CONSERVATION VALUE OF FITZGERALD BIOSPHERE RESERVE BUFFER/TRANSITION ZONE
Phases I-IV

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1.0 SUMMARY

In April 1978 the Fitzgerald River National Park (FRNP) was designated as one of 12 Australian Biosphere Reserves under UNESCO's Man and the Biosphere program. Ideally a Biosphere Reserve contains a natural *core* area that is surrounded by a *buffer zone* with an adjoining *transition zone* where human activity takes place. The FRNP fitted this model very well but it was not until 1986 that moves were made by the local community to recognise the *buffer* and *transition zone*. The Fitzgerald Biosphere Reserve, in concept, now covers the Shire of Jerramungup and about half the Shire of Ravensthorpe, with the total land area being approximately 1.3 million hectares.

The Fitzgerald Biosphere Reserve (FBR) is now recognised by the Australian National Commission for UNESCO and the Australian Nature Conservation Agency (ANCA) as one of two model biosphere reserves within Australia.

Prior to this study there had been few biological surveys conducted within the FBR *buffer zone.* However, the limited results that were available suggested that the nature conservation value could be high and indicated that more work was needed to identify special values and requirements for protection and management.

This project commenced in February 1993 with the objectives of providing a sound biological base for management of uncleared lands within the *buffer/transition zone* and undertaking an active community involvement program.

The community involvement program included raising the general awareness of the study in the community through liaison with relevant community groups and committees, personal visits, attendance at field days, presentation of talks, and provision of information to local the media.

Biological surveys were carried out at ten sites and active community involvement occurred at all stages. A schools biological monitoring program was initiated and expanded and will hopefully be ongoing.

The results of the surveys show that the *buffer zone* and remnant vegetation in the *transition zone* have a high conservation value for fauna. These areas are acting like a true *buffer zone* for the *core* area as they contain, or have the potential to contain, all fauna species that occur in the *core*. Many species have also been recorded in remnant vegetation on farms, road verges and riparian corridors.

A total of eight threatened fauna species were recorded, these were the Malleefowl, Short-billed Black-cockatoo, Ground Parrot, Western Whipbird, Chuditch, Quenda, Heath Rat and Western Mouse.

Of the ten vegetation systems occurring in the FBR at least two are poorly represented in reserves and others have been largely cleared.

The high conservation value of the FBR *buffer/transition zone* has been clearly established during this project and recommendations are made to enhance and protect these values and to continue the high level of community involvement.

2.0 INTRODUCTION

2.1 FITZGERALD RIVER NATIONAL PARK BIOSPHERE RESERVE

In November 1977 the Australian Commission for UNESCO through the Australian National Parks and Wildlife Service sought nominations from each state for areas suitable for designation as International Biosphere Reserves.

Subsequently two areas within Western Australia were nominated, the Prince Regent River Nature Reserve by the Department of Fisheries and Wildlife and the Fitzgerald River National Park (FRNP) by the National Parks Authority (Figure 1). Both nominations were approved and in April 1978 the FRNP was designated as one of 12 Australian Biosphere Reserves under UNESCO's Man and the Biosphere program (MAB).

The FRNP was nominated because of its relatively pristine state and high biological diversity, especially flora.

Ideally a Biosphere Reserve should contain a natural *core* area that is surrounded by a *buffer zone* with an adjoining *transition zone* where human activity takes place (Figures 2,3 and 4).

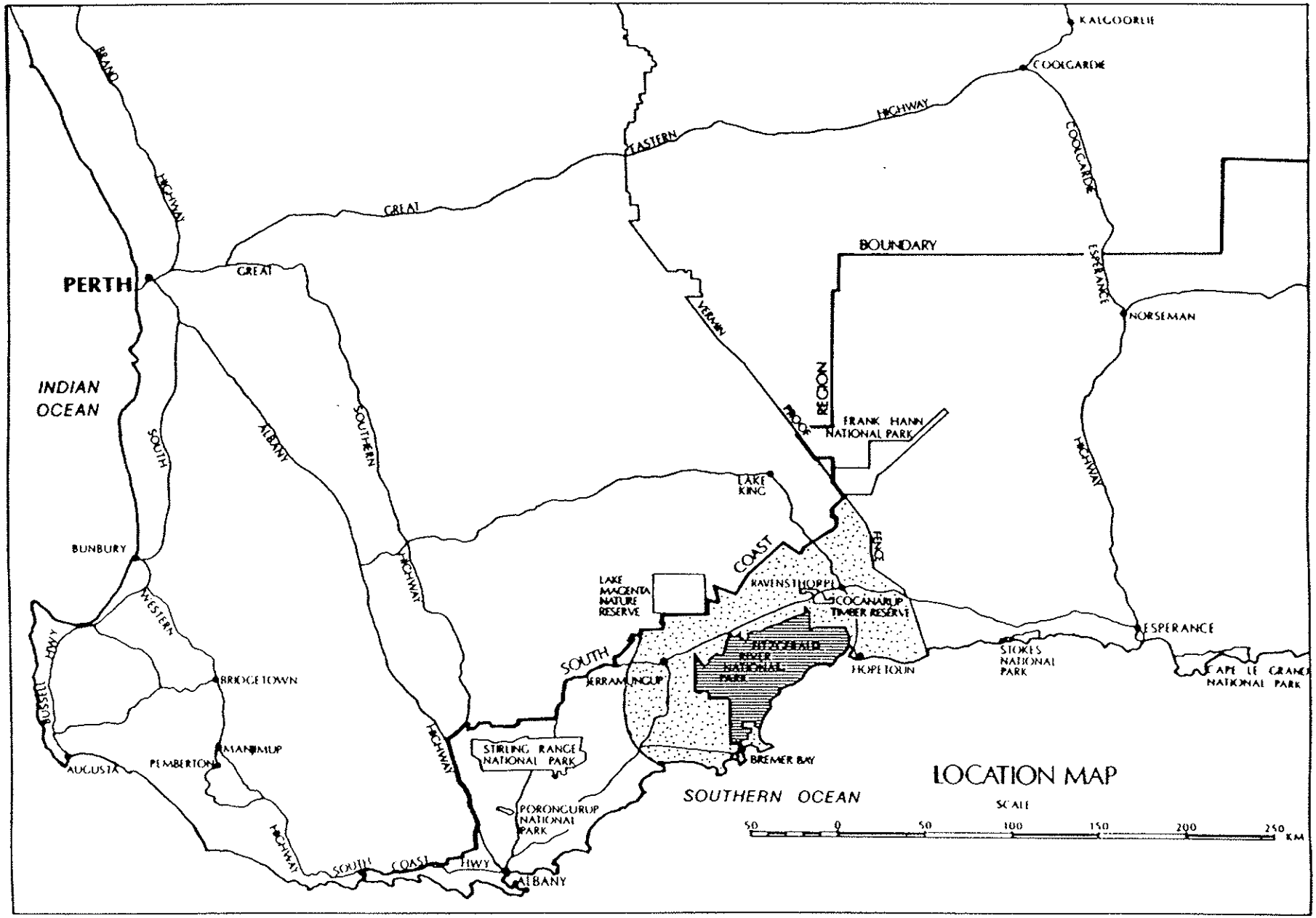
The FRNP fitted this model very well but it was not until 1986 that moves were made by the local community to recognise the *buffer* and *transition zone*.

Since then there has been increasing awareness of the Biosphere Reserve concept and acceptance locally of a greater Biosphere Reserve and the term *zone of co-operation* is now used in place of *transition zone*. The FBR, in concept, now covers the Shire of Jerramungup and about half the Shire of Ravensthorpe (Figure 5), with the boundary being flexible to allow for water drainage and "social" catchments. The total land area covered is approximately 1.3 million hectares.

Owing to involvement of the local community in management of the *core* (FRNP) and increasing acceptance of the surrounding zones, the Fitzgerald Biosphere Reserve (FBR) is now recognised by the Australian National Commission for the United Nations Educational, Scientific and Cultural Organisation (UNESCO) and the Australian Nature Conservation Agency (ANCA) as one of two model biosphere reserves within Australia (Parker, 1993).

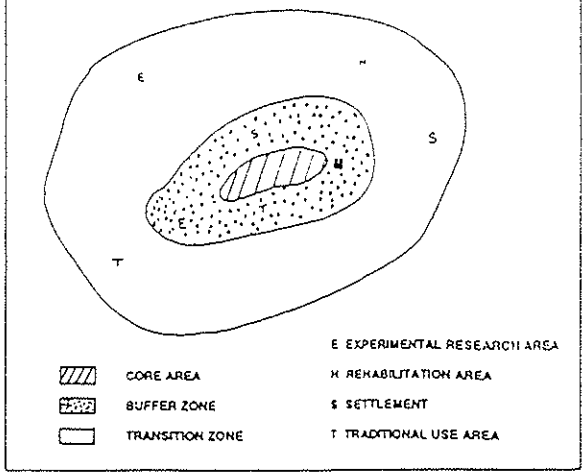
It is not the purpose of this report to detail further the concept of Biosphere Reserves. This is given in Batisse (1982) and Davis and Drake (1983). How the FRNP fits the Biosphere Reserve concept is discussed in Bradby (1989) and Watson *et al* (1995).

FIGURE 1 LOCATION OF THE FITZGERALD BIOSPHERE RESERVE



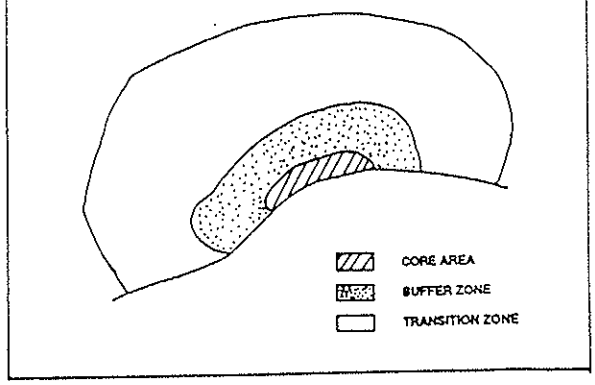
Source: Department of Conservation and Land Management, 1991

FIGURE 2 MODEL BIOSPHERE RESERVE



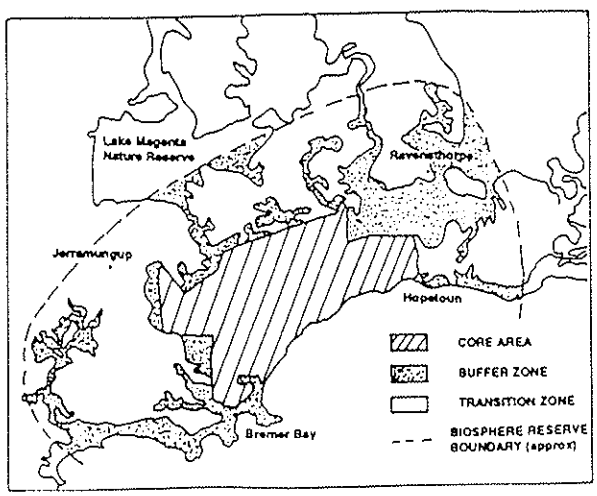
Adapted from: Batisse, 1982

FIGURE 3 TRUNCATED MODEL BIOSPHERE RESERVE



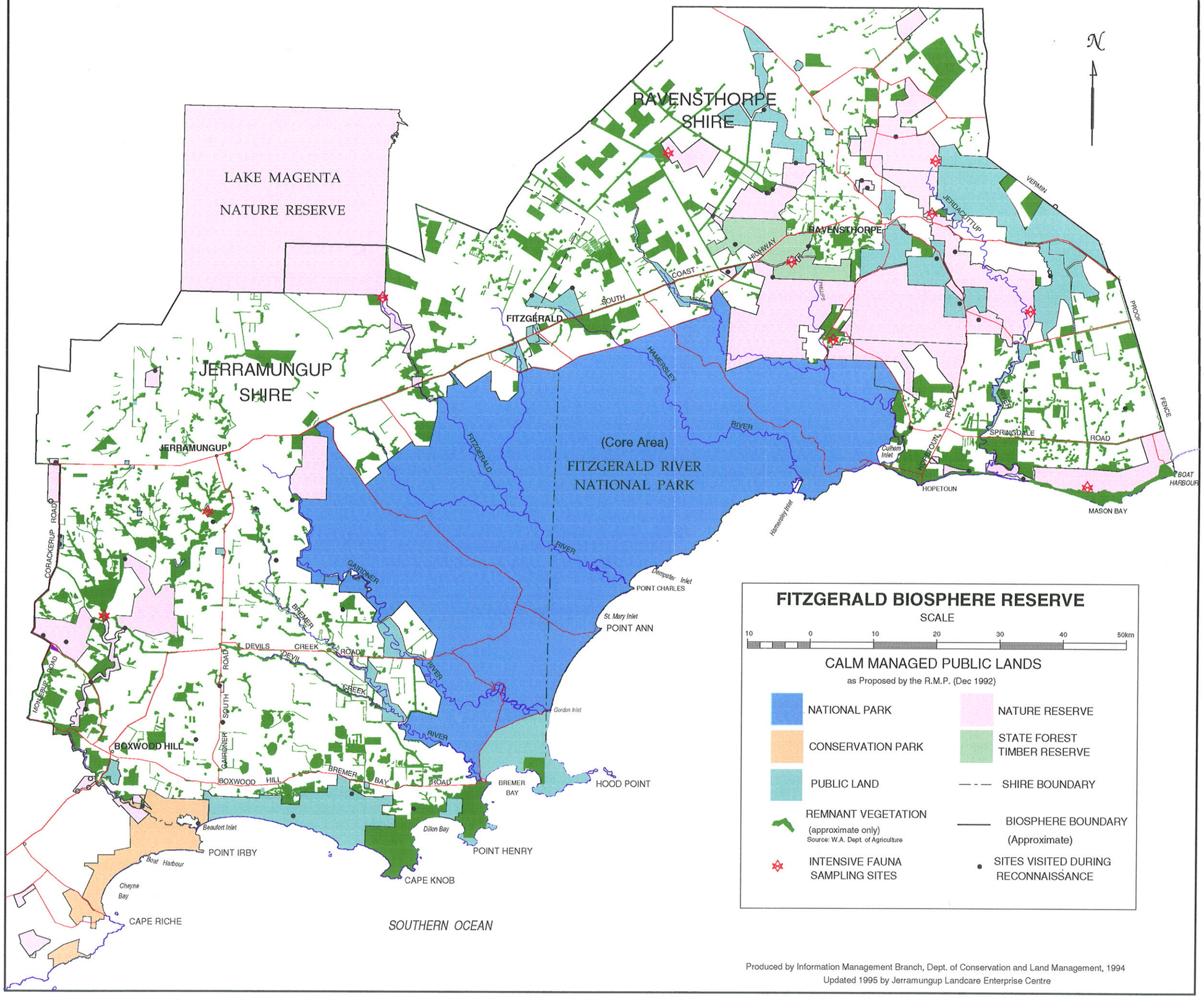
Adapted from: Batisse, 1982

FIGURE 4 FITZGERALD BIOSPHERE RESERVE 1995



Adapted from Department of Conservation and Land Management, 1992

FIGURE 5 FITZGERALD BIOSPHERE RESERVE



FITZGERALD BIOSPHERE RESERVE

SCALE

10 0 10 20 30 40 50km

CALM MANAGED PUBLIC LANDS

as Proposed by the R.M.P. (Dec 1992)

- NATIONAL PARK
- NATURE RESERVE
- CONSERVATION PARK
- STATE FOREST TIMBER RESERVE
- PUBLIC LAND
- SHIRE BOUNDARY
- REMNANT VEGETATION (approximate only) Source: W.A. Dept. of Agriculture
- BIOSPHERE BOUNDARY (Approximate)
- INTENSIVE FAUNA SAMPLING SITES
- SITES VISITED DURING RECONNAISSANCE

Produced by Information Management Branch, Dept. of Conservation and Land Management, 1994
Updated 1995 by Jerramungup Landcare Enterprise Centre

2.2 CONSERVATION VALUES OF THE FITZGERALD BIOSPHERE RESERVE BUFFER/TRANSITION ZONE

Prior to this survey there had been few biological surveys conducted within the FBR *buffer zone*. Chapman and Newbey (1995a) conducted biological surveys of the Ravensthorpe Range during 1982-84 and 1987. Leighton conducted surveys in the Corackerup Creek and Fitzgerald River corridors during 1991 (Leighton and Watson, 1992).

The *buffer zone* comprises vacant Crown land, unvested reserves, Shire reserves, Nature Reserves, a Timber Reserve and remnant vegetation on private property. Some of this land comprises corridors linking Nature Reserves and the FRNP.

Smaller blocks of remnant vegetation occur in the *zone of co-operation* and most of these are in private ownership. There are a few small unvested reserves that do not have any active management (Figure 5).

The results of previous surveys suggested that the nature conservation value of the *buffer zone* was high and that more survey work was needed over a wider area to identify any special values and requirements for protection and management.

3.0 OBJECTIVES AND SCOPE

The objectives of this project were to:

- Provide a sound biological base for management of uncleared lands within the *buffer/transition zone* surrounding Fitzgerald River National Park.

- Undertake an active community involvement program (through Land Conservation District Committees, Fitzgerald River National Park Advisory Committee, community groups and other government agencies) within the *buffer/transition zone*.

To fulfil the above objectives the following scope items were to be addressed during the project.

Phases I & II

(a) Review the existing data from the work of the late Ken Newbey (western sections of the study area) and various researchers who have studied the Kybulup-Ravensthorpe Range areas.

(b) Study the *buffer/transition zones* to the south, west and north of the Fitzgerald River National Park Biosphere *core*

(c) Study the *buffer/transition zones* to the north east and east of the Fitzgerald River National Park Biosphere *core*, making reference to the effect of past mining disturbances in the proposed Ravensthorpe Range nature reserve and the area's rare fauna species

(d) Determine any major changes that have occurred in sites where good quality information was previously obtained

(e) Liaise with neighbours of the Crown land being studied to inform them of the research and where possible encourage their direct involvement and future interest

(f) Where landowners are willing, include significant tracts of uncleared private land within the biological surveys, eg tracts of land adjacent to existing Crown land and more isolated remnants

(g) Raise the general awareness of the study in the community through liaison with relevant community groups and committees, personal visits, use of questionnaires, attendance at LCDC field days, presentation of talks, provision of information to local media, etc.

(h) In liaison with other CALM staff, progressively prepare a detailed report on the study findings which will include the results of the sociological components of the project, recommendations and proposed management strategies.

Phases III & IV

(a) Undertake additional biological surveys to consolidate data from Phases I and II:
- reopen pit traps at selected reference sites;
- repeat bird surveys; and
- check vegetation surveys and plant identification.

(b) Prepare management recommendations for the *buffer zone* and *zone of co-operation*.

(c) Continue liaison, especially with the local community:
- ongoing liaison and attendance at meetings, presentation of talks, displays at local shows etc; and
- liaison nationally and internationally as appropriate.

(d) Encourage land managers and landowners to implement recommendations/ action plans for the *buffer*/corridor zone and *zone of co-operation*.

(e) Complete 1994 pilot schools program:
- assist Ravensthorpe District High School and Fitzgerald Primary School with pilot biological monitoring programs.

(f) Establish a co-ordinated (on-going) schools biological monitoring program within the Fitzgerald Biosphere Reserve:
- encourage additional schools in the area to establish co-ordinated biological monitoring programs, including fauna trapping studies, bird observation and plant identification.

(g) Documentation of project progress:
- production of a summary report.

Phase V

Phase V will commence in February 1996 and will include the following project objectives:

(a) Continue support and liaison with the schools involved in the biological monitoring program.

(b) Continue liaison with the local community, in particular through local organisations and encourage their participation in the monitoring program.

(c) Establish long-term monitoring sites in protected land in the *buffer zone*, ie. Ravensthorpe Range and Corackerup Nature Reserve and the FRNP.

4.0 STUDY AREA

The Fitzgerald Biosphere Reserve is located on the south coast of Western Australia (Figure 1) and covers an area of approximately 1,354,630 hectares (South Coast Regional Initiative Planning Team, 1996). The area includes all the Shire of Jerramungup (654,000ha), approximately half of the Shire of Ravensthorpe (644,000ha) and small portions of the Shires of Kent and Lake Grace (56,630 ha combined). Both the Jerramungup and Ravensthorpe shires have a population of 1,460 (total population 2,920) and also have two major towns each (Figure 5).

The *core* area (FRNP) covers approximately 329,000 ha (24% of total FBR area) and is managed by the Department of Conservation and Land Management (CALM). A management plan is in place for the *core* area that covers the period 1991-2001 (Department of Conservation and Land Management, 1991).

The *buffer zone* areas surrounding the national park cover approximately 130,000ha (10% of total FBR area) and comprise mostly vacant Crown land or unvested reserves. There are a few areas vested with various agencies including the National Parks and Nature Conservation Agency (NPNCA), local shires, and the Minister for Water Resources. Land uses occurring in this zone include mining, flower picking, seed collecting, fence post cutting, gravel and sand extraction, firewood collection, nature conservation, tourism and recreational pursuits such as bush walking, camel trekking, horse riding and motor bike racing.

The *zone of co-operation* covers approximately 895,000ha (66% of total FBR area) and comprises mostly private land which has been cleared of native vegetation and is farmed for cereal crops, sheep and cattle. About 557,000ha has been cleared and there is approximately 160,000ha of remnant native vegetation within this zone in private ownership.

In summary the FBR has approximately 557,000 ha or 41% cleared farmland and 798,000 ha or 59% native vegetation.

The study area lies within the Eyre botanical district (Diels, 1906; Gardner and Bennetts, 1956) of the Southwest Botanical Province (Beard, 1990). Within the FBR there are ten vegetation systems as described by Beard (1976 and 1979) (Figure 6). These are characterised by a particular series of plant communities that recur in a catenary sequence or mosaic pattern linked to topographic, pedological and/or geological features (Beard, 1976).

The FRNP is renowned for its high floral diversity and high percentage of endemic plants, many of which are found on the isolated peaks along the coast. The park is also home to many species of fauna, some of which are threatened. The flora and fauna of the *buffer zone* and *zone of co-operation* are less well known with previous studies being mainly confined to parts of the Ravensthorpe Range, Corackerup Nature Reserve and the Corackerup Creek and Fitzgerald River Corridors.

5.0 METHODS - FAUNA

To provide a sound biological base for management guideline purposes it was decided that the field survey component be conducted in four phases as follows:

Phase I: Reconnaissance and preliminary rare fauna surveys - March-May 1993

Phase II: Intensive fauna surveys at selected sites - August-December 1993

Phase III: Repeat of fauna surveys - July-December 1994

Phase IV: Repeat of fauna and flora surveys - June - October 1995

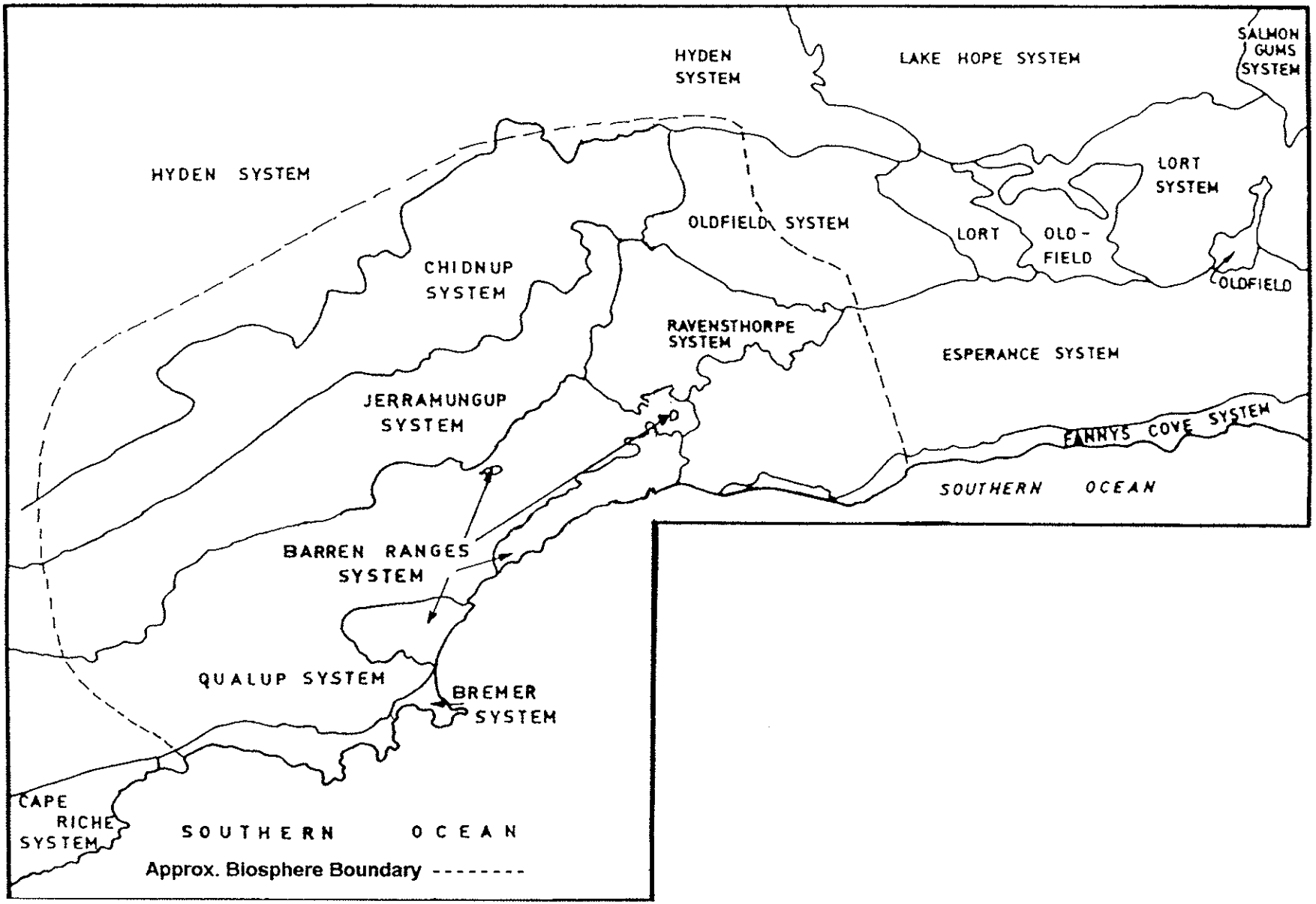
Phase V will commence in February 1996 and run until 1998 and it will include the establishment of long-term monitoring sites for flora and fauna in the FRNP (*core zone*) and also in the Ravensthorpe Range and Corackerup Nature Reserve in the *buffer zone*.

5.1 PHASE I

Prior to the reconnaissance, priority areas were identified using satellite images and aerial photographs as follows:

- Coastal corridors west and east of the FRNP
- River corridors
- Corridors in the Ravensthorpe Range
- Nature Reserves and Crown land in the *zone of co-operation*
- Large patches of remnant vegetation on private property in the *zone of co-operation*

FIGURE 6 VEGETATION SYSTEMS IN THE FITZGERALD BIOSPHERE RESERVE



Adapted from Beard, 1973 and 1976

During this phase all priority areas were visited and time was spent collecting site information and recording fauna species on an opportunistic basis. Fauna trapping was also conducted at some sites. The locations of all sites visited are given in Appendix 1 and shown in Figure 5.

Using information gathered during the reconnaissance and preliminary rare fauna surveys a total of 10 sites were chosen for intensive fauna sampling. The locations and details of these sites is given in Table 1 below.

Table 1: Details of the 10 Intensive Fauna Survey Sites

SITE	SITE CODE	BIOLOGICAL SIGNIFICANCE	VEGETATION FORMATION/S
Corackerup & Peniup Creeks	CO01	Significant corridors between Corackerup & proposed Peniup N. R. & Pallinup River	Mallee Yate Woodland
Fitzgerald River Corridor	CO03	Corridor between Lake Magenta N. R. & FRNP	Heath
Aerodrome Road Nature Reserve	NR10	Uncommon vegetation association in FBR with significant wetlands	Heath Mallee Yate Woodland
Mason Bay (Jerdacuttup Lakes Nature Reserve)	NR11	East coastal *buffer zone*	Heath Mallee Shrubland
Bandalup Hill	OT10	Corridor between FRNP & southern goldfields	Mallee Mallet Woodland
Woodenup Pool	OT12	Undisturbed creek with dense *Allocasuarina huegliana*	Sheoak Woodland
Block 1040	OT13	Rare mammals present	Mallee
Carlingup Road	PN09	Corridor between north & south Ravensthorpe Range	Salmon Gum Woodland
Cocanarup Timber Reserve	PN11	Significant remnant of *Eucalyptus salmonophloia*	Salmon Gum Woodland
Powell's Property	RV06	Significant remnant with relatively fresh creek	Mallee Yate Woodland

5.2 PHASES II-IV

5.1.1 Intensive Fauna Surveys

During Phase II a total of 400 x 20 litre plastic buckets were dug into the ground during September and October 1993 at Corackerup and Peniup Creek, Fitzgerald Corridor, Mason Bay, Bandalup Hill, Cocanarup Timber Reserve and Powell's property. This required help from volunteers and altogether 13 people assisted during the six week establishment period. Between trapping periods all buckets had their lids secured and were covered with soil to prevent heavy rain or animals opening the pitfall traps.

At each site standard trapping methods were used and the pitfall traps were set along a transect with the number of transects, distance between traps and the number of traps per transect being dependant upon the terrain and plant communities being sampled. Prior to each sampling period a 10m long x 30cm high aluminium flywire drift-fence was set up to bisect every second pitfall trap. In addition, an Elliott box trap (30cmx10cm) was set close to each pitfall trap and cage traps (58cm x 20cm) were set at intervals along the transects. The bait used in the Elliott and cage traps was a mixture of peanut butter, oats and sardines.

During 1993 sampling all traps were left open at each site for a period of six nights. The exceptions were Bandalup Hill, where traps were closed after five nights because of persistent heavy rain, and Corackerup and Peniup Corridors where the traps were closed after four nights due to very hot weather and a high level of ant activity.

During 1994 sampling all traps were left open for five nights, except Bandalup Hill which was surveyed for six nights in October 1995. Aerodrome Road Nature Reserve was surveyed for seven nights in September 1995 (Table 2).

5.1.2 Rare Rodent Survey

A preliminary survey conducted in Block 1040 (OT13F) using Elliott traps during June 1993 confirmed the presence of the Heath Rat *Pseudomys shortridgei* (listed as rare) and the Bush Rat *Rattus fuscipes*. These rodents were recorded previously at this site by A. Chapman (A. Chapman pers. comm.). During the June 1993 survey two other native rodent species were caught at this site, Western Mouse *P. occidentalis* (listed as rare) and Mitchell's Hopping Mouse *Notomys mitchelli* (uncommon in the FBR).

This discovery presented an ideal opportunity to study these rodents in relation to the plant communities present and the seral stage of the vegetation. A small mammal survey of Block 1040 was therefore conducted using four transects each with 82 Elliott traps (OT13A-D). The traps were set in an east-west direction to cover all habitats and ages of vegetation with an equal number of traps. Traps were left open for five nights on each transect.

Traps were placed inside plastic bags and a small pad of raw wool was put into each trap as cold, wet conditions were experienced during each trapping session. Prior to the first survey other methods were tested to minimise trap deaths including shredded paper and absorbent cloth pads in each trap. Wool was found to be the easiest to use, caused fewer problems and rarely got caught under the treadle of the trap mechanism.

No trap deaths occurred using this method despite a few periods of very cold, wet weather.

Table 2: Trapping Details of each Survey Site

SITE	TRAPPING DATES	No PITFALL TRAPS	TRAP NIGHTS	No ELLIOTT TRAPS	TRAP NIGHTS	No CAGE TRAPS	TRAP NIGHTS
Corackerup & Peniup Corridors	14-18/12/93	60	240	60	240	6	24
	24-30/10/94	60	300	60	300	6	24
Fitzgerald Corridor	4-10/12/93	60	360	60	360	6	36
	11-16/11/94	60	300	60	300	6	36
Aerodrome Rd Nature Reserve	11-18/9/95	30	210	40	280	10	70
Mason Bay	28/10-3/11/93	80	480	80	480	24	144
	7-12/12/94	80	400	80	400	24	120
Bandalup Hill	5-10/11/93	60	300	60	300	9	45
	25-31/10/95	60	360	60	360	11	66
Block 1040	4-26/8/93	0	0	320	6400	0	0
	17/6-7/7/94	0	0	320	6400	0	0
	5-10/6/95	0	0	80	400	0	0
	21-26/6/95	0	0	80	400	0	0
	9-14/7/95	0	0	80	400	0	0
	17-22/7/95	0	0	80	400	0	0
Cocanarup Timber Reserve	25/11-1/12/93	60	360	60	360	8	48
	20-25/11/94	60	300	60	300	8	40
Powell's remnant	15-/21/11/93	60	360	60	360	6	36
	2-8/11/94	60	300	60	300	6	30

5.1.3 Carlingup Road Bird Census

During the reconnaissance a break in the understorey was found to exist between the northern and southern sections of the Ravensthorpe Range (Figure 7). The value of this portion of the range as a linkage between the southern and northern portion of the range is therefore limited as:

1. Proposed tenure changes (CALM 1992) will only provide a 'point-contact' between the northern and southern parts of the range.

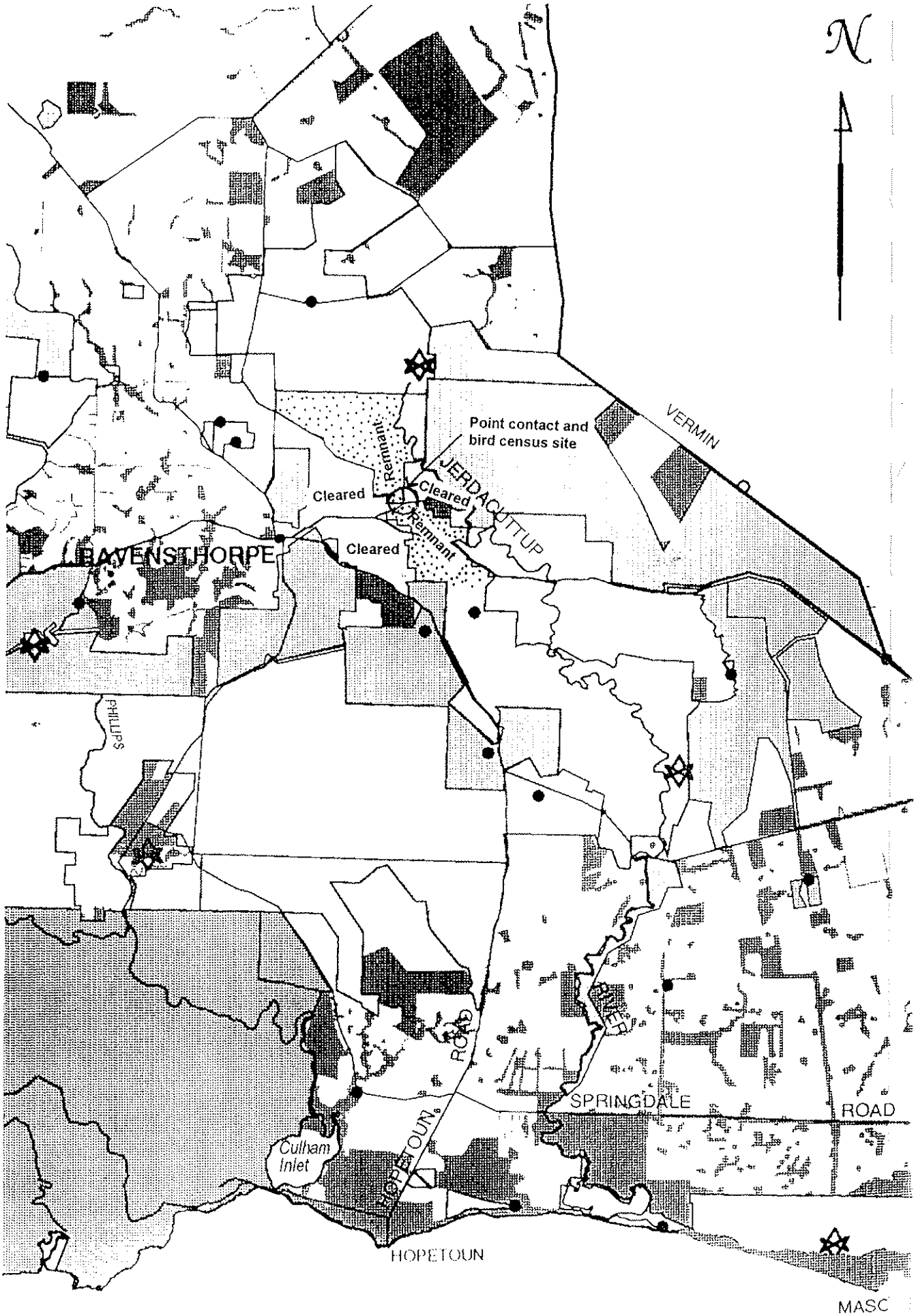
2. The vegetation comprises Salmon Gum Woodland with a very open understorey which may, in fact, act as a filter precluding those species requiring a denser understorey for movement through the landscape.

It was decided therefore that a survey of bird usage of the area would help to ascertain this area's viability for bird movement. The surveys were conducted mainly by a volunteer (M. Bennett) who spent a total of 20 minutes walking at random through a marked area in the vicinity at least twice per month from May 1993 to October 1995 recording all birds seen and/or heard. A total of 60 surveys were carried out during this period.

5.1.4 Opportunistic Surveys

Opportunistic surveys were conducted at Woodenup Pool where records were collected by noting all birds, mammals, reptiles and frogs seen and/or heard. In addition, all reptiles and frogs encountered during hand-foraging were recorded. This activity consisted of raking through leaf litter, loose soil and abandoned Stick Ant (*Iridomyrmex* spp.) nests, digging up stumps, turning over logs and lifting rocks. Opportunistic surveys were also carried out in the Fitzgerald and Corackerup corridors at the sites previously surveyed by Leighton in 1991 (Leighton and Watson, 1992).

FIGURE 7: CARLINGUP ROAD REMNANT VEGETATION AND BIRD CENSUS SITE MAP



Source: Figure 5 this report

5.1.5 Schools Biological Monitoring Program

The schools biological monitoring program began in 1993 after a member of the Ravensthorpe Hopetoun Area Promotions group asked if school students in the Ravensthorpe Shire could visit the fauna trapping sites. As a result of these visits teachers became interested in setting up a similar fauna trapping program in bushland near their schools. After obtaining the appropriate licences through CALM, two pilot programs were run at Ravensthorpe and Fitzgerald Schools during 1994 and methods were refined to suit the school environment.

During 1994 funding was sought and granted from the Australian National Commission for UNESCO and the Western Australian Ministry of Education's Priority Country Areas Program (PCAP) to include all other schools in the region in the project (Figure 8).

A series of two hour teacher professional development courses, including community volunteers, were held during 1995 by Angela Sanders as follows:

March 9 - Jerdacuttup (5 participants)
March 14 - Bremer Bay (3 participants)
March 31 - Ongerup (1 participant); Jerramungup (6 participants)
April 7 - Ravensthorpe (3 participants)

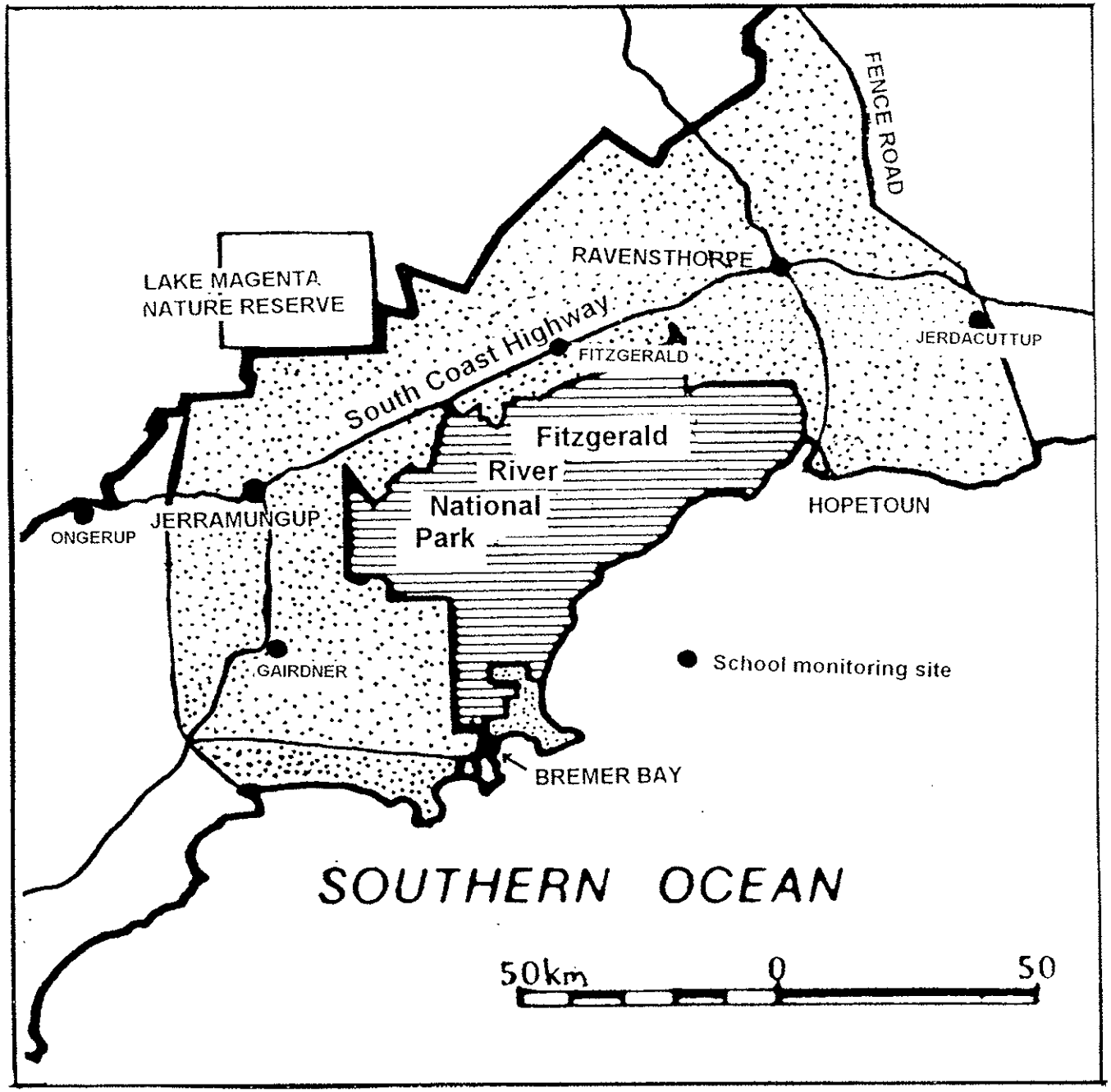
Topics covered in the course are given in Appendix 2, "Guidelines: Fitzgerald Biosphere Reserve School Biological Monitoring Program". All groups visited the proposed trap sites where a demonstration of the equipment and animal handling techniques was given.

An identification kit was produced for each school which contained photographs of all the vertebrates that were likely to be captured and pictures of many of the common invertebrates that are caught in pitfall traps. Vegetation recording sheets were also included, along with a guide on how to use the sheets (Appendix 2).

Each school received a set of equipment consisting of the following:

Measuring equipment (vernier callipers, spring balances)
11 x 20L plastic buckets with lids (1 used to hold equipment)
20 x metal pegs
10 x Elliott traps (30cmx10cm)
2 x cage traps (58cm x 20cm)
10 x lengths aluminium flywire (1m x 0.3m) with wooden stakes at each end
Identification Kit, set of guidelines and data sheets
Bait - Peanut butter, oats, sardines
Plastic bait container
Wooden spoon
Long tongs
Gardening gloves
10 x calico holding bags
Frog reference book

FIGURE 8 LOCATION OF SCHOOL MONITORING SITES



Source: Department of Conservation and Management, 1

Traps were set up in bushland near each school with the assistance of Angela Sanders and 14 community volunteers. Ongerup pitfall trap set-up required the use of a jack hammer which was lent to the project at no charge. At the primary schools all children were involved in setting up the traps and at the high schools at least one class was involved.

All schools opened their traps for a week (4 nights) during terms 1-4 in 1995.

5.1.6 Data Recording

All fauna recorded was written onto fauna recording data sheets (sample given in Appendix 3) and this information was then entered onto a database (Foxbase). Information from the schools program was also incorporated into the main project database.

5.1.7 Review of Other Biological Surveys

Various researchers have worked in the FBR and a summary of the results of these surveys is given in Appendix 4. The surveys most relevant to this project were carried out during the 1980's in the Ravensthorpe Range (Bradby and Chapman, 1987; Chapman and Newbey, 1995a), the Cocanarup Timber Reserve (Forests Department 1980) and the Fitzgerald and Corackerup corridors during 1991 (Leighton and Watson, 1992).

In addition to the above, CALM Wildlife Officers and other CALM personnel have visited the Nature Reserves and some of the other Crown land in the FBR and their records were also reviewed as part of this project. Other sources of fauna information used includes records from the Western Australian Museum and the Royal Australasian Ornithologists Union data bases.

5.1.8 Taxonomy and Nomenclature

The taxonomy and nomenclature of fauna follows:

Birds - Christidis and Boles (1994)
Mammals - Strahan (1995)
Frogs - Tyler *et al* (1994)
Reptiles - Storr *et al* (1981,1983,1986, 1990)

A list of all the common and scientific names of the fauna mentioned in this report is given in Appendix 5.

6.0 METHODS - SITE DESCRIPTIONS, VEGETATION AND FLORA

6.1 PHASE I

During this phase all priority areas were visited and time was spent collecting site information (see Appendix 6 for a sample field recording data sheet). The vegetation information collected included details for compiling Muir Codes (Muir, 1977) such as vegetation structure and canopy cover and, in addition, information on soil type, topography and disturbances present at each site.

6.2 PHASES II-IV

6.2.1 Vegetation

During these phases, vegetation details were collected along the length of all transects within a 30m strip on either side of each trapline at all fauna survey sites (see Appendix 7 for a sample transect vegetation recording sheet). Each site was also photographed using 35mm slide film and prints of these are given in Appendix 8. In order to classify fauna habitat for each transect, vegetation descriptions were made using the Muir method of classification (Muir, 1977), which is presented in Table 3.

This method of classification was chosen owing to its usefulness in describing vertebrate fauna habitat. It was developed for use in the Western Australian wheatbelt and thus is relevant to the Mallee-Heath and Woodland areas of the South Coast Region.

At each survey site the vegetation occurring along the transects was classified into formations as follows (adapted from Muir, 1977):

Woodlands - the dominant life-form of the upper stratum is trees, the total canopy cover of which is greater than 2%. These were divided into Yate (*Eucalyptus occidentalis*) and Salmon Gum (*E. salmonophloia*) Woodland.

Mallee - the dominant life-form of the upper stratum is shrub-form mallee, the total canopy cover is greater than 2%.

Shrubland - the upper stratum is dominated by the shrub life-form which exceeds 2 metres in height and has a total canopy cover exceeding 2%.

Heath - the upper stratum is dominated by the shrub life-form which does not exceed 2 metres in height and has a total canopy cover exceeding 2%.

Wetland complex - *Melaleuca cuticularis* or *Eucalyptus occidentalis* Woodland or *Melaleuca* shrubland associated with lakes, swamps and damplands

Coastal dune complex - Low coastal Heath and halophytes associated with the foreshore, foredune and estuary.

Granite complex - A mosaic of shrubs, sedges and trees growing in crevices or soil pockets in and around granite exposures.

Table 3: Vegetation Classifications used in the Surveys

Life Form and Height Class	Canopy cover %			
	Dense 70-100 d	Mid-dense 30-70 c	Sparse 10-30 i	Very Sparse 2-10 r
LA Trees 5-15m	Dense Low Forest A	Low Forest A	Low Woodland A	Open Low Woodland A
LB Trees < 5m	Dense Low Forest B	Low Forest B	Low Woodland B	Open Low Woodland B
KS Mallee shrub form	Dense Shrub Mallee	Shrub Mallee	Open Shrub Mallee	Very Open Shrub Mallee
S Shrubs > 2m	Dense Thicket	Thicket	Scrub	Open Scrub
SA Shrubs 1.5-2.0m	Dense Heath A	Heath A	Low Scrub A	Open Low Scrub A
SB Shrubs 1.0-1.5m	Dense Heath B	Heath B	Low Scrub B	Open Low Scrub B
SC Shrubs 0.5-1.0m	Dense Low Heath C	Low Heath C	Dwarf Scrub C	Open Dwarf Scrub C
SD Shrubs 0.0-0.5m	Dense Low Heath D	Low Heath D	Dwarf Scrub D	Open Dwarf Scrub D
GL Bunch grass < 0.5m	Dense Low Grass	Low Grass	Open Low Grass	Very Open Low Grass
J Herbaceous spp.	Dense Herbs	Herbs	Open Herbs	Very Open Herbs
VT Sedges > 0.5m	Dense Tall Sedges	Tall Sedges	Open Tall Sedges	Very Open Tall Sedges
VL Sedges < 0.5m	Dense Low Sedges	Low Sedges	Open Low Sedges	Very Open Low Sedges

Adapted from Muir (1977)

An estimate of the maturity of the vegetation was carried out using observations at each survey site. The terminology used follows Muir (1977) and each category is described below:

Immature - plants are not thought to have reached maximum height, girth or canopy dimensions, but may be flowering, ie. plants may be sexually mature but not structurally mature.

Mature - majority of plants in stratum appear (in worker's opinion) to have reached maximum height, girth and canopy dimensions but dead or dying branches or portions of the plant are not conspicuous.

Senescent - dead wood is conspicuous amongst the canopy, and the plants in the stratum give the impression of regression in vigour due to old age, disease or unnatural circumstances such as increase of salt content of the soil. The plants may still be flowering prolifically, but are obviously at maximum dimensions under prevailing conditions.

6.2.2 Flora

Flowering plants representing the dominant species were collected along the length of each transect during the trapping periods and further sampling was carried out during spring 1995. All *Eucalyptus* were identified by Nathan McQuoid. All other species were identified using classification keys and confirmation was carried out at the Albany Herbarium and liaison with other CALM staff.

6.2.3 Fire Histories

During July 1993 fire histories were compiled for the proposed fauna trapping sites. Time was spent examining archival aerial photographs dating back to 1956 and various satellite images. A total of three sets of photographs and six satellite images were used as summarised in Table 4 below. No photographic records of fires in the FBR are available prior to 1956 and it was found that people's memories were too unreliable to be used as a source of information for fire histories prior to aerial photography.

Approximate boundaries of fire scars, identifying the date of photography, were drawn onto an overlay sheet and these were attached to the corresponding 1:100,00 printed cadastral map sheets.

Table 4: Aerial Photographs and Satellite Images used for Compiling Fire Histories of the Survey Sites.

JOB NUMBER	AREA	DATE
AERIAL PHOTO		
WE 382	Ravensthorpe	Nov 1957
R31	Ravensthorpe	Jan 1980
G69	Ravensthorpe	Oct 1968
WA285	Newdegate	Nov 1956
WA1060	Newdegate	Jan 1968
770018	Newdegate	Mar 1978
WA403	Bremer Bay	Jan 1958
G68	Bremer Bay	Mar 1969
770019	Bremer Bay	Nov 1982 and Jan 1984
SATELLITE IMAGE		
109-083	Ravensthorpe	Jan 1986
110-083	Fitzgerald	Feb 1987
110-084	Pallinup	Feb 1988
110-084	Jacup	Feb 1988
110-084	Bremer Bay	Feb 1987
30014703	Bremer Bay	May 1992

6.2.4 Other Characteristics

Soil was described at each survey site using Field Texture as described in McDonald *et al* (1984).

The occurrence of leaf litter at each survey site was described using percentage cover and depth.

Landform was described for each survey site and terminology follows that of McDonald *et al* (1984).

6.2.5 Taxonomy and Nomenclature

Taxonomy and nomenclature of flora follows Green (1985).

7.0 METHODS - COMMUNITY INVOLVEMENT

A variety of methods were used to encourage community involvement in various aspects of the project including:

- liaison with key community members/landholders
- introduction of the project at local community group meetings
- invitations to help with field work and visit survey sites
- surveys on private property
- public talks/slide presentations
- school biological monitoring program
- workshop/tours

8.0 RESULTS AND DISCUSSION

8.1 FAUNA

Table 5 below shows the number of species recorded for the *buffer zone* and remnant vegetation in the *zone of co-operation* (this survey), *core* area (Fitzgerald River National Park), total for the whole biosphere reserve and number of threatened fauna.

Table 5: Fauna Classes Recorded in the Fitzgerald Biosphere Reserve

CLASS	NO. RECORDED THIS SURVEY	NO. RECORDED IN FRNP	TOTAL NO. FOR FBR	TOTAL NO. THREATENED SPECIES*
Birds	165	193	209	8
Mammals	25	31^	40	6
Frogs	13	12	14	0
Reptiles	46	42	51	0

* Listed under CALM Policy Statement No. 50

^ Includes 6 species now locally extinct or extinct.

As can be seen from the above table the *buffer zone* and remnant vegetation in the *zone of co-operation* has a high conservation value for fauna. These areas are acting like a true *buffer zone* for the *core* area as they contain, or have the potential to contain, all fauna species that occur in the *core*. Many species have also been recorded in remnant vegetation on farms, road verges and riparian corridors.

Prior to extensive fauna surveys in the *buffer zone* it was stated in the FRNP Management Plan that, "It is surrounded to the west and north, and partially to the east, by cleared farm land. Consequently if the entire park was burnt at one time, re-colonisation by native fauna from surrounding areas would not be possible" (CALM, 1991 p.5). The results of the current survey are significant in that the FRNP should no longer be viewed as an island with no opportunity for re-colonisation by fauna from surrounding areas following fire.

