DRAFT PLAN
PROJECT EDEN

ALEX CHRISTENSEN & NEIL BURROWS 1994

BACKGROUND

The unique natural features and geology of the Shark Bay region have been internationally recognised as a World Heritage area. The region contains some outstanding national parks, marine parks and nature reserves. Bernier and Dorre Islands are two of the most important areas for nature conservation in Australia, providing the last sanctuary for several mammal species that were once common on mainland Australia. The absence of foxes and cats is the main reason for the persistence of these animals on the islands.

The Peron Peninsula is the most accessible and the most visited area of the Shark Bay region. Its natural splendour and the dolphins of Monkey Mia attract thousands of tourists each year. While the offshore islands host a variety of rare and endangered terrestrial fauna, they are not readily accessible to ecotourism. Predation by foxes and cats has severely depleted the original suite of terrestrial mammalian fauna on the Peron Peninsula but there is enormous potential to increase both the conservation value of the region and ecotourism to the region by controlling foxes and cats (and domestic stock) and by reintroducing threatened animals. The declaration of the northern portion of the Peron Peninsula as the Francois Peron National Park places a large area of habitat into the care of CALM. This mainland area is suitable for the re-establishment of populations of animals which previously occurred in the area which, together with spectacular coastal scenery and diverse marine life, has the potential to be one of the outstanding natural wonders of the world.

Re-introduction of threatened mammals has been a feature of conservation work by CALM and has resulted in the improved conservation status of animals such as woylie, noisy scrub bird, numbat, quenda and chuditch in the south-west of the State. Fox control has been the key to the success of these Re-introductions. Attempts to reintroduce mammals to Karroun Hill Nature Reserve and to the Gibson Desert Nature Reserve in semi-arid and arid regions of the State respectively, have encountered problems due to an inability to control feral cats. The Gibson Desert Nature Reserve experiment found that while conventional control techniques were successful against foxes, on an operational scale they were ineffective against feral cats, which actually increased in numbers following fox control. These experiments clearly demonstrated that control of feral cats is one of the most pressing problems in the conservation of threatened vertebrates in Australia today. Until recently, control methods for feral cats had not been extensively researched in Australia. CALM scientists are leading in this field and Dave Algar has recently made an exciting breakthrough, putting a practical method of cat control within reach.

AIM

This operational experiment aims to control introduced predators and herbivores and to re-establish threatened mammals on the mainland in an area where their presence would have significant conservation benefit to the species and financial benefit to the local community and to the Sate through ecotourism. In particular the aim is to test recently developed cat control techniques on an operational scale. The Peron Peninsula offers a 'closed' situation in contrast to the Gibson Desert and Karroun Hill 'open' situations in which it has proved difficult to prevent re-invasions of predators following initial control. Although the Peron Peninsula differs somewhat in vegetation, geology and climate from Bernier and Dorre Islands, there is historical and sub-fossil evidence that a similar suite of mammal species now

found on the islands existed on Peron until European Settlement. There are also other S.W. species like the Mallee fowl, the Woylie and the Chuditch which could be considered for re-introduction to the Peron.

Specifically, this operational experiment aims to:

1. Control introduced predators (foxes and feral cats) and herbivores (goats, sheep and rabbits) on the Peron.
2. Re-establish a range of threatened animals on the Peron.
3. Foster and promote ecotourism to the region.

STRATEGY

It is important that this project is not perceived as a research (SID) project. A high level of SID involvement is necessary because of the large problem solving component and high technical component of much of the work. Cat control in contrast to fox control, is still in the developmental stage. In spite of rapid advances in control techniques a high research component is still necessary before the techniques which are currently being developed for cat control are ready for broadscale use. The major objectives of the work on the Peron is to hasten the development of operational cat control techniques as well as solving associated practical problems which may arise as a result of predator control, eg. rabbit increase in an area which is at the northern limit of the main myxomytosis vector, the European rabbit flea. It needs to be clear from the outset however that this is an Operational Project and there needs to be a commitment to gradually hand over the project to the Districts and Regions as it progresses, problems are solved and local expertise is developed

