Travers environmental

Target Long-nosed Bandicoot Survey

ALLIED FLOUR MILLS SITE

2-32 SMITH STREET &

16-32 EDWARD STREET,
SUMMER HILL

JANUARY 2009
(REF: 8019)

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TARGET LONG-NOSED BANDICOOT SURVEY

Allied Flour Mills Site
2-32 Smith Street & 16-32 Edward Street, Summer Hill

JANUARY 2009

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Attachment

Leary, T., Kwok, A., Ibbetson, P. (Undated) - *Yuppie Bandicoots of the inner West – in Hiding or Urban Renewal?* Parks and Wildlife Division – Department of Environment and Climate Change, NSW.

ADDENDUM REPORT
Target Survey for Long-nosed Bandicoot – Allied Flour Mill, Summer Hill.

1 Introduction

Travers environmental has been engaged by *EG Funds Management* to carry out a Flora and Fauna Assessment within 2-32 Smith Street & 16-32 Edward Street, Summer Hill, hereafter referred to as the subject site. The proposed development will see demolition of existing Flour Mill buildings and structures on the site and redevelopment of the site for mixed use purposes.

Photo 1 - Long-nosed Bandicoot (*Parameles nasuta*) - PWD (Harbour North) sourced from Leary *etal.* (2008)

As a result of a briefing and consultation with DECC (Contact officer Mr Ray Giddens), target survey has been undertaken within the subject site for Long-nosed Bandicoots which have been recorded within the Dulwich Hill, Lewisham, and Petersham area. This Long-nosed Bandicoot (*Parameles nasuta*) population of inner Western Sydney has a preliminary listing as an endangered population under the Threatened Species Conservation Act 1995 (NSW). The full extent of this population is yet to be determined and whether the population is a remnant or a result of recent dispersal.

Confirmed records from this population occur within 1km to the north-east, south-east and south of the subject site. This population appears to be utilising urban landscapes for foraging areas and, uncharacteristically, using brick and cement structures (similar to that provided by the buildings of the subject site) for shelters. Although there is no supporting evidence, the recorded locations are in close proximity to the rail corridors which tends to suggest that the Long-nosed Bandicoot may be utilising infrastructure corridors for movement (Leary et al, 2008).

Whilst there is no physical evidence demonstrating a preferred movement corridor, there is limited radio tracking evidence of a female Long-nosed Bandicoot using remnant gardens and the urban streetscape for foraging and movement. Radio Tracking DECC found the female Long-nosed Bandicoot some 420 m from its den site which was found under brick steps that contained half brick gap and a void in which the nest was found. The poster paper (section 2 of report) identifies the preferred habitat in an urban landscape.

Given the close proximity of Long-nosed Bandicoot records in the surrounding suburbs (within 1km of the subject site), with the presence of the water canal and the rail corridor along the eastern perimeter of the subject site, it was considered appropriate to undertake target survey within the Allied Mills Flour Mill site.

This report summarises the findings of the target Long-nosed Bandicoot survey and a conclusion is made as to the presence or absence of this species and whether the proposed redevelopment of the site will result in a significant impact.

2 Summary of Existing Documentation

The following paragraphs summarise the outcomes of a poster paper prepared by Leary T. et al (undated publication but assumed to be 2008) as published by DECC on the internet titled: - "*Yuppie Bandicoots of the Inner West – Hiding or Urban Renewal?"* This poster paper represents the only publicly available written summary of the Long-nosed bandicoot survey conducted by DECC which identifies the population within the Dulwich Hill, Lewisham and Petersham suburban area. The entire poster paper is attached to this addendum report.

<u>Summary of the Poster Paper</u>

The Long-nosed Bandicoot *(Parameles nasuta)*, although the most common and widespread Bandicoot in eastern Australia was thought to have disappeared from inner-western Sydney in the late 1950's. In 2002 one adult male was trapped and evidence of another in Dulwich Hill sparked further surveys and requests for public information turning up little information.

