WOYLIE RECOVERY TEAM

ANNUAL REPORT

1994

by

Tony Start and David Armstrong

for

The Woylie Recovery Team

Department of Conservation and Land Management
Western Australian Wildlife Research Centre
PO Box 51, Wanneroo, WA 6065

SUMMARY

This is the third annual report of the team implementing the recovery plan for woylies in South Australia and Western Australia. The team met twice, in July and in December 1994.

Two people have joined the team: Paul Brown from CALM's Swan Region (foreshadowed in the 1993 Annual Report to reflect the selection of Julimar as a translocation site) and Graham Liddelow (because of his long association with monitoring woylies at Perup). John Watson has retired from the team as there has been no confirmation of Woylies in South Coast Region of WA.

The team intends the status of the woylie be reviewed (as planned) in December 1995. However, in December 1994 the team concluded that the criterion of 20% trap success rate is probably unattainable at many sites even where woylies reach carrying capacity. It also recognises that some newly translocated populations may be well established but still be increasing by December 1995. Provided there is good evidence of an expanding population and adequate provision for monitoring and management beyond 1995, this should not delay the review. Criteria in the plan will need to be revised to reflect these factors.

In Western Australia, known woylie populations have thrived. Research is well under way at Kingston and at Batalling to examine the effects of various forest management practices so that prescriptions can be varied, if necessary, to allow recovery across all land tenure types. A consultant, Jackie Courtenay, was contracted to establish a monitoring program for all known Western Australia populations and to determine the extent of woylie distribution in the Kingston, Perup, Lake Muir area. She also collected blood for genetic analysis from populations not yet sampled.

Translocation to Julimar was postponed until January/February 1995. The new population will be intensively monitored as a major component of an Edith Cowan University post-doctoral fellowship study of the genetic consequences of translocations. The fellowship is held by Jackie Courtenay. Preparation is nearly complete for translocations to a number of sites in the northern Jarrah/Wandoo forest in association with Operation Foxglove. The prey monitoring component of this operation is a project under the fox ecology program of the Cooperative Research Centre for bio control of vertebrate pests.

In South Australia a mixed, although generally positive, result in woylie population development was achieved. The small Baird Bay Island population, which was not considered viable in the long term, was lost to foxes which gained access to the island during an extreme low tide. It will not be replaced. An attempted introduction of new genetic stock to the Wedge Island population failed, probably due to a combination of strong competition for food and shelter from the large resident woylie population and severe weather in the week following release. More positively, the remaining island populations appear to be thriving, with increased capture rates recorded for all three. The Yookamurra population continues to be monitored by Sanctuary staff, with the help of SA Department of Environment and Natural Resources.

The Venus Bay reintroduction began in April, with 52 woylies from Dryandra having been released at two sites. Recapture data indicates increased body weights and successful reproduction. Whilst two of 34 radio collared woylies have been predated by foxes, the reintroduction is progressing well with an optimistic view for long term success.

INTRODUCTION

This is the third annual report of the recovery team established to oversee the implementation of a plan to recover woylies in South Australia and Western Australia.

The first edition of the recovery plan was written under contract to ANCA by CALM in collaboration with SADELM. It had a life of 10 years commencing in 1992 and covered recovery of the species in Western Australia and South Australia.

During 1993 a second edition of the plan was prepared. The need for the new edition as well as a summary of the plan objectives, recovery criteria, required actions and costs was presented in the 1993 Annual Report. The revised plan has been modified slightly during 1994 to reflect requirements of ANCA and CALM and it has become evident that changes to recovery criteria will be needed to reflect factors that have become evident recently. The changes will be made before the plan is presented to Executives of the participating Agencies for formal approval.

The second edition has a life of two years from January 1994. The team still believes that the status of woylies can be reviewed in December 1995, and hopes that by then it can be down-graded.

The allocation of funds and the actions carried out in 1994 have been as prescribed in the second edition.

THE RECOVERY TEAM

Membership

During 1994 there have been some changes to the Recovery Team. Membership at the end of the year was;

Tony Start (Chair)	CALM Division of Science and Information.
David Armstrong	SADELM Contracted to implement the recovery plan in SA.
Andrew Burbidge	CALM WA Threatened Species & Communities Unit.
Bob Hagan	CALM Southern Forest Region.
Brian Macmahon	CALM Wheatbelt Region
Stephanie Maxwell	ANCA Endangered Species Program.
Keith Morris	CALM Division of Science and Information.
John Skillen	CLAM Central Forest Region.
Gordon Wyre	CALM Division of Nature Conservation.
Paul Brown	CALM Swan Region (new member)
Graham Liddelow	CALM Division of Science and Information. Manjimup Research Centre (new member)

John Watson, CALM South Coast Region, retired from the Team. He was a founder member because it was thought that woylies may still survive in that Region in Fitzgerald River National Park. However earlier reports are still unconfirmed despite trapping in fox baited areas (J. Kinnear pers. comm.).