This obviously has implications for management and it is recommended that the FRNP is no longer viewed in total isolation with respect to fire management and consideration is given to including the buffer zone in the FRNP Management Plan review in 2001 (see Sections 9.4(a) and (b)).

Table 6: Total Number of Species Recorded at each Survey Site.

SITE	BIRDS	MAMMALS	FROGS	REPTILES	TOTAL
Corackerup & Peniup	67	13	5	16	101
Fitzgerald Corridor	70	11	8	19	108
Aerodrome Rd N.R.*	56	6	7	9	78
Mason Bay	87	7	7	25	126
Bandalup Hill	58	13	4	22	97
Block 1040	63	10	6	22	101
Cocanarup T.R.	75	9	4	21	109
Powell's Remnant	72	10	6	18	106

*1 survey only was carried out here.

The above table gives the total number of species for each survey site taken from Appendix 9. The richest site overall was Mason Bay. The high number of birds recorded at this site is a reflection of the presence of the foreshore and lake. Reptile species were also slightly higher at this site, possibly owing to the sandy substrate which is suitable for burrowing reptiles.

All the other sites had a similar species richness, with the exception of Aerodrome Road Nature Reserve which was only sampled once in 1995.

A total of 12 species not previously officially recorded from the FBR were seen during this survey:

Royal Spoonbill	Australian Spotted Crake
Black-tailed Godwit	Whimbril
Laughing Turtle-Dove	Redthroat
Black Rat	Feral Goat
Kunapalari Frog	Gould's Monitor
Ramphotyphlops species 1	*Ramphotyphlops* species 2

8.1.1 Birds

Bird species that have been recorded from the *buffer zone* but not the FRNP so far include 16 species as follows:

Glossy Ibis*
Royal Spoonbill*
Baillon's Crake
Australian Spotted Crake
Purple Swamphen*
Black-tailed Godwit*
Whimbril*
Red Knot*
Long-toed Stint*
Australian Pratincole*
Gull-billed Tern*
White-winged Black Tern*
Laughing Turtle-Dove
Redthroat
Fairy Martin
Pied Butcherbird

The birds marked with an asterisk* are rare visitors or migrants and could be recorded in the FRNP at any time. These birds, with the exception of the terns, are dependant on wetlands and the foreshore for feeding. The Baillon's Crake and Australian Spotted Crake are secretive birds and are difficult to detect. If surveys were undertaken specifically for these birds they would probably be recorded around wetlands in the FRNP. The Fairy Martin may be present in the FRNP as suitable habitat does exist there and therefore they too may be recorded in the future.

It is unlikely that the remaining species on the above list would occur in the FRNP. The Redthroat and Pied Butcherbird are at the southern limit of their distributional range at Ravensthorpe and it is highly unlikely that they would occur any further south-west. The introduced Laughing Turtle-Dove, has not found its way into the park and it is unlikely to survive there as it is only known to live around towns or disturbed areas.

There are a total of 24 birds that have been recorded in the FRNP but not in the *buffer zone* as follows:

Blue-billed Duck
Freckled Duck
Cape Barren Goose
Little Penguin*
Great-winged Petrel*
Flesh-footed Shearwater*
Short-tailed Shearwater*
Yellow-nosed Albatross*
Australasian Bittern
Letter-winged Kite*
Spotless Crake
Broad-billed Sandpiper*
Inland Dotterel*
Great Skua*
Kelp Gull*
Rock Dove
Barking Owl*
Fork-tailed Swift*
Western Bristlebird
Black Honeyeater*
Crested Shrike-tit*
Gilbert Whistler*
Masked Woodswallow*
Ground Cuckoo-shrike*

The birds marked with an asterisk* are vagrants, migrants or occasional visitors to the area and are likely to be eventually recorded in the *buffer zone*. The Blue-billed Duck prefers deep fresh water lakes and could therefore be found at some lakes outside the FRNP at times of high rainfall. The Freckled Duck, Cape Barren Goose, Australasian Bittern and Western Bristlebird are all threatened species and may occur in the *buffer zone* in small numbers in appropriate habitat. Comments for the Spotless Crake are as above for the Baillon's Crake and Australian Spotted Crake. The Rock Dove (previously Feral Pigeon) is a widespread introduced species that usually occurs around towns and grain storage areas and rarely appears in undisturbed, native vegetation. It has not however officially been recorded in the *buffer zone* as yet.

A total of 58 species of birds dependent on water, constituting 35% of all the birds seen, were recorded in the *buffer zone* in wetlands, estuaries and the foreshore. These areas are highly significant for waterbird conservation and 16 of these bird species are protected under the Japan and/or the China Australia Migratory Bird Agreement (Appendix 9).

The lake adjacent to and east of Mason Bay Road on the northern boundary of the Jerdacuttup Lakes Nature Reserve was found to have a high conservation value, as 40 species of water dependant birds were recorded using the lake during the three surveys. The lake was visited at times of high and very low water levels and a different suite of birds were present depending on the water depth. The diving ducks, grebes and Swans were prevalent during high water level (approximately 2m). During low water level (< 0.5m) large expanses of mud were exposed which provided feeding grounds for migratory wading birds and the shallow water provided feeding opportunities for spoonbills, dabbling ducks and Pelicans. Hundreds of Pink-eared Ducks were seen on the lake during December 1994.

8.1.2 Mammals

Mammal species that have been recorded from the *buffer zone* but not the FRNP so far include seven species as follows:

Quokka
Fat-tailed Dunnart
Chocolate Wattled Bat
Water-rat
Black Rat
Dingo
Pig

The Quokka record from the Hunter River, near Bremer Bay, is unverified as only part of a mandible was found (WA Museum database). The Fat-tailed Dunnart, Chocolate Wattled Bat and Water-rat may be present in the FRNP as suitable habitat does exist there and therefore they may be recorded in the future. The introduced Black Rat and Pig do not appear to have not found their way into the national park and it is hoped that the lack of suitable habitat will keep the park free of these introduced animals.

The Dingo, although not officially recorded from the park, was undoubtedly present in the past and has been hunted to extinction in the FBR due to its liking for sheep. The body of a young Dingo-like dog was found at the survey site at Fitzgerald corridor. Agricultural Protection Board staff had laid 1080 poison baits a few weeks prior to the find so the dog probably died from poisoning. An adult female Dingo was seen by APB staff in Lake Magenta Nature Reserve during 1994 as well as a few cross-breed young dogs. The body found in the corridor was possibly a Dingo cross and the skull has been retained for further study.

There are two native mammals, the Yellow-footed Antechinus and Brush-tailed Bettong, that have not been recorded outside the FRNP boundary. The yellow-footed antechinus possibly does occur in the *buffer zone*, however it has not been officially recorded as yet.

The Brush-tailed Bettong has not been officially recorded in the FRNP since European settlement, however, unverified sightings have been made of this species recently by CALM staff. There is also a chance that the bettong occurs in suitable areas of habitat in the *buffer zone*.

The Common Brush-tail Possum, Tammar and Heath Rat are the only mammals that were found to be restricted in habitat in the *buffer zone*. The Brush-tail Possum was only caught in Yate and also Salmon Gum Woodland and is dependent on hollows for shelter. The Tammar and Heath Rat were both only recorded from Mallee vegetation with a Heath or scrub understorey.

8.1.3 Frogs

Frog species that have been recorded from the *buffer zone* but not the FRNP so far are the Kunapalari Frog and South Coast Froglet.

Both species, however, may be present in the FRNP as suitable habitats are present. The Kunapalari Frog records from Ravensthorpe represent the southern edge of its known distribution, and in all probability it only occurs along the northern boundary of the FRNP. The South Coast Froglet occurs at both Albany and Esperance and will probably eventually be located in more coastal swamps and wetlands in the FRNP.

8.1.4 Reptiles

Reptile species that have been recorded from the *buffer zone* but not the FRNP so far include 10 species as follows:

Burton's Legless Lizard
Mountain Devil
Richard's Crevice Skink
Small-eared Lerista
Ravensthorpe Range Lerista
Gould's Monitor
Ramphotyphlops 'bicolor'
Ramphotyphlops species 1 (undescribed)
Ramphotyphlops species 2 (undescribed)

A few individuals of the arid-adapted Mountain Devil have been recorded from around Hopetoun. These animals are thought to be escapees from captivity in Hopetoun and they were probably originally caught further north.

The Richard's Crevice Skink is at the southern limit of its known distributional range at Ravensthorpe, although it could possibly occur in the FRNP in the Yate (*Eucalyptus occidentalis*) lined valleys.

Two Gould's Monitors were seen in Cocanarup Timber Reserve during the spring 1993 surveys. This record is the most southern for this species as it is normally found in the warmer areas to the north. It is unlikely to occur anywhere else in the FBR other than in Salmon Gum Woodland.

The Small-eared Lerista has not been collected from the FRNP although it would almost certainly be found behind sandy beaches such as Mylies Beach.

The status of Burton's Legless Lizard remains enigmatic at this stage, though if it does occur in the FRNP it is definitely rare.

Two of the blind snakes (*Ramphotyphlops* 'bicolor' and species 2) found during this survey are undescribed species and they may or may not be restricted to the *buffer zone* of FBR. Undescribed blind snake species 1 has been found outside the FBR in Cape Arid National Park, east of Esperance.

The Ravensthorpe Range Lerista is limited to the Ravensthorpe Range and as such has one of the most restricted distributions of any Western Australian reptile.
Further, this lizard has only been found in leaf litter and soil at the base of tall Mallee and Mallet trees. These woodlands occur only in small patches throughout the Ravensthorpe Range. It is estimated that approximately 10% of the Ravensthorpe Range area is suitable for this species, which constitutes a distribution of about 1600ha (16km^2). Because of its limited distribution it is recommended that the Ravensthorpe Range Lerista be considered as one of Western Australia's threatened fauna species (see Section 9.1(a)).

The record of the Striated Worm-lizard from loamy soil near Ravensthorpe was unexpected as it is normally found on sandplains close to the coast (G. Harold pers. comm.).

A few reptiles were found to be restricted to specific habitats such as the Ornate Rock Dragon which is restricted to granite outcrops and was recorded on granite adjacent to creeks and rivers as well as granite outcrops away from creeks. King's Skink was found to be restricted to rocks adjacent to creeks and rivers and also on the foreshore.

The only Long-necked Tortoise seen was in the Chittowurrup creek on the Powell's property south of Jerramungup. This species is known to occur within the FBR east to the Fitzgerald River. Chapman and Newbey (1995b) suggest that salinity levels of approximately 13,000 mg/l TSS may be the upper limit for this species.

8.1.5 Threatened Fauna

During this survey a total of four bird and four mammal species listed as threatened were recorded as follows:

Malleefowl - *Leipoa ocellata*

The Malleefowl is listed as *rare* in Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice 1996; *vulnerable* in CALM Policy Statement No. 50 and IUCN (Garnett, 1992).

The Malleefowl has disappeared from much of its former range, especially in eastern Australia. It is still found in the south-west and is patchily distributed throughout the eastern wheatbelt in the mid to eastern south coast.

During this survey recordings were combined with those of community members giving a total of 171 sightings comprising 259 individual birds from March 1993 to November 1995. Some of these sightings would be of the same birds recorded at different times.

All sightings were collated and it was found that most were from the Ravensthorpe Shire with four areas standing out as "hotspots' where Malleefowl were regularly sighted. This resulted in 'Malleefowl crossing' advisory road warning signs being erected at four sites by the Main Roads Department in 1995. These sites were the Phillips River crossing 17km west of Ravensthorpe, the intersection of Bridger, Hayes and Lake King - Ravensthorpe Roads 25km north of Ravensthorpe, Old Kundip townsite 19km south of Ravensthorpe on the Hopetoun Road and the intersection of Nindibillup Road and Highway One, 25 km east of Ravensthorpe. It is of interest that during late 1995 no sightings were reported from the "hotspots" around Ravensthorpe. The reason for this lack of sightings is unknown at this stage.

The Malleefowl Preservation Group, who are based in Ongerup, are studying Malleefowl populations in the Corackerup Nature Reserve and proposed Peniup Nature Reserve. These sites are in the FBR *buffer zone* and liaison with the group during this project has been ongoing.

Short-billed Black-cockatoo - *Calyptorhynchus latirostris*

The Short-billed Black-cockatoo is listed as *rare* in Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice 1996; *vulnerable* in CALM Policy Statement No. 50 and IUCN (Garnett, 1992).

This species is distributed throughout the south-west where it breeds during summer in areas encompassed by the 350-700mm rainfall zone. During winter the birds migrate to the western coastal plain. Woodlands are required for breeding hollows and nearby Heath for feeding, mainly on proteaceous species. This bird also needs corridors of native vegetation between its breeding and feeding sites (Garnett, 1992).

During this survey 97 individual Short-billed Black-cockatoos were recorded from 17 sites. Ten sightings occurred in Salmon Gum Woodland in Cocanarup Timber Reserve, including two adults with a dependent young in November 1994. A further two sightings were in Yate Woodland, one in Mallee-Heath and one in Heath where the birds were eating seeds from *Hakea corymbosa*. A flock of 50 birds were observed feeding in a paddock adjacent to the FRNP on Old Ongerup Road. This observation shows that this species does exploit food sources in paddocks, however the particular food they were eating was not ascertained. Characteristic bark stripping of *Allocasuarina huegliana*, to obtain wood-boring grubs, was observed at a further two locations.

Ground Parrot - *Pezoporus wallicus flaviventris*

The Ground Parrot is listed as *rare* in Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice 1996; *critically endangered* in CALM Policy Statement No. 50 and *endangered*, IUCN (Garnett, 1992).

This species was formerly distributed along the west coast, possibly from north of Perth to Cape Arid along the south coast (Garnett, 1992). It is now only known to survive in three protected areas, the FRNP, Cape Arid National Park and Waychinnicup National Park. In addition one bird was found by a landowner during this survey and also one was found in the Upper Kalgan area north of Albany. Its habitat appears to be restricted to floristically diverse Heath that have remained unburnt for at least 15 years (Garnett, 1992).

The Ground Parrot found during this survey was in the *buffer zone* and was somewhat surprising in that the bird was found injured on the road 9.5km north of Hopetoun. The surrounding area is comprised of paddocks with a very degraded road verge consisting mainly of weeds. Consequently, it is assumed that this bird was moving through the area as it is unlikely that it would be resident. The closest known population of Ground Parrots is some 24km west in the FRNP.

Potential suitable habitat was noted on the north eastern boundary of the Jerdacuttup Lakes Nature Reserve and surveys need to be carried out in this area to establish if it is present.

Western Whipbird - *Psophodes nigrogularis oberon*

The Western Whipbird is listed as *rare* in Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice 1996; *vulnerable* in CALM Policy Statement No. 50 and *rare*, IUCN (Garnett, 1992).

A recent taxonomic review of this bird recognises two subspecies on the south coast of Western Australia, *Psophodes nigrogularis nigrogularis* and *Psophodes nigrogularis oberon* (Schodde and Mason, 1991). The subspecies *P. n. nigrogularis* is thought to occur around Albany and *P. n. oberon* east of Two People's Bay. However, the taxonomy of the two subspecies is in doubt and more research is needed to ascertain the validity of the recent taxonomic review (Cale and Burbidge, 1993).

During this survey the Western Whipbird was found to be very common and widespread. A total of 112 records were collected, usually of singing birds as they proved very difficult to observe. The majority of records (87%) were from Mallee of various species with a Heath understorey and sedge groundcover. A further 11% were from Heath and 2% were from shrubland. At all sites the vegetation had been unburnt for at least five years and up to 70+ years. As well as being recorded from large areas of bushland, birds were recorded in patches of isolated remnant vegetation, the smallest being 100 ha, and also in 50 m wide road verges. In addition, the Whipbird was recorded by A. Sanders from three patches of remnant vegetation in the Gnowangerup Shire near Ongerup. These birds were heard while searches for Malleefowl nest mounds were being carried out. All records were from vegetation in healthy condition with no obvious weeds present.

This species is more common and widespread in the area than previously thought and it appears that the FBR is now its stronghold. The recent records from Lake Magenta Nature Reserve also augers well for its continued survival.

Chuditch - *Dasyurus geoffroyii*

The Chuditch is listed as *rare* in Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice 1996; *endangered* in CALM Policy Statement No. 50 and IUCN (Kennedy, 1992).

During this survey 1 adult male Chuditch was found dead on the road by Main Roads Department employees 10km east of Ravensthorpe on Highway No.1. Despite attempts at trapping other Chuditch that may be in the vicinity it remains the only Chuditch recorded during the survey.

Two animals were captured by a CALM Ranger in Hopetoun during 1992. The pair used to visit a backyard regularly for food, however, this area has been further developed for housing and they have not been sighted since 1993. There was also an unconfirmed sighting in the FRNP during 1995 (N. McQuoid pers. comm.).

The Chuditch is the subject of a recovery plan which proposes their reintroduction into a semi-arid site in 1996 (Orell and Morris, 1994). The Lake Magenta Nature Reserve to the north of the FRNP has subsequently been chosen as this site. As the nature reserve and the FRNP are linked by the Fitzgerald Corridor (see Figure 5) their release in Lake Magenta may, depending on continuing fox control, eventually lead to interbreeding of the two populations.

Quenda or Southern Brown Bandicoot - *Isoodon obesulus*

The Quenda is listed as *rare* in Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice 1996; *vulnerable* in CALM Policy Statement No. 50 and *potentially vulnerable* by the IUCN (Kennedy, 1992).

Table 7: Details of the Quenda Records

SITE	LAND VESTING	NO.	VEGETATION DESCRIPTION
Res. 27177	Conservation of flora	diggings	Yate (*Euc. occidentalis*) Woodland *over* dense sedges and grasses
Woodenup Pool	Water Reserve	diggings	Dense sedges and rushes around pool
Old Ongerup Rd	FRNP (adj to Nth boundary)	diggings	Dense sedges and herbs adjacent to small creekline
33km East Jacup	Road Reserve	1 dead adult	Dense sedges adjacent to small creekline
West River bridge	Road Reserve	1 dead adult	Dense sedges adjacent to small creekline
16km Sth Jerramungup	Road Reserve	1 dead adult	Dense sedges adjacent to small creekline
Ravensthorpe Town	Town Reserve	1 dead juvenile	unknown - bought to town by a pet cat
3km Sth Ravensthorpe	Vacant Crown Land	1 dead adult	Dense sedges adjacent to creekline

The distribution of the Quenda comprises most of the south-west, including the wheatbelt. Its habitat requirements include a dense groundcover and consequently it is usually found around wetlands and in riparian areas. It is susceptible to fox predation and populations have declined recently and are still declining, though it remains relatively common in areas of continuous and favourable habitat.

During this survey seven Quenda were recorded as detailed in Table 7 above. All the animals were found adjacent to creeklines or pools. Many more sightings were reported from community members during the course of the project. These sightings were not included in the database as they were not confirmed but it is likely that there are many populations present in the FBR *buffer zone*.

Heath Rat - *Pseudomys shortridgei*

The Heath Rat is listed as *rare* in Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice 1996; *endangered* in CALM Policy Statement No. 50 and the IUCN (Lee, 1995) and *insufficiently known* (Mace and Lande, 1991).

Prior to European settlement the Heath Rat had a distribution which covered the coastal Heaths of the west and south coasts from Shark Bay to Point Culver, at the western end of the Great Australian Bight. Specimens were also collected from the wheatbelt at Woyerling and Buniche. The Heath Rat seemed to disappear after 1931 and it was 56 years before it was rediscovered in the Ravensthorpe Range by Chapman in 1987 (Baynes *et al*, 1987). Subsequently the Heath Rat has been captured at various site in the Ravensthorpe Range, Fitzgerald River National Park, Dragon Rocks and Lake Magenta Nature Reserves. This species also occurs in south-western Victoria. During this survey it was captured at a further site 20km south of Ravensthorpe.

Table 8: Capture Locations of the Heath Rat

SITE	LAND VESTING	NO. & SEX	VEGETATION & SOIL DESCRIPTION	VEGETATION AGE SINCE LAST FIRE
Block 1040 Transect A	Vacant Crown Land	9 F 10 M	open-dense shrub Mallee *over* dense Heath *over* dwarf scrub *over* very open low sedges *on* sandy loam with laterite	~ 30 years
Block 1040 Transect B	Vacant Crown Land	13 F 2 M 1 U	very open-open shrub Mallee *over* Heath A *over* low Heath-dwarf scrub *over* very open low sedges *on* sandy loam with laterite	~ 30 years
Block 1040 Transect C	Vacant Crown Land	2 F 1 M	dense shrub Mallee *over* Heath A *over* low Heath C *over* very open low sedges *on* loamy sand with laterite	70+ years
Block 1040 Transect D	Vacant Crown Land	2 F 7 M	very open-open shrub Mallee *over* low scrub-thicket *over* open dwarf scrub-dense low Heath *over* very open low sedges *on* loamy sand	70+ years

Their habitat has been described as variable, including scrub Mallee and mixed scrub on loamy soils (Lee, 1995). Table 8 above shows that during this survey the Heath Rat was captured in shrub Mallee with a Heath or scrub understorey on loamy-sand or sandy loam with a laterite component (see Appendix 8(j)).

The age of the vegetation at the capture sites is between 30 and over 70 years. As for the Western Mouse this species was also captured in higher numbers in the younger vegetation. Eight animals, however, were captured during the trapping period in 1995 in close proximity in a patch of open shrub Mallee with a thicket of *Melaleuca uncinata* over open dwarf scrub adjacent to a cleared paddock on transect D.

More research is needed to establish the minimum age of vegetation required for this species.

Western Mouse or Walyadji - *Pseudomys occidentalis*

The Western Mouse is listed as *rare* in Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice 1996; *vulnerable* in CALM Policy Statement No. 50, IUCN (Lee, 1995) and Mace and Lande (1991).

Table 9: Capture Locations of the Western Mouse

SITE	LAND VESTING	NO. & SEX	VEGETATION & SOIL DESCRIPTION	VEGETATION AGE SINCE LAST FIRE
Fitzgerald Corridor	Water Reserve	1 F	Open low scrub A *over* dwarf scrub C*over* dense low Heath *over* open low sedges *on* sand	~ 28 years
Aerodrome Rd N.R	Nature Reserve	2 U	open low scrub A *over* low Heath C *over* dense low Heath *over* low sedges *on* sand	36+ years
Bandalup Hill Transect C	Vacant Crown Land	2 F 1 M	shrub Mallee *over* scrub *over* open dwarf scrub *over* very open herbs and very open tall sedges *over* very open low sedges *on* loamy sand	38+ years
Bandalup Hill Transect D	Vacant Crown Land	1 M 1 F	open shrub Mallee *over* low scrub A *over* Heath B *over* dwarf scrub D *over* very open tall sedges *over* very open low sedges *on* sand	38+ years
Block 1040 Transect A	Vacant Crown Land	10 F 23 M 2 U	open-dense shrub Mallee *over* dense Heath *over* dwarf scrub *over* very open low sedges *on* sandy loam with laterite	~ 30 years
Block 1040 Transect B	Vacant Crown Land	20 F 32 M 8 U	very open-open shrub Mallee *over* Heath A *over* low Heath-dwarf scrub *over* very open low sedges *on* sandy loam with laterite	~ 30 years
Block 1040 Transect C	Vacant Crown Land	8 F 8 M 1 U	very open-dense shrub Mallee *over* Heath A-thicket *over* low Heath-dwarf scrub *over* very open low sedges *on* loamy sand with laterite	70+ years
Block 1040 Transect D	Vacant Crown Land	2 F 5 M	very open-open shrub Mallee *over* low scrub-thicket *over* open dwarf scrub-dense low Heath *over* very open low sedges *on* loamy sand	70+ years

Prior to this survey this species was known from the following conservation reserves, Anderson Lake, Dragon Rocks, Bendering, Harris, Lake Grace, North Kalgarin, Rock View, Tarin Rock and Lake Magenta. It has also been recorded from the Fitzgerald River National Park and the Ravensthorpe Range, as well as the Hatters Hill area east of Lake King (Lee, 1995).

The age of the vegetation at all capture sites was between 28 to over 70 years old. It appears from this and previous surveys that the presence of this species is linked to age of vegetation rather than plant community and also to a sand component in the soil.

During this survey the Western Mouse was recorded from a further seven locations as given in Table 9 above. Their habitat has been described as shrublands which have not been burnt for at least 15-30 years on sandy clay loam soils, usually with a laterite component (Lee, 1995). Table 9 shows that during this survey the Western Mouse was captured in shrub Mallee with a Heath understorey on sand, sandy-loam and loamy sand, sometimes with a laterite component (see Appendix 8(d, g and h)). One common component of the plant community where all animals were captured during this survey is dwarf scrub, which comprises a sparse (10-30%) to very sparse (2-10%) cover of shrubs from 0m to 0.5m in height.

The results of the trapping program carried out for rodents in Block 1040 shows that the highest number of individuals were captured in the younger vegetation in transects A and B (see Table 9). More research is needed to establish the minimum age since burning of vegetation required for this species.

8.1.6 Rare Rodent Survey

During the three systematic surveys of Block 1040, 20 km south of Ravensthorpe, a total of five rodent species were captured. These were the Western Mouse (listed as rare), Heath Rat (listed as rare), Bush Rat, Mitchell's Hopping Mouse (uncommon in the FBR) and the introduced House Mouse.

The numbers of each species per trapping transect are given in Table 10 and Figures 9,10 and 11) below.

Table 10: Rodent Captures at Block 1040 during 1993-1995

	TRANSECT											
	A			B			C			D		
SPECIES	**93**	**94**	**95**	**93**	**94**	**95**	**93**	**94**	**95**	**93**	**94**	**95**
Heath Rat	3	11	0	5	11	0	2	1	0	0	5	1
Western Mouse	10	3	13	5	4	31	2	6	4	0	0	3
Hopping Mouse	2	2	0	0	0	0	0	0	0	0	0	0
Bush Rat	29	23	2	39	16	2	12	2	0	9	2	0
House Mouse	89	4	0	78	1	0	67	4	0	57	5	1

FIGURE 9: RODENTS CAPTURED AT BLOCK 1040
DURING 1993

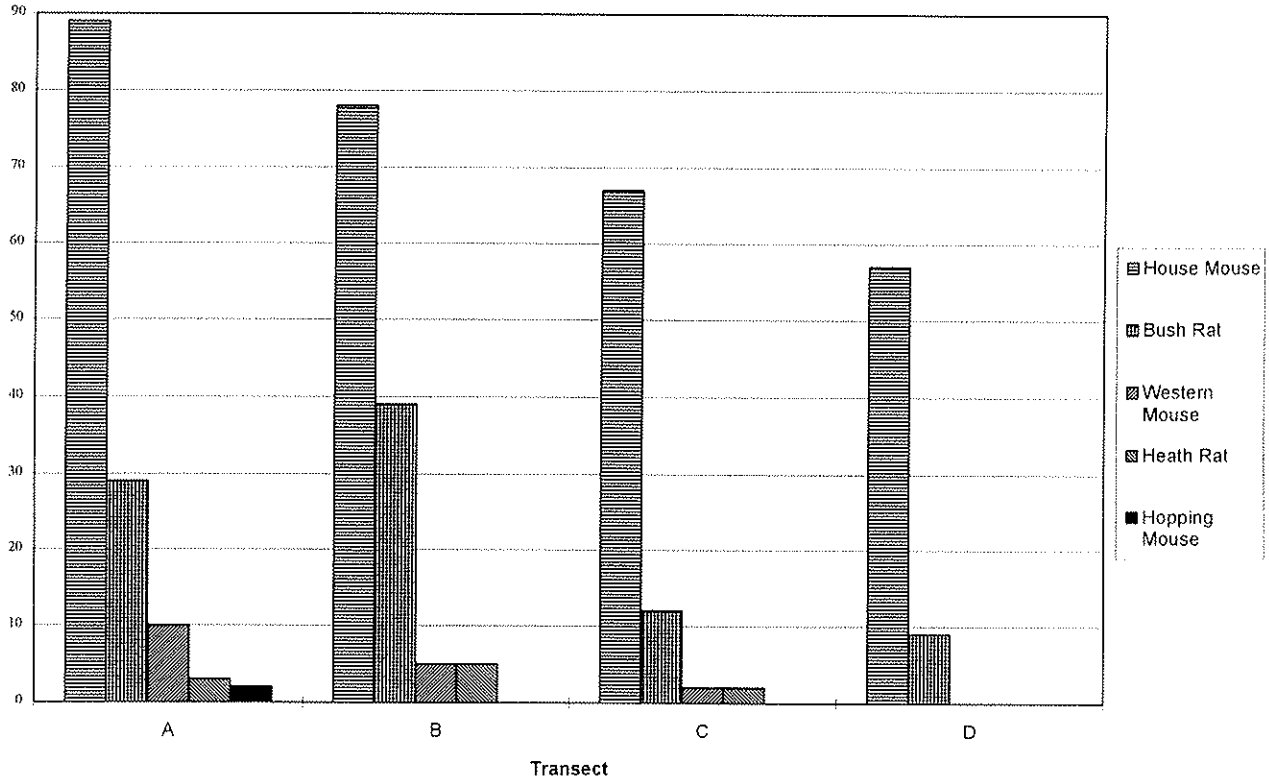


FIGURE 10: RODENTS CAPTURED AT BLOCK 1040
DURING 1994

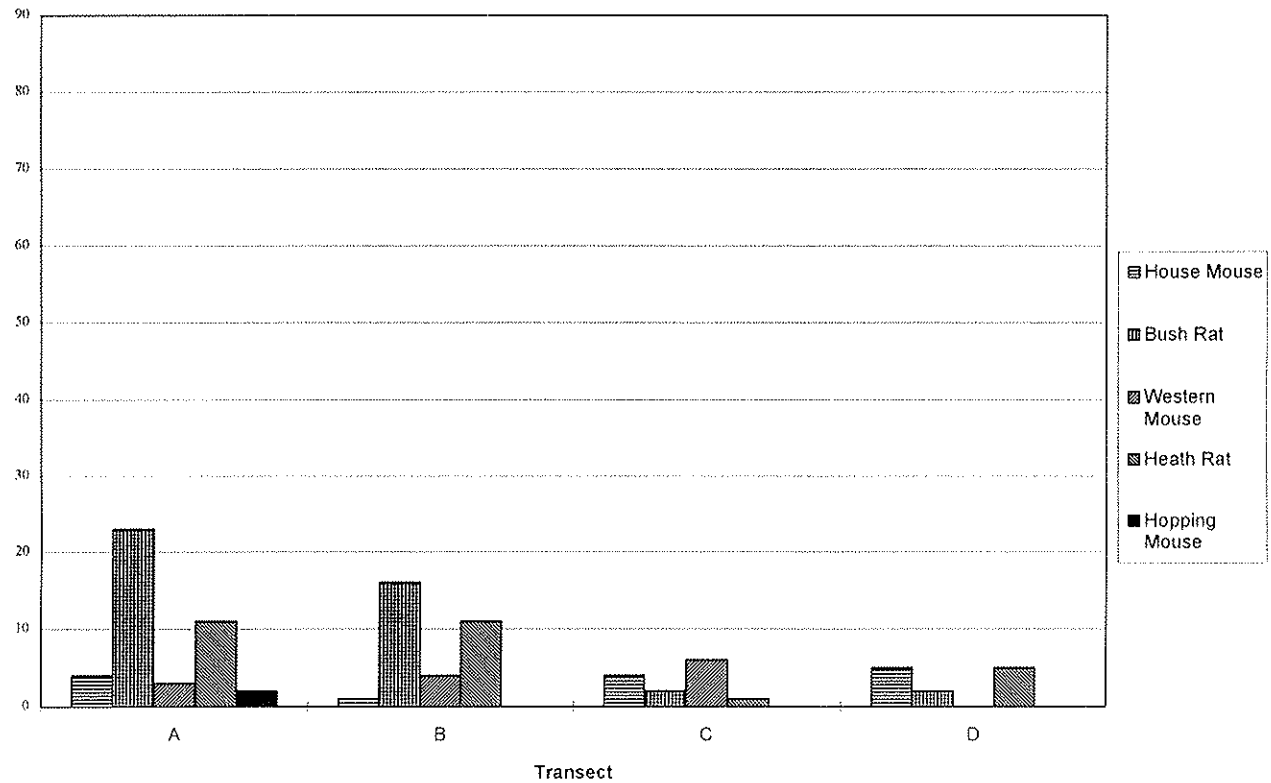
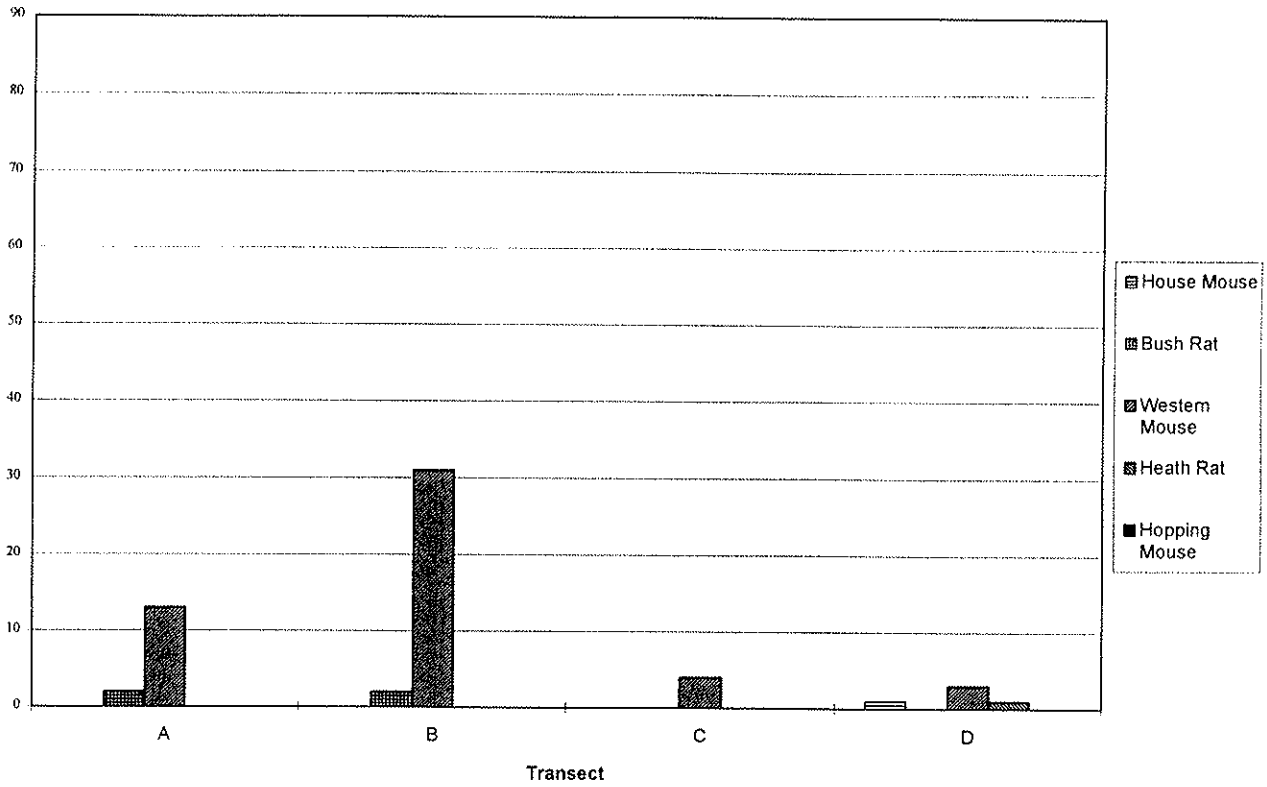


FIGURE 11: RODENTS CAPTURED AT BLOCK 1040 DURING 1995



Examination of the above results shows that the numbers of each species varied each year and, generally, more individuals of each species were captured on Transects A and B than on Transects C and D. The vegetation on Transects A and B is approximately 30 years old and on Transects C and D, 70 or more years old.

The age of vegetation on transects C and D was established by examining aerial photographs and satellite images from 1957-1988. No evidence of fires in the area containing Transects C and D was seen. It was found that fire scars in similar vegetation showed up on other photographs for at least 30 years, consequently this gives an age of at least 70 years and probably much older for transects C and D.

Bush Rat and House Mouse numbers were much higher in 1993 than the two later years. This may be related to season as wet winters preceded 1993 whereas 1994 and 1995 were drier than the average. It is of interest that during 1995 Western Mouse numbers were relatively high and they were captured in areas where Bush Rats were dominant previously. The results of this study require detailed analysis to enable a more comprehensive picture to be built up of the life histories, habitat requirements and species interactions of these rodents. These results could be viewed as baseline data for further research and it is recommended that the sampling be continued long-term (at least 10 years). The study could also be expanded to involve radio-tracking of the rare species (Section 9.1(d)).

8.1.7 Carlingup Bird Census

During the 60 surveys a total of 52 birds species were recorded from the Carlingup Road census site. It is useful to compare these results with a similar site at Cocanarup Timber Reserve where 2 surveys were carried out and 72 species were recorded (Appendix 9).

The birds that were found to be absent from the Carlingup site but present at the Cocanarup site include:

Short-billed Black-cockatoo
Elegant Parrot
Sacred Kingfisher
Splendid Fairy-wren
Little Wattlebird
Red-capped Robin
Southern Scrub-robin
Western Rosella
Shining Bronze-Cuckoo
Rainbow Bee-eater
Shy Heathwren
Spiny-cheeked Honeyeater
Western Yellow Robin

The remaining birds "missing' from the Carlingup Road site comprise raptors, which are wide-ranging species, and night birds, that would probably be recorded over time and if night surveys were carried out.

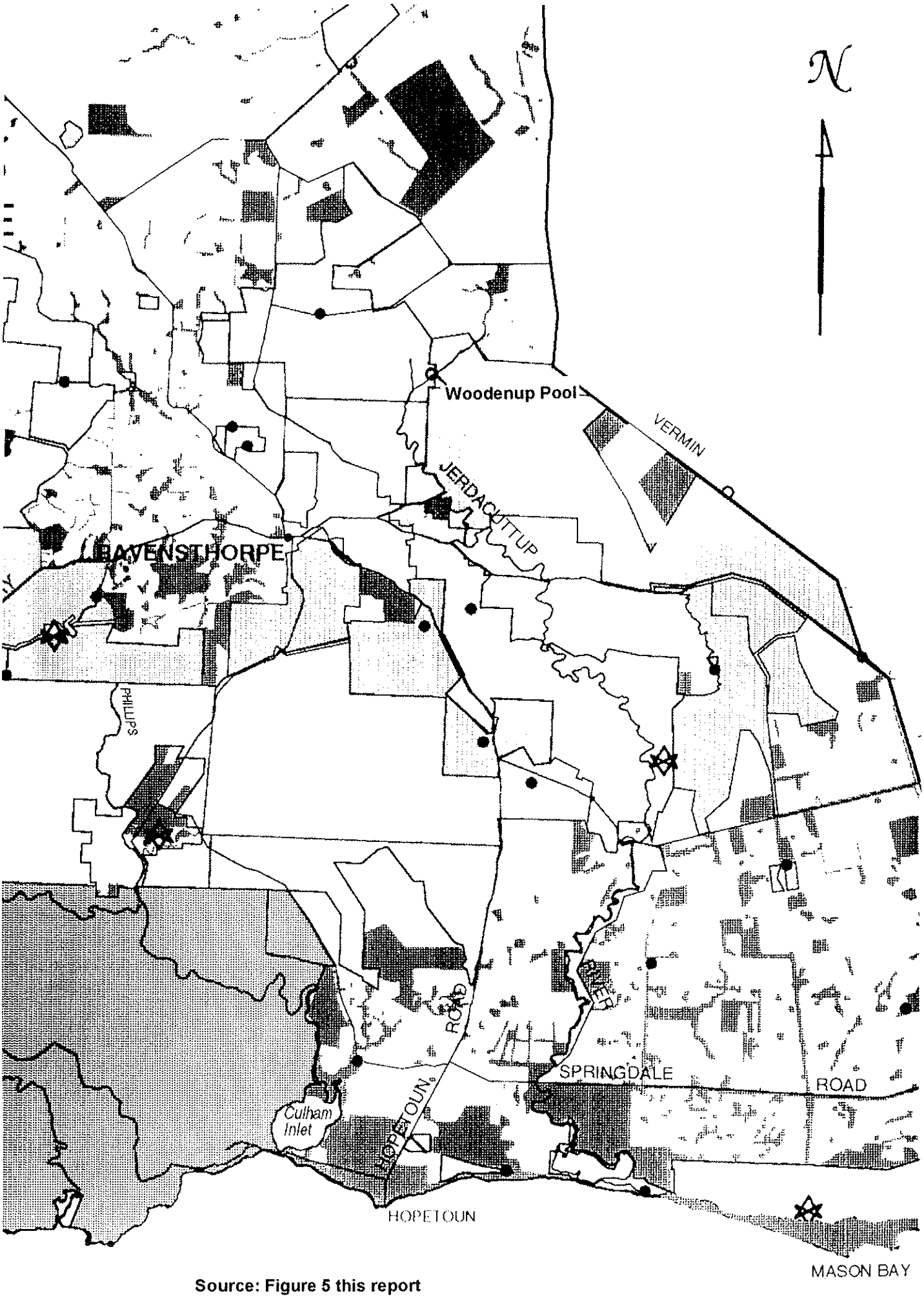
The fact that none of the above listed birds were recorded at the Carlingup Road site over the 2.5 years of survey work and 60 individual surveys indicates that the habitat is unsuitable. These species all occur in similar vegetation in Cocanarup Timber Reserve or in Mallee vegetation close to the Carlingup site. This area is therefore not an effective corridor for the movement of the birds listed above and could be enhanced by encouraging and supporting the adjoining landowner to fence off a section of Mallee regrowth to form a viable corridor (see Section 9.2(d) and Appendix 8 (o)).

8.1.8 Woodenup Pool

This spring-fed fresh water pool represents a very restricted habitat in the FBR. The value of this fresh water source was recognised early during the development of Ravensthorpe and subsequently a 56.6ha area became water Reserve 17384 (Figure 12).

The pool was visited April 1994 following a dry winter and summer period. During this time the pool was still being fed by a trickle of fresh water and many animals were observed coming in to drink (see Appendix 8(p)). Among them were pigeons, parrots, Red-eared Firetails and also goats. The pool provides a significant water source for fauna during drought conditions and may be threatened by rising salinity and altered water balance, as is evident in other creek that are being monitored in the FBR. The aquatic flora and fauna of the pool was not surveyed and it is recommended that a survey be undertaken of the pool in view of its restricted nature. There may be a need in the future for this water to be used to supplement the Ravensthorpe town supply. This further highlights the need for a full survey and assessment of the conservation value of the pool and environs (see Section 9.1(e)).

FIGURE 12 WOODENUP POOL SURVEY SITE MAP



Source: Figure 5 this report

The presence of goats was of great concern and since 1994 they have been seen in other parts of the Ravensthorpe Range. As yet, apart from obvious paths adjacent to the pool, their impact is minimal owing to their low numbers, however steps should be taken to control any increase in their population (see Section 9.1(b)).

8.1.9 Fox control

The introduced fox has been identified as one of the major threats to maintenance of biological diversity in Australia. Fox control, by way shooting, trapping and laying poison baits has been practised by many landowners in the FBR for many years. More recently the Ravensthorpe and Jerramungup LCDC's have organised Shire-wide co-ordinated fox baiting programs twice per year. Department of Conservation and Land Management Research Scientist, Jack Kinnear has been carrying out research on the response of medium sized native mammals to fox control in the FRNP over the past few years and the work is ongoing. Evidence of fauna recovery in response to fox baiting in the *buffer zone* and *zone of co-operation,* however is largely anecdotal at this stage. It is recommended that fox control is continued in the FBR and research be carried out to ascertain the effectiveness or otherwise of community fox baiting programs (Section 9.1(k)).

8.2 VEGETATION

8.2.1 Vegetation Systems

The FBR contains 10 vegetation systems, as described by Beard (1976 and 1979), and these are shown in Figure 6. Of particular significance are the Barren Ranges System and the Ravensthorpe System which are totally contained within the FBR. The Barren Ranges System comprises the quartzite ranges along the coast and occurs totally within the *core* area and as such is protected.

The Ravensthorpe System is associated with the greenstone rocks of the Ravensthorpe Range and Phillips River area in the *buffer zone*. Very little of this area is represented in reserves and most of the land is vacant Crown land. The vegetation types associated with this system are; Thicket, found on the summit ridges of the Ravensthorpe Range and Mount Desmond; Mallee, found on the slopes of the range and south of Ravensthorpe and, Sclerophyll Woodland occupying the broad valleys where the soil is at its deepest (Beard, 1979). The Thicket and some of the Mallee vegetation types are included in the proposal for NPNCA vesting for the Ravensthorpe Range. The Sclerophyll Woodland (mostly Salmon Gum) has been mostly cleared for agriculture and very little of this vegetation type remains. A fine example is included in the Cocanarup Timber Reserve and is discussed further in Section 8.2.4.

Of the other vegetation systems the Esperance, Chidnup, and Jerramungup systems have been mostly cleared for agriculture and the remnant vegetation and reserves that occur in these areas are small and often isolated. The Qualup, Bremer and Oldfield systems still have much of their area uncleared and/or in reserves. In view of this it is recommended that a map of the vegetation systems is produced to overlay the remnant vegetation map of the FBR (see Figures 5 and 6). This map could then be used to identify remnant vegetation in these less well represented systems so priority can be given to their protection (see Section 9.1(f)).

8.2.2 Plant Communities

Table 11: Description of Plant Communities for Survey Sites

SITE	TRAN	TRAPS	FORMATION	PLANT COMMUNITY	VEG AGE
Corackerup & Peniup	A	1-20	WOODLAND	*E. occidentalis* Woodland *over* Mallee *over* Heath *over* sedges	unknown but >10yrs
	B	1-10	WOODLAND	*E. occidentalis* Woodland *over* Mallee *over* Heath *over* sedges	unknown but >10yrs
	B	10-20	MALLEE	Shrub Mallee *over* Heath *over* herbs *over* sedges	unknown but >10yrs
	C	1-5	MALLEE	Shrub Mallee *over* Heath *over* herbs *over* sedges	unknown but >10yrs
	C	5-20	WOODLAND	*E. occidentalis* Woodland *over* Mallee *over* Heath *over* sedges	unknown but >10yrs
Fitzgerald Corridor	A	1-60	HEATH	Heath *over* sedges	~ 28 yrs
Aerodrome Rd N. R.	A	1-15	HEATH	Scrub *over* sedges	36+ yrs
	B	1-15	HEATH	Scrub *over* sedges	36+ yrs
Mason Bay	A	1-12	HEATH	Heath *over* sedges	38+ years
	A	12-30	MALLEE	Shrub Mallee *over* Heath *over* herbs *over* sedges	38 + years
	A	30-40	SHRUBLAND	Shrubland *over* low Heath *over* sedges	26 years
	B	1-30	MALLEE	Shrub Mallee *over* Heath *over* herbs *over* sedges	2 yrs
	B	30-40	HEATH	Heath *over* sedges	2 yrs
Bandalup Hill	A	1-4, 7-20	MALLEE	Shrub Mallee *over* Heath *over* herbs *over* sedges	10-25 yrs
		4-7	WOODLAND	Mixed Eucalypt spp. *over* scrub *over* herbs	10-25 yrs
	B,C,D	1-15	MALLEE	Shrub Mallee *over* Heath *over* herbs *over* sedges	38+ yrs
Woodenup Pool	----	----	WOODLAND	*Allocasuarina huegliana over* scrub *over* sedges	unknown but >10yrs
Block 1040	A,B	1-80	MALLEE	Shrub Mallee *over* Heath *over* herbs *over* sedges	30 yrs
	C,D	1-80	MALLEE	Shrub Mallee over Heath over herbs over sedges	70 + yrs
Carlingup Road	-----	----	WOODLAND	*E. salmonophloia over* scrub *over* grasses and sedges	unknown but poss 70+ yrs
Cocanarup Timber Res.	A,B,C	1-15	WOODLAND	*E. salmonophloia over Acacia accuminata over* scrub *over* herbs	unknown but poss 70+ yrs
	D	1-15	WOODLAND	Mixed Eucalypt spp. *over* scrub *over* herbs	unknown but poss 70+ yrs
Powell's Property	A	1-12, 16-30	MALLEE	Shrub Mallee *over* Heath *over* herbs *over* sedges	45 +yrs
	A	12-16	WOODLAND	*E. occidentalis* Woodland *over* Mallee *over* Heath *over* sedges	45 +yrs
	B	1-23	MALLEE	Shrub Mallee *over* Heath *over* herbs *over* sedges	45 +yrs
	B	23-30	WOODLAND	*E. occidentalis* Woodland *over* Mallee *over* Heath *over* sedges	45 +yrs

As can be seen from Table 11 above the highest proportion of traps were sited in the Mallee formation, followed by Woodland then Heath and the lowest proportion were in Shrubland. This is a reflection of the relative occurrence of each vegetation formation within the FBR. Details of vegetation and other characters for each survey site are given in Appendix 11. Photographs of the vegetation at some of the survey sites are presented in Appendix 8.

8.2.3 Dieback Disease

No new infections of dieback disease were noted during the surveys and none of the intensive fauna survey sites showed signs of infection.

Dieback disease does occur however in parts of the *buffer zone* and *zone of co-operation* and infections have been previously identified at nine sites as follows (Figure10):

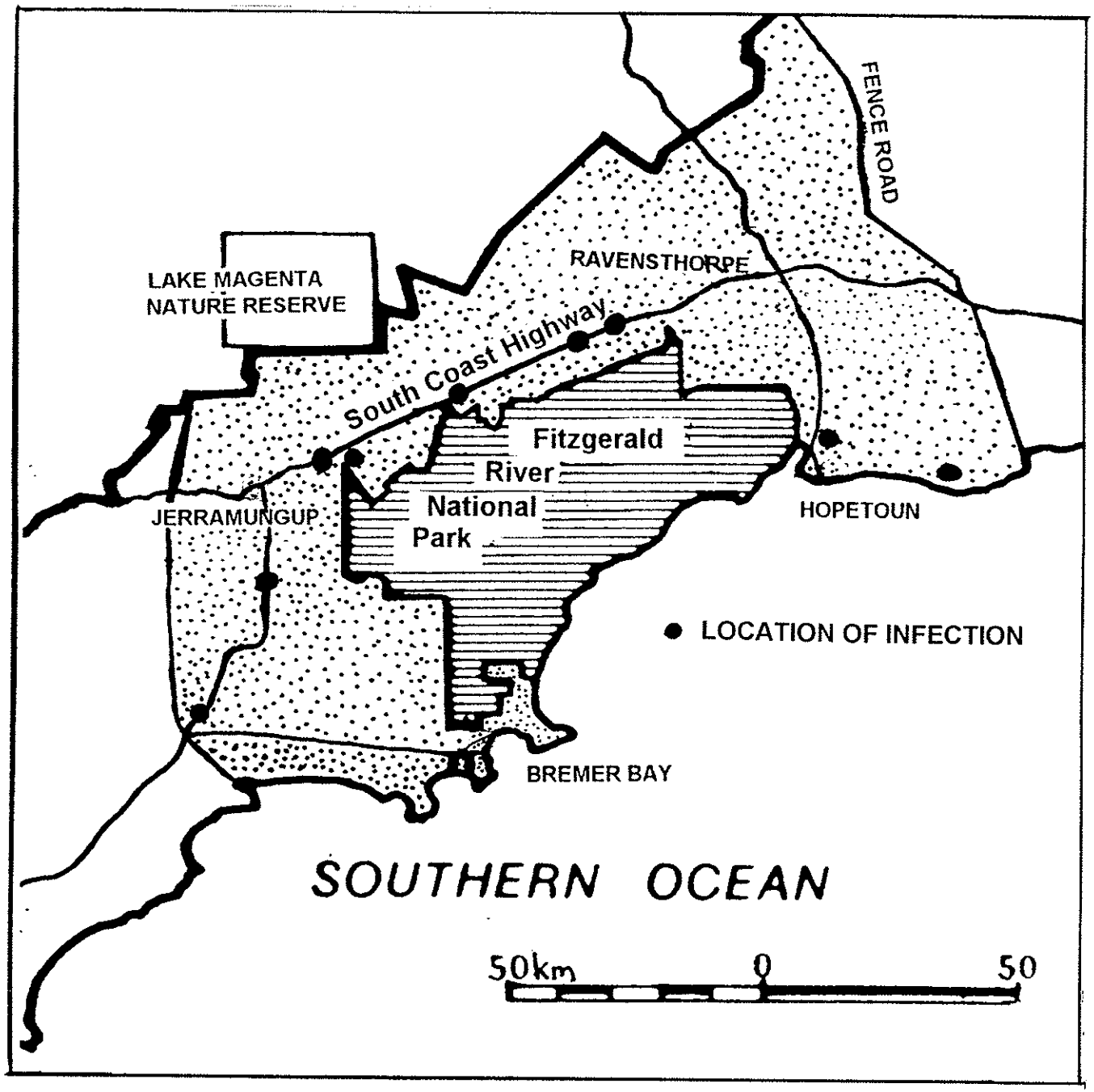
- 3.6km west Jacup Park Headquarters on the south of Highway One
- Jacup, FRNP National Park Headquarters
- Between Reynolds Hill and Cowallelup Rd on Highway One south of Jerramungup
- North of Boxwood Hill on Highway One
- Dunn Swamp north of Hopetoun
- Hamersley River Crossing on Highway One
- Koornong Road Nature Reserve on Highway One 28km west Ravensthorpe
- Mallee Road and Highway One intersection
- Jerdacuttup Lakes Nature Reserve 4km west of Mason Bay

These old infections are either *Phytophthora cinnamomi* or *P. megasperma* (Malcolm Grant pers. comm.). Most of the infections are situated in gravel pits or in drainage systems associated with roads and tracks.

