

3 RESULTS AND DISCUSSION

3.1 OVERVIEW

DEC established and surveyed 47 systematic fauna survey sites within Lane Cove NP and adjacent public lands between February and May 2004. These sites cover the range of dominant habitats and landscapes present within the park. During the surveys, a number of records collected by park rangers and field officers, volunteers and neighbours were collated and added to the Atlas of NSW Wildlife.

One hundred and six vertebrate fauna species were observed during the survey period, including seventeen species that had not previously been recorded within the park (fourteen native and three introduced species). Over 670 records were collected during the surveys, including 345 within the boundaries of the park and 331 in neighbouring lands, thereby vastly increasing the knowledge of fauna distribution, abundance and habitat use in the area.

Four species that are listed as threatened on the NSW Threatened Species Conservation Act (1995) (NSW TSC Act) were recorded during the surveys. These were the Powerful Owl, Red-crowned Toadlet, Eastern Bent-wing Bat (*Miniopterus schreibersii oceanensis*) and Grey-headed Flying-fox (*Pteropus poliocephalus*). The latter of these species is also listed as Vulnerable on the commonwealth Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act). In addition, the Gang-gang Cockatoo (*Callocephalon fimbriatum*) was recorded during the surveys, which in the north of the study area are part of the Hornsby and Ku-ring-gai Council Local Government Area population, which is listed as an endangered population on the NSW TSC Act.

Ten introduced species, including four birds and six ground mammals, were recorded during the survey, of which three (Cat (*Felis catus*), Fox and Rabbit (*Oryctolagus cuniculus*)) are listed as a Key Threatening Process under the NSW TSC Act and the EPBC Act.

A complete list of fauna species, as recorded on the Atlas of NSW Wildlife, within 200 metres of Lane Cove NP, is presented in Appendix B. As described above, the species list was refined in order to increase its accuracy and avoid misinterpretation of the data. Initially the list comprised 301 species, however, this has been reduced to a considerably more accurate 156 species. In total, nineteen threatened and fifteen introduced species have been recorded within the study area by various observers since 1950, as will be discussed further below.

An incidental record was also made of the Common Jollytail (*Galaxias maculatus*) in the unnamed creek below Turramurra High School. This native fish is very common in the coastal drainages of south eastern Australia and descends from freshwater to estuaries to breed, hence tolerating a wide range of salinities (Allen *et al.* 2002). Other native fish may also be present, but systematic survey would be required to compile a complete list. The presence of this fish in the waterway has positive implications for water quality in that area.

The results of the vertebrate fauna survey indicate that Lane Cove NP supports a diverse mix of fauna species and plays an integral role in the survival of a number of native fauna species within the region.

3.2 NATIVE BIRDS

Eighteen systematic diurnal bird surveys were conducted in the study area during February and March 2004, generating 238 records of 40 native species. The species most often recorded was the Rainbow Lorikeet (*Trichoglossus haematodus*), followed by the Australian Raven (*Corvus coronoides*), Pied Currawong (*Strepera graculina*), and Sulphur-crested Cockatoo (*Cacatua galerita*). This is typical of many areas that have been disturbed, with large dominating species forming the core of the species assemblage. However, Lane Cove NP retains many species that only occur if a suitable intact shrub layer is still present, providing habitat and protection from the aggressive species. Examples of such species include the White-browed Scrubwren (*Sericornis frontalis*), Variegated Fairy-wren (*Malurus lamberti*) and Brown Thornbill (*Acanthiza pusilla*), which are all typical of undisturbed environments in the Sydney Basin. The continued presence of the White-throated Treecreeper (*Cormobates leucophaeus*) is also encouraging, as this is a species that often disappears from isolated fragments of bushland. Three new species were added to the park record list during the survey: Little Lorikeet (*Glossopsitta pusilla*), White-bellied Sea-eagle (*Haliaeetus leucogaster*) and Silver Gull (*Larus novaehollandiae*).

