RECOVERY PLAN FOR
THE BRUSH-TAILED BETTONG OR WOYLIE
(*BETTONGIA PENICILLATA*)

ANNUAL REPORT OF THE RECOVERY TEAM

1992

CONTENTS

1. INTRODUCTION

1.1 Summary of status and distribution when the plan was written

Bettongia penicillata once occurred across most of non tropical mainland Australia west of the Dividing Range (Fig 1). It thrived in all mainland states and was very common over much of its range (selling "by the dozen at about nine pence a head for coursing on Sunday afternoons" in South Australia).

When the plan was written it was known, in the wild, at Dryandra State Forest, Perup State Forest and Tutanning Nature Reserve in sw WA. There were unconfirmed reports from the Eyre peninsula in SA and Fitzgerald River National Park in WA and there were introduced populations on several SA islands (WA stock) and at Batalling State Forest in WA. (Fig 2).

Typical *B.p.penicillata* of the eastern Australian mainland is presumed extinct. Wild animals may persist on the Eyre peninsula but this is considered very unlikely.. All known surviving populations are *B.p.ogilbyi* of sw WA. It is listed as "Endangered" (ANZECC and SA National Parks and Wildlife Act) and "Threatened" (WA Wildlife Conservation Act).

1.2 The Recovery Plan

In 1991 the Australian National Parks and Wildlife Service (ANPWS) contracted the Western Australian Department of Conservation and Land Management (CALM) (in consultation with the South Australian National Parks and Wildlife Service - SANPWS) to write a plan for recovery over the next 10 years for the species in WA and SA. The summary page from the plan is attached as Appendix 1.

The objective of the plan is: "Downlisting to vulnerable within 10 years by protecting mainland populations from exotic predation and competition, maintaining island populations and establishing new populations on the mainland." and the Recovery Criterion for the first 2 years is to establish exotic predator control over existing populations. Longer term criteria include establishing additional populations. Appendix 1.

1.3 ANPWS approval for implementation of the Recovery Plan.

The Plan was submitted to ANPWS in late 1991. ANPWS agreed to fund the recovery action through the Endangered Species Program. Accordingly CALM was contracted (17 February 1992) to implement the actions specified for