Later, in November 2006 a Bandicoot was killed by a car in Dulwich Hill with other bodies turning up in quick succession which triggered renewed efforts of survey and media releases. Three of the dead animals were killed by cars, one by a dog in a backyard and two probably by foxes. Dead individuals and public sightings were mapped.

Figure 1 - Recorded locations for Long-nosed Bandicoot – Source Leary T. *et al* (undated publication but assumed to be 2008).

<u>Urban park survey for diggings</u>

In September 2007, 88 parks were visited from the Cooks River to West Concord based on mapped locations. 50 of these were searched on foot for signs of diggings given the presence for potential refuge/foraging areas. It was found that 12 parks had "possible" bandicoot diggings given that Pied Currawongs were observed to be making similar conical diggings during surveys.

<u>Pilot Radio-tracking Study</u>

Studies found a small population of Bandicoots on a church property at Lewisham. Two adult females from this population were trapped and fitted with tail-mounted radio-transmitters to determine where they were foraging and nesting. Home ranges were calculated along with core usage areas.

The nest of Female 1 was underneath a concrete staircase below an old hospital building. A small crack approximately the size of half a brick led into a large area below the steps with

the nest located inside a second entry inside the bottom step. The nest was a depression lined with shreds of vegetation. She foraged in garden beds and lawns and was recorded crossing a road. Several days she was tracked 420m away on the other side of the railway line.

Female 2 was tracked intermittently for a month spending most of the time foraging on the church property making three excursions across adjacent streets to backyards of different houses and a park.

Summary of Bandicoot Findings

- They like old buildings in need of renovation for nest sites.
- They appear to be foraging mainly in backyard gardens.
- Urban parks and the rail corridor may not be as important for nesting and foraging as first thought.
- The three animals caught were of good weight and condition.
- There can be high levels of mortality.
- They are active at or shortly after dark indicating that there is no evidence to suggest they are avoiding busy traffic periods.
- Short or no foraging over some nights may be a predator avoidance strategy.
- The church property at Lewisham provides a safe haven within a busy urban environment.

What is Still not Known

- If the inner west Bandicoots are a population or animals dispersing from elsewhere.
- If it is a population, are they a remnant population or a result of dispersal to an isolated locality?
- Size of the population and full extent of distribution.
- Is there a focal area?
- How to determine the population size given locations are predominantly on private land.
- If the vegetated railway corridor plays a role.

3 Target Survey Effort with Subject Site

Whilst the site was considered to provide marginal habitat for Long-nosed Bandicoot, the following survey was undertaken to confirm the presence or absence of this species within the subject site.

The site was assessed for the presence of any scats, markings, diggings, runways and scratches during visits. Any scats or pellets not readily identifiable are normally collected and sent to Barbara Triggs for identification of contents, hair or bone fragments. Habitat was also assessed to determine the likelihood of Long-nosed Bandicoots and threatened native species of fauna occurring within the subject site.

Hair tubes were used to target the presence of Long-nosed Bandicoot (*Parameles nasuta).* Three (3) hair tube transect lines each with six hair tubes were placed in areas of suitable passage from 3 October to 13 October 2008, amounting to 180 terrestrial hair tube nights. Transect locations are shown on Figure 1 of the Flora and Fauna Assessment Report. One transect was placed within the rail corridor to the east of the subject site to determine presence along the outer fence line. The separation distance varied between 10m and 20m.

The tubes were baited with a mixture of rolled oats, honey peanut butter and black truffle oil. Double-sided tape was attached around the entry of tubes so hair samples of animals entering the tube were collected. Hair tube transects within the subject site were located near to the rail corridor within any existing areas providing surface vegetation or refuse hides. The southern line was placed along old existing building structures with characteristics similar to those utilised by the local Bandicoot population. Hair samples collected were sent to noted expert Barbara Triggs for identification.

Alternative survey methods were considered such as cage Trapping and movement sensor cameras baited with Truffle Oil. However, as there was no evidence of diggings on site and the use of cameras was not practical, hair tube transects baited with truffle oil were considered to be a more effective survey method to determine presence of absence of Long-nosed Bandicoot onsite. As the hair tubes can be left onsite for an extended period, they are more likely to pick up presence or absence of this species.

