



Fauna Rehabilitation Plans

Introduction

Port Jackson Catchment

2001

Fauna Rehabilitation Plan for Port Jackson Catchment 2001

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Section 1- Introduction

1.1 Overview

The biodiversity of Australian wildlife has experienced a great loss since European settlement and North Sydney has seen no exception. Indeed, Australia has the worst mammal extinction rate in the world over the last 200 years (NPWS, Nature & Conservation). Prior to European settlement, North Sydney would have been home to around 21 species of mammals and many species of birds, frogs and reptiles. A fraction of this variety still survives today. In order to ensure the survival of these species into the future, management plans need to be implemented to protect wildlife habitat, populations and reduce the threats to wildlife.

Remnant bushland throughout the Port Jackson Catchment provides important habitat for remnant species of mammals, birds, frogs, reptiles and invertebrates. Effective wildlife management requires knowledge of what species are present in the North Sydney area. This report has been compiled using results from the findings and recommendations in a survey of wildlife living in the bushland reserves of the Port Jackson Catchment in March 2001 by the Biosphere Environmental Consultants (see **Section 3**), the Fauna of North Sydney Database (see **Section 3**) and other first-hand observations from Council staff.

Biodiversity loss is largely a result of human impact. Significant vegetation clearing, followed by a range of impacts on isolated remnants of bushland, has placed immense pressure on surviving biota. In particular, wildlife suffers from a decline in quantity and quality of habitat (food and shelter), predation from domestic and feral animals and consequently increasing competition from other persisting aggressive species.

This report attempts to address some of the impacts placed on native wildlife. Recommendations have been made to reduce the pressures placed on wildlife, and management guidelines have been developed to ensure habitat is rehabilitated and protected. Issues addressed in this report include bush regeneration practices; community education; feral and feral animal control; creation of wildlife corridors; fire management; provision of fresh water sources; definition of formal walking tracks; lighting; installation of nesting boxes; and installation of traffic calming devices.

The focus of these management plans is terrestrial vertebrate fauna. Aquatic and invertebrate fauna are not specifically dealt with in this report. However, management practices for wildlife addressed in this report will have positive impacts for aquatic and invertebrate fauna. The Fauna Rehabilitation Plan for Port Jackson Catchment is designed to be used in conjunction with the Bushland Rehabilitation Plans for Port Jackson Catchment, compiled in 1999.

1.2 Location of Bushland reserves in Port Jackson Catchment - refer to Map 1

1.3 Aim Statement

- Protect and enhance habitat for migratory, visitor and residential wildlife species in North Sydney's Port Jackson Catchment.
- Create additional habitat areas for wildlife.
- Implement management strategies that will help ensure the survival of wildlife in North Sydney into the future.
- Use management practices that will maximise biodiversity in North Sydney, in a sustainable manner.
- Create and protect habitat used by species that is of local significance in North Sydney.
- Reach a comparable solution to the differing needs of reserve use and native wildlife.

1.4 Conservation status of wildlife in North Sydney

1.4.2 Overview

Findings from the Fauna Survey revealed that the diversity of fauna in the bushland reserves in Port Jackson Catchment was moderately low. Many species that would have once been present in the past are absent from the reserves. The native animals that still persist in the bushland reserves do so despite a range of impacts on them and their habits.

Certain groups of animals are able to utilize the urban environment better than others. The medium-sized native birds are well represented in the reserves. However, the smaller, insectivorous and more specialised bird species are absent from most reserves. Native terrestrial mammals have been eliminated from most reserves, with the exception of a significant finding of the Brown Antechinus along the Gore Cove Track, Wollstonecraft. Generally, species that are more robust, gregarious and less specialised are able to still persist in the urban environment.

Some species have benefited from urbanisation, notably edge dwelling species that are able to utilize the urban environment. Some bird species are able to hunt insects from ovals and large lawn areas (eg. Willie Wagtails and Welcome Swallows). Some bird species have increased in population size due to availability of large quantities of nectar produced from ornamental flowers, such as Robin Gordon Grevilleas (eg. Noisy Miners and Rainbow Lorikeets). Species that scavenge (Magpies, Currawongs, Silver Gulls and Australian Ravens) have adapted to food the urban environment provides. Birds that feed on berries produced from exotic or weed trees/shrubs and native trees/shrubs dominating degraded bushland (eg. Currawongs) have also flourished in the urban environment. Some introduced species have also adapted well (eg. the Feral Pigeon, Indian Mynah, the Red Fox, and Honey Bees).

Despite the lack of diversity of fauna, some species are notable and significant. The insectivorous Large Bent-wing Bat, a species listed as Vulnerable under the *Threatened Species Conservation Act 1995*, was first detected near Balls Head in 1999. The fauna survey also found this bat to be present in Oyster Cove Bushland Reserve. A second species of insectivorous micro-bat, Gould's Wattle Bat, previously unrecorded in North Sydney, was detected in Smoothery Park. Large numbers of Ringtail Possums and fewer numbers of Brushtail Possums were also detected in all reserves. Significant bird species were noted such as the Noisy Pitta (Gore Cove Track), Striated Heron (Gore Cove), Tawny Frogmouth (all reserves) and the Superb Blue Fairy-wren persisting in most reserves.

Gore Cove Bushland was found to contain the highest biodiversity in the Port Jackson Catchment, containing significantly more fauna. This bushland is narrow and degraded in places. Despite these disadvantages, the key factor to this reserve's high diversity of fauna that is important to note, is that it contains a wide variety of habitat through different vegetation communities and is connected to Lane Cove bushland.

A comprehensive list of all species present in the North Sydney area, and their status can be found in **Section 3** of this report.

1.4.1 Relevant legislation

All native fauna are protected under the *NSW National Parks Wildlife Act, 1974*.

Species listed as threatened are protected under the *Threatened Species Conservation Act 1995*. Species considered *Threatened* are classified as: vulnerable, endangered or presumed extinct. The *Threatened Species Conservation Act* provides identification, conservation and recovery of threatened species and their populations and communities. It also aims to reduce the threats faced by those species.