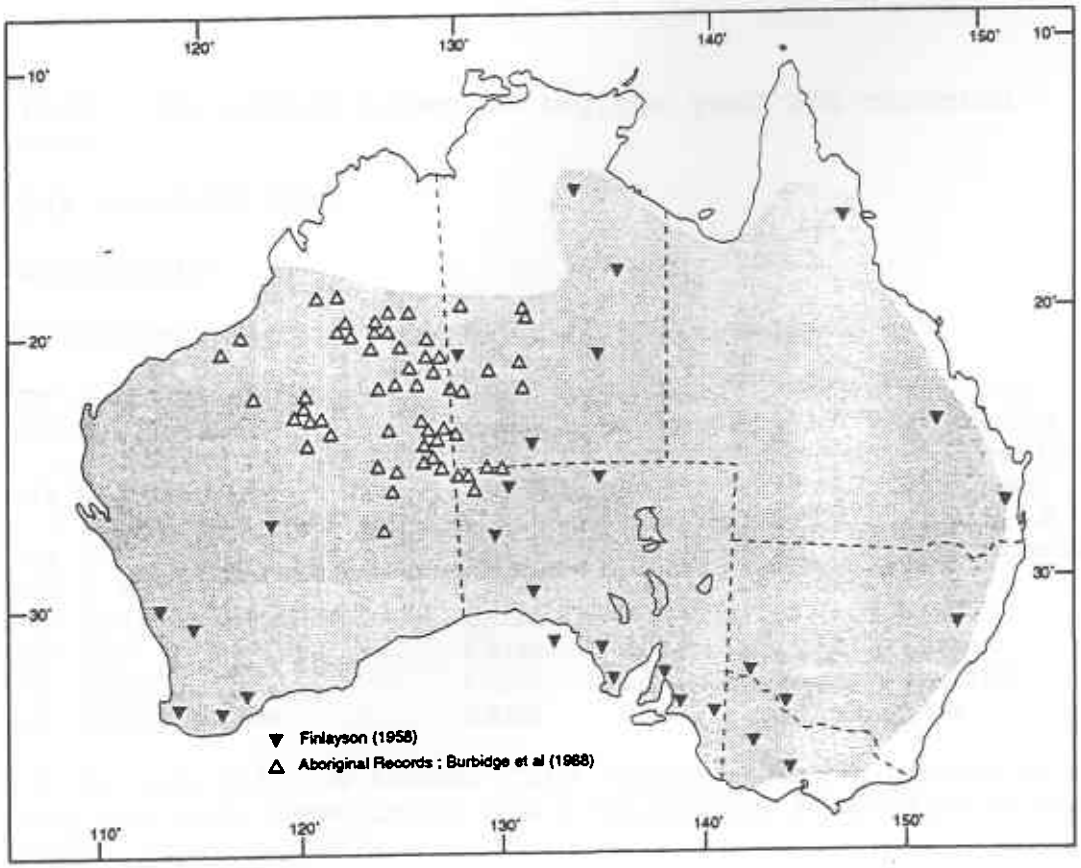


Figure 1

Historic Distribution

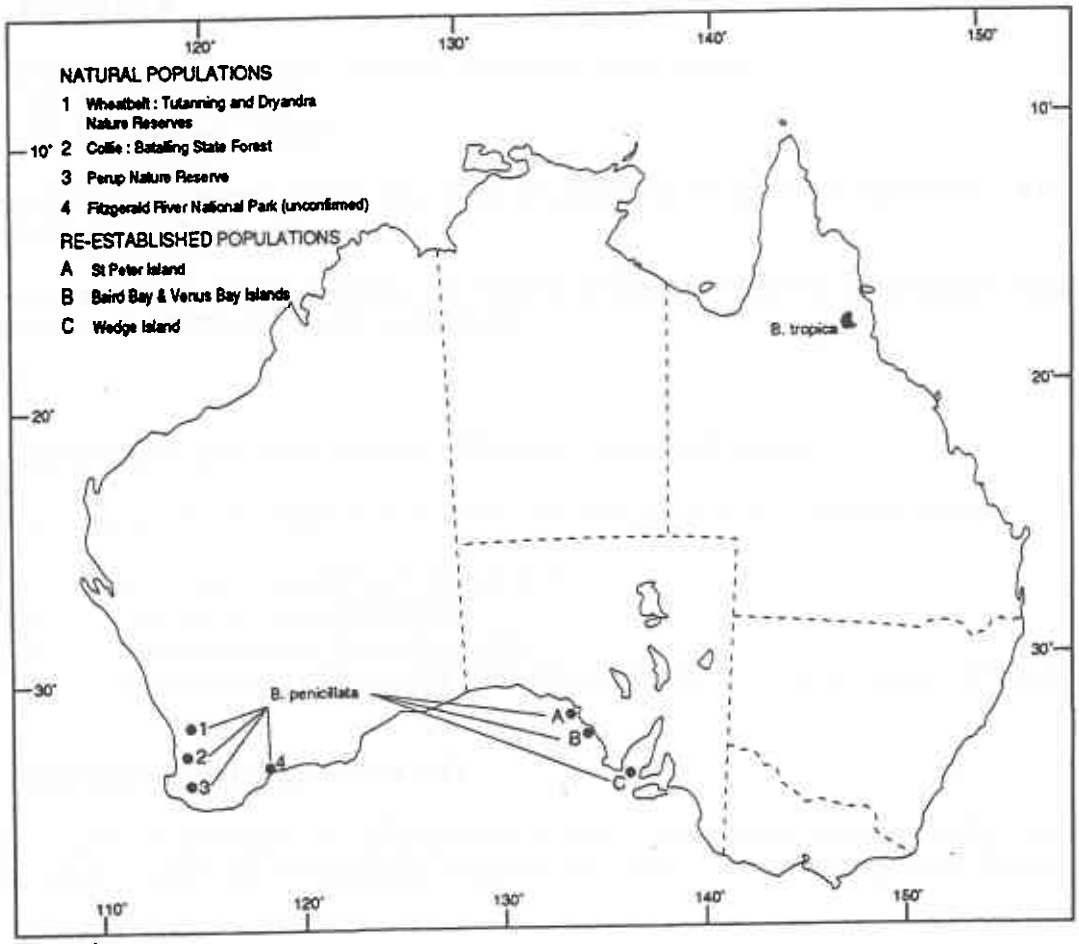


Figure 2

Present Distribution

1992. The action taken during the year are reported here.

2. THE RECOVERY TEAM

2.1 Membership

A recovery team has been appointed. Members are

Dr A N Start (Chair)	CALM	Wildlife Science Group
Dr A A Burbidge	CALM	Director, WA Threatened Species & Communities Unit
Mr D Armstrong	SANPWS	Contracted to implement the recovery plan in SA
Ms S Stephens	ANPWS	Endangered Species Program
Mr G Wyre	CALM	Wildlife Branch
Mr Brian Macmahon	CALM	Wheatbelt Region
Mr Bob Hagen	CALM	South Forest Region
Mr John Skillon	CLAM	Central Forest Region
Dr John Watson	CALM	South Coast Region

Mr Graham Hall, a former CALM employee was a member of the Recovery team until his resignation from CALM in late 1992.

2.2. Meetings

The recovery team met twice during the year:
10 August 1992
15 December 1992

Both meetings were held at the Wildlife Research Centre, at Woodvale in WA.

Observers were John Blyth of WATSCU/CALM (first meeting) and Ray Nias of WWFA/Second meeting.

3. PROGRESS ON SPECIFIED ACTIONS DURING 1992.

The Recovery Plan has four Action Categories. These are:

1 Exotic Predator Control
2 Genetic assessment
3 Population monitoring
4 Translocation and establishment of new populations

3.1 Exotic Predator Control

In WA exotic predator (primarily fox) control using 1080 has been continued at Dryandra State Forest, Tutanning and Boyagin

Nature Reserves (woylies have been translocated to Boyagin Nature Reserve; see section 3.3)

A baiting program at Batalling State Forest has been regularised through Chuditch Recovery actions and a baiting program has been introduced over a large area of Fitzgerald River National Park as part of a broad study undertaken by members of CALM's fox research group through the Vertebrate Biological Control Co-operative Research Centre.