4 Target Survey Results

A thorough search of the Allied Mills site revealed no evidence of Long-nosed Bandicoot diggings. There were no recorded samples of bandicoot hair from hair tube lines. The surrounding fence line was found to be in good condition with little to no opportunity for passage. The existing canal is of a profile that would not allow any bandicoot passage to and from the site. As a result of the target survey and inspection of surrounding barriers, it is considered unlikely that the subject site is utilised by Long-nosed Bandicoot.

4.1 Long-nosed Bandicoot Habitat Assessment

Whilst the records are generally located around the rail corridor and water canals in the local area there is no evidence as yet to confirm use of such infrastructure by Long-nosed Bandicoots for movement (DECC, Leary et al 2008). Tracking of one female Long-nosed Bandicoot suggests that individuals move throughout the urban landscape and over roads to access suitable foraging gardens. If the Long-nosed Bandicoot can access a garden, backyard, park or infrastructure corridor with suitable foraging habitat, then we have assumed that there is potential habitat for this species.

It is considered there is only sub-optimal habitat for the Long-nosed Bandicoot (*Parameles nasuta*) within the subject site. Cement foundations and other structures to support likely shelters and nesting behaviour generally have open and/or trafficable surrounds with little protection from sight.

Photo 1: *Canal showing almost vertical sides within a steeply cut channel.*

The limited foraging areas which occur within the northern and southern limits of the site are generally sparse and/or difficult to access. Such areas may support some invertebrate, fungi and other feeding opportunities; however these areas provided no evidence of foraging such as characteristic

diggings during field assessments.

The stormwater canal and the adjoining rail corridor were assessed for suitable habitat. The steeply sided open stormwater canal runs through the north-eastern portion of the subject site adjacent to landscaped and unmanaged areas and continues to the south below ground. There is no likely entrance to the site via usage of this canal given the steep concrete sides which provide very limited opportunity for animals to gain a foot hold. Any Long-nosed Bandicoot entering the canal will have to travel the entire length of the canal to find a suitable exit, which do not appear to exist within the subject site. There is no suitable foraging or burrowing habitat of any kind in the canal within the subject site.

The chain mesh fencing observed between the site and the rail corridor is well maintained with only one observed opportunity for possible underpass in an open cemented area. Large buildings make up the remaining portion of the central eastern property.

The only foraging areas within the rail corridor next to the site are on the eastern side of the railway lines and the furthest ends of the site. The western side of the rail corridor along the subject site boundary is concrete, bitumen or gravel, unsuitable for foraging or shelter. There is no evidence of diggings along this fence or other fencing nearer to the more appropriate northern and southern foraging areas.

There was no evidence of diggings around structures likely to support shelters for the Long-nosed Bandicoot. Hair tubes provided no recordings of terrestrial mammal activity in transect locations within the site grounds. Whilst rodents have been observed inside the flour storage buildings by workers, these animals are likely to be introduced Black Rats (*Rattus rattus*) or Brown Rats (*Rattus norvegicus*) which is supported by the dominance of rat hairs within hair samples collected from the hair tubes.

4.2 Potential for Improved Environmental Outcomes

Whilst survey has not identified the presence of Long-nosed bandiccot within the subject site, the sites grounds are potential foraging grounds for this species. Given the importance of this population, it is recommended that future landscaping within the site provide suitable foraging areas for the Long-nosed Bandicoot. Consequently, the location and design of beds should generally be accessible at ground level and incorporate suitable shrub type vegetation that can protect and shelter bandicoots.

5 Conclusion & Recommendations

There is a preliminary listing for the endangered fauna population Long-nosed Bandicoot (*Parameles nasuta*) within the Ashfield and Marrickville LGAs. The subject site contains limited and sub-optimal habitat for this population which is generally well fenced and difficult to access. Based on survey conducted to date, there was no evidence to indicate the presence of this species within the site's grounds.

The 7-part test assessment within the Flora and Fauna Assessment Report concluded that the proposal is not likely to have an adverse effect on the life cycle of the Long-nosed Bandicoot that constitute the endangered population in Inner-Western Sydney such that a viable local population of this species is likely to be placed at risk of extinction.