The *buffer zone* areas around Ravensthorpe are just outside the normal expected distribution of dieback disease. This distribution is based on average rainfall with the spread of the disease being usually limited in areas receiving less than 650mm annual rainfall. These areas, however, do receive heavy rainfall from thunderstorms or cyclonic activity during summer. These conditions are ideal for the spread of dieback if it should be introduced. No infections have been identified in the Ravensthorpe Range during monitoring over the last three years but these areas continue to be closely monitored (Malcolm Grant pers. comm).

Dieback disease has been identified as one of the most significant issues in the FRNP and given the high conservation value of the *buffer zone* vegetation it is recommended that research is carried out on the potential impact of the disease in the *buffer zone*. In addition, every effort should be made to ensure that effective precautions are taken during road construction and maintenance (see Section 9.1(i)).

FIGURE 13: LOCATION OF DIEBACK DISEASE INFECTIONS IN THE BUFFER ZONE



8.2.4 Cocanarup Timber Reserve

A section of this timber reserve (approximately 100ha) comprises an unusual plant community of Salmon Gum (*Eucalyptus salmonophloia*) over Jam (*Acacia acuminata*) (see Appendix 8(k)). It is thought that this may be the only example of this community in Western Australia and more research is needed to ascertain its status (see Section 9.1(h)).

A different section of the reserve contains very old stands of Salmon Gum (approx. 150ha) with many rotting fallen logs and hundreds of hollows (see Appendix 8(l)). This is a fine example of a mature Salmon Gum Woodland and as such has a very high conservation value. Adjacent Salmon Gum Woodland was burnt during wildfires in 1967 and 1977 which reduced the estimated original size of the Woodland from 1460 ha to 400ha in 1980 (Forests Department, 1980).

The Management Plan for this reserve was due to be revised in 1985, however it is still to be carried out (Forests Department, 1980). It is therefore recommended that this plan be reviewed, with reference to the Fitzgerald River National Park Management Plan (CALM, 1991), particularly in relation to fire protection (see Section 9.4(b)).

A flock of 12 goats was seen in the Cocanarup Timber Reserve during the November 1994 survey. Poisoned oats were laid by the local APB officer, however it is not known if any goats were poisoned. Some damage to shrubs, probably caused by goats, was noted in the reserve at the same time. It is recommended that goat research and eradication programs are undertaken (Section 9.1(b)).

Pigs were also seen in the reserve and they had caused damage to the banks of the Phillips River with their diggings and wallows. Despite requests to the landowners to keep the pigs inside the paddocks, signs of pig damage has been noted recently along the Phillips River in the vicinity of Moir Road, close to the FRNP north-eastern boundary (M. True pers. comm). It is recommended that owners of free-range pigs ensure that their animals do not escape into adjoining bush areas (see Section 9.1(c).

8.3 FLORA

A total of 41 families, 90 genera and 177 identified vascular plant species were recorded from the eight fauna survey sites (Appendix 12). The dominant families were Myrtaceae and Proteaceae. The total number of species occurring at each site would be much higher as only the dominant species and those flowering during the fauna surveys were collected. The flowering season was very poor during spring 1994 so further plant collections were made during spring 1995.

There are 22 species of Declared Rare Flora, 163 Priority species and one species presumed extinct that have been recorded in the *buffer zone* and *zone of co-operation* (Department of Conservation and Land Management Declared Rare and Priority Flora list 14/9/95) (Appendix 13). One Priority 3 species, *Adenanthos glabrescens* subsp. *?exasperatus*, was recorded during the survey at the Fitzgerald Corridor and Aerodrome Road sites (identification of this specimen is currently being confirmed by the WA Herbarium).

FIGURE 14 CORACKERUP REMNANT VEGETATION MAP

8.4 VEGETATION CORRIDORS

8.4.1 Corackerup and Peniup Creek

The results of the fauna survey in this area shows that these corridors comprise valuable fauna habitat in their own right (see Appendix 8(a and b)). A total of 101 species were recorded living in and using the corridor, including 67 birds, 13 mammals, 5 frogs and 16 reptiles. These creeklines link the proposed Peniup Nature Reserve, Corackerup Nature Reserve and, further south, the bushland of the Pallinup River system.

During the 1993 survey period four pigs were seen regularly in the Corackerup Creek corridor and soil was disturbed by pigs along the length of the creek adjacent to the trapline (Transect B) (see Section 9.1(c)).

A large patch of remnant vegetation is situated between the Chereninnup Creek (which runs into the Corackerup Creek) and the Corackerup Nature Reserve forming an important corridor (Figure 14). This remnant comprises a breakaway complex of Mallee and Mallet and as such is unsuitable for farming. It is recommended that the landowner is encouraged to protect this remnant from clearing or grazing in the future (see Section 9.2(a)).

8.4.2 Fitzgerald River

The results of the fauna survey showed that the corridor provides habitat for 108 species including 70 birds, 11 mammals, 8 frogs and 19 reptiles. This result was surprising as the vegetation of the corridor is not structurally diverse, being comprised mostly of Heath (see Appendix 8(c)). The Fitzgerald River at this point is a small creek approximately 3 metres wide and the water during the surveys was hypersaline. There is a large block of remnant vegetation to the west of the corridor where it meets Lake Magenta Nature Reserve and the proximity of this bush undoubtedly enhances the value of the corridor for fauna at this point.

This and previous surveys (Leighton and Watson, 1992) have identified the corridor as having important conservation value in its own right. It is relatively narrow and as such is subjected to increased edge effects of weed invasion, impact of feral animals, grazing stock and an increased risk of an unnaturally high fire regime.

While setting up the trapline at the Fitzgerald Corridor site during August 1993 it was noted that about one third of the corridor at this point was showing signs of water-logging and possibly increased salinity. Some patches of Heath in the lowest part of the landscape were already dead and the vegetation on the slightly elevated areas on the outer edges of the waterlogged sections were showing stress, particularly the *Banksia baueri*, many of which were dead or dying.

It seems that the wet years of 1992-1993 had increased run-off from adjacent paddocks causing this waterlogging as most of the vegetation had died very recently. It was clear that if water levels continued to rise unchecked and this portion of the corridor changed to a saline complex its corridor value would be severely diminished.

Subsequently, during the dry year of 1994, the problem was alleviated with much of the vegetation recovering from the waterlogging. It is recommended, however, that this situation is monitored in the future (see Section 9.2(b)).

The Fitzgerald Corridor is in desperate need of an integrated catchment management plan to protect and enhance its corridor and habitat values and to ultimately protect the downstream values of the FRNP (Watson, 1994). It is therefore recommended that the catchment of the Fitzgerald River is given priority in obtaining funding for an integrated catchment management plan (see Section 9.2(b)).

8.4.3 Bandalup Hill

During the reconnaissance an important corridor was identified that links the FRNP and uncleared land to the east of the rabbit-proof fence (Figure 15). This corridor was not identified in the South Coast Region Regional Management Plan (CALM, 1992) or the recent proposals for vesting in the Ravensthorpe Range. The corridor comprises the following land:

Reserve 27177 (~ 20.6ha) Conservation of flora, vested in the NPNCA
Reserve 26920 (~1515ha) Mining Purposes, unvested
Reserve 31978 (~104ha) Parklands and Recreation, unvested
Location 397 (435ha)
Location 410 (165ha)
Location 418 (920ha)
Location 1223 (933ha)
Location 1373 (2099ha)
Location 1374 (1052ha)
Vacant Crown Land surrounding Bandalup Hill (~1340ha)

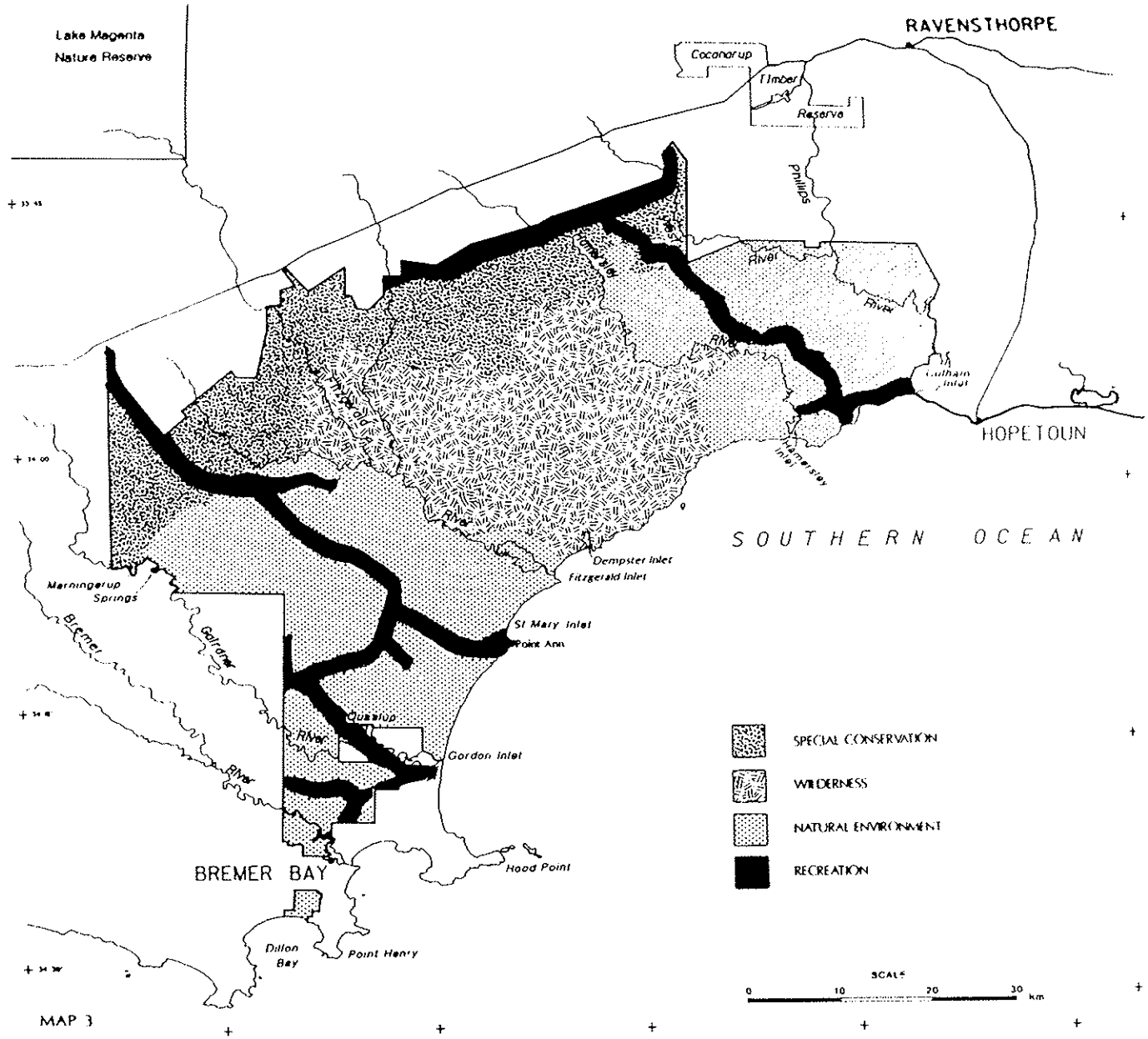
A total of 40,500ha are included in the existing vegetated corridor which is 2.5km wide at its narrowest point. The surveys identified this area as important for nature conservation in its own right. A total of 97 species were recorded at the survey sites in the narrowest part of the corridor, including the threatened Western Whipbird and Western Mouse. The dominant plant community in the corridor is Mallee-Heath, much less common are Mallet and Yate woodlands (see Appendix 8(g and h)). The Flora Reserve 27177 was found to be especially rich in birds owing to the diverse range of plant structures including Yate Woodland over dense sedges and grasses adjacent to a creek, open Yate Woodland and Mallee with a dense Heath understorey.

It is important that a viable corridor, as exists at present, is retained in the Bandalup Hill area and it is recommended that the land comprising the corridor is considered for NPNCA vesting (see Section 9.2(c)).

FIGURE 15 BANDALUP HILL CORRIDOR MAP

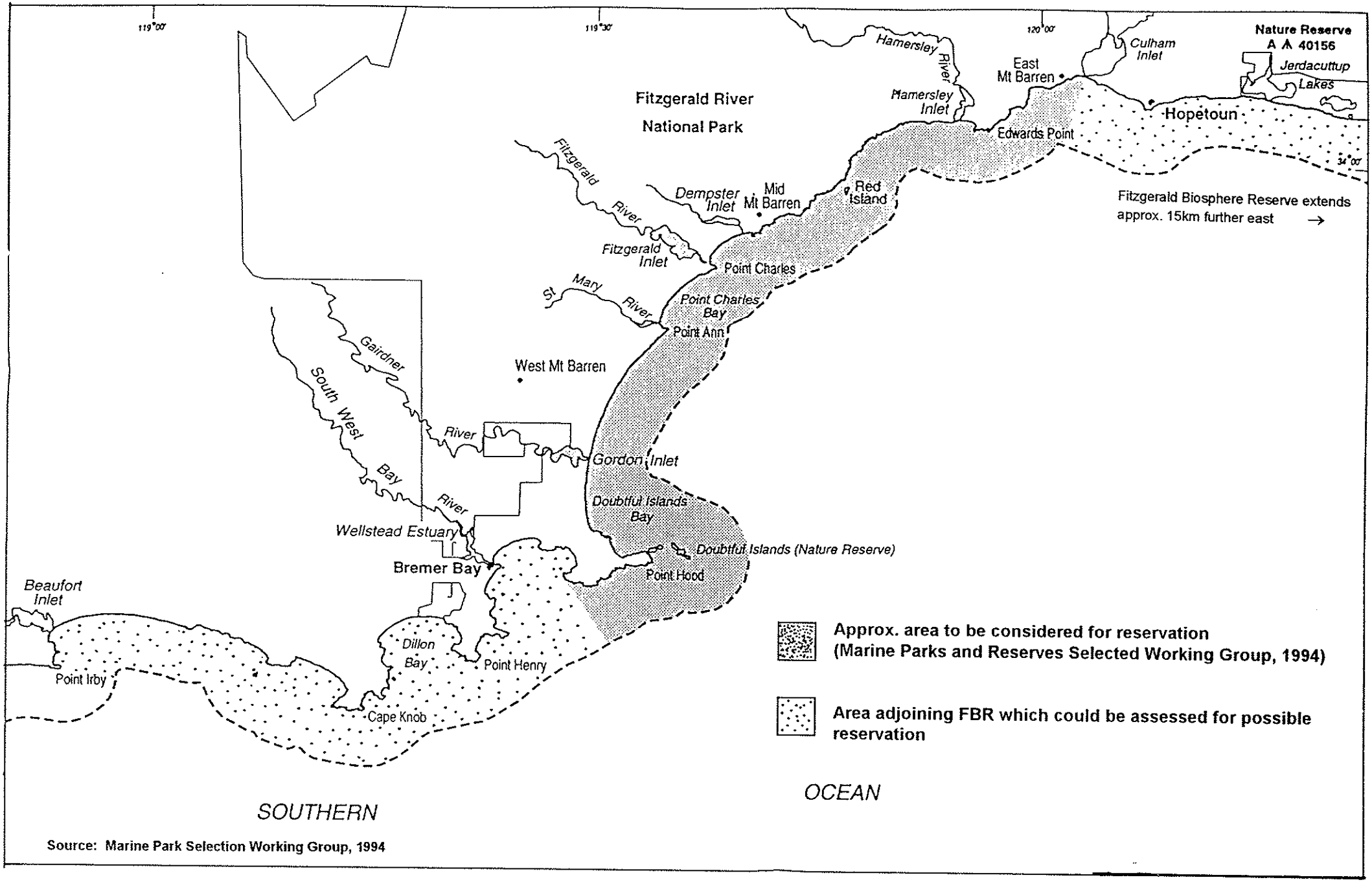
Source: Department of Land Administration Landsat Imagery 109-083, 8/1/86

FIGURE 16 FITZGERALD RIVER NATIONAL PARK MANAGEMENT ZONES



Source: Department of Conservation and Land Management 1991

FIGURE 17 MARINE RESERVE PROPOSAL



Source: Marine Park Selection Working Group, 1994

8.5 OTHER AREAS

8.5.1 Jerdacuttup River and Catchment

The Jerdacuttup River catchment is mostly cleared of native vegetation, in parts right up to the river bank where stock have access to the river. The river does not run out to the ocean but into the lakes in the Jerdacuttup Lakes Nature Reserve. This nature reserve is an important area for waterbirds and birds dependent on water, some of which are protected under International agreements. It is recommended therefore that the Jerdacuttup River is treated as a priority for an integrated catchment plan (see Section 9.2(e)).

At present a plan for use of underground water in the Hopetoun area is being developed by the Western Australian Water Authority (WAWA) in consultation with the local community. There is concern locally that the springs that feed the Jerdacuttup River will be affected by the proposals put forward in the plan and it is recommended that CALM be involved in the planning process for underground water use in this area owing to the dependence of the health of the Jerdacuttup Lakes on a balanced water regime (see Section 9.2(e)).

8.5.2 Fitzgerald River National Park

The FRNP has been divided into four management zones; special conservation, wilderness, natural environment and recreation (CALM, 1991) (Figure 16). The marine area adjacent to the FRNP has recently been proposed for consideration as a marine protected area possibly with a nature reserve component adjacent to the park's wilderness zone area (Marine Parks and Reserves Selection Working Group, 1994) (Figure 17). This proposal fits in well with the biosphere reserve concept as management of the catchments of the Fitzgerald and Hamersley Rivers will affect the proposed marine nature reserve area (Figure 18). The upper catchments of the two rivers are largely cleared of native vegetation and increased siltation, salination and nutrient levels of the rivers and estuaries is occurring. It is recommended that the proposed marine protected area adjacent to the FRNP wilderness zone is further assessed and the coastline of the whole FBR is assessed for possible reservation (see Section 9.4(c)).

One of the main objectives of biosphere reserves is to provide opportunities for monitoring of environmental change. Baseline data was collected in the FRNP, Ravensthorpe Range and Corackerup Nature Reserve 10 years ago and since then a major fire has affected parts of the FRNP. Monitoring of these sites is now needed and it is recommended that in addition to the sites established in the FRNP at least two sites in protected areas in the *buffer zone* are also monitored (Section 9.1(j)).

8.6 SCHOOLS BIOLOGICAL MONITORING PROGRAM

This program generated a lot of interest in wildlife at the schools amongst the students and teachers and also the wider community. All 197 students at the primary schools and some 85 high school students have been involved to date.

It has provided a focus for the schools with science as a priority for 1995 (Gairdner and Ravensthorpe). The program was also used during 1995 as a basis for teaching the "Biological Field Studies" and "Ecology" units for years 9 and 10 at Ravensthorpe District High School.

As a direct result of the trapping program the Jerdacuttup Primary School students and staff in conjunction with the Agricultural Protection Board, Ravensthorpe have organised a feral cat and fox eradication program in the remnant vegetation patch surrounding their school. The first phase of this program was carried out during April 1995.

During 1996 the Gairdner Primary School will be setting up a further trapping site near their school and will be incorporating the monitoring into a landcare project.
The schools program has proved to be popular with students, parents and teachers and it is recommended that the program be continued in future years (Section 9.3(b).
It is important, however, that the program is adequately supervised and all new teachers are given training in fauna trapping and handling techniques both for the safety of the students and the welfare of the animals.

8.7 COMMUNITY LIAISON AND INVOLVEMENT

8.7.1 Information

A brochure was produced with the aim of using it to inform local people what it means to live in a biosphere reserve. A sample brochure is given in Appendix 14. In total 2000 brochures have been distributed within the FBR during talks, workshops and school visits and they have also been made available at various public places.

Two brochures were produced by the Royal Australasian Ornithologists Union (RAOU) using information provided by A. Sanders on the bird watching locations and species found in the FBR (Appendix 15).

A set of five posters titled "Reptiles and Frogs of the Jerramungup Shire" was produced for displaying at local shows. They were funded by the Jerramungup Land Conservation District Committee and they are now displayed at the Jerramungup Landcare Enterprise Centre.

Information on fauna of the FBR was provided to the following:

Agricultural Protection Board - Ravensthorpe
Local Farm Stay enterprises
Ravensthorpe Landscape Committee for Rangeview Park Information Board

Information was also provided to the Jerramungup and Ravensthorpe Land Conservation District Committees to assist them in funding applications for farmers through the Remnant Vegetation Protection Scheme and the National Landcare Program.

Advisory 'Malleefowl crossing' road signs were requested from the Main Roads Department and these were erected at four sites in the Ravensthorpe Shire where Malleefowl were seen regularly.

A tape/slide presentation on frogs of the FBR was produced for use by teachers of Year 3 students.

A composite satellite image showing vegetation and the approximate boundary and towns of the FBR was purchased early in the project. This information aid proved to be extremely valuable and has been used extensively to promote the project and also in community education.

It became clear during the course of this project that the local community and visitors to the FBR have a desire for more information on its natural history, especially the Ravensthorpe Range and the FRNP. Very little local information of this kind is available that is accessible to or easily assimilated by the general public.

A few scientific reports have been published such as Hodgkin and Clark (1988 and 1990), Chapman and Newbey (1995 a and b) and, recently, a popular book on the wildflowers of the Ravensthorpe area (Craig, 1995). There is a need for information suitable for the non-scientific community on the FBR and it is recommended that existing information is collated and a quality publication is produced (see Section 9.3(c)).

8.7.2 Community Visits to Sites

When the project was initiated in February 1993 a representative of the Ravensthorpe-Hopetoun Area Promotions group asked if three school groups from the Ravensthorpe Shire could visit the fauna trapping sites. This was agreed to and other teachers and Principals in the Jerramungup Shire were contacted. As a consequence, during the November-December 1993 trapping session, groups from all six schools in the FBR visited at least one site with one or two classes. These comprised a total of 156 children and 13 teachers.

During these visits various trapping methods were described and a selection of traps were checked with each class and students were shown how the animals were handled, marked then released. Some of the keener students and teachers got some 'hands on' experience with some of the animals. All visits were concluded with question time and the students and teachers asked many questions, which highlighted their interest in the areas of science, biology and conservation.

Table 12: Summary of Visitors to Survey Sites

SITE	TOTAL NUMBER	CHILDREN	FARMERS	TEACHERS	OTHERS*
Corackerup and Peniup #	**118**	91	3	7	17
Fitzgerald Corridor	**77**	55	5	4	13
Mason Bay	**41**	23	5	2	11
Bandalup Hill	**28**	19	2	1	6
Block 1040	**15**	5	0	0	10
Cocanarup	**42**	21	0	1	20
Powell's Remnant	**150**	93	27	15	15
TOTALS	**471**	**307**	**42**	**30**	**92**

*Others include CALM and Department of Agriculture staff and people from towns in the area and other researchers.
Animals were taken from this site to Bremer School for 20 children and 2 teachers.

The total population of the FBR is approximately 2600 and, allowing for some people visiting the sites twice, about 15% of the population were involved in some way in the survey program.

These visits were extremely valuable for the children and were enjoyed by most of the participants. Many of the animals caught are not normally seen around towns and farms and these visits gave children the opportunity to see the many varied types of animals that live in their local area.

The value of community involvement in research and survey work has been highlighted during this project and previously during other projects in the area. Not only does the researcher benefit with the extra assistance but the volunteers benefit by hands-on experience and a greater understanding and awareness of their surroundings. It is important for nature conservation and public awareness that people living in the FBR become involved with the various research projects that are carried out. It is therefore recommended that researchers be encouraged to involve the local community in their projects and to ensure that the results are available locally (Section 9.3(d)).

Many requests were received from landholders wanting more information on the plants and animals living on their properties. The requests far outweighed the resources available to carry out the surveys and, as a consequence, many were not fulfilled. The interest and support has been demonstrated locally for a program to be set up whereby landholders become members of a scheme to receive information on their remnant vegetation and specific guidelines on whole farm management. The 'Land for Wildlife' scheme in Victoria is one that could be used as a model for the FBR. It is recommended that an appropriate scheme is researched and established to involve landholders in care and management of their remnant vegetation (Section 9.1(g)).

8.7.3 Public Presentations

A total of six talk/slide presentations were given during February and March 1994 with a total of 144 people attending.

Hopetoun Hall - 18 people attended (all adults)
Ravensthorpe Community Centre - 15 people attended (2 children)
Bremer Progress Association meeting - 15 people attended (all adults)
Jerramungup CWA Hall - 58 people attended (18 children)
Gairdner Progress Association meeting - 8 people attended (1 child)
Fitzgerald Hall - 30 people attended (6 children)

These talks were well received and time was spent after each talk answering questions about the wildlife of the FBR.

Presentations were also given at meetings of the following groups:

- Ravensthorpe Hopetoun Area Promotions
- Malleefowl Preservation Group
- Wellstead Land Conservation District Committee
- Fitzgerald River National Park Association
- Fitzgerald River National Park Advisory Committee
- Ravensthorpe Land Conservation District Committee
- Priority Country Areas Program
- Jerramungup Shire Annual Camp
- Ravensthorpe Range Field Visit

Displays to promote the Biosphere concept and the biological survey project were presented at the Ravensthorpe Wool Day and Jerramungup Show in 1993 and 1994.

8.7.4 Fitzgerald Biosphere Reserve Workshop

As part of this project a workshop was held in the FBR during 11-13th May 1994. Two field trips were conducted, one in the western end of the FBR and a separate one to the eastern end. These days were well attended and a summary is given in Appendix 16.

In response to the question "Do we support the Fitzgerald Biosphere Reserve?" all participants answered "Yes". When asked " Does the general community support the FBR?", participants expressed concern that the general community did not understand what the biosphere concept was about and felt threatened and confused about the concept.

Participants were asked to suggest some ways to improve community support and what actions or strategies were needed. In summary the responses covered areas such as:

- Provide more education, information and promotion of the biosphere reserve concept locally.
- Establish more trust between individuals, community groups and government employees.
- Establish a network of interested people, possibly using a Telecentre as a base.
- Prepare an action plan for the FBR.
- Appoint a co-ordinator for the FBR.
- Explore the possibility of 'twinning' with another biosphere reserve.
- Continue the Biosphere Ecologist position.

Some of the suggestions have been acted upon such as:

- A camp in the Ravensthorpe Range attended by local people
- Articles frequently published in the local media
- Encouragement of community participation in the current project
- Involvement of school children in a biological monitoring program
- Continuation of the Biosphere Ecologist position
- Involvement of Landcare and Environment Action Program participants in this current project
- Visits by national and international dignitaries

To ensure that the momentum achieved over the last 12 years is not wasted, a full-time position needs to be funded to co-ordinate the actions suggested in the 1994 workshop. In the past the FBR concept has been promoted locally mostly by voluntary contributions from local community members, however, the stage has now been reached where this is no longer feasible and a paid position is required.

It is therefore recommended that funding is sought for a full-time co-ordinator for the FBR (see Section 9.3(a)).

8.7.5 Other Workshops, Seminars and Conferences

Talks were presented at the following:

- CALM Regional Seminar 1993 and 1995 - Albany
- Nature Conservation - the Role of Networks - Geraldton 1994 (Watson *et al*, 1995)
- South Coast Fauna Workshop - Albany 1994
- Double Helix Club - Albany 1994
- Biosphere Reserves: In pursuit of sustainable living in semi-arid landscapes workshop - Berri, South Australia 1995

A "web of life" game was organised for the Jerramungup Eco Expo during August 1994. Students took part in various activities with an environmental awareness theme.

Other seminars, workshops and courses were attended as follows:

- Blooming Wildflowers Seminar- Hyden (Alternative land use)
- $$$ or Dreams Seminar- Jerramungup (Alternative land use)
- Effective Communications Skills Course - Esperance
- Teacher's Landcare Workshop - Albany
- Ribbons of Blue Workshops - Gnowangerup and Jarrahdale
- Bremer Bay Botany and Geology Course
- Biodiversity Incentives Workshop - Jerramungup
- Signposts Telecommunications Seminar- Bremer Bay
- South Coast Management Committee Field Day - Hopetoun
- South Coast Regional Land and Water Care Strategy Workshop - Bremer Bay
- Volunteers on Non-profit Committees Workshop - Perth

A community information night was organised in Ravensthorpe with guest speakers on fox control and also on Malleefowl ecology.

Involvement in two University Extension courses run in the FBR occurred during spring 1994 and 1995.

8.7.6 Media

Articles were published in all the local community newspapers distributed in the FBR and also 'CALM News' during the project (copies given in Appendix17).

Four radio interviews were carried out with ABC personnel during the project.

8.7.7 National and International Liaison

Assistance was given to John Watson (Regional Manager, CALM South Coast Region) to prepare material for his attendance at the following:

- UNESCO Biosphere Working Group meeting - Canberra 1994
- Marine Protected Areas and Biosphere Reserves Workshop (ANCA/UNESCO) - Canberra 1994
- World Biosphere Congress - Sevilla, Spain 1995

A visit by staff associated with the Bookmark Biosphere Reserve to the FBR was hosted by A. Sanders and J. Watson during May 1994.

A visit by Ian Anderson, Australian Commission for UNESCO to the FBR was hosted by A. Sanders and J. Watson during September 1994.

9.0 RECOMMENDATIONS

The high conservation value of the FBR *buffer/transition zone* has been established as a result of this project and some previous studies in the area. The importance of ongoing community involvement has also been confirmed. Arising from the study the following recommendations are made to enhance and protect these values and requirements.

9.1 FAUNA, VEGETATION AND FLORA

(a) Ravensthorpe Range Lerista

The Ravensthorpe Range Lerista (*Lerista viduata*) has one of the most restricted distributions of any Western Australian reptile (Section 8.1.4) and despite numerous searches less than 15 individuals have been found. It is recommended that:

LERISTA VIDUATA BE CONSIDERED AS ONE OF WESTERN AUSTRALIA'S THREATENED FAUNA

(b) Feral goats

The presence of goats in the Ravensthorpe Range, Cocanarup Timber Reserve and the Phillips River area is of concern and their population size and impact is unknown (Sections 8.1.8 and 8.2.4). It is recommended that:

AN ASSESSMENT OF THE IMPACT OF FERAL GOATS IN THE BUFFER ZONE BE UNDERTAKEN AND AN ERADICATION PROGRAM BE IMPLEMENTED IN CONJUNCTION WITH THE APB

(c) Pigs

The presence of pigs in Cocanarup Timber Reserve and the Peniup Creek Corridor is of concern (Section 8.2.4 and 8.4.1). It is recommended that:

LANDOWNERS KEEPING FREE- RANGE PIGS DO NOT ALLOW THE ANIMALS TO ESCAPE INTO BUSHLAND AREAS IN THE FBR AND ANY FOUND WANDERING INTO RESERVES OR REMNANT BUSHLAND BE ERADICATED

(d) Rare Rodent Survey

The results of this study require detailed analysis to enable a more comprehensive picture to be built up of the life histories, habitat requirements and interactions of these rodents (Section 8.1.6). The results of these surveys could be viewed as baseline data for further research and it is recommended that:

THE BUFFER ZONE RARE RODENT SURVEY BE CONTINUED LONG-TERM (AT LEAST 10 YEARS) AND EXPANDED TO INVOLVE RADIO-TRACKING OF THE RARE SPECIES

(e) Woodenup Pool

Woodenup Pool, on the Woodenup Creek, is a spring-fed fresh water pool on a saline river system and this habitat is not well represented in the FBR. It provides a significant water source for fauna during drought conditions and may be threatened by rising salinity and altered water balance in the creek catchment (see Section 8.1.8). It is recommended that:

FURTHER RESEARCH BE CARRIED OUT INTO THE NATURE CONSERVATION VALUES OF WOODENUP POOL'S FLORA AND FAUNA

A CATCHMENT MANAGEMENT PLAN BE PREPARED FOR WOODENUP POOL

(f) Identification of priority remnant vegetation

Of the 10 vegetation systems occurring in the FBR only five have adequate representation in reserves or large tracts of uncleared land (Section 8.2.1). It is recommended that:

A VEGETATION MAP OF THE FBR WITH OVERLAYS OF THE VEGETATION SYSTEMS BE PRODUCED AND THAT THE MAP BE USED TO IDENTIFY PRIORITY REMNANT VEGETATION FOR PROTECTION

A STUDY BE UNDERTAKEN TO ASSESS THE HEALTH STATUS OF REMNANT VEGETATION IN THE FBR TO ASSIST WITH THE ABOVE RECOMMENDATION.

(g) Management of remnant vegetation

Interest and support has been demonstrated for a program to enable landholders to become members of a scheme whereby they receive information on their remnant vegetation and specific guidelines on its management. The 'Land for Wildlife' scheme in Victoria is one that could be used as a model (Section 8.7.2). It is recommended that:

AN APPROPRIATE SCHEME BE RESEARCHED AND ESTABLISHED TO INVOLVE LANDHOLDERS IN CARE AND MANAGEMENT OF THEIR REMNANT VEGETATION IN THE ZONE OF CO-OPERATION

(h) Cocanarup Timber Reserve

A section of the Cocanarup Timber Reserve comprises Salmon Gum *Eucalyptus salmonophloia* over Jam *Acacia acuminata*. This plant community is possibly uncommon or rare (see Section 8.2.4). A review of the 1980 Management Plan for the reserve is overdue. It is recommended that:

RESEARCH BE UNDERTAKEN TO EVALUATE LISTING THE SALMON GUM/JAM WOODLAND SECTION OF THE COCANARUP TIMBER RESERVE AS A THREATENED COMMUNITY.

THAT A REVIEW OF THE COCANARUP TIMBER RESERVE MANAGEMENT PLAN BE UNDERTAKEN AND REFERENCE MADE TO THE FRNP MANAGEMENT PLAN WITH RELATION TO FIRE PROTECTION

(i) Dieback Disease

Dieback disease has been identified as one of the most significant issues in the FRNP and is known to occur at sites in the buffer zone and zone of co-operation (Section 8.2.3) . It is recommended that:

RESEARCH ON THE POTENTIAL IMPACT AND MANAGEMENT OF DIEBACK DISEASE IN THE BUFFER ZONE BE UNDERTAKEN

(j) Monitoring in the Fitzgerald Biosphere Reserve

One of the objectives of biosphere reserves is to provide opportunities for monitoring of environmental change. Baseline data was collected in the FRNP, Ravensthorpe Range and Corackerup Nature Reserve 10 years ago and since then a major fire has affected parts of the FRNP (Section 8.5.2). Monitoring of these sites is now needed and it is recommended that:

FLORA AND FAUNA MONITORING BE REGULARLY CARRIED OUT AT SITES IN THE FBR WHERE BASELINE DATA IS AVAILABLE

(k) Fox control

The introduced fox has been identified as one of the major threats to maintenance of biological diversity in Australia (Section 8.1.9). It is recommended that:

FOX CONTROL BE GIVEN A HIGH PRIORITY IN THE FBR AND RESEARCH BE CARRIED OUT TO ASCERTAIN THE EFFECTIVENESS OR OTHERWISE OF COMMUNITY FOX BAITING PROGRAMS

9.2 CORRIDORS OF REMNANT VEGETATION

(a) Vegetation Corridor on private property linking Corackerup Nature Reserve and the proposed Peniup Nature Reserve

This corridor comprises Mallee vegetation and spongolite breakaway in healthy condition and is the only major vegetation corridor remaining linking Corackerup Nature Reserve and the proposed Peniup Nature Reserve. The other links are relatively narrow road verges (see Figure 14 and Section 8.4.1). It is recommended that:

LIAISON WITH THE LANDHOLDER OCCURS TO ENSURE THAT THE VEGETATION CORRIDOR LINKING CORACKERUP NATURE RESERVE WITH THE PROPOSED PENIUP NATURE RESERVE IS RETAINED AND FENCED

(b) Fitzgerald River Corridor

The Fitzgerald River vegetation corridor runs from Lake Magenta Nature Reserve through cleared farm land into the FRNP (Figure 5, Section 8.4.2) and as such requires a catchment management plan that takes this into consideration. Waterlogging, with subsequent plant deaths, has been noted in the northern section of the corridor. It is recommended that:

A CATCHMENT MANAGEMENT PLAN FOR THE FITZGERALD RIVER AREA BE PREPARED

THE WATERLOGGING PROBLEM AT THE NORTHERN END OF THE FITZGERALD VEGETATION CORRIDOR AT THE LAKE MAGENTA BOUNDARY BE MONITORED AND A PLAN TO ADDRESS THE PROBLEM BE FORMULATED AND IMPLEMENTED

(c) Bandalup Hill Corridor

Examination of cadastral maps, aerial photos and satellite images, in conjunction with field visits, has identified that the major vegetation corridor linking the FRNP, Ravensthorpe Range and extensive areas of native vegetation to the north-east does not have secure long-term vesting. As far as could be determined there is sufficient VCL and unvested land between the southern extension of Hatfield Road to the west and the Vermin Fence to the east to provide for a large vegetation corridor (Figure 15, Section 8.4.3). It is recommended that:

A VIABLE VEGETATION CORRIDOR IN THE BANDALUP HILL AREA BE RECOGNISED AND NPNCA VESTING BE CONSIDERED

(d) Ravensthorpe Range North-South link at Carlingup Road crossing

The value of this portion of the Ravensthorpe Range as a link between the southern and northern portion of the range is limited. Bird surveys in the vicinity have found that some of the smaller birds are absent, indicating that this area is acting as a filter (see Figure 7 and Section 8.1.7). It is therefore recommended that:

THE CURRENT LANDOWNER BE ASSISTED TO FENCE OFF A PORTION OF THE PADDOCK ADJOINING THE POINT CONTACT ON CARLINGUP ROAD, RAVENSTHORPE TO ALLOW THE PARTIALLY CLEARED VEGETATION TO REGROW TO ENHANCE THE CORRIDOR VALUE OF THIS AREA.

(e) Jerdacuttup River Catchment

The Jerdacuttup River runs through cleared farm land directly into the lakes in Jerdacuttup Lakes Nature Reserve (Figure 5, Section 8.5.1) and as such requires an integrated catchment management plan that takes this into consideration. A management plan for underground water use is currently being formulated for the area which has implications for the health of the river and the Jerdacuttup Lakes. It is recommended that:

A CATCHMENT MANAGEMENT PLAN FOR THE JERDACUTTUP RIVER BE PREPARED

THE PLANNING PROCESS FOR UNDERGROUND WATER USE IN THE JERDACUTTUP CATCHMENT CONSIDERS IMPACTS UPON THE JERDACUTTUP LAKES NATURE RESERVE OR OTHER CONSERVATION VALUES

9.3 COMMUNITY LIAISON

(a) Fitzgerald Biosphere Reserve Co-ordinator

It is clear from the success of the community component of this project that many members of the local community support the biosphere reserve concept and have provided written support for the appointment of a co-ordinator for the FBR. Through their involvement with the schools program and fauna trapping many local residents are now more aware of the high nature conservation value of the *buffer zone* and *zone of co-operation* and are keen for more guidance and support in this area. To maintain this level of support and enthusiasm will require a paid full-time co-ordinator (Section 8.7.4). As CALM may not be able to resource this position for the long term it is recommended that:

FUNDING BE SOURCED INDEPENDENTLY TO EMPLOY A FULL-TIME CO-ORDINATOR WHO WILL LIAISE WITH COMMUNITY GROUPS AND INDIVIDUALS TO FURTHER PROMOTE THE BIOSPHERE CONCEPT IN THE FBR

(b) School Biological Monitoring Program

This program has now been ongoing for two years and all teachers involved are keen to keep the program going in the future. It is vital that the program is closely supervised by a person familiar with fauna trapping techniques and that new teachers are provided with instruction on fauna trapping and handling techniques (Section 8.6). It is recommended that:

THE SCHOOLS BIOLOGICAL MONITORING PROGRAM IN THE FBR BE CONTINUED AND BE ADEQUATELY SUPERVISED

(c) Information on the Fitzgerald Biosphere Reserve

Very little local information of the kind that is accessible to or easily assimilated by the general public is currently available. There is a definite need for information suitable for the non-scientific community on the FBR (Section 8.7.1). It is recommended that:

EXISTING INFORMATION ON THE FBR BE COLLATED AND A QUALITY PUBLICATION BE PRODUCED

(d) Community Involvement in Research Projects

It is important for nature conservation and public awareness that people living in the FBR are invited to become involved with the various research projects that are carried out, and any results or findings are reported locally (Section 8.7.2). It is recommended that:

RESEARCHERS BE ENCOURAGED TO INVOLVE THE LOCAL COMMUNITY IN PROJECTS WITHIN THE FBR AND ENSURE THAT RESULTS ARE AVAILABLE LOCALLY

9.4 FITZGERALD RIVER NATIONAL PARK AND COASTAL ZONE

(a) Fire Management in the FRNP

The FRNP should no longer be viewed in total isolation when considering fire management. The *buffer zone* has been confirmed in this study to be a significant source of fauna for re-colonisation following fire. It is important that the *buffer zone* areas are considered when planning is carried out for fire management in the FRNP (see Sections 8.1 and 8.2.4). It is recommended that:

ANY REVIEW OF FIRE MANAGEMENT IN THE FRNP TAKE INTO CONSIDERATION THE SURROUNDING BUFFER ZONE OF THE FBR

(b) Fitzgerald River National Park Management Plan

This plan is due for review in 2001 and given the high conservation value of the *buffer zone* (Section 8.1) it is recommended that:

THE BUFFER ZONE BE CONSIDERED IN THE REVIEW OF THE FRNP MANAGEMENT PLAN

(c) Fitzgerald Biosphere Reserve Coastal Zone

The marine area adjacent to the FRNP has recently been proposed for consideration as a marine reserve, however the remaining section of coastline is not included in the proposal (see Figure 16 and Section 8.5.2). The presence of a marine reserve adjacent to the FBR fits the biosphere reserve concept very well and it is recommended that:

THE CONCEPT OF THE PROPOSED MARINE RESERVE ADJACENT TO THE FRNP BE FURTHER ASSESSED

THE COASTAL AREA ADJACENT TO THE ENTIRE FBR, FROM BEAUFORT INLET TO STARVATION BOAT HARBOUR, BE FURTHER ASSESSED FOR POSSIBLE MARINE RESERVATION

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APPENDICES

APPENDIX 1: SITES VISITED DURING APRIL 1993 - APRIL 1995

SITE CODE	RESERVE No/ Loc No	RESERVE NAME/LAND HOLDER	MAP SHEET No	TRAP	DATES/S FIRST VISITED	LOCATION
FRNP	Various	FITZGERALD RIVER NATIONAL PARK		N	VARIOUS	VARIOUS
CO01A	VCL	PENIUP CREEK CORRIDOR	2629-1	Y	14-18/12/93	34° 11' 17.6" 118° 46' 16.5"
B	VCL	CORACKERUP CREEK CORRIDOR	2629-4	Y	21-24/3/93;14-18/12/93	34° 10' 32.1" 118° 44' 13.4"
C	VCL	CORACKERUP CREEK CORRIDOR	2629-3	Y	14-18/12/93	34° 16' 2.9" 118° 42" 50.0"
CO02A	VCL	PALLINUP CORRIDOR	2629-3	N	18/4/93	34° 18' 15" 118° 42' 15"
CO03A	26172	FITZGERALD CORRIDOR	2730-4	Y	4-10/12/93	33° 42' 17.5" 119° 11' 27.7"
B	1028	FITZGERALD CORRIDOR	2730-2	N	31/5/93	
C	VCL	FITZGERALD CORRIDOR	2730-2	N	27/9/93	
D	36207	FITZGERALD CORRIDOR	2730-3	N	7/12/93	
NR01A	26793	CORACKERUP NR	2629-4	Y	18,19,21,22,23,24/3/93	34° 12' 00" 118° 37' 45"
B						34° 12' 30" 118° 40' 06"
C						34° 10' 56" 118° 42' 48"
NR02A-I	14039	GAIRDNER NR	2630-2	Y	2,3,4,5/4/93	33° 49' 10" 118° 48' 40"
NR03A	28687	PALLINUP NR	2629-3	N	17/4/93	34° 25' 15" 118° 41' 36"
B						34° 24' 55" 118° 42' 45"
C						34° 24' 10" 118° 42' 55"
NR04A	26792	HOLDEN RD NR	2630-3	N	20/4/93	34° 00' 30" 118° 38' 14 '
NR05A	31128	KUNDIP NR	2930-1+4	N	13/5/93	33° 14' 15" 120° 15' 33"
B						33° 42' 54" 120° 12' 40"
NR06A	27525+13271	OVERSHOT HILL NR	2930-4	N	19/5/93	33° 31' 20" 120° 00' 14"
B						33° 31' 58" 120° 00' 50"
NR07A	29184	HAYES RD NR	2931-3	N	20/5/93	33° 19' 01" 120° 04' 24"
B						33° 16' 34" 120° 05' 10"
NR08	31425	KOORNONG NR	2830-1	N	22/5/93	33° 39' 30" 119° 47' 00"
NR09A	31881	LONG CREEK NR	2830-1	N	24/5/93	33° 34' 45" 119° 45' 18"
NR10A	31424	AERODROME RD NR	2831-3+2830-4	N	25,26/5/93	33° 29' 27" 119° 40' 39"
NR11A	40156	JERDACUTTUP LAKES NR	2930-2	Y	28/10-3/11/93	33° 56' 48.0" 120° 26' 26.7"
B	40156			Y	28/10-3/11/93	33° 56' 45.8 120° 26' 19.2"
C	22761			N	7-8/5/93	33° 56' 21" 120° 17' 52"
D	40156			N	7-8/5/93	33° 55' 30" 120° 25' 35"
OT01A	29088+13823	WATER & GOVT REQ	2629-4	N	15/3/93	34° 04' 30"118° 39' 25"
B						34° 04' 10" 118° 39' 15"
C						34° 03' 28" 118° 39' 15"
OT02A	18863	CAMPING RES -Carlawillup Rockhole	2629-1	N	17,20/3/93	34° 01' 00" 118° 59' 35"
B						34° 00' 48" 118° 59' 20"
C						34° 01' 00" 118° 59' 05"

SITE CODE	RESERVE No/ Loc No	RESERVE NAME/LAND HOLDER	MAP SHEET No	TRAPS	DATES/S VISITED	LOCATION
OT03A	3114	MINERUP-JOHN MILLER	2729-2	N		34° 26' 10" 119° 16' 25"
OT04A	27102+26935	COMMON & RECREATION	2729-3	N	16/4/93	Reef Beach. Warramurrup Rd 34° 25' 00" 119° 10' 00"
B						34° 27' 00" 119° 04' 00"
C						34° 27' 50" 118° 54' 10"
OT05	CG73	STEERE RIVERxJOHN FORREST RD	2930-3	N	12/5/93	33° 52' 20" 120° 06' 10"
OT06A	ROADVERGE	CNR MIDDLE & TAMARINE RD	2930-2	N	12/5/93	33° 48' 46" 120° 17' 45"
OT07A	28144	GOVT REQ	2930-2	N	12/5/93	Mason's Bay Rd 33° 45' 20" 120° 23' 00"
OT08A	??	KUNDIP TOWNSITE	2930-4	N	8/5/93	33° 41' 39" 120° 10' 06"
B						33° 41' 35" 120° 10' 41"
C						33° 41' 34" 120° 11' 00"
OT09A	27177	CONSERVATION OF FLORA	2930-1	N	15/5/93	33° 38' 56" 120° 19' 47"
OT10A	VCL	BANDALUP HILL	2930-1	Y	5-10/11/93	33° 39` 21.5`` 120° 21` 18.1``
B				Y	5-10/11/93	33° 38` 54.2`` 120° 19` 52.5``
C				Y	5-10/11/93	33° 38`` 50.2`` 120° 20` 14.0``
D				Y	15/5/93; 5-10/11/93	33° 40` 55.4`` 120° 18` 8.3``
OT11A	Rd No. 4274	RABBIT PROOF FENCE RD	2930-1+3	N	16/5/93	33° 38' 19" 120° 25' 41"
B						33° 33' 00" 120° 20' 00"
OT12A	17384	WOODENUP POOL WATER RESERVE	2931-3	N	17/5/93	33° 29' 31" 120° 09' 02"
B		POOL				33° 29' 12" 120° 08' 08"
OT13A	1040	VCL	2830-1	Y	4-8/8/93	33° 44' 08" 119° 57' 27"; 33° 44' 39" 119° 58' 35"
B	1040			Y	9-14/8/93	33° 44' 22" 119° 57' 20"; 33° 44' 43" 119° 58' 19"
C	1040			Y	16-21/8/93	33° 44' 31" 119° 57' 14" ; 33° 45' 05" 119° 57' 56"
D	1040			Y	21-26/9/93	33° 44' 42" 119° 57' 05"
E	1040			Y	21-27/5/93	33° 44' 22.6`` 119° 58` 27.6``
F	1040			Y	10-15/10/93;8-13/1/94	33° 44' 22" 119° 58' 27"
H	216	CARRACARRUP		N	HOME BASE	33° 44' 34" 119° 58' 37"
OT14	??	DESMOND TOWNSITE	2930-4	N	20/5/93	33° 37' 48" 120° 08' 10"
OT15A	34410	PARKLANDS & RECREATION	2831-2	N	25/5/93	cnr Bridger+Long Crk Rd 33° 25' 33" 119° 50' 01"
OT16A	26245	PUBLIC UTILITY & CAMPING	2730-1+2830-4	N	31/5/93	5km Nth Fitzgerald Town 33° 42' 00" 119° 27' 00"
B						33° 41' 14" 119° 31' 07"
PN01A	29500	PENIUP PROPOSED NR	2629-1	N	23/3/93	34° 11' 15" 118° 46' 10"
B						34° 05' 20" 118° 46' 00"

SITE CODE	RESERVE No/Loc No	RESERVE NAME/LAND HOLDER	MAP SHEET No	TRAPS	DATES/S VISITED	LOCATION
PN02A	2084	PROPOSED RESERVE	2629-4+2730-3	N	30/3/93	Gairdner River , end of Carlawillup Rd 34° 00` 00`` 119° 03` 05``
PN03A	28283	PROPOSED RESERVE	2629-2	N	17/4/93	on Gairdner Sth Rd. isolated remnant 34° 15' 56" 118° 56' 00"
B						34° 15' 55" 118° 56' 02"
C						34° 15' 52" 118° 56' 02"
PN04A	22353	PROPOSED RESERVE	2629-2	N	17/4/93	end of Paperbark Rd 34° 26' 27" 118° 48' 20"
PN05A	33257	PROPOSED RESERVE	2629-3	N	18/4/93	North of Pallinup NR 34° 21' 35" 118° 41' 05"
PN06	22343	PROPOSED RESERVE	2630-3	N	20/4/93	Nth Holden Rd NR 33° 57' 10" 118° 38' 40"
PN07	28438	PROPOSED RESERVE	2930-3	N	7/5/93	Extension of Dunn's Swamp 33° 55' 50" 120° 12' 16"
PN08	NOW OT08					
PN09	VCL	PROPOSED RESERVE	2930-4	N	17,19/5/93	Point contact Carlingup Rd 33° 33' 55" 120° 07' 34"
PN10	32047+18460	PROPOSED RESERVE	2931-3	N	20/5/93	Moolyall Rocks 33° 27' 30" 120° 03' 32"
PN11A	30795	PROPOSED RESERVE - COCANARUP	2830-1	Y	25/11-1/12/93	33° 37` 28.8`` 119° 55` 00.8``
B				Y	25/11-1/12/93	33° 37` 56.7`` 119° 55` 28.8``
C				Y	25/11-1/12/93	33° 38` 00.6`` 119° 55` 13.1``
D				Y	25/11-1/12/93	33° 38` 39.0`` 119° 53` 28.4``
E				N	24/5/93	33° 32' 21" 119° 51' 12"
F				N	24/5/93	33° 32' 40" 119° 50' 37"
PN12	34410	PROPOSED RESERVE	2830-1	N	24/5/93	33° 30' 00" 119° 53' 30" Belli Road
PN13	16119	PROPOSED RESERVE	2930-4	N	20/5/93	Ravey Rng Sth 33° 37' 10" 120° 10' 00"
PN14	1049, 1050, 1052, 16091	VCL & COMMON	2930-4	Y		Rd No. 11 33° 42` 00`` 120° 09` 00``
PN15	VCL	PROPOSED RESERVE	2930-4	Y	24-28/10/94	Raventhorpe Range south 33° 36` 40`` 120° 08` 00``
PN16	VCL	PROPOSED RESERVE	2930-4	Y	10-14/10/94	Ravensthorpe Range north 33° 32` 50`` 120° 06` 00``
RV01	1910	M. MEADE	2729-4	N	24/3+1/4/93	34° 09' 15" 119° 08' 35"
RV02	1528	YENDINNUP SWAMP- D. CAMPBELL	2629-2	N	25/3/93	34° 20' 40" 118° 53' 45"
RV03	1526	J. TENSELDAM	2629-2	N	25/3/93	34° 19' 08" 118° 56' 30"
RV04A	1270	K. BALES	2630-2	Y	31/3+2,3,4,5/4/93	34° 56' 28" 118° 49' 48"
B				Y		34° 55' 52" 118° 49' 48"
C				Y		34° 56' 28" 118° 49' 48"

SITE CODE	RESERVE No/Loc No	RESERVE NAME/LAND HOLDER	MAP SHEET No	TRAPS	DATES/S VISITED	LOCATION
RV05	1396	R. HOUSTON	2729-4	N	1/4/93	34° 05' 10" 119° 01' 35"
RV06A	823+1414	F. POWELL	2629-1	Y	15-21/11/93	34° 01` 00.8" 118° 54` 38.5"
B				Y	15-21/11/93	34° 01` 27.6" 118° 55` 55.5"
C				N	30/4/93	34° 02' 00" 118° 55' 00"
RV07A	1402	R. HOUSTON	2630-2	N	31/3/93	34° 58' 08" 118° 51' 36"
B						34° 58' 58" 118° 51' 48"
C						34° 58' 28" 118° 51' 24"
RV08	793	J. McDOUGALL	2930-2	N	7/5/93	33° 50' 00" 120° 28' 00"
RV09	1593	S. LOWE	2830-4	N	6/7/94	33°37` 00" 119° 38` 00"
SC01A	8941	RAVENSTHORPE HIGH SCHOOL	2930-4	Y	9-10/5/94	33°35`10" 120°03`00"
B	8941	RAVENSTHORPE HIGH SCHOOL	2930-4	Y		
SCO2A	VCL	FITZGERALD PRIMARY SCHOOL	2730-2	Y	16/6/94 21/6/94	30°45`55" 119° 27` 20"
SC03A	TOWN RES.	JERDACUTTUP PRIMARY SCHOOL	2930-1	Y	5/5/95	33° 42`41" 120° 28` 28"
SC04A	TOWN RES	JERRAMUNGUP HIGH SCHOOL	2630-2	Y		33° 57` 30" 118° 55` 00"
SC05A	TOWN RES.	ONGERUP PRIMARY SCHOOL	2530-2	Y	12/4/95	
SC06A	TOWN RES.	GAIRDNER PRIMARY SCHOOL	2629-1	Y	4/4/95	34° 12` 48" 118°56`05"
SC07A	TOWN RES.	BREMER PRIMARY SCHOOL	2729-2	Y	27/3/95	34° 22` 35" 119° 20` 59"

APPENDIX 2:

GUIDELINES

FITZGERALD BIOSPHERE RESERVE SCHOOL BIOLOGICAL SURVEY PROGRAMME

CONTENTS page

VERTEBRATE FAUNA SURVEY INFORMATION FOR THE SCHOOL BIOLOGICAL PROGRAMME

1.0 BACKGROUND

This School Biological Survey Programme began in 1993 when Ann Williams (Ravensthorpe Hopetoun Area Promotions) asked Angela Sanders (Ecologist with CALM working in the Fitzgerald Biosphere Reserve - FBR) if school students in the Ravensthorpe Shire could visit her fauna trapping sites. As a result of these visits teachers became interested in setting up a similar fauna trapping programme at their schools. Two pilot programmes were run at Ravensthorpe and Fitzgerald Schools during 1994 and teething problems were identified and methods refined to suit the school environment.

