animal species to stone sculptures, murals, etc)



Hollows in established trees provide nesting sites for birds  
Photo: Trevor Collins

- Identify mown areas that are not used for passive or active recreation which can be **planted out** with habitat species that are appropriate to the area and its intended use. This will have the dual result of reducing maintenance costs in the long term and increasing the area and quality of habitat available.
- Increase the availability of **locally-sourced indigenous species**:
  - Create a list of appropriate species for each corridor or habitat area. This list to be based on the species found in the relevant vegetation community that are easy to propagate and grow.
  - Continue to support and develop a community based nursery (at Manly Dam or another suitable location) to propagate suitable species in sufficient numbers for community and council use. Seeds to be locally sourced.
  - Ongoing liaison with commercial nurseries to arrange propagation of appropriate locally-sourced species.
- Consider storing **habitat furniture** such as logs (salvaged from Kimbriki Tip or from trees removed from parks, streets, etc) and large rocks (removed from development sites, etc) for habitat plantings at an appropriate site such as the Council depot at Cromer, Manly Dam or another appropriate site. Make these available, with advanced warning, to habitat planting contractors, volunteers or schools where appropriate.

## 6.2 Staff/contractor training

On-ground maintenance of public places is carried out by Council staff and contractors. In relation to areas of wildlife habitat, this maintenance consists mainly of mowing or weeding adjacent areas. If not carried out correctly, there is potential for the maintenance to inadvertently damage the habitat areas. In addition, many day-to-day decisions made by planning and strategic staff can have potential impacts on habitat. Many of these staff need additional training in habitat related matters to enable them to carry out their duties appropriately.

- **Review all Council and Contractor maintenance practices** and make necessary amendments or retrain staff. Matters to be addressed include:
  - Avoiding whipper snipper damage to trees
  - Mulching areas around group of trees to avoid mower damage
  - Encroachment of mowing into bush areas
  - Increased frequency of mowing and retrain staff to avoid large quantities of clippings washing into the creeks or bushland reserves
  - appropriate herbicide use
  - preventing irrigation water and fertiliser from entering remnant vegetation
- Include council and contractor **preferred maintenance practices in all tender documentation** including mowing, weeding, bush regeneration within corridors and noxious weed control.
- Provide **habitat awareness training** for Council staff and contractors as necessary. Identify all departments and officers within departments of Council whose activities either directly or indirectly impact on habitat areas. Run, or co-ordinate, a series of workshops for identified Council officers on habitat-related matters including responsibilities under various acts and policies relating to bushland, aquatic habitat, habitat corridors, ways to minimise damage to habitat, etc. Regularly update this program as legislative changes are enacted or key staff are replaced.

## 6.3 Mowing practices

- Turf areas are to be mown regularly to avoid grass seeding into bushland.
- Where necessary construct mowing barriers between bushland and turf areas.
- Review current mowing techniques to prevent grass clippings going into natural areas.

- Clearly delineate management zones [eg. install protective fencing or mowing strips to protect remnant native trees/ vegetation; establish no mowing areas and install interpretive signage].

#### 6.4 Weeding practices

- Continue to **remove and control noxious and environmental weeds** from reserves with high habitat value and from aquatic environments. Weed removal should focus on progressive, environmentally sympathetic control treatments. Wherever possible, community and council resources should be strategically directed towards this program. Full regeneration of an area may not be feasible if the resilience of the system has been significantly depleted (eg. through the extensive modification or importation of soil). In these situations, revegetation with locally source indigenous species may be more appropriate.
- Continue to use **best management standards when controlling weeds**, including minimum impact on habitat areas such as roadsides, community lands, parks and aquatic habitat in creeks.

#### 6.5 Community education

Council's community education program is constructed with the goal of encouraging people to value habitat in Warringah and to give them the desire and the knowledge to protect habitat and be actively involved in its protection and improvement. Council strives to continuously improve delivery of education to the community to make it more effective in bringing about change in attitude and behaviour.

- Continue **partnerships** between interested groups (including major landowners, community groups and council) to have joint input into the management of key off-reserve habitat areas.
- Continue and build on **habitat education activities** for Warringah, including distributing information to residents and schools, conducting habitat themed guided bushwalks in habitat areas, encouraging schools and residents to develop habitat gardens, interpretive signage for appropriate habitat areas, expanding Council's website to include information on habitat gardens as they relate to vegetation communities in Warringah etc.
- Encourage the **community to be actively involved** in the preservation and restoration of local habitat through initiatives such as tree planting days, and ongoing education and community consultation.
- Undertake a continuing education program targeting **residents whose land adjoins habitat areas** (including bushland, riparian zones, creeklines, etc) as to the impact they may have on surrounding native vegetation. In particular:
  - the impacts of dumping garden refuse and other encroachments.
  - the impact of domestic animals, including cats, dogs and horses
  - the value of the area (including roadside vegetation) and appropriate activities to minimise adverse impacts.
- Provide education on **wildlife in urban areas**, in particular:
  - the importance of leaving fallen trees and bushrock for ground dwelling animals
  - key processes that threaten habitat in general and wildlife in particular
  - the importance of creeks and other waterways to local biodiversity
  - how to deal with local native fauna, including bandicoots, brush turkeys, ticks, etc.
- Continue an education program that provides information on **noxious and environmental weeds** and their control, and highlights legal requirements to remove noxious weeds.

## 7 Habitat on public open space in identified corridors is improved

### 7.1 General principles

The first priority is to **identify and protect remnant** vegetation in public open space. This has already begun with the surveying and mapping of Warringah's vegetation communities and fauna. It is most important this process continues with the implementation of a targeted ongoing restoration program for degraded vegetation within mapped wildlife corridors. The program should place priority on rare and threatened habitat and crucial linkages.

Habitat in corridors is so important and fragile that established methods of bush regeneration need to be modified in these areas. The standard methods of bush regeneration do take account of habitat values, but in cases where the habitat is of prime importance additional measures and a slightly different approach will be necessary. A **specialised methodology for bush regeneration** in important habitat areas in Warringah needs to be developed and used in all bush regeneration activities in areas with high habitat value. Bush regeneration contracts within wildlife corridors will need to be **managed closely** to ensure that the habitat value of the area is maintained.

Secondly, **habitat restoration** work aimed at re-establishing or improving linkages on open space within the corridors needs to be prioritised according to the principles in section 2 of this Strategy. These priorities will also be applied to the work carried out by volunteer groups such as Warringah's Friends of the Bush. A review of the Friends of the Bush work sites will be undertaken to focus efforts in prioritised areas both within corridors and in local habitat outside corridors. Priority will be assigned on the basis of sites that can be sustainably managed by volunteers and that have a high conservation priority.



