



Endangered Long-nosed Bandicoot Population at North Head

The following information is provided to assist authors of Species Impact Statements, development and activity proponents, and determining and consent authorities, who are required to prepare or review assessments of likely impacts on threatened species pursuant to the provisions of the *Environmental Planning and Assessment Act 1979*. These guidelines should be read in conjunction with the NPWS *Information Circular No. 2: Threatened Species Assessment under the EP&A Act: The '8 Part Test' of Significance* (November 1996).

Proponents, consent and determining authorities should also note that a recovery plan for the Long-nosed Bandicoot population is currently being prepared. The recovery plan will require that any developments or activities will be assessed in accordance with the recovery plan and these environmental impact assessment guidelines. Development proposals must assess direct and indirect impacts on the bandicoot population and its habitat. Direct impacts can include harm to individual bandicoots, loss, fragmentation of habitat and restriction of access to shelter and foraging areas through barriers/fences. Indirect impacts can include increases in noise and light around nesting or foraging areas and fragmentation and isolation of habitat areas.

Survey

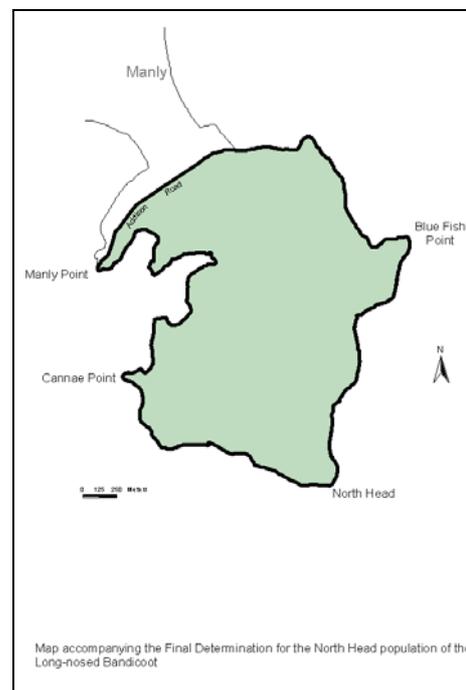
Survey for development assessment purposes should target areas of potential foraging and shelter habitat and should be performed by a suitably qualified and licensed person. Habitat includes areas of woodland, heath, scrub and open areas such as lawns, playing fields and garden beds. As Long-nosed bandicoots at North Head are active all year the timing of the survey is not crucial. Identification of the species is quite straight forward as there are no similar species present in the local

area. Spotlighting and searching for signs, such as conical diggings, are considered adequate for initial presence/absence surveys. Trapping and radiotracking may be required to confirm nesting activity and should only be conducted by suitably qualified and experienced people who hold the necessary licence under the *National Parks and Wildlife Act 1974*.

Limit of known distribution

Potential habitat for the population of Long-nosed Bandicoots occurs on the area of North Head south of Addison Road, Manly (Figure 1).

Figure 1 Map of Long-nosed Bandicoot distribution on North Head (1997 NSW Scientific Committee).



Life cycle of the species

Mating takes place at night and may occur throughout the year in the Sydney Region, although there is a trough in breeding activity from late autumn (April) to mid-winter (June) (Stoddart 1995). At North Head, Scott (1995)

recorded Long-nosed Bandicoots breeding from mid winter (June) to Autumn (March) and found the average litter size to be 2.3.

Birth takes place during the daylight hours after a gestation of only 12.5 days (Stoddart 1995). The young are carried in the pouch for 50 to 54 days and are then left in the nest. After about 60 days, the young begin to accompany their mother and learn to forage for themselves (Menkhorst and Seebeck 1995). When the young are about 50 days old the mother may mate again and produce another litter several days after the previous one has been weaned (Stoddart 1995). In good years, females may produce up to 4 litters. Female bandicoots may begin breeding at about four months and males around five months (Menkhorst and Seebeck 1995).

There are insufficient data concerning longevity, although individuals have been recorded living up to three years in captivity (Lyne 1982) and it is expected that they may live up to two to two and a half years in the wild.

Scott (1995) found that the diet of *P. nasuta* at North Head consisted primarily of beetles, larvae, ants, monocot leaf and stem and fungi.

Bandicoots spend the day in a nest, usually a shallow hole or depression on the surface of the ground which is lined with grass and leaves which it scrapes together (Stoddart 1995). These nest can be extremely difficult to locate and the entrance is closed when occupied. At North Head, bandicoots were observed nesting in a variety of habitat types including areas of dense shrubs, long grass, exotic vegetation (pampas grass) and in residential backyards (Scott 1995, Puddephatt and Miller 1996, Ecotone Ecological Consultants 1998; NPWS 1998).

Threatening processes

Four Key Threateneing Processes (KTPs) that have been listed under Schedule 3 of the TSC Act 1995 are known to have implications for the Long-nosed Bandicoot population.

Last updated July 2004

“Predation by the European Red Fox (Vulpes vulpes)” is listed as a KTP and is identified as a threat to the Long-nosed Bandicoot.

In June 2000, 8 bandicoots were killed by a fox at North Head. Subsequent baiting was successful in removing this fox. This incident highlights the impact one fox can have on the population. Monitoring of the establishment of foxes on North Head needs to be vigilant as they are difficult to control given limitations on predator control techniques in urban areas.