North Sydney is known to contain one resident **Vulnerable Species** listed under the *Threatened Species Conservation Act, 1995*, and two **Vulnerable Species** visitors:

Resident

1. The Large Bent-wing Bat (*Miniopterus schreibersii*) listed as a **Vulnerable Species** on Schedule 2 of the *NSW Threatened Species Conservation Act, 1995*.

Visitors

1. The Powerful Owl (*Ninox strenua*) listed as a **Vulnerable Species** on Schedule 2 of the *NSW Threatened Species Conservation Act, 1995*.
2. The Grey-headed Flying-fox (*Pteropus poliocephalus*) listed as a **Vulnerable Species** on Schedule 2 of the *NSW Threatened Species Conservation Act, 1995*.

1.5 Habitat Requirements for Wildlife

1.5.1 Overview

Important components of an ecosystem for fauna habitat are:

- Mature native hollow bearing trees
- Fallen timber (logs and branches)
- Rock crevices
- Caves
- Leaf litter (mulch)
- Permanent fresh water source
- Continuous canopy coverage
- Thick, dense middle-storey vegetation
- Under-storey vegetation

Diversity within habitats is the most important feature of nature conservation (Johnston & Don, 1990). Most of the bushland reserves in the Port Jackson Catchment predominately contain a single community being Hawkesbury Sandstone Open Forest/Woodland. The exception being Gore Cove Reserve which contains four different vegetation communities as indicated by Benson and Howell (1994): Open Forest/Woodland, Low Open Forest, Closed Forest and Open Scrub.

Although weed species have a negative impact on bushland and degrade native habitat, some fauna species have adapted to utilising particular weed species, providing alternative and often essential habitat. For example, Lantana provides protective habitat for Ringtail Possums and Superb Blue Fairy-wrens; and reptiles utilise weedy ground cover.

1.5.2 Green Corridors

Narrow corridors and small remnant bushland reserves are likely to be dominated by 'edge' species. Many 'edge' bird species are large bodied which feed on the ground in surrounding areas and use corridor species for nesting and roosting (Hoye, 2000). 'Edge' bird species include: Australian Magpie, Noisy Miner, Kookaburra, Eastern Rosella and Magpie-lark (Hoye, 2000). Forest bird species include small insectivorous species that tend to not move across open spaces and are vulnerable to domination by larger more aggressive 'edge' species that are found in forest trees. Small insectivorous birds can live well in areas of shrub only (and no tall trees), despite gaps in the shrub layer (ie. not continuous).

Corridors may be effective for a particular species but completely ineffective or worse for other species (Hoye, 2000). A corridor 30m wide is dominated by the processes of the forest edge, typically dominated by the aggressive Noisy Miner with the exclusion of forest birds (Hoye, 2000). A corridor must be designed from the point of view from the fauna utilising the area.

Sharp edges and maximum contrast between clearing and bushland may cause serious losses of residual biological value due to abiotic (ie. wind) and biotic (ie. nest parasites, predation) forces (Hoye, 2000).

1.5.3 Specific Habitat Requirements

Birds

Small insectivorous birds (ie. White-browed Scrub-wrens, Superb Blue fairy-wren)

- Habitat requires shelter from dense middle and under-storey of shrubs, grasses and ground covers (Bakewell, 2001).
- Make nests in the shrub layer.
- Eat insects that are attracted to insect attracting shrubs (Ondinea, 1997) (see **Section 3 Wildlife Habitat Plants of North Sydney**)
- Need a thick under-storey to provide shelter and protection from aggressive larger birds.

Laughing Kookaburra

- Sedentary birds that occupy the same territory year after year.
- Live in woodlands and open forest.
- Diet consists of: lizards, snakes, insects, rodents and the odd small bird (Reader's Digest, 1993).
- Nest in a large cavity, either a tree hollow or branch, or a termite mound. Have been known to nest in possum boxes also.

Parrots

- Require tree hollows for nesting.

Rainbow Lorikeet

- Harvest nectar and pollen and associated insects and fruit on the occasion (Reader's Digest, 1993) from flowers such as *Eucalypt*, *Angophora*, *Grevillea*, *Melaleuca*, *Callistemon* and *Banksia* blossoms.
- Gregarious birds that flock in groups of two to fifty and roost in groups up to several hundred (Reader's Digest, 1993).

King Parrots

- King parrots feed on seed, berries, fruits, nuts, nectar, blossoms and leaf buds, from *Eucalypt*, *Acacia* trees and rainforest trees.
- Common in heavily timbered and rainforest areas.

Crimson Rosella

- Live along the edges of tall timbered Eucalypt forests and woodlands.

- Essentially eat seed and fruit of *Eucalypt*, *Casuarina*, native shrubs, grasses and weed species (Reader's Digest, 1993).

Yellow-tailed Black Cockatoo

- Fly up and down the coast and between ranges in search of food.
- Feed on seeds of introduced Conifer trees and *Banksia*, *Hakea*, Pine trees and wood-boring larvae in *Eucalypt* and *Acacia* trees (Reader's Digest, 1993).
- Nest in hollows high above the ground (Reader's Digest, 1993).

Owls

Barn Owl

- Nomadic birds.
- Feed primarily on the House Mouse (Reader's Digest, 1993).
- Live in open wooded country.
- Roost in the day in tree hollows, thickly foliated trees, caves, rock crevices, buildings and wells (Reader's Digest, 1993).

Powerful Owl

- Keep large permanent territories (Reader's Digest, 1993). Population density is kept naturally low (Greenyer, 1999).
- Roost by day in tall forest trees.
- Preys on birds and medium sized arboreal mammals, especially the Ringtail possum (Reader's Digest, 1993).

Nocturnal Birds

White-throated Nightjar

- Live in Eucalypt forests and camouflage themselves on the ground during the day in dry dense leaf litter with few plants growing close to the ground (Reader's Digest, 1993).
- Hunt during the night for nocturnal insects, such as moths and flying beetles (Reader's Digest, 1993).
- Local birds that breed in the same few hectares year after year (Reader's Digest, 1993).

