Ku-ring-gai Flying-fox Reserve management plan

May 1999

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Pteropus poliocephalus Grey-headed Flying-fox

1. Introduction

1.1 Background

In February 1991, Ku-ring-gai Municipal Council entered into a conservation agreement with the Minister for the Environment which outlined management intent of the Ku-ring-gai Flying-fox Reserve. This voluntary conservation agreement was made in accordance with the provisions of s. 721(1) of the *National Parks and Wildlife Act 1974* (NSW).

Following on from the Voluntary Conservation Agreement, this Plan has been prepared and details the specific reserve issues and management practices. Preparation of this plan has included a review of the previous plan adopted by Ku-ring-gai Municipal Council in August 1995 and has been initiated as a result of changes in legislation, local government policies and further developments in scientific research.

In 1985 the Ku-ring-gai Bat Colony Committee (now the Ku-ring-gai Bat Conservation Society Inc.) was established at the behest of the Mayor. Council approved it undertaking the Habitat Restoration Project, with ongoing consultation being maintained. The Society has also successfully applied for and administered a series of State and Commonwealth Government Grants to undertake the Project using contract bush regenerators and volunteers.

1.2 Planning framework

This Plan for the Ku-ring-gai Flying- fox Reserve is considered as a plan of management in relation to clause 3.7 of the Voluntary Conservation Agreement (the "Agreement') and under section 72 (1) (e) of *the National Parks and Wildlife Act, 1974,* and is considered a specific reserve management plan under Council's Bushland Plan of Management prepared under the *Local Government Act, 1993* (NSW).

The words and phrases used in this Plan have the same meanings as defined in the Agreement and this plan, on adoption, replaces all the previous plans for the Ku-ring-gai Flying- fox Reserve. It is also expected that this Plan will be further reviewed in the future.

1.3 Review of this plan

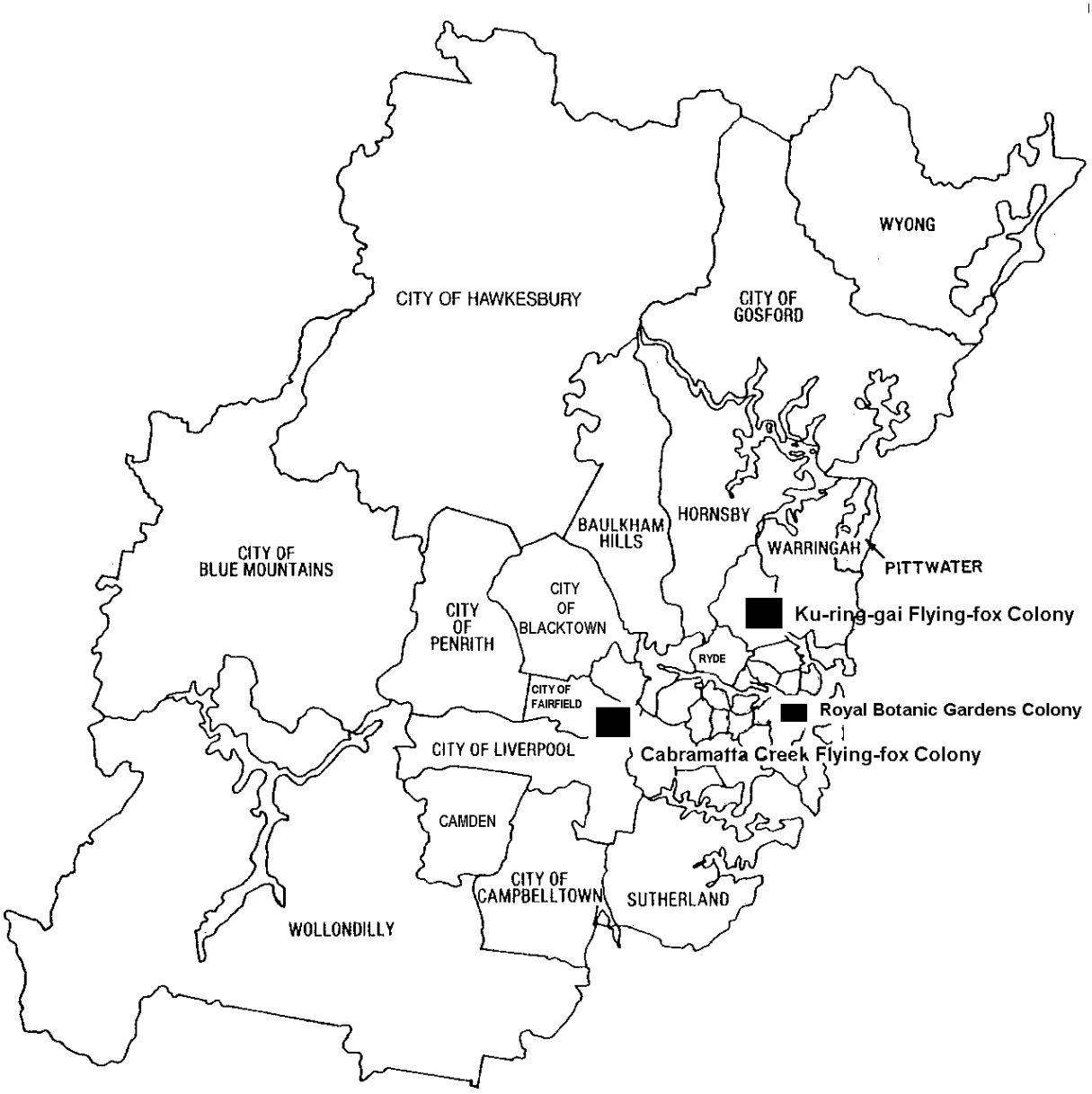
This plan will be reviewed jointly by Ku-ring-gai Municipal Council and the Director General of the National Parks and Wildlife Service or his representative in consultation with the Ku-ring-gai Bat Conservation Society Inc. This Plan shall remain in force until it is revised and then adopted by both the Ku-ring-gai Municipal Council and the NSW Minister for the Environment.

1.4 Reserve location

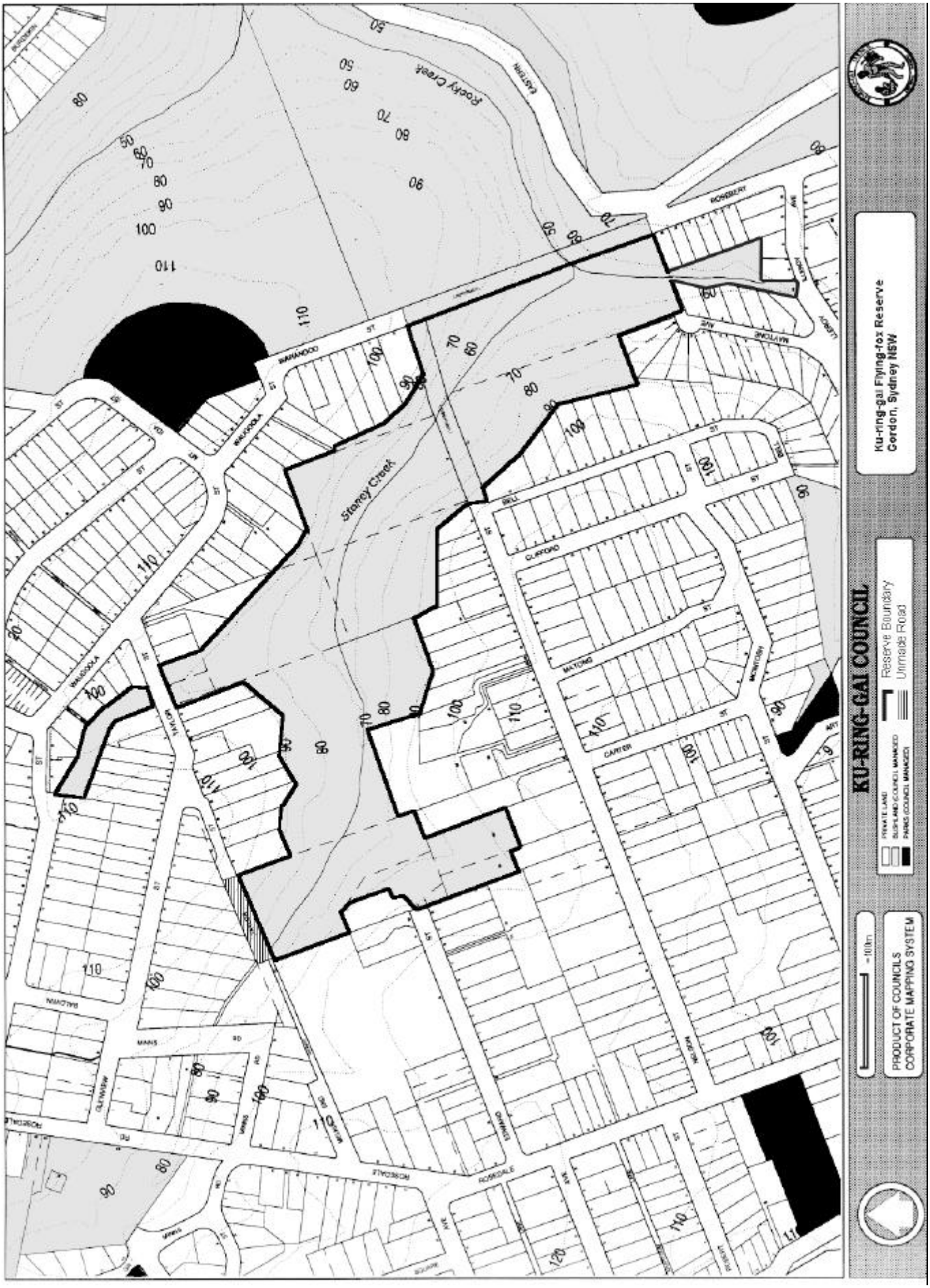
The Ku-ring-gai Flying-fox Reserve is an area of 14.6 hectares of open space bushland situated within the northern Sydney suburb of Gordon.

The Reserve is located within the boundaries of the Ku-ring-gai Local Government Area and encompasses the downstream section of Stoney Creek (see Map 1 & 2). The headwaters of Stoney Creek are in Pymble and Gordon and consequently drain residential properties, business and commercial centres and roads.

To the east, downstream, the Reserve adjoins the larger bushland areas managed by Ku-ring-gai Municipal Council, which are contiguous with Garigal National Park in Middle Harbour Catchment.



Map 1 Colonies of the Grey-headed Flying-fox in the Sydney Region



Map 2 Cadastral Map Showing the Ku-ring-gai Flying-fox Reserve, Gordon, Sydney NSW.

2. Aim of this Plan

The aim of this plan is to retain the colony of Grey-headed flying-foxes (*Pteropus poliocephalus)* and the natural environment at this site by:

- conserving and maintaining a sustainable vegetative structure which will provide roosting habitat for the maternity colony with an area sufficient to allow for periodic movement of the colony in the valley;
- conserving habitat for other fauna of the valley including threatened species and communities; and
- minimising disturbance that could detrimentally affect the colony.

3. Responsibilities

The management of this Reserve involves three main parties working in close co-operation to develop strategies and achieve the desired outcomes of the plan. These parties are:

- Ku-ring-gai Municipal Council;
- NSW National Parks and Wildlife Service; and
- Ku-ring-gai Bat Conservation Society Inc.

Ku-ring-gai Municipal Council is the owner of the Reserve and has the legal responsibility for the overall management of the Reserve and contributes to its continuing maintenance.

