TRANSLOCATION PROPOSAL

NUMBATS FROM DRYANDRA WOODLAND TO DRAGON ROCKS NATURE RESERVE

Summary

The reintroduction of numbats to Dragon Rocks Nature Reserve (32 218 ha) near Hyden, is proposed in accordance with the Numbat Recovery Plan, by translocation of 20 numbats per year from Dryandra Woodland (27 947 ha), for at least three years (1995-1997). Numbats were last recorded at Dragon Rocks in the early 1970s, after which time an increase in fox numbers in the south-west of WA caused a number of extinctions of remnant populations of numbats and other medium-sized mammal species. An ongoing program of fox control by distribution of 1080 meat baits is now in place at Dragon Rocks NR.

Translocations will be carried out in November or December each year, when dispersal of young normally occurs. Numbats will be captured from the source population and released at Dragon Rocks within 24 hours. All animals will be fitted with radio-collars before release to allow detailed monitoring to be carried out over the first one or two years. Young born to radio-collared females at Dragon Rocks will be fitted with radio-collars before dispersal. As numbats cannot be trapped, this is the only practicable way that individuals can be monitored. Longer-term monitoring of population spread will utilise diggings searches and driven surveys.

The numbat population in the main block of Dryandra is currently stable at around 400 animals. More are known to inhabit the other blocks but accurate survey data are not available. It is not anticipated that the removal of 20 animals per year, at least half of which will be juveniles, will have a significant impact on the population.

Proponent

Dr J.A. Friend, Senior Research Scientist, Department of Conservation and Land Management.

Background on the Species

Description

Numbats are small marsupials belonging to a monotypic family, the Myrmecobiidae, related to the Dasyuridae (the carnivorous marsupials). Males attain slightly higher body weights than females (maximum 700 g and 550 g respectively). The coloration of the numbat makes the animal unmistakable: red-brown fur on the upper back grades into a series of white bands on a black background across the lower back and rump,. Other distinctive features include a white stripe through the eye, a bottle-brush tail and a delicate pointed snout.

Biology

The numbat is the only marsupial that specialises in a diet of termites (Calaby 1960). The extremely long worm-like tongue, the numerous, poorly developed teeth and enlarged salivary glands are amongst its many morphological, physiological and behavioural adaptations to this diet. Feeding is accomplished by making small diggings in the ground or turning over sticks to expose termite galleries, then extracting the insects with the tongue. Numbats shelter primarily in hollow logs, although they also dig their own burrows, particularly in areas where logs are scarce. As well as using hollows on the ground, they also climb up dead trees and nest in hollows up to 5 m above ground

Numbats mate in January and the young are born in January or February. They remain attached to the mother's nipples until July, when they are deposited in a burrow. They are weaned in October and disperse from their natal ranges by mid-December. Numbats are polygamous, and as the mating season approaches, the range of movement of the males, smaller than those of females in winter, expands greatly to encompass the home ranges of several females. Female home ranges do not overlap. Radio-tracking studies at Dryandra indicate that female home range size is 25-50 ha (Friend unpublished). If 30 ha is taken as the area required by a male and a female numbat, and it is assumed that 60% of Dryandra constitutes numbat habitat, then the main block of Dryandra (ca 13 000 ha) should be able to support 520 numbats.

Preferred Habitat

Vegetation types used by numbats in various areas are as follows:

Dryandra Woodland and Boyagin NR:

Woodland on valley floors and slopes, dominated by *Eucalyptus wandoo* (wandoo) and *E. accedens* (powder-bark), with a patchy understorey of shrubs including *Gastrolobium* species (poison plants). Adjacent upland vegetation types are used to a lesser extent. At Dryandra, numbats are found in *E. astringens* (brown mallet) plantations, especially in areas low in the landscape.

Northern jarrah forest and Perup area:

Upland forest sites dominated by *E. marginata* (jarrah) and *E. calophylla* (marri), with open lower canopy of *Banksia grandis.* In the Perup, the shrub understorey includes *Bossiaea ornata, B. linophylla, Hakea lissocarpa* and *Leucopogon capitellatus* (Christensen *et. al* 1984).