Tawny Frogmouth

- Sedentary birds living in the same area year after year.
- Hunt during the evening for nocturnal insects, spiders and myriapods (centipedes, millipedes).
- Nest on a horizontal fork of a tree 3-15 metres above the ground (Reader's Digest, 1993).

Migratory Birds

Common Koel

- Migrate from Indonesia arriving in September to October (Reader's Digest, 1993).
- Live in dense pockets of *Eucalypt* trees and rainforest.
- Parasitises other species' nests and lay their eggs in species that have similar sized eggs, such as: Red Wattlebirds, Figbirds and Magpie-larks (Reader's Digest, 1993).

Channel-billed Cuckoo

- Migrates south from Papuaia in August-October to breed.
- Parasitises other species' nests to lay their eggs in, including the Magpie-lark, Magpie, Currawong and Raven (Reader's Digest, 1993). These birds then raise the chick as their own.
- Eat fruits and berries, particularly figs. Occasionally eat eggs, chicks and insects.

Mammals

Require:

- Tree hollows,
- Connecting canopy coverage,
- Dense native middle and under-storey.

Brown Antechinus

- Thick ground cover and abundant logs (Braithwaite, 1995).
- Live in forests or scrub with dense ground cover, sleeping during the day in burrows under rocks or logs (Ondinea, 1997).
- Feed at night on stems, bark, leaves, pollen, flowers, fruits, seed and fungi, as well as earthworms, insects and their larvae (Ondinea, 1997).

Ringtail Possums

- Live in a variety of forest and woodland habitats, often in suburban gardens.
- Make nests (drey) of leaves, twigs, ferns in dense middle-storey shrubs (such as *Lantana* and *Kunzea*), or on a branch or tree hollow. Will commonly utilize Possum boxes, and occasionally live in roofs.
- Diet consists predominately of *Eucalypt* leaves (McKay & Ong, 1995; White, *pers.com.*) but will also make use of introduced plant species; flowers and fruits.

Brush-tail Possums

- Live in variety of forest and woodland habitats, frequently in the suburban garden.
- Nest in tree hollows and roofs, but also in a fallen log, rock cavity or a hollowed termite mound (Strahan, 1995).
- Found to feed mainly outside of bushland reserves, rather in gardens (White, *pers.com.*).
- Feed predominately on leaves, succulent shoots, flowers, fruit, buds, bark of native and cultivated shrubs and trees. Very occasionally may eat meat in the wild (How & Kerle, 1995; Ondinea, 1997)

Insectivorous Micro-bats

- Use echo-location to locate insects near the tops of trees (Bakewell, 2001).
- Diet consists of insects, primarily moths (Hoye, 2000).
- Roost in tree hollows, under bark, in caves, stormwater culverts, buildings, roofs, old mines (Hoye, 2000; Ondinea, 1997).
- Found in forested areas where small insects can be foraged above tree canopy (Dwyer, 1995).

Grey-headed Flying-fox

- Common in rainforest and wet *Eucalypt* forest with a relatively dense canopy.
- Commute daily to foraging areas, usually within 15 kilometres of the day roost, a few individuals may travel up to 50 kilometres in an evening.
- Roost in gullies, usually close to water and in vegetation with a dense canopy (Tidemann, 1995).
- Feed nocturnally on rainforest fruits (Figs and Palms) and nectar and pollen from *Eucalypts*, *Turpentine*, *Leptospermum*, *Banksia* and *Callistemon*, and are probably important pollinators of these trees (Ondinea, 1997; Tidemann, 1995).
- Responsible for the seed dispersal of many rainforest and other *Eucalypt*, *Angophora*, *Leptospermum* and *Banksia* trees (Tidemann, 1995).

Frogs

- Require moist under-storey and ground cover near clean water.
- Live around logs, rocks and bark for shelter.
- Eat insects, snails, worms, spiders, small lizards and other frogs.

Brown Striped Marsh Frog

- Live in most freshwater environments including fish ponds, ornamental ponds, sheltering under logs, rocks or leaf litter during the day (Ondinea, 1997).

Common Eastern Toadlet

- Live near creeks, ponds, swamps and areas of seepage and shelter beneath rocks, vegetation and leaf litter (Ondinea, 1997).

Reptiles

- Thick under-storey of grasses, mulch, logs, rocks, leaf litter and shrubs to provide protection from predators.
- Large bare rocks and logs for basking in the sun.

Eastern Water Dragon

- Live near fresh water, such as: creeks, rivers, foreshores, fish ponds, ornamental ponds and swimming pools. Often use overhanging branches (Ondinea, 1997).
- Eat small reptiles, frogs, insects, flowers, fruit, snails, worms, small mammals and some vegetation (Ondinea, 1997).

Geckoes

- Shelter beneath small rocks, in rock crevices, in caves and under logs. Also found in garages.
- Nocturnal reptiles.
- Eat insects and other invertebrates.

Skinks

- Live in and around tree trunks, rocks, logs, ground litter, low cover near basking sites, concrete paths, fences and walls (Ondinea, 1997).
- Eat small insects.

Eastern Blue-tongued Lizard

- Live in rock crevices, hollows, animal burrows, under fallen timber, in drain-pipes, under concrete and in old brick and stonework (Ondinea, 1997).
- Eat snails, insects, fruit, flowers and carrion.

Fish and Aquatic Fauna

- Require clear, unpolluted water. Some species are more sensitive to pollutants than others. Macro-invertebrates can be used as indicators for testing water pollution levels.
- Habitat requirements include: rocks, logs, and aquatic vegetation, bank vegetation (including mangroves), intertidal areas (such as mudflats), pools, riffles and backwaters, and bank stability to provide shelter, shade, foraging and breeding site (Ondinea, 1997).
- Food requirements include: aquatic and terrestrial insects, crustaceans, molluscs, plankton, algae and other aquatic plants, fish (Ondinea, 1997).

Insects and other Invertebrates

- Appropriate habitat and host species to complete entire life cycle.
- Invertebrates rapidly respond to environmental change.
- Ecologically important for the functioning of an ecosystem.
- Useful as bio-indicators to monitor the health and/or pollution/disturbance of an ecosystem (Pik, 2000).