NSW National Parks and Wildlife Service has legislative responsibilities for the protection of native fauna under the *National Parks and Wildlife Act 1974* (NSW) and the *Threatened Species Conservation Act 1995* (NSW). The Service, on behalf of the Minister of the Environment administers the Voluntary Conservation Agreement program and is responsible for providing assistance on site with fauna and flora protection, technical and scientific advice, financial assistance and educational opportunities.

Ku-ring-gai Bat Conservation Society Inc. was established at the behest of the Mayor in 1985. The Society, on behalf of Ku-ring-gai Municipal Council, is responsible for co-ordinating the day to day site operations, the Habitat Restoration Project and the education program. The Society conducts the education program to raise public awareness and understanding of bats and their conservation. The Society is also responsible for co-ordinating the production of an Annual Report prepared for Ku-ring-gai Municipal Council and the NSW National Parks and Wildlife Service.

4. Significance of the Ku-ring-gai Flying-fox Reserve

4.1 Colony of Grey-headed flying-fox, *Pteropus poliocephalus*

From both a National and a State perspective, this Reserve is significant for providing roosting and maternity habitat for the Grey-headed flying-fox (*Pteropus poliocephalus)*.

The draft Australian Bat Action Plan lists *Pteropus poliocephalus* as Vulnerable under IUCN criterion A2 (c, d & e) in the Red List Categories. Under this criterion a reduction in population of at least 20% is projected or expected to be met within the next 10 years based on the combined effects of, a decline in extent of occurrence and or quality of habitat; levels of exploitation; and hybridisation, competitors, pathogens or pollutants.

Eby (1995) and Parry-Jones (1990) examined the diet of Grey-headed flying-foxes and found that they have a preference for nectar and pollen from blossoms. Rainforest fruits also play an important part of their diet during the summer / autumn period.

Flying-foxes contribute substantially to the maintenance of ecosystems by performing the functions of:

- pollinating blossoms of native flora; and
- dispersing seeds of rainforest flora.

A decrease in the overall population or absence of Grey-headed flying-foxes from native forests and remnant urban bushland may well lead to the reduction of biodiversity within these areas.

This Reserve contains one of a number of colony sites found in New South Wales, Southern Queensland and Victoria used by this species. Permanent colonies are generally confined to the coastal areas where there is a reliable food resource and are seldom more than 150 km inland (Eby, 1995). Radiotelemetry research has shown that this species also occupies many colony sites either annually or occasionally throughout their range.

The importance of this Reserve to the Grey-headed flying-foxes lies in it being one of a network of camps which allow nomadic movements in response to the unpredictable flowering of eucalypts, in space and time, throughout the range of the species. Their range extends from south-eastern Queensland to southern Victoria and as far as the western slopes of New South Wales. During the maternity period when the young are unable to fly the colony provides a safe roost.

4.2 Threatened species & ecological communities

In addition to this, the Reserve provides habitat for species and ecological communities listed in the schedules of the *Threatened Species Conservation Act, 1995* (NSW). These include the Powerful Owl (*Ninox strenua)* which uses the Reserve as part of its habitat range and the Sydney Turpentine Ironbark Forest found in part of the Reserve. Other species listed in the Act which have been known to exist in the vicinity of the Reserve are the Red-crowned Toadlet (*Pseudophryne australis)*, and the Great Barred Frog (*Mixophyes iteratus)*.

Map 3 Aerial Photograph Showing the Ku-ring-gai Flying-fox Reserve and Surrounding Land Uses.

5. Natural values

5.1 Topography

The Ku-ring-gai Flying-fox Reserve is located in a steep-sided valley drained by Stoney Creek which flows generally eastward. The ridges to the north and south have been developed for residential housing. There are distinct variations in microclimate between the northerly and southerly aspects and the upper and lower slopes (see Map 3).

5.2 Geology & soil landscapes

During the Triassic period, between 245 - 208 million years ago, the Sydney Basin was subject to a succession of sedimentary depositional events. This resulted in a variety of sedimentary deposits varying from coarse to fine grained sands, interspersed with fine grained black clays. Consolidated and cemented, these now form the Hawkesbury Sandstone, with its interspersed beds of shales. These formations are overlain by fine grained material of the Mittagong Formation. It is this nutrient deficient sandstone, which dictates the characteristic topography of the Sydney environment and the unique flora that has adapted to these conditions.

Surface erosion during the subsequent Tertiary Period (1.6 - 66 million years ago) has produced the valley through which Stoney Creek is still cutting.

The upper slopes and western end of the Reserve are classified as the Lucas Heights Soil Landscape. This landscape consists of gently undulating crests and ridges without rock outcrops. The soils are weathered Mittagong Formation rocks. The soils are moderately deep hardsetting yellow podzolic soils, yellowish-brown sandy loam to yellowish-brown clay (Chapman & Murphy 1989).

Below the Lucas Heights Soil Landscape can be found the Gymea Soil Landscape. This landscape has undulating hills with slopes between 10-25%. Hawkesbury sandstone rock outcrops can be found with some areas having wide rock benches and low broken scarps. The soils consist of shallow to moderately deep yellow earths and earthy sands, yellow podzolic soils and siliceous sands (Chapman & Murphy 1989).

Toward the lower eastern end of the Reserve the Hawkesbury Soil Landscape is evident. This landscape contains rugged, steep hills with slopes greater than 20% with more than 50% being rock outcrops of sandstone. The soil is shallow and is typically siliceous sands, yellow earths and some yellow podzolic soils (Chapman & Murphy 1989).

Variation in vegetation types is evidence of the variation in soil landscapes and geological strata exposed and weathered in the Stoney Creek valley.

5.3 Vegetation

5.3.1 Vegetation Associations

Within the Reserve there are a variety of vegetation associations.

On the upper slopes the tall open forest canopy species consist of Blackbutts (*Eucalyptus pilularis)*, Turpentines *(Syncarpia glomulifera)*, Red Mahogany *(Eucalyptus resinifera)*, Stringybarks *(Eucalyptus globoidea)*, Bloodwoods *(Corymbia gummifera)* and Sydney Red Gums *(Angophora costata).* This community is considered as being Sydney Turpentine Ironbark Forest listed in the schedules of the *Threatened Species Conservation Act, 1995* (NSW). Understorey include shrubs of *Dodonaea sp., Acacia sp., Grevillea sp., Hakea sp., Hibbertia sp., Leptospermum sp., Breynia sp., Bursaria sp., Lasiopetalum sp.* and groundcovers consist of native grasses, vines, herbaceous plants and ferns.

On the lower slopes and along the creek line, the tall open forest gives way to closed forest. The dominant canopy species are Blackbutts *(E. pilularis)*, Turpentines *(Syncarpia glomulifera)*, Coachwoods *(Ceratopetalum apetalum)* and Blue Gums *(Eucalyptus saligna)*. Other species include Sandpaper Fig *(Ficus coronata)*, Blueberry Ash *(Elaeocarpus reticulatus)*, Port Jackson Fig *(Ficus rubiginosa)*, Lillypilly *(Acmena smithii)*, Brush Cherry *(Syzygium sp.)*, Cheese Tree *(Glochidion ferdinandi)* and Sweet Pittosporum *(Pittosporum undulatum*) (refer Appendix C).

5.3.2 Threatened Communities - Sydney Turpentine Ironbark Forest

The NSW Scientific Committee identifies the Sydney Turpentine Ironbark Forest as occurring on clay soils derived from Wianamatta Shale or shale layers within Hawkesbury Sandstone. The forest is characterised by *Syncarpia glomulifera* (Turpentine), *Eucalyptus resinifera* (Red Mahogany), *Eucalyptus globoidea* (Stringybark), *Eucalyptus paniculata* (Grey Ironbark), *Angophora costata* (Sydney Red Gum) and *Angophora floribunda* (Rough-barked Apple). It is estimated that only 0.5% of the original area of Sydney Turpentine Ironbark Forest exists as a number of small remnants.

Not all of the characteristic species occur in all remnants. It is likely that few grey ironbarks survived timber cutting during the 19th century and subsequent residential development.

The forest on the upper slopes at the western end of the Reserve is characterised by the species listed above however no grey ironbarks have been found

5.3.3 Native species introduced by the Grey-headed flying-foxes

Flying-foxes introduce seeds from native rainforest species which to date have not been considered as endemic to the Reserve. Some of these such as Giant Stinging Tree *(Dendrocnide excelsa)* have germinated but not survived while others such as Sandpaper Figs *(Ficus coronata* and *Ficus fraseri)*, Port Jackson Fig *(Ficus rubiginosa)*, Pigeonberry Ash *(Elaeocarpus kirtonii)* and Red Ash *(Alphitonia excelsa)* have been introduced and are surviving. This introduction of native flora into the Reserve is considered as a natural ecological process and provides a more diverse and resilient canopy for the flying-foxes.

5.4 Fauna

5.4.1 Colony of Grey-headed flying-foxes

Grey-headed flying-foxes camp in rainforests, moist eucalyptus forests, casuarina forests, melaleuca swamp forest and mangroves. The common factor being the proximity to water, either fresh or estuarine. They roost in large trees in the middle and high canopies. From the available literature, very little is known of the Grey-headed flying-foxes' roosting requirements other than, that the location of roost sites is linked to food availability. Destruction of habitat is the primary cause of new sites being established. Presumably each move is to the "next best" site.

The Ku-ring-gai Flying-fox Reserve is a sheltered valley that offers cooler roosting habitat for the flying-fox colony in the summer months and is sheltered from seasonal extremes such as southerly and south westerly winds. In the Reserve the colony has a preference for slopes with a northerly aspect. Stoney Creek has permanent waterholes and the flow is maintained through most of the year.

Another colony of the Grey-headed Flying-fox is located at Cabramatta Creek in Fairfield and they are tending to frequently camp in the Royal Botanical Gardens, Sydney (see Map 1).

5.4.2 Threatened Fauna

Three species which are listed as vulnerable on schedule 2 of the *Threatened Species Conservation Act 1995* (NSW) have been known to inhabit the Reserve or the immediate surrounding areas. These species are:

- Powerful Owl (*Ninox strenua);*
- Red-crowned Toadlet *(Pseudophryne australis)* , and
- Great Barred Frog *(Mixophyes iteratus)*

Recorded in the Reserve in 1993 and again in 1998, the Powerful Owl is listed in the schedules of the *Threatened Species Conservation Act 1995 (NSW).* It inhabits moist closed forest, tall open forest and open forest within protected gullies occupying a home range of 800-1000 ha. Breeding is in winter with nesting in tall open forest, typically in emergent trees that are often among the largest and oldest in the area. Eggs are laid between late autumn and mid winter. The Powerful Owl is a natural predator of the flying-fox.

The Red-crowned Toadlet was observed in the Stoney Creek valley in the vicinity of the Reserve in 1970 (M.Robinson pers. com.). There have been no recent observations recorded. The Red-crowned Toadlet distribution is restricted to Hawkesbury sandstone areas and much of its habitat coincides with the Greater Sydney Metropolitan Region. It is estimated that approximately 20 % of the species former habitat is no longer suitable. Red-crowned Toadlets rely on small ephemeral drainage lines that feed the water from the top of the ridge to the perennial creeks below. The species breeds at most times through the year and lays eggs under leaf litter in these ephemeral drainage lines.