Jandakot area:

Banksia attenuata, B. menziesii and *B. ilicifolia* woodland with emergent *E. marginata* and *E. todtiana* (prickly bark), with an open understorey including *Adenanthos cygnorum, Melaleuca scabra* and *Stirlingia latifolia* (Ninox Wildlife Consulting 1986).

Karroun Hill NR:

A range of vegetation types including:

> *Eucalyptus loxophleba* (York gum) and *Callitris columellaris* open woodland with an open understorey of *Acacia linoealata, A. obtecta, A. prainii, A. resinomarginea* and *A. graffiana* over *Alyxia buxifolia* and *Hakea recurva.*
>
> Tall closed shrubland of *Allocasuarina acutivalvis, Melaleuca uncinata* and *Acacia resinomarginea.*
>
> *Eucalyptus salubris* (gimlet) open woodland with occasional *Callitris columellaris* over a very open understorey including *Templetonia egena.*

Distribution

Early museum records and Aboriginal knowledge shows that numbats were distributed across much of southern Australia and north as far as the southern end of the Northern Territory. This distribution began to contract early this century until by the 1980s there were only an handful of localities in the south-west of Western Australia where numbats were still found. The factors which caused this contraction probably include predation by cats and then foxes coupled with the changes in fire regime, particularly in the arid zone, which followed the movement of Aborigines away from their traditional lands. Clearing of native vegetation for agriculture was an important factor in reducing the numbat's distribution in south-west WA (Friend 1989, 1994). More recently, predation by foxes has been shown to have an immense effect on the viability of remnant populations in the south-west (Friend 1990). Fox control by monthly distribution of meat baits containing 4.5 mg of 1080 has been shown to cause dramatic increases in numbat numbers, and a population has been successfully established at Boyagin Nature Reserve under a regime of fox control (Friend 1990; Friend and Thomas 1994).

The Translocation

The Numbat Recovery Plan (Friend 1994) presents a reintroduction program designed to bring the total number of populations of numbats to at least nine within the ten-year term of the plan. Each reintroduction will comprise at least three annual translocations of 15-20 animals to the destination site. The initial translocation to Dragon Rocks Nature Reserve is scheduled for November-December 1995. It is estimated that this reserve can support around 650 adult numbats, assuming that 50% of the area will be utilised by numbats. Figure 1 shows the location of the source and proposed destination sites of translocations listed in the Numbat Recovery Plan.

Numbats were recorded on Dragon Rocks Nature Reserve in the early 1970s, through reports from one of the reserve neighbours (McKenzie *et al.* 1973). The area is well within the former range of the numbat (Calaby 1960; Friend 1989). The species is apparently extinct in the reserve now, however. No sightings of numbats from the area have been reported to CALM since the early 1970s, and there have been no other