Since then the project has evolved to include 6 schools within the FBR (Jerdacuttup, Ravensthorpe, Fitzgerald, Jerramungup, Gairdner and Bremer Bay) and 1 school with affiliations to the FBR (Ongerup). These schools all now have a fauna trapping programme in place which has been jointly funded by the Australian Nature Conservation Agency (Angela's salary and travel expenses and some equipment), Priority Country Areas Programme (equipment and teacher relief) and UNESCO (equipment).

It is envisaged that this will be an ongoing programme that can be carried out each year irrespective of staff changes. The programme is being used in 1995 as a basis for teaching the "Biological Field Studies" unit at Ravensthorpe District High School.

The main aim of the programme is to provide a framework for teaching science in each school. It is an opportunity for the students to have "hands on" experience using scientific methodology and handling local native fauna. A secondary aim of the programme is to collect fauna and flora information from the bushland adjacent to each school. The information collected will be incorporated into a database of fauna of the FBR, which is ultimately used to formulate management guidelines for bushland areas.

2.0 METHODS AND WHAT YOU ARE LIKELY TO CATCH

METHOD	MAMMALS	REPTILES	FROGS
Pitfall trap with fence	rodents, small marsupials	most excluding adult goannas and large snakes	all
Elliott traps	rodents, small marsupials excluding honey and pygmy possums	bobtails, skinks (occasionally)	no
Cage traps	brush-tailed possum, bush rat, chuditch	bobtails, blue-tongues, goannas	no
Hand foraging	occasional house mouse, marsupials	all	occasional frogs
Headtorching	rarely small, sometimes large	geckos	all
Spotlighting	as above	sometimes	sometimes

During this programme only the first three trapping methods will be used. I have included the last three to let you know what other methods are available if you wish to extend the programme at any time.

3.0 TIMING OF TRAPPING

It would be ideal if traps could be opened for a 5 day period at least once each term.

- Spring trapping is the best for everything (September-November).
- Summer is good for reptiles (December-January).
- Winter is good for most mammals and frogs (May-August).
- Autumn is the least productive time to trap anything (Feb-April).

TRAPPING DAY 1 - Open the traps anytime (morning will give the best results).

TRAPPING DAYS 2 - 4 - Check the traps first thing each morning.

TRAPPING DAY 5 - Check the traps and then put the lid securely on each bucket and cover it with soil if it is going to be more than 4 weeks until the next trapping session. Collect up all Elliott and cage traps and store them at the school. Fences can be left in place.

4.0 RULES OF TRAPPING

THE WELFARE OF THE ANIMALS IS PARAMOUNT

Once the traps are open they have to be checked **EVERY** morning. If checking them every morning is a problem contact Angela and if possible she will arrange for someone to check them for you.

Ants are usually the biggest problem to any trapping programme and to minimise problems with them and to avoid causing the animals undue stress:

- Don't site pitfall traps near meat ant, sergeant ant or stick ant nests (these are the worst species in this part of the world)
- Don't place a drift fence across an ant trail.
- Place shade over each pitfall trap, the bucket lid attached to two pegs works well.
- Always let the animals go at the capture site after identification. Pick a sheltered part of the areas for release depending on each species. Ground frogs (not *Litoria* species) should be revived by part immersion in water and buried under damp soil if they are dehydrated. For *Litoria* species revive them in water, if necessary and put them in dense vegetation.
- Honey possums and pygmy possums often go into torpor in the traps during cold weather. Warm them up with your body heat and offer them honey and water before you release them.
- Elliott traps can be death traps during really cold, wet weather and hot weather. During winter enclose the trap in a plastic bag and put a small pad of wool inside. During summer put all traps in a spot where they are shaded ALL day, this is essential. A dense covering of leaf litter is good if dense shrubs are not available.
- Cage traps should be placed in a well shaded spot and covered with a hessian sack.
- Drift fences will require occasional maintenance to keep them working effectively. The folded lip of the fence should be kept covered in soil so the animals cannot get underneath. The edge of the bucket should be kept level with the ground surface otherwise animals will not fall in.

Fauna trapping **ALWAYS** carries a risk to the animals despite the best efforts of care. If an animals dies during trapping it is important to preserve it for the WA Museum. Wrap the animal in newspaper, put it in a plastic bag and freeze it. Contact Angela Sanders as soon as possible.

5.0 CHECKING THE TRAPS

1. Make sure ALL the traps are checked, be aware of Elliott traps that may be hidden under a bush.

2. Identify each vertebrate that you catch using the **Identification Kit** and fill out the data sheet. If you catch an animal that does not appear in the kit or you are not sure which species it is put it in a holding bag, take it back to school and contact Angela or your nearest CALM Ranger as soon as possible.

3. Put a mark under each animals tail (except frogs) with a non-toxic waterproof marker pen. You can use a different colour for each day of the week, this will tell you which day you caught the animal.

4. Release each animal at the site of capture and make sure they are out of the way of trampling feet.

5. When you have finished trapping at the end of each week all buckets must have their lids securely fitted and if the next trapping session is more than 4 weeks away the lids must be covered with soil. Collect up all Elliott traps and cage traps and store them somewhere secure until the next trapping session. It is important not to leave the Elliotts and cages out in the open as they may be stolen and they deteriorate if they are left out for long periods.

6. At the end of each trapping session please send a copy of data sheets to Angela so she can enter your data onto the regional database.

7. AT THE END OF THE SCHOOL YEAR ALL BUCKETS MUST HAVE THEIR LIDS SECURELY FITTED AND BE COVERED WITH A BIG PILE OF SOIL AND ALL FENCES MUST BE ROLLED UP AND STORED AT THE SCHOOL. This stops the lids and fences from degrading in sunlight and also helps to keep foxes and dogs from pulling the lids off.

6.0 HANDLING THE BITIES

Snakes

Do Not Handle these animals until you are sure they are harmless

Leave snakes and legless lizards in the bucket and identify them using the kit. When you are sure that you have identified the animal correctly, if it is a venomous snake make sure everyone is standing back out of the way and put on a glove and use the tongs to **gently** lift the snake out and release it. If there is any doubt as to its identity always use the tongs to lift it out the bucket and release it.

If it is a legless lizard or a harmless snake you can lift it out gently by hand have a good look at it and then release it (except blind snakes, please keep these for Angela as they cannot be identified in the field).

Spiders, Scorpions and Centipedes

Some of these animals can inflict a sting so take care when handling them

Put on a glove and scoop the animal out using a clean glass jar, put the lid on the jar and hand it around and use a hand lens to have a close look. Release the animal when you have finished.

7.0 TRAPPING LICENSE

As a requirement of your trapping license you will need to send a "fauna return" to CALM at the end of the year when you receive your license renewal application form. The "fauna return" is a list of all animals caught during the year. **Angela will provide you with a list at the end of the year for you to attach to your renewal.** You do not need to do anything else for this.

8.0 DATABASE

If you are interested Angela can run a session on the database at your school. You will need an IBM compatible machine with at least 2.4 megabytes of free memory. The database includes all the fauna records (over 3000) that have been collected in the FBR since 1993.

9.0 VEGETATION RECORDING

The vegetation recording sheet can be filled out once for each class involved in the programme during the year. From this sheet you will be able to write a vegetation description for your trapping site.

10.0 EQUIPMENT LIST

10 x 20 LITRE PLASTIC BUCKETS WITH LIDS
20 x LID PEGS
10 x 1 METRE DRIFT FENCES
10 x ELLIOTT TRAPS IN BOX
1 PAIR LONG BARBECUE TONGS
10 CALICO HOLDING BAGS
1 PAIR WEIGHING SCALES
1 PAIR GARDENING GLOVES
1 CAN OPENER
1 BAIT CONTAINER
8 TINS OF SARDINES
1 BOX OF ROLLED OATS
1 BUCKET OF PEANUT BUTTER
IDENTIFICATION KIT
DATA SHEETS
VEGETATION RECORDING SHEET

11.0 QUICK CHECKLIST

1. Make sure ALL traps are checked, data sheets are filled out and all animals are released.

2. At the end of each trapping session put all lids on the buckets securely and collect up all Elliott and cage traps.

3. Send a copy of your data sheet/s to Angela for inclusion in the regional database.

12.0 CONTACTS IF YOU HAVE ANY QUESTIONS

TRY ANGELA FIRST, IF SHE IS NOT AVAILABLE THEN TRY YOUR NEAREST CALM RANGER.

Angela Sanders - All schools - Phone/fax (098) 381166 PO Box 279, Ravensthorpe, 6346.

Mark True - Ranger for Jerdacuttup and Ravensthorpe Schools - Phone (098) 383060

Nathan McQuoid - Ranger for Fitzgerald, Jerramungup and Ongerup Schools - Phone (098) 355043 Fax 355045

Lindsay Brown - Ranger for Gairdner and Bremer Bay Schools - Phone/fax (098) 371022

Peter Collins - CALM Wildlife Officer, Albany. Phone (098) 417133

13.0 BAIT RECIPE

Peanut Butter
Oats
Sardines

Mix together 5 spoons of peanut butter and 1 tin sardines. Add enough rolled oats to make a mixture that will roll into balls in your hand.

Put a ping-pong ball sized lump in each Elliot trap and a larger lump on the hook in each cage trap. Replace bait during the week as necessary.

Discard left-over mixture at the end of each trapping session and wash container with hot, soapy water.

QUICK CHECKLIST

1. Make sure ALL traps are checked, data sheets are filled out and all animals are released.

2. At the end of each trapping session put all lids on the buckets securely and collect up all Elliott and cage traps.

3. Send a copy of your data sheet/s to Angela for inclusion in the regional database.

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Discard left-over mixture at the end of each trapping session and wash container with hot, soapy water.

BREMER BAY SCHOOL BIOLOGICAL SURVEY PROJECT

VEGETATION RECORDING SHEET

SITE:	Bushland about 1km north-east of the Bremer Bay Primary School

VEGETATION DESCRIPTION:

TREES:	Woody plants with a single trunk and the leaf canopy raised well above the ground.

How tall are the trees? Tick the correct box.

No trees	☐
Between 15 - 30 metres	☐
Between 2 - 15 metres	☐

How much ground does the tree leaf canopy cover?

2 - 10% (very sparse)	☐
10 - 30% (sparse)	☐
30 - 70% (mid-dense)	☐
70 - 100% (dense)	☐

To estimate the leaf canopy cover chose a site in the centre of your trapline and imagine that the sun is shining directly overhead and estimate the amount of ground that the shadow from the leaves would cover.

Which species of trees are growing at the site?

MALLEES: Woody plants with many stems or trunks growing from a mallee root. Leaf canopy may touch the ground or may be raised well above the ground.

How tall are the mallees and how many trunks do they have?

No Mallees ☐
Shrub form - Less than 8 metres tall with 5 or more trunks ☐
Tree form - More than 8 metres tall with 4 or less trunks ☐

How much ground does the mallee leaf canopy cover?

2 - 10% (very sparse) ☐
10 - 30% (sparse) ☐
30 - 70% (mid-dense) ☐
70 - 100% (dense) ☐

Which species of mallees are growing at the site?

SHRUBS:	Plants that grow erect or upright and have many stems with leaves growing right along each stem. Shrubs are usually smaller than 5 metres.

How tall are the shrubs?

Taller than 2 metres ☐
Between 1 - 2 metres ☐
Between 0 - 1 metre ☐

How much ground do the shrubs cover?

2 - 10% (very sparse) ☐
10 - 30% (sparse) ☐
30 - 70% (mid-dense) ☐
70 - 100% (dense) ☐

Which species of shrubs are growing at the site?

GRASSES: Grasses grow in clumps and have thin wispy stems and flat leaves.

Are there any grasses growing at the site? YES / NO

How many different types or species are there? _____

How much ground do the grasses cover?

- 2 - 10% (very sparse) ☐
- 10 - 30% (sparse) ☐
- 30 - 70% (mid-dense) ☐
- 70 - 100% (dense) ☐

SEDGES: Sedges have thick, tough, flat or round leaves and grow in clumps.

Are there any sedges growing at the site? YES / NO

How many different types or species are there? _____

How much ground do the sedges cover?

- 2 - 10% (very sparse) ☐
- 10 - 30% (sparse) ☐
- 30 - 70% (mid-dense) ☐
- 70 - 100% (dense) ☐

LITTER: Litter includes fallen leaves, sticks and branches. Litter is important for food and shelter for insects and other animals.

How much ground is covered by litter?

2 - 10% (very sparse)	☐
10 - 30% (sparse)	☐
30 - 70% (mid-dense)	☐
70 - 100% (dense)	☐

FALLEN LOGS AND HOLLOWS IN TREES: Logs lying on the ground and hollows in trees provide shelter for many animals.

Are there any logs lying on the ground? YES / NO

Are there any hollows in the trees? YES / NO

KEY FOR DESCRIBING THE VEGETATION AT YOUR TRAPPING SITE

Plant and Height	Tree Leaf Canopy Cover %			
	Dense 70-100 %	**Mid-dense 30-70 %**	**Sparse 10-30 %**	**Very Sparse 2-10 %**
Trees 15-30m	Dense Forest	Forest	Woodland	Open Woodland
Trees 2-15m	Dense Low Forest	Low Forest	Low Woodland	Open Low woodland
Mallee shrub form	Dense Shrub Mallee	Shrub Mallee	Open Shrub Mallee	Very Open Shrub Mallee
Mallee tree form	Dense Tree Mallee	Tree Mallee	Open Tree Mallee	Very Open Tree Mallee
Shrubs taller than 2m	Dense Thicket	Thicket	Scrub	Open Scrub
Shrubs 1.0-2.0m	Dense Heath	Heath	Low Scrub	Open Low Scrub
Shrubs 0.0-1.0m	Dense Low Heath	Low Heath	Dwarf Scrub	Open Dwarf Scrub
Grasses	Dense Low Grasses	Low Grasses	Open Low Grasses	Very Open Grasses
Sedges	Dense Sedges	Mid-dense Sedges	Open Sedges	Very Open Sedges
Litter	Dense Litter	Mid-dense Litter	Sparse Litter	Very Sparse Litter

Adapted from Muir (1977)

To work out the vegetation description for your site use the information from your recording sheet and the above key.

FOR EXAMPLE

Plant and Height	Tree Leaf Canopy cover %			
	Dense 70-100 %	**Mid-dense 30-70 %**	**Sparse 10-30 %**	**Very Sparse 2-10 %**
Trees 15-30m	Dense Forest	Forest	***Woodland***	Open Woodland

If you ticked the box for trees 15-30 metres high and a leaf canopy cover of 10-30% you would describe your site as ***Woodland*** ....

Plant and Height	Tree Leaf Canopy cover %			
	Dense 70-100 %	**Mid-dense 30-70 %**	**Sparse 10-30 %**	**Very Sparse 2-10 %**
Shrubs 1.0-2.0m	Dense Heath	Heath	Low Scrub	***Open Low Scrub***

If the shrubs were 1-2 metres high and had a leaf canopy cover of 2-10% your description would now become ***Woodland over Open Low Scrub...***

Plant and Height	Tree Leaf Canopy cover %			
	Dense 70-100 %	**Mid-dense 30-70 %**	**Sparse 10-30 %**	**Very Sparse 2-10 %**
Sedges	***Dense Sedges***	Mid-dense Sedges	Open Sedges	Very Open Sedges

If you had ticked the box for sedges with 70-100% cover your description would now become ***Woodland over Open Low Scrub over Dense Sedges...***

Plant and Height	Tree Leaf Canopy cover %			
	Dense 70-100 %	**Mid-dense 30-70 %**	**Sparse 10-30 %**	**Very Sparse 2-10 %**
Litter	Dense Litter	Mid-dense Litter	Sparse Litter	***Very Sparse Litter***

If the litter layer was between 2-10% your full description would now become

Woodland over Open Low Scrub over Dense Sedges over Very Sparse Litter.

YOU CAN NOW FILL IN THE VEGETATION DESCRIPTION BOX ON PAGE ONE OF YOUR RECORDING SHEET.

APPENDIX 3 SAMPLE FAUNA RECORDING DATA SHEET

FITZGERALD BIOSPHERE PROJECT

VERTEBRATE DATA SHEET

STUDY AREA : | TRIP # | DATE : / / | OBSERVER :

	TYPE	LINE	SPECIES CODE	SPECIES NAME	NUMBER	AGE	SEX	METH	DIST	BREEDING	SPEC	MARK/RECAP
*												
	REMARKS											
*												
	REMARKS											
*												
	REMARKS											
*												
	REMARKS											
*												
	REMARKS											
*												
	REMARKS											
*												
	REMARKS											
*												
	REMARKS											
*												
	REMARKS											
*												
	REMARKS											

TYPE
O - OPPORTUNISTIC
S - SYSTEMATIC

LINE
C CORRIDOR
N NATURE RESERVE
R PRIVATE REMNANT
V CROWN LAND

SPECIES CODE
SEE CODE SHEETS

SPECIES NAME
USE COMMON OR SCIENTIFIC NAME

NUMBER
NUMBER IF INDIVIDUALS

AGE
A = ADULT
S = SUB-ADULT
J = JUVENILE
U UNKNOWN

SEX
M MALE
F = FEMALE
X = MALE(S) + FEMALE(S)
U UNKNOWN

METHOD
PF = PITFALL TRAP
ET = ELLIOTT TRAP
CT = CAGE TRAP
MN = MIST NET
HT = HAT TRAP
HC = HAND CAUGHT
SN = SEEN
SH = SEEN/HEARD
HD = HEARD
SA = SEEN ACTIVE
HT = HEADTORCHED

METHOD (CONT)
SL = SPOTLIGHTED
SC = SCAT/S
FP = FOOTPRINTS
DG = DIGGINGS
DB = DEAD BODY (FRESH)
PU = PICK UP (SKELETAL)
OT = OTHER (EXPAND IN REMARKS)

DISTANCE
BIRD TRANSECTS/POINT COUNTS
0-10M = 10
11-20M = 20
21-30M = 30
31-40M = 40
41-50M = 50

BREEDING
MT = OBSERVED MATING
PG = PREGNANT
GR = GRAVID
DY## = DEPENDANT YOUNG + No
PY## = POUCH YOUNG + No
NB = NEST BUILDING
ON = OLD NEST
EN = THIS SEASON'S EMPTY NEST
NU = NEST WITH UNKNOWN CONTENTS
NE##= NEST + No EGGS
NN##=NEST + No NESTLINGS

SPECIMEN
FIELD NUMBER OF MUSEUM SPECIMEN
F##

MARK/RECAP
EM##= EAR MARK + No
RC = RECAPTURE THIS SURVEY
RP = RECAPTURE PREVIOUS SURVEY

REMARKS
WT = WEIGHT
P = PES LENGTH
H = HEAD LENGTH
SV = SNOUT/ VENT LENGTH
AND ANY OTHER RELEVANT REMARKS

APPENDIX 4: FAUNA RECORDED IN THE FITZGERALD BIOSPHERE RESERVE TO DEC 1995

KEY:

A - Species recorded during this project in the Buffer Zone and Zone of Co-operation

B - Species recorded by others in the Buffer Zone and Zone of Co-operation areas - Source

1: RAOU Database Records from Jan 1980 to Feb 1993 - Shire of Ravensthorpe
2: RAOU Database Records from Jan 1980 to Feb 1993 - Shire of Jerramungup
3: Western Australian Museum Records - Shire of Ravensthorpe
4: Western Australian Museum Records - Shire of Jerramungup
5: R. Jasper - Bird surveys 1989, Oldfield Loc 216, Ravensthorpe Shire.
6: N. McQuoid - Personal Communication
7: L. Brown - Personal Communication

C - Species recorded in Nature Reserves of the Buffer Zone and Zone of Cooperation - Source

1: Res. 40156, 28286 & 22761 Jerdacuttup N.R. CALM Reserve Reports, RAOU records and Jaensch, Vervest & Hewish (1988)
2: Res. 31128, 26662, 11577 (Kundip area) CALM Reserve Reports
3: Res. 27525 Overshot Hill N.R. CALM Reserve Reports
4: Ravensthorpe Range Res. 17880 & 32047 CALM reserve Reports, Chapman & Newby (1995), Bradby & Chapman (1987), Harold & Maryan (Field Note Books)
5: Res. 31881 Long Creek N.R. CALM Reserve Reports
6: Res. 31425 Koornong CALM Reserve Reports
7: Fitzgerald River Corridor, Leighton & Watson (1992)
8: Res. 26793 Corackerup N.R. & 29500 proposed Peniup Reserve, CALM Reserve Reports and Leighton & Watson (1992)
9: Res. 28687 Pallinup N.R., CALM Reserve Reports
10: Res. 31424 Aerodrome Rd N.R., CALM Reserve Reports
11: Res. 30795 Cocanarup Timber Reserve. Forests Dept. (1980) and CALM Reserve Reports
12: Res: 27177 Flora Reserve, CALM Reserve Reports
13: Res: 26792 Holden Rd N.R. and 22343 Cowallelup Water Reserve CALM Reserve Reports

D - Species recorded in the Fitzgerald River National Park - Source

1: Chapman (1986)
2: Newby (1982)
3: Newby & Chapman (1985)
4: National Parks Authority (1985)
5: Bradly (1982)
6: RAOU Database Records from January 1980 to February 1993
7: Mammal sub-fossil records (A. Baynes, W.A. Museum)
8: N. McQuoid - Ranger in Charge, FRNP Records
9: Recorded during this project (1994)

STATUS KEY:

CR = Critically Endangered **EN** = Endangered **VU** = Vulnerable **CD** = Conservation Dependent
IN = Introduced
J = Birds protected under the Japan Australia Migratory Bird Agreement
C = Birds protected under the China Australia Migratory Bird Agreement

SPECIES RECORDED	stat	A	B	C	D
BIRDS					
Emu		X	1,5	4,7,8,10,11	1,2,3,4,6
Malleefowl	VU	X	5	4,7,8	1,3,4,6
Stubble Quail		X	1	9	1,2,4
Brown Quail		X			1,4,6
Blue-billed Duck					1,4,6
Musk Duck		X	1	1	1,4,6
Freckled Duck	VU				1,4
Black Swan		X	1	1,8,9,10	1,4,6
Cape Barren Goose	VU				6
Australian Shelduck		X	1,2,5	1,7,8,9,10	1,4,6
Australian Wood Duck		X	1,5	4,7,8	1,4,6
Pacific Black Duck		X	1,2	1,2,4,8,9	1,4,6
Australasian Shoveler		X	5	1,4	1,4,6
Grey Teal		X	1,2,5	1,2,4,7,8,9,10	1,4,6
Chestnut Teal		X	1	4,7,8	1,2,4,6
Pink-eared Duck		X		1,4,9,10	1,4,6
Hardhead		X		1,4,8,9	6
Australasian Grebe		X	1	8	1,4,6
Hoary-headed Grebe		X	1	1,4,7,8	1,4,6
Great Crested Grebe		X	1		1,4,6
Little Penguin					1,4
Great-winged Petrel					1
Flesh-footed Shearwater	J				1,4,6
Short-tailed Shearwater	J				6
Yellow-nosed Albatross					1,4
Australasian Gannet		X	1		1,4,6
Darter		X	1	1	1,4,6
Little Pied Cormorant		X	1,2,5	1,8	1,2,4,6
Pied Cormorant		X	1	4	1,4,6
Little Black Cormorant		X	1,2	1,2,8,9	1,4,6
Great Cormorant		X	1	1	1,4,6
Australian Pelican		X	1,2	1	1,4,6
White-faced Heron		X	1,2,5	1,4,7,8,9,13	1,2,4,6
Eastern Reef Egret	C	X	1		1,4,6
White-necked Heron		X		1	1,4,6
Great Egret	J,C	X	1	1	1,4,6
Nankeen Night Heron		X	5	1,8	1,4,6
Australasian Bittern	VU				1,4
Glossy Ibis				1	
Australian White Ibis		X	1,2	1	6
Straw-necked Ibis			1,2	1	6
Royal Spoonbill		X			
Yellow-billed Spoonbill		X	1	1	6
Osprey		X	1		1,4,6
Black-shouldered Kite		X	1,5	1,10	1,4,6
Letter-winged Kite					1,4
Square-tailed Kite		X	2,5	4,8	1,2,3,4,6
Whistling Kite		X	1,2		6
White-bellied Sea-Eagle	C	X	1	1	1,4,6
Spotted Harrier		X			6
Swamp Harrier		X	1	1	1,4,6

SPECIES RECORDED	stat	A	B	C	D
Brown Goshawk		X			1,2,4,6
Collared Sparrowhawk		X	5	1,8	1,4,6
Wedge-tailed Eagle		X	1,5	2,4,7,8,10	1,2,3,4,6
Little Eagle		X	1	4	1,2,3,4,6
Brown Falcon		X	1,2,5	1,2,3,4,5,6,8,9,10,11	1,2,3,4,6
Australian Hobby		X	6	4,8	1,4,6
Peregrine Falcon		X	1		1,4,6
Nankeen Kestrel		X	1,2,5	1,2,3,4,5,7,9,10,13	1,3,4,6
Baillon's Crake				1	
Australian Spotted Crake		X			
Spotless Crake					1,4,6
Purple Swamphen				7	
Black-tailed Native-hen		X		7,9,10	1,2
Eurasian Coot		X	1,2,5	1,4,8	1,4,6
Australian Bustard			1		1,2,4,6
Painted Button-quail		X		4	1,3,4,6
Black-tailed Godwit		X			
Bar-tailed Godwit	C,J		2		1,6
Whimbril	C,J	X			
Common Greenshank	C,J	X	1	1,4	1,4,6
Wood Sandpiper	C,J	X			6
Common Sandpiper	C,J	X	1		1,4,6
Ruddy Turnstone	C,J	X			1,4,6
Red Knot	C,J		1		
Sanderling	C,J		1		1,4,6
Red-necked Stint	C,J	X	1	1	1,4,6
Long-toed Stint	J			1	
Pectoral Sandpiper	J	X		1	6
Sharp-tailed Sandpiper	C,J	X		1	1,4,6
Curlew Sandpiper	C,J	X	1	1	1,4,6
Broad-billed Sandpiper	C,J				1
Bush Stone-curlew				9	1,4
Pied Oystercatcher		X	1,2		1,4,6
Sooty Oystercatcher		X	1		1,4,6
Black-winged Stilt		X		1	1,4
Banded Stilt				10	1,6
Red-necked Avocet		X		1,10	1,4,6
Grey Plover	C,J	X		1	1,4,6
Red-capped Plover		X	1	1	1,4,6
Inland Dotterel					1,4,6
Black-fronted Dotterel		X	1	4,7,8	1,2,3,4,6
Hooded Plover		X	1	1	1,4,6
Red-kneed Dotterel		X		1	1
Banded Lapwing		X	1	4,7,8	1,3,4,6
Australian Pratincole				1	
Great Skua					1,4
Pacific Gull		X	1,2		1,4,6
Kelp Gull					6
Silver Gull		X	1,2	1	1,4,6
Gull-billed Tern				1	
Caspian Tern		X	1,2		1,4,6
Crested Tern		X	1,2		1,4,6

SPECIES RECORDED	stat	A	B	C	D
Fairy Tern		X	1		1,6
Whiskered Tern				1	1
White-winged Black Tern	J			1	
Rock Dove					6
Laughing Turtle-dove	IN	X			
Common Bronzewing		X	1,2,5	1,3,4,5,8,9,10,11,12,13	1,2,3,4,6
Brush Bronzewing		X	1,5	4,5,7,8	1,2,3,4,6
Crested Pigeon		X	1,2,5	1,3,4,6,7,8,10,13	1,3,4,6
Short-billed Black-Cockatoo	V	X	5	4	1,3,4
Long-billed Black-Cockatoo				11	2
Galah		X	1,5	3,7,10,13	1,4,6
Purple-crowned Lorikeet		X	1,2,5	1,3,4,5,6,7,8,9,10,13	1,2,3,4,6
Regent Parrot		X	5	3,4,5,10,13	1,6
Western Rosella		X	5	4,8,11	3
Australian Ringneck		X	1,2,5	2,3,4,6,7,8,9,10,11,13	1,2,3,4,6
Red-capped Parrot		X	1,2,5	2,4,7,8,9,10	1,2,3,4,6
Elegant Parrot		X	1,5	4,7,10	1,3,4,6
Rock Parrot		X	1		1,3,4,6
Ground Parrot	CR	X			1,2,4,6
Pallid Cuckoo		X	5	4,7,10	1,4,6
Fan-tailed Cuckoo		X	1,5	4,8	1,2,3,4,6
Black-eared Cuckoo		X	5		1,3,4,6
Horsfield's Bronze-Cuckoo		X	2,5	4,9	1,2,3,4,6
Shining Bronze-Cuckoo		X	5	4	1,2,3,4,6
Barking Owl					1,4
Southern Boobook		X	1,5	4,8,9	1,3,4,6
Barn Owl		X		7,8	1,4
Tawny Frogmouth		X	1,5	4,7,9	1,3,4,6
Spotted Nightjar		X	5	4	1,3,4,6
Australian Owlet-nightjar		X		4	1,3,4,6
Fork-tailed Swift	C,J				1
Laughing Kookaburra	IN	X	1,5	3,4,8,9,10,11	1,3,4,6
Sacred Kingfisher		X	1	2,8,9	1,3,4,6
Rainbow Bee-eater	J	X	5	4,9,10	1,2,3,4,6
Splendid Fairy-wren		X	1,5	2,4,7,8,9	1,2,3,4,6
Blue-breasted Fairy-wren		X	2,5	4	1,2,3,4,6
Southern Emu-wren		X	1,5	4	1,2,3,4,5,6
Spotted Pardalote		X	2,5	4	1,3,4,6
Yellow-rumped Pardalote *			1	4,11	1,4,6
Striated Pardalote		X	1,5	4,7,8,10,13	1,2,3,4,6
Western Bristlebird	EN				1,2,4
White-browed Scrubwren		X	1,2,5	4,8,9	1,2,3,4,6
Shy Heathwren		X	2,5	4,7,8	1,2,3,4,6
Striated Fieldwren		X		4	1,2,3,4,6
Redthroat		X			
Weebill		X	1,5	1,4,9,10	1,2,3,4,5,6
Western Gerygone		X	6	4	1,4,6
Inland Thornbill		X	1,5	4,5,8,10,11	1,2,3,4,6
Western Thornbill			1	3	1,4,6
Yellow-rumped Thornbill		X	1,2,5	1,4,9,10,11,12,13	1,2,3,4,6

SPECIES RECORDED	stat	A	B	C	D
Red Wattlebird		X	1,2,5	1,2,3,4,5,7,8,9,10,12,13	1,2,3,4,5,6
Little Wattlebird		X	1,2,5	1,2,3,4,13	1,3,4,5,6
Spiny-cheeked Honeyeater		X	5		1,4,6
Yellow-throated Miner		X	1,2,5	1,3,4,7,8,9,10	1,2,4,6
Singing Honeyeater		X	1	1,2,7,8,13	1,2,4,6
White-eared Honeyeater		X	5	4,8	1,2,3,4,6
Purple-gaped Honeyeater		X	5	4,8,11,13	1,2,3,4,6
Yellow-plumed Honeyeater		X	5	4	1,2,3,4,6
Brown-headed Honeyeater		X	5	3,4,9,10	1,2,3,4,6
White-naped Honeyeater		X	1,5	2,4,5,8,9,11	1,2,3,4,6
Brown Honeyeater		X	1,2,5	1,2,3,4,8,9,10	1,2,3,4,6
New Holland Honeyeater		X	1,2,5	1,2,3,4,7,8,9,12,13	1,2,3,4,5,6
White-cheeked Honeyeater		X	1,2,5	4,7,8,10	1,2,3,4,5
White-fronted Honeyeater +				4	
Tawny-crowned Honeyeater		X	1,5	4,7,8,9,10,11	1,2,3,4,5,6
Western Spinebill		X	1	2,4,8,9	1,3,4,6
Black Honeyeater					1
White-fronted Chat		X	1,5	3,8,10	1,3,4,6
Jacky Winter				1,8,9	6
Scarlet Robin		X		8	1,4,6
Red-capped Robin		X	5	4,11	1,2,3,4,6
Hooded Robin		X	1	8,10	1,2,3,4,6
Western Yellow Robin		X	5	4,9	1,2,3,4,6
Southern Scrub-robin		X	1,5	2,4,8,10,13	1,2,3,4,6
White-browed Babbler		X	5	2,3,4,7,8	1,2,3,4,6
Western Whipbird	VU	X		4,8,10	1,2,3,4,6
Varied Sittella		X	5	4,13	1,3,4,6
Crested Shrike-tit					1,4,6
Crested Bellbird		X	1,5	4,8,10	1,2,3,4,6
Gilbert's Whistler					1
Golden Whistler		X	1,5	2,4,7,8,11,13	1,2,3,4,6
Rufous Whistler		X	5	4,10,13	1,2,3,4,6
Grey Shrike-thrush		X	1,2,5	4,7,8,9,10,13	1,2,3,4,6
Restless Flycatcher		X	1,2,5	2,4,5,8,9,10,11,13	1,2,4,6
Magpie-lark		X	1,2,5	1,2,3,4,7,8,9,10,12,13	1,4,6
Grey Fantail		X	1,2,5	1,2,3,4,8,9,10,11	1,2,3,4,6
Willie Wagtail		X	1,2,5	1,2,3,4,6,7,8,9,10,13	1,2,3,4,6
Black-faced Cuckoo-shrike		X	1,2,5	1,2,3,4,7,8,9,10,11,12	1,2,3,4,6
Ground Cuckoo-shrike					2
White-winged Triller		X	1,2,5	8,10	1,2,4,6
Masked Woodswallow					1,3,4
Black-faced Woodswallow		X	2	4,8,9,10,11	1,2,3
Dusky Woodswallow		X	1,2,5	4,8,10	1,2,3,4,6
Grey Butcherbird		X	1,2,5	3,4,7,8,10,13	1,2,3,4,6
Pied Butcherbird		X		1,7,8	
Australian Magpie		X	1,2,5	1,2,3,4,5,7,8,9,10,11,13	1,2,3,4,6
Grey Currawong		X	1,2,5	1,2,3,4,8,9,10,11,12,13	1,2,3,4,6
Australian Raven		X	1,2,5	1,2,3,4,5,7,8,9,10,11,13	1,2,3,4,6
Richard's Pipit		X	1	3,4,5,8,10,11	1,2,3,4,6
Red-eared Firetail		X	1,5	8	1,2,3,4,6
White-backed Swallow				4	1,4,6

SPECIES RECORDED	stat	A	B	C	D
Welcome Swallow		X	1,2,5	1,4,7,8,9,10	1,2,4,5,6
Tree Martin		X	1,5	2,4,8,9,10	1,3,4,6
Fairy Martin		X	1		
Rufous Songlark		X			1,4
Brown Songlark		X	1		1,4,6
Silvereye		X	1,2,5	1,2,4,7,8,9	1,2,3,4,5,6
MAMMALS					
Short-beaked Echidna		X		3,4,8,10	1,3
Chuditch	EN	X	3		8
Southern Dibbler	EN		3		1,7,8
Yellow-footed Antechinus					7
Red-tailed Phascogale	EN		4		1,7
Kultarr (locally extinct)					7
Fat-tailed Dunnart		X	3,4	7,9	
White-tailed Dunnart			3		7
Grey-bellied Dunnart		X	3,4	4,8	1,3,5,7
Quenda	VU	X	3,4	4,8	1,7
Western Barred Bandicoot (locally extinct)	EN				7
Bilby (locally extinct)	VU		4		
Western Pygmy-possum		X	3,4	4,7,8,9	1,3,7
Honey-possum		X	3,4	4,7,8,9	1,3,5,7
Common Brushtail Possum		X	3	4,9	1,7
Brush-tailed Bettong	CD				7
Broad-faced Potoroo (extinct)					7
Tammar Wallaby		X	3	4,8,9	1,7
Western Grey Kangaroo		X	3,4	2,3,4,5,7,8,9,10,11,12	1,2,3
Western Brush Wallaby		X	4	2,4,8,9,13	1,3
Quokka (unverified remains)	VU		4		
Banded Hare-wallaby (locally extinct)	EN				7
White-striped Freetail-bat		X		4	1,3
Lesser Long-eared Bat		X	3,4		7
Gould's Wattled Bat			3,4		1,7
Chocolate Wattled Bat			3	4	
Southern Forest Bat			3		7
Mitchell's Hopping-mouse		X	4		1,7cf
Ash-grey Mouse			3,4	7	1,3,7
Western Mouse or Walyadji	VU	X	3	4	1,7
Heath Rat	EN	X	3	4	7
Water-rat			7		
House Mouse	IN	X	3,4	2,4,7,8	1,3,7
Bush Rat		X	3,4	4,7,8	1,7
Black Rat	IN	X			
Pale Field-rat (locally extinct)					7
Dingo		X	3		
Fox	IN	X		4,8,9,13	1,3
Feral Cat	IN	X	3		1,3
Rabbit	IN	X		2,4,7,8,9,10,13	1,7
Pig	IN	X			
Goat	IN	X			9

SPECIES RECORDED	stat	A	B	C	D
FROGS					
Slender Tree Frog		X	4		1,3
Spotted-thighed Frog		X	3,4	4,11	1,2,3
Quacking Frog		X	4	7	1
Western Spotted Frog		X	4	4,7,8	1
Moaning Frog		X	4	4	1,3,5
Sand Frog				8	
Banjo Frog		X	3,4	4,7,8,	1,3,5
Turtle Frog		X	4		1,3
White-footed Trilling Frog		X	4?		1
Kunapalari Frog		X			
Humming Frog		X		7,4	1
Shoemaker Frog #				7,8	
Guenther's Toadlet		X	4	4,7	1,3,5
Glauert's Froglet		X		8	2
Bleating Froglet		X	3,4	4	1,3
South Coast Froglet ^			4		
REPTILES					
Long-necked Tortoise		X	4	8	1
Clawless Gecko		X	3,4	4,11	1,3
Wheatbelt Gecko		X	3,4	4,7,11	1,3
Spiny-tailed Gecko		X	3,4	4	1,3
Marbled Gecko		X	3,4	4,11	1,3
Barking Gecko		X	3,4	4,11	1,3
Yellow-chinned Worm-lizard		X	4	7,8	1,3
Striated Worm-lizard		X	4		1
Southern Delma		X	3,4	4	1,3
Fraser's Delma		X	3,4	4	1
Burton's Legless Lizard			4		
Southern Scaly-foot		X	3,4	4	1,3,5
Spotted Sand Dragon		X	3,4	4,8,11	1,2,3
Ornate Rock Dragon		X	3,4	11	1,2,3
Mountain Devil			6		
Western Bearded Dragon		X	3,4	4,8,11	1,3
Chapman's Dragon		X	3		1
South-western Cool-Skink		X	4		1,5
Common Shinning Skink		X	4	4,7,8	1,3
Chain-striped Ctenotus			3		3
Gem Ctenotus		X	4		1,3
Eleven-striped Ctenotus		X	4	4	1,3
Red-legged Ctenotus		X	4	4	1,3
King's Skink		X	3,4	4	1,2
Southern Sand Skink		X		4	1,3
Napoleon's Skink		X	4		1
Richard's Crevice Skink		X	4		
Orang-bellied Earless Skink		X	3,4	4,7,8,11	1
Peroni's Earless Skink		X	3,4	4,7,8,11	1,3
Orange-tailed Lerista		X	3,4	4,7,11	1,3
L. microtis intermedia		X			1
L. m. microtis			4		

SPECIES RECORDED		A	B	C	D
Ravensthorpe Range Lerista		X		4	
Grey's Menetia		X	4		1
Brown Morethia		X	3,4	4,7,8,11	1,3
Bluetongue		X	3,4	4,11,13	1
Bobtail		X	3,4	2,3,4,7,8,9,13	1,2,3
Gould's Monitor		X			
Rosenberg's Monitor		X	4	2,4,8,9,10,13	1,2,3
Ramphotyphlops australis		X	4	4	1
R. pinguis			4		
R. sp. 1		X			
R. sp. 2		X			
R. sp. 'bicolor'				4	
Carpet Python		X		4	1
Crowned Snake		X	4		1
Bardick		X	4		1
Tiger Snake		X	4	4,8,9,10	3
Dugite		X	3,4	4,9,11	1,3
Square-nosed Snake		X	4		1
Gould's Snake		X	3,4	4,11	1
Black-backed Snake		X	4		1

* The taxonomy of *Pardalotus* follows Christidis and Boles (1994) ie *Pardalotus punctatus* and *Pardalotus xanthopygus* have been maintained as a single species.

+ This is possibly an erroneous record, validity not confirmed.

^ Identified by the WA Museum as possibly *Crinia subinsignifera*

This species is not known to occur on the South Coast, animals were most probably *Neobatrachus kunapalari*

APPENDIX 5: COMMON AND SCIENTIFIC NAMES OF FAUNA RECORDED IN THE FITZGERALD BIOSPHERE RESERVE

BIRDS

CASUARIIDAE
- *Dromaius novaehollandiae*, Emu

MEGAPODIIDAE
- *Leipoa ocellata*, Malleefowl

PHASIANIDAE
- *Coturnix pectoralis*, Stubble Quail
- *C. ypsilophora*, Brown Quail

ANATIDAE
- *Oxyura australis*, Blue-billed Duck
- *Biziura lobata*, Musk Duck
- *Stictonetta naevosa*, Freckled Duck
- *Cygnus atratus*, Black Swan
- *Cereopsis novaehollandiae*, Cape Barren Goose
- *Tadorna tadornoides*, Australian Shelduck
- *Chenonetta jubata*, Australian Wood Duck
- *Anas superciliosa*, Pacific Black Duck
- *A. rhynchotis*, Australasian Shoveler
- *A. gibberfrons*, Grey Teal
- *A. castanea*, Chestnut Teal
- *Malacorhynchus membranaceus*, Pink-eared Duck
- *Aythya australis*, Hardhead

PODICIPEDIDAE
- *Tachybaptus novaehollandiae*, Australasian Grebe
- *Poliocephalus poliocephalus*, Hoary-headed Grebe
- *Podiceps cristatus*, Great Crested Grebe

SPHENISCIDAE
- *Eudyptula minor*, Little Penguin

PROCELLARIIDAE
- *Pterodroma macroptera*, Great-winged Petrel
- *Puffinus carneipes*, Flesh-footed Shearwater
- *P. tenuirostris*, Short-tailed Shearwater

DIOMEDEIDAE
- *Diomedea chlororhynchos*, Yellow-nosed Albatross

SULIDAE
- *Morus serrator*, Australasian Gannet

ANHINGIDAE
- *Anhinga melanogaster*, Darter

PHALACROCORACIDAE
- *Phalacrocorax melanoleucos*, Little Pied Cormorant
- *P. varius*, Pied Cormorant
- *P. sulcirostris*, Little Black Cormorant
- *P. carbo*, Great Cormorant

PELECANIDAE
- *Pelecanus conspicillatus*, Australian Pelican

ARDEIDAE
- *Ardea novaehollandiae*, White-faced Heron
- *Egretta sacra*, Eastern Reef Egret
- *Ardea pacifica*, White-necked Heron
- *A. alba*, Great Egret
- *Nycticorax caledonicus*, Nankeen Night Heron
- *Botaurus poiciloptilus*, Australasian Bittern

THRESKIORNITHIDAE

Plegadis falcinellus, Glossy Ibis
Threskiornis molucca, Australian White Ibis
T. spinicollis, Straw-necked Ibis
Platalea regia, Royal Spoonbill
P. flavipes, Yellow-billed Spoonbill

ACCIPITRIDAE

Pandion haliaetus, Osprey
Elanus axillaris, Black-shouldered Kite
E. scriptus, Letter-winged Kite
Lophoictinia isura, Square-tailed Kite
Haliastur sphenurus, Whistling Kite
Haliaeetus leucogaster, White-bellied Sea-Eagle
Circus assimilis, Spotted Harrier
C. approximans, Swamp Harrier
Accipiter fasciatus, Brown Goshawk
A. cirrhocephalus, Collared Sparrowhawk
Aquila audax, Wedge-tailed Eagle
Hieraaetus morphnoides, Little Eagle

FALCONIDAE

Falco berigora, Brown Falcon
F. longipennis, Australian Hobby
F. peregrinus, Peregrine Falcon
F. cenchroides, Nankeen Kestrel

RALLIDAE

Porzana pusilla, Baillon's Crake
P. fluminea, Australian Spotted Crake
P. tabuensis, Spotless Crake
Porphyrio porphyrio, Purple Swamphen
Gallinula ventralis, Black-tailed Native-hen
Fulica atra, Eurasian Coot

OTIDIDAE

Ardeotis australis, Australian Bustard

TURNICIDAE

Turnix varia, Painted Button-quail

SCOLOPACIDAE

Limosa limosa, Black-tailed Godwit
L. lapponica, Bar-tailed Godwit
Numenius phaeopus, Whimbrel
Tringa nebularia, Common Greenshank
T. glareola, Wood Sandpiper
Actitis hypoleucos, Common Sandpiper
Arenaria interpres, Ruddy Turnstone
Calidris canutus, Red Knot
C. alba, Sanderling
C. ruficollis, Red-necked Stint
C. subminuta, Long-toed Stint
C. melanotos, Pectoral Sandpiper
C. acuminata, Sharp-tailed Sandpiper
C. ferruginea, Curlew Sandpiper
Limicola falcinellus, Broad-billed Sandpiper

BURHINIDAE

Burhinus grallarius, Bush Stone-curlew

HAEMATOPODIDAE

Haematopus longirostris, Pied Oystercatcher
H. fuliginosus, Sooty Oystercatcher

RECURVIROSTRIDAE

Himantopus himantopus, Black-winged Stilt
Cladorhynchus leucocephalus, Banded Stilt
Recurvirostra novaehollandiae, Red-necked Avocet

CHARADRIIDAE

Pluvialis squatarola, Grey Plover
Charadrius ruficapillus, Red-capped Plover
C. australis, Inland Dotterel
Elseyornis melanops, Black-fronted Dotterel
Thinornis rubricollis, Hooded Plover
Erythrogonys cinctus, Red-kneed Dotterel
Vanellus tricolor, Banded Lapwing

GLAREOLIDAE

Stiltia isabella, Australian Pratincole

LARIDAE

Catharacta skua, Great Skua
Larus pacificus, Pacific Gull
L. dominicanus, Kelp Gull
L. novaehollandiae, Silver Gull
Sterna nilotica, Gull-billed Tern
S. caspia, Caspian Tern
S. bergii, Crested Tern
S. nereis, Fairy Tern
Chlidonias hybridus, Whiskered Tern
C. leucopterus, White-winged Black Tern

COLUMBIDAE

Columba livia, Rock Dove
Streptopelia senegalensis, Laughing Turtle-Dove
Phaps chalcoptera, Common Bronzewing
P. elegans, Brush Bronzewing
Ocyphaps lophotes, Crested Pigeon

CACATUIDAE

Calyptorhynchus latirostris, Short-billed Black-Cockatoo
C. baudinii, Long-billed Black-Cockatoo
Cacatua roseicapilla, Galah

PSITTACIDAE

Glossopsitta porphyrocephala, Purple-crowned Lorikeet
Polytelis anthopeplus, Regent Parrot
Platycercus icterotis, Western Rosella
Barnardius zonarius, Australian Ringneck
Purpureicephalus spurius, Red-capped Parrot
Neophema elegans, Elegant Parrot
N. petrophila, Rock Parrot
Pezoporus wallicus, Ground Parrot

CUCULIDAE

Cuculus pallidus, Pallid Cuckoo
Cacomantis flabelliformis, Fan-tailed Cuckoo
Chrysococcyx osculans, Black-eared Cuckoo
C. basalis, Horsfield's Bronze-Cuckoo
C. lucidus, Shining Bronze-Cuckoo

STRIGIDAE

Ninox connivens, Barking Owl
N. novaeseelandiae, Southern Boobook

TYTONIDAE

Tyto alba, Barn Owl

PODARGIDAE

Podargus strigoides, Tawny Frogmouth

CAPRIMULGIDAE
Eurostopodus argus, Spotted Nightjar
AEGOTHELIDAE
Aegotheles cristatus, Australian Owlet-nightjar
APODIDAE
Apus pacificus, Fork-tailed Swift
HALCYONIDAE
Dacelo novaeguineae, Laughing Kookaburra
Todiramphus sanctus, Sacred Kingfisher
MEROPIDAE
Merops ornatus, Rainbow Bee-eater
MALURIDAE
Malurus splendens, Splendid Fairy-wren
M. pulcherrimus, Blue-breasted Fairy-wren
Stipiturus malachurus, Southern Emu-wren
PARDALOTIDAE
Pardalotus punctatus, Spotted Pardalote
P. striatus, Striated Pardalote
Dasyornis longirostris, Western Bristlebird
Sericornis frontalis, White-browed Scrubwren
S. cauta, Shy Heathwren
Calomanthus fuliginosus, Striated Fieldwren
Pyrrholaemus brunneus, Redthroat
Smicrornis brevirostris, Weebill
Gerygone fusca, Western Gerygone
Acanthiza apicalis, Inland Thornbill
A. inornata, Western Thornbill
A. chrysorrhoa, Yellow-rumped Thornbill
MELIPHAGIDAE
Anthochaera carunculata, Red Wattlebird
A. chrysoptera, Little Wattlebird
Acanthagenys rufogularis, Spiny-cheeked Honeyeater
Manorina flavigula, Yellow-throated Miner
Lichenostomus virescens, Singing Honeyeater
L. leucotis, White-eared Honeyeater
L. cratitius, Purple-gaped Honeyeater
L. ornatus, Yellow-plumed Honeyeater
Melithreptus brevirostris, Brown-headed Honeyeater
M. lunatus, White-naped Honeyeater
Lichmera indistincta, Brown Honeyeater
Phylidonyris novaehollandiae, New Holland Honeyeater
P. nigra, White-cheeked Honeyeater
P. albifrons, White-fronted Honeyeater
P. melanops, Tawny-crowned Honeyeater
Acanthorhynchus superciliosus, Western Spinebill
Certhionyx niger, Black Honeyeater
Ephthianura albifrons, White-fronted Chat
PETROICIDAE
Microeca fascinans, Jacky Winter
Petroica multicolor, Scarlet Robin
P. goodenovii, Red-capped Robin
Melanodryas cucullata, Hooded Robin
Eopsaltria griseogularis, Western Yellow Robin
Drymodes brunneopygia, Southern Scrub-robin
Pomatostomus superciliosus, White-browed Babbler
CINCLOSOMATIDAE
Psophodes nigrogularis, Western Whipbird

NEOSITTIDAE

Daphoenositta chrysoptera, Varied Sittella

PACHYCEPHALIDAE

Falcunculus frontatus, Crested Shrike-tit
Oreoica gutturalis, Crested Bellbird
Pachycephala inornata, Gilbert's Whistler
P. pectoralis, Golden Whistler
P. rufiventris, Rufous Whistler
Colluricincla harmonica, Grey Shrike-thrush
Myiagra inquieta, Restless Flycatcher

DICRURIDAE

Grallina cyanoleuca, Magpie-lark

RHIPIDURIDAE

Rhipidura fuliginosa, Grey Fantail
R. leucophrys, Willie Wagtail

CAMPEPHAGIDAE

Coracina novaehollandiae, Black-faced Cuckoo-shrike
C. maxima, Ground Cuckoo-shrike
Lalage sueurii, White-winged Triller