1.6 Threats to Wildlife

1.6.1 Overview

Threats to wildlife identified from the Fauna Survey and other findings include:

- Lack of bushland area
- Isolation of bushland reserves
- Loss of ground cover
- Disruption of canopy
- Predation from feral animals, especially the Red Fox
- Competition for hollows from feral animals
- Dominance from aggressive bird species, such as: Currawongs, Noisy Miners
- Predation by domestic animals, especially the cat
- Street and house lighting
- Disturbance from noise, movement and pedestrian traffic
- Weed invasion
- Lack of middle-storey vegetation
- Lack of hollows
- Pollution and poisons (ie pesticides accumulating in the food chain) and rat poison

1.6.2 Specific Threats to Wildlife

Birds

Insectivorous Birds

- Loss of habitat, particularly dense middle-storey vegetation.
- Change in ecosystem, with a greater number of trees in the urban environment that encourage edge dwelling species and lack of shrubs that favour small insectivorous birds.
- Predatory attack from cats and foxes.
- Predatory attack of eggs and aggressive dominance from territorial birds such as Currawongs.
- Change of fire regime affecting loss of flora species, availability and timing of insect attracting plants.

Parrots

- Lack of hollows. Out competition of parrots that only require nesting hollows at nesting season with parrots that remain in nesting hollows all year round.
- Lack of large old growth hollows.
- Competition for hollows from introduced species such as the Honey Bee and Indian Mynah.
- High incidence of disease within populations of parrots eg. *Pscitticean* Beak and Feather Disease, which affects Lorikeets and Cockatoos.

Kookaburras, Tawny Frogmouths

- Loss of suitable trees for nesting, roosting, and perching while waiting for prey.
- Insects killed by pesticides, then eaten by Kookaburras and Tawny Frogmouths which absorb the pesticide chemicals and are stored in their fat. When food is in short supply, their fat storage is used and high concentrations of poison may be absorbed in their blood, which results in reproductive losses or death (NPWS, 2001).

Owls

- Loss of habitat. Require large areas of bushland (White, *pers.com*). Reserves are often too small and isolated to support breeding pairs (Greenyer, 1999).
- Lack of prey; fauna species loss affects species higher up in the food chain.
- Predation from cats, foxes, snakes and dogs.
- Competition with foxes and cats for food, such as Ringtail Possums and other small mammals (Greenyer, 1999).

- Loss of old trees with hollows (Greenyer, 1999).
- The main cause of premature mortality is due to road fatalities (Wilbrow, 1999 *pers.com.*; Debus & Chafer, 1994). High mortality also due to: electrocution, fungal infections, poisoning and predation (Greenyer, 1999).
- Disturbances from noise and presence of humans near nest sites deter Powerful Owls from mating (Greenyer, 1999).

Mammals

Insectivorous bats

- The Large Bent-wing Bat is preyed upon by owls, pythons, feral cats, and occasionally the fox (Dwyer, 1995).
- Frequent disturbance of roosts used for hibernation increases winter mortality.
- Dependence upon relatively few nursery caves, threatens the survival of widespread populations if these sites are disturbed (Dwyer, 1995).
- Gould's Wattle Bat is preyed upon by owls, the feral cat and the Pied Butcherbird and Currawong (Dixon, 1995).

Grey-headed Flying-fox

- Disturbance of roosting sites, particularly during the last few weeks of pregnancy, can lead to females spontaneously aborting (Tidemann, 1995).
- Electrocution on power-lines (NPWS, 2001).
- Persecution due to poor understanding of diseases they may carry (NPWS, 2001).

Possums

- A discontinuous canopy leads to individuals needing to descend to the ground more frequently and are thus more exposed to terrestrial predators.
- A large impact on populations of possums and other marsupials is due to predatory attack from the introduced cat, both feral and domestic, fox and occasionally dogs (Smith, 1995; How & Kerle, 1995).
- Possums crossing roads are subjected to the potential of being run over by cars.
- Lack of hollows for nesting.
- Lack of middle-storey for shelter and nesting.
- Possums are territorial. Possums trapped and relocated greater than 50 metres from site of capture, are taken outside of their territory. The stress of entrapment and relocation, particularly in the day, leads to a very high incidence of mortality.
- Resident frustration and subsequent action with possums living in their roofs, and damaging their garden plants.
- Possums killed either accidentally or on purpose with rat poison.

Brown Antechinus

- Vulnerability to introduced predatory attack from cats, foxes and dogs (Braithwaite, 1995).
- Mistaken as the introduced house mouse or rat and subsequently killed.
- Species vulnerability due to specific mating habit.
- Loss of habitat through the clearing of native vegetation.

Reptiles and Amphibians

Frogs

- Susceptibility to pollution. Increased pollution levels in the air and water.
- Lack of permanent fresh water supply.
- Alteration of drainage patterns and storm water runoff (White & Pyke, 1996).
- Fungal pathogen (Berger & Speare, 1998).
- Water quality, pollution and sedimentation.

- Herbicides, pesticides and fertilizers.
- Predation by feral animals such as foxes and cats (Daly 1995 & 1996).
- Road mortality where populations are already small due to other threats (Daly, 1996).
- Predation by exotic fish, which eat frog eggs and tadpoles, particularly the Plague Minnow (*Gambusia holbrooki*) (Morgan & Buttemer, 1996).
- Loss of suitable breeding habitat through alteration by infilling and destruction of wetlands (Morgan & Buttemer, 1996; Clancy, 1996).
- Susceptibility to increasing levels of ultra-violet light (damage to the ozone layer).

Snakes

- Loss of habitat and ground cover vegetation.
- Removal of bush rock.
- Indiscriminate killing of snakes through fear or dislike. Many harmless snakes and legless lizards are killed unnecessarily in this way (NPWS, 2001).

Lizards and Skinks

- Predatory attack from cats, foxes and dogs.
- Mortality from cars and lawn mowers.
- Poisoning from pesticides.