“Predation by the Feral Cat (Felis catus)” is listed as a KTP and is identified as a threat to the Long-nosed Bandicoot.

“Clearing of native vegetation as defined by the Scientific Committee”)” is listed as a KTP and is identified as a threat to the Long-nosed Bandicoot.

Major threats to the North Head population include the loss, modification, degradation and/or fragmentation of suitable habitat and direct impacts to individuals.

Whilst there has been a major loss of habitat over the past 200 years as a result of urbanisation (Manly), the amount of habitat lost in the last 20 years at North Head has been minimal and the majority of habitat currently available to bandicoots is either in National Park, will be added to National Park or is currently having management plans prepared to protect and enhance habitat values. However, there are a number of current development proposals that may result in further loss of small areas of habitat.

“High Frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition”)” is listed as a KTP and is identified as a threat to the Long-nosed Bandicoot.

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Other threats, although not listed as KTPs that are likely to impact on the Long-nosed Bandicoot include:-

- Road mortality.
- Inbreeding depression. Small populations such as the North Head population are likely to suffer from inbreeding depression. There have been no studies of the genetic variability and health of the population.
- Disease. The population could potentially be affected by toxoplasmosis. The protozoan parasite *Toxoplasma gondii* is a well recognised cause of disease and mortality in Australian marsupials. In Australia, *Toxoplasma* is a parasite of the introduced cat. There is a substantial population of domestic cats adjacent to North Head and feral cats are occasionally trapped by NPWS staff. There have been no studies completed of the incidence of toxoplasmosis at North Head.

Viable local population

Systematic monitoring of the North Head population by the NPWS began in 1998. This monitoring indicates that the population has remained relatively stable between 1998 and 2002 (Banks & Powell 2002), however, has not been able to determine the population size with any certainty. A comprehensive population census co-ordinated by the NPWS in May 2002, indicated that the population consists of around 100 animals, assuming that 80% of the population was sampled (Banks & Hayward 2002), which is consistent with the population estimate provided in the Scientific Committee's final determination for the population. This census was repeated in May 2004 (Banks & Lenehan 2004) and the results indicated that the population had apparently increased to between 130 and 160 animals.

Population viability analysis for the population (Banks 2000, 2004) indicates that the North Head bandicoot population had a 10% chance of going extinct within 20 years due to chance events such as

Last updated July 2004

the arrival of a fox. The population was also extremely sensitive to increased adult mortality.

This analysis needs to be repeated and tested with new and more robust information as it becomes available. However, it is apparent that the North Head population will remain vulnerable to stochastic events such as major wildfire, outbreak of disease or establishment of introduced predators such as the fox. Contingencies for these situations need to be considered.

Significant area of habitat

The amount of available habitat for breeding and foraging seems to be the main limiting factor affecting the distribution of the Long-nosed Bandicoot population at North Head. Therefore all known or potential habitat is considered significant. Areas identified as high value bandicoot habitat should not be further fragmented or isolated through development. Movement of bandicoots between habitat areas should not be further restricted by development and corridors between bandicoot habitat and Sydney Harbour National Park should be retained and where possible enhanced.

At North Head, Long-nosed Bandicoots occupy to varying degrees all of the habitat types available including woodlands, scrub, heath and open areas.

Isolation and fragmentation

The Long-nosed Bandicoot population at North Head is currently isolated. It is extremely unlikely that this population interacts with other bandicoot populations in the Sydney area. Any further fragmentation of the population at North Head is likely to be detrimental to its continued existence.

Adequacy of representation in conservation reserves

The North Head bandicoot population occupies approximately 260 hectares of woodland, heath, scrub and open habitats across North Head and has also been recorded occupying some of the 100 hectares of highly modified habitats in residential areas. Ninety percent (160ha

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NP, 75ha Sydney Harbour Federation Trust lands out of 260ha) of this habitat is under the control of the NPWS or is being managed primarily for conservation purposes.

Critical habitat

To date, critical habitat has not been declared for this population under the TSC Act. The feasibility of declaring critical habitat will be investigated as part of finalising the recovery plan..

Mitigating impacts

The basic principles of protecting threatened species is to:-

1. Avoid direct impacts and retain habitat;
2. Minimise impacts where ever possible;
3. Mitigate or ameliorate impacts; and as a last resort
4. Compensate or offset for any unavoidable impacts.

In regards to Long-nosed Bandicoots, where activities or developments are proposed within or adjacent to habitat occupied by the bandicoot population, the following mitigating measures should be adopted, where practicable:

- Maintenance/enhancement of movement corridors between areas of

habitat; these corridors should be as wide as possible and include dense ground cover to provide shelter from predators;

- Provision of bandicoot spaces under fences to allow movement of bandicoot's between properties;
- Measures to reduce road mortality such as restrictions of vehicle movement after dusk or devices to slow vehicles (i.e. signs, speed calming devices);
- Predator control programs and measures to reduce the attraction of predators (waste management)
- Educational programs to encourage responsible pet ownership or restrictions on pet ownership;

For further information contact

The Long-nosed Bandicoots Recovery Program Co-ordinator, Threatened Species Unit Central Directorate NSW NPWS PO Box 1967, Hurstville NSW 2220 Phone 02 9585 6678. www.npws.nsw.gov.au.

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