Given the close proximity of the site to recorded locations of Long-nosed Bandicoot, the landscape design should consider the provision of native landscape beds that can contribute

to foraging areas suitable for this species. The proposed fencing should, where possible, allow for movement and access to the site for this species.

ATTACHMENT

Leary, T., Kwok, A., & Ibbetson, P. *Yuppie Bandicoots of the inner West – in Hiding or Urban Renewal?* Parks and Wildlife Division – Department of Environment and Climate Change, NSW.

Yuppie bandicoots of the inner west – in hiding or urban renewal?

Photo: PWD (Harbour North)

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Photo: PWD (Harbour North)

INTRODUCTION

** Yes, this seems like a long story - but believe us when we say it is worth reading!*

The Long-nosed Bandicoot (LNB) *Perameles nasuta* (the most common and widespread bandicoot in eastern Australia), was thought to have disappeared from inner western Sydney in the late 1950s. Populations still occur in the leafy suburbs north of the harbour & to the south in the Royal National Park, but inner western Sydney has virtually no remnant vegetation except for a few pockets along the Cooks River & the rail corridors. Bandicoots also appear to have disappeared from the Cumberland Plain. During four years of intensive fauna survey in western Sydney NPWS reserves we only recorded LNB's twice (1 trapped & 1 spotlighted), both from Agnes Banks Nature Reserve, which is not far from a known population at Yarramundi.

It came as a huge surprise when in 2002 we trapped an adult male LNB & found evidence of at least one other animal in an urban backyard in the suburb of Dulwich Hill, just off one of Sydney's major roads……And so began our quest to try to determine whether there really was a remnant bandicoot population in the suburbs of inner western Sydney. In 2003 we trapped & hair-tubed along the rail corridor at Dulwich Hill but found nothing but Black Rats *Rattus rattus* & House Mice *Mus musculus*. We also issued a media release asking for information from the public. This turned up lots of rat burrows & a few possible bandicoot diggings, but nothing terribly convincing. Frustratingly, nothing happened until November 2006, when a bandicoot was killed by a car in Dulwich Hill…. Several more bodies also turned up in quick succession. This poster presents our efforts to try to determine whether or not there really is a remnant population of Long-nosed Bandicoots in the inner west of Sydney.

METHODS, RESULTS AND DISCUSSION

Bodies & reports from the public

We mapped the locations of dead LNBs & the live animals that have been trapped, as well as the reports of bandicoots from local residents in the inner west in response to another media release in August 2007 (Figures 1 & 2). Many of the public sightings are still unconfirmed & many of the reports that we have checked have turned out to be rat holes.

Three of the dead animals were killed by cars, one by a dog in a backyard, & two probably by foxes. Excluding the outliers, the majority of the reports/signs are in an area approximately 5km long by 2km wide (Figure 2). There is no clear pattern to these sightings, though most are south of Parramatta Rd. Most of the sightings are within 700m of the railway corridor & water canal, however, there is little evidence at present to indicate any sort of reliance on this corridor.