1.7 Method

The Fauna Rehabilitation Plan for Port Jackson Catchment has been compiled using results from the Fauna Survey conducted by the Biosphere Environmental Consultants in March 2001. Carried out over six days and six nights, the survey gave a brief overview of the presence/status of wildlife in North Sydney. The aims of the survey were to catalogue the mammals, reptiles, birds and frogs that occur in each reserve; identify threatened or endangered species or species of local significance; to assess the extent of habitat for wildlife; and to recommend methods that might improve the habitat value of the reserves for native wildlife.

A database of the Fauna of North Sydney (see **Section 3**) compiling sighting records from Council's Wildlife Watch Program, Bushland Management Team, Contractors and past sightings and studies were also used to supplement findings from the survey. Wildlife Watch is a community based education program whereby interested local residents record fauna seen in their local area. The program provides valuable information for sightings of wildlife in North Sydney, however the information provided is not substantiated evidence.

1.7.2 Limitations of the Study

Limitations of the study include the rapid assessment of fauna for the Fauna Survey. It is unlikely that all species of fauna present in North Sydney could have been recorded in this survey that occurred over six days and nights. Some species are seasonal and migratory and would not have been recorded if they were not present in the time-frame of this study. However, to supplement findings of this report, other studies and the Fauna of North Sydney Database were used. Despite the possibility that not all species are accounted for, management guidelines in this plan will benefit all native fauna species.

Section 2 - Fauna Rehabilitation Management Plans

2.1 Management Strategies for the North Sydney Local Government Area

The following management strategies are applicable across the whole local government area, and are geared towards promoting the sustainable management of local wildlife. More specific on-ground strategies have been created for each bushland reserve with the Port Jackson Catchment, and can be found in the latter part of Section 2 of this report.

2.1.1 Management of Threatened Species

The Grey-headed Flying-fox

A NPWS Recovery Plan for the Grey-headed Flying-fox will be prepared by 2006.

Management guidelines set out under the *Threatened Species Conservation Act, 1995*, for the Grey-headed Flying-fox that are applicable for Council are as follows:

- Continuing synchronous annual counts to track population trends and monitor success of management actions.
- Conducting education programs to increase awareness about Grey-headed Flying-foxes and dispel misconceptions.
- Identification and protection of key foraging areas to ensure foraging resources are available throughout the year.

North Sydney provides foraging areas for the Grey-headed Flying-fox, however there are no roosting sites located in North Sydney.

Synonymous with the NPWS Recovery Plan, it is recommended that the Wildlife Watch Program continue to help monitor the sightings of the Grey-headed Flying-fox. Residents involved in the program should be notified that recording sightings of this species is important. The information provided from these sightings can then be forwarded to the NPWS for their monitoring program.

Grey-headed Flying-foxes are frequently electrocuted on overhead electricity wires. Specific areas of electric wires have been identified in North Sydney (in consultation with a representative from the Ku-ring-gai Bat Conservation Society) as having frequent Flying-fox fatalities. These wires have been prioritised for 'Aerial Bundled Cabling'. Aerial Bundled Cabling combines all wires into one sheathed cable, which prevents electrocution. It is recommended that North Sydney Council continue to bundle in high priority areas on an annual basis.

Educational talks by the Ku-ring-gai Bat Conservation Society have been provided to the public through the Bushcare Adventures Program in 2001. Educational activities and talks by the Ku-ring-gai Bat Conservation Society and other environmental educators for children and adults on the Grey-headed Flying-fox can continue to form part of the Bushcare Adventures educational activities.

The Large Bent-wing Bat

Roosting sites of the Large Bent-wing Bat are protected and their location is not publicly revealed.

Management issues for the colony of Large Bent-wing Bats in Waverton are discussed in the *Fauna and Flora Assessment of Waverton Peninsula*, by Glenn Hoye, 2000.

An NPWS Recovery Plan for the Large Bent-wing Bat is available from the National Parks and Wildlife Service.

2.1.2 Implementation of the Bushland Rehabilitation Plan for Port Jackson Catchment

It is recommended that the Council continue to implement the Bushland Rehabilitation Plan for Port Jackson Catchment, which is guided by environmental legislation set out in the *Local Government Amendment Act 1998* and the North Sydney Council Management Plan 2000 – 2003.

2.1.3 Tree Preservation Order

The Tree Preservation Order (TPO) needs to assess habitat value of trees on private property when evaluating permission for removal and pruning. During the evaluation process, an assessment should be made on the presence and/or potential of existing nesting hollows, nests and dreys. An assessment should also be made on the food resources the tree provides to local fauna. TPO guidelines for the pruning of larger branches should require a collar to be left (of at least 30cm) to allow a hollow to develop over time.

The Significant Tree Register should be reviewed and amended where appropriate to include specimens of high ecological value. Such specimens would include mature indigenous trees.

A list of indigenous plant species for Port Jackson Catchment has been compiled for gardens and gardeners. The list provides information on each species' growing condition requirement and height at maturity. This list should be provided with Tree Preservation Order permits to encourage and educate residents about planting local species in private gardens.

2.1.4 Wildlife Corridors and Linkages

North Sydney's remnant bushland areas are isolated islands in the urban environment. This poses problems for terrestrial, arboreal and some aerial species to move around beyond their home territory in search of food, mates, new territory or habitat. Isolation also limits the capacity of migratory species to use the reserves while moving across Sydney. Island pockets not only have large physical boundaries and implications but may also lead to genetic inbreeding and ultimately local extinction.

The creation of *Green Corridors* and linkages will enable fauna to move between bushland areas. These corridors should be as large and as wide as possible so as to minimise 'edge effects' and enable usage for a wide range of species. Narrow corridors may not provide adequate protection for extremely edge-sensitive bird species (Bakewell, 2001). Corridors, where possible, should mimic vegetation communities and structure of the bush to include:

1. Canopy trees
2. Middle-storey
3. Under-storey
4. Ground covers

There are three ways that corridors can be created:

1. Plantings in Council Parkland areas without interfering with recreational space and/or views.
2. Sympathetic street tree planting/street tree landscaping.
3. Backyard Bush Friendly Garden Programs for residents adjoining bushland or linking bushland reserves.