This initial project plan is a strategic plan which provides a broad outline of the project. The next atage will be the preparation of detailed operations plans as follows:

a. Communication plan
b. Protection plan
c. Feral animal control plan
d. Monitoring plan
e. Re-introduction plan
f. Eco-tourism plan

An essential ingredient which also needs to be addressed as soon as possible is the development of a support base in the scientific community. Scientists who support the concept of experimental Re-introduction

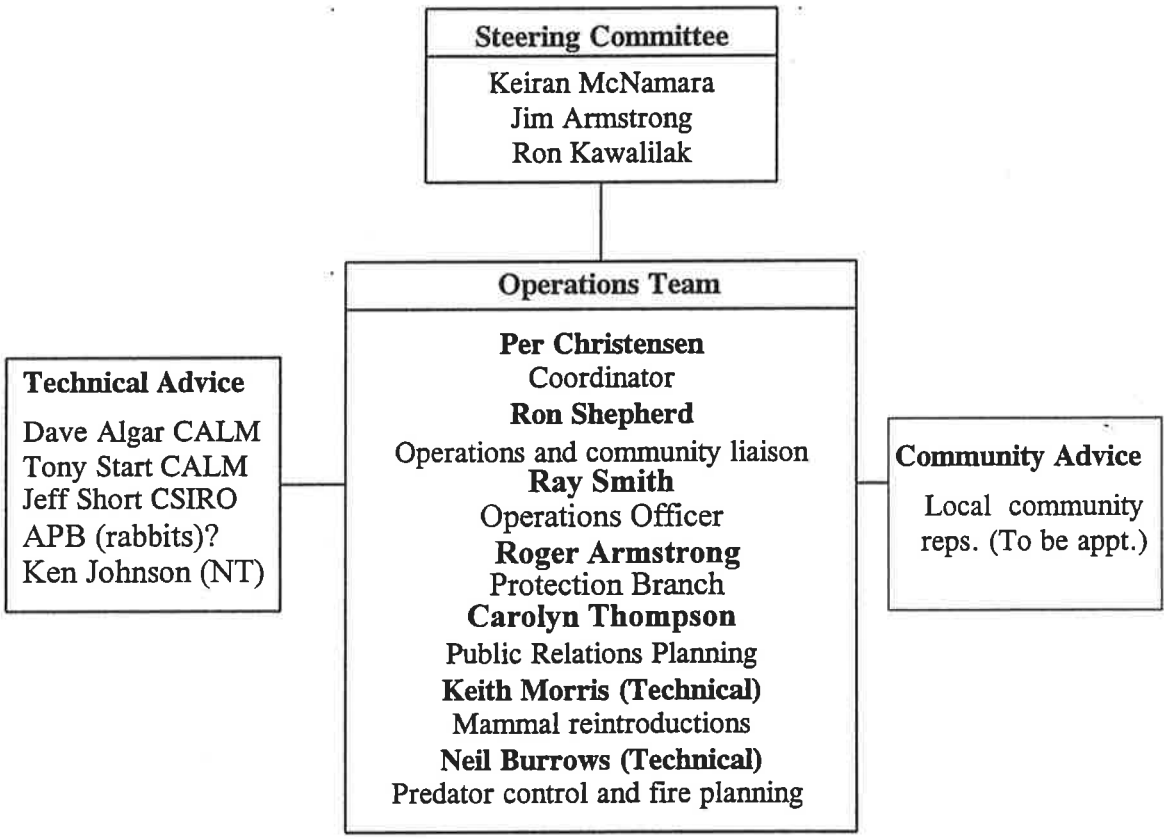
The operation will progress in stages, with progression from one stage to the next depending on the successful completion of the previous stage. Firstly gaining the support of the local Shark Bay community is fundamental to the success of the project. The next stage is to control foxes, feral cats and rabbits. When this is achieved to a predetermined level, (see under Phase 1, Feral animal control) re-introductions can be attempted. Following the successful re-introduction ecotourism based on these animals can be developed.