That program is not designed to implement the Woylie Recovery Plan. However Woylie recovery (if they are present) will benefit directly from it. A trapping program will start in early 1993 to measure the effectiveness of fox baiting.

The Perup State Forest is not regularly baited. Species such as Woylies and Numbats have persisted in reasonable numbers without predation control. This is assumed to be attributable to the abundance of plants (*Gastrolobium* spp) containing 1080 and "natural" predator control through secondary poisoning. However 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.

In South Australia there is no requirement for predator control in the islands that have woylies. However predator control is a prerequisite for re-introduction to Venus Bay Peninsula (programmes for 1994). During 1992 various options were subjected to feasibility study. The options included were:-

A To construct a vermin exclusion fence on the site of the park boundary. This was decided against because of:

1. The impossibility of continuing the fence down the 60° upper slope of the cliffs on the seaward side of the boundary. Numerous ledges would enable introduced predators easy access past any fence constructed here.

2. The extent of the tidal flat on the bay side of the boundary also makes for easy access around the end of any fence.

B To construct a vermin exclusion fence at the narrowest point on the peninsula (on private land). This had distinct advantages over the initial proposal in that there are vertical sea cliffs on one side and the width of the peninsula is only 600m, almost half that at the park boundary, thus dramatically reducing costs. However, this was also decided against because:

1. The same problems with the tidal flat on the bay side of the fence would still occur. Any fence built into the water would be subject to corrosion and build up of seaweed thus creating a severe on-going maintenance problem.