The Great Barred Frog, like the Red-crowned Toadlet was observed in the vicinity of the Reserve in 1970 (M.Robinson pers. com.) and has not been observed recently. The range of the Great Barred Frog has severely contracted from its original southern and northern limits. In the past its range stretched from south eastern Queensland to Narooma on the NSW South Coast. The reason for its decline is unknown. At present the main objective for the recovery of this species is to maintain populations in all areas of forest where it currently occurs. As a result of this the species has been listed in the schedules of the *Threatened Species Conservation Act 1995* (NSW). The species is found beside shallow, rocky rainforest streams and adjacent to slow moving rivers in lowland open forest.

5.4.3 Other Fauna

Apart from the Grey-headed flying-fox and the threatened fauna species, the Reserve provides habitat for or is part of the range of at least 150 species of fauna (refer Appendix D). The species recorded to date include invertebrates such as Native Bees and Scarab Beetles, and reptiles such as Diamond Python, Lace Monitors and Eastern Water Dragons. The birds recorded in the Reserve include White-breasted Sea Eagle, Silvereyes and Eastern Yellow Robins along with migratory species such as the Channel-billed Cuckoo and Dollar Birds. Mammals such as the Short-beaked Echidna and Ring-tailed Possums can also be found in the Reserve.

6. Cultural values

6.1 European heritage

A study of European heritage was commissioned in 1987 by Ku-ring-gai Municipal Council to identify significant heritage developments in the Ku-ring-gai area. No sites recorded in the study were identified in the Reserve.

6.2 Aboriginal heritage

In 1988 Ku-ring-gai Municipal Council commissioned a comprehensive aboriginal sites survey of the Council area. M. Koettig (1988) undertook the survey and no aboriginal sites have been recorded within the Reserve.

7. Specific issues & management strategies

7.1 Restoration of the habitat

7.1.1 Background

The Habitat Restoration Project was commenced in 1987 by the Ku-ring-gai Bat Conservation Society Inc. (then known as the Ku-ring-ga Bat Colony Committee Inc.) which manages the Project on behalf of Ku-ring-gai Municipal Council.

Before commencing the project the weed infestation on the north facing slope, which is primarily used by the flying-foxes, was particularly dense (Buchanan 1985). The dominant weeds were Privet and Lantana along with vines reaching the canopy and a ground cover of Wandering Jew *(Tradescantia albiflora)*. The weed association was preventing germination of native seed and if left without management the senescent native tree canopy would not be replaced. Many of the trees were in fact dead or dying.

It was apparent that if the colony was to remain at this site the existing native vegetation would need to recover and the weeds would have to be removed to allow regeneration of new canopy trees. This was a matter of urgency.

Contract staff and volunteers undertake the habitat restoration project works. The community contribution of volunteer bush regenerators and public donations enabled the Society to obtain a series of grants from the NSW and Commonwealth governments to employ contract bush regenerators. Volunteers are registered under Ku-ring-gai Municipal Council's Community Bushcare Service and supervised on site by the Ku-ring-gai Bat Conservation Society.

During the project a variety of techniques have been used and assessed to improve the effectiveness of the project.

7.1.2 Strategy

The following strategies were developed between 1987 and 1998 and found to be effective:

- Weed removal takes place at a rate that balances the clearing of weeds with the regeneration of native vegetation to provide habitat for small terrestrial fauna.
- Removal of the three layers of weeds (vines, shrubs, groundcover) and exposing the soil to sunlight stimulates the germination of the native seed bed.
- The burning of dry piles of woody weeds increases the diversity of the seed bed germination.
- Flushes of herbaceous weeds are removed before they can set further seed. This process continues until the native plants dominate.
- Seedlings of local native trees are planted to speed the restoration of the canopy. Trees planted 10 years ago have reached canopy height but are still too immature to support flying-foxes.

- Monitoring and maintenance weeding is ongoing because seeds and propagules of exotic plants are re-introduced by birds, bats, wind and water.

- Regeneration of native species on creek banks is undertaken in a checkerboard pattern such that only short sections of the bank are without vegetation at any time.

- Seeds of native rainforest plants introduced by the flying-foxes will be allowed to grow. The long term effect of these species on nearby bushland will be monitored as part of the Habitat Restoration Project.

The Habitat Restoration Project will continue to be carried out using this strategy with modifications as necessary to achieve a manageable balance between primary weed removal, maintenance and monitoring.

7.2 Soil nutrients

7.2.1 Background

It is an accepted premise in managing and restoring urban bushland in Sydney that nutrient content of soils has increased due to urban runoff. The introduction of phosphorus and nitrogen has a detrimental effect on many native species while stimulating the growth of other species particularly weeds. In addition to the impacts from the surrounding urban land use, the flying-fox colony was assumed to contribute an additional source of nutrients through addition of faeces. How much was unknown.

A graduate student at University of NSW, M. Treadwell, funded by a grant from NPWS, carried out a soil nutrient and vegetation study in Ku-ring-gai Flying-fox Reserve and in a nearby control valley. Her results indicate that the biggest impact that the flying-fox colony has on its habitat is the contribution of additional nutrients. This contribution far exceeds that contributed by the surrounding residential development.

The vegetation in parts of the Reserve used by the flying-foxes has changed from open forest to a forest with a more closed canopy. This vegetation shift must be recognised in the context of maintaining the flying-fox colony's habitat. The future management needs to balance the vegetation changes towards a closed forest with the aim of conserving habitat for other fauna in the valley.

7.2.2 Strategy

- Local education program will be investigated to minimise nutrient runoff from private property into the Reserve especially where the soils have a low nutrient content.

- The vegetation on the lower slopes of the valley will be allowed to shift towards a closed forest association of indigenous species suited to the higher nutrient status of the soil.

- Monitor the native vegetation association change over time under the preferred roosting sites and assess whether changes impact on colony behaviour.

7.3 Fire management

7.3.1 Background

Records of bush fires are not available prior to 1979 but oral history indicates the whole valley has not been burnt in the last 40 years. A fire was reported in the eastern end of the Reserve in 1947. The absence of fire has led to the growth of closed forest with emergent eucalypts. This habitat is favoured by the flying-foxes.

In 1991 as part of the habitat restoration the burning of piles of woody weeds was carried out. This was found to increase the diversity of native plant species germinating, including Acacia, Dodonea, and Lasiopetalum species. This practice has been continued and weed piles are burned by fire agencies in winter when only a small number of flying-foxes are in the valley.

The conservation agreement specifically excludes hazard reduction burning from being carried out in the Reserve without written consent from the Director-General of National Parks and Wildlife Service. However, to retain the species diversity of the open forest on the upper slopes fire will need to be used.

Fire should be excluded from the closed forest and in some areas planting will be needed to maintain emergent eucalypts.

7.3.2 Strategy

- The practice of burning piles of woody weeds in winter on the upper slopes will be continued as part of the Habitat Restoration Project.
- A mosaic of small area or pile burns will be undertaken in accordance with Ku-ring-gai Municipal Council's Bush Fire Management Policy.
- Management burning within the Reserve will be based on ecological principles in accordance with Ku-ring-gai Municipal Council's Bush Fire Management Policy after annual inspections and with consent from the NSW National Parks and Wildlife Service.
- Written information will be provided for residents by Council adjoining the Reserve on what measures they can instigate within their property to protect their assets and how they can be prepared for bush fire situations.
- Residents are responsible for maintaining fuel management activities on their land. In addition to this, an appropriate fuel reduced zone of no more than 10 metres wide will be provided in some areas of the Reserve as a buffer zone. The management of this buffer zone must be compatible with the aims of this Plan.

7.4 Stormwater and catchment management

7.4.1 Background

The Reserve is located at the lowest point in the Stoney Creek catchment. Stormwater enters the Reserve from three main sources. These sources are:

- directly from street gutters and associated municipal drainage lines around the Reserve;
- diffuse and piped drainage from neighbouring residential properties; and
- flows in Stoney Creek from higher in the catchment.

Stormwater from street gutters carries gross pollutants such as leaves, road gravel and litter. These gross pollutants can block drainage lines within the Reserve causing overflows and depositing pollutants across the slope outside the drainage lines. These drainage lines, due to the steep slope, carry water swiftly to the creek and are treated as ephemeral small creeks. Natural detritus from trees that is likely to impede the flow is removed during bush regeneration maintenance. Road gravel has been found in all blockages. These blockages cause major overflow scour and sediment deposition problems.

Drainage from neighbouring properties, which have been recently developed, is required to conform to Council's stormwater management requirements. These requirements include measures to minimise sediments transported during construction and installation of stormwater detention and retention facilities. In older housing, stormwater drains into the Reserve from old pipes and seepage from absorption trenches.

During storm episodes Stoney Creek experiences immense peak flow rates, due to rapid runoff from impervious surfaces. This has led to widening of the channel of Stoney Creek, causing bank collapse and felling of large, living trees. The water overflows the banks on to a narrow flood plain. Weed propagules are transported and deposited during these episodes.

The trunk sewer along Stoney Creek discharges sewage into the valley during high rainfall events.

7.4.2 Strategy

- Experimental pollutant traps have been installed outside the Reserve in three street gutters to ascertain the effectiveness of trapping gross pollutants (road gravel, weed propagules, leaves, plastic etc.) and to assess the ease / cost of servicing them. Council staff will monitor these when cleaned to gauge the nature and quantities of pollutants.

- New developments are required to install appropriate detention facilities to control stormwater discharge in accordance with Ku-ring-gai Municipal Council's Water Management Policy.

- Old discharge points from private property will be examined and mapped individually as the habitat restoration project proceeds.

- Simple solutions such as encouraging water tolerant endemic native species both within the Reserve and on private property will be investigated.

- Sewer problems will be reported to Sydney Water Corporation.

- The channel condition of Stoney Creek will be monitored annually by the staff of Ku-ring-gai Municipal Council and NSW National Parks and Wildlife Service along with the Ku-ring-gai Bat Conservation Society and will be reported to Council.

7.5 Introduced fauna

7.5.1 Background

Companion and domestic animals, cats and dogs, are occasionally seen in the Reserve in daytime. Their activities are unlikely to have a detrimental impact on healthy flying-foxes but may scavenge sick or dead animals. With the recent identification of disease-

causing viruses in flying-fox populations there is some concern by scientists that these viruses might in time be transmitted from flying-foxes to other mammals.

Cats and dogs can disturb and kill other fauna such as small birds, small mammals and reptiles. The Voluntary Conservation Agreement (section 3.4) does not permit domestic animals or pets within the Reserve.

Feral animals identified in the Reserve are black rats, occasional introduced birds and foxes which have been seen in the daytime.

7.5.2 Strategy

- Council will advise neighbours of the impact of cats and dogs on the Reserve, and of Ku-ring-gai Municipal Council's Fauna Management Policy that does not permit companion and domestic animals in the Reserve.

- Feral animal control programs in the Reserve will be implemented, as resources allow, by Ku-ring-gai Municipal Council or NSW National Park and Wildlife Service, preferably in conjunction with regional actions.

7.6 Disturbance of grey-headed flying-foxes

7.6.1 Background

The areas of the Reserve occupied by the flying-fox colony have been monitored summer and winter since 1985. There was a major easterly shift in summer 1990 from the western end of the Reserve behind the Lady Gowrie Complex to the middle of the Reserve still mainly using the north-facing slope. In winter, the residual colony sometimes uses the north-facing slope at the western end.

The shape of the area used by the colony varies from year to year.

As the colony is within an urban residential area, close to public transport in a city with a population of 3.7 million people, there is a potential for major disturbance of the colony causing distress and harm to the bats and causing noise nuisance impacts on neighbouring residents.