While this is an operational experiment, there are important technical imperatives which will require the considerable involvement of Science and Information Division staff. In addition, CALM's operational resources at Denham are limited, even with the proposed appointment of an Operations Officer. A project of this size and complexity will be beyond the resources of the Gascoyne District to tackle alone. The success of the project will depend on a firm

technical understanding of introduced predator control and monitoring of habitat suitability and suitable candidate species for Re-introduction, of techniques for monitoring the progress of reintroduced animals and of fire management for both protection and habitat management. It is proposed that Gascoyne District staff and Midwest Region Planning staff will work collaboratively with SID staff, with each group and individuals having clearly defined roles.

It is recommended that an additional full time Operations Officer (L3) be seconded to Denham for the duration of this operation and that funds be available for the contracting of a local person to assist the Operations Officer with this operation on an as needed basis. The primary role of SID staff will be to provide technical support to the project, but it will be necessary for staff to spend time in the field to train district staff and to assist with the work load. Figure 1 illustrates the proposed structure and functions of people involved with the operation. The Operations Team will be responsible for the physical implementation of the operation and will draw on the expertise of the Technical Advisory Team. The Community Advisory Committee will provide a forum for community involvement in the operation.

Figure 1: Structure and functions - Operation Peron



Phase 1: Feral Animal Control

The support of the Shark Bay community is an essential prerequisite for the success of this operation. A community based advisory committee should be established to foster local involvement and support and to demonstrate the benefits to the community arising out of this operation. The role of such a committee would be to act as a conduit for disseminating

information about the operation to the local community and for feeding back any local concerns about the operation to the Operations Team. It may be beneficial for councillors and other key people to visit Bernier and Dorre islands from which some of the animals to be reintroduced are likely to come, and to arrange exchange visits with councillors from other shires around Australia where similar projects have taken place (eg., Sherbrooke Shire and Hamilton Shire, Vic.).

Corporate Relations should develop a Communications Plan for the operation targeting local, statewide and nationwide audiences.

a. Feral predator control

The main aim of the feral animal control part of the project is to investigate the feasibility on an operational scale of reducing predator numbers to a level which will allow successful Re-introduction of native species which formerly occurred on the Peron Peninsula. Unless predator control, especially cats, can be achieved on an operational scale there is very little chance that we will ever be successful with Re-introductions on the Peron or anywhere else.

The critical issue is, to what level do predators, cats and foxes, have to be reduced in order for re-introduction to be successful? We know that this will vary from one potential re-introduction species to the next and also with each species previous level of exposure to predations viz island species like the boodie and the barred bandicoot are 'predator dumb' whereas surviving mainland species such as for example the woylie, the chuditch, the dalgyte and the mallee fowl have now acquired some predator sense.

For this reason it is not possible to say with any certainty what levels fox and cat numbers have to be reduced to. Nevertheless it is essential to set a level so that if and when the re-introduction phase begins we can obtain information on this important question for each species which we try. It is also essential to have a target for the feral control team to aim at. Achievement of the target level should be the determining factor for phase 3 of the project. It is important to reach agreement on this target level from the outset so that disagreements do not arise later as to whether or not predator levels are low enough to attempt re-introduction.

A major problem exists with setting a target population level for foxes and cats in the absence of a reliable technique for estimating population levels of these two species, particularly at low densities. We may have to use a combination of methods, cyanide transects, bio-markers and track counts. It is likely however that we will be forced to rely on track counts to set our level for cats and foxes at very low densities. At this stage it is proposed that we should aim to achieve a level of no more than 2 cats per 100 km of transect. This represents the lowest level of cats achieved in the Gibson Desert during the drought, and should be low enough for trial re-introduction. Foxes can be reduced to less than one per 100 km. These proposed levels need further debate and the team can draw on other experience of people like Jeff Short and Ken Johnson.