2. The sea spray coming over the cliff tops could cause a serious corrosion problem and replacing of sections of a complex fence would be a recurring financial burden.

3. Such a fence would require some level of electrification to be effective and salt spray would cause electrical failure through corrosion and shorting to earth.

C It was concluded that the success of a total vermin exclusion fence could not be guarantied but that eradication and exclusion of rabbits on the peninsula is possible. Therefore, following negotiation with the adjacent land owner (Mr Lee Amey) and recent changes in state regulation permitting the use of 1080 on meat baits for fox control, the following programme for vermin control on the Venus Bay Peninsula has been chosen.

1. Construct a rabbit exclusion fence on private land across the narrowest point of the peninsula at a cost of approximately $6,500. This will create a "buffer zone" approximately 3km long varying in width from 0.6 to 1.2km. Concentrated baiting for foxes will occur in the buffer. This will prevent re-invasion of the Park. The removal of rabbits from the buffer will encourage foxes to take baits as they travel through this more open country.

2. Fox control will be achieved through the use of 1080 meat baits. Baiting frequency is yet to be determined. It will be established from monitoring the effects of the initial baiting in February 1993. Baiting will consist of:

(a) Baits at marked stations 50m apart in front of the rabbit exclusion fence with a scent drag between them,

(b) a grid of marked bait stations at 200m intervals throughout the "buffer zone" and

(c) baiting within the park itself at approx 200m intervals along tracks, accessible beaches and in the cliff top dunes and other areas of known fox activity.

All marked bait stations will be positioned on areas of bare sand to permit recognition of tracks of species taking baits and assist in monitoring of fox activity within the area. Further monitoring of fox activity will

be by scat and track counts along tracks and by spotlighting.

3.2 Action 2 Genetic Assessment.

Blood samples for Genetic analysis were collected from twenty eight animals at Tutanning Nature Reserve and from twenty animals at Batalling State Forest. The samples are stored at Curtin University pending analysis. Blood sampling at Perup and Dryandra State Forest in WA and on SA Island populations has been re-scheduled to 1993.

3.3 Action 3 Populations monitoring

Batalling. Fig 3 shows changes in Woylie capture rates in a baited area of the forest block to October 1992. Capture data prior to December 1990 is irregular. In December 1990 capture rates were below 1%. Since baiting commenced in February 1991 there has been a steady increase to almost 9% in October 1992 but in an adjacent unbaited block (Godfrey/Leach) capture rates remain below 1%.

Perup. Capture rates have remained fairly constant. In the Yendicup block capture rates have been:

YEAR	TRAP NIGHTS	CAPTURES	%
1990	200	68	34%
1991	360	160	45%
1992	100	46	46%

Dryandra. Comparative data for 1992 from Dryandra is not available at present. However Woylies are currently abundant there.

Tutanning. In July 1992 65 woylies were caught in 272 trap nights; a trap rate of 23.9%.

