ENDANGERED SPECIES PROGRAM

PROJECT 351

NUMBAT RECOVERY PLAN IMPLEMENTATION

Progress Report

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er the Endangered Species Program.

onsibility for the views expressed.

SUMMARY

The implementation of the Numbat Recovery Plan has had financial support from ANCA under ESP Project 351 since the beginning of 1995. Since that time, most work funded under this project has involved monitoring the population of numbats at Dryandra, where a 50% decline in numbers was recorded between November 1992 and November 1993, and monitoring radio-collared animals at the reintroduction sites at Batalling, Tutanning and Karroun Hill. In addition, scheduled fox-baiting campaigns have been carried out and a health monitoring program and a disease survey have commenced.

Intensive monitoring of the Dryandra numbat population has involved an extra driven survey, carried out in April 1995, over and above the yearly surveys in November. The results of this survey indicate that the 1992/93 decline was short-lived and that population numbers have now stabilised at the November 1993 level.

The results of monitoring radio-collared animals at Dryandra also indicate that mortality rates are relatively low and are not consistent with continued decline. Predation by birds of prey is the predominant cause of death of numbats at Dryandra.

Since January the monitoring of current and recent reintroductions has been limited to locating and checking on radio-collared individuals. This method has met with limited success at 1994 translocation sites at Batalling and Tutanning, where either there has an unusually high rate of transmitter failure or many animals have dispersed well beyond the study area. Signal loss interfered with a study aimed at comparing the survival of translocated wild-caught versus zoo-bred animals. Indications were, however, that wild-caught animals have higher survival rate than zoo-bred individuals. Searches for diggings and driven surveys will be set up at those sites in 1995. At Karroun Hill, where no numbats were released in 1994, predation by raptors continues to be the main cause of death and diggings surveys have indicated that the reintroduction has resulted in the presence of a residual population.

Translocations of numbats to two fenced properties, Yookamurra in 1993 and Karakamia in 1994, have been followed by intensive monitoring. Results are promising at this early stage and are consistent with the future establishment of viable populations.

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INTRODUCTION

The Numbat Recovery Plan (Friend 1994) gives an account of the history and the present status of efforts, chiefly by the Western Australian Department of Conservation and Land Management (CALM) and the Perth Zoo, with funding from various sources, to improve the conservation status of the numbat (*Myrmecobius fasciatus*). In January 1995 the funding of the Numbat Recovery Plan by the Australian Nature Conservation Agency (ANCA) through the Endangered Species Program (ESP) under Project 351 commenced. This report details the progress made during January-May 1995 on the actions scheduled for implementation in 1995 according to the contract between CALM and ANCA. Progress on other actions scheduled for 1995 in the Numbat Recovery Plan, but being funded by institutions other than ANCA is also reported here.

This report should be read in conjunction with the Numbat Recovery Plan.

PROGRESS ON RECOVERY PLAN ACTIONS

Action 1. Management of existing populations and habitat

1.1. Exotic predator control

The Recovery Plan refers to three "existing populations" of numbats, comprising those at Dryandra and Perup-Kingston, which are the only surviving original populations, and at Boyagin, where numbats were reintroduced in 1985-1987 resulting in the establishment of a self-sustaining population. All of these areas have been subject to fox control by baiting with 1080 meat baits for some years. Fox control at Dryandra and Boyagin (monthly) and at Perup-Kingston (twice yearly) has been carried out under pre-existing programs during 1995, funded by CALM.

1.2. Monitoring of existing populations

Driven surveys

All of the existing populations are monitored by annual driven surveys carried out between October and December. However, at the Recovery Team meeting in December it was resolved to carry out an additional driving survey at Dryandra in April each year for the next few years, because of the need to keep a closer watch on the population there given the recent decline in numbers. Since the commencement of this project the April 1995 driven survey at Dryandra is the only one that has been carried out.