1080 baiting programs for foxes and cats would be conducted twice a year. April and September are the suggested times to maximise kill success. Baiting operations should be conducted as follows:-

a. pre-baiting assessment of predator numbers, using cyanide transects (NB. Cyanide transects will be used minimally because of possible problems with

tourists) and track counts. A choice of lures will permit collection of both species on the cyanide transects.

b. a broad-scale 1080 baiting, using small baits for foxes and cats, to be conducted immediately following the pre-baiting assessment (check with APB on tolerance levels of reptilian predators).

c. post-bating assessment, and track counts to be conducted 10 days following the 1080 campaign. Cyanide transects may be used but predator numbers will probably be too low to warrant this expensive technique.

Permanently baited sites will be located strategically around the township of Denham, Monkey Mia and the isthmus to reduce dispersal into the baited area (see map zones 4, 5 and 8. There should be no need to place any controls on pet ownership within the Denham townsite or at Monkey Mia, although sterilisation of cats would be encouraged.

Initially at least there will also be a baited buffer area along the southern boundary of the Peron Park (zone 3). The Peron Park, especially zone 1 the northern tip, is likely to be the site of the first releases. Following the initial aerial baiting, tracks should be monitored on a regular basis for the presence/absence of foxes and cats. A search/trap/poisoning program will be implemented to reduce the number of residual animals. This program will commence at the northern tip (zone 1) and proceed southward. It is most important to reduce the numbers in the Peron National Park first before going on to the VCL in zones 6 and 7.

b. Feral herbivore control

The goat eradication program, which is already in place, will continue with the aim ultimately of eradicating this animal from the Peninsula. A likely problem which is predicted to occur as a result of predator control is an increase in the number of rabbits on the Peninsula (as has occurred on Herrison Prong). Rabbits will be particularly difficult to control especially since the Peninsula rabbit lives in solitary burrows or beneath dense clumps of scrub and not in caverns. It is planned to re-introduce the European flea as well as possibly trialing the Spanish rabbit flea for improved transmission of myxomytosis. Possible trialling of rabbit haemorrhagic diseases should also be investigated. Jeff Short (CSIRO) is currently conducting trials on the European flea at Herrisson Prong. We will also investigate 1080 baiting both 1 shot 1080 and poisoned carrots. Birds have a fairly high LD50 for 1080, also if carrots are used and dyed green this stops uptake by birds. How big a problem rabbit competition is likely to be is not known. They are likely to compete with some of the proposed re-introduced species for resources. We should consider involving the APB in the baiting programme. This has been successful in Herrison Prong.

c. Predator exclusion fence

There has been much discussion about a 'predator exclusion fence' across the neck of the isthmus, most likely on the site of the present goat fence . The huge advantage of the Peron lies in the fact that re-colonisation by predators can only occur along the very narrow isthmus. To further reduce or even eliminate re-colonisation from outside by fencing would undoubtedly increase the success of the venture in the longer term. In addition to this biological advantage a fence has perhaps an even greater role as a public relations excercise.

Some one hundred and forty thousand or more annual visitors to the Peninsula come by road through the isthmus. A predator exclusion fence would be the most visible evidence of the project to the visitor. In addition it provides an ideal opportunity to publicise the project and

CALM's management of the World Heritage area through an appropriate display placed at the 'gate' where everyone passes through.

It seems highly likely that we can get corporate sponsorship for the fence from one of the major fence manufacturers.

Following discussion on fence options it has been decided to leave the decision on the fence to see if it is necessary once the project gets underway.

It may be necessary to close off parts of the Francois Peron National Park for short periods during baiting.

Phase 2: Fauna Re-introduction

In needs to be re-stated here that the re-introduction is a separate phase from the Feral animal control and it will not go ahead unless the latter achieves the stated levels of feral animal control. Nevertheless the re-introduction and establishment of the original fauna of the Peron for scientific, cultural and economic reasons remains the ultimate goal of this project. Therefore the re-introduction phase, although it may not be activated, nevertheless needs to be an intimate part of the planning. We need to select the most suitable species, with the highest possible chance of success, and to develop plans for their release and subsequent protection and monitoring. This program includes selection of suitable release sites so that special emphasis can be given to feral control in these key areas. Fire protection methodology also needs to be developed.