The colony is particularly vulnerable during the birthing months of October to December. Therefore the Plan has concentrated on satisfying the public interest in ways which directs attention from the site and provides educational opportunities in other ways (refer section 7.10).

The identification of the Australian Bat Lyssavirus in wild populations of flying-foxes has provided a further need to limit opportunity for direct contact with the flying-foxes (Field 1998, 1999). The virus may be transferred by direct contact with blood and saliva, that is, from bites and scratches and all wounds should be washed immediately for ten minutes with soap and water and immediately reported to a doctor and the NSW Health Department.

From time to time requests are received from special interest groups to view the colony. These include professional film makers and photographers.

7.6.2 Strategy

- To limit disturbance to the flying-fox colony, public education and awareness activities will be conducted off reserve when ever possible (refer section 7.10).

- To discourage the public from approaching the colony, no designated walking tracks will be provided in the Reserve. This also precludes commercial eco-tourism groups from visiting the Reserve.

- Filming within the Reserve will only be allowed following written approval from Ku-ring-gai Municipal Council after consultation with the Ku-ring-gai Bat Conservation Society and will be conducted in accordance with Ku-ring-gai Municipal Council's current conditions of filming and fees & charges.

- Requests and approvals for visitations will be issued and recorded by Council and reviewed annually as part of the reporting process.

7.7 Works within the Reserve

7.7.1 Background

The habitat restoration has been undertaken in such a way as to minimise disturbance to the colony, recognising that temporary disturbance may be unavoidable in some circumstances. Flying-foxes have moved away from areas in which the understorey of weeds was removed and have returned after regeneration occurred.

Bush regenerators working in the Reserve are also sensitive to the needs of the other fauna and work is organised to cause minimal disturbance.

Sydney Water Corporation requires access to the Reserve periodically to inspect and undertake maintenance to sewer mains along Stoney Creek

7.7.2 Strategy

- Plan and schedule habitat restoration works to cause as little disturbance to the flying-fox colony as possible.

- Establish formal liaison links with Sydney Water Corporation and other service authorities so that notification is provided to Ku-ring-gai Municipal Council when routine maintenance is scheduled in the Reserve. If possible works should be programmed to avoid the flying-fox birthing period from October to December and preferably works should be undertaken in winter when the number of flying-foxes is at its lowest.

7.8 Flying-fox rehabilitation program

7.8.1 Background

Rescue and rehabilitation of orphaned and injured flying-foxes is carried out by wildlife care organisations under license from NSW National Parks and Wildlife Service. These organisations are required to conform to the Service's Policy on Rehabilitation of Native Fauna.

Ku-ring-gai Bat Conservation Society, under license from the NSW National Parks and Wildlife Service, co-ordinates the release of rehabilitated flying-foxes from the Sydney Region into the Reserve.

It must be accepted that in any wild population infant mortality is part of the natural selection process. Also there is little conservation value in the rescue and release of small numbers of flying-foxes compared with the importance of conserving habitat. Therefore Ku-ring-gai Bat Conservation Society does not remove flying-foxes from the Reserve for rehabilitation

It was unknown how well the hand-reared juveniles survived and integrated into the colony after release. In 1995 to 1997 research into the survival of hand-reared flying-foxes after release was assessed by a research project (Ague et al. 1995) supervised by the University of NSW and funded by NSW National Parks and Wildlife Service and the University of NSW. Results showed that survival rates and integration into the colony improved when young flying-foxes were released in February and support feeding terminated after one month. Individual juveniles released into the Reserve were located, by radio-telemetry, at Newcastle and Nowra a few weeks after release

7.8.2 Strategy

- The releasing of flying-foxes into the Reserve must be co-ordinated through the Ku-ring-gai Bat Conservation Society and must only be undertaken in accordance with license conditions of the NSW National Parks and Wildlife Service.

- No native fauna will be removed from the Reserve for rehabilitation. This includes fauna that is injured, diseased or distressed.

7.9 Flying-fox research

7.9.1 Background

A number of research projects have been carried out in the Reserve to increase overall knowledge of flying-fox habitat, behaviour and movements. Universities and researchers under licence from NSW National Parks and Wildlife Service initiate these projects. Because Ku-ring-gai Municipal Council is the owner of the Reserve and subject to the conditions of the agreement, approval is also required from Council.

7.9.2 Strategy

- Prior to considering applications for undertaking research in the Reserve, Ku-ring-gai Municipal Council will notify and consult with the Ku-ring-gai Bat Conservation Society and advise the Society of all approvals.

- Research within the Reserve will only be undertaken with the written approval of Ku-ring-gai Municipal Council and licence approval from the NSW National Parks and Wildlife Service and will be conducted on site under the guidance of the Ku-ring-gai Bat Conservation Society.

- A condition of approval will be copies of the research report will be supplied to Ku-ring-gai Municipal Council and the NSW National Parks and Wildlife Service.

7.10 Education and interpretation

7.10.1 Background

While recognising the potential of the site for environmental education, the topography of the valley does not allow for the provision of safe visitor access, which would not impact adversely on the colony.

Therefore to promote and satisfy the public interest in flying-foxes and to deflect attention from the colony site, an off-site education program has been developed. This provides information on the ecology of flying-foxes and caters for all age groups. Bat talks presented by the Society, consist of a slide presentation and meeting a hand-reared flying-fox. These can be booked at the client's venue. These talks cover audiences from pre-school to Year 12 and community groups. Evening bat walks which include a talk, meeting a flying-fox and watching the evening flying-fox flight from Rosedale Road bridge (refer Map 3) are conducted in conjunction with National Parks and Wildlife Service's Chase Alive Volunteer Program in the summer months. Other venues are fairs and environmental open days where the public meets a flying-fox. Hand-reared educational flying-foxes are housed at Kukundi Wildlife Shelter in Lane Cove National Park where park visitors can view them.

Interpretive signage has been erected at the Edward Street entrance to the Reserve, on Rosedale Road bridge and at Kukundi Wildlife Shelter in Lane Cove National Park. These signs are designed to link the three venues and indicate the co-operation between NSW National Parks and Wildlife Service, Ku-ring-gai Municipal Council and the Ku-ring-gai Bat Conservation Society in managing this Reserve.

7.10.2 Strategy

- To continue off-Reserve education programs in conjunction with NSW National Parks and Wildlife Service, Ku-ring-gai Municipal Council and the Ku-ring-gai Bat Conservation Society.
- Education activities will be recorded and published in the annual report (refer section 8.3).

7.11 Neighbour relations

7.11.1 Background

As the Reserve is within an urban residential area and bounded by approximately 100 residential properties there is the potential for the colony to cause nuisance impacts such as noise and odours on neighbouring residents.

There is also the potential for neighbouring properties and those higher in the catchment to impact on the colony. These potential impacts include disposing of stormwater pollutants, growing invasive introduced plants and not controlling companion animals.

On occasions neighbours are also fearful of the bushland reserve in terms of bush fires, snakes and dangerous trees.

7.11.2 Strategy

- The management of neighbour relations needs to be addressed both within the Reserve and on adjoining properties.
- Where properties adjoin the Ku-ring-gai Flying-fox Reserve, Council's land information and property database, will highlight that the property adjoins the Reserve and that a conservation agreement and management plan exists for the Reserve.
- The Ku-ring-gai Bat Conservation Society will periodically provide information to neighbours on flying-foxes and progress of the habitat restoration project.
- As the Habitat Restoration Project progresses in the Reserve, individual neighbours will be contacted by Society members to encourage co-operative management of the various issues such as weeds, bush fire fuels etc.

7.12 Community involvement

7.12.1 Background

The community increasingly recognises the importance of flying-foxes and their Reserve as part of the conservation of our natural heritage. This is evident by the volunteer support that comes from, not only Ku-ring-gai but also other parts of Sydney. Volunteers assist as bush regenerators, bat speakers, flying-fox counters and in fund raising projects. The ecological importance of flying-foxes is being widely recognised throughout Sydney as judged by requests for bat talks and information from community groups, schools and other Councils. Other licensed wildlife rehabilitation groups co-operate in the rescue and rehabilitation programs.

Following Ku-ring-gai Municipal Council's lead, Fairfield City Council has protected the grey-headed flying-fox colony in western Sydney with support from the Cabramatta Creek Flying-fox Committee and strong links have been formed between the Ku-ring-gai Bat Conservation Society and Cabramatta Creek Flying-fox Committee. These organisations are also linked to a flying-fox information network of community groups which stretches from far north Queensland to Victoria. This network shares information and works together for flying-fox conservation.

7.12.2 Strategy

- NSW National Parks and Wildlife Service and Ku-ring-gai Municipal Council will foster and maintain public support for flying-foxes through consultation with community networks.
- Community interests in the Reserve will be encouraged and facilitated through the existing programs and networks.
- The Ku-ring-gai Bat Conservation Society Inc. will require all community volunteers who handle flying-foxes to be vaccinated for protection from the Australian Bat Lyssavirus.
- New volunteers will be welcomed and encouraged to participate in activities conducted by the Society.

7.13 Adjacent land use planning & management

7.13.1 Background

The Reserve is conserved under the Ku-ring-gai Planning Scheme, State Environmental Planning Policy No. 19 Bushland in Urban Areas, Local Government Act, 1993 (community land), the Voluntary Conservation Agreement and this Plan.

Despite these conservation mechanisms, the management of the Reserve is subject to environmental influences from outside the Reserve. These influences include the introduction of weed species and sediments and other stormwater pollution. Equally the natural environment extends out into developed land in terms of the native tree canopy and the habitat range of some fauna species. Preferably the natural habitat should extend beyond the Reserve boundaries and be integrated into the urban landscape.

Some sections of Taylor Street which adjoin the Reserve remain as unmade roads and are not currently zoned for any particular purpose. Currently there are no plans to develop these sections of unmade road as trafficable thoroughfares.

7.13.2 Strategy

- Investigate rezoning the unmade sections of Taylor Street to a zoning of open space and seek to incorporate such lands into the Reserve.
- Adjacent land holders will be encouraged to conserve native vegetation on their land.
- Where land holders are willing to conserve native vegetation on their land, encourage the land holder to approach Council to initiate a rezoning of part of their land to open space (private).

8. Monitoring, research & reporting

8.1 Monitoring & research

The primary objective of monitoring the Reserve is to assess whether the strategies outlined in the plan are achieving the aims. Monitoring will be conducted at regular intervals by Ku-ring-gai Municipal Council (KMC), Ku-ring-gai Bat Conservation Society Inc. (KBCS) and the NSW National Parks and Wildlife Service (NPWS) and will include the following criteria.

8.1.1 Flying-fox Colony

Monitoring will entail;

- the number and nature of research projects specifically on flying-foxes in the Reserve (KMC),
- estimating the number of flying -foxes in the colony at summer and winter (KBCS): and
- the number of released flying-foxes into the Reserve.

8.1.2 Vegetation

Monitoring will entail;

- recording species (KBCS);
- maintaining data base of species records (KMC);
- recording changes in vegetation community composition and structure (long term KBCS); and
- assessing condition of vegetation in the Reserve in terms of weed invasion (KMC).

8.1.3 Other Fauna

Monitoring will entail:

- recording species (KBCS);
- maintaining data base of species records (KMC); and
- recording actions and outcomes to control introduced fauna (KMC).

8.1.4 Progress of Habitat Restoration Project

Monitoring will entail:

- specific management actions and resourcing levels (KBCS); and
- outcomes of management actions (KBCS).

