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ECOLOGY AND MANAGEMENT OF THE SOUTHERN BROWN BANDICOOT OR QUENDA *Isoodon obesulus*

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1. DESCRIPTION

The southern brown bandicoot or quenda is a member of the Peramelidae, a family of marsupials found only in Australia and Melanesia. Six species of bandicoots have been recorded in Western Australia (not counting the bilbies, which belong to the Thylacomyidae), of which two, the desert bandicoot, *Perameles eremiana*, and the pig-footed bandicoot, *Chaeropus ecaudatus*, are extinct.

A fully grown southern brown bandicoot is rather larger in size than a rabbit. The fur on the upper surface of the body is dark greyish or yellowish-brown and rather coarse to the touch, as the guard hairs are quite stiff. On the underside the fur is softer and creamy white to pale brown. The short, sparsely-furred tail and the upper surfaces of the hind-feet are dark brown. The southern brown bandicoot has a long pointy nose, rounded ears and small teeth which are evenly spaced along the jaws (compared with the kangaroos and other marsupials that have incisors and molars separated by a distinct gap). In Western Australia, males grow larger than females, becoming sexually mature at about 800g and occasionally attaining weights of over 2.5kg. The scrotum in adult males is usually darkly pigmented. Females are sexually mature at about 700g and rarely exceed 1.5kg in weight. The pouch opens rearward, as in the other species of bandicoot, and contains eight nipples.

2. DISTRIBUTION AND STATUS

The southern brown bandicoot is found in the south-east of the continent as well as in the south-west, and on part of Cape York in far north Queensland. Figures 1 & 2 show the recorded and present distribution of the species. Three subspecies of the southern brown bandicoot have been described: *Isoodon obesulus obesulus* from South Australia, *I. o. affinis* from Tasmania, and *I. o. fusciventer* from Western Australia. Quenda is the Nyungar word for the species, so this name should be perhaps applied only to the south-western subspecies.

As a species, the southern brown bandicoot is not considered to be endangered or even vulnerable (ANZECC, 1991). However, it appears on the State threatened species

lists in Western Australia, New South Wales and South Australia; in all of these states the species has undergone considerable contraction in range, especially during the last twenty years.

In Western Australia, the range of the quenda has shrunk since white settlement, especially in the northern and eastern areas that it previously occupied. In most cases, its disappearance is related to the clearing of vegetation for agriculture, especially in the wheatbelt. The populations inhabiting Tutanning Nature Reserve and Dryandra Forest became extinct in the 1970s with an increase in fox numbers. The last quenda stronghold in the wheatbelt seems to be in the area around the town of Mount Barker. There are apparently secure populations in the jarrah and karri forests, and along the south coast as far east as Cape Riche, and the only island population of *I. o. fusciventer* is found on Daw Island in the Recherche Archipelago.

The Swan coastal plain provides good habitat for quendas, but is largely cleared for agriculture, so that, ironically, some of the best surviving populations on the Swan coastal plain are on the outer fringes of the Perth metropolitan area. Populations there are now threatened by urban expansion.

The quenda is listed on Schedule 1 of the Wildlife Conservation Act 1950 (fauna that is rare, or is likely to become extinct) because of the historic decline in its range and because it falls within the Critical Weight Range (CWR) of Burbidge and McKenzie (1989), who predict that such animals are most likely to undergo serious decline.

3. HABITAT REQUIREMENTS

Quendas prefer areas in which there is a high proportion of dense vegetation between 0 and 1 metre above ground, especially where there is foliage below 0.5 m. They will, however, forage out into open areas provided there is cover nearby in which to take refuge and to nest. In addition, their food requirements limit them to the more productive parts of the landscape. On the Swan coastal plain, they inhabit the dense vegetation fringing permanent and seasonal wetlands. On the Darling scarp and in other forested areas, they are mainly found along watercourses and in nearby shrublands. The extensive shrublands along the south coast also provide good habitat.

4. BIOLOGY

Diet

The diet of the quenda consists mainly of insect larvae and adults, as well as earthworms and other soft-bodied invertebrates of similar size (most invertebrate prey are >5mm long). Small reptiles and even small mammals are also taken. Most feeding is done by digging, and faeces contain soil as well as the hard remains of the food items, such as insect exoskeleton and reptile scales. Small diggings, often about 5cm wide and 5cm deep are made in the soil. The animal digs first with the forepaws, then pokes its snout in to extract the food item. This often results in a quite conical hole.