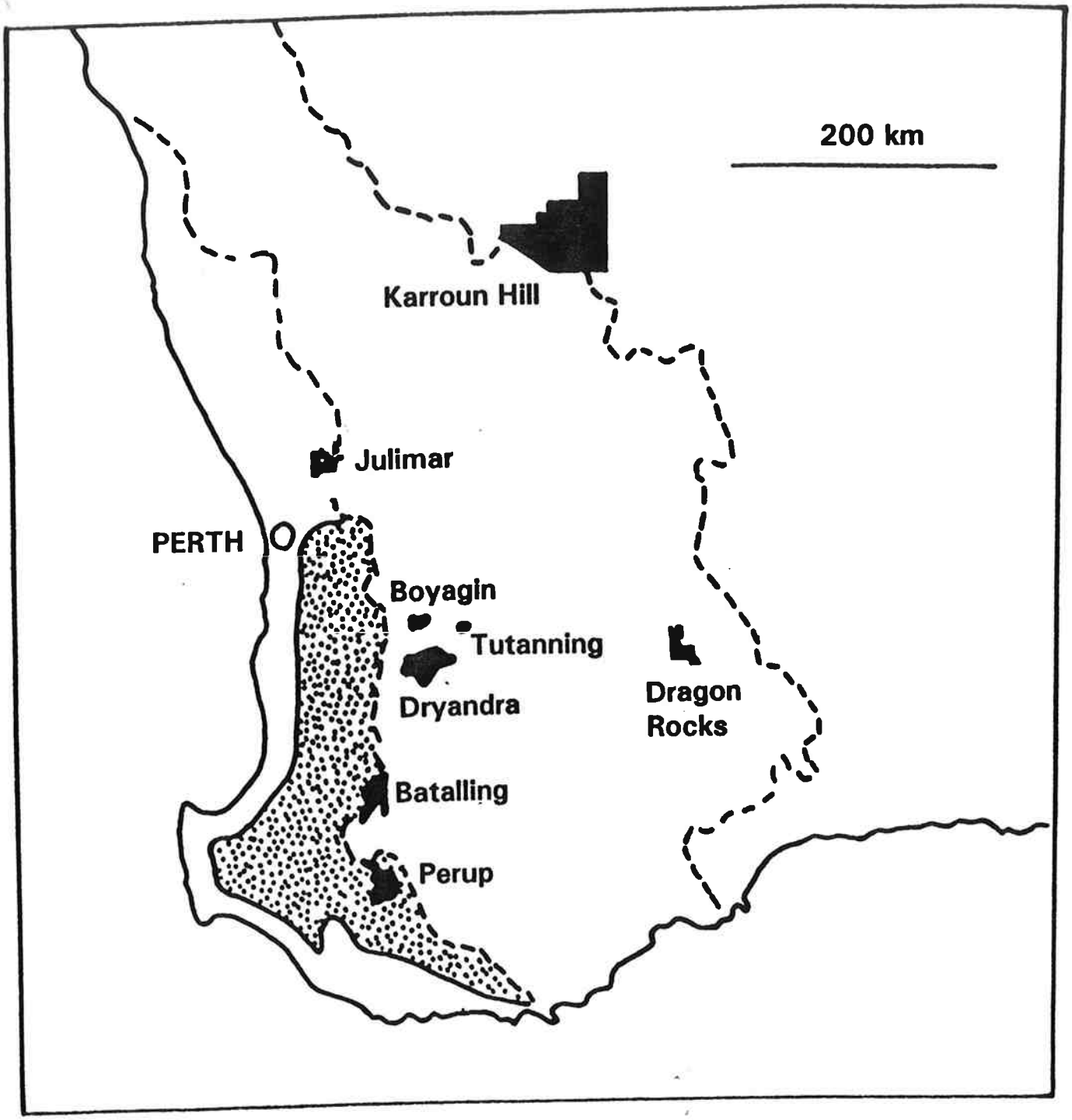

Figure 1. Locations of surviving Numbat populations and proposed re-introduction sites (shown in black). The dashed lines enclose the most heavily cleared agricultural area (termed "the wheatbelt"); the stippled area is the portion of the main forest block dominated by jarrah or wandoo.

recent records of numbats from the reserve or surrounding districts. In 1983, as part of the survey stage of the numbat project, representative areas of the reserve (concentrating on the woodland formations) were searched for numbat diggings, with no success (Friend, unpublished). Landholders in the Dragon Rocks and Pingaring areas interviewed in 1984 (Connell and Friend 1985) knew of the presence of numbats in earlier years but the most recent sightings had been in the mid-1970s. No sightings of numbats were made during 30 months' intensive fieldwork on Dragon Rocks Nature Reserve in 1990-93 as part of the western mouse conservation project (Morris *et al.* 1993). In terms of the IUCN definition (IUCN 1987), the proposed translocation is a reintroduction.