ARTAMIDAE

Artamus personatus, Masked Woodswallow
A. cinereus, Black-faced Woodswallow
A. cyanopterus, Dusky Woodswallow
Cracticus torquatus, Grey Butcherbird
C. nigrogularis, Pied Butcherbird
Gymnorhina tibicen, Australian Magpie
Strepera versicolor, Grey Currawong

CORVIDAE

Corvus coronoides, Australian Raven

MOTACILLIDAE

Anthus novaeseelandiae, Richard's Pipit

ESTRILDIDEA

Stagnopleura oculata, Red-eared Firetail

HIRUNDINIDAE

Cheramoeca leucosternum, White-backed Swallow
Hirundo neoxena, Welcome Swallow
H. nigricans, Tree Martin
H. ariel, Fairy Martin

SYLVIIDAE

Cinclorhamphus mathewsi, Rufous Songlark
C. cruralis, Brown Songlark

ZOSTEROPIDAE

Zosterops lateralis, Silvereye

MAMMALS

TACHYGLOSSIDAE

Tachyglossus aculeatus, Short-beaked Echidna

DASYURIDAE

Dasyurus geoffroii, Chuditch
Parantechinus apicalis, Southern Dibbler
Antechinus flavipes,Yellow-footed Antechinus
Phascogale calura, Red-tailed Phascogale
Antechinomys laniger, Kultarr
Sminthopsis crassicaudata, Fat-tailed Dunnart
S. granulipes, White-tailed Dunnart
S. griseoventer, Grey-bellied Dunnart

PERAMELIDAE
- *Isoodon obesulus*, Southern Brown Bandicoot or Quenda
- *Perameles bougainville*, Western Barred Bandicoot
- *Macrotis lagotis*, Bilby

BURRAMYIDAE
- *Cercartetus concinnus*, Western Pygmy-possum

TARSIPEDIDAE
- *Tarsipes rostratus*, Honey-possum

PHALANGERIDAE
- *Trichosurus vulpecula*, Common Brushtail Possum

POTOROIDAE
- *Bettongia penicillata*, Brush-tailed Bettong
- *Potorous platyops*, Broad-faced Potoroo

MACROPODIDAE
- *Macropus eugenii*, Tammar Wallaby
- *M. fuliginosus*, Western Grey Kangaroo
- *M. irma*, Western Brush Wallaby
- *Setonix brachyurus*, Quokka
- *Lagostrophus fasciatus*, Banded Hare-wallaby

MOLOSSIDAE
- *Nyctinomus australis*, White-striped Freetail-bat

VESPERTILIONIDAE
- *Nyctophilus geoffroyi*, Lesser Long-eared Bat
- *Chalinolobus gouldii*, Gould's Wattled Bat
- *C. morio*, Chocolate Wattled Bat
- *Vespadelus regulus*, Southern Forest Bat

MURIDAE
- *Notomys mitchelli*, Mitchell's Hopping-mouse
- *Pseudomys albocinereus*, Ash-grey Mouse
- *P. occidentalis*, Western Mouse or Walyadji
- *P. shortridgei*, Heath Rat
- *Hydromys chrysogaster*, Water-rat
- *Mus musculus*, House Mouse
- *Rattus fuscipes*, Bush Rat
- *R. rattus*, Black Rat
- *R. tunneyi*, Pale Field-rat

CANIDAE
- *Canis lupus dingo*, Dingo
- *Vulpes vulpes*, Fox

FELIDAE
- *Felis catus*, Cat

LEPORIDAE
- *Oryctolagus cuniculus*, Rabbit

SUIDAE
- *Sus scrofa*, Pig

BOVIDAE
- *Capra hircus*, Goat

FROGS

HYLIDAE

Litoria adelaidensis, Slender Tree Frog
L. cyclorhynchus, Spotted-thighed Frog

LEPTODACTYLIDAE

Crinia georgiana, Quacking Frog
Heleioporus albopunctatus, Western Spotted Frog
H. eyrei, Moaning Frog
H. psammophilus, Sand Frog
Limnodynastes dorsalis, Banjo Frog
Myobatrachus gouldii, Turtle Frog
Neobatrachus albipes, White-footed Trilling Frog
N. kunapalari, Kunapalari Frog
N. pelobatoides, Humming Frog
N. sutor, Shoemaker Frog
Pseudophryne guentheri, Guenther's Toadlet
Ranidella glauerti, Glauert's Froglet
R. pseudinsignifera, Bleating Froglet
R. subinsignifera, South Coast Froglet

REPTILES

CHELUIDAE

Chelodina oblonga, Western Long-necked Tortoise

GEKKONIDAE

Crenadactylus ocellatus ocellatus, Clawless Gecko
Diplodactylus granariensis granariensis, Wheatbelt Gecko
D. spinigerus inornatus, Spiny-tailed Gecko
Phyllodactylus marmoratus, Marbled Gecko
Underwoodisaurus milii, Barking Gecko

PYGOPODIDAE

Aprasia repens, Yellow-chinned Worm Lizard
A. striolata, Striated Worm Lizard
Delma australis, Southern Delma
D. fraseri, Fraser's Delma
Lialis burtonis, Burton's Legless Lizard
Pygopus lepidopodus, Southern Scaly-foot

AGAMIDAE

Ctenophorus maculatus griseus, Spotted Sand Dragon
C. ornatus, Ornate Rock Dragon
Moloch horridus, Mountain Devil
Pogona minor minor, Western Bearded Dragon
Tympanocryptis adelaidensis adelaidensis, Chapman's Dragon

SCINCIDAE

Bassiana trilineata, South-western Cool Skink
Cryptoblepharus virgatus clarus, Southern Shinning Skink
Ctenotus catenifer, Chain-striped Ctenotus
C. gemmula, Gem Ctenotus
C. impar, Eleven-striped Ctenotus
C. labillardieri, Red-legged Ctenotus
Egernia kingii, King's Skink
E. multiscutata bos, Southern Sand Skink
E. napoleonis, Napoleon's Skink
E. richardi, Richard's Crevice Skink
Hemiergis initialis initialis, Orange-bellied Earless Skink
H. peronii, Peron's Earless Skink
Lerista distinguenda, Orange-tailed Lerista
L. microtis intermedia, Small-eared Lerista
L. microtis microtis, Small-eared Lerista
L. viduata, Ravensthorpe Range Lerista

Menetia greyii, Grey's Menetia
Morethia obscura, Brown Morethia
Tiliqua occipitalis, Bluetongue
T. rugosa rugosa, Bobtail

VARANIDAE

Varanus gouldii, Gould's Monitor
V. rosenbergi, Rosenberg's Monitor

TYPHLOPIDAE

Ramphotyphlops australis, Common Blind Snake
R. 'pinguis'

BOIDAE

Morelia spilota imbricata, Carpet Python

ELAPIDAE

Notechis coronatus, Crowned Snake
N. curtus, Bardick
N. scutatus occidentalis, Western Tiger Snake
Pseudonaja affinis affinis, Dugite
Rhinoplocephalus bicolor, Square-nosed Snake
R. gouldii, Gould's Snake
R. nigriceps, Black-backed Snake

APPENDIX 6 SAMPLE FIELD RECORDING DATA SHEET

FITZGERALD BIOSPHERE RESERVE PROJECT

FIELD RECORDING SHEET

DATE: _____ SITE CODE: _____ PHOTO: _____

PERSONNEL: _____

RESERVE No: _____ RESERVE NAME: _____

LOC. No: _____ LANDHOLDER: _____

CONTACT No: _____

1:50 000 MAP SHEET REF: _____

SITE No: _____ LOCATION: _____

SIZE OF REMNANT: _____ ha FENCED: yes / no

FORMATION: _____ MUIR CODE: _____

	HEIGHT	DOMINANT SPECIES:	CANOPY COVER
S1			
S2			
S3			
S4			
S5			

DRF PLANTS:

WEED INVASION: 0-20% 20-80% >80%

DOMINANT WEEDS:

SOIL TYPE: _____ SOIL COLOUR: _____

OUTCROPPING: _____ TOPOGRAPHY: _____

ADJOINING LAND USE:

DISTURBANCES PRESENT:

FIRE HISTORY:

FAUNA OBSERVED:
Birds:

Mammals:

Reptiles:

Amphibians:

Vermin:

POSSIBLE RARE FAUNA:

ELLIOTT TRAPS USED: yes / no No TRAPS: _____ TRAPNIGHTS _____

CAGE TRAPS USED: yes / no No TRAPS: _____ TRAPNIGHTS _____

TRAPPING RESULTS (see fauna data sheets):

NOTES:

APPENDIX 7 **SAMPLE TRANSECT VEGETATION RECORDING DATA SHEET**

FITZGERALD BIOSPHERE RESERVE PROJECT TRANSECT VEGETATION RECORDING SHEET

DATE: SITE CODE: TRANSECT:
FROM LAT ° ' . "S LONG ° ' . "E 1:50000 MAP REF:
TO LAT ° ' . "S LONG ° ' . "E BEARING:

TRAPS	LAYER	HEIGHT	DOMINANT SPECIES	No. SPECIES	CANOPY COVER
	1				
	2				
PHOTO	3				
LITTER	4				
DEPTH	5				
SOIL					
TRAPS	1				
	2				
PHOTO	3				
LITTER	4				
DEPTH	5				
SOIL					
TRAPS	1				
	2				
PHOTO	3				
LITTER	4				
DEPTH	5				
SOIL					

APPENDIX 8: PHOTOGRAPHS OF ALL SURVEY SITES

Plate (a) Peniup Corridor - Yate Woodland, Transect A

Plate (b) Corackerup Corridor - Mallee, Transect B

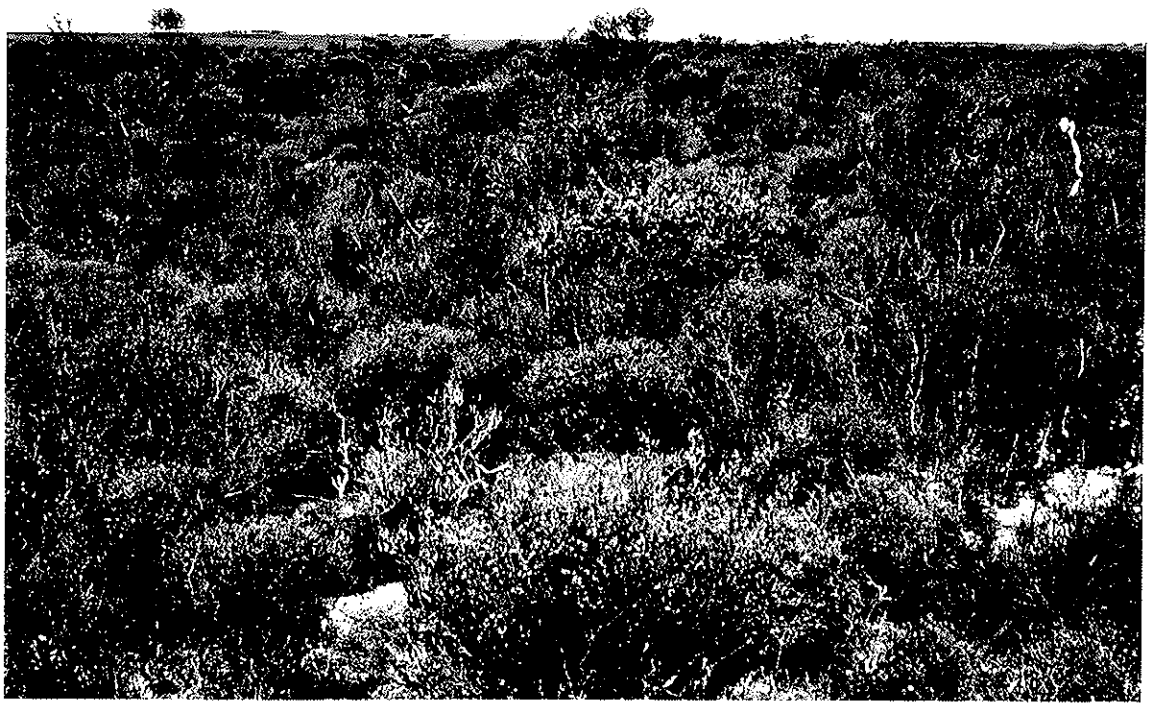

Plate (c) Fitzgerald River Corridor - Heath

Plate (d) Aerodrome Road Nature Reserve - Heath, Transect C

Plate (e) Mason Bay - Heath, Transect A, unburnt

Plate (f) Mason Bay - Heath, Transect B, burnt 1991

Plate (g) Bandalup Hill Corridor - Mallee, Transect C, Western Mouse Capture Site

Plate (h) Bandalup Hill Corridor - Mallee, Transect D, Western Mouse Capture Site

Plate (i) Block 1040 - Mallee, Transect A

Plate (j) Block 1040 - Mallee, Transect F, Heath Rat, Mitchell's Hopping Mouse and Bush Rat Capture Site

Plate (k) Cocanarup Timber Reserve - Salmon Gum/Jam Woodland, Transect A

Plate (l) Cocanarup Timber Reserve - Old Salmon Gum Woodland, Transect B

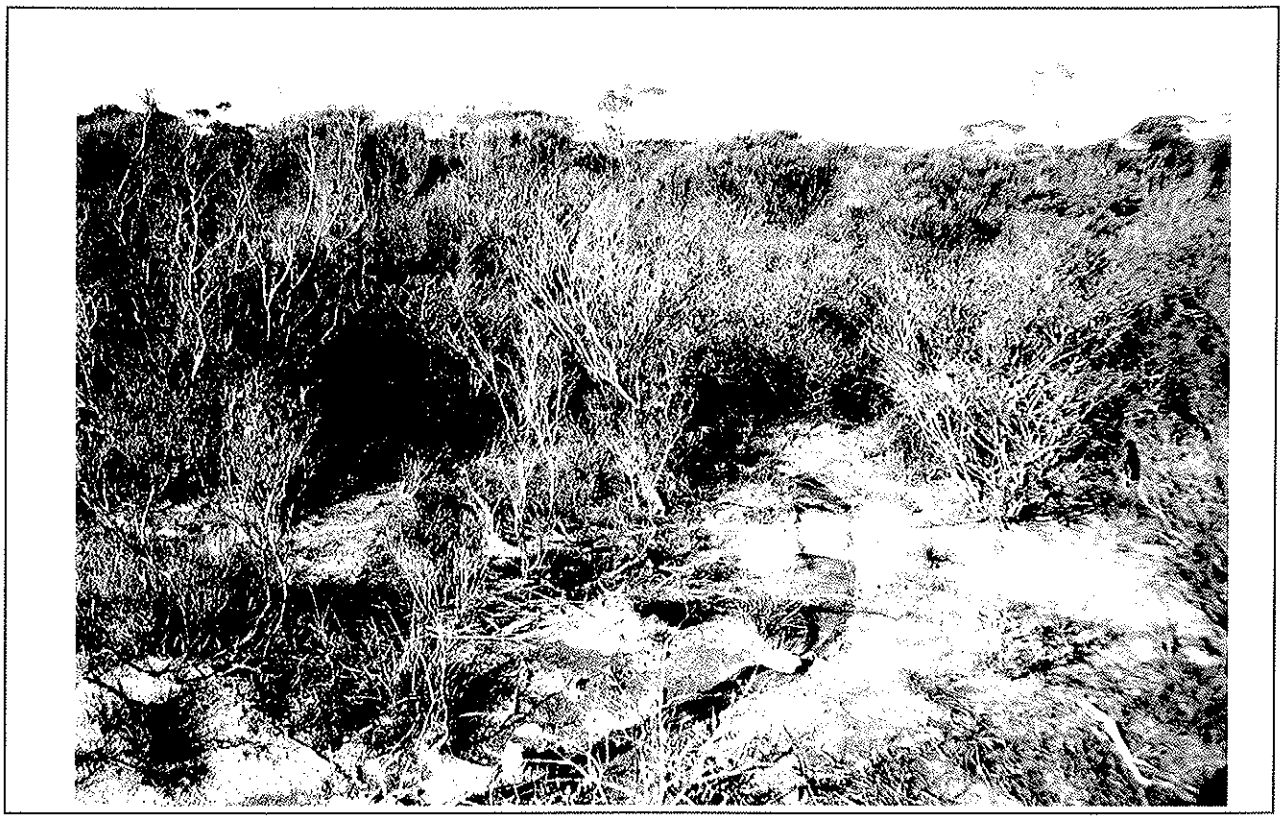

Plate (m) Powell's Remnant Vegetation - Mallee. Transect A

Plate (n) Powells's Remnant Vegetation - Moort Woodland, Transect B

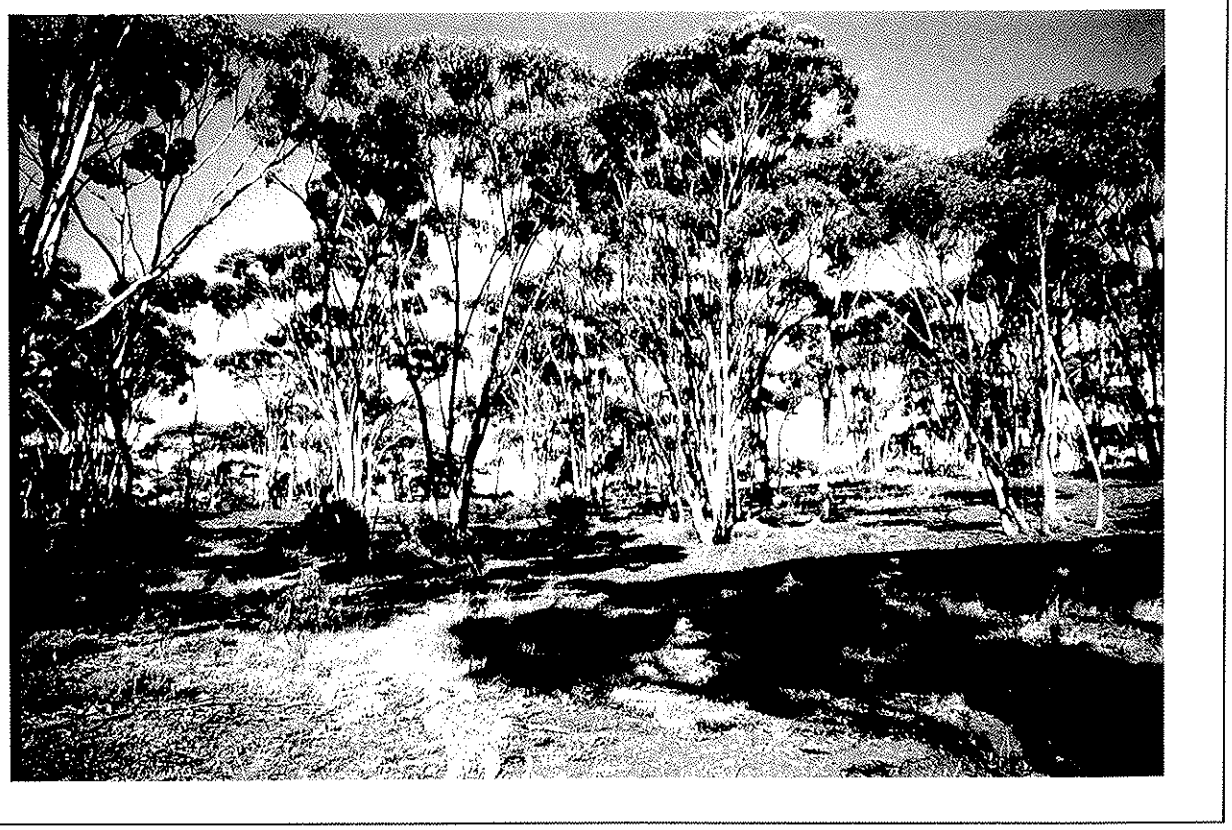

Plate (o) Carlingup Road Bird Census Site

Plate (p) Woodenup Pool

APPENDIX 9: VERTEBRATE FAUNA RECORDED IN THE BUFFER ZONE AND ZONE OF CO-OPERATION DURING 1993-1995 SURVEYS.

OBSERVATIONS KEY:

0-4 = **R**are; 5-15 = **U**ncommon; 16-50 = **C**ommon; 50+ = **V**ery **C**ommon

STATUS KEY:

CRitically Endangered; **EN**dangered; **VU**lnerable; **IN**troduced; **MI**grant; **VA**grant; **RE**esident; **VI**sitor

Birds protected under the **J**apan Australia Migratory Bird Agreement

Birds protected under the **C**hina Australia Migratory Bird Agreement

SITE KEY:

1 = Mason Bay (Jerdacuttup Lakes Nature Reserve)- Trapping and Opportunistic Records
2 = Bandalup Hill - Trapping and Opportunistic Records
3 = Powell's remnant vegetation - Trapping and Opportunistic Records
4 = Cocanarup Timber Reserve - Trapping and Opportunistic Records
5 = Fitzgerald Corridor - Trapping and Opportunistic Records
6 = Corackerup and Peniup Corridors - Trapping and Opportunistic Records
7 = Block 1040 - Trapping and Opportunistic Records
8 = Woodenup Pool - Opportunistic Records
9 = Carlingup Rd - Systematic Bird Census
10= Aerodrome Rd N.R. - Trapping and Opportunistic Records
11= Opportunistic Records from other Buffer Zone areas

SPECIES			S I T E										
BIRDS	***O***	***Status***	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***
Emu	C	RE	X	X	X	X	X	X		X		X	X
Malleefowl	C	VU, RE		X		X	X						X
Stubble Quail	U	RE		X	X		X	X					X
Brown Quail	R	RE											X
Musk Duck	C	VA	X										
Black Swan	U	RE	X									X	X
Australian Shelduck	U	RE	X		X		X					X	
Australian Wood Duck	C	RE			X			X	X	X		X	X
Pacific Black Duck	C	RE	X		X							X	X
Australasian Shoveler	R	VA	X										
Grey Teal	U	RE	X		X					X			X
Chestnut Teal	U	RE	X			X	X						X
Pink-eared Duck	R	VA	X										X
Hardhead	R	VA											X
Australasian Grebe	U	RE											X
Hoary-headed Grebe	U	RE	X				X						X
Great Crested Grebe	R	VA											X
Australasian Gannet	R	VA	X										
Darter	R	VA											X
Little Pied Cormorant	C	RE	X		X	X	X	X		X			X
Pied Cormorant	U	VA	X										X
Little Black Cormorant	U	RE						X					X
Great Cormorant	R	VA											X
Australian Pelican	U	VA	X										X
White-faced Heron	C	RE	X		X	X	X	X	X	X		X	X

BIRDS	O	Status	1	2	3	4	5	6	7	8	9	10	11
Eastern Reef Egret	R	C,RE											X
White-necked Heron	R	VA											X
Great Egret	R	C,J,VA											X
Nankeen Night Heron	R	VA								X			X
Australian White Ibis	C	VA											X
Royal Spoonbill	U	VA	X										
Yellow-billed Spoonbill	U	VA	X										X
Osprey	R	RE	X										
Black-shouldered Kite	R	RE							X				X
Square-tailed Kite	U	RE	X	X		X			X				X
Whistling Kite	R	VA											X
White-bellied Sea-Eagle	R	C,RE	X										
Spotted Harrier	R	VA											X
Swamp Harrier	R	RE											X
Brown Goshawk	U	RE	X	X	X	X		X					
Collared Sparrowhawk	R	RE		X									
Wedge-tailed Eagle	C	RE	X	X	X	X	X	X	X	X	X	X	X
Little Eagle	R	RE									X		
Brown Falcon	C	RE	X	X		X	X		X		X	X	X
Australian Hobby	R	RE				X							X
Peregrine Falcon	R	VA										X	
Nankeen Kestrel	C	RE	X		X	X	X				X	X	X
Australian Spotted Crake	R	VA											X
Black-tailed Native-hen	R	VA											X
Eurasian Coot	C	RE	X										X
Painted Button-quail	R	RE						X			X		X
Black-tailed Godwit	R	C,J,MI											X
Whimbril	R	C,J,MI	X										
Common Greenshank	U	C,J,MI	X				X						X
Wood Sandpiper	R	C,J,MI	X										
Common Sandpiper	R	C,J,MI	X										
Ruddy Turnstone	R	C,J,MI	X										
Red-necked Stint	R	C,J,MI	X										X
Pectoral Sandpiper	R	J,MI	X										
Sharp-tailed Sandpiper	R	C,J,MI	X										
Curlew Sandpiper	U	C,J,MI	X										
Pied Oystercatcher	U	RE	X										X
Sooty Oystercatcher	U	RE	X										X
Black-winged Stilt	R	VA	X										
Red-necked Avocet	R	RE											X
Grey Plover	R	C,J,MI	X										X
Red-capped Plover	R	RE											X
Black-fronted Plover	R	RE	X										X
Hooded Plover	U	RE	X										X
Red-kneed Dotterel	R	VA	X										X
Banded Lapwing	U	VA			X		X						X
Pacific Gull	U	RE	X										X
Silver Gull	U	RE	X										X
Caspian Tern	U	C,J,RE	X										X
Crested Tern	U	RE	X										X
Fairy Tern	R	VA	X										
Laughing Turtle-dove	R	RE											X

BIRDS	O	Status	1	2	3	4	5	6	7	8	9	10	11
Common Bronzewing	C	RE		X	X	X	X	X	X	X	X	X	X
Brush Bronzewing	U	RE		X			X			X	X	X	X
Crested Pigeon	C	VA	X		X		X	X	X		X	X	X
Short-billed Black-Cockatoo	U	VU,RE	X			X		X	X				X
Galah	C	RE			X	X	X	X	X		X	X	X
Purple-crowned Lorikeet	V	RE	X	X	X	X	X	X	X	X	X		X
Regent Parrot	U	VA			X	X		X			X		X
Western Rosella	R	VI				X				X			
Port Lincoln Ringneck	V	RE		X	X	X	X	X	X	X	X	X	X
Red-capped Parrot	V	RE	X	X	X	X	X	X	X	X	X	X	X
Elegant Parrot	C	RE	X		X	X	X			X		X	X
Rock Parrot	R	VA	X										
Ground Parrot	R	CR,RE											X
Pallid Cuckoo	U	MI							X				X
Fan-tailed Cuckoo	V	RE	X	X	X	X		X	X	X	X		X
Black-eared Cuckoo	R	VI							X				
Horsfield's Bronze-Cuckoo	U	MI		X	X		X		X			X	X
Shining Bronze-Cuckoo	C	MI	X	X	X	X	X	X				X	X
Southern Boobook	U	RE			X	X		X					X
Barn Owl	U	RE				X	X	X					X
Tawny Frogmouth	U	RE	X		X	X	X	X	X		X	X	X
Spotted Nightjar	U	RE		X	X		X	X					X
Australian Owlet-nightjar	C	RE		X	X	X		X					
Laughing Kookaburra	C	IN,RE			X	X		X	X		X		X
Sacred Kingfisher	U	MI			X	X		X	X				X
Rainbow Bee-eater	C	J,MI		X	X	X		X	X				X
Splendid Fairy-wren	C	RE	X		X	X	X	X					X
Blue-breasted Fairy-wren	V	RE	X	X	X	X	X	X	X		X	X	X
Southern Emu-wren	U	RE		X			X						X
Spotted Pardalote	C	RE	X	X	X	X	X	X	X		X		X
Striated Pardalote	C	RE	X	X	X	X		X	X		X	X	X
White-browed Scrubwren	V	RE	X	X	X	X	X	X	X	X	X	X	X
Shy Heathwren	C	RE	X	X	X	X	X	X	X	X		X	X
Striated Fieldwren	U	RE					X				X		X
Redthroat	R	VI											X
Weebill	V	RE		X	X	X	X	X	X		X	X	X
Western Gerygone	U	VA		X				X	X				X
Inland Thornbill	C	RE	X	X	X	X	X	X	X	X	X	X	X
Yellow-rumped Thornbill	V	RE	X		X	X	X	X	X	X	X	X	X
Red Wattlebird	V	RE	X	X	X	X	X	X	X	X	X	X	X
Little Wattlebird	C	RE	X	X		X			X				X
Spiny-cheeked Honeyeater	U	VA				X	X		X				X
Yellow-throated Miner	C	RE	X	X	X	X	X	X	X		X	X	X
Singing Honeyeater	R	RE			X						X		X
White-eared Honeyeater	V	RE	X	X	X	X	X	X	X	X	X	X	X
Purple-gaped Honeyeater	C	RE		X	X	X	X	X	X		X	X	X
Yellow-plumed Honeyeater	U	RE				X		X			X		X
Brown-headed Honeyeater	C	RE	X	X		X		X	X		X	X	X
White-naped Honeyeater	C	RE		X	X	X		X	X		X		X
Brown Honeyeater	V	RE	X	X	X	X	X	X	X		X	X	X
New Holland Honeyeater	V	RE	X	X	X	X	X	X	X	X	X	X	X
White-cheeked Honeyeater	U	RE					X		X		X		X
Tawny-crowned Honeyeater	V	RE	X	X	X	X	X	X	X	X	X	X	X

BIRDS	O	Status	1	2	3	4	5	6	7	8	9	10	11
Western Spinebill	C	RE	X	X			X	X	X	X			X
White-fronted Chat	C	RE	X	X	X		X	X	X			X	X
Scarlet Robin	R	RE			X								X
Red-capped Robin	U	RE			X	X			X				
Hooded Robin	R	RE					X					X	
Western Yellow Robin	U	RE				X			X			X	X
Southern Scrub-robin	V	RE		X	X	X	X	X	X	X		X	X
White-browed Babbler	V	RE		X	X	X	X	X	X	X	X	X	X
Western Whipbird	V	VU,RE	X	X	X	X	X	X	X	X			X
Varied Sittella	U	RE		X		X			X		X	X	X
Crested Bellbird	V	RE		X	X	X	X	X	X	X	X	X	X
Golden Whistler	V	RE		X	X	X	X	X	X	X	X	X	X
Rufous Whistler	C	RE			X		X	X					X
Grey Shrike-thrush	V	RE	X	X	X	X	X	X	X	X	X	X	X
Restless Flycatcher	V	RE	X	X	X	X		X	X	X	X	X	X
Australian Magpie-lark	C	RE	X		X	X	X	X	X			X	X
Grey Fantail	V	RE	X	X	X	X	X	X	X	X	X	X	X
Willie Wagtail	V	RE	X	X	X	X	X	X	X	X	X	X	X
Black-faced Cuckoo-shrike	C	RE	X	X	X	X	X		X	X	X	X	X
White-winged Triller	U	MI				X							X
Black-faced Woodswallow	U	VA					X				X		X
Dusky Woodswallow	C	RE		X	X	X				X	X	X	X
Grey Butcherbird	V	RE	X	X	X	X	X	X	X	X	X	X	X
Pied Butcherbird	R	VI											X
Australian Magpie	C	RE	X	X	X	X	X	X		X	X	X	X
Grey Currawong	V	RE	X	X	X	X	X	X	X	X	X	X	X
Australian Raven	V	RE	X	X	X	X	X	X	X	X	X	X	X
Richard's Pipit	U	RE			X	X	X					X	X
Red-eared Firetail	C	RE			X	X	X	X		X			X
Welcome Swallow	U	RE	X			X	X				X		X
Tree Martin	C	MI	X		X	X	X	X					X
Fairy Martin	R	VA											X
Rufous Songlark	R	MI			X		X		X				X
Brown Songlark	R	MI		X									
Silvereye	V	RE	X	X	X	X	X	X	X	X	X	X	X
MAMMALS													
Short-beaked Echidna	C			X	X	X	X	X		X			X
Chuditch	R	EN											X
Fat-tailed Dunnart	R			X	X								
Grey-bellied Dunnart	C		X	X			X	X					
Southern Brown Bandicoot or Quenda	U	VU								X			X
Western Pygmy-possum	V			X	X	X	X	X					X
Honey-possum	V		X	X	X	X	X	X	X			X	
Common Brushtail Possum	U			X		X	X	X					X
Tammar Wallaby	R												X
Western Grey Kangaroo	V		X	X	X	X	X	X	X	X	X	X	X
Western Brush Wallaby	U							X	X				X
White-striped Freetail-bat				X	X			X					X
Lesser Long-eared Bat									X				
Mitchell's Hopping-mouse	U								X				X
Western Mouse or Walyadji	V	VU		X			X		X			X	
Heath Rat	C	EN							X				
House Mouse	V	IN	X	X	X	X	X	X	X	X		X	

MAMMALS	***O***	***Status***	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***
Bush Rat	V		X	X	X			X	X	X			
Black Rat	R	IN											X
Dingo	R						X						
Fox	C	IN	X	X	X		X	X	X			X	X
Feral Cat	U	IN	X									X	X
Rabbit	C	IN		X	X	X	X	X					X
Goat	C	IN				X				X			
Pig	R	IN				X		X					
FROGS	***O***	***stat***	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***
Slender Tree Frog	U				X		X	X					X
Spotted-thighed Frog	C		X	X	X	X	X	X	X	X		X	X
Quacking Frog	R						X						
Western Spotted Frog	C						X		X			X	X
Moaning Frog	U		X									X	
Banjo Frog	V		X	X	X	X	X	X	X			X	X
Turtle Frog	C				X		X		X			X	X
White-footed Trilling Frog	U		X	X									X
Kunapalari Frog	R												X
Guenther's Toadlet	V		X	X	X	X	X	X	X			X	X
Glauert's Froglet	R												X
Bleating Froglet	V		X		X	X	X	X	X	X		X	X
REPTILES													
TORTOISES													
Western Long-necked Tortoise	R				X								
GECKOS													
Clawless Gecko	C				X	X		X	X		X		X
Wheatbelt Gecko	V		X	X	X	X	X	X	X				X
Spiny-tailed Gecko	R		X	X	X		X						
Marbled Gecko	V					X			X				X
Barking Gecko	V			X		X			X				X
LEGLESS LIZARDS													
Yellow-chinned Worm Lizard	V		X	X	X	X	X	X	X	X		X	X
Striated Worm-lizard	R												X
Southern Delma	U		X	X				X	X				X
Fraser's Delma	C		X	X		X			X				X
Southern scaly-foot	C		X				X		X				X
DRAGON LIZARDS													
Spotted Sand Dragon	C			X	X			X	X				X
Ornate Rock Dragon	V				X					X			X
Western Bearded Dragon	C		X	X			X	X					X
Chapman's Dragon	U		X				X					X	
SKINKS													
South-western Cool Skink	C		X					X				X	X
Southern Shinning Skink	V			X		X			X				X
Gem Ctenotus	C		X	X			X		X				X
Eleven-striped Ctenotus	V		X	X	X		X	X	X				X
Red-legged Ctenotus	C				X					X			X
King's Skink	U				X					X			
Southern Sand Skink	R			X									
Napoleon's Skink	U		X										
Richard's Crevice Skink	U					X							
Orange-bellied Earless Skink	V			X		X	X		X			X	X
Peron's Earless Skink	V		X	X	X	X	X	X	X	X	X		X

SKINKS	***O***	***Status***	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***
Orange-tailed Lerista	V		X	X	X	X	X	X	X	X	X	X	X
Small-eared Lerista	R		X										
Ravensthorpe Range Lerista	R												X
Grey's Menetia	V		X	X	X	X		X	X				X
Brown Morethia	V		X	X	X	X	X	X	X	X	X	X	X
Western Bluetongue	C		X		X		X					X	X
Bobtail	V		X	X	X	X	X	X	X			X	X
MONITORS													
Gould's Monitor	R					X							
Rosenberg's Monitor	C		X	X	X	X	X	X	X				X
BLIND SNAKES													
Common Blind Snake	U		X	X			X						X
Ramphotyphlops species 1	R					X							
Ramphotyphlops species 2	R					X							
PYTHONS													
Carpet Python	R					X							
ELAPID SNAKES													
Crowned Snake	U		X	X					X				X
Bardick	U		X					X	X				X
Western Tiger Snake	C		X	X			X	X		X		X	X
Dugite	C				X	X							X
Square-nosed Snake	R		X				X						
Gould's Snake	U					X	X		X				X
Black-backed Snake	R									X			

APPENDIX 10 : VERTEBRATE FAUNA RECORDED IN EACH VEGETATION FORMATION DURING 1993-1995 SAMPLING.

SITE KEY:

1 = Mallee
2 = Yate Woodland (*Eucalyptus occidentalis*)
3 = Salmon Gum Woodland (*Eucalyptus salmonophloia*)
4 = Shrubland
5 = Heath
6 = Foreshore, foredune and estuary complex
7 = Wetland complex
8 = Granite complex

SPECIES	FORMATION							
BIRDS	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Emu	X	X	X	X	X	X	X	X
Malleefowl	X	X	X		X		X	
Stubble Quail	X	X			X		X	
Brown Quail	X							
Musk Duck						X	X	
Black Swan						X	X	
Australian Shelduck							X	
Australian Wood Duck						X	X	
Pacific Black Duck						X	X	
Australasian Shoveler							X	
Grey Teal						X	X	
Chestnut Teal						X	X	
Pink-eared Duck							X	
Hardhead						X		
Australasian Grebe						X	X	
Hoary-headed Grebe						X	X	
Great Crested Grebe						X		
Australasian Gannet						X		
Darter							X	
Little Pied Cormorant						X	X	
Pied Cormorant						X	X	
Little Black Cormorant						X	X	
Great Cormorant						X	X	
Australian Pelican						X		
White-faced Heron						X	X	
Eastern Reef Egret						X		
White-necked Heron							X	
Great Egret							X	
Nankeen Night Heron							X	
Australian White Ibis							X	
Royal Spoonbill							X	
Yellow-billed Spoonbill							X	
Osprey						X		
Black-shouldered Kite	X	X						
Square-tailed Kite	X		X		X	X		
Whistling Kite						X		X
White-bellied Sea-Eagle						X		
Spotted Harrier	X							
Swamp Harrier	X						X	
Brown Goshawk	X	X	X		X		X	
Collared Sparrowhawk	X							

BIRDS	1	2	3	4	5	6	7	8
Wedge-tailed Eagle	X	X	X	X		X	X	
Little Eagle			X					
Brown Falcon	X	X	X	X	X	X	X	X
Australian Hobby	X		X			X		
Peregrine Falcon							X	
Nankeen Kestrel	X	X	X		X	X	X	X
Australian Spotted Crake							X	
Black-tailed Native-hen							X	
Eurasian Coot						X	X	
Painted Button-quail	X		X					
Black-tailed Godwit						X		
Whimbril						X		
Common Greenshank						X	X	
Wood Sandpiper						X		
Common Sandpiper						X		
Ruddy Turnstone						X		
Red-necked Stint						X		
Pectoral Sandpiper							X	
Sharp-tailed Sandpiper							X	
Curlew Sandpiper							X	
Pied Oystercatcher						X		
Sooty Oystercatcher						X		
Black-winged Stilt							X	
Red-necked Avocet						X		
Grey Plover						X		
Red-capped Plover						X	X	
Black-fronted Plover						X	X	
Hooded Plover						X		
Red-kneed Dotterel							X	
Banded Lapwing		X			X		X	
Pacific Gull						X		
Silver Gull						X	X	
Caspian Tern						X		
Crested Tern						X		
Fairy Tern						X		
Laughing Turtle-dove	X							
Common Bronzewing	X	X	X		X		X	X
Brush Bronzewing	X		X		X		X	
Crested Pigeon	X	X	X	X	X	X	X	
Short-billed Black-Cockatoo	X	X	X		X			
Galah	X	X	X	X	X		X	
Purple-crowned Lorikeet	X	X	X		X		X	
Regent Parrot	X	X	X				X	
Western Rosella	X		X				X	
Port Lincoln Ringneck	X	X	X	X	X		X	X
Red-capped Parrot	X	X	X	X	X	X	X	X
Elegant Parrot	X	X	X		X		X	
Rock Parrot						X		
Ground Parrot	X							
Pallid Cuckoo	X	X					X	
Fan-tailed Cuckoo	X	X	X	X	X		X	X
Black-eared Cuckoo		X						
Horsfield's Bronze-Cuckoo	X	X			X		X	
Shining Bronze-Cuckoo	X	X	X	X	X	X	X	
Southern Boobook	X	X	X				X	
Barn Owl		X	X		X			

BIRDS	1	2	3	4	5	6	7	8
Tawny Frogmouth	X	X	X		X	X		
Spotted Nightjar	X	X			X			
Australian Owlet-nightjar	X	X	X					
Laughing Kookaburra	X	X	X					
Sacred Kingfisher	X	X	X				X	
Rainbow Bee-eater	X	X	X				X	
Splendid Fairy-wren	X	X	X		X	X	X	
Blue-breasted Fairy-wren	X	X	X	X	X	X	X	
Southern Emu-wren	X				X			
Spotted Pardalote	X	X	X		X		X	
Striated Pardalote	X	X	X				X	X
White-browed Scrubwren	X	X	X	X	X	X	X	X
Shy Heathwren	X	X	X	X	X		X	
Striated Fieldwren	X		X		X			
Redthroat							X	
Weebill	X	X	X	X	X		X	
Western Gerygone	X	X					X	
Inland Thornbill	X	X	X	X	X		X	X
Yellow-rumped Thornbill	X	X	X	X	X	X	X	
Red Wattlebird	X	X	X	X	X	X	X	
Little Wattlebird	X	X			X	X	X	
Spiny-cheeked Honeyeater	X	X	X		X			
Yellow-throated Miner	X	X	X	X	X		X	
Singing Honeyeater	X		X			X		
White-eared Honeyeater	X	X	X	X	X		X	
Purple-gaped Honeyeater	X	X	X		X		X	
Yellow-plumed Honeyeater	X	X	X				X	X
Brown-headed Honeyeater	X	X	X				X	
White-naped Honeyeater	X	X	X				X	
Brown Honeyeater	X	X	X	X	X	X	X	
New Holland Honeyeater	X	X	X	X	X	X	X	
White-cheeked Honeyeater	X		X		X			
Tawny-crowned Honeyeater	X	X	X	X	X	X	X	X
Western Spinebill	X	X		X	X	X	X	
White-fronted Chat	X	X		X	X		X	
Scarlet Robin		X						
Red-capped Robin	X	X	X					
Hooded Robin	X				X			
Western Yellow Robin	X	X	X				X	
Southern Scrub-robin	X	X	X	X	X		X	X
White-browed Babbler	X	X	X	X	X		X	X
Western Whipbird	X	X	X	X	X		X	
Varied Sittella	X	X	X					
Crested Bellbird	X	X	X	X	X		X	X
Golden Whistler	X	X	X		X		X	X
Rufous Whistler	X	X		X			X	X
Grey Shrike-thrush	X	X	X	X	X		X	X
Restless Flycatcher	X	X	X	X	X	X	X	
Australian Magpie-lark	X	X	X		X	X	X	
Grey Fantail	X	X	X		X	X	X	
Willie Wagtail	X	X	X	X	X	X	X	X
Black-faced Cuckoo-shrike	X	X	X	X	X	X	X	X
White-winged Triller	X	X	X				X	
Black-faced Woodswallow	X				X			X
Dusky Woodswallow	X	X	X		X		X	

BIRDS	1	2	3	4	5	6	7	8
Grey Butcherbird	X	X	X	X	X	X	X	X
Pied Butcherbird	X							
Australian Magpie	X	X	X		X		X	
Grey Currawong	X	X	X	X	X		X	
Australian Raven	X	X	X	X	X	X	X	
Richard's Pipit	X		X		X			
Red-eared Firetail	X	X	X	X	X		X	
Welcome Swallow	X	X	X	X		X	X	
Tree Martin	X	X	X	X	X	X	X	X
Fairy Martin							X	
Rufous Songlark		X					X	
Brown Songlark	X							
Silvereye	X	X	X	X	X	X	X	
MAMMALS								
Short-beaked Echidna	X	X	X	X	X		X	X
Chuditch	X							
Fat-tailed Dunnart	X							
Grey-bellied Dunnart	X	X		X	X			
Southern Brown Bandicoot or Quenda	X						X	
Western Pygmy-possum	X	X	X		X			
Honey-possum	X	X	X	X	X	X		
Common Brushtail Possum		X	X					
Tammar Wallaby	X							
Western Grey Kangaroo	X	X	X	X	X		X	X
Western Brush Wallaby	X	X						
White-striped Freetail-bat	X	X					X	
Lesser Long-eared Bat	X							
Mitchell's Hopping-mouse	X				X			
Western Mouse or Walyadji	X				X			
Heath Rat	X							
House Mouse	X	X	X	X	X		X	X
Bush Rat	X	X		X		X	X	
Black Rat		X				X	X	
Dingo					X			
Fox	X	X	X	X	X	X	X	
Feral Cat					X	X	X	
Rabbit	X	X	X	X	X		X	
Pig		X						
Goat			X				X	
FROGS								
Slender Tree Frog		X			X		X	
Spotted-thighed Frog	X	X		X	X	X	X	
Quacking Frog					X			
Western Spotted Frog	X	X			X			
Moaning Frog				X	X			
Banjo Frog	X	X	X	X	X	X	X	X
Turtle Frog	X	X			X			
White -footed Trilling Frog	X			X	X			
Kunapalari Frog	X						X	
Guenther's Toadlet	X	X	X	X	X	X	X	
Glauert's Froglet	X							
Bleating Froglet	X	X		X	X	X	X	X

REPTILES	1	2	3	4	5	6	7	8
TORTOISES								
Western Long-necked Tortoise							X	
GECKOS								
Clawless Gecko	X	X	X					X
Wheatbelt Gecko	X	X	X		X		X	
Spiny-tailed Gecko	X				X	X		
Marbled Gecko	X	X	X		X		X	X
Barking Gecko	X	X	X		X		X	X
LEGLESS LIZARDS								
Yellow-chinned Worm-lizard	X	X	X	X	X		X	
Striated Worm-lizard	X							
Southern Delma	X	X		X				
Fraser's Delma	X	X	X	X	X	X		
Southern Scaly-foot	X	X		X	X	X		
DRAGON LIZARDS								
Spotted Sand Dragon	X	X						
Ornate Rock Dragon							X	X
Western Bearded Dragon	X	X			X			
Chapman's Dragon				X	X			
SKINKS								
South-western Cool Skink	X	X		X	X		X	X
Southern Shinning Skink	X	X	X					X
Gem Ctenotus	X			X	X			
Eleven Striped Ctenotus	X	X		X	X			
Red-legged Ctenotus	X						X	
King's Skink							X	
Southern Sand Skink	X							
Napoleon's Skink					X	X		
Richard's Crevice Skink	X		X					
Orange-bellied Earless Skink	X	X	X	X	X			X
Peron's Earless Skink	X	X	X	X	X		X	X
Orange-tailed Lerista	X	X	X	X	X	X	X	
Small-eared Lerista						X		
Ravensthorpe Range Lerista	X							
Grey's Menetia	X	X	X	X		X		
Brown Morethia	X	X	X	X	X	X	X	X
Western Bluetongue	X	X			X	X		
Bobtail	X	X	X	X	X	X	X	
MONITORS								
Gould's Monitor			X					
Rosenberg's Monitor	X	X	X		X	X	X	
BLIND SNAKES								
Common Blind Snake	X		X		X			
Ramphotyphlops sp. 1	X							
Ramphotyphlops sp. 2		X						
PYTHONS								
Carpet Python			X					
ELAPID SNAKES								
Crowned Snake	X	X		X	X	X	X	
Bardick	X	X		X				
Western Tiger Snake	X	X			X	X	X	
Dugite	X		X	X				
Square-nosed Snake				X	X			
Gould's Snake	X	X	X	X	X			
Black-backed Snake							X	

APPENDIX 11: SITE AND VEGETATION DESCRIPTIONS OF FAUNA SURVEY SITES

SITE	TRAN	TRAP No	MUIR CODE *	FORMATION *	MATURITY *	SOIL+	LITTER % COVER	LITTER DEPTH	LANDFORM+
Corackerup & Peniup Corridors	A	1-4; 10-16	e_1 c_1 LAr.SAc.SDi.VTr.VLr	Woodland	Mature	sand	10	0.5	lower slope
	A	5-9; 17-20	e_1 c_1 LAr.SAr.SCr.Ji.VTr.VLc	Woodland	Mature	sandy loam	40	2.0	lower slope
	B	1-7	e_1 LAr.KSr.SAi.Ji.VLc	Woodland	Mature	clay loam	25	1.0	lower slope
	B	7-10	e_1 LAr.KSr.SAi.SCr.Jr.VLi	Woodland	Mature	clay loam	15	2-3.0	stream channel
	B	10-20	KSc.SAi.SDi.VLr	Mallee	Mature	clay loam	25	1.0	lower slope
	C	1-5	e_2 KSi.SBc.SDr.VLr	Mallee	Mature	sand	50	1-2.0	mid-slope
	C	5-10	e_1 e_2 c_1 LBr.KSi.SAi.SDr.VLr	Mallee	Mature	sand	10	1.0	mid-slope
	C	10-20	e_2 c_1 LBr.KSi.SAi.SDr.VLr	Mallee	Mature	sand	10	1.0	mid-slope
Fitzgerald Corridor	A	1-30; 33-60	SAr.SCi.SDd.VLi	Heath	Mature	sand	10	0.5	mid-lower slope
	A	30-33	SBr.SCi.SDc.VTi.VLi	Heath	Mature	sand	10	0.5	stream channel
Powell's Remnant Veg	A	1-7; 27-30	e_2 KSr.c_2 Sr.SAi.SDc.VLi	Shrubland	Mature	sandy loam, granite	10	1.0	upper slope
	A	7-12	KSr.SAc.Jr.VLi	Mallee	Mature	sandy clay	75	1.0	mid-slope
	A	12-16	e_1 LBr.KSi.Si.SBi.Jr.VLi	Mallee	Mature	clay	85	2.0	lower slope
	A	16-27	KSr.SAd.SCi.Jr.VLr	Heath	Mature	clay, granite	60	1.0	mid-slope
	B	1-13	KSr.SAc.SDr.VLr	Mallee	Mature	sand / clay, granite	20-30	4.0	upper slope
	B	13-23	e_3 KSd.SAi.SCr.VLr	Mallee	Mature	clay	90	3.0	mid-slope
	B	23-30	e_1 LBr.e_3 KSc.Sc.SAi.GLr.VLr	Woodland & Mallee	Mature	sandy clay, granite	30	1.0	lower slope
Mason Bay	A	1-8	SAd.SDr	Heath	Mature	sand	80	2-3.0	foredune
	A	8-12	SAd.SDr.VLr	Heath	Mature	sand	10	1.0	swale
	A	12-13	KSi.SCc.SDi	Mallee	Mature	sand	10	1.0	dune crest
	A	13-21	e_2 KSr.SAi.SCi.SDr.VTi.VLi	Mallee	Mature	sand	10	1.0	flat
	A	21-30	KSr.SBr.SCd.VLi	Mallee	Mature	sand	20	1.0	dune
	A	30-35	n_1 n_2 Sc.SCc.VLi	Shrubland	Mature	sand	20	2.0	dune
	A	35-40	n_1 n_2Si.SBr.SCd.Jr.VLi	Shrubland	Mature	sand	20	2.0	dune
	B	1-10	KSr.SDd	Mallee	Immature	sand	5	<0.5	dune

SITE	TRAN	TRAP No	MUIR CODE *	FORMATION *	MATURITY *	SOIL+	LITTER % COVER	LITTER DEPTH	LANDFORM+
Mason Bay continued	B	10-12	KSc.SDr.VLr	Mallee	Immature	sand	10	0.5	dune
	B	12-30	e_2 KSi.n_3 SDc.VLr	Mallee	Immature	sand	10	0.5	flat
	B	30-40	SCc.VLr	Shrubland	Immature	sand	1	0.5	dune
Carlingup Road	-	-	e_4 Mi.LAi.Sr.SBr.GLi.Jr.VLr	Woodland	Mature	stony loam	5-10	1-4	lower slope
Cocanarup Timber Res.	A	1-15	e_4 LAr.a_1 LBc.SBr.SDr	Woodland	mature	clay loam, granite	80	1.0	mid-slope
	B	1-15	e_4 Mi.a_1 Sr.SCr.Ji	Woodland	mature-senescent	stoney clay loam	90	4-5.0	flat-lower slope
	C	1-15	e_4Mi.a_1 Si.SCi.Jc	Woodland	mature-senescent	stoney clay loam	90	4-5.0	flat-lower slope
	D	1-15	xLBc.SAr.SCi.Jr	Woodland	mature	clay loam with limestone nodules	80	1-2.0	mid-slope
Bandalup Hill	A	1-4	KSr.Sc.Jr.VLr	Mallee		loam with laterite	65	3-4.0	lower slope
	A	4-7	LBr.Sr.SAc.Jr.VLr	Woodland		loam with laterite	70	2.0	ridge
	A	7-17	KSi.SAc.SCi.Jr.VLr	Mallee		loam with quartzite	50	1.0	upper slope
	A	17-20	KSi.Si.SCd	Mallee		loam with quartzite	5	0.5	upper slope
	B	1-12	KSi.Si.SAi.SCr.Jr.VTi.VLi	Mallee		sandy clay loam	5	1.0	lower slope
	C	1-12	KSc.Si.SCr.Jr.VTr.VLr	Mallee		loamy sand	60	2-4.0	mid-slope
	D	1-16	e_2 KSi.SAi.SBc.SDi.VTr.VLr	Mallee		sand	40	2-4.0	mid-upper slope
Block 1040	A	1-8	KSc.m_2 SAd.SDr.VTr.VLr	Mallee	mature	loam	50	2.0	upper slope
	A	7-26	KSc.m_2 SBc.SDr.VLr	Mallee	mature	loam	70	3.0	ridge
	A	27-29; 65-71	e_2 KSi.m_2 SBd.Jc.VLr	Mallee	mature	sandy loam with laterite	10	1.0	flat
	A	29-33	KSc.m_2 SCc.SDi.VLr	Mallee	mature	clay loam	15	1.0	flat
	A	33-65	KSi.m_2 SBd.Jc.VLr	Mallee	mature	sandy loam with laterite	10	1.0	flat
	A	71-82	xKSi.m_2 SDd.Jr.VLr	Mallee	mature	silty clay loam with laterite	15	1.0	upper slope
	B	1-13	xKSc.m_2 SAc.SCc.VLr	Mallee	mature	loamy sand	70	2-3.0	upper slope
	B	13-49	KSi.m_2 SAc.SDi.VLr	Mallee	mature	sandy loam with laterite	60	2-3.0	flat
	B	50-65	e_2 KSr.Sc.SCc.VLr	Mallee	mature	loamy sand	70	2-5.0	upper slope

SITE	TRAN	TRAP No	MUIR CODE *	FORMATION *	MATURITY *	SOIL+	LITTER % COVER	LITTER DEPTH	LANDFORM+
Block 1040 continued	C	1-16;25-42; 51-60	KSd.SAc.SCe.VLr	Mallee	senescent	loamy sand with laterite	30	2.0	mid-slope
	C	16-25	KSr.m_2 Sc.SCi.VLi	Mallee	senescent	loamy sand	25	1-2.0	mid-slope
	C	42-51; 60-82	e_2 KSi.SAi.SCe. Ji.VLr	Mallee	senescent	sand	10	1.0	mid-slope
	D	1-30; 38-40; 44-55; 65-82	KSi.m_2 Sc.SCr.VLr	Mallee	senescent	loamy sand	50	2-3.0	lower slope
	D	30-38; 40-44	KSr.m_2 SAi.SCd.VLr.VTr	Mallee	senescent	sand	20	1.0	lower slope
	D	55-65	KSc.m_2 Si.SCr.VLi	Mallee	senescent	sandy loam	40	2-3.0	lower slope
	E	1-10	e_2 KSc.SAi.SDd.VLc	Mallee	mature	sand	10	1	mid-slope
Woodenup Pool	B	1-10	c_1 LAd.Sr.VTr.VLr	Woodland	mature	sand	100	4-5	lower slope
		11-20	m_1 LBc.VTc. Xr	Woodland	mature	sand with granite	0	0	stream channel
Aerodrome Rd N.R.	B	1-15	SAr.SCc.SDc.VLc	Heath	Mature	sand	40	1-2	lower slope
	C	1-15	Si.SBi.SDc.VTr.VLi	Heath	Mature	sand	10	1-2	lower slope

*Muir Code, Formation and Maturity follows Muir, 1977.
+Landform and Soil follows McDonald, 1990

Muir Code species key:

a_1 = *Acacia accuminata*
c_1 = *Allocasuarina huegeliana*
c_2 = *A. campestris*
e_1 = *Eucalyptus occidentalis*
e_2 = *E. tetragona*
e_3 = *E. platypus*
e_4 = *E. salmonophloea*
m_1 = *Melaleuca cuticularis*
m_2 = *M. uncinata*
n_1 = *Banksia speciosa*
n_2 = *B. baxteri*
n_3 = *Xanthorrhoea* ?species

APPENDIX 12: FLORA RECORDED AT FAUNA SURVEY SITES

Site/transect: CO01A Corackerup and Peniup Corridors

AIZOACEAE
- *Carprobrotus* ?sp.