The local community also need to be informed of the ultimate aim of the project as do the visiting public. Ecotourism opportunities also need to be explored and co-ordinated with the Peron Management Plan which is currently being developed.

For these reasons, although in a sense the feral control is a separate operation, the re-introduction part of the project must be planned and developed from the start.

The aim of the re-introduction phase is to attempt as nearly as possible to re-establish the original (pre-European) fauna of the Peninsula. At this early stage it has not yet been possible to fully research the topic of the Peninsulas past fauna. Much more work needs to be done to properly select and priortize the species for Re-introduction. At this stage unequivocal evidence of former occurrence on the Peninsula is regarded as the main criteria for selection. Species which may have been present could also be considered, especially if they occur in sub-fossil deposits eg. *L. fasciatus*.

Species will be re-introduced one or two at a time. It is most important that the species most likely to succeed are the first to be tried and that detailed monitoring of the animals is carried out in each case. Criteria for potential candidates for re-introduction are:considered important for prioritzing are:

a. Evidence of former occurrence on the Peninsula.
b. Low vulnerability to predation - features of species biology which are important here include:
   (i) Non colonial species eg. colonial species like the boodie are a problem.
   (ii) Some predator sense eg. surviving mainland species
   (iii) Species which use reasonably dense cover eg. bandicoots
   (iv) High fecundity eg. woylie

c. Conservation status.
d. Ecotourism value.

Possible candidates for re-introduction are listed below:

Mammals
Evidence of recent presence from cave sub-fossil deposits:

Bettongia penicillata	Woylie
Perameles bougainville	Western Barred Bandicoot
Lagorchestes hirsutus	Mala or Rufous Hare Wallaby
Dasyurus gregori	Chuditch *(coll. British Museum No. 62.2.8.7,62.2.89)*
Pseudomys fieldi	Shark Bay mouse
Leporillus conditor	Greater Stick-nest Rat

Other species recorded on the Peninsula include:

Dasyurus cristata	*Notomys alexis* (still present)
Phascogale calura	*Sminthopsis dolicura?*
Leporillus apicalis (extinct)	*Onychygale lunata* (extinct)
Pseudomys hermansbergensis	*Rattus tunneyi*
Sminthopsis ooldea	

Archeological presence only:

L. fasciatus

No evidence of presence:

M. lagotis	Dalgyte
B. lesueur	Boodie

Birds

L. ocellata	Mallee Fowl
O. australis	Australian Bustard

Initially during (phases 1 and 2) research to determine the most suitable species and the best release locations will be carried out. This work should include a literature search, a habitat survey of the peninsula, visits to Bernier and Dorre Islands to obtain habitat data for selected species, visits to mainland locations where prospective re-introduction species were last recorded (Landscope Expeditions are already planned for May 95 to the Canning Stock Route for this).

Fire Management

As with almost all biomes in Western Australia, the Peron Peninsula is prone to bushfires and ecosystems on the Peninsula have probably evolved to cope with infrequent fire. CALM has fire management responsibility for the Francois Peron National Park. One management option is to do nothing and accept the risk of wildfires disrupting or devastating the Re-introduction project. The future tenure and use of VCL south of the National Park is yet to be decided, so the fire management of this area proposed by this plan is provisional only. A fire management plan for the area should be prepared for:

1. The protection of human life and property
2. The protection of vulnerable populations of flora and reintroduced fauna
3. The role of fire in maintaining suitable habitat

Fire suppression resources are very limited in the Shark Bay area, so a fire management plan to address the above issues must be one which is practical and implementable with the limited available resources. Gascoyne District are currently undertaking a wildfire threat analysis of the Peninsula.

It may be difficult to construct firebreaks in the sparse scrub on the peninsula and some fire behaviour research may need to be done.