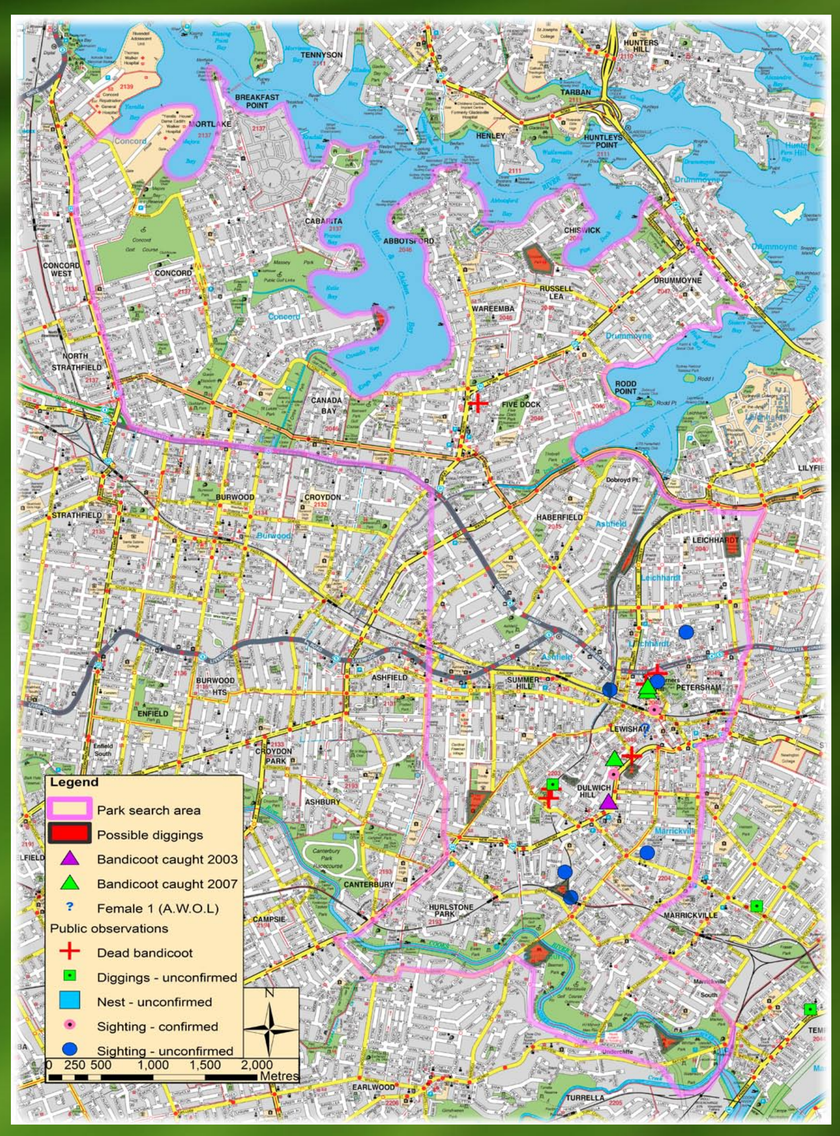

Figure 1: Inner west Sydney, showing search area for bandicoot diggings, as well as bodies and other reports.

Urban park survey for diggings

In September 2007 we searched every local park & recreational area from the Cooks River to West Concord (see Figure 1). The north-western search boundary was chosen because we had an unconfirmed report of a small population of LNBs at the repatriation hospital on Major's / Yaralla Bay in the 1990's (J. Sanders, DECC, pers. comm. 2007). We reasoned that if bandicoots had dispersed from that area, these parks, the water canal & the railway corridor would make a likely dispersal route. The southern boundary was chosen to incorporate another potential source area for animals – the Cooks River.

We visited 88 parks, & if they had potential refuge/foraging areas we searched them on foot (50) for signs of digging (see photo on right). On several occasions we observed Pied Currawongs *Strepera graculina* making "conical diggings" in loose mulch similar to a bandicoot. Consequently we cannot say with certainty that the diggings we observed are bandicoot diggings, & so have labelled these as "possible" bandicoot diggings (12 parks).