CASUARINACEAE
- *Allocasuarina campestris*
- *A. huegeliana*

DASYPOGONACEAE
- *Lomandra mucronata*

GOODENIACEAE
- *Lechenaultia tubiflora*

MIMOSACEAE
- *Acacia saligna*
- *Acacia* ?sp.
- *Acacia* ?sp.
- *Acacia* ?sp.

MYRTACEAE
- *Calytrix* ?sp.
- *Eucalyptus occidentalis*
- *Leptospermum* ?sp.
- *Melaleuca* ?sp.
- *Verticordia* ?sp.

ORCHIDACEAE
- *Caladenia flava*
- *Caladenia* ?sp.
- *Thelymitra* ?sp.

PAPILIONACEAE
- *Gastrolobium spinosum*
- *Jacksonia* ?sp.

PITTOSPORACEAE
- *Sollya* ?sp.

POACEAE
- *Stipa* ?sp.

PROTEACEAE
- *Hakea lissocarpha*
- *H. prostrata*
- *Isopogon buxifolius*

Site/transect: CO01B Corackerup and Peniup Corridors

AMARANTHACEAE
- *Ptilotus spathulatus*

ASTERACEAE
- *Olearia* ?sp.

CAESALPINIACEAE
- *Senna* ?sp.

CASUARINACEAE
- *Allocasuarina huegeliana*

CHENOPODIACEAE
- *Rhagodia* ?sp.

DILLENIACEAE
- *Hibbertia* ?sp.

EPACRIDACEAE
- *Astroloma* ?sp.

LAURACEAE
- *Cassytha* ?sp.

MIMOSACEAE
- *Acacia cyclops*
- *A. saligna*

MYRTACEAE
- *Callistemon phoeniceus*
- *Eucalyptus annulata*
- *E. flocktoniae*
- *E. occidentalis*

Melaleuca uncinata
Melaleuca ?sp.
Melaleuca ?sp.
Melaleuca ?sp.

PAPILIONACEAE
Daviesia ?sp.

PROTEACEAE
Grevillea pectinata
Hakea nitida
Hakea ?sp.

RUTACEAE
Boronia ?sp.

SANTALACEAE
Santalum acuminatum

SAPINDACEAE
Dodonaea ?sp.

Site/transect: CO01C Corackerup and Peniup Corridors

AIZOACEAE
Carprobrotus ?sp.

CASUARINACEAE
Allocasuarina huegeliana

CUPRESSACEAE
Actinostrobus ?sp.

DILLENIACEAE
Hibbertia ?sp.

GOODENIACEAE
Scaevola ?sp.

HAEMODORACEAE
Anigozanthos ?sp.
Conostylis ?sp.

IRIDACEAE
Patersonia occidentalis

LAURACEAE
Cassytha ?sp.

MIMOSACEAE
Acacia ?sp.

MYRTACEAE
Calothamnus quadrifidus
Calothamnus ?sp.
Calytrix ?sp.
Eucalyptus annulata
E. occidentalis
E. tetragona
Kunzea ?sp.
Leptospermum ?sp.
Melaleuca uncinata
Melaleuca ?sp.
Melaleuca ?sp.
Verticordia ?sp.

PROTEACEAE
Banksia media
Dryandra pteridifolia
Dryandra ?sp.
Hakea corymbosa
H. nitida
H. trifurcata
Petrophile ?sp.

RESTIONACEAE
Loxocarya ?sp.

STYLIDIACEAE
Stylidium ?sp.

Site/transect: CO03 Fitzgerald Corridor

AIZOACEAE
- *Carprobrotus* ?sp.

CASUARINACEAE
- *Allocasuarina acuaria*
- *A. humilis*

CUPRESSACEAE
- *Actinostrobus* ?sp.

CYPERACEAE
- *Lepidosperma angustatum*
- *L. pubisquameum*
- *Mesomelaena stygia*

DASYPOGONACEAE
- *Lomandra* ?sp.

DILLENIACEAE
- *Hibbertia* ?sp.

DROSERACEAE
- *Drosera* ?sp.
- *Drosera.* ?sp.

EPACRIDACEAE
- *Lysinema ciliatum*

MIMOSACEAE
- *Acacia redolens*

MYRTACEAE
- *Beaufortia micrantha*
- *Calothamnus* ?sp.
- *Chamelaucium ?ciliatum*
- *Eucalyptus perangusta*
- *Leptospermum spinescens*
- *Leptospermum* ?sp.
- *Leptospermum* ?sp.
- *Melaleuca hamulosa*
- *Melaleuca* ?sp.
- *Melaleuca* ?sp.
- *Verticordia* ?sp.

PAPILIONACEAE
- *Davesia incrassata*

PROTEACEAE
- *Adenanthos cuneatus*
- *Banksia baueri*
- *Dryandra* ?sp.
- *Grevillea* ?sp.
- *Hakea corymbosa*
- *H. crassifolia*
- *H. trifurcata*
- *Isopogon buxifolius*
- *Petrophile helicophylla*
- *Synaphea* ?sp.

RESTIONACEAE
- *Leptocarpus* ?sp.
- *Lepyrodia* ?sp.
- *Loxcarya ?flexuosa*

RUTACEAE
- *Boronia* ?sp.
- *Boronia* ?sp.

SANTALACEAE
- *Santalum murrayanum*

Site/transect: NR10B Aerodrome Road Nature Reserve

CASUARINACEAE
- *Allocasuarina thuyoides*

DILLENIACEAE
- *Hibbertia gracilipes*

DROSERACEAE
Drosera ?sp.
EPACRIDACEAE
Andersonia caerulea
Leucopogon ?sp.
Lysinema ciliatum
HAEMODORACEAE
Conostylis petrophiloides
MIMOSACEAE
Acacia ?sp.
MYRTACEAE
Baeckea ?sp.
Conothamnus aureus
Leptospermum spinescens
Melaleuca ?sp.
PROTEACEAE
Adenanthos cuneatus
Banksia violacea
Dryandra obtusa
Hakea adnata
H. corymbosa
Isopogon buxifolius
I. trilobus
Petrophile helicophylla
P. squamata
Synaphea petiolaris
S. polymorpha

Site/transect: NR10C Aerodrome Road Nature Reserve

CASUARINACEAE
Allocasuarina lehmannii
CYPERACEAE
Lepidosperma ?sp.
Mesomelaena tetragona
DILLENIACEAE
Hibbertia drummondii
H. gracilipes
DROSERACEAE
Drosera ?sp.
Drosera ?sp.
EPACRIDACEAE
Andersonia caerulea
Leucopogon ?sp.
Lysinema ciliatum
HAEMODORACEAE
Conostylis petrophiloides
C. serrulata
MIMOSACEAE
Acacia cochlearis
MYRTACEAE
Baeckea corynophylla
Calytrix lechenaultii
Conothamnus aureus
PROTEACEAE
Adenanthos cuneatus
Banksia media
Dryandra obtusa
Hakea adnata
H. corymbosa
H. prostrata
Petrophile helicophylla
Synaphea gracillima
RESTIONACEAE
Restio sphacelatus

Site/transect: NR11A & B Mason Bay

ASTERACEAE
- *Olearia* ?sp.

CASUARINACEAE
- *Allocasuarina humilis*
- *A. thuyoides*

DILLENIACEAE
- *Hibbertia* ?sp.

EPACRIDACEAE
- *Leucopogon* ?sp.
- *Leucopogon* ?sp.
- *Lysinema ciliatum*

GOODENIACEAE
- *Lechenaultia tubiflora*
- *Scaevola* ?sp.

LORANTHACEAE
- *Nuytsia floribunda*

MIMOSACEAE
- *Acacia ?rostellifera*
- *Acacia* ?sp.
- *Acacia* ?sp.

MYRTACEAE
- *Agonis* ?sp.
- *Calothamnus* ?sp.
- *Calytrix* ?sp.
- *Eucalyptus angulosa*
- *E. kessellii*
- *E. tetragona*
- *Leptospermum spinescens*
- *Melaleuca pulchella*
- *Melaleuca* ?sp.
- *Melaleuca* ?sp.
- *Verticordia* ?sp.

PAPILIONACEAE
- *Daviesia incrassata*
- *Daviesia* ?sp.

PROTEACEAE
- *Adenanthos cuneatus*
- *Banksia baxteri*
- *B. media*
- *B. pulchella*
- *B. repens*
- *B. speciosa*
- *Conospermum* ?sp.
- *Dryandra* ?sp.
- *Hakea corymbosa*
- *H. nitida*
- *Hakea* ?sp.
- *Hakea* ?sp.
- *Lambertia inermis*
- *Petrophile* ?sp.

RUTACEAE
- *Boronia* ?sp.

SOLANACEAE
- *Anthocercis littorea*

THYMELAEACEAE
- *Pimelea ferruginea*

XANTHORRHOEACEAE
- *Xanthorrhoea* ?sp.

Site/transect: OT10A Bandalup Hill

ASTERACEAE
- *Helichrysum lepidophyllum*

CASUARINACEAE
Allocasuarina humilis
CYPERACEAE
Mesomelaena stygia
DILLENIACEAE
Hibbertia ?sp.
EPACRIDACEAE
Leucopogon minutifolius
Lysinema ciliatum
EUPHORBIACEAE
Phebalium rude
GOODENIACEAE
Coopernookia polygalaceae
Scaevola scapigera
LAMIACEAE
Hemigenia teretiuscula
LAURACEAE
Cassytha ?sp.
MIMOSACEAE
Acacia glaucoptera
MYRTACEAE
Agonis spathulata
Astartea ambigua
Baeckea corynophylla
Beaufortia micrantha
B. schaueri
Calothamnus quadrifidus
Eucalyptus 'anceps'
E. falcata
E. flocktoniae
E. phaenophylla
E. stoatei
E. tetragona
Leptospermum spinescens
Melaleuca cardiophylla
M. subtrigona
M. uncinata
Verticordia chrysantha
V. oxylepis
PAPILIONACEAE
Daviesia ?sp.
Gastrolobium parviflorum
Gompholobium ?sp.
Jacksonia ?sp.
PROTEACEAE
Banksia lemanniana
B. media
Dryandra falcata
D. quercifolia
Grevillea ?sp.
Hakea commutata
H. corymbosa
H. laurina
H. lissocarpha
H. marginata
H. pandanicarpa
H. varia
Isopogon buxifolius
Persoonia teretifolia
Petrophile fastigiata
RUTACEAE
Phebalium rude
SANTALACEAE
Exocarpos sparteus

SAPINDACEAE
Dodonaea ?sp.

Site/transect: OT10B Bandalup Hill

APIACEAE
Trachymene ornata
BORAGINACEAE
Halgania andromedifolia
CAESALPINIACEAE
Senna artemisiodes
CUPRESSACEAE
Actinostrobus ?sp.
CYPERACEAE
Lepidosperma viscidum
Lepidosperma ?sp.
DASYPOGONACEAE
Lomandra effusa
DILLENIACEAE
Hibbertia ?sp.
EPACRIDACEAE
Leucopogon ?sp.
LAURACEAE
Cassytha ?sp.
MIMOSACEAE
Acacia glaucoptera
A. ixiophylla
A. nigropilosa
A. saligna
MYRTACEAE
Baeckea latens
Calothamnus quadrifidus
Eucalyptus 'anceps'
E. cylindroidea
E. flocktoniae
E. 'nutans'
E. occidentalis
Melaleuca uncinata
PAPILIONACEAE
Daviesia ?sp.
POACEAE
Spartachloa scirpoides
PROTEACEAE
Dryandra obtusa
Grevillea hugellii var. *hugellii*
G. paniculata
Hakea laurina
H. lissocarpha
H. nitida
SANTALACEAE
Exocarpos sparteus
Santalum acuminatum
SAPINDACEAE
Dodonaea ?sp.

Site/transect: OT10C Bandalup Hill

CUPRESSACEAE
Callitris roei
GOODENIACEAE
Coopernookia polygalacea
LAURACEA
Cassytha ?sp.
MIMOSACEAE
Acacia glaucoptera
A. ingrata

MYRTACEAE
- *Baeckea corynophylla*
- *Eucalyptus 'anceps'*
- *E. falcata*
- *E. flocktoniae*
- *E. leptocalyx*
- *E. spathulata grandiflora*
- *Melaleuca cardiophylla*
- *M. pentagona*
- *M. subfalcata*
- *M. thyoides*
- *M. uncinata*

PAPILIONACEAE
- *Daviesia* ?sp.

PROTEACEAE
- *Grevillea oligantha*
- *G. pectinata*

SANTALACEAE
- *Exocarpos aphyllus*

THYMELAEACEAE
- *Pimelea imbricata var. nana*

Site/transect: OT10D Bandalup Hill

CASUARINACEAE
- *Allocasuarina humilis*
- *A. thuyoides*

CYPERACEAE
- *Mesomelaena stygia*

DASYPOGONACEAE
- *Lomandra effusa*

DILLENIACEAE
- *Hibbertia* ?sp.

EPACRIDACEAE
- *Lysinema ciliatum*

GOODENIACEAE
- *Goodenia scapigera*

HAEMODORACEAE
- *Anigozanthos* ?sp.

IRIDACEAE
- *Patersonia* ?sp.

MIMOSACEAE
- *Acacia* ?sp.

MYRTACEAE
- *Agonis spathulata*
- *Beaufortia micrantha*
- *Calothamnus gracilis*
- *Calytrix decandra*
- *Eucalyptus tetragona*
- *Lambertia inermis*
- *Leptospermum maxwellii*
- *L. spinescens*
- *Melaleuca* ?sp.
- *Verticordia chrysantha*

PAPILIONACEAE
- *Daviesia anceps*
- *D. striata*

PROTEACEAE
- *Adenanthos* ?sp.
- *Banksia gardneri*
- *B. media*
- *B. violacea*
- *Calothamnus gracilis*
- *Conospermum distichum*
- *Dryandra falcata*

D. obtusa
Grevillea macrostylis
Hakea corymbosa
H. nitida
H. prostrata
Petrophile teretifolia
Stirlingia tenuifolia

STYLIDIACEAE
Stylidium ?sp.

Site/transect: OT13A Block 1040

AIZOACEAE
Carpobrotus ?sp.

ASTERACEAE
Helichrysum lepidophyllum

BORAGINACEAE
Halgania andromedifolia

CUPRESSACEAE
Callitris ?sp.

CYPERACEAE
Lepidosperma viscidum
Lepidosperma ?sp.

DASYPOGONACEAE
Lomandra mucronata

DILLENIACEAE
Hibbertia ?sp.

EPACRIDACEAE
Andersonia caerulea
Lysinema ciliatum
Styphelia intertexta

MIMOSACEAE
Acacia acuminata
A. glaucoptera
A. gonophylla
A. redolens

MYOPORACEAE
Eremophila ?sp.

MYRTACEAE
Baeckea corynophylla
Beaufortia micrantha
Eucalyptus 'anceps'
E. celastroides virella
E. cylindroidea
E. flocktoniae
E. leptocalyx
E. perangusta
E. redunca
E. spathulata grandiflora
E. tetragona
Kunzea ?sp.
Melaleuca acuminata
M. calycina
Melalueca ?sp.
M.uncinata
Verticordia ?sp.

PAPILIONACEAE
Chorizema nervosum
C. uncinatum
Daviesia pachyphylla
Daviesia ?sp.
Gastrolobium parviflorum
Templetonia retusa

PROTEACEAE
- *Banksia media*
- *Conospermum* ?sp.
- *Grevillea oligantha*
- *G. pectinata*
- *Hakea corymbosa*
- *H.laurina*
- *Hakea* ?sp.
- *Isopogon buxifolius*
- *Persoonia teretifolia*

RUTACEAE
- *Boronia inornata*

SANTALACEAE
- *Exocarpos aphyllus*
- *E. sparteus*
- *Santalum acuminatum*

SAPINDACEAE
- *Dodonaea* ?sp.

STERCULIACEAE
- *Guichenotia* ?sp.

Site/transect: OT13B Block 1040

ANTHERICACEAE
- *Borya constricta*

CASUARINACEAE
- *Allocasuarina humilis*
- *A. thuyoides*

CYPERACEAE
- *Lepidosperma viscidum*
- *Lepidosperma* ?sp.

DASYPOGONACEAE
- *Lomandra* ?sp.

DILLENIACEAE
- *Hibbertia* ?sp.

EPACRIDACEAE
- *Andersonia caerulea*

IRIDACEAE
- *Patersonia* ?sp.

MIMOSACEAE
- *Acacia gonophylla*
- *A. ingrata*
- *A. redolens*
- *A. saligna*

MYRTACEAE
- *Baeckea corynophylla*
- *Conothamnus aureus*
- *Calytrix leschenaultii*
- *Eucalyptus aff. foecunda*
- *E. flocktoniae*
- *E. leptocalyx*
- *E. perangusta*
- *E. spathulata grandiflora*
- *E. tetragona*
- *Kunzea* ?sp.
- *Leptospermum* ?sp.
- *Melaleuca uncinata*
- *Melaleuca* ?sp.
- *Verticordia* ?sp.

PAPILIONACEAE
- *Chorizema nervosum*
- *Daviesia* ?sp.
- *Gastrolobium parviflorum*

PHORMIACEAE
- *Dianella revoluta*

PROTEACEAE
- *Banksia media*
- *Grevillea oligantha*
- *G. pectinata*
- *Hakea corymbosa*
- *H. laurina*
- *H. lissocarpha*
- *H. nitida*
- *Isopogon buxifolius*
- *Persoonia teretifolia*
- *Petrophile squamata*

SANTALACEAE
- *Exocarpos aphyllus*
- *Leptomeria* ?sp.

STERCULIACEAE
- *Guichenotia* ?sp.

Site/transect: OT13C Block 1040

CASUARINACEAE
- *Allocasuarina humilis*
- *A. thuyoides*

CYPERACEAE
- *Lepidosperma angustatum*
- *L. viscidum*
- *Mesomelaena stygia*

DASYPOGONACEAE
- *Lomandra mucronata*

EPACRIDACEAE
- *Andersonia cerulea*
- *Astroloma epicradis*
- *Leucopogon* ?sp.
- *Lysinema* ?sp.

MIMOSACEAE
- *Acacia gonophylla*

MYRTACEAE
- *Baeckea corynophylla*
- *Calothamnus* ?sp.
- *Eucalyptus aff. foecunda*
- *E. flocktoniae*
- *E. perangusta*
- *E. spathulata grandiflora*
- *E. tetragona*
- *Leptospermum* ?sp.
- *Melaleuca uncinata*
- *Melaleuca* ?sp.
- *Verticordia* ?sp.

PAPILIONACEAE
- *Daviesia* ?sp.

PROTEACEAE
- *Banksia media*
- *Dryandra obtusa.*
- *Grevillea macrostylis*
- *G. oligantha*
- *G. pectinata*
- *Hakea corymbosa*
- *H.laurina*
- *H. lissocarpha*
- *H. macrostylus*
- *H. nitida*
- *Isopogon buxifolius*
- *Persoonia teretifolia*

RESTIONACEAE
- *Restio sphacelatus*

RUTACEAE
Boronia inornata

Site/transect: OT13D - Block 1040

CYPERACEAE
Lepidosperma brunonianum
L. viscidum
DASYPOGONACEAE
Lomandra mucronata
Lomandra ?sp.
MIMOSACEAE
Acacia ?sp.
MYRTACEAE
Eucalyptus 'anceps'
E. flocktoniae
E. perangusta
E. spathulata grandiflora
E. tetragona
Melaleuca uncinata
Melaleuca ?sp.
PAPILIONACEAE
Daviesia ?sp.
PROTEACEAE
Grevillea macrostylus
G. oligantha
G. pectinata
Hakea lissocarpha
H. nitida
RUTACEAE
Boronia inornata
SANTALACEAE
Exocarpos aphyllus
Santalum acuminatum

Site/transect: PN11A - Cocanarup Timber Reserve

AMARANTHACEAE
Ptilotus spathulatus
MIMOSACEAE
Acacia acuminata
MYRTACEAE
Eucalyptus salmonophloia
POACEAE
Stipa ?sp.
SANTALACEAE
Santalum spicatum
SAPINDACEAE
Dodonaea aptera
Dodonaea ?sp.

Site/transect: PN11B & C - Cocanarup Timber Reserve

MIMOSACEAE
Acacia acuminata
A. cyclops
A. ?lachnophylla
MYOPORACEAE
Eremophila ?sp.
MYRTACEAE
Calytrix leschenaultii
Eucalyptus annulata
E. salmonophloia
PAPILIONACEAE
Jacksonia ?sp.
Templetonia retusa
POACEAE
Stipa ?sp.

PROTEACEAE
Grevillea ?sp.
SANTALACEAE
Santalum acuminatum
SAPINDACEAE
Dodonaea ?sp.

Site/transect: PN11D - Cocanarup Timber Reserve

APOCYNACEAE
Alyxia buxifolia
BORAGINACEAE
Halgania andromedifolia
CHENOPODIACEAE
Maireana ?sp.
MIMOSACEAE
Acacia glaucoptera
Acacia ?sp.
MYRTACEAE
Eucalyptus brachycalyx
E. cylindroidea
E. myriadena
E. salmonophloia
PAPILIONACEAE
Jacksonia ?sp.
POACEAE
Stipa ?sp.
SANTALACEAE
Santalum spicatum
SAPINDACEAE
Dodonaea aptera
Dodonaea ?sp.

Site/transect: RV06A - Powell's Remnant Vegetation

CASUARINACEAE
Allocasuarina campestris
A. huegeliana
CYPERACEAE
Lepidosperma brunonianum
L. viscidum
Mesomelaena stygia
DILLENIACEAE
Hibbertia ?sp.
EPACRIDACEAE
Leucopogon ?sp.
Lysinema ciliatum
HAEMODORACEAE
Conostylis bealiana
MIMOSACEAE
Acacia leptospermoides
A. redolens
MYRTACEAE
Calothamnus quadrifidus
Eucalyptus occidentalis
E. tetragona
E. uncinata
E. xanthonema xanthonema
Kunzea ?sp.
Leptospermum ?sp.
Leptospermum ?sp.
Melaleuca uncinata
Melaleuca ?sp.
Melaleuca ?sp.
Verticordia ?sp.

PAPILIONACEAE
Daviesia incrassata
Gastrolobium spinosum
PROTEACEAE
Dryandra ?sp.
Hakea lissocarpha
Isopogon buxifolius
Petrophile ?sp.
Petrophile ?sp.
RESTIONACEAE
Loxocarya ?flexuosa
STYLIDIACEAE
Stylidium ?sp.

Site/transect: RV06B - Powell's Remnant Vegetation

ANTHERICACEAE
Borya constricta
Thysanotus ?sp.
CASUARINACEAE
Allocasuarina campestris
A. huegeliana
CYPERACEAE
Lepidosperma ?scabrum
DASYPOGONACEAE
Lomandra effusa
EPACRIDACEAE
Astroloma ?sp.
MIMOSACEAE
Acacia glaucoptera
A. leptospermoides
MYRTACEAE
Agonis ?sp.
Calothamnus quadrifidus
Eucalyptus annulata
E. flocktoniae
E. occidentalis
E. platypus var. platypus
E. tetragona
E. uncinata
E. xanthonema xanthonema
Leptospermum ?sp.
Leptospermum ?sp.
Melaleuca uncinata
Melaleuca ?sp.
Melaleuca ?sp.
Verticordia ?sp.
Verticordia ?sp.
PAPILIONACEAE
Gastrolobium ?sp.
PROTEACEAE
Dryandra ?sp.
Hakea ?sp.
Isopogon buxifolius
Petrophile ?sp.
RESTIONACEAE
Loxcarya ?flexuosa
SAPINDACEAE
Dodonaea ?sp.
STACKHOUSIACEAE
Stackhousia ?.sp
STYLIDIACEAE
Stylidium ?sp.

APPENDIX 13: DECLARED RARE FLORA AND PRIORITY SPECIES RECORED IN THE FRNP AND BUFFER ZONE

Status key:
DRF - Declared Rare Flora - Extant Taxa
X - Declared Rare Flora - Presumed Extinct Taxa
Priority 1 - Poorly known Taxa
Priority 2 - Poorly known Taxa
Priority 3 - Poorly known Taxa
Priority 4 - Rare Taxa

FAMILY	SPECIES	STATUS
ANTHERICACEAE	*Laxmannia grandiflora* subsp. *stirlingensis*	Priority 3
	Thysanotus brachiatus	Priority 2
	T. glaucus	Priority 4
	T. parviflorus	Priority 2
APIACEAE	*Xanthosia peduncularis*	Priority 3
	X. singuliflora	Priority 2
	X. sp. Fitzgerald	Priority 2
BORAGINACEAE	*Halgania tomentosa*	Priority 2
BRASSICACEAE	*Lepidium aschersonii*	X
CYPERACEAE	*Chorizandra multiarticulata*	Priority 3
EPACRIDACEAE	*Andersonia echinocephala*	Priority 3
	Astroloma sp. Fitzgerald	Priority 2
	Coleanthera coelophylla	Priority 1
	Leucopogon brevicuspis	Priority 3
	L. compactus	Priority 2
	L. denticulatus	Priority 2
	L. pleurandroides	Priority 2
	L. tamariscinus	Priority 2
	Monotoca aristata ms	Priority 1
	Styphelia pulchella	Priority 1
EUPHORBIACEAE	*Calycopeplus marginatus*	Priority 3
	Monotaxis sp. Ravensthorpe	Priority 2
	Ricinocarpos trichophorus	DRF
	Stachystemon sp.	Priority 1
FABACEAE	*Daviesia megacalyx*	DRF
GOODENIACEAE	*Coopernookia georgei*	DRF
	Dampiera deltoidea	Priority 2
	D. fitzgeraldensis	Priority 2
	D. orchardii	Priority 2
	Goodenia phillipsiae	Priority 1
	G. stenophylla	Priority 4
	Lechenaultia acutiloba	Priority 3
	L. superba	Priority 4
GYROSTEMONACEAEA	*Cypselocarpus haloragoides*	Priority 3
HAEMODORACEAE	*Anigozanthus bicolor* subsp. *minor*	DRF
	Conostylis lepidospermoides	DRF
HALORAGACEAE	*Gonocarpus hispidus*	Priority 2
	G. trichostachyus	Priority 3
	Haloragis sp. Ravensthorpe	Priority 1
	Haloragodendron glandulosum	Priority 4
HYDATELLACEAE	*Hydatella australis*	Priority 1

FAMILY	SPECIES	STATUS
LAMIACEAE	*Hemigenia brachyphylla*	Priority 2
	Microcorys pimeleoides	Priority 1
	M. virgata	Priority 2
	M. wilsoniana	Priority 1
LILIACEAE	*Thysanotus gageoides*	Priority 2
MIMOSASEAE	*Acacia aemula* subsp. *aemula*	Priority 4
	A. argutifolia	Priority 4
	A. bifaria	Priority 3
	A. diminuta ms	Priority 1
	A. errabunda ms	Priority 3
	A. empelioclada	Priority 4
	A. durabilis	Priority 3
	A. improcera ms	Priority 3
	A. pusilla ms	Priority 1
	A. rhamphophylla ms	Priority 1
	A. dictyoneura	Priority 2
	A. disticha	Priority 2
	A. papulosa	Priority 2
	A. brachyphylla var. *recurvata*	Priority 3
	A. declinata	Priority 3
	A. heterochroa subsp. *heterochroa*	Priority 3
	A. laricina var. *crassifolia* ms	Priority 2
	A. leioderma Fitzgerald River National Park variant	Priority 2
	A. moirii subsp. *dasycarpa*	Priority 3
	A. mutabilis subsp. *incurva* ms	Priority 1
	A. newbeyi	Priority 3
	A. octonervia	Priority 3
	A. ophiolithica	Priority 3
	A. phlebopetala var. *phlebopetala*	Priority 3
	A. phlebopetala var. *pubescens*	Priority 2
	A. pinguiculosa subsp. *pinguiculosa* ms	Priority 3
	A. pritzeliana	Priority 3
	A. simulans	Priority 4
	A. sp. Ravensthorpe	Priority 3
	A. varia var. parviflora villous variant	Priority 2
MYOPORACEAE	*Eremophila denticulata* subsp. *denticulata*	DRF
	E. serpens	Priority 4
	Myoporum cordifolium	DRF
MYRTACEAE	*Astartea* sp. Fitzgerald	Priority 2
	Calothamnus macrocarpus	Priority 2
	Chamelaucium juniperinum ms	Priority 2
	C. sp. Hamersley	Priority 1
	Darwinia sp. Thumb Peak	Priority 2
	Eucalyptus acies	Priority 3
	E. bennettiae x	DRF
	E. burdettiana	DRF
	E. chrysantha x	Priority 2
	E. coronata	DRF
	E. deflexa	Priority 4
	E. desmondensis	Priority 4
	E. erythrandra x	Priority 4
	E. famelica	Priority 3
	E. melanophitra	Priority 4
	E. newbeyi	Priority 3
	E. petila ms	Priority 2
	E. praetermissa	Priority 4

FAMILY	SPECIES	STATUS
	E. preissiana subsp. *lobata*	Priority 2
	E. preissiana x *staeri*	Priority 4
	E. sp. B Ravensthorpe	Priority 1
	E. sp. West Cape Howe	Priority 4
	E. stoataptera x	Priority 4
	E. stoatei	Priority 4
	Hypocalymma melaleucoides ms	Priority 2
	Leptospermum confertum	Priority 2
	Melaleuca araucarioides	Priority 3
	M. cliffortioides	Priority 4
	M. ordinifolia	Priority 2
	M. penicula	Priority 2
	M. pomphostoma	Priority 3
	M. sculponeata	Priority 1
	Rinzia longifolia	Priority 1
	Verticordia crebra	DRF
	V. helichrysantha	DRF
	V. integra	Priority 4
	V. longistylis	Priority 3
	V. pityrhops	DRF
ORCHIDACEAE	*Calochilus sp. Hopetoun* (H. Taylor s.n)	Priority 2
	Caladenia bryceana subsp. *bryceana* ms	DRF
	Thelymitra psammophila	DRF
PAPILIONACEAE	*Bossiaea divaricata*	Priority 3
	Bossiaea strigillosa	Priority 1
	Chorizema carinatum	Priority 3
	C. trigonum	Priority 3
	C. ulotropis	Priority 3
	Daviesia megacalyx ms	DRF
	D. newbeyi	Priority 2
	D. pauciflora	Priority 2
	Eutaxia sp. Hatter Hill	Priority 1
	Gastrolobium heterophyllum	Priority 2
	G. stenophyllum	Priority 3
	Jacksonia compressa	Priority 4
	J. elongata ms	Priority 3
	J. intricata ms	Priority 2
	J. venosa ms	Priority 2
	Mirbelia densiflora	Priority 1
PITTOSPORACEAE	*Billardiera mollis*	DRF
PORTULACACEAE	*Calandrinia porifera*	Priority 3
PROTEACEAE	*Adenanthos cacomorphus*	Priority 2
	A. dobagii	DRF
	A. ellipticus	DRF
	A. labillardierei	Priority 4
	Adenanthos glabrescens subsp. *exasperatus*	Priority 3
	Banksia laevigata subsp. *laevigata*	Priority 4
	Comesperma lanceolatum	Priority 2
	Conospermum coerulescens subsp. *coerulescens* ms	Priority 1
	Dryandra corvijuga ms	Priority 1
	D. foliosissima	Priority 2
	D. viscida ms	Priority 3
	Grevillea coccinea subsp. *lanata*	Priority 3
	G. fistulosa	Priority 2
	G. fulgens	Priority 3

FAMILY	SPECIES	STATUS
	G. infundibularis	DRF
	G. insignis subsp. *elliotii*	Priority 3
	G. maxwellii	DRF
	G. wittweri	Priority 2
	Hakea hookeriana	Priority 2
	Persoonia brevirhachis	Priority 2
RAFFLESIACEAE	*Pilostyles collina*	Priority 4
RESTIONACEAE	*Restio confertospicatus*	Priority 3
RHAMNACEAE	*Cryptandra inconspicua* ms	Priority 2
	C. intonsa	Priority 1
	Siegfriedia darwinioides	Priority 3
	Spyridium glaucum	Priority 1
	S. mucronatum subsp. *recurvum*	Priority 3
	S. oligocephalum	Priority 3
	Stenanthemum cristatum	Priority 2
	Trymalium litorale	Priority 1
RUBIACEAE	*Opercularia rubioides*	Priority 2
RUTACEAE	*Boronia clavata*	Priority 2
	B. oxyantha var. *brevicalyx*	Priority 2
	B. oxyantha var. *oxyantha*	Priority 2
	B. penicillata	Priority 3
	Eriostemon cymbiformis	Priority 2
	Microcybe pauciflora subsp. *grandis* ms	Priority 1
SAPINDACEAE	*Dodonaea trifida*	Priority 3
SOLANACEAE	*Anthercercis fasciculata*	Priority 2
STERCULIACEAE	*Guichenotia apetala*	Priority 1
	Lasiopetalum fitzgibbonii	Priority 3
	L. parviuliflorum	Priority 3
	L. sp. Ironcaps	Priority 1
STYLIDIACEAE	*Levenhookia pulcherrima*	Priority 2
	Stylidium galioides	DRF
	Stylidium pseudohirsutum	Priority 3
THYMELAEACEAE	*Pimelea granticola*	Priority 3
	P. physodes	Priority 4

From the Department of Conservation and Land Management Declared Rare and Priority Flora List (14/9/95)

INTERNATIONAL RECOGNITION

MaB

The Fitzgerald River National Park BIOSPHERE RESERVE is part of UNESCO'S "Man and the Biosphere Programme", an international network dedicated to promoting conservation and compatible land use through voluntary cooperation.

unesco

Status as a BIOSPHERE RESERVE does not have any legal impact on any landowner, nor does it affect the sovereignty of Australia. The "Man and the Biosphere Programme" is not related to World Heritage Listing.

LOCAL PARTICIPATION

The cooperative action of local organisations, landowners, individuals and government agencies has resulted in the Fitzgerald River National Park BIOSPHERE RESERVE being recognised as a model BIOSPHERE RESERVE for Australia.

For further information contact:

FITZGERALD BIOSPHERE PROJECT

A group which supports the goals of the Fitzgerald River National Park BIOSPHERE RESERVE and UNESCO'S "Man and the Biosphere Programme".

Bill Lullfitz	(098) 35 5011
Bob and Helen Twigg	(098) 35 4021
Geoff Bee	(098) 35 5030

JERRAMUNGUP LAND CARE CENTRE	(098) 35 1127
RAVENSTHORPE LAND CARE DISTRICT	(098) 38 1068
DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT	
Ranger-In-Charge, Fitzgerald River National Park	(098) 35 5043

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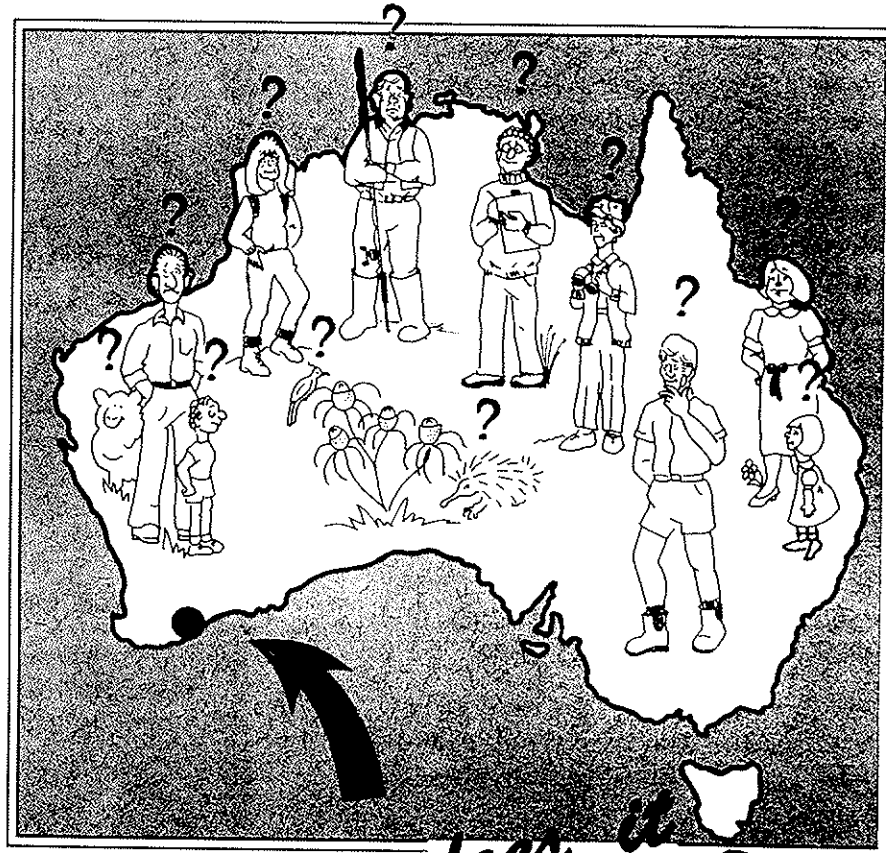
FITZGERALD RIVER NATIONAL PARK

BIOSPHERE RESERVE



What does it mean to me?

WHAT IS A BIOSPHERE RESERVE ?

OUR BIOSPHERE is the thin layer of the earth's crust, water and atmosphere which supports life.

A BIOSPHERE RESERVE is an area dedicated to helping discover how people and nature can flourish together. Ideally, it is an area where conservation and economic opportunities can occur in harmony.

There is a worldwide network of over 300 BIOSPHERE RESERVES involving 81 countries. In 1978 the United Nations Education, Scientific and Cultural Organisation (UNESCO) gazetted Fitzgerald River National Park as one of 12 BIOSPHERE RESERVES in Australia.

Each BIOSPHERE RESERVE must contain a Core Zone, a biologically rich area where plants and animals can exist and evolve largely undisturbed by people. This protected zone can serve as a baseline to monitor environmental changes in other areas.

Adjoining or surrounding the Core Zone is a Buffer Zone where land uses and activities are managed in ways that help protect the core.

The outermost Zone of Cooperation is an area where landowners, communities, researchers, and government agencies work together to find ways to use the environment without degrading it.

WHAT DOES IT MEAN TO ...

FARMERS ?

- improved land management skills
- increased production and land values
- advances in sustainable agriculture

COMMUNITIES ?

- protection of basic resources
- more stable economic base
- influence in land use decisions
- increased tourism potential

THE WORLD ENVIRONMENT ?

- worldwide approach to environmental monitoring
- undisturbed ecosystems for research
- international scientific cooperation

CHILDREN ?

- cleaner, more healthful environment
- protection of resources for the future

VISITORS ?

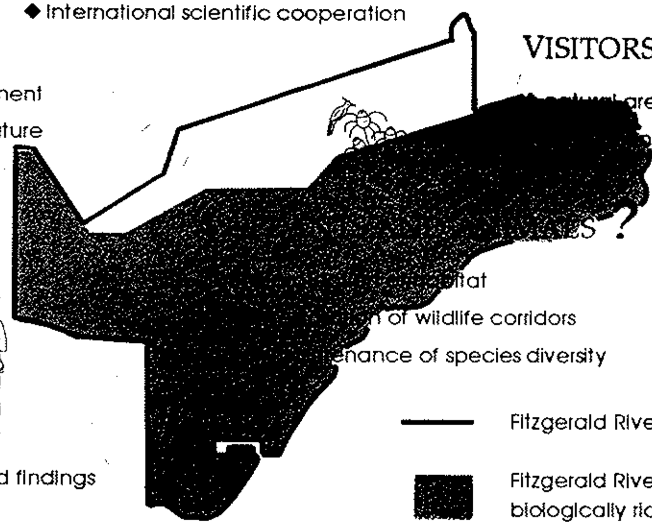
- ...areas for recreation and study
- ...of wilderness areas

...ES ?

- ...itat
- ...of wildlife corridors
- ...enance of species diversity

RESEARCHERS ?

- unspoiled research sites
- access to research methods and findings from other BIOSPHERE RESERVES



Fitzgerald River National Park boundary

Fitzgerald River National Park forms the biologically rich Core Zone.

Nearby nature reserves, public lands and wildlife corridors form a patchwork Buffer Zone.

Surrounding communities and farmlands make up the Zone of Cooperation.

WHAT IS THE R.A.O.U.?

The Royal Australasian Ornithologists Union was founded in 1901 and is Australia's national organization for the study, preservation and enjoyment of our Australian birds.

Its members are of all ages and come from all walks of life, and include amateur birdwatchers and professional scientists.

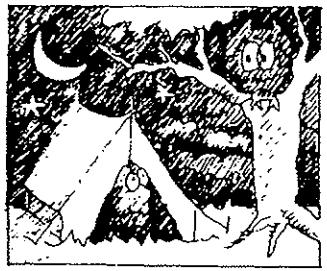
Projects for the conservation of native birds involve the collection of field knowledge by amateurs and its assessment by professionals.

W.A. GROUP

The W.A. Group of the R.A.O.U. has over 600 members. We offer a wide range of activities and services for members.

MEMBER PARTICIPATION

Programs include excursions, campouts, bird surveys, research projects and social activities.



NEW MEMBERS

New members are welcome and are encouraged to participate in all activities.

COUNTRY MEMBERS

We have many country members who take part in our projects and activities.

MEMBER SERVICES

Volunteers staff our Headquarters Office Monday to Friday from 9.30 am to 12.30 pm. They update data for our various research projects, provide information for members and attend to members requests.

At headquarters we have a reference library (including slides) and a bookshop.

QUARTERLY NEWSLETTER

W.A. Birdnotes includes members' contributions and information on activities, surveys and research.

MONTHLY MEETING

The meetings give you the opportunity to hear local, national and overseas speakers and to keep up to date with the W.A. Group activities.

INTERESTED?

Then contact our office now for membership information.

Postal address
RAOU WA Group
PO Box 199
Jolimont
WA 6014

Office address
RAOU WA Group
71 Oceanic Drive
Floreat
WA 6014

Phone: (09) 383-7749

Oct 94

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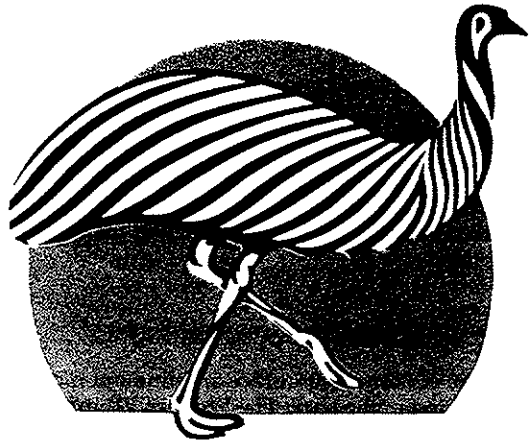
BIRDWATCHING IN THE FITZGERALD RIVER NATIONAL PARK BIOSPHERE



RAOU

BIRDS • KNOWLEDGE • CONSERVATIO

APPENDIX 15

RAOU BROCHURE

Prepared by:

W.A.GROUP
ROYAL AUSTRALASIAN ORNITHOLOGISTS UNION

Funded by the Gordon Reid Foundation for Conservation

BIRDWATCHING IN THE FITZGERALD RIVER NATIONAL PARK BIOSPHERE

A total of 208 species of bird have been recorded in this area, along the coast and many rivers, mallee-heaths and woodlands.

1 BREMER BAY AND WELLSTEAD ESTUARY

Good places to see migratory wading birds including Grey Plover, Hooded Plover, Sanderling and Red Knot.

2 BEAUFORT INLET

Another good place for wading birds and waterbirds.

3 GORDON INLET

Take a walk along the shore and look for Rock Parrot, Southern Emu-wren, Chestnut Teal and many other waterbirds.

4 FITZGERALD RIVER NATIONAL PARK

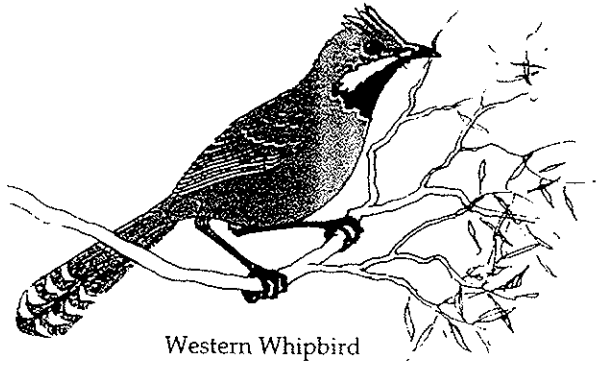
Call at the National Park office and find out more about birdwatching in the park. The Western Whipbird can often be heard from the information centre. Western Bristlebird and Ground Parrot have been recorded.

5 FITZGERALD RIVER

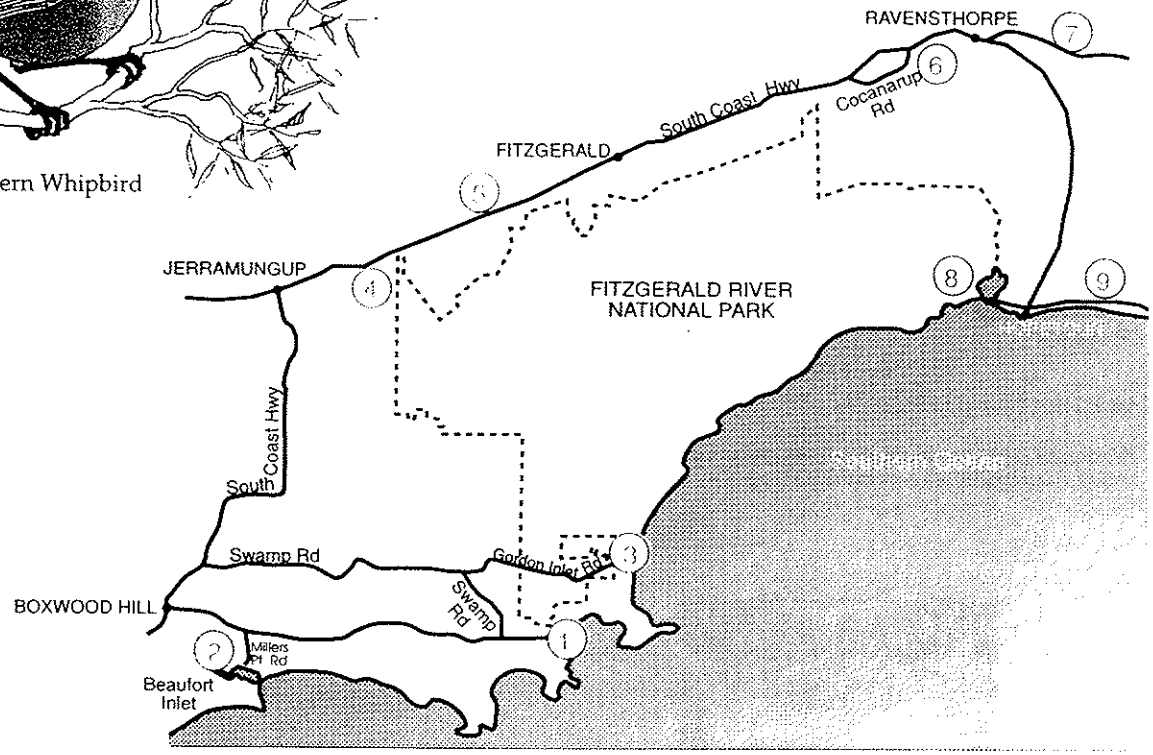
A walk along the river north or south of the highway may reveal Rufous Night Heron, Blue-breasted Wren, Western Whipbird, Southern Scrub-robin and Chestnut Teal.

6 COCANARUP TIMBER RESERVE

Wander through the magnificent Salmon Gum woodland and see Carnaby's Cockatoo, Western Rosella, Regent Parrot and Red-capped Parrot. An overnight stay may be rewarded with a look at Southern Boobook, Barn Owl, Tawny Frogmouth, Australian Owlet Nightjar and Spotted Nightjar.



Western Whipbird



7 RAVENSTHORPE RANGE

Access from Floater Road or Ethel Daw Drive. Look for Brush Bronzewing, Red-capped Parrot, Southern Scrub-robin, Shy Hylacola, Western Yellow Robin, Crested Bellbird, Western Whipbird, Purple-gaped Honeyeater and Spotted Pardalote.

8 CULHAM INLET

A good area for Great Crested Grebe, Australian Pelican, cormorants, Osprey, White-bellied Sea-eagle and waterfowl.

9 JERDACUTTUP LAKES NATURE RESERVE

A group of large lakes with dense fringing vegetation accessed from Southern Ocean East Road. Glossy Ibis, Freckled Duck and Australian Crake have been recorded.

LOCAL CONTACT

Angela Saunders (098) 381166

M Tawny Frogmouth
M Australian Owlet-nightjar
M Spotted Nightjar

Ground Cuckoo-shrike

C Laughing Kookaburra
M Sacred Kingfisher
C Rainbow Bee-eater
C Richard's Pipit

U White-backed Swallow
Welcome Swallow
C Tree Martin
Fairy Martin

C Black-faced Cuckoo-shrike
R Ground Cuckoo-shrike
White-winged Triller

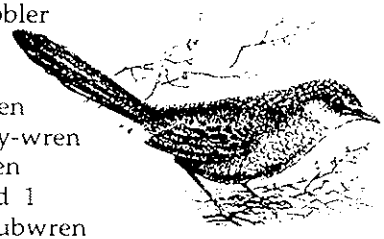
C Southern Scrub-robin
Scarlet Robin
M Red-capped Robin
U Hooded Robin
U Western Yellow Robin
R Crested Shrike-tit 1
R Gilbert's Whistler
U Jacky Winter
M Golden Whistler
M Rufous Whistler
C Grey Shrike-thrush
C Crested Bellbird

Hooded Robin

C Restless Flycatcher
C Grey Fantail
C Willie Wagtail

M Western Whipbird
M White-browed Babbler
U Rufous Songlark
U Brown Songlark
C Splendid Fairy-wren
C Blue-breasted Fairy-wren
M Southern Emu-wren
R Western Bristlebird 1
M White-browed Scrubwren
C Shy Hylacola
R Redthroat
U Calamanthus

Western Bristlebird



C Weebill
U Western Gerygone
C Inland Thornbill
U Western Thornbill
C Yellow-rumped Thornbill

Western Gerygone

M Varied Sittella

C Red Wattlebird
C Little Wattlebird
U Spiny-cheeked Honeyeater
C Yellow-throated Miner
U Singing Honeyeater
C White-eared Honeyeater
C Purple-gaped Honeyeater
U Yellow-plumed Honeyeater
M Brown-headed Honeyeater
M White-naped Honeyeater
M Brown Honeyeater
C New Holland Honeyeater
M White-cheeked Honeyeater
C Tawny-crowned Honeyeater
M Western Spinebill
R Black Honeyeater
M White-fronted Chat

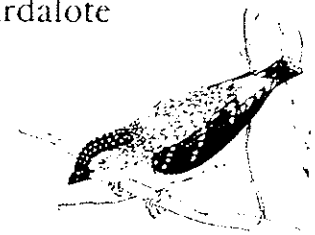
Purple-gaped Honeyeater

C Spotted Pardalote
Yellow-rumped Pardalote
C Striated Pardalote
C Silvereye

U Red-eared Firetail
C Australian Magpie-lark
R Masked Woodswallow
U Black-faced Woodswallow
C Dusky Woodswallow

C Grey Butcherbird
U Pied Butcherbird
C Australian Magpie
C Grey Currawong
C Australian Raven

Yellow-rumped Pardalote



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FITZGERALD RIVER NATIONAL PARK BIOSPHERE BIRD LIST

CODE

C Common.
M Moderately common.
U Uncommon.
R Rare.