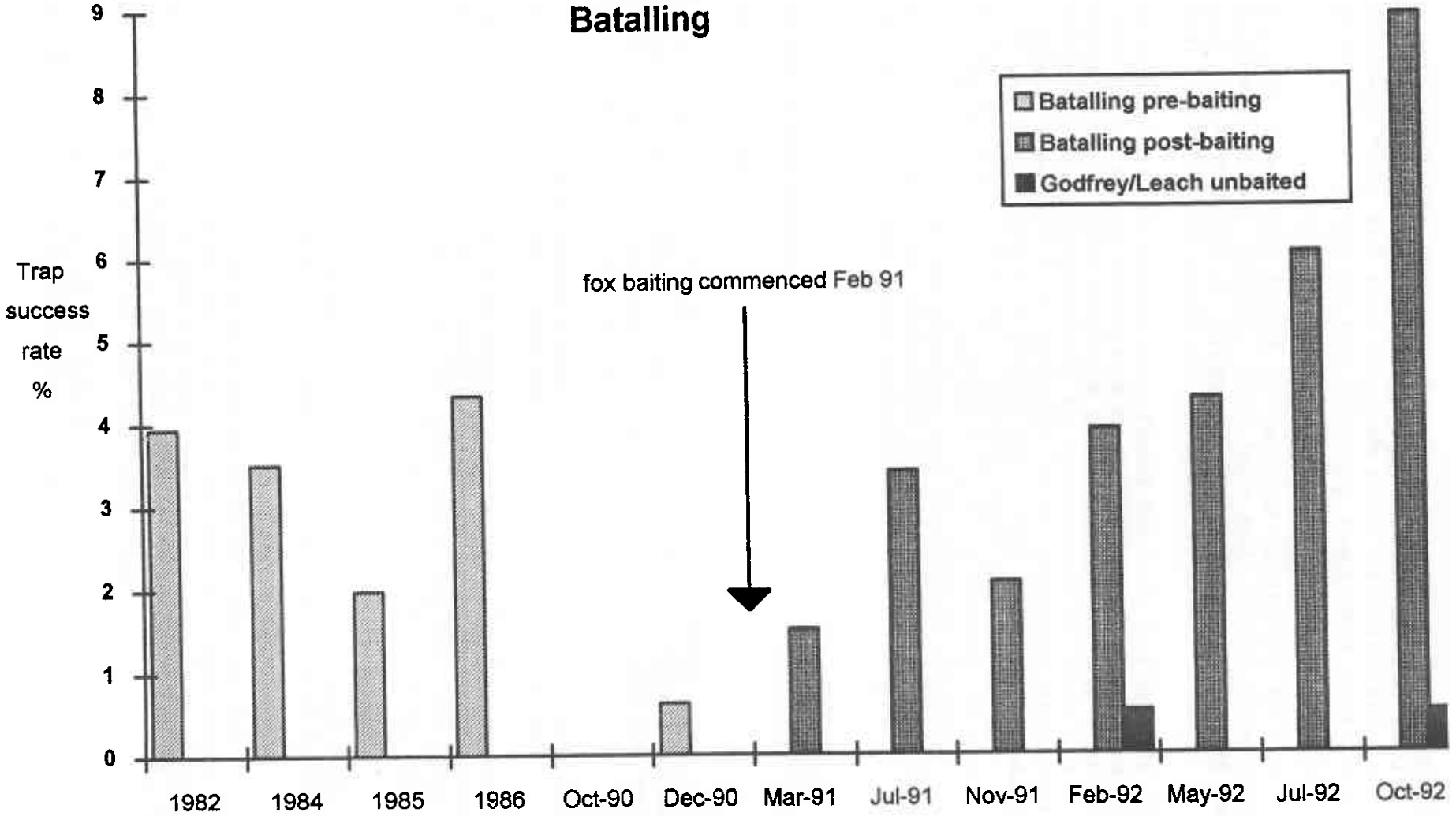
SA Islands will be monitored in early 1993

3.4 Action 4 Translocation and establishment of new populations

No translocations were scheduled for 1992 under the Woylie Recovery Plan. However 40 animals were released on Boyagin Nature Reserve. They were obtained from the nearby Dryandra State Forest. Boyagin has been baited for foxes for several years and has had Numbats successfully re-introduced. This translocation was

The Effect of Fox Baiting on the Woylie

Batalling



carried out for experimental purposes by the Vertebrate Biological Control CRC. The interaction of the Woylie Recovery Team and that program will be addressed in a proposed revision of the Recovery Plan (see section 4.1).

Woylies have been found at two new locations in the Southern Forest Region: Near Lake Muir about 20km south east of Perup and at Kingston State Forest about 20 km east of Manjimup (west of Perup).

At Lake Muir an animal was found dead on a road. It had a live pouch young which has been raised. In Kingston State Forest forty three Woylies were trapped during routine fauna surveys preparatory to harvesting of five small coups. They are also present in an adjacent area that was harvested about 6 years ago. The harvesting has been postponed by 12 months. During that period it is intended that more detailed data be gathered on the population. The monitoring and management of this population will be addressed in the proposed revision of the Recovery Plan (see section 4.1).