A strategy for the creation and design of Green Corridors for North Sydney has been formulated and will form part of the Council's Biodiversity Strategy. This will be developed in 2002.

1. Parkland Vegetation

Planting of indigenous species in Parklands could provide habitat for fauna and linkages to remnant bushland areas. Planting could take place around existing mature parkland trees to create a shrubby under-storey, as well as on lawn areas that are not utilised for recreational purposes.

In areas where views are to be retained or a population of small insectivorous birds are known to exist, it is recommended that islands of shrub vegetation are created. The exclusion of larger canopy trees in this area means that habitat for larger, more aggressive bird species has been omitted. Therefore, smaller birds can persist without the threat of competition from larger birds, such as Magpies or Currawongs.

Remnant vegetation, rubble and weeds found on the side of roads and surrounding old industrial sites, provide important habitat for small birds, possums and reptiles. For example, Lantana can provide important habitat for Scrub Wrens, while rubble provides shelter for lizards; therefore, the habitat value of these particular sites, needs to be carefully considered before removal or a 'tidy up' of these sites occurs. If removal is to take place, alternative habitat needs to be arranged prior to the event.

2. Street Tree Landscaping

Street Tree Landscaping involves the planting of under-storey shrubs and ground covers around the bases of existing street trees. This type of landscaping has the potential to provide habitat for wildlife such as travel routes, shelter, food or nesting sites. Although many indigenous trees may not be appropriate for street tree planting due to their size, structure, root system and/or vulnerability to the streetscape, native trees do provide more habitat and food for fauna compared to their exotic counterparts. On consultation with the Tree Preservation Officer, a list of both indigenous and native species that would be appropriate for Street Tree Landscaping has been compiled and listed below.

NB. * Indicates native species that are not currently found in North Sydney, or are not indigenous to North Sydney, but native to the Sydney region

Indicates native genera with the potential usage of hybrid species or species not indigenous to the region, selected as appropriate for streetscaping.

Grasses and Ground Covers

<i>Lomandra longifolia</i>	Mat Rush
<i>Geranium homeanum</i>	Native Geranium
<i>Dichelachne crinita</i>	Longhaired Plume Grass
<i>Dichleachne micrantha</i>	Shorthair Plume Grass
<i>Themeda australis</i>	Kangaroo Grass
<i>Echinopgan caespitosus</i>	Hedgehog Grass
<i>Viola hederaceae</i>	Native violet

Shrubs

<i>Grevillea linearifolia</i>	White Spider Flower
# <i>Banksia</i> sp.	Banksia
<i>Acacia implexa</i>	Hickory
# <i>Acacia</i> sp.	Wattle
# <i>Callistemon</i> sp.	Bottle Brush
<i>Eriostemon myoporides</i>	Long-leaved Wax Flower

Trees

<i>Melaleuca armillaris</i>	Braclet Honey Myrtle
<i>Eleocarpus reticularis</i>	Blueberry Ash
<i>Banksia serrata</i>	Old Man Banksia
<i>Banksia integrifolia</i>	Coastal Banksia
<i>Acemna smithii</i>	Lillypilly
<i>Leptospermum polygalifolium</i>	Lemon-scented Tea-tree
* <i>Synoum glandulosum</i>	Scentless Rosewood
<i>Phebalium dentatum</i>	
<i>Callicoma serratifolia</i>	Black Wattle
* <i>Cupaniopsis anacardioides</i>	Tuckeroo
<i>Livistona australis</i>	Cabbage-tree Palm
* <i>Diploglottis australis</i>	Native Tamarind
<i>Tristaniopsis laurina</i>	Water Gum
* <i>Backhousia citriadora</i>	Lemon Myrtle

Fruiting exotics that have been planted in the streetscape or in parkland areas should be reduced as they provide an abundant, year round supply of food for aggressive bird species such as the Currawong.

2.1.5 Fire Management

Ecological burning is an essential tool used to maintain bushland resilience, biodiversity and habitat conservation. Whilst fire is needed to create healthy bushland and thus habitat, it is essential that current habitat is also preserved during this process.

Small broad-scale burning is the most beneficial type of burning, however should be used only in reserves large enough to provide alternative habitat areas. As a general rule broad-scale burning should

not be larger than 10% of the total area of the reserve, and should be proportional to the shape of the reserve. Burning should be undertaken strategically and in a mosaic fashion, with areas adjacent to one another not being burnt until regeneration has reached a height of around 1.5 metres. If broad-scale burning is not appropriate for an area, then pile burning should be used.

An entire reserve should be burnt over a period of ten years, excluding areas inappropriate for burning (i.e. indigenous closed forest, degraded sites or young revegetated sites). Repeated burning of an area should not take place more frequently than seven years or less frequently than fifteen years. Too frequent a burning of bushland encourages fire-dependent species, with the loss of other species that may lead to a fire susceptible ecosystem. Likewise, with too infrequent burning, mesophilic vegetation will dominate the bushland with the loss of sclerophyll species.

Burning should not coincide with the nesting season of birds that are known to make their nests near the ground or in the shrub layer. A table highlighting nesting seasons of birds found in each reserve from the Fauna Survey and the Fauna of North Sydney Database is provided for each reserve in **Section 2.3**. Birds that are not included in the table are those that nest: above 6m; on creek banks; in tree hollows; in cave and rock ledges; and in rainforests (which should not be burnt).

Before burning piles of debris, piles should be disturbed to encourage lizards and other reptiles that may be living in the piles to move on.

2.1.6 Fresh Water Sources

There is a lack of fresh water in most of the reserves. Fresh water is crucial in providing habitat for frogs as well as drinking and bathing water for lizards and birds. Artificial frog ponds could be created in appropriate and sheltered areas in reserves. Bird-baths can also be constructed for each reserve.

For further information, see:

Section 3 - How To Build a Bird Bath and *Frog Facts No. 2: Keeping Frogs in Your Garden*.

2.1.7 Walking Tracks

Tracks and pathways create an 'edge effect' in a reserve, whereby the bushland intersected with pathways experiences a change in microclimate, is susceptible to weed invasion and other pressures associated with an altered ecosystem.