Kim Williams and Rob Brazell represented John Skillen in July and December respectively . Dave Mitchell represented Brian Macmahon in July.

Observers at the December meeting were:

Jackie Courtenay	Consultant
Ray Nias	WWFA

Meetings

The recovery team met twice during the year: on 27 July 1994 at CALM's Wildlife Research Centre, Woodvale, WA, and on 6 December 1994 at Dryandra. The latter was an excellent venue because woylies are so abundant and visible there.

THE RECOVERY PLAN.

Some modifications to the 2nd. edition recovery plan objectives, criteria and actions (as detailed in the 1993 Annual report) have been necessary. They are:

Recovery Plan objectives.

Replace Objective 5. *(Prepare a recommended revision of the conservation status of the Woylie, using internationally accepted criteria.)*

With *Review the conservation status of the woylie, using internationally accepted criteria and recommend changes if necessary.*

Recovery criteria:

The first criterion for Western Australia reads:

1. *Maintenance of at least six populations of Woylies, each extending over at least 1 500 ha at densities that, when trapped using standard techniques, provide a minimum 20% trap success rate.*

The 20% was a trap success rate chosen arbitrarily in light of the trap success at Dryandra. However, experience elsewhere suggests that the population density (or the trapability anyway) at Dryandra is atypical of other areas. For example trap success rates at Batalling appear to have plateaued at about 10%. The team is deliberating on a more realistic figure to use in this criterion.

The team also notes that because of the foreshortened life of the plan, it is unrealistic to expect newly established populations such as that at Julimar to expanded to occupy 1,500 ha at or near carrying capacity by July 1995. Nevertheless new populations have proved easy to establish where predators are controlled. The team therefore believes that provided there is an adequate number of populations in suitably large areas of potential habitat and that the newer populations are expanding the review should proceed.

Actions needed:

Two actions have been added to the five previously reported. They are:

6. Employment of Scientist, South Australia.

7. Education and publicity

The former is necessary to the appropriate allocation of funds in the budget and the latter, added at ANCA's request, is to give greater focus on education and publicity opportunities.

PROGRESS ON SPECIFIED ACTIONS DURING 1994

This report addresses all seven of the actions although some aspects of some have been of little importance to the past year. Action numbers are those in the Recovery Plan.

3.1 Exotic predator control

Western Australia

Exotic predator (primarily fox) control using 1080 continues at Batalling, Dryandra, Tutanning and Boyagin as routine monthly operations. Regular baiting has commenced at Kingston. Baiting has continued at six monthly intervals at Perup (ground) and Fitzgerald River National Park (aerial - earlier reports of woylies in this NP are still not confirmed despite extensive trapping. J. Kinnear, pers. comm.). In the Perup area the Agricultural Protection Board continues baiting the boundaries with agricultural land and areas between Perup and Lake Muir to prevent Dingo incursion from the south coast to agricultural areas.

Operation Foxglove, an operation to aerial bait over 500,000 ha of the northern Jarrah/Wandoo forest, commenced in June. There are three zones, two, four and six baitings per year. An additional unbaited area is a control. Prey response to the various regimes is being intensively monitored. This aspect is a project under the fox ecology program of the CRC for Biological Control of Vertebrate Pests. Because woylie populations increase more rapidly than most other Critical Weight Range mammals in this area, it is planned to translocate woylies to five sites where prey responses are being monitored.

Fox baiting has been carried out for three years at Julimar Forest as an action under the Chuditch Recovery Plan. This will be the site for woylie translocation in January/February 1995.

South Australia

At Venus Bay the established fox baiting regime of replacing baits at fixed points 200 m apart, along tracks, fences and accessible beaches, at two monthly intervals was continued. Fox activity within the baited zone is now extremely low, with tracks being observed only once or twice during each one to two week visit to the area, and only one fox seen whilst spotlighting during the entire year. From this, it is assumed that no resident foxes exist and any entering the area are therefore naive and more easily baited.