LOCATIONS

1 Fitzgerald River National Park only
2 Jerdacuttup Lakes Nature Reserve.

Further information and map for the above locations is available in the accompanying brochure 'Birdwatching in the Fitzgerald National Park Biosphere'.

For further information ring:

Angela Sanders *(098) 381166*

Royal Australasian Ornithologists Union (WA Group) *(09) 3837749*

Oct 1994

Funded by the
Gordon Reid Foundation for Conservation

C Emu
U Great Crested Grebe
M Hoary-headed Grebe
M Australasian Grebe

Little Penguin
Yellow-nosed Albatross
Great-winged Petrel
Flesh-footed Shearwater
Short-tailed Shearwater

M Australian Pelican
Australasian Gannet
Darter
Pied Cormorant
C Little Pied Cormorant
Great Cormorant
Little Black Cormorant

Pacific Heron
C White-faced Heron
Great Egret
Eastern Reef Egret
Rufous Night Heron
R Australasian Bittern
Glossy Ibis 2
Sacred Ibis
Straw-necked Ibis
Yellow-billed Spoonbill

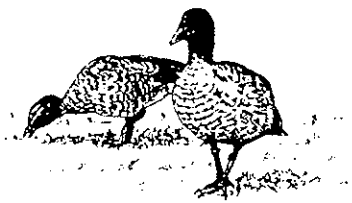
Black Swan
R Freckled Duck
R Cape Barren Goose
C Australian Shelduck
C Pacific Black Duck
C Grey Teal
M Chestnut Teal
U Australasian Shoveler
U Pink-eared Duck
U Hardhead
C Maned Duck
U Blue-billed Duck
U Musk Duck

Osprey
C Black-shouldered Kite
U Square-tailed Kite

Great Crested Grebe

Glossy Ibis

Maned Duck



U Whistling Kite
Brown Goshawk
Collared Sparrowhawk
White-bellied Sea-Eagle
M Wedge-tailed Eagle
U Little Eagle
U Spotted Harrier
U Marsh Harrier
U Peregrine Falcon
U Australian Hobby
M Brown Falcon
M Australian Kestrel

Malleefowl

M Stubble Quail
Brown Quail
Painted Button-quail

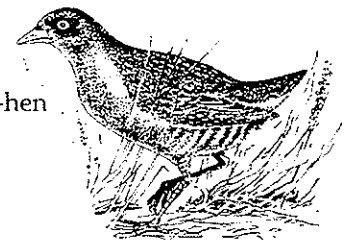
R Baillon's Crake 2
R Australian Crake
R Spotless Crake
Black-tailed Native-hen
U Purple Swamphen
M Eurasian Coot

R Australian Bustard

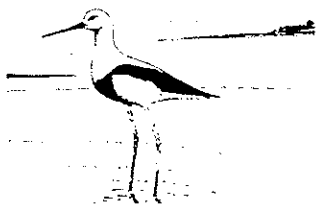
R Bush Thick-knee
M Pied Oystercatcher
M Sooty Oystercatcher
M Banded Lapwing
Grey Plover
Red-kneed Dotterel
Black-fronted Plover
Hooded Plover
Red-capped Plover
Inland Dotterel
Black-winged Stilt
Banded Stilt
Red-necked Avocet
Ruddy Turnstone
Wood Sandpiper
Common Sandpiper
Greenshank
R Black-tailed Godwit
Bar-tailed Godwit

Wedge-tailed Eagle

Australian Crake



Banded Stilt



Red Knot
Sharp-tailed Sandpiper
Pectoral Sandpiper
Red-necked Stint
Long-toed Stint
Curlew Sandpiper
Sanderling
Australian Pratincole

Great Skua
C Silver Gull
C Pacific Gull
Kelp Gull
Whiskered Tern
White-winged Tern
Gull-billed Tern
Caspian Tern
U Fairy Tern
M Crested Tern

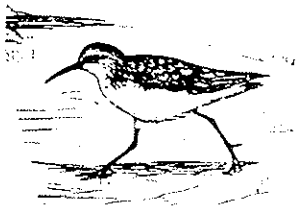
U Feral Pigeon
C Common Bronzewing
M Brush Bronzewing
M Crested Pigeon

U Carnaby's Black-Cockatoo
U Baudin's Black-Cockatoo
M Galah
C Purple-crowned Lorikeet
M Regent Parrot
M Red-capped Parrot
U Western Rosella
C Port Lincoln Ringneck
M Elegant Parrot
U Rock Parrot
R Ground Parrot

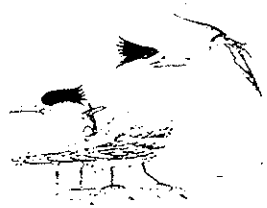
Pallid Cuckoo
C Fan-tailed Cuckoo
U Black-eared Cuckoo
M Horsfield's Bronze-Cuckoo
M Shining Bronze-Cuckoo

M Southern Boobook
R Barking Owl 1
U Barn Owl

Curlew Sandpiper



Crested Tern



Barking Owl

APPENDIX 16: SUMMARY FITZGERALD BIOSPHERE RESERVE WORKSHOP

SUMMARY

FITZGERALD BIOSPHERE RESERVE WORKSHOP

12TH MAY 1994
FITZGERALD HALL

FITZGERALD BIOSPHERE RESERVE WORKSHOP

Organiser: Angela Sanders

Participants:
Adrienne Campbell - Gairdner
Amelia Moir - Albany
Andre Schmitz - Chidlow
Ann Williams - Jerdacuttup
Beryl Fregon - Gairdner
Bill Lullfitz - Jacup
Bill Moir - Albany
Bob Twigg - Fitzgerald
Bruce Lambie - Bookmark Biosphere Reserve, South Australia
Carol Daniel - Jerramungup
Charlie Hick - Bremer Bay
Corinn Hine - Wellstead
Cynthia Thieze - South Australia
Drew Griffiths - Albany
Graham Laslett - Jerramungup
Greg Harold - Ravensthorpe
Ian Goldfinch - Jerdacuttup
John McDougall - Jerdacuttup
John Watson - Albany
Lorita Saunders - Chidlow
Mark True - Hopetoun
Mary Richardson - Hopetoun
Merle Bennett - Ravensthorpe
Mike Harper - Bookmark Biosphere Reserve, South Australia.
Moonika McHale - Hopetoun
Nadine Brown - Gairdner
Nathan McQuoid - Jacup
Pamela Parker - Bookmark Biosphere Reserve, South Australia
Pat McDougall - Jerdacuttup
Ralph Cooper - Hopetoun
Reg Ross - Jacup
Rex Edmondson - Jerramungup
Robbie Smart - Fitzgerald
Robin House - Corackerup
Rosemary Jasper - Ravensthorpe
Rosemary Turle - Hopetoun
Stephanie Williams - South Australia
Susanne Dennings - Ongerup
Sylvia Leighton - Albany
Valerie Milne - Albany

Acknowledgements: John Watson for assistance with pre-workshop organisation
Nadine Brown and Ralph Cooper for providing transport
Ann Smart for catering
Nathan McQuoid, Mark True and Greg Harold for help on the day
Corinn Hine for co-ordinating the discussions at short notice

Enquiries: Angela Sanders. PO BOX 279, RAVENSTHORPE, WA. 6346.
Phone/Facsimile (098) 381166

This document gives a summary of the talks presented and the outcomes of the group discussions at the Fitzgerald Biosphere Workshop held on May 12 1994 at the Fitzgerald Hall.

A summary of details relevant to the Fitzgerald Biosphere Reserve from the "Nature Conservation - The Role of Networks" conference held in Geraldton May 16-20 1994 is also included. This conference was attended by John Watson, Angela Sanders, Nathan McQuoid and Bill Lullfitz who gave a presentation similar to the one given at the Biosphere Workshop titled "Networks and the Fitzgerald River National Park Biosphere Reserve, Western Australia (summarised in this document).

OPENING AND WELCOME

BY IAN GOLDFINCH - VICE PRESIDENT RAVENSTHORPE SHIRE

INTRODUCTION
BY REX EDMONDSON - CHAIRMAN SOIL AND LAND CONSERVATION COUNCIL

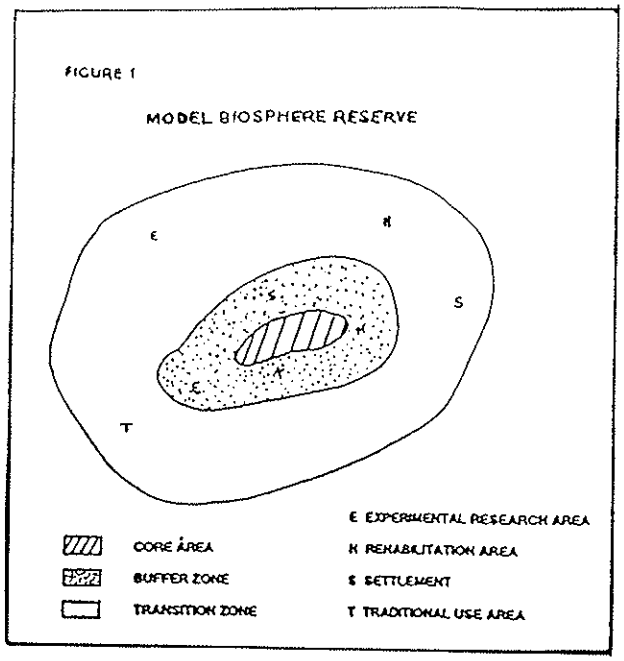
AN OVERVIEW OF THE FITZGERALD BIOSPHERE RESERVE
BY JOHN WATSON, NATHAN McQUOID, ANGELA SANDERS AND BILL LULLFITZ

This joint presentation gave an overview of the Fitzgerald River National Park Biosphere Reserve (FBR) and John Watson set the scene by giving an explanation of the model Biosphere Reserve concept and how the FBR fits that model very well (see Figures 1, 2 and 3). Nathan McQuoid gave details of some of the outstanding features of the Fitzgerald River National Park (FRNP), Angela Sanders outlined her biological survey work and community involvement in that work and Bill Lullfitz detailed how community networking had enhanced landcare and conservation activities in the zone of co-operation around the park.

THE FITZGERALD BIOSPHERE RESERVE PROJECT
BY BOB TWIGG

Bob gave at brief background of the Fitzgerald Biosphere Project (FBP) group's inception, activities, projects and some of his reflections. The beginning of the FBP was a result of two public meetings, the first in November 1985 held at the Twertup Field Studies Centre and the second at Bremer Bay in March 1986. At the Twertup meeting the following questions were addressed - What does it mean to be a designated Biosphere Reserve and what have we got? The mind-boggling idea of an "umbrella" group was suggested at the Twertup meeting, and at Bremer Bay in March 1986 the Fitzgerald Biosphere Project group was formed and the constitution was discussed. The aim of the group was - think globally, act locally.

The next major event for the group was the "Bush comes to the City" seminar held at Murdoch University in 1987 where members told the Fitzgerald Biosphere Reserve story. In addition a system of landscape management was developed with the help of a consultant farm planner in the Jerdacuttup and Jacup farming areas. Funds for these projects were received from Department of Agriculture, CALM,



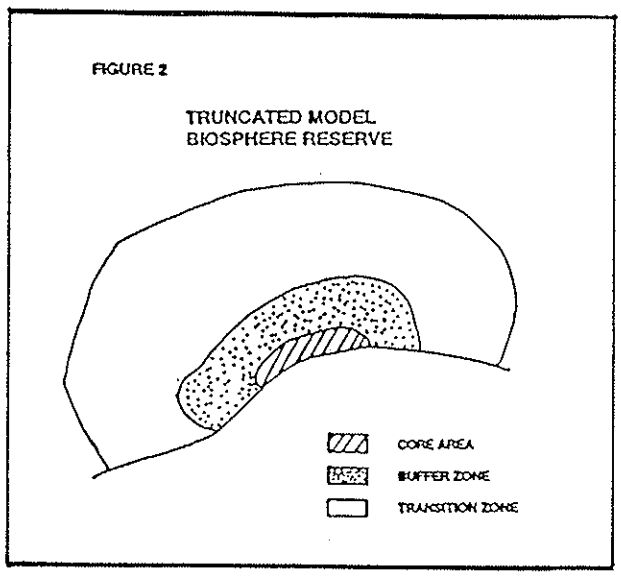
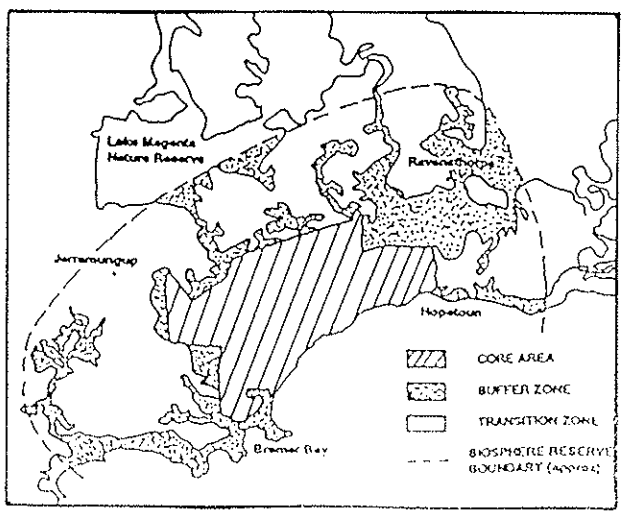


FIGURE 3

FITZGERALD RIVER NATIONAL PARK
BIOSPHERE RESERVE



EPA, Federal Department of Education and Training, Alcoa, WA Farmers Federation and UNESCO in Canberra and Paris.

The group was very active up until 1989 when 4 people left, agricultural production was down and the group has a recess of 4 years. At present the group is again involved in Biosphere activities with the new opportunities provided through Fitzgerald River National Park Association, Jerramungup Land Conservation District Committee, CALM and the Ecomuseum concept.

COMMUNITY INVOLVEMENT IN THE FITZGERALD RIVER NATIONAL PARK BY BILL MOIR

Bill gave a background on the Fitzgerald River National Park Association (FRNPA), its inception and achievements so far. The birth of the association (then the Ongerup Conservation Organisation) was a response to the threat of mining in the park for brown coal during 1970. After this threat disappeared the association lapsed and then reformed in 1980. The quarryman's hut at Twertup has been renovated by many volunteers and has been the "glue" that has held the association together over the years. This hut is now used as a field studies centre for groups and individuals and is a base for the FRNPA.

LANDCARE IN JERRAMUNGUP BY CAROL DANIEL

Carol gave details of the history and activities of the Jerramungup Land Conservation District Committee (JLCDC). The JLCDC was first started 11 years ago by local farmers in response to the severe soil erosion problems that were occurring in the district at that time. The JLCDC now is an umbrella organisation for 11 catchment groups which together form an information network that is used by many people living in the Jerramungup Shire and other agencies in the region. The biggest project that has been undertaken is the Farm Planning Project with a target of 80% of the landholders working from farm plans in the near future.

LANDCARE IN RAVENSTHORPE BY JOHN McDOUGALL

John gave details of the history and activities of the Ravensthorpe Land Conservation District Committee (RLCDC). In Ravensthorpe the members of the LCDC are mainly from farms that were developed in the land boom of the 1970's and 1980's. The Yallobup Creek Catchment Project (also mentioned by Bob Twigg) was the start of landcare activities in the district. To date the RLCDC have set up an arboretum, piezometer (water level) monitoring programme, perennial grass trials, fox and cat control programmes and machinery hire to farmers.

SUSTAINABLE AGRICULTURE AND CONSERVATION BY GRAHAM LASLETT

Graham explained why we are having problems with some of our current farming techniques and how these can be overcome by the use of sustainable farming practices.

DISPLAYS BY THE JERDACUTTUP AND FITZGERALD PRIMARY SCHOOLS AND THE RAVENSTHORPE DISTRICT HIGH SCHOOL

The Jerdacuttup and Fitzgerald Primary Schools and Ravensthorpe District High School prepared a series of displays in the Fitzgerald School. These displays showed some aspects of the student's involvement in conservation activities including tree planting programmes and biological survey work. The students also explained what they had been doing in these programmes to the workshop participants on a one to one basis.

MALLEEFOWL PRESERVATION GROUP BY SUSANNE DENNINGS

Susanne gave details of how the Malleefowl Preservation Group at Ongerup got started and what the group had achieved so far. The group started in 1992 and since then has been awarded a grant of $3000 from the Gordon Reid Foundation that has enabled the group to produce and publish the "Community Action Plan for the Gnowangerup/Ongerup/Borden Area". A further grant from the National Landcare/Save the Bush Programme has enabled the group to employ a Project Officer to continue research on the Malleefowl (part of the research is within the FBR). The group produces a quarterly newsletter "Malleefowl Matter" which is sent to all 80 members.

RAVENSTHORPE-HOPETOUN AREA PROMOTIONS BY RALPH COOPER

Ralph outlined the inception and role of the Fitzgerald River National Park Advisory Committee (FRNPAC) and commented that at a recent meeting it was agreed that the Committee needed to be changed to include representatives and "experts" from a wider field in the community.

Ralph also gave details of the role of the Ravensthorpe Hopetoun Area Promotions group. The group was formed 2 years ago to address the issues of tourism in the Ravensthorpe Shire and has been important in joining the two towns together into a coherent body. The group's role has been to produce tourist information brochures, establish a tourist centre (Going Bush Information Stop) situated in the Ravensthorpe Community Centre, lobby for road access, signs and facilities and promote nature-based tourism in the shire.

BREMER BAY AREA COASTAL PLAN
BY ROBIN HOUSE

Robin explained the role of the Coastal Reserves Advisory Committee and what the committee has achieved since it was formed in 1992. To enable the coastal land to the west and east of Bremer Bay to be vested in the Jerramungup Shire a Management Plan had to be drawn up. Stage 1 of the plan, which covers the Doubtful Islands area, has been completed and provides a sensible, workable, creative and adaptable plan for the best use and protection of the coastal reserves. Phase 2, a management plan for the area from Bremer Bay to the Beaufort Inlet, has just begun.

GROUP DISCUSSIONS CO-ORDINATED BY CORINN HINE

Participants were split into 6 groups and all were asked to address two questions and their responses are given below.

The order of presentation for each point in no way implies any priority.

QUESTION 1A: *Do we support the Fitzgerald Biosphere Reserve?*

RESPONSE:

All group representatives supported the Fitzgerald Biosphere Reserve concept.

QUESTION 1B: *Does the general community support the FBR?*

RESPONSE:

- The general community does not understand what it is about or may never have heard of the concept.
- The word BIOSPHERE is not generally understood and may be "scary" to some.
- Jargon is confusing and people feel threatened.
- The concept of the buffer zone is not too clear and is said to be organised differently in other Biosphere Reserves.
- Management within CALM are disliked and treated with suspicion by some sections of the community. Fire management policies were identified as a source of some of this resentment.
- Many people are looking after the environment e.g. farmers and town people without necessarily being aware of the Biosphere Reserve concept or involved in groups.
- Support is patchy and attitudes towards the Biosphere Reserve concept ranges from indifference to complacency.
- Self-interests are still very prominent.
- Attitudes are changing slowly with more community awareness being apparent.
- The farming community is more aware than the township community.

- People from outside the area see the asset more than the locals. Locals know it is there so feel they don't need to do much about it. Outsiders take a more active role.

QUESTION 1C: ***How can we improve community support over the next 3-5 years?***

- Networking and communication leads to efficiency and understanding and a better use of existing resources.
- The Biosphere Reserve concept is a good way to bring the two communities together (Jerramungup and Ravensthorpe).
- More seminars like todays are needed and others should be encouraged to come, especially those who are passive.
- More communication with the local press is needed.
- Good communication and promotion is needed.
- Encourage tours to increase the awareness of local people.
- Involve people in maintaining the facilities and encourage them in nature-based activities.
- Advertise the FRNP more.
- The diagram of the model Biosphere Reserve depicting the core, buffer and transition zone shows the concept as a whole very well and leads to better understanding.
- Community participation in projects should be continued.
- The concept of catchment groups is accepted in the farming community.
- The current biological survey work is helping to enlighten the community and it should continue and involve a broader base.
- Appoint a Biosphere Reserve Co-ordinator.
- The position of Biosphere Ecologist should be continued.
- More community involvement in the project is needed.
- Erect signs on all main access roads into the Biosphere Reserve.
- Agencies or individuals that support the concept could be identified with biosphere vehicle stickers or logos on letterheads etc.
- More education, using courses and other information etc. to tell the locals how precious the BR is.
- Focus on schools, develop a curriculum in the education system that involves the concept.
- Encourage a sense of ownership by the community through meetings, literature, leadership enthusiasm and the media.
- Community should feel they have an effective input into the management of the area with quotable examples.
- Reactivate the Fitzgerald Biosphere Project.
- Sell 'quality of life' in the FBR.
- Group representatives should have equal responsibility
- Aim to have 80% of the Biosphere Reserve population knowing what the concept is about in 3 years
- Change the jargon, "Zone of Co-operation" not so threatening.
- More research is needed.
- Encourage people to join groups and work together.

QUESTION 2: *What actions or strategies are needed for the buffer/corridor zone and zone of co-operation over the next 3-5 years? How should these actions be carried out? (i.e. who will do them, how and who will pay for them?).*

FOCUS: Responsibility and Management

RESPONSE:

- Educate the biosphere inhabitants about the concept and benefits to them.
- Education actions - signs when entering the Biosphere Reserve
  - appoint a co-ordinator to run programmes
- Identify the components of the biosphere people network.
  - CALM - rangers
  - LCDC - co-ordinators
  - Dept. Agriculture/APB
  - Shires
  - Education Department
  - Bushfires Brigade
  - MRD
  - Tourism groups
  - Progress Associations
  - Greenskills
  - other community groups
  - individuals

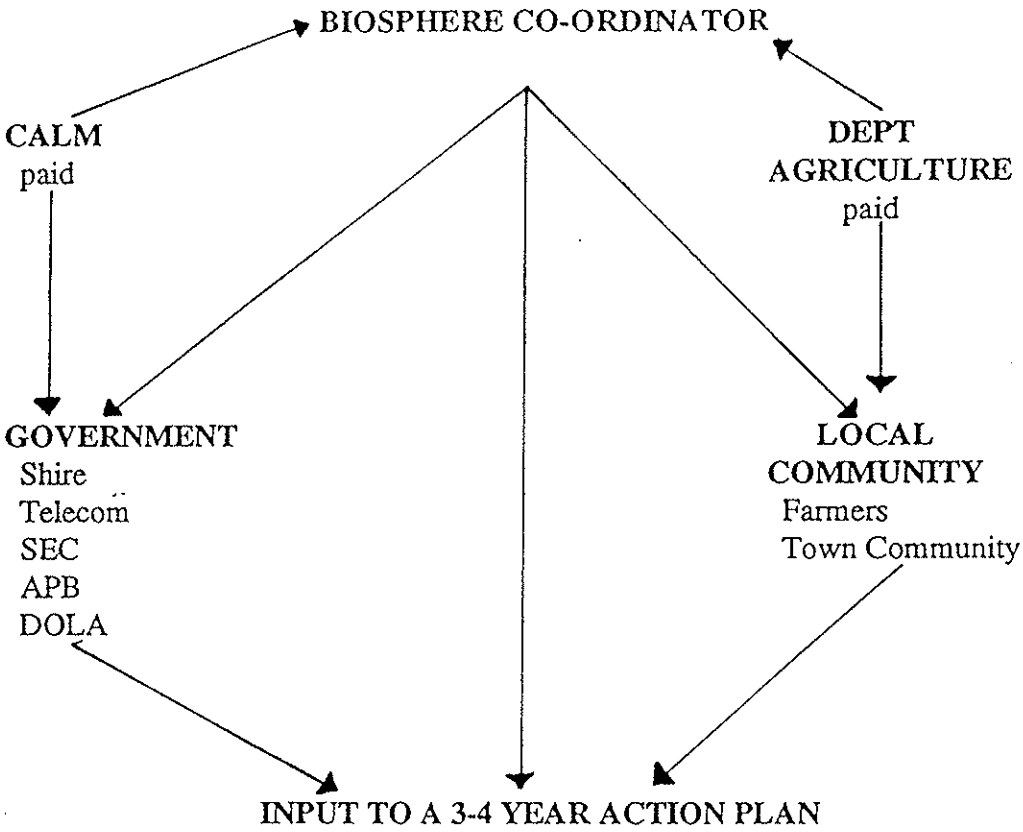
- Use representative from the above to
  - develop a committee
  - develop an Action Plan
  - identify who will fund the Action Plan
  - promote ownership/stewardship
  - co-ordinate the Action Plan
  - advise the Biosphere Co-ordinator

QUESTION 2 - FOCUS: Community Projects and Research

RESPONSE:

- Community involvement is as important as the research itself.
- Promote school involvement (e.g. Biosphere Schools Biological Survey Project)
- Ongoing and final results need reporting locally.
- Projects need to avoid remoteness and lack of communication.
- Tourist opinion surveys, done properly, would be valuable.
- Concern expressed about the number of people available for volunteer projects and potential lack of support.
- Job Start or LEAP Projects may help to staff projects.
- To be effective, projects should be local, involving a small group of people.
- To be effective, projects should involve many smaller communities joining together.

The following is a diagram of an idea put forward for management and responsibility.



- A co-ordinator is needed.
- A funding facilitator may be the most cost-effective way of using scarce funds.
- Find gaps in the data/literature and make it accessible, indexed and available.
- Ask the community what they need to know to make a living and develop awareness projects.
- Run workshops etc. on alternative sustainable industries and investigate options.
- Find new options and ensure they are done properly e.g. farm stays, flower picking on fire breaks.
- Take action on water management e.g. education via LCDC
- Initiate a Corporate Landlord Project - find them, educate them and give them recognition.
- Education and research is needed on rare flora and fauna via CALM.
- Need care and co-operative management e.g. fire.
- Facilitate "twinning" with other Biosphere Reserves to share data and ideas etc.
- Invite dignitaries and others to visit other BR's.
- Compile a register of volunteers.
- Road improvements are needed.

QUESTION 2 - FOCUS: Communications and Networking

RESPONSE:

- Ravensthorpe has the facilities (Community Centre) and is the 'headquarters' for RLCDC, Tourist Office (Going Bush), Health workers etc. in one building and could be the Fitzgerald Biosphere Reserve Headquarters.
- Bremer Bay and Hopetoun have many retired residents that could provide resources and support for the interchange of ideas between the eastern and western areas of the Biosphere Reserve.
- A professional secretariat or Telecentre is needed at either Jerramungup or Ravensthorpe with branches at the other three towns (Hopetoun, Bremer Bay).
- The Telecentre could be co-ordinated with School Telematics.
- Conduct seminars using all four centres alternately each year (need face to face contact).
- The LCDC's could act as a central point for an action network using catchment groups to spread information, and to involve everyone in farm planning.
- Need to do a tourist opinion survey.
- Need to have a tourist plan for the future.
- East and west zones should have a centre each on the main highway that promotes the FBR.
- Need to cater for a diversity of tourists e.g. Nature-based with individual type tours being preferable.
- Well presented good quality information needs to be provided to tourists using local expertise.
- Tourist centres need to be 'networked' with co-operation between all zones.
- Tourist centre staff need to be professional and well informed.

- The tourist groups in the area should consider promoting the region through a professional marketing group.
- For coastal and Ravensthorpe Range management, shire vesting is needed and also local control and co-operation between shires and the local people.
- More CALM rangers and extension people are needed to provide education.
- Liaison between all government departments is needed to carry out the above.

POSSIBLE FUNDING SOURCES FOR THE ABOVE SUGGESTED ACTIONS

- A reactivated Fitzgerald Biosphere Project group could co-ordinate the above, but all projects would need to be handled differently.
- All projects need paid co-ordinators either as part of their regular job e.g. LCDC or need a special grant.
- Initiate a Corporate Landlord Project and use as a funding source
- A funding facilitator may be the most cost-effective way of using scarce funds
- Funds from tourism may eventually fund projects such as information boards and dieback research.
- External grants
- Conduct farms tours
- Offer nature-based tourism on a commercial basis.
- Set up an Alternative Technology Centre i.e. wind power, solar power, mud bricks, solar cooking, recycling or wood lots.
- Produce a small well-circulated newspaper with the Biosphere Reserve Logo heading.
- Use recycling as a source of fund raising.
- User pays with money collected to go back into the FRNP and local facilities.
- Need a local co-ordinator for the above.
- A Biosphere network/committee could use its expertise to seek state and federal funds

SUMMARY

The main suggested actions for the Fitzgerald Biosphere Reserve can be categorised as follows:

- More education, information and promotion of the Biosphere Reserve concept including quality of life, sense of place, custodianship/stewardship/ownership is needed for local inhabitants and this could be achieved through the following:

logo	road signs
brochures	posters
car stickers	advertising
seminars	workshops
educational courses	tours
meetings	networking
newspaper articles	opinion surveys

  local reporting of project results
  community and school involvement in projects
  community involvement in management

- Trust needs to be established between individuals, community groups and government employees.

- A network of interested individuals, community groups, and government employees needs to be set up and could be facilitated through a Telecentre.

- An action plan for the FBR needs to be developed.

- A FBR Co-ordinator is needed

- "Twinning" with other Biosphere Reserves should be carried out.

GERALDTON NETWORKS CONFERENCE SUMMARY

The following points were collated as a result of the "Nature Conservation - The Role of Networks" conference held in Geraldton May 16-20 1994. The points have been adapted to the Fitzgerald Biosphere Reserve and many are similar to the outcomes of the Fitzgerald Biosphere Workshop held on May 12 1994.

The order of presentation in no way implies any priority.

Community Projects and Research

- Conduct research to find out what is happening "beneath the scenery" in the FBR. What is happening in our hydrologic environment?
- Produce maps of the FBR e.g. vegetation, zones etc.
- Encourage those interested in nature conservation to become more involved in developing productive agricultural systems.
- Establish priorities for research effort i.e. water quality.
- Identify interrelationships between ecology, economy and society in the FBR e.g. chart or diagram using maps of the FBR as a baseline.
- Conduct a social research survey to determine the views and values of the community.
- Identify important remnant vegetation patches and optimal revegetation sites in the FBR, plan actions and actively encourage fencing and revegetation (include location, habitat, vulnerability and conservation value of remnant).
- Observe and research the functions of corridors and encourage enhancement of them to increase these functions.
- Use the FRNP as a benchmark for fauna species that are threatened or are decreasing elsewhere (e.g. birds that are dependent on native vegetation for their survival).
- Group birds into categories according to their habitat requirements and use these groups to highlight where research priorities lie and therefore where responsibilities lie.
- Calculate how much of each plant community/fauna habitat is represented on private land or how much "nature conservation" habitat is represented on private land.
- Investigate the possibility of setting up a voluntary scheme using Victoria's "Land for Wildlife" scheme as a model.

- Carry out an environmental "stock take" of the FBR and compare it to other agricultural areas in the south-west.

- Encourage the establishment of a FBR Resource Centre.

- Investigate the Ecomuseum concept further.

- Find ways to link conservation and landcare to employment opportunities.

- Conduct a research project on the Ravensthorpe Range Lerista, Lerista viduata.

- Use the model of the "Bushland Self Assessment Kit" to encourage landholders to survey remnant vegetation on their properties.

- Identify all research projects past and present that have been carried out in the FBR and establish a central register.

Community Education

- Inform the local community as to -What if there.
  Why it is there.
  How to keep it there.

- Formulate actions needed to promote "quality of life" in the FBR.

- Promote the wilderness/wildness value of the FRNP.

- Highlight the ecological dynamics of the FBR and societies dependence on a healthy ecosystem.

- Investigate the possibility of a FBR resident's trip to Bookmark Biosphere Reserve in South Australia.

- Provide ongoing dieback education in the FBR.

- Organise self-funding tours and walks through the FBR on a regular basis for local residents on a regular basis.

Communication and Networking

- Identify who will make up the FBR Network. How will it function? Identify the aims e.g. provide information/advice.

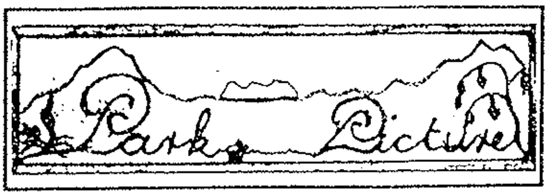
- Find a name for our "Club Bio" and logo.

- Produce a regular newsletter and/or regular Biosphere Reserve articles in the local press.

- Start raising awareness for a possible marine component for the FBR.

- Identify common problems between community/agency/individuals and look for solutions.

- Investigate ways to establish trust between community/agency/individuals (personalities/credibility, fairness of advisory/planning process).



Biosphere ecologist

Angela Sanders has been employed for an 18 month period to work on the Fitzgerald Biosphere Reserve Project in CALM's South Coast Region.

The funding for this project was obtained by the Region from the ANPWS States Co-operative Assistance programme.

Angela commenced work in mid-February and will be working in the b. 'er/transition zone aro. nd the Fitzgerald River National Park in the shires of Jerramungup and Ravensthorpe.

During the project, biological surveys will be conducted in identified priority areas in the buffer zone including threatened areas, corridors, sites previously surveyed and large blocks of remnant vegetation either in reserves or on private land (with owner's permission).

The biological survey component will concentrate on vertebrate fauna, mainly rare fauna and small mammals. Angela will be visiting as many areas as possible in the first 3 months of the project with the view to choosing sites to conduct intensive surveys during spring 1993 and autumn 1994.

Gaining the co-operation of local landowners and community groups will be an integral part of the project. Angela will be promoting the Biosphere Reserve concept as much as possible and will be attending the LCDC field days, liaising with relevant community groups and presenting talks over the duration of the project.—John Watson

LEFT to right: Angela Saunders (ecologist), Helen Taylor (former president FANP), Elsie Penglase (former committee member FRNP), Merle Bennett (vice-president FRNP). Photo John Watson.

Roads in the Park

All 4WD tracks are closed until they dry out from tl. recent heavy rain. Gravel roads are open but care is needed in parts of Hamersley Drive which have been eroded. The Point Ann Road is closed due to road works.—RC

How the chuditch got its spots

by Trevor Walley

THIS is a story from the Dreamtime when animals were half human (super-human), and the chuditch was married to the emu.

One day the chuditch went away hunting, as men often do, and the emu stayed at the camp gathering berries, as women often do.

While the chuditch was away, along came the possum, who fancied the emu, and tried to entice her away, which he failed to do—so before he left, he marked her beak with ochre.

When the chuditch returned he noticed the ochre mark and, in a fit of rage, built a fire and threw the emu in it.

The fire burnt her wings so badly that she was unable to fly and to this day emus cannot fly.

Meanwhile, the chuditch left the camp to track down the possum. Eventually he came upon the possum's camp, but before he could spear him the chuditch was ambushed and speared in the sides.

If you look at a chuditch or its picture, you can see the spear marks.

You will also find that the possum now lives high up in tree hollows and comes out only at night to avoid any chuditch bent on revenge.—Thanks to CALM NEWS for this article.

FITZGERALD RIVER NATIONAL PARK ASSOCIATION

NEW PRESIDENT

Due to the appalling weather conditions, apologies poured in (oops!) for the AGM of the Fitzgerald River National Park Assn. So much so, that there was some doubt as to whether there would even be a quorum.

Members coming down from Perth the previous day, rang to say they were marooned, so it was a pleasant surprise that almost twice the expected number attended.

Since the Field Study Centre at Twertup was inaccessible, the meeting was held in the shearers quarters at 'Marwonga' at Jacup.

Paula Davis of Needilup was elected President for 1993, Merle Bennett of Ravensthorpe Vice-President, Amelia Moir of Borden secretary, Kaye Vaux of Ongerup treasurer.

Committee members are Kim Bennett from Hopetoun and Nadine Brown from Bremer Bay. Helen Taylor will continue to produce the newsletter and also co-ordinate Field Study Courses.

The Maintenance Committee for Twertup is headed by Ranger-in-Charge, Nathan McQuoid from Jacup. Other members are Tom Hounsham and Bill Moir from Borden and Ron Taylor from Hopetoun.

Nathan gave a most interesting and comprehensive report on the activities of the Rangers last year. He listed road and construction work done, including repeated repair of flood damage and the building of a whale-watching platform at Pt Ann. The Army Reserve is to build wheelchair access to this platform in the near future.

Nathan also listed rare plants and animals studied last year. Some flowers that we thought rare have come up prolifically following the fire eg a wattle, Acacia simula.

Sightings of uncommon animals have been made including the Quenda (Southern brown bandicoot), tammar wallabies, and the Chuditch (native cat) at Hopetoun.

Some discussion took place on threats to the Park—mining, the spread of introduced weeds, and degradation of river banks.

The next activity of the Park Assn is a search for the rare Barrens Wedding Bush on East Mt Barren on the weekend of 3-4 April.

On 8 and 9 May, Grant Wardell-Johnson from Walpole will take us frog hunting. Accommodation will be at Twertup, and cost will be $5 per adult, $2 per child.

If you would like to be involved in either of these, contact Helen Taylor, Box 46 Hopetoun 6348. Phone (098) 383183.

Coastcast Gazette

March 1993

Biosphere Ecologist ...

Angela Sanders has been employed for an 18 month period to work on the Fitzgerald Biosphere Reserve Project in CALM's South Coast Region. The funding for this project was obtained by the Region from the ANPWS States Cooperative Assistance Programme. Angela commenced work in mid-February and will be working in the buffer/transition zone around the Fitzgerald River National Park in the shires of Jerramungup and Ravensthorpe.

During the project biological surveys will be conducted in identified priority areas in the buffer zone including threatened areas, corridors, sites previously surveyed and large blocks of remnant vegetation either in reserves or on private land.

The biological survey component will concentrate on vertebrate fauna, mainly rare fauna and small mammals. Angela will be visiting as many areas as possible in the first 3 months of the project with the view to choosing sites to conduct intensive surveys during spring 1993 and autumn 1994.

Gaining the cooperation of local landowners and community groups will be an integral part of the project. Angela will be promoting the Biosphere Reserve concept as much as possible and will be attending the LCDC field days, liaising with relevant community groups and presenting talks over the duration of the project.

South Coast Regional Manager, John Watson, said he believed the project would increase community awareness of the Fitzgerald Biosphere Reserve and would provide valuable guidelines for cooperative management of the buffer/transition zone around Fitzgerald River National Park.

Biosphere fauna study

by John Watson

KNOWLEDGE of vertebrate fauna in the area surrounding Fitzgerald River National Park is likely to increase as a result of a project which started recently.

Biologist Angela Sanders has been employed for an 18-month period to work on the Fitzgerald Biosphere Reserve Project in CALM's South Coast Region.

In 1978, at the time of the biosphere's declaration, the park was used to form the core zone of the biosphere. (The park has since been increased by more than a third.)

Angela is working out buffer and transition zones. The former comprises unvested reserves and vacant Crown land adjacent to the park while the latter extends beyond this and includes land cleared for agriculture and towns, but with some substantial areas of remnant vegetation.

During the project the biological survey component will concentrate mainly on rare fauna and small mammals.

It will be conducted in priority areas in the buffer and transition zones, including threatened areas, corridors, sites previously surveyed and large blocks of remnant vegetation either in reserves or on private land.

Previous surveys have tended to concentrate on the core zone and this work will add to that knowledge by providing a comparison with relatively undisturbed areas.

Angela will visit as many areas as possible in the first three months to choose sites for intensive surveys during spring 1993 and autumn 1994.

Gaining the cooperation of local landowners and community groups will be an integral part of the project. Angela will be promoting the biosphere reserve concept wherever possible.

This will involve attending Land Conservation District Committee field days, as well as giving talks and liaising with community groups.

The project will also provide valuable guidelines for cooperative management of the buffer and transition zones around Fitzgerald River National Park.

Funding for the project was obtained by the Region from the Australian National Parks and Wildlife Service's States' Cooperative Assistance Pro-

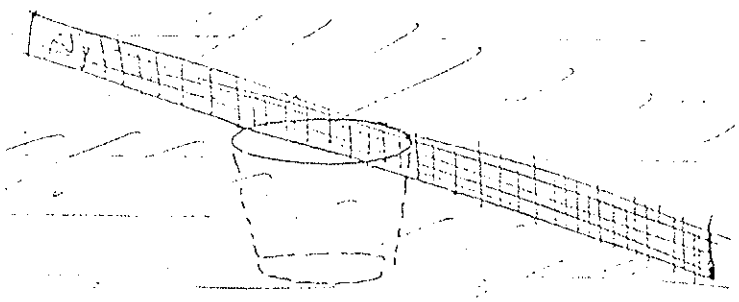
JERRAMUNGUP COMMUNITY NEWS

DECEMBER 6TH '93 #33 20 CENTS

SURPRISING RESULTS IN BUSH SURVEY

As part of a survey of the fauna in buffer zones around the Fitzgerald National Park, CALM researcher Angela Sanders implemented a trapping program in some remnant vegetation on our property, 10 km south of Jerramungup. The results are somewhat of a revelation .

About six weeks prior to the actual capturing & recording of species we had to dig sixty 400m deep holes for bucket size pit traps on two, one kilometre transects. Then two weeks ago, small fences were erected radiating out from the pits. The small animals run along the fences & fall into pails placed in the pits.



Also, Elliot traps (shoebox size containers) & cage traps were set in the afternoons. Each morning all traps are cleared & the various animal species & sex details are recorded then released. this activity went on for a period of one week.

The results from this trapping plus other observations revealed the presence of seven species of native mammal - Pygmy Possum, Honey Possum, Fat-tailed Dunnart, Bush Rat, Echidna, Common Sheath -tail Bat, Western Grey Kangaroo Also seven species of frog & fifteen species of reptile were noted Sixty fire species of bird including two gazetted rare species, the Western Whipbird & the White-tailed Black Cockatoo have been recorded.

The presence of the small mammals is significant as normally they disappear once isolated in a sea of crops or pasture. The size & diversity of the bush in this remnant along with the fact that it is linked to other similar areas by vegetated creeklines helps account for this. The high diversity of birdlife is also supported by the network. The results of this study do not indicate all the species present as others have been observed at different times.

It would be nice to have a more exhaustive study completed on the state of the natural environment surrounding Jerramungup For example: what species still live in the fresh water pools in the main creek on our property? I know of long necked tortoises, yabbies, leaches, minnows & various frogs. This draws the questions - What effects may increasing salinity, nutrient run-off & the leaching or other discharge of materials from the townsite & Jerramungup rubbish tip have on these & other freshwater species currently still in existence? More research is required in order to be able to make decisions from a solid base of knowledge.

In conclusion, I'd like to say how impressed Angela was with the community interest in her work. Forty eight visitor observed & helped with he trapping including a group of High School students. Thankyou to everyone involved, especially the diggers of pit trap holes. Angela will be back in autumn next year from another week of trapping, observing & recording.
ANDREAS POWELL

GOING ON HOLIDAYS?

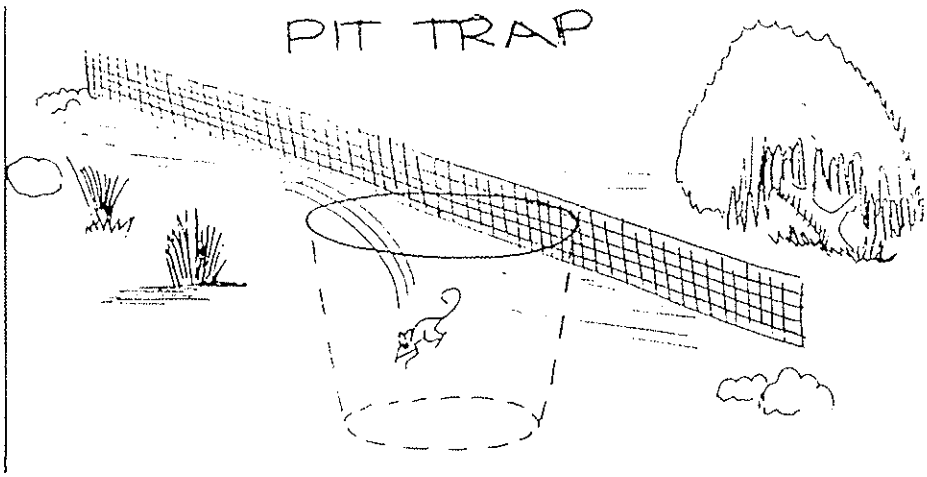
Reliable Farm Sitter Available for Xmas Break Contact Jarrod Daniel via Carol Daniel

Tel: A/H 353025

HEPATITIS B VACCINATION PROGRAMME

This is a reminder to all sporting bodies involved in the HEPATITIS B vaccination programme, the third vaccine of the three dose regime is due shortly.

Times allocated for final vaccine;
Thurs Dec 2nd: 6pm-8pm
Thurs Dec 9th: 6pm-8pm
or during normal surgery hours.
Enq: 351050



WOULD YOU LIKE TO FIND OUT MORE ABOUT THE WILDLIFE LIVING IN YOUR DISTRICT?

Angela Sanders (CALM) has recently been trapping animals in the Ravensthorpe and Jerramungup Shires and will be presenting a 1 hour talk and slide show on the animals she has been catching

FRIDAY 18TH FEBRUARY
HOPETOUN HALL
7.30PM

AND

SATURDAY 26TH FEBRUARY
RAVENSTHORPE COMMUNITY CENTRE
RED ROOM
7.30PM

Stay for coffee and question and answer time afterwards

ALL WELCOME

Enquiries (098) 381166

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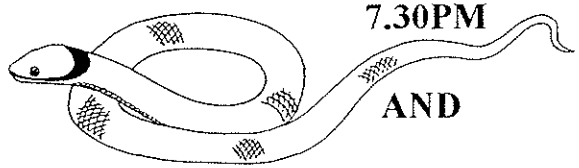
FRIDAY 4TH MARCH
JERRAMUNGUP CWA HALL
7.30PM



AND

SATURDAY 11TH MARCH
FITZGERALD HALL
7.30PM

Stay for coffee and question and answer time afterwards

ALL WELCOME

Enquiries (098) 381166

Ravensthorpe District High School

Biosphere Project

A casual talk with Angela Sanders (Fitzgerald Biosphere researcher) early last year has led to this school being one of two pilot schools in the district to establish a Biosphere Project.

Angela invited the year seven students and me to check traps in two areas she was working in. The students were extremely enthusiastic before the visits and after were completely sold on the idea.

A couple of overnight trips to Twertup and the matter was settled. Students were now consciously aware of their part in conserving their environment.

This year the scheme within our school has grown to include this year's Year Sevens and the teacher of the now year eights, Vicki Mews.

Before we could set traps we had to apply for Flora and Fauna Licences which have since been granted. Students and teachers have visited the site with Angela and Greg to dig holes for the pitfall traps. Armed with spades, mattocks and crow bars we were able to dig ten holes in the space of three school periods, with a lot of effort. Anyone who has dug holes in this area will empathise with us.

Two mornings later off we all trooped to open the pit traps, 20 Eliot traps and two cage traps in the same area. A couple of brave volunteers mixed the bait, a concoction of oats, sardines and peanut putter! By this time students and teachers had gained a real ownership of this project and every one of us had realised how lucky we were to be involved and how much of a commitment we had made.

The following morning, our very first time of checking our very own traps, the size of the group had exploded to include Paula Yates and her pre-primary students and by now a very curious Principal, Steve Yates.

The results of our first check included a Gould's snake, a blind snake, a housemouse and a pygmy possum, plus several groups of bull ants. The excitement after each find was almost tangible and I'm certain everyone will remember the experience for a long time to come. The buzz is always there each time we check the traps.

The students have already gained so much, and the gains will continue as the traps are opened and closed over the next few weeks. Parents and community members have already commented that this is such a wonderful way to learn. It not only involves Science, but of course Language, Maths, Health, Art and most other subjects taught in schools.

A trip to Fitzgerald on Thursday saw our students speaking with some knowledge to various adults about the project, and displaying posters they had made with information gathered so far. Students also had the opportunity to listen to a talk about Mallee Fowl.

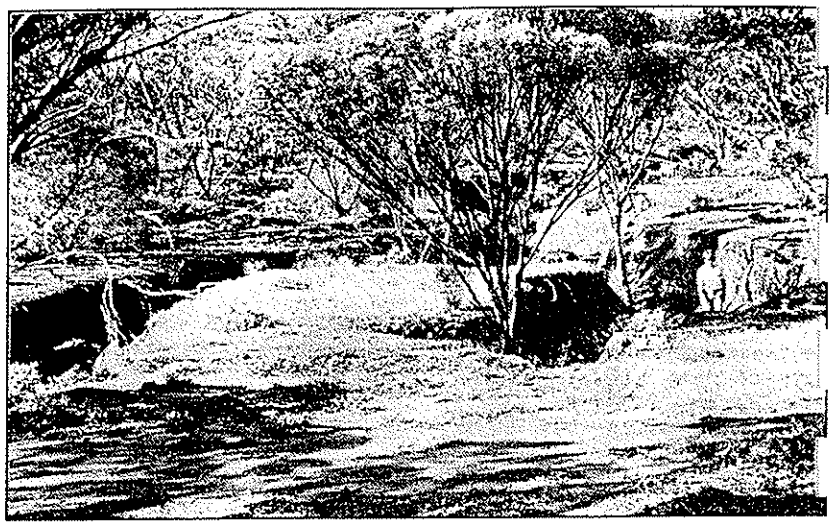
We have been asked to help a school in South Australia to set up a Biosphere Project similar to ours. The most likely way of communicating with them is through out telematics equipment with which our students are familiar.

We will continue to keep you informed about this long term project through the Community Spirit, however, if you wish to know more please contact us at the school—**Josephine Hobbs-Brown**

NATIONAL PARK

The biosphere revives

Two recent meetings may have improved the prospects of movement and action on the Fitzgerald River National Park. On 10 May the Advisory Committee for the Park took a hard look at its role and effectiveness and on 12 May a workshop at Fitzgerald decided that the Park Biosphere concept should be revived and strengthened.



EROSION in the Ravensthorpe Range.

The idea of a zone around a national park in which conservation is watched and managed in collaboration with farming, and particular care is taken with community liaison, is not new. It was first defined and given the title 'biosphere reserve' in 1974 by UNESCO. There are now about 300 across the world, including 12 in Australia and two in WA.

UNESCO gazetted the Fitzgerald River National Park as an international biosphere reserve in 1978. In 1986, a group of conservationists met in Bremer Bay to form the Fitzgerald Biosphere Project, intending to mobilise farmers and others in the area and interested people outside. Together with the National Park Association, it lobbied the National Park Advisory Committee in a long series of meetings to agree the 1991-2001 Management Plan which is now current. Biological studies were undertaken and books written.

But then the project fell into abeyance for a while until February 1993, when a national grant for biosphere research enabled the appointment of Angela Sanders. In addition to her research concentrating on vertebrate fauna in the zones surrounding the Park, she has co-operated fruitfully with the two Land Care committees in Ravensthorpe and Jerramungup and generated much enthusiasm in local schools.

BIOSPHERE WORKSHOP

Another outcome of this renewed interest in the biosphere reserve was the conference in Fitzgerald over three days from 11-13 May, organised by Angela Sanders and the CALM Albany office. The first and last day were spent touring the eastern and western parts of the Park and biosphere reserve. The middle day was the main workshop in Fitzgerald, which was fully booked. The hall was packed with visitors from South Australia including a researcher from the USA, as well as councillors, farmers and other local people from all around the Park.

The meeting was first told of the three zones recommended by UNESCO to make up any biosphere reserve: The Core Zone, Buffer Zone and Zone of Cooperation. The Core is the protected area for plants and animals 'largely undisturbed' by people. The Buffer is where land management is designed to protect the Core. The Cooperation Zone is where people and agencies are supposed to work together to protect the environment. The zones do not appear to imply any particular land ownership or management body but rather a set of agreed management principles in each of them.

In most biosphere reserves, the two outer zones make complete concentric rings surrounding the Core, but the Fitzgerald already has farmland bordering it. So CALM has specified the Buffer zone as the crown land and reserves which border the Park (including the bush corridors to the north and east and the Ravensthorpe Range) and the Cooperation Zone as the interspersed farmland and communities as far east as the rabbit-proof fence and as far north as the river watershed (see map on this page). It was not stated whether these zones have any legal or other formal status.

After these definitions, the meeting then had several quick-fire contributions about the history of the biosphere group and other community involvement and then a session to hear about the land care work of th two district committee (LCDC) and farming conservation in general. There was little time for question

Then came equally brie talks on mallee fowl preservation, tourism (RHAPS) and the Bremer Bay coast plan. The final session wa for group discussions on th general problem of the relationship between the bio sphere reserve and the com munity.

The main outcome was a list of ways to involve the community in research an useful projects. It was sai that community groups and schools should be organised but it would take com petent training and supervi sion, which would nee funding. A restored biosphere group might help i fund-raising.

Your reporter felt tha the meeting was fruitful but did not give enough time for real discussion of th problems of conservation dieback, tourism, management input by the community or similar problems Maybe such meetings onl attract the converted and so enable cosy discussion without fear of contradic tion.—RC

NETWORKING AND THE FITZGERALD BIOSPHERE RESERVE

We all know how effective networking can be and this was the topic of a recent conservation seminar held at Geraldton. The conference attracted about 200 delegates from 17 countries including New Zealand, Uganda, Saudi Arabia and Pakistan.