Volunteers play an important role in restoring our bushland

Additional actions to pursue to improve habitat on open space within corridors include:

- Install **signage** at critical areas of remnant vegetation on public land. Where necessary, fences and paths should be rerouted to prevent further degradation.
- Develop guidelines to ensure new **unleashed dog exercise areas** are located away from sensitive habitat areas.
- Target **companion animal education programs** and enforcement activity in known sensitive habitat locations (eg Southern Brown Bandicoot habitat in Duffys Forest and wading bird habitat at Long Reef Rock Platform)
- Liaise with the RTA regarding the provision of **fauna sensitive road design principles** and practices, particularly within wildlife corridors and on roads marked as fauna movement hazards in the NAS.
- Work with the responsible authority to incorporate bush regeneration works when establishing or working on **services**, through direct contact and education with public utility and infrastructure providers.
- Investigate the suitability of having threatened species information added to the '**Dial Before You Dig**' service.
- Continuing to support volunteers such as Friends of the Bush and other community /school groups in prioritised areas

## 7.2 Habitat Restoration Plans for Specific Public Open Space Sites

Based on the information in section 3 of this Strategy, a number of public open space sites within wildlife corridors have been identified as having high priority for habitat restoration. These sites were chosen based on a range of factors including corridor priority, status and condition of vegetation communities, land ownership and land use. Habitat Restoration Plans have been written for each of these areas (Ondinea, D 2007). Basically these Plans aim to protect existing habitat within the corridor, and then enhance, restore or extend the area of habitat by planting an approximation of the original vegetation community. These Plans contain detailed information on community involvement and revegetation with fauna habitat plants. They recommend weed and feral animal control and environmental interpretation. The following sites are covered:

- Coastal Corridor – Long Reef Beach Car Park area
- Dee Why Creek Corridor between Dee Why Lagoon and Dumic Place
- South Creek Corridor – St Matthews Farm
- Brookvale Creek Corridor between Manly Lagoon and Warringah Golf Course
- Manly Creek

These Plans provide a good base from which Council can approach the enhancement of habitat within each of these sites. The principles in these Plans can also be applied to habitat work in other areas of public open space.

The principles and ideas in these Plans should be implemented. To drive the process and ensure success, Council needs to **allocate responsibility for co-ordinating corridor activity**.



This dense vegetation provides native animals with shelter, food and opportunities to breed.

## **8 Habitat in private ownership in identified corridors is improved**

### **8.1 General principles**

The first priority is to **identify and protect remnant** vegetation on private property. This has already begun with the surveying and mapping of Warringah's vegetation communities and fauna. It is most important the process of protecting remnant vegetation continues. Opportunities to work with private landholders should be investigated. Particular attention needs to be focussed on restoration programs for degraded vegetation within priority wildlife corridors, rare and threatened habitat and crucial linkages.

Secondly, **habitat restoration** work aimed at re-establishing or improving linkages on private property in appropriate areas within the corridors needs to be prioritised according to the principles in section 2 of this Strategy. Although the management approach to regeneration of habitat on private land will be different to the approach on public open space, the principles remain the same.

Whether protecting existing remnant vegetation or re-establishing habitat linkages, the key on private property is to **work with landholders** to value, manage, and conserve their habitat.

Consider activities such as:

- free plants
- 'Habitat House' signs
- assistance at planting days
- weed control
- fencing
- technical advice and training

It may be appropriate to establish a program equivalent to the Friends of the Bush program for private property.

## **8.2 Properties with Vegetation Management Plans/Vegetation Covenants**

There are a growing number of properties within habitat corridors or which support habitat with high conservation value with Vegetation Management Plans (VMPs) or covenants in place. VMPs are imposed on the property owner by Council to offset the loss of habitat associated with development on the property. They are a condition of consent. A legal covenant to restrict use or clearing of vegetation on land proposed to be sub-divided or otherwise developed or sold may also be placed on the title of the land with owner's consent.

Currently Council does not monitor these conditions, Plans or Covenants. There is a need to lift the priority on auditing, and where necessary assisting or enforcing compliance with these instruments. Ideally, a field officer should develop and maintain a database of properties with consent conditions relating to habitat, VMPs and Covenants and then follow up on them. This might include the following actions:

- monitor change of ownership and inform/assist new owners with their habitat responsibilities;
- assist property owners to comply with their consent conditions, implement their Plans or comply with the Covenant on their property.
- Where assistance and liaison is not successful, consent conditions should be enforced.
- ensure that any conditions of consent applied at the subdivision stage are carried through and applied in any future form of assessment.

## **8.3 Habitat Restoration Plans in targeted local suburban areas**

Based on the information in section 3 of this Strategy, a number of suburban areas within wildlife corridors have been identified as having high priority for habitat restoration. These sites were chosen based on a range of factors including corridor priority, status and condition of vegetation communities, land ownership and land use. These areas contain remnant or potential habitat areas on private property, as well as potential sites on roadside verges, pocket parks and the like. Habitat Restoration Plans have been written for these areas (Ondinea, D 2007). These Plans contain detailed information on community involvement and street and garden planting with fauna habitat plants. They recommend weed and feral animal control and environmental interpretation. These Plans are focussed on restoring habitat with a very definite community focus. The following areas are covered:

- Allambie Heights Corridor
- Collaroy Escarpment Corridor
- Duffys Forest Corridor

The community focus includes engendering a sense of purpose among the community, building on community spirit and adding social capital. For example, residents involved in the corridor habitat work could be given a number of free plants, assistance at planting days, even 'Habitat House' signs, reminiscent of the 'Safety House' signs displayed by members of Neighbourhood Watch programs.

These Plans provide a good base from which Council can approach the restoration of habitat within each of these suburban areas. The principles in these Plans can also be applied to habitat work in other suburban areas with habitat value. The principles and ideas in these Plans should be implemented.

## 9 Council's strategic planning activities promote habitat values

### 9.1 Council's Natural Resource Data

#### 9.1.1 Revision of NAS

Council is using the wildlife corridor mapping in the *Warringah Natural Area Survey – Vegetation History and Wildlife Corridors (August 2005)* to make increasingly rigorous recommendations and decisions. Because of this, further information is needed on the methodology used to determine where the corridors are located and what priority is assigned to each one. As well, a detailed description of each corridor and the areas they link would assist Council in programming future restoration works and developing planning mechanisms to protect and restore their function. The areas of core and significant bushland in Warringah need to be mapped as well as the corridors to focus attention on their importance and so that they can be afforded additional protection when needed. Finally, further information on fauna use of the corridors and fauna movement hazards would be helpful.