In addition to the above, fifteen species were observed incidentally during the study period. These included birds of prey, which are not commonly recorded during systematic sampling, and waterbirds, whose habitats were not targeted systematically during the survey. The Lane Cove River provides habitat for numerous waterbirds, including Pacific Black Duck (*Anas superciliosa*), Australian Wood Duck (*Chenonetta jubata*) and Dusky Moorhen (*Gallinula tenebrosa*). Four birds of prey were observed within the park during the surveys, including the Brown Goshawk (*Accipiter fasciatus*), Pacific Baza (*Aviceda subcristata*), Peregrine Falcon (*Falco peregrinus*) and White-bellied Sea-eagle. The majestic White-bellied Sea-eagle was seen soaring over the top of the tree canopy at Sugarloaf Hill, and is likely to use the estuarine habitats in the park regularly. The Peregrine



Plate 1: Gang-gang Cockatoo ©Kylie Madden/DEC

Falcon is thought to be in decline in various parts of the nation (Barrett *et al.* 2003), thus protection of their habitat within Lane Cove NP and the surrounding region is important. Birds of prey are wide ranging, but Lane Cove NP is likely to form an important component of remnant bushland in their home range. The Gang-gang Cockatoo (Plate 1) was also recorded during the surveys, which in the north of the study area are part of the Hornsby and Ku-ring-gai Council Local Government Area population, listed as an endangered population on the NSW TSC Act.

Overall, 143 species of birds have been recorded within Lane Cove NP since 1950 (DEC 2004aA). This is an incredibly high number given the level of urbanisation surrounding the park, and compares favourably with many larger sandstone reserves that do not experience such intense urban pressures. The composition of bird species is a reflection of the diversity of habitats present within the study area, and includes species typical of shrubby sandstone woodland and open forest (such as White-browed Scrubwren), wet sclerophyll forest and simple rainforest (such as Brown Gerygone (*Gerygone mouki*)), riparian strips (such as Pacific Black Duck and Australian Wood Duck) and estuarine habitats, and species characteristic of disturbed environments (such as Noisy Miner (*Manorina melanocephala*) and Rainbow Lorikeet).

Three species of nocturnal bird were recorded during the surveys, including the Powerful Owl, Southern Boobook (*Ninox boobook*) and Tawny Frogmouth (*Podargus strigoides*). The former of these species is considered vulnerable in NSW, and will be discussed further in Section 5 below. The latter two species are widespread within the Sydney Basin Bioregion. The Tawny Frogmouth is commonly recorded in urban environments, as is the Southern Boobook to a lesser extent, depending on the availability of prey species (including insects and introduced rodents) and suitable roosting sites.

3.3 ARBOREAL MAMMALS

Four species of arboreal mammal were detected during the surveys. The most notable of these is the Greater Glider (*Petauroides volans*) which has not previously been recorded within the study area. Unfortunately, both the records of Greater Glider were collected by remains present in introduced predator scats (Dog and Dog/Fox). This lends some doubt as to the origin of the record, as it cannot be ascertained where the predator consumed the prey, particularly if it was a domestic Dog. Previous research has suggested, however, that in the wild, predators defecate within an average of two kilometres of where the prey item was consumed (Lunney *et al.* 2002). The closest known established population of the species occurs in Bouddi National Park, on the southern point of Brisbane Water, with a few scattered records in the north of Ku-ring-gai Chase NP (DEC 2004aA). Greater Gliders are easily detected by systematic spotlighting surveys, due to their extremely bright eye-shine. Given that the Gliders were not detected during any of the sixteen spotlighting surveys, they can be assumed to occur within the park only at very low density, if at all. The recent fires within the park are likely to have had a significant impact on the species, particularly given the isolated nature of the study area. A recent study on the Woronora Plateau found Greater Gliders to be significantly negatively effected by high intensity fire in Eucalypt forest, located at only one site out of ten two years after the fire, whereas prior to the fire an average of one individual was found for every spotlighting site (DEC 2004b). Continued predation on the species by introduced predators, in combination with other pressures, may push the species to extinction within the study area.