8.1.5 Education Activities

Monitoring will entail:

- number and nature of formal education activities (KBCS); and

- number of participants at formal education activities (KBCS).

8.1.6 Visitation

Monitoring will entail:

- number and nature of approved site visits (KMC); and
- number of research projects undertaken within the Reserve which are not directly associated with flying-foxes (KMC).

8.1.7 General Reserve Issues

An annual site inspection of the reserve will be carried out prior to the end of June each year by the NSW National Parks and Wildlife Service, Ku-ring-gai Municipal Council and the Ku-ring-gai Bat Conservation Society Inc. This will include observations and discussions on the management issues.

8.2 Annual reporting

An Annual Report will be prepared prior to the end of September each year detailing the above issues (refer section 8.1) for the preceding period 1 July to 30 June. The compilation of this report will be undertaken by the Ku-ring-gai Bat Conservation Society Inc. with assistance from the other organisations and printed by Ku-ring-gai Municipal Council. The annual report will be submitted to the Minister for the Environment, the Director-General NSW National Parks and Wildlife Service, the Mayor of Ku-ring-gai Municipal Council and the General Manager of Ku-ring-gai Municipal Council and the Council libraries.

Copies will be made available to other interested parties on application to Ku-ring-gai Municipal Council.

9. Plan adoption

This plan has been prepared by the GENERAL MANAGER of Ku-ring-gai Municipal Council.

Rhonda Bignell ……

General Manager, Ku-ring-gai Municipal Council

Date …….

The KU-RING-GAI MUNICIPAL COUNCIL has adopted this Plan:

David Dobbin ……

Mayor of Ku-ring-gai Municipal Council

Date …….

The DIRECTOR-GENERAL recommends that the Minister for the Environment adopt this Plan:

Brian Gilligan ……

Director-General NSW National Parks and Wildlife Service

Date …….

The MINISTER FOR THE ENVIRONMENT adopts this Plan:

Bob Debus ……

Minister for the Environment

Date …….

Appendices

Appendix A – Voluntary Conservation Agreement

CONSERVATION
AGREEMENT

Between TIMOTHY JOHN MOORE

Minister for the Environment

And THE COUNCIL OF THE MUNICIPALITY OF KU-RING-GAI

The Owner

of Ku-ring-gai Flying Fox Reserve

Lots 1 and 3 in DP 578212; Lot 101 in DP 714935; Lots 154A, 156 and 158 in DP 17131; Lots 1 and 2 in DP 38541; Lot 10 in DP 23994; Lot A in DP 212698; Lot 35 in DP 16006; Lot 2 in DP 200605; Lot 2 in DP 204102; Lot 1 in DP 179532; Lot Part 7 Section 2 in DP 979271; Lot 103 in DP 17647, Lot 5 Section 1 DP 979271; and the section of unmade road off the eastern end of Nelson Street north of Lot 35 DP 16006 and Lot 7 Section 2 DP 979271. Parish of Gordon, County of Cumberland and Municipality of Ku-ring-gai, as shown on diagram annexed hereto.

Dated: 7th February, 1991 ~~1990~~

This is a true and accurate copy of the original document held by Council.

TOWN CLERK

Director

NSW National Parks and Wildlife Service

43 Bridge Street

HURSTVILLE NSW

THIS AGREEMENT made the seventh day of February
One thousand nine hundred and ninety one
BETWEEN THE HONOURABLE TIMOTHY JOHN MOORE,
the Minister for the Environment
of the State of New South Wales being
the Minister for the time being administering the
National Parks and Wildlife Act 1974 ("the Minister"
which expression shall where the context admits be deemed
to include his successors in office) of the one part
AND THE COUNCIL OF THE MUNICIPALITY
OF KU-RING-GAI
("The Owner")
of Council Chambers
818 Pacific Highway Gordon NSW 2072
of the other part the parties agree as follows

1. INTERPRETATION

In this Agreement unless the contrary intention appears:-

"the Act" means the National Parks and Wildlife Act 1974 and any regulations from time to time in force thereunder.

"the Minister" means the Minister for the time being administering the Act and where not repugnant to the context includes the servants and agents of the Minister.

"the Owner" includes the Owner and successors in title as defined by the Act.

"the Director" means the Director of National Parks and Wildlife appointed under the Act and includes any person for the time being acting as such.

"the subject land" means the land hereinbefore described and where the context so admits any part of the land.

"development" has the same meaning as the definition in Section 69A of the Act.

"plan of management" means a written document/plan prepared by the Owner within a period of 12 months from the date of this Agreement containing details of proposed management of the subject land for a period of five years, to give effect to the purpose of the agreement.

Words importing the singular number shall include the plural and masculine gender the feminine or neuter and vice versa.

Any reference to a person shall be deemed to include a corporate body and vice versa.

Any covenant or agreement on the part of two or more persons shall be deemed to bind them jointly and severally.

2 A. The Owner is registered as the holder of that parcel of land known as Ku-ring-gai Flying-Fox Reserve which includes Lots 1 and 3 in DP 578212; Lot 101 in DP 714935; Lots 154A, 156 and 158 in DP 17131; Lots 1 and 2 in DP 38541; Lot 10 in DP 23994; Lot A in DP 212698; Lot 35 in DP 16006; Lot 2 in DP 200605; Lot 2 in DP 204102; Lot 1 in DP 179532; Lot Part 7 Section 2 in DP 979271; Lot 103 in DP 17647; Lot 5 Section 1 DP 979271 and the section of unmade road off the eastern end of Nelson Street north of Lot 35 DP 16006 and Lot 7 Section 2 DP 979271. Parish of Gordon, County of Cumberland and Municipality of Ku-ring-gai in the State of New South Wales comprising 14.589 hectares plus unmade road.

B. The subject land forms a major part of the catchment of Stoney Creek, from off the eastern end of Edward Street to the boundary with Governor Phillip Reserve and straddles Taylor Street in the north and extends south to Illeroy Avenue, Gordon. It is in a relatively natural condition so far as native plant species are concerned and is described as urban bushland. It includes a variety of wildlife habitats and contains the only Sydney colony of the Grey-headed Flying-fox *(Pteropus poliocephalus)* which is the largest and most important maternity colony of this species in southern New South Wales.

C. The Minister wishes steps to be taken to ensure the protection and preservation of native flora and fauna, in particular the Grey-headed Flying-fox colony and all elements of its habitat, on the subject land.

D. The Owner has agreed with the Minister to enter into these presents pursuant to section 69B of the Act for the purpose of protecting and preserving the natural scenery and the native flora and fauna on the subject land upon the terms and conditions hereinafter appearing.

3. USE OF THE SUBJECT LAND

The Owner covenants with the Minister as follows:-

3.1 Unless the prior written consent of the Director is obtained, no development shall be carried out on the subject land which is inconsistent with the preservation of native flora and fauna according to the intent of this agreement other than is necessary for essential services.

3.2 The Owner shall retain the soils, water courses, native flora and fauna as far as possible in an undisturbed condition.

3.3 The Owner shall take such action as is necessary to restore and maintain the habitat of the Grey-headed Flying-fox Colony as consistent with the purpose of this agreement.

3.4 The Owner shall not permit domestic animals or pets on the subject land.

3.5 Unless the prior written consent of the Director is obtained, the Owner shall not undertake or permit controlled burning for bushfire hazard reduction purposes.

3.6 The Owner shall not construct or permit any recreation facilities on any part of the land or formalise access other than those required for the provision of education opportunities and interpretation for the public regarding the Grey-headed Flying-fox colony.

3.7 The Owner will manage the subject land in accordance with an adopted plan of management.

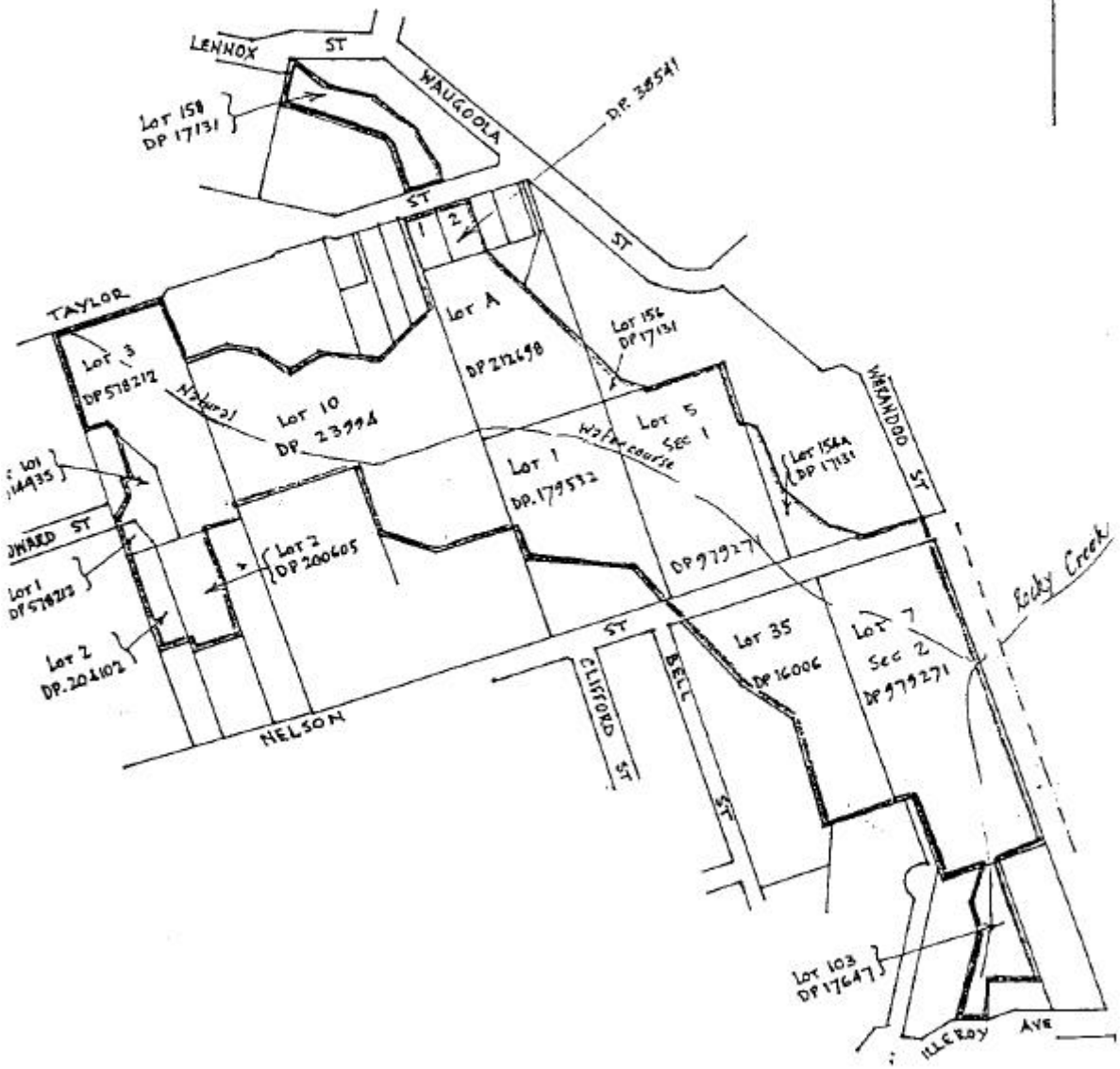
4. RIGHT TO INSPECT

The Minister, the Director and their servants and agents may at all times enter upon the subject land to ensure due compliance with this Agreement.