#### 9.1.2 Upgrade of natural resource layers on Council's GIS

Council staff have access to an extensive database of natural resources information. This includes mapped information on native vegetation, threatened species (flora and fauna), riparian corridors and habitat corridors. This information is available on Council's GIS and is updated as new information becomes available. Staff use the information daily to make strategic and developmental decisions. There is scope for the information relating to habitat to be presented differently, so that it is more easily understood. This would facilitate habitat protection throughout Warringah. For example, the following information could be provided:

- areas of core bushland specifically identified and mapped
- information about individual properties to include corridor details where appropriate
- information about areas of degraded bushland to include reference to the vegetation community it was formerly (and could potentially become again with sufficient regeneration)
- distribution of native vegetation units estimated to have occurred in 1750
- regularly updated information on threatened vegetation communities and species
- identification of bushland cleared since the aerial photographs used on Council's GIS were taken.

In addition, it would be helpful for staff to have an indication of the presence or distribution of threatened fauna species. It is not a straightforward matter to map this information. Council holds records of where these animal species have been seen, however it would be insufficient to map this information on its own. Different species have different habitat and range requirements and staff would need some indication of the range or area that a breeding pair needs to survive. A useful and practical way of representing presence or distribution of threatened fauna species needs to be investigated or developed.

Once the threatened fauna species have been entered onto the GIS, the information will need to be updated every 6 months. This is because the information changes as new (Scientific Committee) determinations are made or new occurrences of threatened species are discovered within Warringah. This applies to vegetation communities as well as threatened flora and fauna species. In particular, the Narrabeen Escarpment Scrub vegetation community should be nominated for **listing as an Endangered Ecological Community** under the NSW Threatened Species Conservation Act. There may be other communities listed as threatened in Warringah and which may be threatened in NSW which should also be nominated, this should be investigated.

## 9.2 Strategic Approach to Managing Habitat

### 9.2.1 Prioritise all bushland in Warringah.

Currently our approach to areas of habitat value is not based on an overall understanding of relative priority. Rather, management of Council-owned bushland is focussed on a number of themes – weed control at certain urban boundaries; management of fire management access zones at certain locations; bush regeneration within some Council reserves (including riparian zones, beach dunes and bushland); etc. Our focus on privately owned bushland tends to be triggered by individual development applications or other proposals. Because of limited resources, there are a number of smaller degraded remnant bushland reserves within corridors that are not being actively managed by Council. However, these reserves have value because of their location within habitat corridors. As such, there is a need to lift their profile and start to **prioritise regeneration work** within them to ensure that their value as habitat is not diminished and that the value of the habitat corridor is not compromised.



There is a need to prioritise all areas with habitat value within Warringah. This is so that resources can be focussed in the areas where they will have the most impact on the most important habitat. A priority ranking of all areas with habitat value in Warringah would enable more effective use of Council resources. A **methodology** to assess conservation significance specific to Warringah's habitat should be developed based on existing methodologies which consider rarity, viability and connectivity criteria. This methodology could then be used to assist in planning Council's bushland management programs, strategic habitat conservation and land-use initiatives.

Council bushland reserves can form important areas of local habitat

### 9.2.2 Bushland Reserve Planning

The central core bushland area is currently held in diverse ownership. There is continuing development pressure on this area and the bushland is at risk of fragmentation over the next 25 years. If all areas with habitat value in this area were prioritised (as per paragraph above) it would be possible to identify areas of crucial habitat. These areas could form the basis of a strategic habitat corridor and reservation network through this area.

### **9.3 Environmental Planning Instruments**

Council is currently preparing a new draft Local Environmental Plan (LEP) in accordance with the State Government's LEP Standard Instrument template. The following actions should be considered:

- Document an investigation into the use of mechanisms to deliver habitat outcomes in the new LEP. These might include Environmental Protection Zones and /or environmental constraints layers.
- Investigate whether certain keystone areas that are crucial for habitat or biodiversity conservation qualify as areas for future acquisition or Environmental Heritage. These areas would be subject to tighter controls than other areas.

Council will continue to maximize opportunities to further protect areas with high habitat value through relevant planning instruments.

### **9.4 Strategic Approach to Development Issues**

#### **9.4.1 Development Control Plan**

A Development Control Plan (DCP) is being prepared to accompany the new LEP. The DCP may contain considerations relating to vegetation and habitat that may apply to land within mapped wildlife corridors, riparian zones and core bushland areas regardless of zone. It may also be appropriate for the DCP to apply to buffer zones around each wildlife corridor, riparian zone or area of core bushland. Further work is required on the content of the DCP. However as a minimum, the DCP may contain landscaping requirements, including relevant species lists. It may set out requirements for leaving existing habitat undeveloped and undisturbed. It may also set out the percentage of a site that should be reinstated as habitat once development has occurred. Other relevant information on maintaining or improving habitat on the property may also be included.

#### **9.4.2 Standard Consent Conditions**

The information in the Environmental Planning Instruments and DCP may then be incorporated into a number of standard development consent conditions to be applied to developments within or near habitat areas. These habitat areas could include mapped wildlife corridors, threatened species habitat, riparian zones and core bushland areas. It may be appropriate for the standard consent conditions to apply to an appropriate buffer zone around these areas. Individual species lists could be attached to the standard conditions so that they apply specifically to each area of Warringah.

It is important to ensure that these conditions are drafted in such a way that they are specific and enforceable.

#### **9.4.3 Development Applications**

Habitat values should be introduced early into any discussions about developments, particularly when they are within areas of habitat value (including core bushland areas and wildlife corridors). This could be achieved by creating a checklist, matrix or similar to assist with assessing the environmental sensitivity of proposed development sites. The matters to include in the checklist include habitat value, proximity to riparian zone, presence of threatened species and vegetation type. This checklist or matrix could be added to the pre-lodgment starter kit or DA form checklist that is currently provided to applicants.

### **9.5 Future Open Space Plans of Management**

Council is responsible for preparing and updating Plans of Management for all open space under its control. These Plans of Management contain guiding principles or desired outcomes for the land they cover, and provide a list of recommended actions or specific tasks. Where relevant, a desired outcome of each Plan of Management should be to preserve, enhance or restore habitat,

particularly within mapped habitat corridors or areas of core bushland. These Plans should refer to and incorporate the principles and relevant actions of this Strategy.