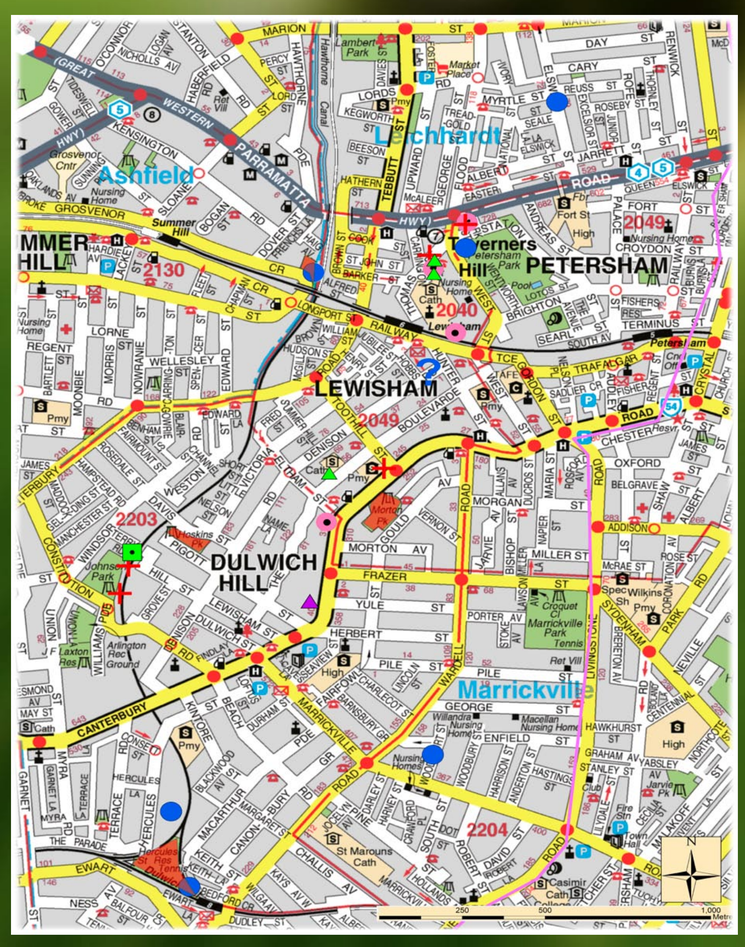

Figure 2: Finer scale location map showing majority of bandicoot sightings. For legend see Figure 1

Pilot radio-tracking study

When we became aware of a small population of between four & seven animals on a church property in Lewisham we fitted two adult females with tail-mounted radio transmitters (see photo below). We tracked these animals in late August/early September 2007 to gain insight into where they were nesting & foraging. We calculated the home range area for the single animal for which we had enough data using the minimum convex polygon (MCP) & fixed kernel method (KL). The 50%KL was defined as the core usage area.

Top left: *No no, we really did track a real bandicoot... we just don't have a transmitter photo!*

Above: *Betty Bandicoot's nest.*

Left: *An exceptionally neat bandicoot diggings They're not always this 'conical', and can be quite messy in loose soil.*

Female 1 – "Buggered off"

Nights 1 & 2

She remained in her nest, which was underneath an old hospital building on the church property. This nest was underneath a concrete staircase that led to the outside by a crack approximately the size of half a brick. Underneath the staircase was open to a space that could be entered by us, except for the lowest step, which only had a small opening (roughly 30cm in length). The step was essentially a hollow concrete rectangle – almost perfect protection for an animal. The nest itself was a shallow depression lined with shreds of vegetation.

Nights 3 to 5

On night 3 she foraged in the garden beds & lawns of the hospital & retirement village grounds until 4:00am, at which time we saw her cross the road & enter the garden of a Federation-aged house, under which she nested for the day. We did not radio-track for the next two nights.

Nights 6 to 9

We were unable to find her in this area on the 6th night. After 4 hours of systematically searching the streets we picked up her signal in the yard of another Federation terrace approximately 420m from her original location, & on the other side of the railway line (see Figure 2). She appeared to be nesting under this house, in a crawl space that we could not get to. While we were under the house the signal direction changed, indicating that she may have moved next door. Three days later the signal was still coming from this spot, & we concluded that she had either dropped her transmitter (which was pulsing at 60ppm rather than the 80ppm that it should be pulsing at if it had fallen off) &/or that this was some sort of weird signal matching our animal's frequency. We have been unable to find anything that might emit a signal at this frequency, & she did not return to her original trapped location with a working radio-transmitter.

Female 2 – "Betty bandicoot"

We tracked a second animal intermittently over a month, during which time she spent the majority of her time foraging in the church property. On several occasions she was active as early as 18:00, which was only half an hour after sunset. On some nights she either did not come out to forage or only foraged for an hour or two. This was often followed by a full night of foraging. She did however make three small excursions foraging in the backyards of different houses & a local park in adjacent streets (see Figure 3 below).