ECOTOURISM

The potential for introduced mammals to contribute to ecotourism can be realised by:

1. Selecting appropriate "visual" animals.
2. Cryptically - i.e., the region becomes famous for its rare mammalian fauna, but tourists do not actually see the animals.
3. By guided ecotours involving activities such as spotlighting and trapping. This has very limited potential as the nature of the animals, of the vegetation and of the access means that it is unlikely that many people will actually see the animals.
4. By developing hides at strategic locations such as on water points and near known animal colonies. Again, this has limited potential.
5. By developing the facilities in the Peron Homestead area and encouraging animals around these facilities. The Peron Homestead area has the potential to be the focal point for ecotourism within the Francois Peron National Park.
6. Involvement in research project on established population.
7. Breeding pens for re-introduction species could be set up at the homestead for visitor viewing?

GENERAL

In the time available and because the main person concerned was on leave it has not been possible yet to link this project with the Peron Management Plan which is currently being developed. Obviously this is a critical issue which will need to be addressed immediately if this project is approved. There are many issues, fire, ecotourism, the homestead, road upgrading Minkey Mia etc which will concern both.

The future of South Peron will also have a bearing on this plan especially phase 2.

PROJECT EDEN- Estimated Costs, Phase 1 only

Personnel		Year 1	Year2
	Permanent Officer L3/4	$33398	$33398
	Salary Overheads	3006	3006
	Allow/Subsidies/Etc	8000	8000
	20% Overtime	6680	6680
	Local Contract Labour	20000	20000
		$71084	$71084
	Vehicle 4cyl.4wd		
	Standing Charge	$2210	$2210
	Running 25000k @ .25c	4500	4500
		$6710	$6710
Baiting			
	Fox/Cat 20000 @ .70c	$14000	$14000
	Special Cat Baits	5000	5000
	Rabbit	2000	2000
	Freezer	2000	
	Compound	2000	
		$25000	$21000
	Aircraft - Set up for baiting		
	Fox/Cat 30 hrs @ $300	$9000	$9000
	Rabbit 25 hrs	7500	7500
	Ferry Time 10 hrs	3000	3000
		$19500	$19500
Roading			
	Feral Monitoring Tracks		
	Dragging Only 40km @$250	$10000	$-----
	Maintence 40km @$80	3200	3200
		$13200	$ 3200
Feral Proof Fence			
	3km @ $25000 /km		$75000
	Maintence		1100
	(Optional cost)		
			$ 76100
Public Relations			
	Information Bay	$10000	$-----
	Pulicity	12500	12500
	Peron Homstead/Quaters	7500	2000
		$30000	$14500