The most commonly recorded arboreal mammal during the surveys was the Common Ringtail Possum (*Pseudocheirus peregrinus*), which is present at high densities in the park. Nests (dreys) were observed in a number of locations, particularly within the sandstone woodlands with a dense tall shrub layer. The high density of Ringtails in turn provides a strong prey base for Powerful Owls in the area, as discussed in Section 5 below. Common Brushtail Possums (*Trichosurus vulpecula*) are also widespread in the park, captured in three cage traps and detected during spotlighting, nocturnal call playback surveys and in predator scats. The Sugar Glider (*Petaurus breviceps*) is also widespread, though occurring only in relatively low numbers.

3.4 BATS

Seven species of bat were recorded during the systematic surveys of Lane Cove NP and adjoining council reserves. The surveys have greatly improved the knowledge of microbats within the reserve, detecting four new species and providing over fifty new location records. Six of the species recorded are Microchiropteran bats, which are small flying mammals that feed on insects and use echo-location to forage and navigate. Two systematic techniques, harp trapping and ultrasound call detection, were used to identify these species. The harp trapping results were disappointing, as the erection of eleven harp traps (each left in place for two nights) captured only



Plate 2: Gould's Wattled Bat ©Ray Williams

three individuals of two species, the Little Forest Bat (*Vespedelus vulturnus*) and Gould's Wattled Bat (*Chalinolobus gouldii*, Plate 2). These are tree-roosting species, sheltering in hollows and under bark, that forage below the tree canopy (Churchill 1998). The former species is one of the smallest mammals in the world, weighing just four grams. It is commonly observed flying at dusk chasing insects that gather around street lights. The harp trapping results represent a low trapping rate for this group of bats, suggesting that low-flying microbats are present only at low abundance in the reserve, and may still be recovering from recent fires (A. White pers. comm.).

Use of ultrasound recording devices (Anabat) proved more successful, detecting an additional four species. One of these, the Common (Eastern) Bent-wing Bat, is listed as Vulnerable on the NSW TSC Act, 1997 and is discussed in more detail in Section 5 of this report. The other species recorded were Chocolate Wattle Bat (*Chalinolobus morio*), undescribed Mastiff Bat (*Mormopterus* sp. 1) and White-striped Mastiff-bat (*Nyctinomus australis*). Ultrasound call recordings were dominated by calls emitted by the Gould's Wattled Bat. This suggests that this species is the most common microbat in the study area, given that it was also recorded at the most number of sites and in the greatest number of vegetation communities.

The Grey-headed Flying-fox (*Pteropus poliocephalus*), listed as vulnerable on both the TSC Act and EPBC Act, is well known within the reserve and from camps at Gordon and Ku-ring-gai. The species will be discussed in greater detail in Section 5.

3.5 NATIVE GROUND MAMMALS

Four species of native ground mammal were recorded during the surveys. Two of these, the Bush Rat (*Rattus fuscipes*, Plate 3) and Brown Antechinus (*Antechinus stuartii*) have not previously been recorded on the Atlas of NSW Wildlife within the study area. A total of 280 Elliott trap nights were undertaken during the survey period, during which only one individual of each of the above species were captured. This indicates that though the species are present, they occur only at low abundance. In contrast, the introduced Black Rat (*Rattus rattus*) was captured sixteen times and the introduced House Mouse (*Mus musculus*) four times, though some of these are likely to be recaptures.