Limited rabbit control, using spotlight shooting and fumigation of any reopened warrens, was also continued to maintain the large reduction in numbers, achieved through the 1080 baiting, carried out in February 1993. This encourages foxes to take baits in the absence of their major prey item.

Feral cat numbers were high during the first half of the year, almost certainly due to increased survival of kittens following the mouse plague of 1993. Control was both time consuming and labour intensive, with 32 cats being caught from 977 trap-nights. This population boom has subsided, and whilst occasional tracks are seen, cats are not considered a major problem at present. However, in view of the difficulty in trapping cats when prey items are more readily available, during spring and summer, regular trapping will continue during 1995 with a more accurate assessment being made in view of results over the winter months.

FERAL CAT TRAP EFFORT, VENUS BAY 1994

Month	Cage Trap Nights	Leg Hold Trap Nights	Cats Caught
February	91	105	5
April	258	161	19
May	21	-	2
June	94	28	5
August	71	2	1
Sept/Oct	50	-	0
November	96	-	0
Total	**681**	**296**	**32**

In the past exotic predator control has not been necessary for the island populations of woylies. While this situation continues for the Wedge and St Peter Island populations, and for the smaller less significant Venus Bay Island A population, a fox (or foxes) was able to gain access to the unnamed island in Baird Bay, presumably because an extreme low tide exposed a sand bar connecting it to the mainland a few hundred metres away. As no fresh sign of woylies (or foxes) was found and this population had not been considered viable in the long term, the only action taken was the distribution of a small number of fox baits as a precautionary measure to protect the remaining resident seabirds.

3.2 Population survey and monitoring

Western Australia

Dr Jackie Courtenay was contracted to establish standardised monitoring programs for woylie populations. Monitoring transects each ten kilometres long were established at Dryandra, Boyagin and Tutanning. Two existing transects (a north-south and an east-west transect), both about twelve km long, were utilised at Batalling. The routes are mapped and permanent trap locations marked, and trapping protocols documented. Dr. Courtenay will establish a program to the same protocols at Julimar when there is an established population there. CALM Science and Information staff will establish monitoring transects in Yendicup and Boyicup Blocks (Perup area) using the same methods. A sample of the protocol (for Tutanning Nature Reserve) is attached.

Summary of trapping data on transects established by Dr Courtenay

Location	Date	nights	Traps	% TSR[1*1]
Batalling Transect 1	July 1994	3	61	10.1%
Batalling Transect 2	August 1994	3	63	0.5%
Boyagin (west block)	May 1994	3	50	7.3%
Dryandra	May 1994	3	50	47.0%
Tutanning	May-June 1994	3	50	18.0%

Notes.

Batalling transect 1	Baited since Feb 1991 when TSR was 0.4%
Batalling transect 2	Expanded baiting area. Baited since July 1994
Boyagin (west block	Baiting commenced 1989 with TSR 0%. 20 released 1992. Captures in 1994 included 4 from founding stock.
Dryandra	Baiting of restricted began 1982. Current regime began 1989.

[1] TSR = Trap Success Rate as a percentage

Tutanning

Baiting commenced 1984. TSR has been variable in different areas of the reserve, eg, in 1989 TSR varied from 3-55% (mean 21.5%) (Kinnear's data quoted in Courtenay's report).

Four surveys were undertaken by Dr Courtenay in forest blocks south and west of Lake Muir covering sections of Meribup, Tone, Stoate, Talling, Dwalgan and Corbal blocks. Access to some other areas that would warrant survey was impossible because of weather and track conditions. Woylies were captured on three of the surveys.

Survey	Area	Dates	Trap-nights	Woylies	TSR
1	Meribup/N Tone	29/6-1/7 1994	150	2	1.3%
2	Tone/Stoate	13-15/7 1994	225	0	0.0%
3	Talling/Stoate	14-15/7 1994	169	1	0.6%
4	Dwalgan/Corbal	18/19-3 1994	88	3	10.2%

Woylies are now known to occupy an extensive area of the southern jarrah forest from Kingston and Warrup in the west through Perup to Tone and Talling in the south east. Earlier reports of woylies near Lake Muir were not confirmed but the survey has been very limited. The generally low TSR may reflect an expanding population form a core area about Perup or predation or, perhaps, a combination of these (and other) factors. Nevertheless,it is very encouraging that relatively low trap effort over two or three nights yielded woylies in three of four areas surveyed. This suggests that they are probably widely distributed in the area.