Results

The survey protocol utilised in November was followed in this survey, i.e. six circuits of a set route were driven during those times of day when numbats are active, over a period of a week. Fifteen numbats were sighted during the April survey, giving a sighting rate of 3.9 sightings per 100 km. This compares well with recent November surveys (1993: 5.5 sightings/100 km; 1994: 4.2 sightings/100 km), especially considering that as numbat young become independent in October/November, there is a high mortality in the following months. This sighting rate indicates that the decline of 1992/93 was short-term and that population numbers have probably stabilised. This supports the hypothesis that the numbat population outstripped resource availability in 1992 and that the decline was a consequent adjustment.

Monitoring of radio-collared animals at Dryandra

Since the decline of the Dryandra numbat population in 1992/93, a number of measures have been implemented in order to more closely monitor the Dryandra population and to expose any unusual sources of mortality. Briefly, these measures comprise extra population monitoring surveys (see above), maintaining radio-collared animals to measure mortality rate and attribute mortality to different causes, and health monitoring. In April 1994, seven numbats were radio-collared at Dryandra for monitoring. Another 10 were collared in November-December 1994 and during the April 1995 driven survey another seven were radio-collared, giving a total of 24 numbats at Dryandra that have been fitted with radio-collars for monitoring over the last year. Each month every animal is located and either its movement monitored or it is sighted (usually in a log) to ascertain whether or not it is alive.

Results

These animals are still being monitored, although seven have suffered signal loss without explanation (probably through transmitter failure, although it is possible that the four juveniles amongst these dispersed out of Dryandra). Currently 13 numbats with functioning radio-collars are alive at Dryandra and four are known to have died.

Survival of the radio-collared numbats at Dryandra has been surprisingly good. This low mortality rate indicates that, if the decline of 1992/93 was driven by increased mortality, rather than decreased reproduction, this decline is not continuing. This supports indications from the results of the November 1994 and April 1995 driven surveys that population numbers have stabilised since the decline. The four deaths were attributed to the following causes: two were taken by raptors, one was taken by an unidentified predator (raptor, fox or cat) and one died when it became caught by its collar inside a log.

1.3.1 Effectiveness of silviculture guidelines

In February 1995, two numbats (a male and a female) were caught and radio-collared in areas due to be logged at Kingston State Forest, near Perup. They were radio-tracked intensively over the next two weeks in order to establish the size and location

of their home ranges prior to logging. Night refuge logs were recorded and mapped. Logging has now proceeded in the areas where the numbats were resident. Post-logging refuges have been recorded and mapped. Both animals remained in the logged areas. Follow-up radio tracking will be carried out at three-month, six month and 18-month intervals after logging.

Action 3. Translocation program

3.1. Selection of reintroduction sites

A field trip to inspect Dragon Rocks NR is planned for September 1995, when release sites will be selected.

3.2. Exotic predator control

This action concerns fox control at numbat reintroduction sites in the translocation program. Current translocations under the Recovery Plan comprise Batalling Forest, Tutanning Nature Reserve and Dragon Rocks Nature Reserve. In addition, translocation to Karroun Hill NR has been suspended under the Recovery Plan until cat control can be implemented there, but fox control is continuing in order to protect the numbat population established by translocations between 1986 and 1993. Translocations to Karroun Hill are proposed in the Recovery Plan for 1997-1999. Fox control is also carried out when necessary at the fenced properties where numbat reintroductions are under way (Yookamurra and Karakamia).

Batalling and Tutanning

Fox control by baiting at Batalling (3-monthly) and at Tutanning (monthly) has been carried out under pre-existing programs during 1995, funded by CALM.

Dragon Rocks

As the release of numbats at Dragon Rocks NR is proposed for November 1995, fox baiting funded through this project will not commence until October 1995. A less intensive baiting program is currently being carried out on the reserve by CALM Katanning District under a WWFA-funded program to protect populations of the western mouse *Pseudomys occidentalis*.