A central 'core' area is needed for conservation, which provides an area that is undisturbed and suffers minimally from edge effect. Tracks should be redirected around the outside of the reserves, and tracks running through the middle of reserves should be closed. Where there are too many tracks, especially informal ones, these should be closed and discouraged and a few formal walking tracks constructed or highlighted.

2.1.8 Community Education

Community education is essential for promoting an understanding/appreciation of wildlife issues in North Sydney. Lack of knowledge/understanding is often the cause of negative human impact on native wildlife.

Community awareness programs highlighting the presence of wildlife populations can be achieved through educational signage along the bush tracks. Educational signage should educate passers-by about the fauna that inhabit the reserve, to be mindful of their presence and how they can utilize the reserve without negatively impacting on wildlife.

Other community education programs are currently run through the Bushcare program, such as workshops on Wildlife Habitat Gardens, educational material/displays. The Bushcare Adventures Program provides interactive educational activities for children and adults in the school holidays. This Program provides important education about local wildlife and bushland issues and should continue as part of the Bushcare Program.

Wildlife education needs to reach the wider community. This may be achieved through education of the threats to wildlife that is caused by human impact through articles in local newspapers, displays in the Stanton Library and in rates notices. The selling of indigenous plants locally, possibly through local nurseries, would also be useful in encouraging residents to plant native species in their garden.

2.1.9 Feral Animal Control

Ground-dwelling native terrestrial mammals are absent within North Sydney's Port Jackson Catchment reserves. With this absence, the introduced Black Rat and House Mouse have expanded to become a dominant ground-dwelling terrestrial mammal. The main reason for the demise of mammals appears to be heavy predation by foxes, cats and dogs (White, 2001). Together with the lack of natural habitat and decades of public misunderstanding, their mammals have fallen into serious decline.

Fox control programs are required by the NPWS and are in progress. Foxes will never be completely eradicated from bushland reserves but their numbers can be culled (White, 2001). Den fumigation and a baiting program both need to be utilized. By making den fumigation the focus of the fox control program, this will ensure the culling of juvenile foxes, thus reducing the next generation of foxes. Vagrant foxes will still be present and these can be culled through a baiting program in reserves that are a distance of 150m from residential dwellings at Balls Head Reserve and Berry Island.

For further information

Section 3 – Summary of Fox Control Program 2001.

Cat traps can also be placed in reserves to trap any feral cats that may be present. Cat traps may also trap domestic cats found in reserves. Feral cats can generally be distinguished from domestic cats by their larger size and more aggressive behaviour. If there is uncertainty as to whether a cat is feral or domestic, the cat should be taken to a veterinary clinic for identification. Feral cats will need to be taken to a veterinary clinic to be euthanased. If the cats' owners can be identified from a tag on their cat's collar or microchip, the cat should be released to their owner and the owner notified that their cat was caught in bushland.

Escaped domestic rabbits are also sometimes present in reserves such as Cremorne Point. A trap can be placed for such occurrences and taken to the local veterinary clinic and hopefully returned to the owner. It is unlikely that rabbits in small numbers will pose much threat to native fauna and flora. They may even take the pressure off native populations as prey for foxes.

2.1.10 Control of Domestic Animals in Reserves

Cats and dogs are both a problem in bushland reserves. Domestic cats were recorded in the reserves at night in the Fauna Survey and possums were found killed by cats. Cats are a particular problem to wildlife as they are able to hunt lizards, birds and mammals throughout the day and night.

Statistics from WIRES and Taronga Zoo Wildlife Clinic from 1991-2000 (Section 3) regarding cat attacks on native animals in the North Sydney local government area, reveal that of all the species, Ringtail Possums have had the greatest number of cat attacks/fatalities. These statistics also show that Rainbow Lorikeets and Blue Tongued Lizards have been subject to large numbers of fatalities from cat attack. Cremorne Point was reported having the greatest number of cat attacks over this period.

Declaration of bushland reserves as Wildlife Protection Areas under the *Companion Animals Act 1998*, which prohibits cats from reserves and requires dogs to be leashed, would provide a legislative framework for protecting wildlife from the impact caused by domestic animals. Priority for declaration of Wildlife Protection Areas should be given to reserves that are high in biodiversity with the greatest conservation potential and low recreational usage. Lowest priority for the declaration of Wildlife Protection Areas should be given to reserves with high recreation usage and lower diversity of wildlife species. A public education program, educating the impacts cats and dogs off leads can cause to wildlife, will be an essential component prior to zoning Wildlife Protection Areas.

Highest priority to lowest priority for declaration of Wildlife Protection Areas, as recommended from findings from the Fauna Survey (highest conservation potential measured against least public recreational usage), are as follows:

1. Oyster Cove, Wollstonecraft (highest)
2. Smoothey Park/ Gore Cove Track, Wollstonecraft
3. Balls Head, Waverton
4. Berry Island, Wollstonecraft
5. Forsyth Park, Neutral Bay
6. Cremorne Point, Cremorne (lowest)

For further information

Section 3 – Cat Attack and Fates of Native Animals in North Sydney and Cremorne Point 1991/2 – 2000.

Community education regarding responsible pet owners, should be targeting across all areas adjoining bushland, in particular those where the declaration of a Wildlife Protection Zone is not feasible. The focus of the education should be to encourage cat owners to keep their cat within residential property boundaries, in particular at night.

Dogs are also a problem, as dogs roaming the bushland disturb a lot of wildlife, especially birds. The constant presence of dogs in the reserves is sufficient to cause native animals to abandon the reserves (White, 2001). Dogs also kill some mammals, and possums were found during the wildlife survey (2001) that had been savaged by dogs.

All bushland reserves in North Sydney require dogs to be on a lead at all times. This policy ensures that dogs are confined to the tracks and under control of their owner, which minimises disturbance to wildlife and the bushland. This policy needs to be further accompanied by educational signage in the reserves where it is not already, which includes the reasons why Council enforces all dogs to be walked on a leash. Further, active enforcement of this policy is needed by the Rangers. Dog bins and plastic bags should also be provided for all reserves. Dog Exercising areas are available around North Sydney to allow a space for dogs to run around freely.