## 9.6 Street Tree Master Plan

Currently there is no planned approach to street tree planting in Warringah. Council provides plants, advice and assistance with street tree planting if a number of residents in a street make a request to council for street trees. A Street Tree Master Plan would provide clear guidelines to ensure a consistent approach towards the provision of street trees in each street of Warringah. Appendix 1 contains further details on a Street Tree Master Plan. A Street Tree Master Plan should be produced which has regard for habitat values. Alternately, a future Development Control Plan may prescribe the trees or other vegetation permitted in various areas by reference to species, size and location. Until such Plan is available, decisions on street trees should be made with regard to the actions and principles in the Habitat Restoration Plans that have been prepared for selected corridors within Warringah.

## 9.7 Improved Co-ordination

### 9.7.1 Coordination within Council

Each Team within Council has differing priorities based on their differing objectives. They often work on area-specific projects that have the potential for cross-team co-ordination. For example, the Catchment Management Team manages creeks for water quality and flooding values. This would generally mean that the upstream reaches would be restored before tackling the downstream reaches, as the upstream reaches have such an impact on the downstream reaches. It also means that areas at risk of flooding are treated with a higher priority than other areas. The Bushland and Biodiversity Team manages remnant bushland for biodiversity and habitat values. The priorities and funding opportunities within each of these teams may mean that an area can have a higher priority for one team than another. For example, Dee Why Creek is an area of lower priority in terms of creek management and an area of moderate priority in terms of habitat restoration.

An **Implementation Task Force** should be established to oversee the implementation of this Strategy, to meet quarterly.

### 9.7.2 Regional Coordination

Opportunities exist for co-ordination of habitat restoration in habitat corridors and elsewhere with adjoining councils. In particular, the corridor along Manly Creek is on the boundary with Manly Council. The southern bank of the creek is currently degraded bushland with great potential for habitat restoration. This Strategy contains a restoration plan for the northern bank at this point and for both banks further upstream. Every effort should be made to co-ordinate this work with the work Manly Council proposes for their bank of the creek.

## 9.8 Future steps

This Strategy has made a number of recommendations for actions over the next two to five years and beyond. These actions will bring some immediate improvement in Warringah's local habitat. There are many other actions beyond the scope of this Strategy that warrant further investigation. These include:

- Investigate the introduction of **incentives and supporting mechanisms** to encourage the retention of local habitat on private land. These mechanisms may include: rate relief, grants, technical assistance, training and educational programs, covenants, community recognition through local awards, etc. Investigate whether DEC/ NPWS **Voluntary Conservation Areas** or similar strategies are applicable to Warringah.
- Pursue the declaration of additional "**Wildlife Protected Areas**", particularly for areas of threatened species habitat and for bushland in the urban and urban fringe areas of Warringah

where pressure from pest animals (including fox, feral cat, feral dog) and domestic cats and dogs is likely to be highest.

- Investigate how **biobanking** might be applied in Warringah.
- Investigate opportunities for carbon trading through street tree planting.



Beach dunes can provide good habitat

## 10 Action Table and Means of Assessment

### 10.1 Means of Assessment

The actions listed here are aimed at achieving the objectives of this Strategy, which are:

- To recognise, maintain and improve local habitat throughout Warringah.
- For the people who live in Warringah to value habitat and be actively involved in protecting and improving it.

In order to assess whether these objectives have been met, the following measures will need to be undertaken:

**Regular update of Council's Natural Area Survey** – Regular mapping will show any changes in condition and extent of native vegetation.

**Regular assessment of habitat condition against baseline** – A baseline assessment of habitat condition should be undertaken initially. This should be repeated at intervals to show changes. The assessment should not be limited to Council bushland reserves, but should assess habitat on private property as well.

**Regular fauna survey/observations** – A baseline fauna survey should be undertaken initially, and repeated at regular intervals – say every 3 – 5 years.

**Regular assessment of community attitudes to habitat** – This assessment should include an assessment of community involvement as well as community attitudes. It may be appropriate to monitor involvement in restoration projects on private land and public land as volunteers, take-up of Voluntary Conservation Agreements or other incentives to conserve habitat on private land, etc.

## 10.2 Implementation

Actions within the Local Habitat Strategy are to be assessed on a yearly basis for inclusion in Council's Management Plan. It should be recognised that the commencement and completion of these management actions are dependent on available Council resources and funding. As such projects and actions identified in this Strategy must be assessed against the other priorities of Council. Commitment to implementing particular actions is given once these actions appear in Council's Management Plan and related annual planning documents (such as the Capital Expenditure Program). As priorities change, actions may need to be altered, given another priority or even rejected through a formal review process.

Some actions are currently underway and by their nature are ongoing. They are outlined in the first part of the table, actions 1 to 26.

Other actions are not yet underway and these actions have been given a priority. They are listed in the second part of the table, actions 27 to 64.

### What do the priorities mean?

The actions have been given priorities as the Strategy contains a very large list of actions and Council does not have the resources to undertake all of them immediately.

- **High (H)** – Actions with high priority are to be considered in Council's funding processes annually until they can be resourced, then included in the Management Plan and relevant unit's 'Business Plan' each year until completed.
- **Medium (M)** – These actions are to be reviewed by the responsible Council Unit each year as to their current importance. This will be based on completion of previous actions and any new directions. When relevant these actions will be considered for capital expenditure and/or placement in the relevant plans. They should be implemented within the life of this Plan.
- **Low (L)** – These actions are important and are necessary for the overall management and improvement of habitat in Warringah. However they may not be allocated appropriate resources until they are formally reviewed as being of a higher importance or until resources are available for such actions. Relevant Council Units are to consider including these actions in their Business Plans each year.

	Ongoing Actions	Resources Estimation	Responsibility
<b>VISION STATEMENT</b>			
To recognise important habitat in Warringah and ensure the protection, enhancement and restoration of habitat in identified areas through appropriate management and community involvement.			
<b>Strategy: Routine Council activities are carried out in a way that enhances habitat</b>			
<b>Means of Assessment: Regular update of Council's Natural Area Survey Regular assessment of habitat/ bushland condition against baseline Regular fauna survey/observations Regular assessment of community attitudes to habitat</b>			
Landscaping on open space (6.1)	1. Continue to <b>liaise with RFS</b> regarding habitat enhancement activities	Staff time	B&B PRF CATCH
	2. Identify mown areas that are not used for passive or active recreation which can be <b>planted out</b> with appropriate habitat species. Carry out this planting program over time.	Staff time +\$20/m <sup>2</sup> capital cost and \$20/m <sup>2</sup> /year maintenance	B&B PRF
	3. Ongoing <b>liaison with commercial nurseries</b> to arrange propagation of appropriate locally-sourced species.	Staff time	B&B
Staff/contractor training (6.2)	4. <b>Review all Council and Contractor maintenance practices</b> , make necessary amendments and where required provide training.	Staff time	B&B PRF
	5. Include council and contractor preferred maintenance practices in all <b>tender documentation</b> .	Staff time	B&B CATCH PRF
	6. Provide <b>habitat awareness training</b> for Council staff and contractors as necessary.	Staff time	B&B EE CATCH