DIAGRAM

PART LANDS OWNED BY KU-RING-GAI MUNICIPAL COUNCIL
AT GORDON

PARISH OF GORDON: COUNTY OF CUMBERLAND



5. OBLIGATIONS TO THE MINISTER

The Minister covenants with the Owner as follows:-

5.1 The Minister will arrange for the provision of such technical and scientific advice and assistance to the Owner as the Minister deems necessary to ensure the protection and preservation of the native flora and fauna, in particular, the Grey-headed Flying-fox colony and all elements of its habitat, on the subject land.

5.2 The Minister will arrange for the provision of technical advice and financial assistance to the Owner as the Minister deems necessary to ensure the provision of education opportunities and interpretation for the public regarding the Grey-headed Flying-fox colony on the subject land.

Appendix B - Site history

Early 1900s	Oral history indicates that there was a flying-fox camp near Browns Waterhole or further upstream in the upper Lane Cover River valley
1929	Water Board installed sewer along Stony Creek.
1930	Major bush fire in Stony Creek caused some damage on private property.
1947	Oral history indicated that a bush fire occurred in the lower part of Stony Creek to an approximate line extending north from Bell Street.
1950s - 1965	Flying-fox camp located near Browns Waterhole, in Lane Cove River valley, approximately 6 kilometers west of its current position. Flying-foxes used Stony Creek valley seasonally.
1960s	Grey-headed flying-foxes established permanent camp in Stony Creek valley near western end of present Reserve. Bush fire and urban development had altered the Lane Cove River valley habitat.
1977	Stony Creek was renamed Stoney Creek and registered by Geographical Names Board.
1983	Ku-ring-gai Municipal Council commissioned R. Buchanan, an ecological consultant, to survey Council's urban bushland. "Municipality of Ku-ring-gai Bushland Management Survey Report" was issued. In section D on page 29 Stony Creek Reserve - the flying-fox camp, is listed as one of the Reserves of Highest Ecological Value Ku-ring-gai Municipal Council approved subdivision of 18 Edward Street. The flying-fox camp occupied part of this subdivision. Following public opposition to the subdivision approval, the Minister for the Environment & Planning issued an Interim Conservation Order on the site to permit an investigation by the NSW National Parks and Wildlife Service and report on the flying-fox habitat.
1984	Report to the NSW National Parks and Wildlife Service by Dr A.N. Williams regarding the Gordon Bat Colony was issued.
1985	In January Ku-ring-gai Council and the NSW Government (using Heritage Funding) purchased two lots of the subdivision at 18 Edward Street to protect the flying-fox camp. The total cost was $185,000. In February, at a meeting convened by the Mayor of Ku-ring-gai the Ku-ring-gai Bat Colony Committee was formed from individuals and community groups which had supported conservation of the bat colony. In November the relationship between Ku-ring-gai Council and the Ku-ring-gai Bat Colony Committee was defined by a Mayoral Minute. In November the Site Assessment of the Gordon Bat Colony - Weed Control and Restoration of Native Vegetation by R Buchanan was completed. This report was commissioned by the Ku-ring-gai Bat Colony Committee.
1986	State Environmental Planning Policy No 19 - Bushland in Urban Areas (SEPP19) was gazetted.
1996	Grey-headed Flying-fox *Pteropus poliocephalus* became a protected species under the National Parks and Wildlife Act 1974 (NSW).
1987	In March the Habitat Restoration Project was commenced with volunteer labor by the Ku-ring-gai Bat Colony Committee Inc. Following various unsuccessful applications for funding the Ku-ring-gai Bat Colony Committee Inc. appealed to the NSW Minister for Environment and Planning for funding to restore the habitat of the

	bat colony. On the recommendation of the Heritage Council a grant of $7,000 per year for 4 years was provided to the Ku-ring-gai Bat Colony Committee Inc. Ku-ring-gai Council matched this grant.
	In June the Ku-ring-gai Bat Colony Committee Inc. prepared a simple plan of management based on the Site Assessment Report by R Buchanan.
	In June the Ku-ring-gai Bat Colony Committee Inc. employed a bush regeneration team to work one day per week. [Phase 1]
1991	In February a Voluntary Conservation Agreement for Ku-ring-gai Flying-fox Reserve was signed by the Mayor of Ku-ring-gai and the NSW Minister for Environment.
	The name "Ku-ring-gai Flying-fox Reserve" was adopted by the Geographical Names Board.
1992 - 7	Ku-ring-gai Bat Colony Committee Inc. received three successive grants from the NSW Environmental Rehabilitation and Restoration Trust to employ a contract team, one day per week, to continue the Habitat Restoration Project [Phase 2]
1992	A Fruit Crop Protection Seminar was held in Hornsby. NSW National Parks and Wildlife Service and Ku-ring-gai Bat Colony Committee Inc jointly arranged this seminar.
1995	A grant of $10,000 was provided to Ku-ring-gai Municipal Council by the NSW National Parks and Wildlife Service for drafting a Plan of Management for Ku-ring-gai Flying-fox Reserve.
	Interpretive signs with illustrations by Michael Herron were erected on Rosedale Road bridge by Ku-ring-gai Council with assistance from Ku-ring-gai Bat Colony Committee Inc.
1995	Under the Conservation Agreement the NSW National Parks and Wildlife Service provided a grant of $30,000 to Ku-ring-gai Council for the implementation of research, interpretation and catchment management actions in Ku-ring-gai Flying-fox Reserve.
	Plan of Management for Ku-ring-gai Flying-fox Reserve adopted by Ku-ring-gai Council.
1996	Ku-ring-gai Municipal Council adopted the Bushland Plan of Management under the provisions of the Local Government Act 1993 which covered the Flying-Fox Reserve.
1998	Ku-ring-gai Bat Conservation Society Inc. received funding for habitat restoration from the Natural Heritage Trust.

Appendix C - Flora species list

This list is based on those compiled by Indigenous Regeneration Co (Madeleine Schofield, Gordon Limburg and Melissa Medo) with contributions from Robin Buchanan, Nancy Pallin & Sally Fisher. List maintained by Nancy Pallin since 1998.

Scientific Name	Family	Common Name
Trees		
Acacia irrorata	Fabaceae	Green Wattle
Acacia parramattensis	Fabaceae	Parramatta Green Wattle
Acacia schinoides	Fabaceae	
Acacia decurrens	Fabaceae	Sydney Green Wattle
Acmena smithii	Myrtaceae	Lilly Pilly
Allocasuarina littoralis	Casuarinaceae	Black she-oak
Allocasuarina torulosa	Casuarinaceae	Forest Oak
Alphitonia excelsa	Rhamnaceae	Red Ash
Angophora costata	Myrtaceae	Sydney Red Gum
Backhousia myrtifolia	Myrtaceae	Grey Myrtle
Banksia serrata	Proteaceae	Old Man Banksia
Callicoma serratifolia	Cunoniaceae	Black Wattle
Callitris rhomboidea	Cupressaceae	Port Jackson Cypress
Ceratopetalum apetalum	Cunoniaceae	Coachwood
Ceratopetalum gummiferum	Cunoniaceae	Christmas Bush
Corymbia gummifera	Myrtaceae	Red Bloodwood
Cyathea australis	Cyatheaceae	Rough Tree Fern
Dendrocnide excelsa	Urticaceae	Giant Stinging Tree
Eleaocarpus reticulatus	Elaeocarpaceae	Blueberry Ash
Eleaocarpus kirtonii	Elaeocarpaceae	Pigeonberry Ash
Eucalyptus globoidea	Myrtaceae	White Stringybark
Eucalyptus pilularis	Myrtaceae	Blackbutt
Eucalyptus resinifera	Myrtaceae	Red Mahogany
Eucalyptus saligna	Myrtaceae	Blue Gum
Eucalyptus haemastoma	Myrtaceae	Scribbly Gum
Ficus coronata	Moraceae	Creek Sandpaper Fig
Ficus fraseri	Moraceae	Sandpaper Fig
Ficus macrophylla	Moraceae	Moreton Bay Fig
Ficus rubiginosa	Moraceae	Port Jackson or Rusty Fig
Glochidion ferdinandi	Euphorbiaceae	Cheese Tree
Livistona australis	Arecaceae	Cabbage Palm
Melia azedarach	Meliaceae	White Cedar
Pittosporum undulatum	Pittosporaceae	Sweet Pittosporum
Podocarpus elatus	Podocarpaceae	Plum Pine
Polyscias elegans	Araliaceae	Celery Wood
Rapanea variabilis	Myrsinaceae	Variable Muttonwood
Syncarpia glomulifera	Myrtaceae	Turpentine
Syzygium oleosum	Myrtaceae	Blue Lilly Pilly
Syzygium paniculatum	Myrtaceae	Magenta Lilly Pilly
Trema aspera	Ulmaceae	Poison or Native Peach
Tristaniopsis laurina	Myrtaceae	Water Gum
Shrubs		
Acacia linifolia	Fabaceae	Flax-leaf Wattle
Acacia longissima	Fabaceae	Narrow-leaf Wattle
Acacia longifolia	Fabaceae	Sydney Golden Wattle
Acacia terminalis	Fabaceae	Sunshine Wattle
Acacia floribunda	Fabaceae	Sally Wattle
Acrotriche divaricata	Epacridaceae	Ground-berry
Astrotricha floccosa	Araliaceae	Native Tobacco
Austromyrtus tenuifolia	Myrtaceae	Narrow Leaf Myrtle
Banksia spinulosa	Proteaceae	Hairpin Banksia