Most nights she nested under the same old hospital building as Female 1, but in a different section. However, she also nested under at least three other old buildings of either Federation or 1930s age. She had a home range of 2.6 ha & a core usage area of 0.11 ha.

Figure 3: Home range and core usage area for radiotracked Female 2 (Betty Bandicoot)

We retrieved her transmitter from the main nest once it had fallen off her tail. This nest was in a crawl space, which led to the outside world via a small hole in the brick-work. The crawl space was just like any other – dark & filled with loose dirt & old building material. Unlike the nesting area we identified for Female 1, this one was a relatively open crawl space, probably about 5m wide by 10m in length. The nest itself was underneath a piece of circular spongy-plastic-mesh, covered by loose dirt (see photo on left). One of the ends of the mesh was embedded into the soil, while the other end served as an entrance. A scrape was dug underneath the mesh – it was kidney-shaped & about 20cm at its deepest, 25-30cm at its longest & widest – the perfect fit for a bandicoot to snuggle up in!

What have we found out?

Habitat

We now know that, like yuppies, these bandicoots seem to like old buildings in need of renovation!!

1) They appear to be foraging mainly in backyard gardens. It appears that urban parks & the rail corridor might not be as important for nesting & foraging as we had first thought. Vegetation may be relatively unimportant as shelter, provided there are buildings that have external access (cracks & holes) to the space underneath.
2) It seems that bandicoots can find adequate food in urban backyards & aren't reliant soley on areas of remnant vegetation for foraging. The 3 animals that we have caught were heavy & in extremely good condition.

Mortality & behaviour

1) It is clear that there can be high levels of mortality (six bodies in nine months)!!
2) There is no evidence that the bandicoots are avoiding the busiest traffic periods to reduce the "risk of becoming roadkill" – both reports from residents & radio-tracking data show that the bandicoots are often active at or shortly after dusk.
3) The behaviour of "having a night in" or only foraging for a few hours per night may be a predator avoidance strategy. The inner west & the church property in particular have high numbers of cats, some of which are feral.
4) Overall, this particular church property probably represents a safe-haven in a hostile urban environment. The many garden beds provide food, there is minimal vehicular traffic & the bandicoots are able to move in relative safely, compared to nearby residential streets where the dangers of cars, dogs & cats abound.

What do we still not know?

The list of things that we don't know is massive! ☻ Some of the important questions include:

1) While growing evidence suggests there may be a population in the inner west, is this an actual population or just animals dispersing from elsewhere?
2) If it is a population, has it been hanging on for decades or are the animals just dispersing into a 'sink'? If they have been able to hang on in the inner west, why are they absent from the outer west of Sydney?
3) How large is this population? Also, we only have a little information as to how widely it may be dispersed.
4) Is there is a focal area for this population? Given that the majority of records are on private property we are running out of ideas on how we might obtain an estimate of the population size.
5) What is the role of the vegetated railway corridor, if any? For example, is it used for dispersal at a particular time of the year, or for foraging at all?

We will continue to try & answer some of these questions & if you have any information (including historical information) about bandicoots in the inner west, please contact the first author.

NSW National Parks and Wildlife Service

Department of Environment & Climate Change NSW

Legend

- Subject Site
- Fauna surveys for Birds and Reptiles (Main Locations)
- Anabat Station
- Landscaped Gardens and lawns
- Exotic Trees and Shrubs (High proportion of noxious and environmental weeds)
- Flora Quadrat (20 x 20m)
- Flora Random Meanders
- Hair Tube Transect
- Surface Canal
- Subterranean Canal

N

Flora and fauna survey locations are approximate and have not been fixed by land survey.

**Subject Site boundary subject to final survey*

Travers environmental

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0 10 20 30 40 50 m

1:1,500

Original plan produced in A3 colour

Drawing No.	8019	Date	
Drawn By	KF/TM/JP	24/10/08	
Amendment		Date	
A			
B			
C			

Figure 1 -

Fauna & Flora Survey

Edward Street & Smith Street, Summer Hill

Source: DLWC 1:25,000 Aerial Photograph,