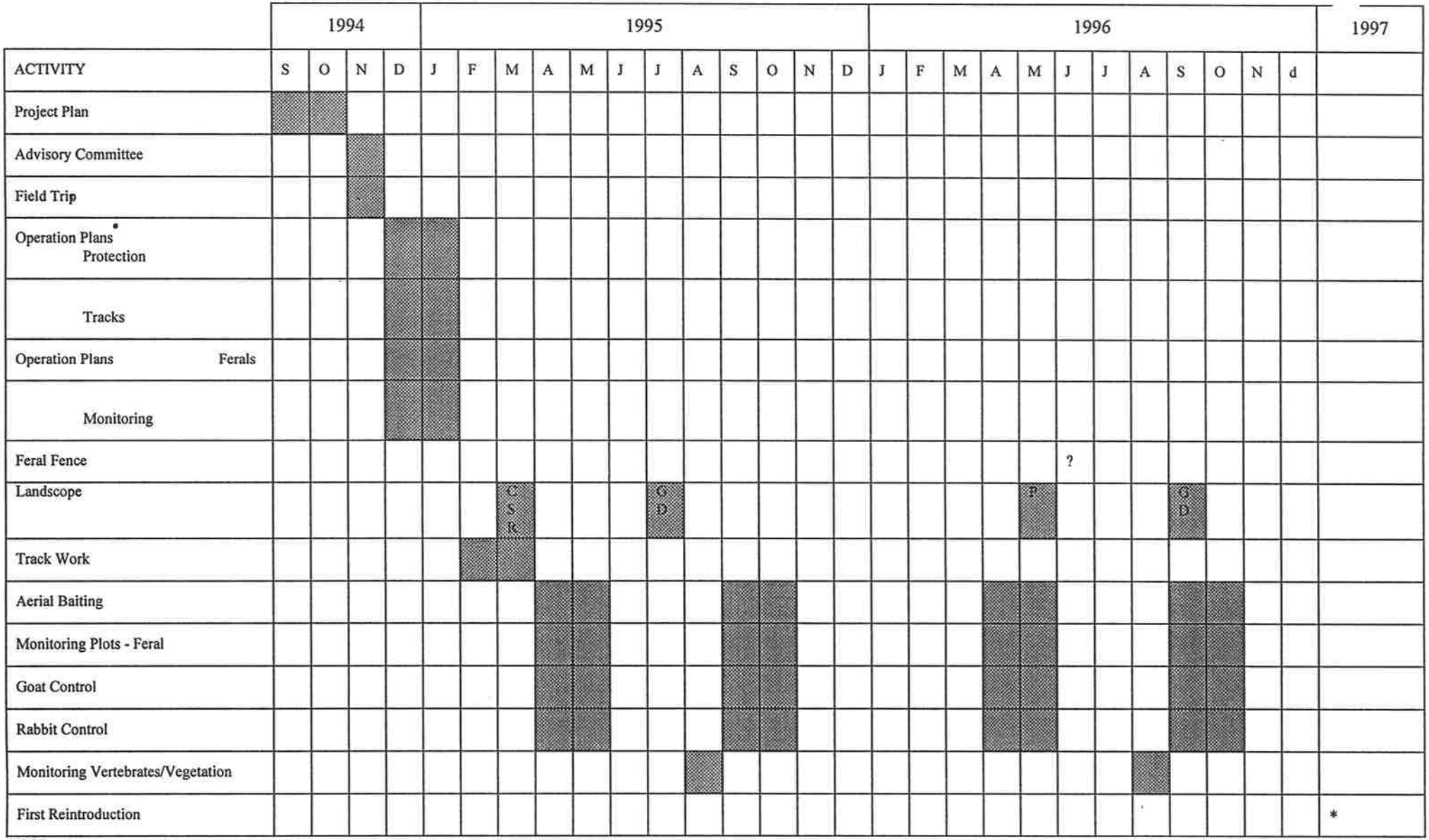
Other

Ops. Plan Field Trip	$7000	$-----
Monitoring Field Trips	13300	13600
Corp. Ex./Supervisor Travel 10000	10000	
Consumables	7500	7500
Landsat Photos	1500	
	$39300	$31100