Reproduction

Quendas are able to breed year round, although in some populations studied near Perth there have been no females with young between early May and July (Figure 3). Between one and six young are produced, but it is unusual for more than three young to survive to weaning, which occurs after about 60 days. Birth occurs quickly after the weaning of the previous litter, so three or even four litters may be produced in a year. Dispersal of the young bandicoots to available habitat from their mother's home range occurs soon after weaning. Longevity may exceed three years.

Home range, interactions, activity and nesting

Quendas are generally nocturnal, and most activity occurs near dusk and dawn. Animals are often seen out during the day, however, although it is unknown how much of their activity is diurnal. A wider range of food items, including diurnal reptiles and insects, is available to animals active by day as well as by night, but a greater risk of predation is also encountered.

In quenda populations of low density, there is little overlap between home ranges of animals of the same sex. Where numbers are high, however, female home ranges overlap extensively, and even some males occupy the same areas (Figure 4). Amongst the males, however, there is usually a large dominant animal that moves widely through the habitat patch, while subdominant males have small home ranges and apparently keep a low profile.

Home range size has been measured in two Western Australian studies, both at the Harry Waring Marsupial Reserve near Jandakot. Average home range sizes of 4.9ha and 2.3ha for males and 4.6ha and 1.8ha for females were recorded by Craven (1981) and Broughton and Dickman (1991) respectively.

Nests are usually built in a slightly raised position, to avoid inundation in winter. Grass and other vegetation is collected, sometimes mixed with earth, and a well-concealed nest is constructed in a shallow scrape.

5. PREDATION

There is little quantitative evidence concerning the relative importance of the quenda's various predators. Amongst the native fauna, large reptiles such as carpet pythons could easily take young quendas, and medium-sized to large diurnal raptors (e.g. little eagles) and owls are also potential native predators. Chuditch undoubtedly take young quendas, but again, evidence is lacking.

There is more information on the role of introduced animals. House cats living near bandicoots are often reported to bring in young, and foxes have been identified as predators of quendas by several lines of evidence. Quenda bones have been found in fox dens at Perup (Christensen 1980) and at Tutanning (Friend, unpublished). The quenda populations at Tutanning and Dryandra became extinct during the 1970s, when numbers of many CWR mammals in the south-west dropped, some populations going

to extinction. A rise in fox numbers was reported at this time, and where fox control was subsequently implemented, dramatic increases in the numbers of those mammals followed.

6. MANAGEMENT FOR CONSERVATION

The following facts are relevant to the conservation management for quendas:

1) Quendas need dense vegetation.

2) Populations are centred on drainage lines in the forest, and on wetlands on the Swan coastal plain.

3) Fox predation can push quenda populations to extinction, especially in the drier parts of their range.

4) Reproductive rate is high, so quendas can quickly invade unoccupied habitat.

5) There are several previously occupied areas of suitable habitat in which fox control is being carried out. These may be suitable for re-introductions.

Given facts 1-3, it is clear that disturbance that removes the cover afforded by dense vegetation will reduce the viability of local bandicoot populations. Frequency of fire in the dense scrub along watercourses should be as low as possible, even if this means excluding fire from parts of a valley system at each prescribed burn, so that any one part is burnt only every three burns.

Apart from the circumstantial evidence that foxes caused the extinction of the quenda at Tutanning and Dryandra, the effect of fox control on existing quenda populations has not yet been determined. The Batalling experiment may provide this evidence, as may other trials currently being set up on CALM estate.

Re-introduction of quendas to previously occupied areas, under fox control programs, may be considered in order to counter the attrition of populations elsewhere through urban and other development.

REFERENCES

ANZECC (1991). List of endangered vertebrate fauna: April 1991. ANPWS, Canberra.

Broughton, S.K. and Dickman, C.R. (1991). The effect of supplementary food on home range of the southern brown bandicoot *Isoodon obesulus* (Marsupialia: Peramelidae). *Australian Journal of Ecology* **16**: 71-8.

Burbidge, A.A. and McKenzie, N.L. (1989). Patterns in the modern decline of Western Australia's vertebrate fauna: causes and conservation implications. *Biological Conservation* **50**: 143-98.

Christensen, P.E.S. (1980). A sad day for native fauna. *Forest Focus* **23:** 3-12.

Craven, L.N. (1981). Ecology of a population of Quendas (*Isoodon obesulus*). M.Sc. Prelim. thesis, Department of Zoology, University of Western Australia: Perth.