2.1.11 Lighting

Street and footpath lighting can be a problem for the nocturnal animals. For creatures such as Ringtail Possums and Owls, light pollution can force these animals out of reserves. Most nocturnal animals avoid street-lit areas, with the only exception being Tawny Frogmouths which have learned to sit above street lights and be concealed in the shadow while waiting for moths to be drawn towards the light (White, 2001).

Street lighting should not be aimed into the reserves. Shielding on the back of street lights should be implemented which greatly reduces the amount of light entering the reserves. Footpath lighting, in areas such as Balls Head Reserve, Smoothey Park and Cremorne Point needs to be shielded so that light is directed downwards rather than radiating in all directions from an overhead light source.

Residents whose properties back onto the bush should be discouraged from having backyard spotlights pointing into reserves. A single backyard spotlight can dislocate fauna for 50m either side of the light source (White, 2001).

2.1.12 Nesting Box Project

Possum boxes are useful in providing homes particularly for Ringtail Possums, Brushtail Possums and occasionally Kookaburras. Possum boxes can be installed in all reserves with the exception of Berry Island. Possum boxes are utilized in the majority by Ringtail Possums although they are designed for Brushtail Possums. No Brushtail Possums were recorded in Berry Island during the survey (2001), and it may not be beneficial to the ecosystem of Berry Island to potentially encourage Brushtail Possums to inhabit there. Smaller boxes designed specifically for Ringtail Possums may be installed at Berry Island.

The number of boxes will vary for each reserve depending on the size of the reserve. Please refer to individual reserve management plans in Section 2.3 for the numbers of boxes recommended. Further research and trial needs to be done to determine the most successful Parrot nesting box design. Other boxes designed for Owls, King Parrots and Kookaburras can also be specifically made, installed, monitored and evaluated. A publication from The Gould League of Victoria (1996) *Nestboxes*, covers a range of nest box design for species of birds, bats and possums. This publication can be referred to for specific nest box design for different species that may benefit from nesting boxes being erected in bushland reserves.

Possum boxes should be installed outside bee swarming season (generally for 6 weeks within mid-August to December) to try to avoid the possibility of European Honey Bees moving into the boxes. It will not be possible to avoid boxes being inhabited by feral animals, particularly bees and Indian Mynahs. If this occurs, the box should be removed.

Council encourages local residents to install possum boxes in their properties. Possum boxes are sold by North Sydney Council at cost price.

2.1.13 Roads and Traffic

Traffic calming devices could be installed along roads adjacent to bushland to reduce possum fatalities on roads.

Aerial pathways for possums can be constructed over roads, by the Roads and Traffic Authority, that have a particularly high incidence of road mortality. Roads, with few options for safe commuting overhead for possums, that have a high incidence of possum fatality, can be identified and the RTA approached for the construction of a possum aerial pathway. The RTA has constructed an aerial pathway for possums over the Wakehurst Parkway.

2.1.14 Development Applications

Council's draft Development Control Plan Section 19 outlines guidelines for properties that share a common boundary with bushland. The guidelines are in place to ensure that works adjacent to bushland are compatible with the long-term conservation and management of remnant bushland in accordance with the Bushland Plan of Management and the principles of the State Environmental Planning Policy No. 19 – Bushland in Urban Areas (SEPP 19).

It is recommended that Council provide development applicants with a list of indigenous plant species for Port Jackson Catchment, so that these residents can create habitat for fauna. The list provides information on each species' growing condition requirements and height at maturity.

2.2 Statement of Management Objectives for Bush Regeneration Works

Management practices to be utilized in Bush Regeneration works by local Bushcare groups, contract Bush Regenerators and the Bush Regeneration Team throughout bushland in the Port Jackson Catchment in North Sydney.

Protect, Enhance and Recreate Middle-Storey Vegetation

The loss of middle-storey vegetation had a large impact on wildlife populations. To restore middle-storey vegetation is a foremost priority.

The middle-storey can be recreated using ecological burning, direct seeding, or planting. Poisoned exotic canopy and mid-storey trees should be left in situ until new native canopy trees have matured in height.

Creating Connective Canopy

To ensure that the canopy is still connected when removing canopy weed species, leave poisoned exotic canopy in situ until new native canopy tree has matured in height.

Buffer Planting

Buffer planting along the edge of the reserves can be done to increase habitat area. This may include plantings next to parkland or on the roadside. This will require the cooperation of other departments in the Open Space and Environmental Services Division.

Spraying of Herbicide

The spraying of herbicide should not be used next to creek lines and near water sources. Hand weeding and other methods such as blanketing out weeds should be used instead. The spraying of herbicide needs to be minimised where possible in all bush regeneration sites. Other methods should be adopted where possible.

Use of Mosaic Pattern for Weeding and Clearing (Method from Ondinea, 1997)

Begin weeding in number 1 areas and allow regeneration or revegetation to develop to a height of no less than 2m, or a density similar to the previous weed cover before commencing on number 2 areas and so forth. Choose upslope sites to begin work at and then move downslope.

Upslope

1	2	1	2	1	2
3	4	3	4	3	4

Downslope

Size of Bush Regeneration Site

Each site for bush regeneration should be no larger than 20m x 20m, or ? of the reserve (Ondinea, 1997).

Replacement of Ground Cover

Replace ground cover habitat components such as rocks, logs, leaf litter and native plantings. Uncover rocks from weeds and plant native ground covers around rocks to create habitat for lizards and skinks.

Removal of Exotic Vines

Cut vines back from indigenous trees, leaving the vine in the tree and remove base of vine from the soil. For non-indigenous trees, leave vines or cut back at base and remove base of vine where necessary, until the tree is removed.

When to carry out Bush Regeneration Works

'Primary' Bush Regeneration work and Ecological Management Burns (eg pile burns, broad area burns) should be done outside of breeding times of scrub birds: March, April, May and June, that are in an area to maximise the retention of the middle-storey for nesting habitat (see Table 1 in individual site management plans in **Section 2.3**).

'Maintenance' work should be carried out throughout the other months of the year.