Karroun Hill

Fox control by aerial baiting with 1080 meat baits at a rate of 7.5 baits per km^2 over 40 000 ha surrounding the release site at Karroun Hill NR is carried out twice per year. The most recent baiting flight, on 4 April 1995, was carried out with funding from this project. Cyanide bait transects (two transects 5 km long, with bait stations at 200 m intervals according to the methodology of Algar and Kinnear 1992) were laid and monitored within the baited area at Karroun Hill for three nights between 31 January and 3 February 1995 to measure the effectiveness of the 1080 baiting regime. Despite

the time elapsed since the previous aerial baiting on 5 October 1994, no foxes were killed and no signs of foxes were detected. This is indicative of the low numbers of foxes in that country at the present time. The next aerial baiting is scheduled for September 1995.

3.3. Initial translocation to Dragon Rocks NR

This will occur in November 1995. Animals will be translocated from Dryandra and released at one or more sites yet to be selected on Dragon Rocks NR.

3.4. Monitoring of reintroduced populations

Since the commencement of this project at the beginning of 1995, considerable effort has gone into monitoring the groups of radio-collared numbats at the current reintroduction sites. Radio-collars are fitted to translocated animals before release, and young born at the sites are radio-collared if possible. Thus the groups being monitored in January-April 1995 comprised animals released in November 1994-February 1995, young collared in October 1994 and resident radio-collared animals from earlier translocations or born on site before 1994. Table 1 summarises the results of monitoring these radio-collared numbats from October 1994, when young born on reintroduction sites in 1994 were captured and fitted with radio-collars.

After release, translocated numbats often move some distance from the release site. Monitoring involves first locating the animals, generally using a light aircraft fitted with receiving equipment, followed up with a ground search, until it can be determined if each numbat is alive or not. The animal is usually captured, weighed and measured and its reproductive condition assessed. In the first few weeks after dispersal (young) or release (translocated animals) a numbat will establish its new home range and remain in or close to that area for the rest of its life. After the initial radio-location, it is rarely necessary to use an aircraft to find the animal again.

The conditions of transfer of numbats to private sanctuaries set by CALM require this monitoring procedure to be followed so that the progress of those populations can be assessed as well.

Batalling

Batalling was the site of the major translocation effort in December 1994. This was the third year of the translocation to this area. Twenty numbats were scheduled for release there and the availability of captive-bred young from Perth Zoo provided an opportunity to compare the survival of wild-caught versus captive-bred individuals in this kind of release. Consequently 10 wild-caught animals were translocated from Dryandra to Batalling on 1 December 1994. It was intended to release 10 zoo-bred numbats at about the same time, but only seven had achieved the minimum weight for collaring and release (350 g) by the proposed release date. These seven were released on 21 December 1994. The other three zoo-bred young were released at Batalling on 20 January 1995 after attaining the desired weight. In addition, five young born at

Table 1. Results of monitoring radio-collared numbats at reintroduction sites over the period October 1994-April 1995.

Site and origin	Collared	Known dead	Signal or collar lost	Alive and transmitting	Collared females with young
BATALLING					
Resident	1	0	0	1	1
Young bred on site	5	0	4	1	1
Translocated from Dryandra	10	1	4	5	2
Translocated from Perth Zoo	10	3	7	0	0
Total	**26**	**4**	**15**	**7**	**4**
TUTANNING					
Resident	1	0	1	0	0
Young bred on site	2	0	1	1	0
Translocated from Dryandra	1	0	1	0	0
Translocated from Perth Zoo	6	1	5	0	0
Total	**10**	**1**	**8**	**1**	**0**
KARROUN HILL					
Resident	2	0	0	2	2
Young bred on site	3	2	1	0	0
Total	**5**	**2**	**1**	**2**	**2**
YOOKAMURRA					
Resident	5	0	1	4	1
Young bred on site	2	0	0	2	1
Total	**7**	**0**	**1**	**6**	**3**
KARAKAMIA					
Translocated from Dryandra	3	0	2	1	0

Batalling had been collared in October 1994, and there was one remaining radio-collared adult from earlier releases.