	Ongoing Actions	Resources Estimation	Responsibility
Mowing practices (6.3)	7. <b>Mow turf areas regularly</b> to avoid grass seeding into bushland.	Staff time	B&B PRF
	8. <b>Construct mowing barriers</b> where necessary between bushland and turf areas.	Staff time	B&B PRF
	9. <b>Review current mowing techniques</b> to prevent grass clippings going into natural areas.	Staff time	B&B PRF
	10. <b>Delineate management zones clearly</b> (eg. install protective fencing or mowing strips to protect remnant native trees/ vegetation; establish no mowing areas and install interpretive signage).	Staff time	B&B PRF IA
Weeding practices (6.4)	11. Continue to <b>remove and control noxious and environmental weeds</b> , including aquatic weeds.	Staff time	B&B CATCH PRF
	12. Continue using <b>best management standards when controlling weeds</b> .	Staff time	B&B PRF CATCH
Community education (6.5)	13. Continue <b>partnerships</b> between interested groups (including major landowners, community groups and council) to have joint input into the management of key off-reserve habitat areas.	Staff time	B&B S&P CATCH
	14. Continue and build on <b>habitat education activities</b> for Warringah, including: <ul style="list-style-type: none"> <li>distributing information to residents and schools,</li> <li>conducting habitat themed guided bushwalks in habitat areas,</li> <li>encouraging schools and residents to develop habitat gardens</li> <li>interpretive signage for appropriate habitat areas</li> <li>expanding Council's website to include information on habitat gardens as they relate to vegetation communities in Warringah etc</li> </ul>	Staff time and additional resources for signage and habitat gardens	EE B&B CATCH
	15. Encourage the <b>community to be actively involved</b> in the preservation and enhancement of local habitat through initiatives such as tree planting days, and ongoing education and community consultation.	Staff time and through existing resources	B&B EE CATCH

	Ongoing Actions	Resources Estimation	Responsibility
	<p>16. Undertake a continuing education program targeting <b>residents whose land adjoins habitat areas</b> as to the impact they may have on surrounding native vegetation. In particular:</p> <ul style="list-style-type: none"> <li>• the impacts of dumping garden refuse and other encroachments</li> <li>• the impact of domestic animals,</li> <li>• the value of the area (including roadside vegetation) and appropriate activities to minimise adverse impacts</li> </ul>	Staff time	B&B EE CATCH
	<p>17. Prepare educational material on <b>wildlife in urban areas</b>, in particular:</p> <ul style="list-style-type: none"> <li>• the importance of leaving fallen trees and bush rock for ground dwelling animals,</li> <li>• the importance of creeks and other waterways</li> <li>• how to deal with local native fauna, including bandicoots, brush turkeys, ticks, etc</li> </ul>	Staff time	EE B&B
<p><b>Strategy: Habitat on public open space in identified corridors is improved</b></p> <p><b>Means of Assessment:</b>    <b>Regular update of Council’s Natural Area Survey</b>  <b>Regular assessment of habitat/ bushland condition against baseline</b>  <b>Regular fauna survey/observations</b>  <b>Regular assessment of community attitudes to habitat</b></p>			
General Principles (7.1)	18. Implement a <b>targeted ongoing bush regeneration program</b> for degraded vegetation within mapped wildlife corridors based on the priorities developed in Action 54.	Staff time	B&B CATCH
	19. <b>Manage bush regeneration contracts</b> within wildlife corridors closely to ensure habitat value is maintained.	Staff time	B&B CATCH
	20. Install <b>signage</b> at critical areas of remnant vegetation on public land. Where necessary, fences and paths should be rerouted to prevent further degradation.	\$10,000/yr	B&B EE PRF RTW

	Ongoing Actions	Resources Estimation	Responsibility
<p><b>Strategy: Habitat in private ownership in identified corridors is improved</b></p> <p><b>Means of Assessment:</b> Regular update of Council's Natural Area Survey  Regular assessment of habitat/ bushland condition against baseline  Regular fauna survey/observations  Regular assessment of community attitudes to habitat</p>			
General Principles (8.1)	21. Investigate opportunities to work with private landholders to undertake <b>restoration programs for degraded vegetation</b> within mapped wildlife corridors with priority on rare and threatened habitat and crucial linkages.	Staff time	B&B
<p><b>Strategy: Council's strategic planning activities promote habitat values</b></p> <p><b>Means of Assessment:</b> Regular update of Council's Natural Area Survey  Regular assessment of habitat/ bushland condition against baseline  Regular fauna survey/observations  Regular assessment of community attitudes to habitat</p>			
Council's Natural Resources Data (9.1)	22. Investigate how to represent presence or distribution of <b>threatened fauna species</b> on Council's GIS.	Staff time	B&B AI
Future Open Space Plans of Management (9.5)	23. Ensure that, where relevant, <b>a desired outcome of each Plan of Management</b> is to preserve, enhance or restore habitat, particularly within mapped habitat corridors or areas of core bushland. These Plans should refer to and incorporate the principles and relevant actions of this Strategy.	Staff time	S&P
Improved Co-ordination (9.7)	24. Establish an <b>Implementation Task Force</b> to oversee the implementation of this Strategy, to meet quarterly.	Staff time	S&P B&B CATCH EE COMP SP

	Ongoing Actions	Resources Estimation	Responsibility
	25. Ensure habitat restoration works adjoining Manly or Pittwater Council areas are planned and carried out in <b>coordination with these neighbouring councils.</b>	Staff time	B&B CATCH
	26. Pursue the declaration of additional <b>"Wildlife Protected Areas"</b> , particularly for areas of threatened species habitat and for bushland in the urban and urban fringe areas of Warringah where pressure from pest animal species and domestic cats and dogs is likely to be highest.	Staff time \$500/ reserve	B&B