During the 1970s, many remnant populations of medium-sized mammals in the south-west of Western Australia declined dramatically or became extinct, due to an increase in fox numbers as rabbit control by use of 1080 oats became less widespread and foxes were at less risk of secondary poisoning (King *et al.* 1981). During this period, numbats became extinct on Boyagin, Tutanning and Dragon Rocks Nature Reserves, as well as in a number of other areas. Numbats have been successfully reintroduced to Boyagin and Tutanning under a regime of fox control.

While the most successful numbat reintroduction has been to Boyagin near the western edge of the wheatbelt, a sparse population has also resulted from the translocation program to Karroun Hill NR (309 678 ha), beyond the eastern margin of the wheatbelt 400 km north-east of Perth. Cat predation has caused some mortality at this site, but an additional problem is the extensive nature of the reserve and the lack of a boundary to dispersal, as provided at Boyagin, Tutanning and Dragon Rocks by the surrounding farmland. It is anticipated that the presence of this barrier to the dispersal of released animals and young will increase the chance of establishment of a population at Dragon Rocks.

Dragon Rocks NR possesses vegetation formations structurally similar to those occupied by numbats at Karroun Hill NR. The vegetation of much of the reserve is classified as mallee and scrub formations, amongst which high shrubland and high open shrubland have a well developed understorey which would provide good cover for numbats. The low open forest, which comprises stands of blue mallet (*E. gardneri*) and silver mallet (*E. ornata* or *E. argyrocaulon*) on the low ridges and covers 5-10% of the reserve, was named as numbat habitat by reserve neighbours (McKenzie *et al.* 1973; Coates 1992).

Source site

Numbats will be taken from the wild population at Dryandra Woodland (27 947 ha). The population there is one of two surviving populations, and one of three populations treated under the Numbat Recovery Plan (Friend 1994) as self-sustaining. The population is monitored on an annual basis by a driven survey in November. The population at Dryandra has been relatively stable since a sharp decline in 1993. Surveys in November 1993, November 1994 and April 1995 have shown that the population of the main block (ca. 13 000 ha) has remained at approximately 400-500 during that time. The 1993 decline is thought to have been due to an adjustment following a period when the population outstripped available resources (Friend 1995).

Under the reintroduction program that commenced in 1985, 15-30 numbats have been removed from the Dryandra population each year. This occurred throughout the period of rapid growth of the population between 1988 and 1992, so it is unlikely that removal of 20 animals per year will significantly reduce the viability of the Dryandra population.

The Dryandra Woodland numbat population has been used as the main source of translocation stock in the numbat reintroduction project so far (Friend 1994). A genetic study of the Dryandra and Perup populations is in progress to compare within and between population differences and to attempt to predict the implications of mixing stock in reintroductions. Until the results of this study are available, the Perup population will not be used as source of animals for reintroduction. It is likely that there will be sufficient information to make this decision before the third translocation is to be carried out. If the incorporation of Perup animals into the translocation group for the second or third year is proposed and approved by the Numbat Recovery Team, a revised translocation proposal will be submitted.

Translocation site

Dragon Rocks Nature Reserve is an "A" Class Reserve of 32 218 ha in area and is vested in the National Parks and Nature Conservation Authority of Western Australia. It is managed by the Department of Conservation and Land Management (CALM) and is situated in CALM's Katanning District, Wheatbelt Region.

Control of introduced predators at the translocation site

Fox control is being carried out by baiting with dried meat baits containing 4.5 mg of 1080, although this concentration may be reduced to 3 mg of 1080 per bait in line with national standards during the term of this reintroduction. Baits are spread at a rate of at least 5/km^2 by air in April and October and along perimeter and internal firebreaks from a vehicle another six times at other times of he year. Operational costs of fox control (baits, plant, plane hire and travel) are provided through the Numbat Recovery Plan under ANCA's Endangered Species Program. Specific cat control will also be carried out if predation by cats emerges as a significant threat to the establishment of a population, given that cat control methods are being developed by Dave Algar (Algar and Friend 1995)

The founder group

The first translocation group will comprise twenty numbats. Foose (1983) recommended that a founder group of five to ten pairs could sample population genetic variability adequately, while pointing out that the founder group size was not as important as the subsequent management. The first release, in 1995, will be followed by at least two more releases of similar numbers of numbats, at yearly intervals.