Plate 3: Bush Rat ©Narawan Williams

The presence of Long-nosed Bandicoot (*Perameles nasuta*) in the park holds conservation significance, as this species has largely disappeared from more densely populated parts of the Sydney Metropolitan area, between Sutherland and Brookvale (DEC 2004a). A well-known population of the species also occurs at North Head (DEC 2004a). These animals are notoriously trap shy and the 160 cage trapping nights failed to capture any Bandicoots. Evidence of their presence was clear however, with tracks, scratching and diggings located around a number of the traps. An individual was spotted during a systematic spotlighting survey, and the species is regularly seen by rangers that live in the park (A. Duffy pers. comm.).

The Swamp Wallaby (*Wallabia bicolor*) is well known within Lane Cove NP, frequently observed by rangers, field officers and park visitors in the vicinity of the depot behind Bradfield Avenue. A single Swamp Wallaby was observed in this location during the current surveys. It is likely that only one or two individuals of this species remain within the park, however, with the same individuals being repeatedly recorded. Nevertheless these are important records, as this is one of the closest known locations of the species to the Sydney CBD. Swamp Wallabies would once have been widespread within the area, but have suffered greatly due to habitat fragmentation and road mortality. The species is still commonly observed throughout Ku-ring-gai chase NP (DEC 2004a).

3.6 REPTILES

Eight species of reptile were detected during the fifteen systematic reptile surveys undertaken between February and March 2004. The most common of these was the Dark-flecked Garden Sunskink (*Lampropholis delicata*, recorded at fourteen sites), followed by the Eastern Water-skink (*Eulamprus quoyii*, recorded at ten sites). Two reptile species were detected during the surveys that had not previously been recorded within the study area: Cream-striped Shining-skink (*Cryptoblepharus virgatus*) and Yellow-faced Whipsnake (*Demansia psammophis*). The latter species is uncommon within remnant bushland in the more densely populated parts of Sydney (DEC 2004a), and the location of the species within the park is therefore an exciting find. The species is regularly observed within Ku-ring-gai Chase NP (DEC 2004a).

In addition to the above, a further six species were recorded during the survey period using other systematic techniques and on an opportunistic basis (Appendix B). In total, 23 reptile species are recorded within 200 metres of Lane Cove NP on the NSW Wildlife Atlas (Appendix B). The diversity of landscapes within the park provides a variety of habitats for reptiles that facilitates the occurrence of this diverse mix of species. Habitats are provided for litter-dwelling species (such as Dark-flecked Garden Sunskink), species that rely on sandstone outcrops (Broad-tailed Gecko (*Phyllurus platurus*)), fossorial species (such as the Yellow-bellied Three-toed Skink (*Saiphos equalis*)) and riparian species (such as the Eastern Water Dragon (*Physignathus lesueurii*)). The park is large enough to support some wide-ranging species such as the Lace Monitor (*Varanus varius*), which is increasingly rare within the dense urban environment of Sydney. Lane Cove NP supports the only recent records of this species between the Georges River, Blacktown and Belrose (DEC 2004a).

3.7 FROGS

Systematic frog surveys were not undertaken due to the prolonged period of drought leading up to the survey period. However, a period of heavy rain during the last week of February provided an opportunity to undertake targeted surveys for Red-crowned Toadlet, and to collect opportunistic records of other frog species. The results of the Red-crowned Toadlet surveys are discussed in Section 5 below. An example of the sandstone quarries within which many of the toadlets were located is shown in Plate 4.



Plate 4: Pool at base of sandstone cutting where Red-crowned Toadlets were heard calling ©Elizabeth Magarey/DEC

Five other species of frog were observed during the surveys, including three ground frogs and two tree frogs. The Common Eastern Froglet (*Crinia signifera*) and Striped Marsh Frog (*Limnodynastes peronii*) are common and widespread within the greater Sydney Metropolitan area, capable of inhabiting highly disturbed waterbodies. The Green Stream Frog (*Litoria phyllochroa*), however, tends to disappear from heavily disturbed environments. Their presence within the upper Lane Cove River, below George Christie Playing Field, indicates that areas of quality habitat are retained within the park, and that water quality is reasonable within this part of the river. This is the first time that the species has been recorded within the study area. Smooth Toadlet (*Uperoleia laevisgata*) and Keferstein's Tree Frog (*Litoria dentata*) are capable of inhabiting altered environments, but are generally less common within the Sydney suburbs. Tadpoles of the latter species were located on Sugarloaf Hill during the surveys, indicating that breeding occurs within the study area.