The release site used in 1992 and 1993 was the section of Varis Road between Dons Road and Ernie Road in Batalling block. Since the first release, the chuditch (*Dasyurus geoffroyi*) population in this area has grown dramatically in response to fox baiting and during 1994 several radio-collared numbats were taken by chuditch. The high density of chuditch is a very local phenomenon, however, so in 1994/95 a new release site, where trapping studies (R. Brazell, pers. comm.) had shown that chuditch numbers were much lower, was used. This was in an adjacent area to the north of the first site, along Dons, Steed and Onion Roads in Godfrey and Hillman blocks.

The fate of 15 of the 26 animals collared since the beginning of at Batalling is not known because their signals were lost (or in one case, the animal dropped its collar). Of these, nine were never located after release, despite five searches from the air extending 15 km in all directions and 20 km through the unbroken forest belt to the north. The two animals located furthest from the release sites were found 11.5 km and 10 km away, so it is conceivable that some may have moved outside the search area. It is more likely, however, that most of these transmitters failed. Another four numbats were located from the air in the general release area weeks after release but not found during subsequent ground searches. These animals should have established home ranges by this time, given our observations from earlier releases. It is likely that their transmitters failed between the air and ground searches, a period of days or, in one case, weeks. Seven animals were found alive and the remains of four more were found by ground searches after their transmitters were located from the air. Predation was the cause of the four deaths recorded. Two of these were taken by birds of prey, but in the other two cases it was not possible to determine whether the predator was a bird or a mammal.

The high rate loss of signals clouds the comparison of wild-caught versus zoo-bred animals, but the data available point to better survival of the wild-caught stock. All three zoo-bred young located had died, whereas only one of the six Dryandra animals located was dead. The comparison is further complicated, however, by the fact that those six Dryandra animals comprised two adults and four juveniles, whereas the zoo-bred animals were all juveniles and might therefore be expected to have a lower survival rate. The dead Dryandra animal was a juvenile.

During 1995, the monitoring program at Batalling will be extended through the commencement of diggings searches and driven surveys. It will be easier to assess the success of the Batalling reintroduction once the results of these exercises are available. A review of alternative sources of transmitters will be carried out before the acquisition of collars for the 1995 translocation program.

Tutanning

Loss of signals also plagued efforts to monitor the 1994 translocation to Tutanning (Table 1). The 1994 translocation plan involved the translocation of 15 numbats from Dryandra to Tutanning if the 1994 Dryandra driven survey showed that the population was recovering from the 1992/93 slump. With the discovery that the population was

still at or just below the November 1993 level, the Tutanning translocation was discussed at the December Numbat Recovery Team meeting. During the year two young had been collared at Tutanning, and the presence of these animals as well as the availability of six or seven zoo-bred young for release was seen as a way to progress the Tutanning reintroduction without putting further pressure on the Dryandra population. Additional animals caught at Dryandra would instead be collared and released to provide further data on the rate and causes of mortality in the Dryandra population. One Dryandra animal had already been released at Tutanning in December 1994, and with the two site-bred young, one resident radio-collared adult and six zoo-bred young released on 20 January 1995, made a total of 10 radio-collared animals in the reserve. Unfortunately only two of these animals have been located on the ground, and one was dead, taken by a fox or dog.

Monitoring the Tutanning reintroduction has been given a low priority until now due to the relatively small size of the reserve, the difficulty of diggings searches because of the high level of digging activity by woylies (*Bettongia penicillata*) and as driven surveys are inappropriate because of the low visibility in much of the reserve. However with extra resources available in 1995 through the funding of the Recovery Plan by ESP, a diggings survey will be carried out later in the year to ascertain how far the numbat population has spread in Tutanning.