The composition of the founder group, and indeed of each annual release, will be 50% females, 25% first-year males and 25% 2+ year-old males. As males do not breed until their second year, this ensures adequate breeding stock in the first year, and no hiatus

in breeding before the males of the first generation born in the new area come to maturity.

Trapping and translocation

The numbats used for the initial release will be captured at Dryandra Woodland and transferred as quickly as possible to the release site. Numbats are only rarely captured in baited cage or Elliott traps, so the most efficient means of capturing new animals is to pursue them on sight and then remove them from the logs where they take refuge. Numbats for translocation are caught and radio-collared over the weeks preceding the translocation and released at point of capture. This allows rapid recapture on the proposed translocation date and transfer with the minimum holding time.

Numbats will be held in calico bags until release, which generally occurs within 24 hours of capture. Transport to the release site will be in an air-conditioned four-wheel drive vehicle. Numbats will be released directly into logs with suitable hollows selected previously. Release enclosures will not be used, due to the difficulty of providing sufficient food within the enclosures to support the translocated animals for the necessary time. Numbats dispersing to areas remote from others can be moved back to the release area in April-June, when they are less likely to disperse again.

Translocation during the months of November and December mimics the natural dispersal of young, and also utilises the only time of year when females do not have dependent young. Both adults and juveniles establish new home ranges within days of release.

Post-release monitoring

Radio-tracking provides the only practicable means of monitoring the progress of individual translocated numbats. Radio-collars used will incorporate two-stage, 1.35-1.5 V transmitters (Biotrack or AVM Instrument Co.) in a package which gives 500-800 m range ground-to-ground and approximately 6 months total life.

In January 1996, when they have established new home ranges, the numbats will be located by use of a light aircraft fitted with radio-tracking equipment, then subsequently checked on the ground. Young born to radio-collared females at the re-introduction site will be captured in October each year before dispersal and also fitted with radio-collars. The young numbats will also be located by use of the aircraft in January from 1997 onwards. Monitoring by checking for survival, condition, weight and reproductive state every two to four months will be continued as long as collars can be maintained on the animals. Estimates of mortality rate can be made using these data, to allow predictions about the fate of the population using population viability analysis. Subsequent monitoring will be carried out by systematic searches for sign (diggings, scats) and driven surveys (if track access is sufficient). Five years after the third release year, an assessment of the success of the translocation will be made.

Funding

Funding for the operational costs of fox control at Dragon Rocks, translocation and monitoring are provided by the ANCA ESP Project 351, "Implementation of the Numbat Recovery Plan". This funding also provides the salary of one temporary technical officer in the Science and Information Division (SID) of CALM. All other salary and wages costs are provided by CALM, either from SID under approved Science Project Proposal 93/00145 "Factors affecting establishment in the numbat reintroduction program", or from CALM Katanning District. The ANCA grant has been guaranteed until the end of 1997, with provisional funding for another two years, when a review of the Numbat Recovery Plan implementation will be carried out.

AEEC approval

This project is covered under CALM AEEC project approval CAEEC 37/92 "Factors affecting establishment in the numbat reintroduction program".

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Proponent's signature

..... 2/11/95
Date

Endorsements

A. This project has my endorsement; Bio-Conservation Group resources committed here are available for this purpose.

..... 3/11/95
Head, Bio-Conservation Group
CALM Science and Information Division
Date

B. This project has my endorsement; Katanning District resources committed here are available for this purpose.

....
District Manager
Katanning District, CALM
Date

Approved by:

....
Director, Nature Conservation
Date

ATTACHMENTS

1. Friend, J.A. (1994). Recovery Plan for the Numbat. Department of Conservation and Land Management, Western Australia.

2. Friend, J.A. (1995). Numbat Recovery Plan implementation: progress report, May 1995. Unpublished report to the Australian Nature Conservation Agency on Endangered Species Program Project 351. Department of Conservation and Land Management, Western Australia.