3.8 INTRODUCED SPECIES

Six species of introduced mammal were recorded during the surveys (Appendix B). The most commonly recorded of these was the Black Rat, followed by the Fox. The latter species was not directly observed, but recorded in the form of scats four times within park boundary and five times in adjacent land (Map4). Dogs were detected on eight occasions during the surveys, five times within the National Park boundary, and three times on adjacent public land (Map 4). Remains of native fauna were detected within the scats of both of these latter species, as discussed in Section 3.9. The locations of records of introduced species on the Atlas of NSW Wildlife within 200 metres of Lane Cove NP are presented in Maps 3 and 4.

Three of the introduced species detected (Cat, Fox and Rabbit) are listed as a Key Threatening Process under the NSW TSC Act and the commonwealth EPBC Act and are likely to be having a significant negative impact on the native terrestrial flora and fauna of the park. The threats posed to native fauna by each animal are summarised as follows:

- Feral Rabbits impact negatively on indigenous species via competition for resources, alteration of the structure and composition of vegetation, and land degradation (NSW Scientific Committee 2002).
- Predation by Foxes is a major threat to the survival of native Australian fauna, with non-flying mammals weighing between 35 and 5500 grams and ground-nesting birds at greatest risk. Fox predation has been implicated in limiting habitat choice and population size of a number of medium-sized marsupials (NSW Scientific Committee 1998). The fact that Foxes prey upon native animals within the park is evident from scat analysis, as summarised in section 3.9.
- Feral Cats threaten native fauna by direct predation. Cats are carnivorous and capable of killing vertebrates up to three kilograms. Preference is shown for mammals weighing less than 220 grams and birds less than 200 grams, but reptiles, and amphibians are also eaten (NSW Scientific Committee 2000).

Clearly the potential for introduced predators to significantly impact on native fauna in Lane Cove NP and surrounds is of conservation concern. Comprehensive targeted survey of the species, assessment of their impacts, followed by appropriate management actions and raising of public awareness, should remain a high priority for park management.

Three introduced bird species (Red-whiskered Bulbul (*Pycnonotus jocosus*), Spotted Turtle-dove (*Streptopelia chinensis*) and Common Myna (*Acridotheres tristis*)) were recorded during systematic surveys. Another species, Little Corella (*Cacatua sanguinea*), which has established a feral population from escaped aviary birds was also recorded. All these species are typical of Sydney urban environments. The presence of a Pacific Black Duck/Mallard hybrid (*Anas superciliosa* x *platyrhynchos*) is of concern, because this is a species that is likely to be fed by visitors, and has the potential to cause the local population of native ducks to disappear.

3.9 PREDATOR SCAT AND PELLET ANALYSIS

Analysis of prey remains in predator scats is a valuable method of collecting information about prey species that are cryptic, and yields interesting information about the vertebrate prey composition of the predator's diet in a given area.

The most interesting finding obtained from scat analysis during the current surveys is the identification of Greater Glider hair in two predator scats. One scat was collected on the slope behind Christie Park, which was positively identified to have come from a Dog. The other scat was collected Pennant Hills Park, behind the sports complex, but is not known whether to have come from a Dog or a Fox. Unfortunately, the origin of the prey species cannot be ascertained, as discussed in Section 3.3.

Eight of the nine Fox scats that were analysed during the surveys contained native arboreal mammal remains, including Common Ringtail and Common Brushtail Possum. The ninth scat contained fur of the introduced Rabbit.

These results prove that Domestic Dogs and Foxes impact on native fauna within the reserve, and that management programs to manage these introduced species should continue to be a high priority.