Banksia ericifolia	Proteaceae	Heath-leaf Banksia
Bauera rubioides	Baueraceae	Dog Rose, River Rose
Boronia pinnata	Rutaceae	Pinnate Boronia
Breynia oblongifolia	Euphoribaceae	Breynia
Comesperma volubile	Polygalaceae	
Conospermum taxifolium	Proteaceae	Small-leaf Smoke Bush
Crowea saligna	Rutaceae	Crowea
Dampiera stricta	Goodeniaceae	Blue Dampiera
Dillwynia retorta	Fabaceae	Eggs and Bacon
Dodonaea triquetra	Sapindaceae	Hop Bush
Epacris longiflora	Epacridaceae	Native Fushia
Gompholobium latifolium	Fabaceae	Golden Glory Pea
Grevillea buxifolia	Proteaceae	Grey Spider Flower
Grevillea linearifolia	Proteaceae	White Spider Flower
Grevillea sericea	Proteaceae	Pink Spider Flower
Grevillea speciosa	Proteaceae	Red Spider Flower
Hakea salicifolia	Proteaceae	Willow-leaf Hakea
Hakea sericea	Proteaceae	Needle Bush, Silky Hakea
Hakea teretifolia	Proteaceae	Dagger Hakea
Hibbertia aspera	Dilleniaceae	Rough Guinea Flower
Hibbertia empetrifolia	Dilleniaceae	Trailing Guinea Flower
Kunzea ambigua	Myrtaceae	Tick Bush
Lambertia formosa	Proteaceae	Mountain Devil, Honey Flower
Lasiopetalum ferrugineum var. ferrugineum	Sterculiaceae	Rusty Petals
Leptospermum polygalifolium	Myrtaceae	Lemon Scented Tea Tree
Leptospermum trinervium	Myrtaceae	Flaky-barked Tea Tree
Leucopogon juniperinus	Epacridaceae	Prickly Beard-heath
Lomatia myricoides	Proteaceae	Long-leaf Lomatia
Lomatia silaifolia	Proteaceae	Crinkle Bush
Micrantheum ericoides	Euphorbiaceae	
Mirbelia rubiifolia	Fabaceae	Red Mirbelia
Notelaea longifolia	Oleaceae	Large Mock Olive
Notelaea venosa	Oleaceae	Native Olive
Olearia microphylla	Asteraceae	Bridal Daisy Bush
Omalanthus nutans	Euphorbiaceae	Bleeding Heart
Opercularia aspera	Rubiaceae	Stinkwort
Ozothamnus diosmifolius	Asteraceae	Pill or Sago Bush
Persoonia linearis	Proteaceae	Narrow-leaf Geebung
Persoonia pinifolia	Proteaceae	Pine-leaf Geebung
Persoonia levis	Proteaceae	Broad-leaf Geebung
Petrophile pulchella	Proteaceae	Conesticks
Phebalium dentatum	Rutaceae	
Phyllanthus gasstroemii	Euphorbiaceae	
Phyllanthus hirtellus	Euphorbiaceae	
Pimelia linifolia	Thymelaeaceae	Slender Rice Flower
Pittosporum revolutum	Pittosporaceae	Yellow Pittosporum
Platylobium formosum	Fabeaceae	Handsome Flat Pea
Platysace linearifolia	Apiaceae	Narrow-leaf Platysace
Platysace lanceolata	Apiaceae	Lance-leaf Platysace
Polyscias sambucifolius	Araliaceae	Elderberry Panax
Pomaderris eliptica	Rhamnaceae	Smooth Pomaderris
Pultenaea daphnoides	Fabaceae	Large-leaf Bush Pea
Pultenaea flexilis	Fabaceae	Graceful Bush Pea
Solanum laciniatum	Solanaceae	Kangaroo Apple
Solanum prinophyllum	Solanaceae	Forest Night Shade
Stenocarpus salignus	Proteaceae	Scrub Beefwood
Tetratheca thymifolia	Tremandraceae	Black-eyed Susan
Zieria smithii	Rutaceae	Sandfly Zieria
Zieria pilosa	Rutaceae	

Terrestrial Ferns

Adiantum hispidulum	Adiantaceae	Rough Maiden Hair
Adiantum aethiopicum	Adiantaceae	Common Maiden Hair
Blechnum cartilagineum	Blechnaceae	Gristle Fern
Calochlaena dubia	Dicksoniaceae	Soft Bracken
Christella dentata	Thelypteridaceae	Binung

Davallia pyxidata	Davalliaceae	Hare's Foot Fern
Doodia aspera	Blechnaceae	Rough Rasp Fern
Doodia caudata	Blechnaceae	Small Rasp Fern
Gleichenia dicarpa	Gleicheniaceae	Pouched Coral Fern
Histiopteris incisa	Dennstaedtiaceae	Bat's Wing Fern
Hypolepis muelleri	Dennstaedtiaceae	Harsh Ground Fern
Lindsaea linearis	Lindsaeaceae	Screw Fern
Lindsaea microphylla	Lindsaeaceae	Lacy Wedge Fern
Pellaea falcata var falcata	Sinopteridaceae	Sickle Fern
Pteridium esculentum	Dennstaedtiaceae	Bracken Fern
Pteris tremula	Pteridaceae	Jungle Brake
Pteris umbrosa	Pteridaceae	Tender Brake
Schizaea dichotoma	Schizaeaceae	Branched Comb fern
Schizaea rupestris	Schizaeaceae	
Sticherus flabellatus	Gleicheniaceae	Umbrella Fern

Understorey Species

Acianthus exsertus	Orchidaceae	Gnat Orchid
Acianthus fornicatus	Orchidaceae	Pixie Orchid
Alocasia brisbanensis	Arecaceae	Cunjevoi, Spoon Lily
Alternanthera denticulata	Amaranthaceae	Lesser Joyweed
Agrostis avenacea avenacea	Poaceae	Blown Grass
Blandfordia nobilis	Blandfordiaceae	Chrismas Bell
Burchardia umbellata	Colchicaceae	Milkmainds
Caladenia catenata	Orchidaceae	White Fingers
Carex breviculmis	Cyperaceae	
Caustis flexuosa	Cyperaceae	Grandfather's Beard
Centella asiatica	Apiaceae	Pennywort
Chamaesyce drummondii	Euporbiaceae	Flat Spurge, Caustic Weed
Cotula australis	Asteraceae	Common Cotula
Cryptostylis erecta	Orchidaceae	Hooded Orchid
Cyperus gracilis	Cyperaceae	Slender Sedge
Cyperus laevis	Cyperaceae	
Cyperus leiocaulon	Cyperaceae	
Cyperus mirus	Cyperaceae	
Dendrobium speciosum	Orchidaceae	Rock Orchid
Dianella caerulea producta	Phormiaceae	Flax Lily
Dianella caerulea caerulea	Phormiaceae	Flax or Paroo Lily
Dianella revoluta	Phormiaceae	Spreading Flax Lily
Dichelachne inaequiglumis	Poaceae	Plume Grass
Dichondra repens	Convolvulaceae	Kidney Weed
Digitaria parviflora	Poaceae	Smallflower Fingergrass
Dipodium punctatum	Orchidadeae	Hyacinth Orchid
Dracophyllum secundum	Epacridaceae	
Echinocloa colona	Poaceae	Awnless Barnyard Grass
Echinopogon caespitosus	Poaceae	Tufted Hedgehog Grass
Echinopogon ovatus	Poaceae	Forest Hedgehog Grass
Einadia hastata	Chenopodiaceae	Berry Saltbush
Entolasia marginata	Poaceae	Margined Panic Grass
Entolasia stricta	Poaceae	Wiry Panic Grass
Epilobium billardierianum	Onagraceae	Willow Herb
Euchiton (Gnaphalium) sphaericum	Asteraceae	Common Cudweed
Geranium homeanum	Geraniaceae	Native Geranium
Geranium solanderi	Geraniaceae	Native Geranium
Gonocarpus tetragynus	Haloragaceae	Poverty Raspwort
Gonocarpus teucrioides	Haloragaceae	Germander Raspwort
Goodenia heterophylla	Goodeniaceae	Variable-leaf Goodenia
Hydrocotyle laxiflora	Apiaceae	Stinking Pennywort
Hydrocotyle peduncularis	Apiaceae	Pennywort
Imperata cylindrica	Poaceae	Blady Grass
Isolepis inundatus	Cyperaceae	Swamp Club-rush
Juncus homalocaulis	Juncaceae	
Juncus planifolius	Juncaceae	Broad-leaf Rush
Juncus prismatocarpus	Juncaceae	Branching Rush
Juncus usitatus	Juncaceae	Common Rush
Lepidosperma laterale	Cyperaceae	A Sword Sedge

Lepyrodia scariosa	Restionaceae	Scale Rush
Lobelia alata	Lobeliaceae	Angled Lobelia
Lomandra multiflora	Lomandraceae	Many-flowered Mat Rush
Lomandra longifolia	Lomandraceae	Spiny-headed Mat Rush
Lomandra obliqua	Lomandraceae	Fish Bones
Microlaena stipoides	Poaceae	Weeping Grass
Opercularia aspera	Rubiaceae	Stinkwort
Oplismenus aemulus	Poaceae	Basket Grass
Oplismenus imbecillis	Poaceae	Australian Basket Grass
Oxalis perennans	Oxalidaceae	Yellow Sucking Clover
Panicum simile	Poaceae	Two Colour Panic Grass
Patersonia sericea	Iridaceae	Silky Purple Flag
Persicaria decipiens	Polygonaceae	Slender knotweed
Persicaria lapathifolia	Polygonaceae	Pale Knotweed
Persicaria strigosa	Polygonaceae	Spotted Knotweed
Plantago debilis	Plantaginaceae	Native Plantain
Plectranthus parviflorus	Lamiaceae	Cockspur Flower
Pomax umbellata	Rubiaceae	Pomax
Poranthera microphylla	Euphorbiaceae	Small Poranthera
Prasophyllum sp.	Orchidaceae	
Pratia purpurascens	Lobeliaceae	White-root
Pseuderanthemum variablile	Acanthaceae	Pastel Flower
Pseudognaphalium luteoalbum	Asteraceae	Jersey Cudweed
Pterostylis nutans	Orchidaceae	Nodding Greenhood Orchid
Ptilothrix deusta	Cyperaceae	
Scaevola calendulaceae	Goodeniaceae	Scented Fan Flower
Schelhammera undulata	Uvulariaceae	Lilac Lily
Schoenus apogon	Cyperaceae	Fluke Bog Rush
Selaginella uliginosa	Selaginellaceae	Swamp Selaginella
Senecio hispidulus hispidulus	Asteraceae	Hill Fireweed
Sigesbeckia orientalis	Asteraceae	Indian-weed
Stipa pubescens	Poaceae	Tall Spear Grass
Stylidium graminifolium	Stylidiaceae	Trigger Plant
Themeda australis	Poaceae	Kangaroo Grass
Tricoryne simplex	Antheriacaceae	Yellow Rush Lily
Veronica plebeia	Scrophulariaceae	Trailing Speedwell
Viola hederaceae forma G & D	Violaceae	Native Violet
Wahlenbergia gracilis	Campanulaceae	Native Bluebell
Xanthorrhoea sp	Xanthorrhoeaceae	Grass Tree
Xanthosia pilosa	Apiaceae	Hairy Xanthosia
Xanthosia tridentata	Apiaceae	Rock Xanthosia
Youngia japonica	Asteraceae	

Vines

Billardiera scandens	Pittosporaceae	Common Appleberry
Cassytha pubescens	Cassythaceae	Devil's Twine
Cayratia clematidea	Vitaceae	Slender Grape
Cissus hypoglauca	Vitaceae	Five-leaf Water Vine
Clematis aristata	Ranunculaceae	Clematis
Clematis glycinoides	Ranunculaceae	Clematis
Convolvulus erubescens	Convolvulaceae	Blushing Bindweed
Desmodium rhytidophyllum	Fabaceae	Rusty Tic-trefoil
Desmodium varians	Fabaceae	Variable Tic-trefoil
Eustrephus latifolius	Luzuriagaceae	Wombat Berry
Geitonoplesium cymosum	Luzuriagaceae	Scrambling Lily
Glycine clandestina	Fabaceae	Twining Glycine
Glycine tabacina	Fabaceae	Love Creeper
Hardenbergia violaceae	Fabaceae	False Sarsparilla
Hibbertia dentata	Dilleniaceae	Twining Guinea Flower
Kennedia rubicunda	Fabaceae	Dusky Coral Pea
Marsdenia rostrata	Asclepiadaceae	Twining doubah
Marsdenia suaveolens	Asclepiadaceae	Sweet Marsdenia
Morinda jasminoides	Rubiaceae	Jasmine Morinda
Pandorea pandorana	Bignoniaceae	Wonga Vine
Parsonsia straminea	Apocynaceae	Common Silkpod
Polymeria calycina	Convolvulaceae	Swamp Bindweed

Smilax glyciphylla	Smilaceae	Native Sarsparilla
Stephania japonica	Minispermaceae	Tape or Snake Vine
Tylophora barbata	Asclepiadaceae	Bearded Tylophora

Native Epiphytes

Asplenium astralasicum	Aspleniaceae	Bird's Nest Fern
Cymbidium suave	Orchidaceae	Snake Orchid
Platycerium bifucatum	Polypodiaceae	Elkhorn Fern
Pyrrosia rupestris	Polypodiaceae	Rock Felt Fern

Appendix D - Fauna species list

Initially compiled by Gordon Limburg in 1993 including information from Martyn Robinson . Win Filewood provided a bird list in 1989. A small mammal survey with live traps was conducted for 4 nights in January 1989 by Ray and Anne Williams of the Royal Zoological Society of NSW. Additional records contributed by Madeleine Schofield, Nancy Pallin and other bush regenerators.