4. OTHER DEVELOPMENTS

4.1 Plan review.

Since the plan was written there have been several developments that, taken collectively, led the recovery team to decide that the Recovery Plan should be reviewed and re-written. These factors include:-

i. In WA the planned translocation sites are Fitzgerald River National Park and Karoun Hill Nature Reserve.

CALM has translocated Numbats to Karoun Hill where we have apparently successfully controlled foxes. However we are having difficulties with cats and believe that it would be inappropriate to put Woylies there under these circumstances.

There is still a question over whether there are natural woylie populations in Fitzgerald River NP. (See sections 1.1 and 3.1)

Given the above, perhaps we should be looking for alternate sites at which to establish an additional population. Changes to the translocation plans would result in a change, but not necessarily an increase, in the cost structure of the Recovery Plan.

ii. In WA there is evidence that woylies are more widespread than previously thought in the Southern Forest

Region including a population in an area that is programmed for timber harvesting (see section 3.4). We need to think through the issue of managing a woylie population in such areas. It would be good to be able to recover woylie populations throughout all forest tenure types and this area would offer an opportunity to monitor the effects of harvesting small coups and to develop operational techniques that will optimise woylie (and other species) survival.

iii. There is an on-going need to conduct research on foxes. This need has recently been given a huge impetus by the establishment of the Vertebrate Biological Control CRC. In WA woylies have benefited enormously from fox control at Tutanning, Dryandra and Batalling. These fox control measures have been part of extensive research projects on the Red Fox. We may need to manipulate fox populations to understand predator-prey relationships under varying population scenarios and to establish optimum baiting regimes. This could affect woylies but none of work will threaten the survival of woylie populations. However the recovery plan needs to acknowledge that woylies will play a role in fox research; their long-term prospects for recovery depend on it.

iv. In SA proposals for fencing Venus Bay have changed from a physical predator fence to a combined physical rabbit and bait predator fence (see section 3.1). This will alter costing estimates (because a cheaper fence will suffice, but there will be an on-going cost for baiting and a salary will be required through 1993.

v. The South Australians want to propose importing additional genetic stock from WA.

1993 (Year 2 of the Plan) is a "quiet" one although some of the work for 1992 will carry over into 1993, notably the analysis of genetic samples and the Venus Bay fencing. This then is an ideal time to review the plan.

Tony Start and Andrew Burbidge have undertaken to play the lead role in that process, but it will be a Team effort.

In reaching this conclusion the team stressed the need for the plan. It also agreed that the basis for the plan is already in place. It simply needs revision of some points in the light of recent developments, and clarification of some details. The team believes it will be much stronger for being a plan that the whole team has developed, rather than a plan that the majority of members have inherited.

4.2 Woylies in captivity.

The Recovery Team has researched Woylie colonies held in captivity. There is an International Studbook with Adelaide Zoo as the responsible custodian. Two editions have been published. The latter (1985) listed 23 colonies including nine that are overseas (Europe and America). Besides captive colonies in recognised institutions it is estimated that there are between 100 and 200 animals in private ownership in SA. The recovery team is concerned about this because these animals are probably highly inbred.

If biological control of foxes is achieved, escape or release of highly inbred animals which become founding stock for new population could be problematical.

5. Conclusions

This has been the first year of implementing the Woylie Recovery Plan. A recovery team has been appointed and it has met twice. Good links have been established between SA and WA and the team works effectively.

By and large the year has been successful. Woylie populations have thrived. Woylies have been located in two areas in the Southern Forest Region of WA where they were not previously known to be extant and forty animals have been introduced to a Nature Reserve close to Dryandra State Forest. However a number of unforeseen issues, taken collectively, led the Recovery team to conclude that the plan should be reviewed in early 1993.

6. Recommendations

6.1 A revised budget for SA in 1993 has already been submitted to ANPWS (ESU) and agreed to. This will allow for the continuing employment of David Armstrong to implement the SA genetic sampling and monitoring of island populations. He will also effect exotic animal control at Venus Bay in preparation for translocation to the mainland.