	Proposed Actions	Priority	Resources Estimation	Responsibility
<b>Strategy: Routine Council activities are carried out in a way that enhances habitat</b> <b>Means of Assessment: Regular update of Council's Natural Area Survey</b> <b>Regular assessment of habitat/ bushland condition against baseline</b> <b>Regular fauna survey/observations</b> <b>Regular assessment of community attitudes to habitat</b>				
Landscaping on open space (6.1)	27. Develop a <b>Landscape Planting and Design Code</b> that will apply to all Council managed open space within urban areas (eg urban parkland, reserves, playgrounds) as well as to streets and urban centres.	Medium	Staff time	B&B PRF PDS
	28. Increase the availability of <b>locally-sourced indigenous species</b> <ul style="list-style-type: none"> <li>▪ Create a <b>list of appropriate species</b> for each corridor or habitat area. This list to be based on the species found in the relevant vegetation community that are easy to propagate and grow.</li> </ul>	High	Staff time	B&B

	Proposed Actions	Priority	Resources Estimation	Responsibility
	<ul style="list-style-type: none"> <li>Continue to support and develop a <b>community based nursery</b> (at Manly Dam or another suitable location) to propagate suitable species in sufficient numbers for community and council use. Seeds to be locally sourced.</li> </ul>	High	\$10,000 initially \$10,000/yr ongoing +staff time	B&B EE
	29. Consider storing " <b>habitat furniture</b> " such as logs and large rocks at an appropriate site. Make these available to habitat planting contractors, volunteers or schools where appropriate.	Low	Staff time \$400/ load	B&B PRF
Community education (6.5)	30. Investigate <b>new ways</b> to deliver education to make it more effective in bringing about change in community attitudes and behaviours.	High	Staff time	EE
	31. Continue an education program that provides information on <b>noxious and environmental weeds</b> and their control, and highlights legal requirements to remove noxious weeds.	High	\$5,000 /yr	EE B&B
<b>Strategy: Habitat on public open space in identified corridors is improved</b> <b>Means of Assessment: Regular update of Council's Natural Area Survey</b> <b>Regular assessment of habitat/ bushland condition against baseline</b> <b>Regular fauna survey/observations</b> <b>Regular assessment of community attitudes to habitat</b>				
General Principles (7.1)	32. Review Friends of the Bush work sites to focus efforts in <b>priority areas</b>	High	Staff time	B&B
	33. Develop and use a <b>methodology for bush regeneration</b> within wildlife corridors which has particular regard for the habitat values of exotic species.	High	\$3000	B&B
	34. Develop guidelines to ensure new <b>unleashed dog exercise areas</b> are located away from sensitive habitat areas.	High	Staff time \$5,000	B&B COMP
	35. Target <b>companion animal education programs</b> and enforcement activity in known sensitive habitat locations.	High	Staff time	COMP

	Proposed Actions	Priority	Resources Estimation	Responsibility
	36. Liaise with the RTA regarding the provision of <b>fauna sensitive road design principles</b> and practices, particularly within wildlife corridors and on roads marked as fauna movement hazards in the NAS.	Low	Staff time	B&B RTW
	37. Work with the responsible authority to incorporate bush regeneration works when establishing or working on services, through direct contact and education with <b>public utility and infrastructure providers</b> .	Medium	Staff time	B&B
	38. Investigate the suitability of having threatened species information added to the ' <b>Dial Before You Dig</b> ' service.	High	Staff time	B&B
	39. Continue to support Friends of the Bush and other <b>volunteer groups</b> in prioritised areas	High	Staff time	B&B
Habitat Restoration Plans for Specific Sites on public open space (7.2)	40. <b>Allocate responsibility for coordinating corridor activity</b>	High	Staff time	B&B CATCH
	41. Use the <b>Habitat Restoration Plans</b> as a base to guide habitat work in the following areas: <ul style="list-style-type: none"> <li>▪ Long Reef Beach carpark site</li> <li>▪ Dee Why Creek Corridor</li> <li>▪ South Creek Corridor – St Matthews Farm site</li> <li>▪ Brookvale Creek Corridor</li> <li>▪ Manly Creek Corridor</li> </ul>	Medium Medium Medium Low Low	Staff time  <i>(Plans need to be scoped before \$ allocation can be given)</i>	B&B EE PRF CATCH
<b>Strategy: Habitat in private ownership in identified corridors is improved</b>				
<b>Means of Assessment:</b> Regular update of Council's Natural Area Survey Regular assessment of habitat/ bushland condition against baseline Regular fauna survey/observations Regular assessment of community attitudes to habitat				

	Proposed Actions	Priority	Resources Estimation	Responsibility
General Principles (8.1)	42. Investigate opportunities to establish a program equivalent to <b>Friends of the Bush for private property</b>	Medium (subject to additional resources)	Staff time	B&B
	43. Work with landholders to value, manage, and conserve their habitat. Consider <b>activities</b> such as: <ul style="list-style-type: none"> <li>▪ free plants</li> <li>▪ 'Habitat House' signs</li> <li>▪ assistance at planting days</li> <li>▪ weed control</li> <li>▪ fencing</li> <li>▪ technical advice</li> </ul>	Medium	Cost per house per annum: 2 plants \$5 1 sign \$15 50 houses /yr +1 planting day/yr =\$1000/yr	B&B EE CATCH
Properties with Vegetation Management Plans/Vegetation Covenants (8.2)	44. Develop and maintain a <b>database of properties with consent conditions relating to habitat, VMPs and Covenants.</b>	High (subject to additional resources)	Staff time	B&B COMP
	45. Monitor <b>change of ownership</b> and inform/assist new owners with their habitat responsibilities.	High (subject to additional resources)	Staff time	B&B
	46. Liaise with and assist property owners to <b>comply with consent conditions relating to habitat, implement their VMPs or comply with the Covenant</b> on their property.	High (subject to additional resources)	Staff time	B&B
	47. Carry out <b>enforcement</b> of consent conditions where assistance and liaison is not successful.	High (subject to additional resources)	Staff time	B&B COMP
	48. Ensure that any conditions of consent applied at the subdivision stage are <b>carried through</b> and applied in any future form of assessment.	High (subject to additional resources)	Staff time	B&B COMP