Scientific Name	Common Name
Mammals	
Antechinus stuartii	Brown Antechinus
Trichosurus vulpecula	Common Brushtail Possum
Pseudocheirus peregrinus	Common Ringtail Possum
Pteropus poliocephalus	Grey-headed Flying-fox
Pteropus scapulatus	Little Red Flying-fox
Tachyglossus aculeatus	Short-beaked Echidna
Birds	
Pelecanus conspicillatus	Australian Pelican
Phalacrocorax varius	Pied Cormorant
Phalacrocorax sulcirostris	Little Black Cormorant
Ardea novaehollandiae	White-faced Heron
Anas superciliosa	Pacific Black Duck
Anas castanea	Chestnut Teal
Elanus notatus	Black-shouldered Kite
Accipiter fasciatus	Brown Goshawk
Haliaeetus leucogaster	White-bellied Sea Eagle
Vanellus miles	Masked Lapwing
Columba leucomela	White-headed Pigeon
Ocyphaps lophotes	Crested Pigeon
Calyptorhynchus funereus	Yellow-tailed Black Cockatoo
Cacatua roseicapilla	Galah
Cacatua galerita	Sulphur-crested Cockatoo
Trichoglossus haematodus	Rainbow Lorrikeet
Alisterus scapularis	Australian King Parrot
Platycerus eximius	Eastern Rosella
Platycerus elegans	Crimson Rosella
Cuculus pallidus	Pallid Cuckoo
Cuculus pyrrhophanus	Fan-tailed Cuckoo
Eudynamis scolopacea	Common Koel
Scythrops novaehollandiae	Channel-billed Cuckoo
Ninox strenua	Powerfull Owl
Ninox novaeseelandiae	Southern Boobook Owl
Podargus strigoides	Tawny Frogmouth
Dacelo Novaeguinae	Laughing Kookaburra
Hacyon sancta	Sacred Kingfisher
Eurystomus orientalis	Dollar Bird
Menura novaehollandiae	Superb Lyrebird
Hirundo neoxena	Welcome Swallow
Cecropis ariel	Fairy Martin
Coracina novaehollandiae	Black-faced Cuckoo-shrike
Zoothera lunulata	White's (Ground)Thrush
Eopsaltria australis	Eastern Yellow Robin
Pachycephala pectoralis	Golden Whistler

Scientific Name	Common Name
Pachycephala rufiventris	Rufous Whistler
Colluricincla harmonica	Grey Shrike-thrush
Rhipidura rufifrons	Rufous Fantail
Rhipidura fuliginosa	Grey Fantail
Rhipidura leucophrys	Willie Wagtail
Psophodes olivaceus	Eastern Whipbird
Malurus cyaneus	Superb Fairywren
Malurus lamberti	Variegated Fairywren
Sericornis frontalis	White-browed Scrubwren
Gerygone mouki	Brown Gerygone (Warbler)
Acanthiza sp	Thornbill
Anthochaera carunculata	Red Wattlebird
Anthochaera chrysoptera	Brush (Little) Wattlebird
Philimon corniculatus	Noisy Friarbird
Manorina melanocephala	Noisy Miner
Meliphaga lewinii	Lewin's Honeyeater
Lichenostomus chrysops	Yellow-face Honeyeater
Lichenostomus penicillatus	White-plume Honeyeater
Phylidonyris novaehollandiae	New Holland Honeyeater
Philidonyris nigra	White-cheeked Honeyeater1
Acanthorhynchus tenuirostris	Eastern Spinebill
Pardalotus punctatus	Spotted Pardalote
Zosterops lateralis	Silveryeye
Emblema temporalis	Red-browed Firetail
Oriolus sagittatus	Olive-backed Oriole
Dicrurus hottentottus	Spangled Drongo
Ptilonorhynchus violaceus	Satin Bowerbird
Grallina cyanoleuca	Magpie Lark (Pee Wee)
Strepera graculina	Pied Currawong
Cracticus torquatus	Grey Butcherbid
Gymnorhina tibicen	Australian Magpie
Corvus coronoides	Australian Raven
Reptiles	
Morelia spilota spilota	Diamond Python
Varanus varius	Lace Monitor (Goanna)
Pogona barbata	Bearded Dragon
Physignathus leseurii	Eastern Water Dragon
Phyllurus platurus	Southern Leaf-tail Gecko
Ctenotus taeniolatus	Copper-tailed Skink
Tiliqua scincoides	Eastern Blue-tongue Lizard
Spehomorphus quoyii	Eastern Water Skink
Saiphos equialis	Three-toed Skink
Pseudechis porphyriacus	Red-bellied Black Snake
Rhinoplocephalus nigrescens	Eastern Small-eyed Snake
Amphibians	
Mixophyes iteratus	Great Barred Frog
Pseudophryne australis	Red-crowned Toadlet
Litoria phyllochroa	Leaf Green Tree Frog
Crinia signifera	Common Eastern Toadlet
Limnodynastes peroni	Brown-striped Marsh Frog
Anguilla reinhardtii	Long finned Eel
Invertebrates	

Scientific Name	Common Name
Cherax destructor	Yabby
Euastacus spinifer	Sydney Spiny Cray
Triboniophorus graessei	Red Triangle Slug
Helicarion sp.	
Missulena bradleyi	Eastern Mouse Spider
Arigiope aetheria	St Andrews Cross Spider
Nephila spp.	Golden Orbweaving Spider
Phonognatha graeffei	Leafcurling Spider
Dinopis subrufa	Common Netcasting spider
Isopoda sp.	Large huntsman Spider
Atrax robusus	Sydney Funnelweb Spider
Misgolas rapax	Sydney Brown Trapdoor Spider
Pholcus phalangioides	Daddy-longlegs Spider
Ixodes holocyclus	Paralysis Tick
Scolopendra morsitans	Common Centipede
Aeshna brvistyla	Dragonfly
Orthodera mimistralis	Green Mantid
Gryllotalpa australis	Mole Cricket
Caedicia major	Katydid
Idiopterus nephrelepidis	Maidenhair Fern Aphid
Abricta curvicosta	Floury Baker Cicada
Cyclochila australasiae	Greengrocer, Yellow Monday
Macrotristria anularis	Cherrynose Cicada
Psaltoda moerens	Redeye Cicada
Psaltoda plaga	Black Prince cicada
Thopha saccata	Double Drummer Cicada
Lestonia haustorifera	Shield Bug
Lestonia grossi	Shield Bug
Ctenarytaina thysanura	Bluegum Psyllid
Pristhesancus papuensis	Assassin Bug, Bee Killer
Havinthus rufovarius	Assassin Bug
Myrmeleon acer	Common Antlion
Anoplognathus viriditarsis	Christmas Beetle
Cephalodesmius armiger	Scarab Beetle
Boreoides subulatus	Stratiomyid fly
Syrphus viridiceps Macq.	Hover Fly
Lamprolonchaea brouniana	Metallic-green Tomato Fly
Dacus tryoni (Bactrocera, Strumeta)	Queensland Fruit Fly
Dirioxa pornia	
Procecidochares utilis	Crofton Gall "Wasp"
Phytobia pittosporphylli	Pittosporum leafminer
Euschemon rafflesia	Regent Skipper
Doratifera casta	Black Slug Cup Moth
Doratifera vulnerans	Mottled Cup Moth
Leptocneria reducta	White Cedar Moth
Graphium sarpedon choredon	Blue Fanny Butterfly
Papilio aegus	Orchard Butterfly
Anaphaeis java teutonia	Caper White Butterfly
Pieris rapae	Cabbage white butterfly
Danaus plexippus	Wanderer Butterfly
Euploea core	Common Crow
Heteronympha merope	Common Brown Butterfly
Tisiphone abeona	Sword-grass Brown Butterfly
Phaedyma shepherdi	Common Aeroplane Butterfly
Vanessa kershawi	Painted Lady
Aenetus ligniveren	Splendid Ghost Moth
Psilogramma menephron	Australian privet Hawk Moth

Scientific Name	Common Name
Coequosa trangularis	Geebung Hawk Moth
Apis mellifera	Honey Bee
Trigona carbonifera	Native Stingless Bee
Nasuititermes walkeri	Nigger Head Termite
Camonotus consobrinus	Sugar Ant
Anonychomyrma nitidiceps, (Syn iridomyrmex nitidiceps)	
Myrmecia nigrocincta	Jumping Ant
Myrmecia forficata	Bull Ant
Rhytidoponera "metallica"	Greenhead Ant
Leptomyrmex erythrocephalus	Spider Ant
Netelia producta	Orange Caterpillar parasite
Echthromorpha intricatoria	Cream Spotted Ichneumon
Perga affinis affinis	Steelblue Sawfly
Cryptocheilus sp.	Spider-killing Wasp
Exeirus lateritius	Cicada-killer Wasp
Sphecius pectoralis	Cicada-killer Wasp
Diamma bicolor	Metallic Blue Wasp

Appendix E - Summary of the funding & reports for the habitat restoration project to date.

Funding

Funding Organisation	Year	Amount
NSW Department of Planning and Environment	1987 – 1990	0
Community donations via Ku-ring-gai Bat Conservation Society Inc.	1987 – 1990	$ 19,837
	1991 – 1997	$ 58,415
Ku-ring-gai Municipal Council	1987 – 1990	$ 28,000
	1991- 1993	$ 21,000
	1994 - 1998	$ 55,000
NSW Environmental Restoration and Rehabilitation Trust	1992 - 1997	$ 120,000
Commonwealth Government Natural Heritage Trust Grant	1997 - 1998	$ 16,000
	1998 – 1999	$ 30,000
Volunteer bush regeneration (calculated @ $10/hr)	1987- 1990	
	1991 - 1993	
	1994 - 1998	$ 30,000

Reports on Habitat Restoration Project

The following reports were provided to the funding authorities - The Heritage Branch of NSW Department of Planning and NSW Environmental Trusts. Copies were also supplied to Ku-ring-gai Municipal Council staff and library, NPWS head office library and Lane Cove National Park, NSW Nature Conservation Council of NSW, Bush Management School at Ryde TAFE

First Four Year of the Habitat Restoration Project at the Ku-ring-gai Bat Colony, Gordon, NSW Australia March 1987 to March 1991 by N. Pallin, E. Hartnell and G. Limburg

Ku-ring-gai Flying-fox Habitat Restoration Project 1991, M Schofield and G Limburg (Indigenous Regeneration Co)(contains details of Area H on north side of Stoney Creek)

Report on Habitat Restoration Project in Ku-ring-gai Flying Fox Reserve Phase 2 1992 - 1993 By Ku-ring-gai Bat Colony Committee Inc. and Indigenous Regeneration Co (contains comprehensive fauna and flora lists by Gordon Limburg)

Habitat Restoration Project, Ku-ring-gai Flying-fox Reserve, Gordon continuation Phase 2 1994 -1995 by Ku-ring-gai Bat Colony Committee Inc. and Indigenous Regeneration Co.

Habitat Restoration Project in Ku-ring-gai Flying-fox Reserve, Gordon completion Phase 2 1996 - 1997 by KBCC and Indigenous Regeneration Co.

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