Karroun Hill

No numbats were translocated to Karroun Hill NR in 1994, in accordance with the Numbat Recovery Plan. Two radio-collared females, both progeny of translocated females and unknown males, remained from the previous reintroduction project. In October 1994, the three young of one of these females were caught and collared, but the other female's litter evaded capture. Only two of the three young were located, and both were victims of predation by raptors.

Over the last five years numbat diggings found outside the home ranges of radio-collared animals have been recorded during walks through the bush at Karroun Hill. The significant frequency of these and the high production of young by females remote from known males indicates the existence of a numbat colony in the reserve, at least within a five kilometre radius of the release site. During 1995 and 1996 a systematic survey of the area around Karroun Hill itself will be carried out in order to ascertain the range of the numbat population in that part of the reserve.

Yookamurra

The numbat population at Earth Sanctuaries' Yookamurra Sanctuary near Sedan in the Murray mallee area of South Australia was established through the translocation of five males and ten females from Dryandra to Yookamurra in November and December 1993. All had been fitted with radio-collars and a monitoring program was set up under CALM's protocol for the translocation. Between November 1993 and October 1994, four numbats were taken by raptors, one died from the pathological effects of an acanthocephalan infection, two dropped their collars and transmitters on three others failed. In March 1994, the six remaining females had been captured and 16 attached

young were recorded, amongst five of the females (three litters of four, one of three and one of one).

In October 1994, attempts were made to catch and radio-collar the young. Only one young, a female, was caught as a result of this effort, although another young was sighted and two were found dead. Since then, young male has been caught and radio-collared, but the transmitter on one of the adult females has failed. Currently, two adult males, two adult females, a juvenile male and a juvenile female are fitted with functioning radio-collars. All three radio-collared females have been caught since the breeding season and are carrying young (two litters of four and one of three). In summary, all indications are that the Yookamurra colony is viable and will probably reach self-sustaining status, with the proviso that regular exchange of animals with other populations needs to be carried out to maintain genetic variability.

Karakamia

On 8 December 1994, an adult male and two female numbats were released, fitted with radio-collars, at Karakamia, a property of 180 ha surrounded by a Yookamurra-style fence at Gidgegannup near Perth. One of the females dropped her collar on or shortly before 30 December 1995 and the other female's collar ceased transmitting between 12 and 17 February 1995. The male is still being radio-tracked by Karakamia staff and other individual numbats have been sighted recently in both areas where the two females were known to have established home ranges. It is most likely that both females are still alive, although it has not possible to ascertain whether they are carrying young or not. During the mating season (January-February) the male was regularly in the home ranges of both females, however. All indications at this early stage are that the Karakamia reintroduction is going well.

Action 4. Disease survey and health monitoring of all populations

Faecal samples have been collected from numbats in all populations where animals are being handled. These are stored in formalin for parasitological examination, with particular emphasis on detection of eggs belonging to the acanthocephalan species found to have killed a number of numbats in or from the Dryandra population. A health monitoring protocol for the translocated numbats is currently being developed.

Since November 1994, all animals translocated from Dryandra either to Perth Zoo or to reintroduction sites have been wormed by injection with Ivomectin.

Action 5. Captive breeding

After the success of the captive breeding program in 1994 (19 young successfully raised to weaning) the 1995 breeding season has been disappointing. Two young survive from a total of only five born in February. This result may be partly due to the high production of young in 1994. Some of the young were weaned late and females may not have had time to return to breeding condition before being put in with males,

whose breeding capability falls off in February. Breeding protocols are currently being reviewed.

Two more first-year males will be brought in to Perth Zoo from the wild during 1995 to maintain genetic variability within the breeding colony.

Action 6. Public awareness, education

Two lectures and various publicity exercises outlining the Numbat Recovery Plan have been given by CALM staff since March 1995. Perth Zoo Education staff prepared a poster on the recovery programs for numbat, chuditch and western swamp tortoise, with input from CALM and University of WA, for the York Earthcare Festival on 2 April 1995. Tony Friend gave a talk on numbats and the Numbat Recovery Program at the same event.

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