	Proposed Actions	Priority	Resources Estimation	Responsibility
Habitat Restoration Plans in targeted local suburban areas (8.3)	49. Use the <b>Habitat Restoration Plans</b> as a base to guide habitat work in the following areas: <ul style="list-style-type: none"> <li>Allambie Heights Corridor</li> <li>Collaroy Escarpment Corridor</li> <li>Duffys Forest Corridor</li> </ul>	Medium Low Low	Staff time ( <i>Plans need to be scoped before \$ allocation can be given</i> )	B&B EE PRF
<b>Strategy: Council's strategic planning activities promote habitat values</b> <b>Means of Assessment: Regular update of Council's Natural Area Survey</b> <b>Regular assessment of habitat/ bushland condition against baseline</b> <b>Regular fauna survey/observations</b> <b>Regular assessment of community attitudes to habitat</b>				
Council's Natural Resource Data (9.1)	50. <b>Revise Warringah Natural Area Survey – Vegetation History and Wildlife Corridors</b> including the following: <ul style="list-style-type: none"> <li>Describe the methodology used to determine where the corridors are located and what priority is assigned to each one.</li> <li>Describe each corridor and the areas they link.</li> <li>Map the areas of core and significant bushland in Warringah</li> <li>Provide further information on fauna use of the corridors and fauna movement hazards</li> </ul>	High	\$3000	B&B SP
	51. <b>Upgrade natural resource layers on Council's GIS</b> , including the following: <ul style="list-style-type: none"> <li>Map and identify areas of core bushland</li> <li>Information about individual properties to include corridor details where appropriate</li> <li>Information about areas of degraded bushland to include reference to the vegetation community it was formerly (and could potentially become again with sufficient regeneration)</li> <li>Add the 1750 vegetation layer</li> <li>Update threatened species layer at 6 month intervals</li> <li>Identify recently cleared bushland</li> </ul>	High	Staff time	B&B AI

	Proposed Actions	Priority	Resources Estimation	Responsibility
	52. Investigate how to represent presence or distribution of <b>threatened fauna species</b> on Council's GIS.	High Ongoing	Staff time	B&B AI
	53. Nominate Narrabeen Escarpment Scrub for <b>listing as an Endangered Ecological Community</b> under the NSW Threatened Species Conservation Act.	Medium	\$1000	B&B
Strategic Approach to Managing Bushland (9.2)	54. Develop a methodology to <b>assess conservation significance</b> in Warringah based on existing models which consider rarity, viability, condition and connectivity criteria.	High	\$3000	B&B
	55. Use the conservation significance assessment methodology (action 54) to assist in <b>prioritising and planning</b> Council's bushland management programs, strategic habitat conservation and land-use initiatives.	Medium	Staff time	B&B SP CATCH
	56. Carry out <b>bushland reserve planning</b> in the central core bushland area: <ul style="list-style-type: none"> <li>▪ identify areas of crucial habitat;</li> <li>▪ consider all other relevant land management issues; and</li> <li>▪ use this information as the basis of a strategic habitat corridor and reservation network through this area.</li> </ul>	High	Staff time \$8000	B&B SP
Environmental Planning Instruments (9.3)	57. Document an investigation into the use of mechanisms to deliver habitat outcomes in the new LEP. These might include <b>Environmental Protection Zones</b> and/or environmental constraints layers.	High	Staff time	SP B&B CATCH
	58. Investigate whether certain keystone areas that are crucial for habitat or biodiversity conservation qualify as areas for future acquisition or <b>Environmental Heritage</b> .	High	Staff time	SP B&B
	59. Continue to investigate ways to provide further protection to areas with high habitat value through relevant planning instruments.	Medium	Staff time	B&B SP

	Proposed Actions	Priority	Resources Estimation	Responsibility
Strategic Approach to Development Issues (9.4)	<p>60. Investigate the inclusion of provisions for habitat protection in a <b>Development Control Plan</b> that apply to land within mapped wildlife corridors, riparian zones and core bushland areas regardless of zone. These provisions might include landscaping requirements such as:</p> <ul style="list-style-type: none"> <li>▪ Relevant species lists,</li> <li>▪ Requirements for leaving existing habitat undeveloped and undisturbed,</li> <li>▪ The percentage of a site that should be reinstated as habitat once development has occurred.</li> </ul> <p>It may also be appropriate for the DCP to apply to buffer zones around each corridor or area of core bushland.</p>	Medium	Staff time	SP B&B CATCH DA
	<p>61. Develop <b>standard development consent conditions</b> arising from the Standard Instrument and Development Control requirements that can be applied to properties within mapped wildlife corridors, threatened species habitat, riparian zones, core bushland areas and any buffer zones associated with these areas.</p>	Medium	Staff time	SP B&B DA COMP
	<p>62. Introduce habitat values early into any discussions about developments, particularly when they are within areas of habitat value, by creating a <b>checklist, matrix or similar</b> to be added to the pre-lodgment starter kit to assist with addressing the environmental sensitivity of proposed development sites.</p>	High	Staff time	B&B DA CATCH
Street Tree Master Plan (9.6)	<p>63. When planning for <b>planting and replacement of street trees</b>,</p> <ul style="list-style-type: none"> <li>▪ Produce then refer to a Street Tree Master Plan having regard to habitat values,</li> <li>▪ Refer to the actions and principles in the Habitat Restoration Plans prepared for selected corridors within Warringah.</li> </ul>	Medium	Staff time	PRF
Future Steps (9.8)	<p>64. Investigate the introduction of <b>incentives and supporting mechanisms</b> to encourage the retention of local habitat on private land.</p>	Low	Staff time	B&B FINANCE SP