6.2 The recovery team recommends that its proposal to review the Recovery Plan in the light of recent developments and the need to provide greater detail and in some areas be endorsed.

APPENDIX 1

SUMMARY OF THE RECOVERY PLAN

Current species status: Endangered (ANZECC 1991). Threatened (WA Wildlife Conservation Act). Endangered (SA National Parks and Wildlife Act). Formerly abundant and widespread, but now restricted to 5 mainland populations in Western Australia and 4 island populations in South Australia.

Habitat requirements and limiting factors: Adequate forests and woodlands exist in southern Australia to support populations provided exotic predators are controlled.
Additional populations can be established if foxes, cats and rabbits are controlled over much of the former range.

Recovery Plan objectives: Downlisting to vulnerable within 10 years by protecting mainland populations from exotic predation and competition, maintaining island populations, and establishing new populations on the mainland. Indefinite protection and management of mainland populations required.

Recovery criteria:
2 years - Establish exotic predator control over existing populations.
5 years - Successful establishment of 2 additional mainland populations.
10 years - Successful establishment of at least 8 mainland populations with a total number of adults exceeding 5000. Maintenance of island populations.

Actions needed: The following actions will be overseen by a Recovery Team composed of people from CALM, SANPWS, ANPWS and other organisations relevant to the recovery process.
1. Exotic predator control
2. Genetic assessment of all populations
3. Population monitoring
4. Translocations and establishment of new populations

Cost of Recovery (1991 prices in $000/year): Total cost (TC) and Endangered species program (ESP) contribution

	Action 1		2		3		4		TOTAL	
YEAR	TC	ESP	TC	ESP	TC	ESP	TC	ESP	TC	ESP
1992	61.0	50.0	12.0	12.0	22.9	9.9	-	-	95.9	71.9
1993	13.0	-	-	-	22.9	9.9	-	-	33.9	9.9
1994	13.0	-	-	-	22.9	9.9	56.9	42.8	90.8	52.7
1995	13.0	-	-	-	22.9	9.9	44.3	28.9	78.2	38.8
1996	13.0	-	12.0	12.0	22.9	9.9	44.3	28.9	90.2	50.8
1997	13.0	-	-	-	22.9	9.9	44.3	28.9	78.2	38.8
1998	13.0	-	-	-	22.9	9.9	42.1	28.9	76.0	38.8
1999	13.0	-	-	-	22.9	9.9	42.1	28.9	76.0	38.8
2000	13.0	-	-	-	22.9	9.9	42.1	28.9	76.0	38.8
2001	13.0	-	12.0	12.0	22.9	9.9	42.1	28.9	88.0	50.8
TOTAL	178.0	50.0	36.0	36.0	229.0	99.0	358.2	245.1	801.2	430.1

Biodiversity benefits: A further 4 endangered and 1 vulnerable species will benefit from the recovery actions, particularly exotic predator control. Soil disturbance caused by woylies aids regeneration of several species of rare flora.

APPENDIX 2

Woylie Recovery Team. ANPWS Grant

1992 Summary Statement

Grant from ANPWS	$71,900.00
To CALM	$14,400.00
To SANPWS	$57,500.00

WA Spent to December 15 1992.

WA Salary (monitor & genetics)	$10,581.00
WA Travel Allowance	$183.18
WA Materials	$182.01
WA Vehicle use	$274.62
WA to Collie District	$1,000.00
	$12,220.81
BALANCE with CALM	$2,179.19

SA Spent to December 15 1992.

SA Salary (D. Armstrong)	$11,000.00
SA Materials	$284.50
SA Travel a) to WA	$1,705.50
SA Travel b) Venus Bay/Yookamarra	$1,885.50
	$14,875.50
Balance with SANPWS	$42,624.50

NOTE Revised expenditure by SA for 1992 1nd 1993, including the funds still in hand has been agreed by ANPWS. Remaining balance in WA will be used to complete genetic sample collection.