South Australia

Venus Bay Island A was again visited in February; 45 captures (29 males, 15 females, 1 unknown) were made, of 40 individuals, from 89 trap nights (over two nights), for 51% trap success. This is a small increase from last year (44%), although 11 (8 males, 3 females) of the 40 individuals were new (untagged) animals. However, only slightly under half of the females caught (7 of 15) were carrying young. Again, it appears this population is relatively stable at this level, in response to the available resources and conditions. In view of this, and the increased workload necessary on the Venus Bay peninsula it has been decided to reduce the frequency of monitoring of this population from annually to two yearly, and redirect the resources allocated to monitoring this and the Baird Bay Island population in 1995, to another attempt at introducing new genetic stock to Wedge Island.

The Baird Bay unnamed island population no longer exists due to a fox gaining access to the island via a sand bar exposed at extreme low tide. The possibility of this occurrence has always existed since the woylies were first introduced in July 1982, but had increased recently due to high fox numbers resulting from the mouse plague of 1993. Fears were raised during the first minutes on the island when no fresh diggings or tracks of woylies were observed. 35 traps were laid on one night producing no captures. A thorough search of the island revealed the remains of two bettongs, dozens of sea birds carcasses, and four sets of fox scats. As this population was not considered viable in the long term no attempt will be made to replace the woylies and monitoring has been discontinued.

St Peter Island monitoring was carried out in March, producing a considerable increase in trap success on last year, from 37% to 60%. 90 captures (57 males, 31 females, 2 unknown) of 88 individuals were made from 150 trap nights, at fixed trap locations, over three nights. There is no doubt that this population is expanding rapidly as 58 of the individuals caught were new (untagged) and only one of the 32 females caught did not have a pouched young.

Wedge Island was trapped in May, and also showed a marked increase on last year (the first year of systematic trapping since release in 1983) from 49% to 84% trap success. This consisted of 101 (66 males, 35 females) captures of 100 individuals, from 120 trap nights over four nights. Whilst not significant in

relation to other populations, as individual marking only commenced in 1993 it is worth noting that 80 of the 100 individuals caught were unmarked animals. Only 21 of the 35 females were carrying pouched young.

At Yookamurra 100 trap-ights were carried out over three nights from 7 September for the same result as last year, 12 captures or 12% trap success. This consisted of 8 males, 3 females and one unknown. All three females had pouched young. Eight of the 12 captures were untagged. However, as this is only the second year of monitoring, the ratio of tagged to untagged animals is not yet considered significant, except for future reference.

3.3 Range expansion (where feasible) and translocation

3.3.1 Western Australia

A translocation to Julimar was planned for 1994. However it has had to be postponed to January/February 1995. The founding stock will be sourced from Dryandra. At Julimar baiting has continued as a routine operation, having been established under the Chuditch Recovery Plan in preparation for a chuditch translocation (which has been successful). A Translocation Plan for Woylies has been approved by CALM's Director of Nature Conservation.

This translocation has been incorporated into a post-doctoral fellowship held by Dr. Courtenay at Edith Cowan University. The aims are to:

- Establish a new population in accordance with the Recovery Plan.
- Monitor intensively the colonising behaviour spatially (by trapping and radio-tracking) and genetically (by DNA fingerprinting founders and their progeny).
- Obtain demographic and genetic information on the behaviour of founding stock which may have implications for future translocations and
- Provide the foundations for a long-term empirical test of the predictions of a Population Viability Analysis of the likely persistence of a translocated population of a given size and composition.

The Director of Nature Conservation has also approved the translocation of woylies from Dryandra to five sites in the northern jarrah/wandoo in association with Operation Foxglove. (see Section 5.1)

3.3.2 South Australia

Following more than 12 months preparatory fox baiting and associated rabbit control, woylies were reintroduced to Venus Bay Conservation Park, beginning in April. Initially, six males were released on 5 April 1994, followed by 10 females on 16 June 1994. All 16 were fitted with radio collars. On assessment of this trial release in late September, 13 were found alive and well, two had died from non predator related causes, and one was missing, presumed transmitter failure. On the basis of this good result was decided to proceed with a major release of a further 50 woylies.

Due to the logistics involved in handling such a large group it was necessary to separate the release of this number into three stages to be carried out in October and November 1994, and January 1995. Thus, at years end, 52 (23 males, 29 females) woylies, originating from the Dryandra population, have been released at Venus Bay. Of these, 34 were fitted with radio collars. In early December it was known that 28 collared animals and several of the uncollared animals were alive, one was missing, three had died from non predator related causes and two had been predated by foxes. Another 15 woylies (5 males, 10 females) will be released in late January 1995 to complete the release program.