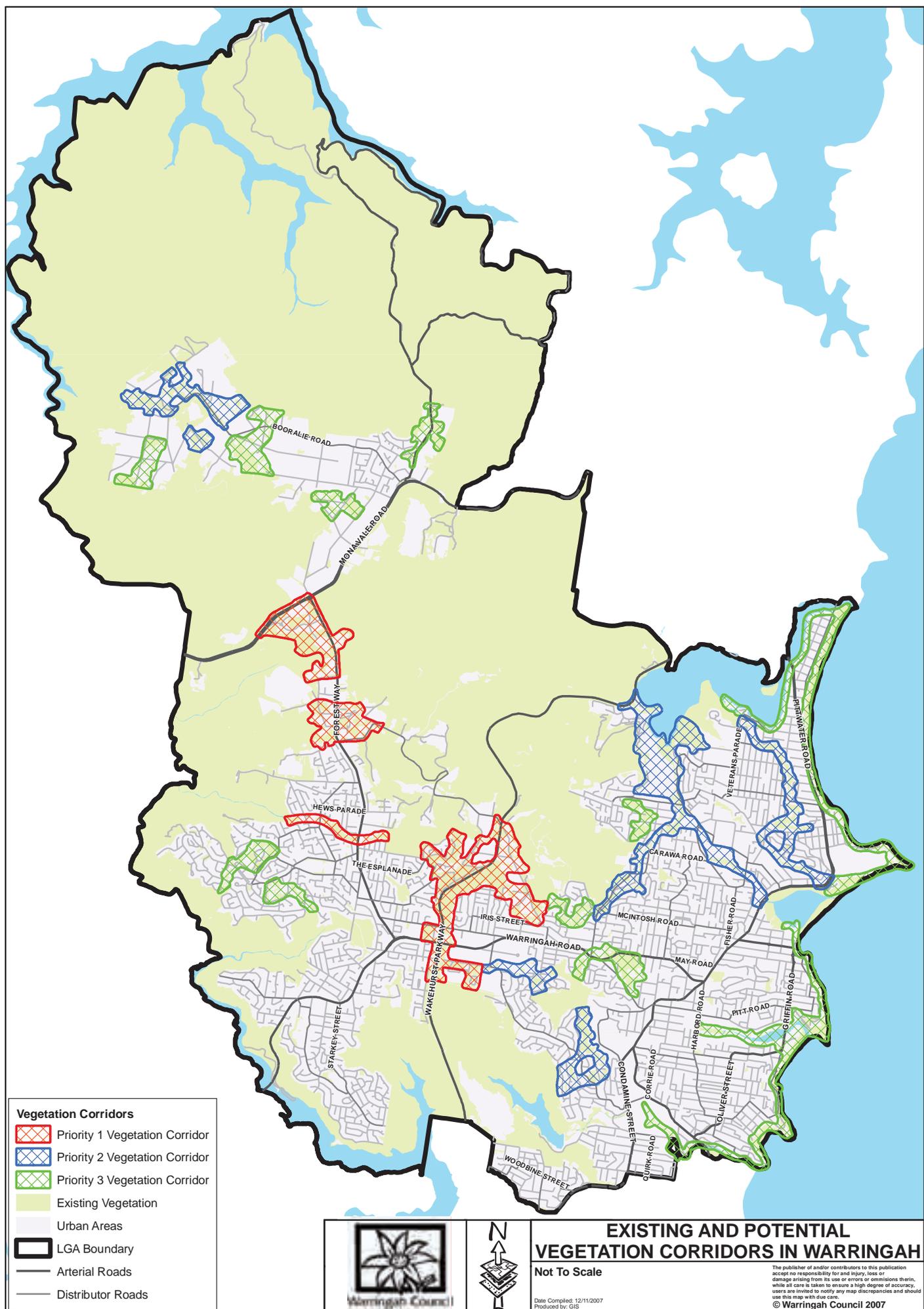
	Proposed Actions	Priority	Resources Estimation	Responsibility
	65. Investigate how <b>biobanking</b> or other biodiversity offset mechanisms might be applied in Warringah.	Medium	Staff time	B&B S&P
	66. Investigate opportunities for <b>carbon trading</b> through street tree planting.	Low	Staff time	B&B S&P PRF

Action Tables Abbreviations	
AI	Asset Information
B&B	Bushland and Biodiversity
CATCH	Catchment Management
COMP	Compliance
DA	Development Assessment
EE	Environmental Education
Finance	Finance
PDS	Planning and Development
PRF	Parks, Reserves and Foreshores
RTW	Roads, Traffic and Waste
S&P	Strategy and Policy
SP	Strategic Planning





# Map 3 - Wildlife Corridors



**Vegetation Corridors**

-  Priority 1 Vegetation Corridor
-  Priority 2 Vegetation Corridor
-  Priority 3 Vegetation Corridor
-  Existing Vegetation
-  Urban Areas
-  LGA Boundary
-  Arterial Roads
-  Distributor Roads



**EXISTING AND POTENTIAL VEGETATION CORRIDORS IN WARRINGAH**

Not To Scale

Date Compiled: 12/11/2007  
Produced by: GIS

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## Glossary

**Ecosystem:** the interaction of plants and animals with each other and the physical environment eg fish and sea-grass living in a coastal lagoon is an example of an aquatic ecosystem.

**Out breeding:** where breeding occurs between plants and animals of the same species but without distinct family ties.

**Population:** a group of plants or animals of the same species living and interbreeding in the same place at the same time.

**Vegetation community:** an assemblage of plants that has evolved in response to specific environmental factors eg: a sandstone swamp vegetation community occurs on Hawkesbury sandstone soils in the wettest sites.

## References

Ondinea, D (2007) Improving Local Habitat in Warringah – Restoration of Habitat in Wildlife Corridors. Part 1 – Introduction to Warringah Wildlife Corridors; Part 2 – Habitat Restoration Plans

Saunders, DA, Hobbs, RJ and Margules, CR (1991) Biological Consequences of Ecosystem Fragmentation: A Review *Conservation Biology* Vol 5, No 1, pp18 – 32.

Smith, J and Smith, P (2005) *Warringah Natural Area Survey.3 Volumes*. Report prepared for Warringah Council.

Rutherford, I, Jerie, K, Marsh, N (2000) *A Rehabilitation Manual for Australian Streams* CRC for Catchment Hydrology, LWRRDC.

## Appendix: Street Tree Master Plan

A Street Tree Master Plan would provide clear guidelines to ensure a consistent approach towards the provision of street trees in each street of Warringah. It would enable staff without specialized tree knowledge to make the correct species selection for any street. It would typically consist of the following sections:

1. **Introduction** – including background information.
2. **Objectives** – including the following:
  - To provide clear guidelines to ensure a consistent approach towards the provision of street trees in each street of the LGA.
  - To reinforce and enhance the special characteristics of each particular street of the LGA using distinct street tree planting.
  - To enhance Warringah's key commercial districts
  - To establish street tree species that are suited to the environmental conditions of the area.
  - To establish green corridors and bio links by providing high quality street trees
  - To increase the number of trees in the Warringah's streets.
  - To improve street tree establishment and survival rates.
3. **Species selection** - including tree selection criteria and design principles. Note that tree selection will be based on a range of management issues. For example, locally endemic species may not be suitable as the soil profile in roadside verges is highly altered. Issues such as inverted soil profiles, compaction, higher nutrient status, altered drainage patterns and paved surfaces can impact on the successful establishment of endemic trees. Also, issues such as leaf fall, pruning requirements, root growth and growth habit need to be considered.
4. **Precinct Plans** - nominates the tree palette and design objectives for each precinct.
5. **Street Tree Master List** - nominates the tree species for every street based on the particular site constraints. This would in theory allow a tree to be chosen for any location that considers all the particular constraints of that site. i.e. It would recommend the tree/s to be planted under power lines in one particular street and the species choices for the other side of the street without power lines. It would
6. **Technical Guidelines** - indicates tree set out, tree planting and surrounding details and specifications.
7. **Appendices** - includes tree data sheets, road classification lists, procedures for maintenance and liaison with utilities (including water, communication, gas and electricity providers).