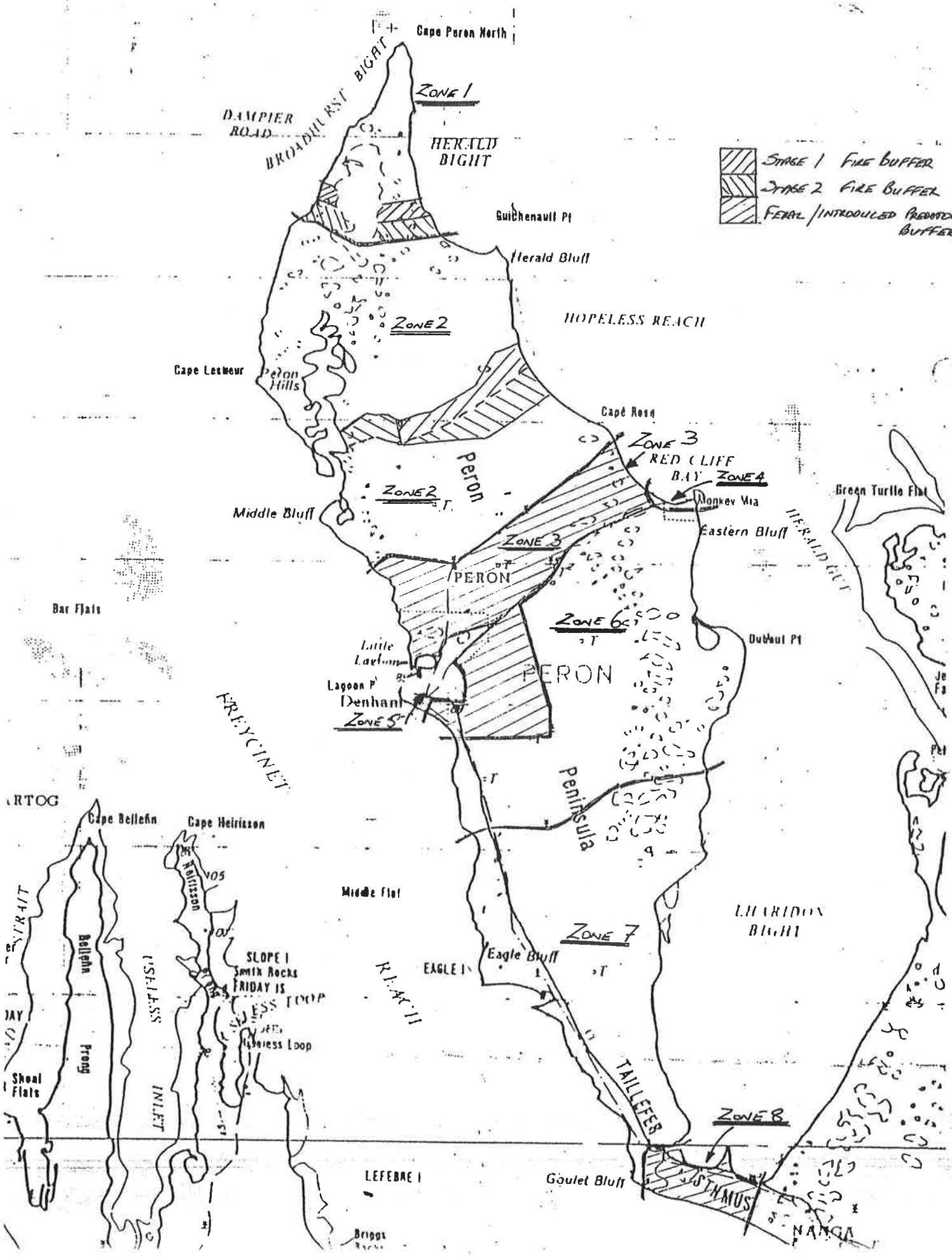
Estimated Total Cost

	Year 1	Year 2
	$279794	$168194
Inflation of 3%		5050
Burning for Stragetic Buffers		15000
	$279794	$188244

GANTT CHART - PROJECT EDEN - PHASE 1 ONLY



CSR - Canning Stock Route
GD - Gibson Desert
P - Peron Peninsula
* - 1st Re-introduction?


Cape Peron North
BROADHURST BIGHT
DAMPIER ROAD
ZONE 1
HERALD BIGHT
Guichenault Pt
Herald Bluff
HOPELESS REACH
ZONE 2
Cape Lesueur
Peron Hills
Cape Rose
ZONE 3
RED CLIFF BAY
ZONE 4
Monkey Mia
Green Turtle Flat
Middle Bluff
ZONE 2
Peron
ZONE 3
PERON
Eastern Bluff
HERALD BIGHT
Bar Flats
ZONE 6
Dubaut Pt
Little Lagoon
Lagoon P
Denham
ZONE 5
PERON
FREYCINET
Peninsula
Cape Bellefin
Cape Helfrisson
Middle Flat
HAMELIN BIGHT
ZONE 7
Eagle Bluff
EAGLE I
SLOPE I
Smith Rocks
FRIDAY IS
Useless Loop
Shoal Flats
Bellefin Prong
USELESS INLET
TAILLEFER
ZONE 8
LEFEBRE I
Goulet Bluff
STEINUS
NANGA
Briggs
Stage 1 Fire Buffer
Stage 2 Fire Buffer
Feral/Introduced Predator Buffer