Many of the woylies have been recaptured for re-collaring. All have at least maintained, if not increased their weight from that recorded at time of release, and the majority of females were carrying pouched young. In fact, in early December, two females released in June were known to be carrying their second young since arriving at Venus Bay.

3.4 Determine the effects of forest management practices

At Kingston a comprehensive research project has been commenced to determine the effects of a normal timber harvesting program on a number of indigenous taxa, including woylies[2]. The area is being baited for foxes four times per year to ensure predation by them is not a confounding factor. Pre-operational data is being collected. The timber harvesting is planned for 1995.

A prescribed burn was conducted at Batalling to evaluate the effect routine fuel-reduction prescribed fire on populations of fauna including woylies. No post-fire data are available yet.

3.5 Genetic assessment and re-stocking

DNA was successfully extracted from blood samples at Curtin University. Band sharing between individuals was assessed manually and a preliminary summary of results is shown below.

Location	Total blood samples	Successful DNA extractions	Band sharing	av. number of bands
Tutanning (WA)	20	15	0.53	10.4
St. Peter I. (SA)	15	12	0.80	8.5
Baird Bay I. (SA)	10	9	0.77	10.6
Wedge I. (SA)	10	8	0.80	12.2
Venus I. (SA)	10	0	n/a	. n/a

The three South Australian island populations display an appreciably lower level of VNTR genetic diversity than the Tutanning population. The preliminary report suggests that the Tutanning population is comparable with a well maintained flock of sheep.

These results justified attempts to introduce new wild-caught animals from Western Australia to the larger South Australian islands. In early May, ten male woylies (originating from Dryandra), fitted with radio collars were released on Wedge Island in an attempt to supplement the genetic variability of this population. One died within five days of release following a severe storm. On returning to the island in early August only two were found alive, four more were dead, and the remaining three could not be relocated. Two of the dead had been taken by diurnal raptors. This combined with the poor quality nesting sites in which the two live animals were found indicated that the new introductions had extreme difficulty establishing, due to competition with the already abundant resident woylies (84% trap success, 1994). It is necessary to continue attempts to introduce new unrelated animals to the Wedge and St Peter Island populations to secure their long term genetic viability.

Blood samples were collected from 39 of the woylies (originating from Dryandra) which were released at Venus Bay and all ten released on Wedge Island. They were stored by the Evolutionary Biology Unit (EBU) at the South Australian Museum. Eighteen of these samples have since been sent to La Trobe University (Vic) for use in DNA studies. There have been considerable delays in obtaining analysis and full reports from Curtin University. Blood samples from other Western Australia populations will be sent elsewhere in future, possibly to La Trobe.

---

2 (Pre-harvesting survey found woylies and other threatened taxa in an area of forest designated for timber production. As CALM wishes to recover fauna in all suitable habitat, irrespective of land use, not just conservation reserves, this area provides an opportunity to examine the effects of harvest operations and, if necessary, revise prescriptions to ensure harvested areas continue to provide suitable habitat for species such as woylies.)

3.6 Employment of Scientist, South Australia

David Armstrong continued to work full time on the Woylie Recovery program in SA, his salary and costs being met from the ANCA allocation in accordance with the Plan Budget. This included two trips to the Recovery Team meetings in WA.

3.7 Education and publicity

Production of a replacement to the out-dated CALM leaflet on woylies has been postponed because CALM's Western Australian Threatened Species and Communities Unit WATSCU) is planning with CALM's Division of Corporate Relations to produce an integrated series of information sheets on threatened species. They will be designed to be informative for general public consumption as well as being suitable as an educational aid for use with schools and other venues. The woylie will be the subject of one of the first in the new series. CALM's Swan Region is planning to produce posters featuring fauna of the jarrah forest which will also feature woylies.

There have been several media releases featuring woylies during the year. These have included information about Operation Foxglove and the work of the VBC CRC.

CONCLUSION

The year has been one of action with some major achievements. After comprehensive preparation over previous years woylies were released on the SA mainland and have settled in well. In Western Australia, long-term monitoring protocols have been put in place for most populations and experiments are under way to examine the effect of various land management actions on woylies. These include prescribed fire, timber harvesting and aerial delivery of fox baits over large areas of forest. The Recovery Plan has been difficult to finalise because of the dynamic nature of progress in the recovery of the species. This has even been reflected in changes to the membership of the team. Nevertheless the Plan has provided a flexible and workable foundation for the actions.