Four representatives from the Fitzgerald Biosphere Reserve went along and presented a joint talk on "Networks and the Fitzgerald Biosphere Reserve". The group presentation was unique and John Watson (CALM) set the scene with a backdrop of wonderful slides and gave a brief overview of the Biosphere Reserve, Nathan McQuoid (Ranger in Charge) then explained some of the outstanding features of the National Park, Angela Sanders (Biosphere Ecologist) outlined what her survey work in the buffer zone had revealed so far and Bill Lillfitz (founder member of the Fitzgerald Biosphere Project group) detailed how community networking had enhanced landcare and conservation activities in the zone of co-operation around the Park. Several people commented that the group presentation was a good illustration of the co-operation between various groups involved in the Biosphere Project.

The main message that came out of the conference was the recognition that networking between people is a very powerful tool and we need to do more of it between local communities, government departments and individuals if we are to address the environmental challenges that confront us all at present.

A network of interested people and community group representatives will be set up in the Fitzgerald Biosphere Reserve soon and the details are being worked out at present. If you would like to know more please contact Angela Sanders, Biosphere Ecologist - Ravensthorpe, phone/fax 381166.

FITZGERALD BIOSPHERE WORKSHOP

During May a workshop and two field tours were held in the Fitzgerald Biosphere Reserve. A total of sixty people were involved and we were fortunate to have five visitors from the Bookmark Biosphere Reserve in South Australia attend all three days.

The first and last day was spent in a bus and vehicle convoy touring the Fitzgerald River National Park, eastern and western ends, and farms in the Zone of Co-operation around the Park. The rangers, Nathan McQuoid and Lindsay Brown, gave excellent commentaries during the tour covering topics such as rare plants, fauna, geology and dieback disease and its control. The second day was spent at Fitzgerald Hall where local speakers presented an overview and history of the Fitzgerald Biosphere Reserve, local involvement in the National Park and landcare and conservation activities and the pilot School Biological Survey Programme.

During the afternoon group discussions were held and the following questions were addressed: Does the general community support the Fitzgerald Biosphere Reserve? How can we improve community support over the next three to five years? What actions or strategies are needed for the buffer/corridor zone and zone of co-operation over the next three to five years?

Angela Sanders is currently preparing a summary of the outcomes of the workshop which will be distributed locally for comment. If you or your community group were not involved in the workshop but would like a copy of the summary please contact Angela on phone/fax 381166.

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PCAP Year Seven Leadership Camp

At the beginning of Second Term, fifty-four Year Seven students from the eight schools in the Roe Cell met at Bremer Bay Youth Camp for two days of activities aimed at developing leadership skills, through abseiling, trekking, games and discussions. Nine students accompanied by a teacher from here attended and all completed the nursery abseiling feature. I'm inclined to think that the word nursery does not quite describe the feature, which seemed an awfully long drop to the sea/beach.

The nine kilometre trek, through the Wellstead property included learning radio procedures and taking turns to lead the rest of the group safely in the right direction and crawling on all fours through some rough terrain.

All students from this school acquitted themselves well and will be given every opportunity to continue to develop the skills they have gained.

(PCAP—Priority Country Areas Programme). This programme is financed through Commonwealth Funds. To receive funds each PCAP district presents projects that are deemed to be worthy of financial consideration and which meet specific criteria. Projects may be written by school staff and/or community members. If you have a project idea from which you believe our students will gain educational benefits, please contact the school.

Lightning Carnival

Monday 27 June is the day! This event incorporates both football and netball. This year we are again hoping to involve the Claremont players, who are regular visitors to this event. This year has also seen a push for a West Coast Eagles player to attend, and to increase the status of netball in the district by inviting a netball player from the WA Netball State side. I would hope that many of our football and netball players will contact either myself or Carolyn Richardson to offer their services as umpires or coaches. An event of this kind only works with many volunteers, so please ring now.

Esperance Senior High School Band

This band will be visiting the school on Tuesday 28 June, (the day after the carnival). But the whole town is in for a treat because they will be giving a public performance on Monday night the 27th at the Town Hall. Contact the school and watch future editions of this paper for more information.—**JHH**

SORRY for the wrong caption to your Anzac School Service photo in the last issue but here is a photo of the school at that service.

A LOT IS HAPPENING

An information-crammed couple of hours at the Ravensthorpe Hopetoun Area Promotions annual general meeting in the Red Room, Ravensthorpe Community Centre gave people a quick insight into many present and future happenings in the area.

The format of the awareness meeting was eight short and very intensive talks by local speakers on various topics relevant to tourism.

Mineral and rock hunting in the Ravensthorpe range

Dennis Walker, who has been involved in mining in the area for 30 years spoke on mineral and rock hunting in the Ravensthorpe Range.

He outlined the history of gold from the days of panning with kitchen trays and transport by wheelbarrow in the late last century to the present day.

He highlighted the rare coppers found locally and the garnet spots, then speculated on the potential of liaison with the larger leaseholders for tourism fossicking.

Emu enterprise for tourism

Rob Stone, who has had a long time interest in tourism, explained his enterprise at a pretty spot on the Jerdacuttup River where he has built a new home. In about 12 months he will open an emu farm live display showing the life of the bird from egg to adult.

As well as emus he and family will have other animals such as Scottish belted galloway cattle.

Emu products will be on sale.

Farmstay

Barbara Cronin and her family found themselves initiated into farmstay because the Telecom men used their old house when they laid the fibre optic cable in 1991.

With help from the Farmstay Association and WA Tourism Commission and lots of renovating they were soon in business. They have found it extremely rewarding as the people who come to stay genuinely like the peaceful country life and come to get away from it all.

Most visitors are from Europe and they do like to sit and talk. Harold and Barbara are so involved they keep in touch with all their visitors.

Marketing is done by word of mouth plus advertising.

LEAPS

Mary Smith of Jerdacuttup who is chairperson of the LEAPS Committee gave a good overall coverage of what LEAPS is all about and the projects which are being undertaken.

The programme for 18 youths from 15 to 20 years of age, is designed to improve their job possibilities, aiming to build up self esteem and to learn skills in such things as photography, computing and building.

Twenty five per cent of the 26 week programme is allocated to training in such things as St Johns First Aid, English and Maths. The six projects to be undertaken are at West Beach, Hopetoun, Starvation Bay, Elverdton Copper Mine, Rangeview Park and the museum. (Full details in previous issues of this paper.) Local youths have been given first options and the remainder will be made up from Esperance.

The biosphere and tourism

Angela Sanders has been in the area for just over a year recording fauna in the Fitzgerald River National Park Biosphere. During this time she has involved many adult and school children groups in trapping.

Now the Fitzgerald and Ravensthorpe schools have their own programmes going, which she supervises. Angela is happy to take more groups of locals and visitors with her on trapping expeditions.

Angela explained the FRNP Biosphere has a model role and that it receives little promotion through lack of funds, not lack of interest.

She would like to see a Ravensthorpe based programme for chuditch breeding in captivity instead of it being done in Perth. The Zoo is willing to co-operate. It could make a good tourist attraction. She also suggested a nature-based museum would be ideal as the area lends itself so well to environment and social history.

Hopetoun Progress

John Ryall, new president of the Hopetoun Progress reported the Culham Inlet temporary causeway had been repaired, that Progress is mindful of the town as a tourist attraction and that it needs tourism to keep it going. A town planning group is being set up and tenders have been called for painting and repairing the town hall.

RHAPS committee

The RHAPS committee elected at the meeting are President, Ralph Cooper, Vice President Leah Way, Secretary Ann Williams Treasurer Julie Bell, and Christine Rowe Peter Stone and Barbara Cronin with Shire Council representatives Kerry Dickinson and Moonika McHayle.—AW

CALM NEWS AUG-SEPT 1994

South Coast Region networks the networkers

Geraldton Networks Conference - Fitzgerald Bioshere Reserve Presenters: Angela Sanders, John Watson, Nathan McQuoid, Bill Lullfitz. Photo by Sue Patrick

Bookmark Biosphere Reserve Visitors from South Australia: Pamela Parker, Bruce Lambie, Stephanie Williams, Cythia Thiele, Mike Harper. Photo by John Watson

by Verna Costello

A DIRECT result of networking - at a conference on networking - is that two research projects, one on ants and the other on bees, are being proposed for Fitzgerald River National Park (FRNP).

The aim of the Geraldton Networking Conference was to explore the role of networks at the local, regional, national and international level.

Making a major presentation at the Conference was a contingent from the South Coast Region, comprising regional manager John Watson, biosphere ecologist Angela Sanders, founder member of the Fitzgerald Biosphere Project, Bill Lullfitz, and FRNP ranger-in-charge Nathan McQuoid.

They spoke on the role of the Fitzgerald River National Park Biosphere Reserve in biological and community networks.

Several conference participants commented that making the presentations as a group was a fine example of the high level of co-operation between the various parties involved in the Fitzgerald Biosphere Reserve Project.

A group of five South Australian visitors, who had attended the workshop and field tours held at FRNP, reported below, also attended the Geraldton Networks Conference.

They were from the Bookmark Biosphere Reserve, an area comprising Danggali Conservation Park, the former Calperum Pastoral Station, and other reserves on the Murray River system near Renmark.

The visitors were: Danggali Conservation Park manager Mike Harper, Calperum Pastoral Station manager Bruce Lambie, author of UNESCO/ANCA 1993 review of Australia's Biosphere Reserves Pamela Parker. Travelling with the South Australians were two women from the Chicago Zoological Society in the USA, Stephanie Williams, a researcher into malleefowl, and Cynthia Thiele, a volunteer working at various locations in Bookmark.

Workshop recommends promoting biosphere

Fitzgerald Biosphere Reserve Field Tours above: Sepulcralis Hill, Fitzgerald River National Park. Photo by John Watson

by Verna Costello

ONE of the recommendations resulting from a recent one-day workshop and two field tours was that more community education and promotion about biosphere reserves be undertaken.

The workshop and field tours were held to address a range of issues affecting Fitzgerald River National Park Biosphere Reserve.

Organised by CALM ecologist Angela Sanders, the workshop and field tours were part of her Fitzgerald Biosphere Project, funded by the Australian Nature Conservation Agency (ANCA).

About 60 people were involved, including CALM's South Coast regional manager, John Watson, Albany district manager, Drew Griffiths, part-time interpretation officer Corinn Hine, Fitzgerald River National Park rangers Nathan McQuoid, Lindsay Brown and Mark True, - and several members of CALM's Fitzgerald River National Park Advisory Committee.

Chairman of the WA Soil and Land Conservation Council Rex Edmondson was workshop host, and Shire councillors from Jerramungup and Ravensthorpe Shires also attended.

The field tours were to Fitzgerald River National Park, Ravensthorpe Range, and local farms where sustainable farming practices and other landcare activities such as retaining native bushland along creek lines are being carried out.

A large part of the workshop was devoted to developing recommendations for future management of the vegetated buffer zone and agricultural areas surrounding Fitzgerald River National Park.

The workshop also included presentations on the history of the biosphere reserve, landcare issues, malleefowl preservation activities, examples of Shire support, and a special schools display mounted by Fitzgerald and Jerdacuttup Primary Schools and Ravensthorpe District High School.

ECO-EXPO 1994

The Jerramungup Land Conservation Group win Landcare awards and they know how to spread the word.

On the 10 August they organised an Eco-Expo for 330 school children of this region. It was a great success. The children came from Bremer Bay, Wellstead, Ongerup, Gairdner, Jerramungup, Fitzgerald, Lake King and Ravensthorpe Primary Schools.

The aim of the day was to raise the children's awareness of issues such as ecological and agricultural sustainability, bio-diversity and the networks in nature. The day was held in the Jerramungup Entertainment Centre.

After an impressive Opening Ceremony the children divided into six groups and through the day circulated to each of six presentations which were located around the centre. They were all interesting and all different.

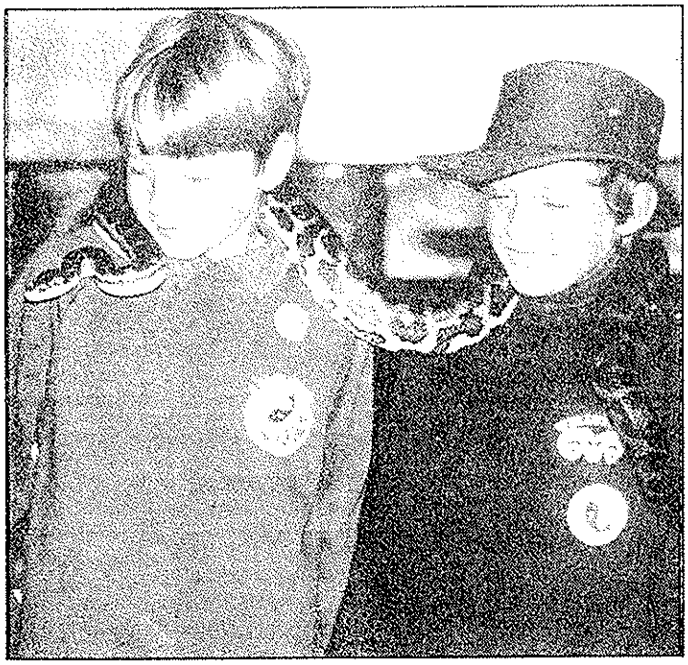
There was Brian Bush, the Snakeman, who convinced us that bob-tail goannas are as cuddly as koalas; Brian Davies of Eagle Heritage, who elucidated the wonders of owls, eagles and their relatives; a man from Sci Tech who enthralled us with a demonstration of how a whale catches a giant squid; a man from the zoo who had the children searching through delicious-looking soil for all shapes of soil animals; there were people from CALM who involved the children in simulating the web of life and showing the effect on this of foxes and die back; and finally the local Land Conservation fraternity, who excelled with their dramatic production about Farmer Fred who decided to change his farming practices before he too was washed or blown away.

The day was appropriately concluded with a simple and delightful performance by the Coco Youth Theatre from Albany.

The Eco-Expo was funded by State Landcare and the Priority Country Areas Programme. The Jerramungup LEAP team were responsible for the organisational detail of the day.

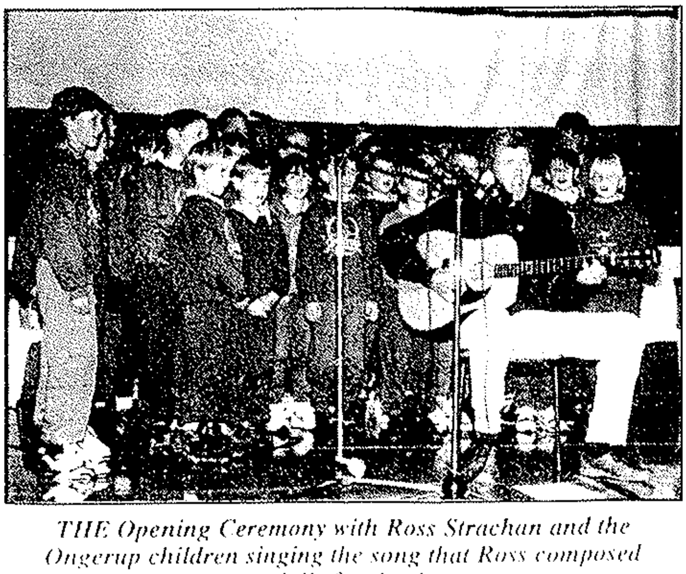
The day was a masterpiece of co-operation and co-ordination. It was an ambitious programme but it achieved all that it aimed to in a thoroughly enjoyable and enlightening way.

—R Jasper



SHANNON Ferrier, Lake King and a Wellstead student with a carpet python in common.

BRIAN Davies, a whistling kite and an interesting question from Leshaye Wisewould, Fitzgerald.



THE Opening Ceremony with Ross Strachan and the Ongerup children singing the song that Ross composed specially for the day.

WHAT eats what? Catriona Tillbrook, Adele Crane, Breanna Tillbrook and Solveigh Bolognini, Ravensthorpe, preparing to make a web of life.

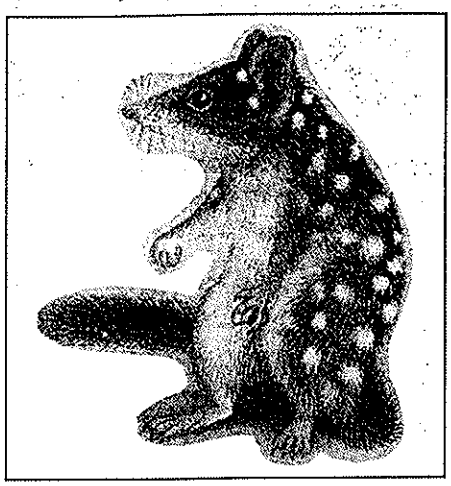
Foxes, Malleefowl and Chuditch

Over the past 200 years Australia has lost more mammal species than the rest of the world put together and it seems certain that the fox is responsible. Dr Jack Kinnear, a research scientist with CALM, explained his fox research project to a group of us at the Ravensthorpe Community Centre earlier this month. Graham Hall, the acting General Curator of the Perth Zoo, gave a talk on the same night on Chuditch and Malleefowl. It was great to see some of the LEAP participants at the talks and many other community members. I am sure everyone who came along now knows much more about these animals than they did before.

Jack Kinnear's research started with the Rock Wallaby which was only found on a few rock outcrops in a few reserves in the Wheatbelt. His research pinpointed the fox as the main cause of their decline as after fox baiting the wallaby numbers increased dramatically. Similar results were found when baiting was done in other Wheatbelt reserves and Woylie, Brush-tailed Possum, Numbat and Chuditch have all increased, dramatically in some cases.

Our native wildlife did not evolve with the fox and most species are "sitting ducks." The mammals most affected are those that weigh between 35g and 4.5kg, which includes our small wallabys, native mice and rats and many of our smaller marsupials. The Fitzgerald River National Park has lost about six species of mammal in the last 200 years and Dr Kinnear has been researching ways to keep fox numbers down in the park to allow the mammals that are left to survive there. If foxes can be controlled we may even be able to reintroduce some of the mammals that have disappeared from the park. This may mean more opportunities for tourists visiting the area to see some of our native animals in the wild.

The Chuditch is still present in the park in the Ravensthorpe/Hopetoun area but in very low numbers. The Perth Zoo is breeding Chuditch to release back into the wild and wants to use animals from this area for breeding. Graham Hall explained why we need to breed Chuditch in captivity and the success of a reintroduction programme he has been involved in with CALM near Perth. Graham also talked about the malleefowl and how fortunate we are to still have them living in our area and was pleased to see the malleefowl recording scheme that we have running at present.



THE Chuditch is present in the Fitzgerald River National Park and Ravensthorpe/Hopetoun area in very low numbers.

If you would like any further information on any of these animals please contact Angela Sanders 381166, or upstairs in the Ravensthorpe Community Centre.

—A Sanders

Biosphere news

Congratulations to all the people who took part in the recent fox baiting programme and it seems like hundreds of foxes have been killed throughout the Ravensthorpe Shire. This may pose ethical questions with some people such as, is it right to subject foxes to a possible slow and painful death that can occur with 1080 poisoning? The alternatives available, at present, are shooting or trapping but these methods are not nearly as effective as poisoning in keeping fox numbers down.

The facts are that foxes kill and maim lambs and sometimes adult sheep and they have played a very major part in the extinction and demise of many of our native animals. Research into humane biological methods of fox and rabbit control is presently underway but still some years off so we need to use 1080 until better methods are available. I hope another successful fox baiting programme will be run next year, but be aware that 1080 baits also kill loved pets and working dogs in the same way as foxes so keep them away from baited areas.

I am just about to start a six week fauna trapping programme taking in Mason Bay, Bandalup Hill, Cocanarup Timber Reserve, Fitzgerald River, south Jerramungup and Corackerup Creek. I had over a hundred people visit me at the sites last year and I hope more will come out this time. If you would like to get a look at some of the cute and not so cute animals that share your area let me know and I can give you a mud map and arrange to meet you. I will be camping out for most of the time between 24th October and mid-December so obviously it may be difficult to contact me so let me know before the 24th October if you are coming out so you won't miss out.

The chuditch trapping in the Ravensthorpe Range is going well but no Chuditch as yet, but I'll keep trying. A fox disturbed 15 out of 30 traps last week for 2 days running so I had to move them. Up to now I have caught 3 Brush-tailed Possums, one with a baby in her pouch, a few Bush Rats and Bobtails, a Bluetonge Skink, a House Mouse and a Raven (who was not impressed at being locked in a cage all night). One of the exciting things about trapping is you never know what you're going to find and there are always surprises. Hope to see you around the traps. Phone/fax 381166 a/h 381123.

—Angela Sanders

PARK Ranger Mark True weighing a Bush Rat at one of Angela's sites recently.

AROUND THE TRAPS

A big thank you to all the people who have made this years trapping sessions enjoyable. At the Corackerup, Powell's and Fitzgerald sites, I have had many more people visiting[210] than animals in the traps! Although the animal numbers have been lower than this time last year- especially frogs, I have found some species that weren't caught last year. The traps at Fitzgerald Corridor turned up a rare Western Mouse and as the Jerramungup LE.A.P.er's and Angela and Stephen Carmen will testify, I got very excited.

I have just finished trapping in Cocanup Timber Reserve and was pleased to catch four brush tailed possums. Thanks to the Ravensthorpe LE.A.Per's, we closed the traps there, in record time and were finished by lunch.

Not so good were the feral goats sighted in the Reserve, which I hope took the baits set by Julianne Hill. I still have one site to go at Mason Bay which is 30 km East of Hopetoun from 7th - 12 th December. Come on out there to the camping area there before 7 am. if you would like to join us to check the traps.

A meeting of the original Fitzgerald Biosphere Project Group and other interested people was held recently and the participants thought it was about time to re-visitilize the old group. With so much attention locally, nationally and internationally being given to the Biosphere Reserve, we saw a need to keep up the enthusiasm and interest. There will be a further meeting on Wednesday February 3rd, to crank up the group, elect Office - bearers and seek input from all corners of the Biosphere Reserve. Funding is being sought to employ a local Biosphere Co-ordinator and a junior club will be started next year to cater for all our enthusiastic youngsters interested in nature. I deas on running a Biosphere Headquarters and Information Centre will also be sought.

Everyone is most welcome to become involved in the group and overcome the problems of distance. Meetings are to be kept to a minimum and facilitated through phone calls, Telecom conferences and Fax machines.

Another exciting project happening next year , is the expansion of the School Biological Survey program to include Jerdacuttup, Jerramungup, Ongerup, Gairdner and Bremer Bay schools. Grants have been approved by P.C.A.P. and U.N.E.S.C.O. to buy fauna trapping equipment for each school. I will be running workshops for teachers and interested community volunteer next February. If you are interested in participating in this unique project by volunteering to help during trapping sessions, please contact your school Principal or me .

We were fortunate to have Ian Anderson, from the Australian Commission for U.N.E.S.C.O.and hand me their cheque personally.

See you around the traps and have a safe and happy Christmas and New Year.

Angela Sanders

BIOSPHERE WORKSHOP IN WA

'Bushlines' No4.

The Fitzgerald River National Park on WA's southern coast is one of twelve areas in Australia designated as Biosphere Reserves under the UNESCO Man and the Biosphere Program. The National Park forms the core conservation area and there is increasing community recognition of a buffer zone and a zone of cooperation surrounding the Park.

Biological surveys of remnant vegetation in the buffer and cooperation zones are being conducted. In May this year 45 people, including five from the Bookmark Biosphere Reserve in SA, attended a workshop. Topics included landcare in the local shires, sustainable agriculture and community projects, including a School Biological Survey Program in local schools.

Group discussions focused on how to improve community support for the Biosphere Reserve concept and what strategies or actions are needed in the buffer and cooperation zones over the next 3-5 years.

Contact: Angela Sanders (09) 838 1166.

Around the biosphere

A big thank you to all the people who have made this year's trapping sessions enjoyable once again. At the Corackerup, Powell's and Fitzgerald sites I had many more people visiting (210) than animals in the traps. Although the animal numbers have been lower than this time last year, especially frogs, I have found some species that weren't caught last year. The traps at Fitzgerald Corridor turned up a rare Western Mouse and, as the Jerramungup Leapers and Angela and Stephen Carman will testify, I got very excited about that.

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Funding is being sought to employ a local Biosphere Co-ordinator and a junior club will be started next year to cater for all our enthusiastic youngsters interested in nature. Ideas on running a Biosphere Headquarters and Information Centre will also be sought. **Everyone is most welcome to become involved in the new group and to overcome the problems of distance, meetings will be kept to a minimum and facilitated through phone calls, Telecom conference lines and fax machines.**

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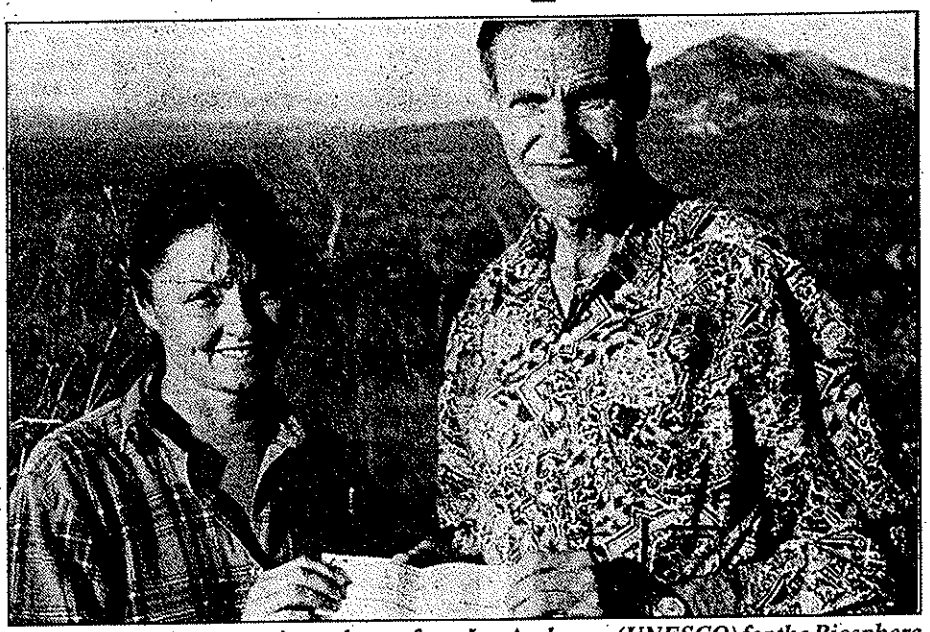
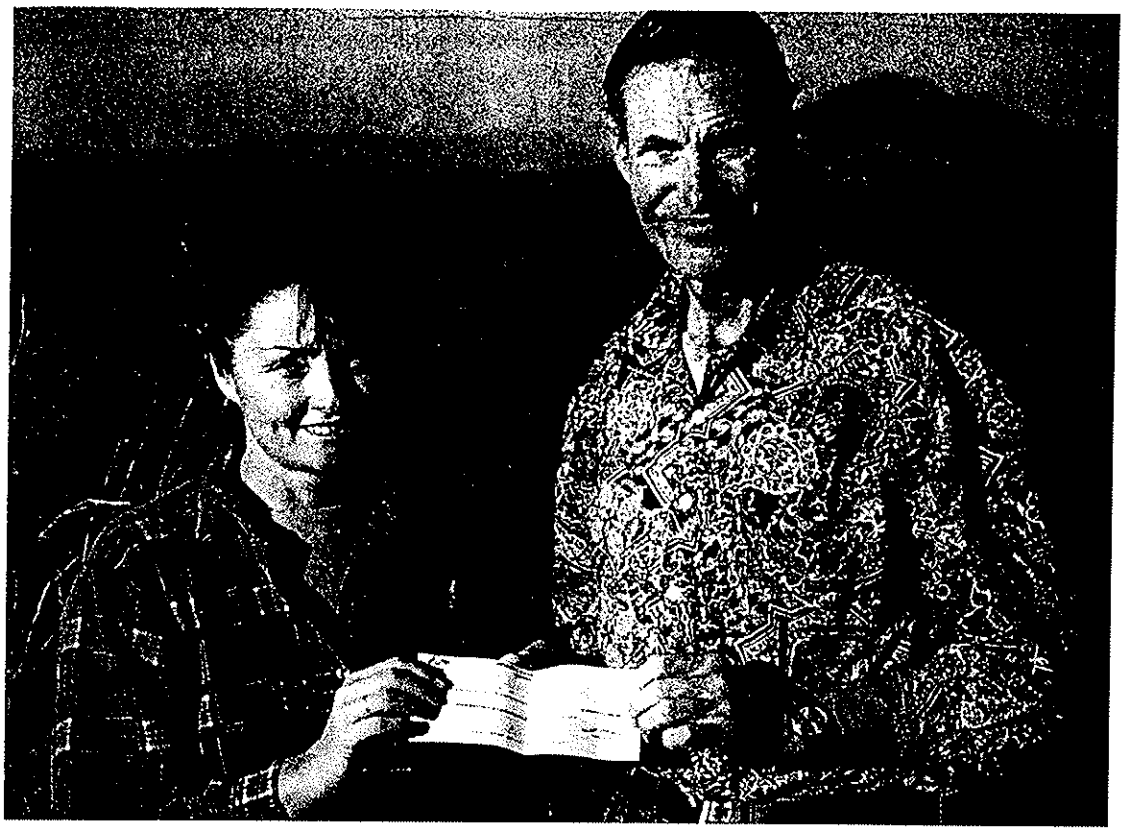


ANGELA Sanders accepting a cheque from Ian Anderson (UNESCO) for the Biosphere School biological Survey project.

If you are interested in participating in this unique project by volunteering to help during trapping sessions next year please contact your school principal or me to register your interest and we can let you know our progress. We were fortunate to have Ian Anderson from the Australian Commission for UNESCO visit the Fitzgerald Biosphere Reserve recently and hand me their cheque personally.

Thank you for the huge response with your Malleefowl sighting forms. It seems we are very fortunate to have Malleefowl still living in our area. Your sightings have helped me in my request to the MRD for Malleefowl Crossing signs for the 5 sites around the shire where they are seen regularly. The Phillips River crossing on Highway 1 seems to be the hot spot. Five were seen there at one time and about 6 reported as roads casualties.

I hope we will have warning signs erected early in the New Year but no doubt it will take a few prods in the right direction to get them there. See you around the traps and have a safe and happy Christmas and New Year.—**Angela Sanders-CALM (098) 381166**



CALM Fitzgerald Biosphere Ecologist, Angela Sanders, receives the UNESCO cheque from Ian Anderson.
Photo by John Watson.

Angela's work to continue

A MAJOR grant has enabled the Fitzgerald Biosphere Project in CALM's South Coast region to continue to the end of 1995.

by John Watson

The grant from the Australian Nature Conservation Agency was made available through the States' Co-operative Assistance Program.

In addition to further biological survey work being carried out in the buffers and corridor reserves around the Fitzgerald River National Park, it will now be possible for an integrated schools monitoring program to be established to include all schools in the area.

Fitzgerald Biosphere ecologist Angela Sanders has already established pilot projects with Fitzgerald Primary School and Ravensthorpe District High School.

Additional funds for equipment have been received through the Australian National Commission for UNESCO Small Grants Program, and Priority Country Areas Program (PCAP) funding.

As a result, schools at Bremer Bay, Gairdner, Jerramungup, Jerdacuttup and Ongerup will participate in 1995.

Studies will include flora and fauna monitoring at selected sites near each school and results will be incorporated into the Biosphere Project database and shared between the schools.

Already, teachers are considering ways of integrating the project into the school curriculum.

Ian Anderson of the Australian National Commission for UNESCO recently visited Fitzgerald River National Park where he handed over the UNESCO grant to Angela Sanders.

Around the biosphere

The Fitzgerald Biosphere Project Incorporated is alive and well after participants at the public meeting on 14 February decided unanimously to revitalise the organisation.

There will be a further meeting in April to elect new office-bearers. In the meantime a committee has been busy writing a proposal to attract funding to employ a Biosphere Co-ordinator later this year. All participants agreed that our growing network of interested people and increasing number of tasks that need to be carried out can no longer be sustained with voluntary community contributions. The committee is also considering employing a consultant to compile an overview and action plan for the Fitzgerald Biosphere Project to guide the project over the next few years. I will keep you posted.

The Biosphere School Programme is going well with trapping equipment arriving and teacher and volunteer workshops coming up soon. We are keen to involve community members in the trapping project, this would involve an hour or so each morning for one week each term (that's only about 20 hours for the year).

It's great fun and you'll get to see many critters in the traps that run around doing their thing while you're tucked up in bed. If you are interested in getting involved contact me or your local school and you don't have to have children at the school to be involved.

Jerramungup has been selected as a venue for a consultative workshop on biodiversity incentives (see article in this issue) to be held on 28 March.

This is an exciting honour as most of the workshops in other states are being held in cities. This is our chance as a rural community to put forward our views on incentives that could be put in place to improve biodiversity values and alleviate losses. Angela Sanders CALM 381166.

The Ravensthorpe Range Lerista (*Lerista viduat*

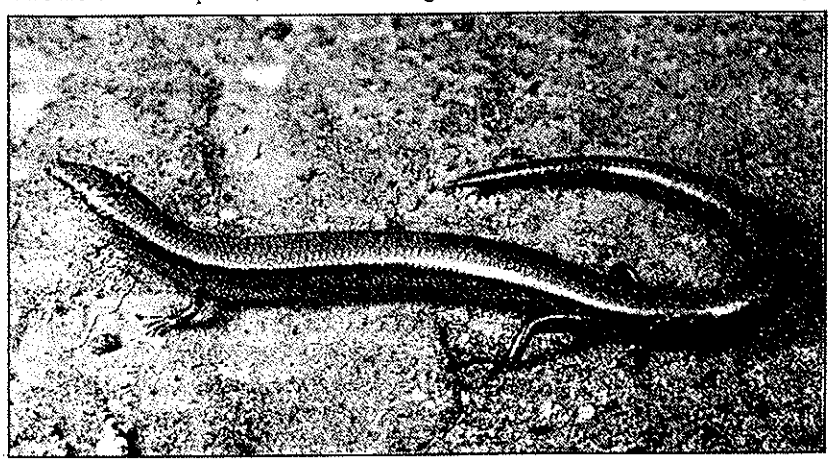
The above animal will be instantly recognisable to most people as a lizard.

More correctly, it is a skink, one of the five families of Australian lizards. The other families being goannas, geckoes, legless lizards and dragons. Within the skink family it is classified scientifically as belonging to the genus Lerista. This is a large genus that contains more than 50 species, with new ones being found each year.

The Ravensthorpe Range Lerista is known scientifically as Lerista viduata. Viduata is Latin for widowed, in relation to its dark colouring. In colour it is mid-grey on its sides and a beautiful metallic bronze on its back.

Many small skinks look similar to ours, though some have fewer fingers and toes and some have no legs at all. Our Lerista has 5 fingers and 5 toes and burrows through loose soil and leaf litter to find small insects to eat.

What makes Lerista viduata very special is that it occurs nowhere else but the Ravensthorpe Range. It was first discovered here in 1986 in the mallet/mallee woodland on the south-western flanks of the range. Andy Chapman found another in 1987 and twelve more were found in 1992 by two specialist lizard hunters working for the WA Museum. These captures suggest that it is locally qu common within the mall mallee woodland bu woodland is only fou small pockets in parts of t range.—**Angela Sander**



THE Ravensthorpe Range Lerista (Lerista viduata).

AROUND THE BIOSPHERE

Well you've all probably noticed the new Malleefowl warning signs that have been put up by the MRD around the Ravensthorpe Shire. The three areas covered were chosen in response to the Malleefowl sighting forms that you've been sending in since last year. I chose the sites that had the most records of Malleefowl, the hotspots I suppose. I realise that the signs have been put up in the wrong place on the Hopetoun Road and I will endeavour to have them moved.

Thank you to all those who have phoned me with comments on the signs, most of them have been positive. Some people think they are too faint and are difficult to see, especially at night. Apart from a touch-up job there is probably not a lot that can be done at this stage. Ideas would be welcome. I have been seeing quite a few Malleefowl while I've been out and about just lately so keep those sighting forms coming in and I will pass them on to the Malleefowl Preservation Society so they can include the Ravensthorpe birds on their regional map.

The Fitzgerald Biosphere Project group have employed Keith Bradby, a founder member of the group and former resident of Ravensthorpe, to prepare an Action Plan. The plan will include a brief history of the FBP and a report on opportunities and strategies for increased contact between the FBP and the wider community, locally nationally and internationally. Keith will also be identifying strategies and relevant agencies for obtaining funds to further the objectives of the FBP. The report will be finished at the end of April and will be available to interested people as soon as it has been accepted by the FBP committee who are directing Keith's project.

The school biological survey programme is now in full swing and I remind anyone that may want to get involved to contact their local school.—**Angela Sanders CALM 381166.**

HAVE you seen the new signs? So watch out for the birds!

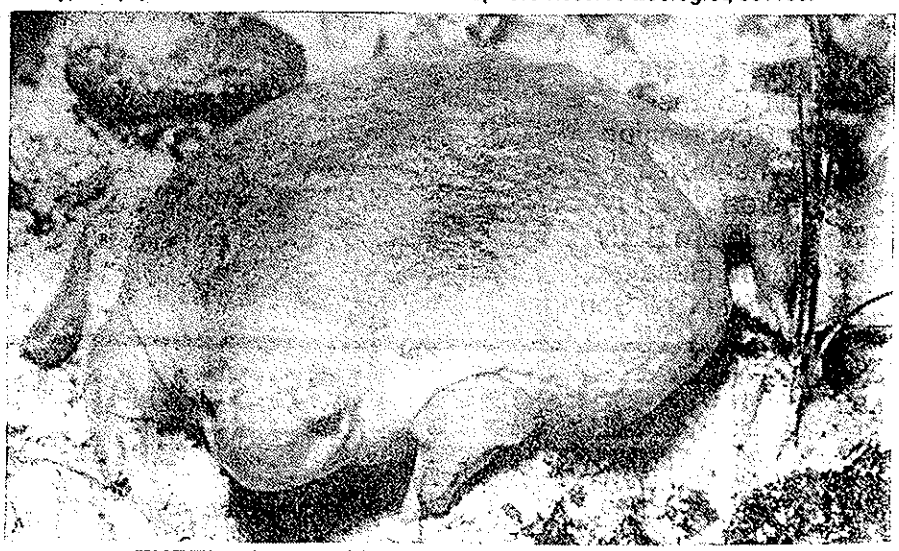
Turtle Frogs and Rare Rats

The Fitzgerald School students had their first encounter with the rather comical Turtle Frog or "Jelly Bag" last week.

There were oohs and aahs and the odd yuuk but most of them braved a hold of the young Turtle Frog which was caught in a pitfall trap near their school. The traps were set up as part of the Fitzgerald Biosphere School Biological Survey Programme. Under the guidance of myself and teaching staff the students did a great job of digging in 10 plastic buckets and setting up fences to direct animals into the pitfall traps. The following week their hard work was rewarded with not only a few Turtle Frogs but also Gunther's Toadlets, Banjo Frogs and lots of Honey Possums. The students will be opening the traps periodically throughout the year and keeping a record of the different animals they catch.

The schools programme at present includes the Ravensthorpe District High School too and has been educational and lots of fun so far. I am hoping that will be expanded next year to include Jerdacuttup, Jerramungup, Gairdner and Bremer Schools. A grant of $2500 has recently been approved from the Australian Commission for UNESCO towards the school programme and more funding is being sought to buy equipment for each school.

Getting back to the Turtle Frog, the little we know about its life history is fascinating. It feeds on termites (maybe the Ravensthorpe Museum could use a few) and lives mostly in sandy soils. The name comes from their resemblance to the turtle minus its shell. They do not require water for breeding as they lay their eggs about a metre deep in damp sand and the tadpoles develop into frogs inside the egg capsule. These frogs are difficult to find as they spend most of their life underground. Their call is best described as an abrupt croak and last year I heard them calling only three times during the whole winter. I also spent time looking for them and although I could hear them I couldn't find them. I guess the female frogs have no problem finding the males croaking away in their burrows though! Also as part of the Biosphere Reserve biological survey work I am currently repeating a trapping programme for rare native rodents in a block of Vacant Crown Land south of Ravensthorpe. This entails crashing through dense bush to set 80 Elliott traps (aluminium box-type traps) in four east-west transects each about 2km in length. Results so far have been very interesting and surprisingly the gazetted rare Heath Mouse and Western Mouse outnumber the usually common Bush Rat and, even more surprising, the introduced House Mouse which is usually caught in the highest numbers. In addition, the rare rodents are turning up in areas where, during last year's August survey, none was caught. So what does it all mean? Stay tuned for further insights into the fascinating life of rats and mice in future issues.—**Angela Sanders, Fitzgerald Biosphere Reserve Ecologist, 381166.**



TURTLE frog or "Jelly Bag" Myobatrachus gouldii.

Around the biosphere

I may have been keeping fairly quiet lately but its certainly not due to lack of things to write about as there has been quite a lot happening in the Fitzgerald Biosphere over the last couple of months.

I recently completed a fauna survey of the Aerodrome Road Nature Reserve, which is the big W shaped patch of bush about 40km north west of Ravensthorpe. The area contains some wonderful lakes complete with swans and many different ducks. There are large areas of low-lying heath with paperbark trees as well as heath on the higher sand dunes. In fact, most of the Reserve is heath which is quite unusual for this area. I was really thrilled to find a Western Mouse (listed as rare by CALM) in the pitfall traps one morning as well as Honey Possums, different species of frog, a Bardick snake, skinks and a Chapman's Dragon.

Malleefowl sightings seem to have dropped off over the last couple of months. The birds are busy scraping leaf litter into their mounds at the moment which may account for the apparent lack of sightings. If you are still seeing birds please keep those sighting forms coming in as we're starting to build up a good picture of where they live in the Ravensthorpe Shire.

Myself and Bill Lullfitz (Chairman, Fitzgerald Biosphere Project) recently attended a five day International Biosphere Reserve Workshop at Berri in South Australia. Our area was well represented as one of the Model Biosphere Reserves for Australia. We gave presentations during the week about community involvement and perceptions and many people said they would like to visit to experience the Fitzgerald first-hand. We also heard about Biosphere Reserves in Zimbabwe, China, Colombia, Germany, Indonesia, Korea, Canada, USA and others in Australia. The workshop was held in the Bookmark Biosphere Reserve and we were taken on field trips to look at the main challenges they are facing in their area. Rising saline water tables was a problem familiar to us, as was the decline in ecosystem health, especially around the Murray River. I certainly came back with a renewed appreciation of the Fitzgerald area and the importance of looking after it. A visitor from Bookmark to the Fitzgerald has called it the "Rolls Royce" of Biosphere Reserves and after receiving a global view of others I can certainly appreciate why.

I will be carrying out another trapping session in the Bandalup Hill area from 25 October to 2 November. I would love some help, company or curious observers so come along and enjoy the bush. Anyone that would like to come and camp with us would be welcome.

A weekend in the Ravensthorpe Range is all go for the 11-12 November. I have had a few families already register their attendance. It will be self-sufficient camping at the old vineyard off Carlingup Road and portable toilets and water will be available. Activities for the weekend include walks in the Range looking at geology, plants, animals and history. There will be spotlighting and star-gazing on the Saturday evening as well as a barbecue.

If you would like to be part of all or some of this weekend please register your interest with me and I can send you a map of how to get there and a more detailed itinerary. Looking forward to seeing you there.—**Angela Sanders (098) 381166, A/H 389013, PO Box 279, Ravensthorpe 6346 or leave a message on my office door upstairs in the Community Centre.**

WESTERN spotted frog found at Aerodrome Road Nature Reserve.

Networking and the Fitzgerald Biosphere reserve

We all know how effective networking can be and this was the topic of a recent conservation seminar held at Geraldton. The conference attracted about 200 de egates from 17 countries including New Zealan Uganda, Saudi Arabia and Pakistan.

Four representatives from the Fitzgerald Biosphere Reserve went along and presented a joint talk on "Ne works and the Fitzgerald Biosphere Reserve." The grou presentation was unique and John Watson (CALM) set the scene with a backdrop of wonderful slides and gave a brief overview of the Biosphere Reserve, Nathan McQuoi (Ranger in Charge) then explained some of the outstandir features of the National Park.

Angela Sanders (biosphere Ecologist) outlined what her survey work in the buffer zone had revealed so far an Bill Lullfitz (found member of the Fitzgerald Biospher Project Group) detailed how community networking ha enhanced landcare and conservation activities in the zone of co-operation around the park.

Several people commented that the group presentatio was a good illustration of the co-operation between var ous groups involved in the biosphere project.

The main message that came out of the conference was the recognition that networking between people is a ver powerful tool and we need to do more of it between loca communities, government departments and individuals i we are to address the environmental challenges that confront us all at present.

A network of interested people and community grou representatives will be set up in the Fitzgerald Biosphere Reserve soon and the details are being worked out at present. If you would like to know more please contact me **Angela Sanders, Biosphere Ecologist—Ravensthorpe phone/fax 381166.**

COUNCIL CONTACTS

Ravensthorpe Shire Councillors:

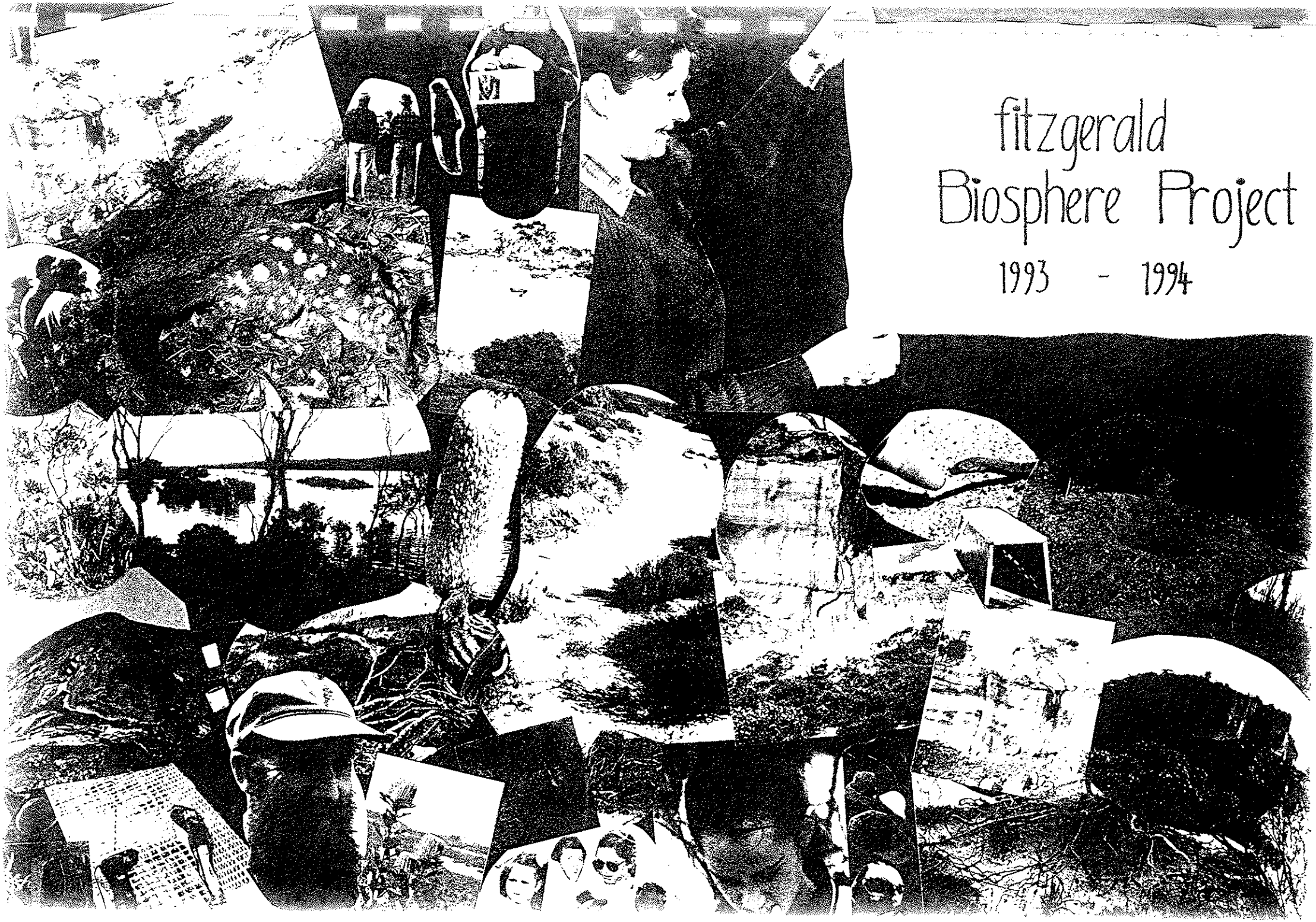
Tony Sullivan (President)	Ph 380063 Fax 380057
Peter Blond (Deputy President)	Ph 383043 Fax 383111
Brad Clarke	Ph/Fax 381082
Kerry Dickinson	Ph 381259 Fax 381284
Gordon Jones	Ph 381046 Fax 381291
Ruth Kirchner	Ph/Fax (090) 751087
Moonika McHayle	Ph/Fax 383193
Mary Smith	Ph/Fax 385041

Jerramungup Shire Councillors:

CR JF Mudle
PO Box 69, RAVENSTHORPE
Ph 356034

Lake Grace Shire Councilors:

SJ Brandenburg	Ph 744021 Fax 744039
HR Bennett	Ph 651026
TJ Cattle	Ph/Fax 744051
IG Chamberlain	Ph 716043 Fax 716035
CJ Connolly	Ph 651010 Fax 651161
TJ DeVree	Ph 651162 (hm) Ph 651100 (wk) Fax 651391
SC Duckworth	Ph 651189
KL Green	Ph 711547 Fax 711690
M Naisbitt	Ph 649043
WA Newman	Ph 711582 Fax 711587
DM Stewart	Ph 712042
PR Taylor	Ph 649026
GB Walsh	Ph 720029



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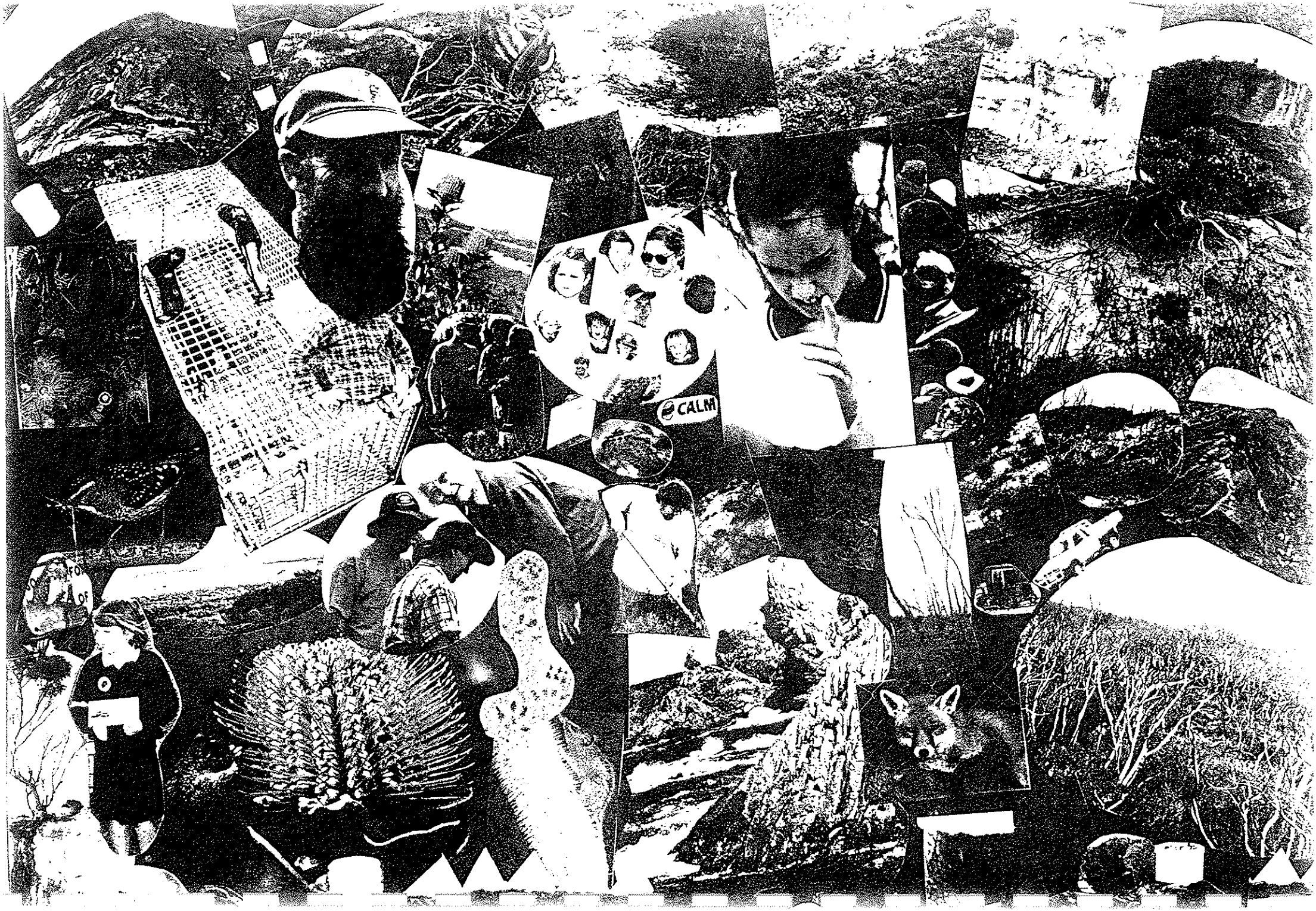
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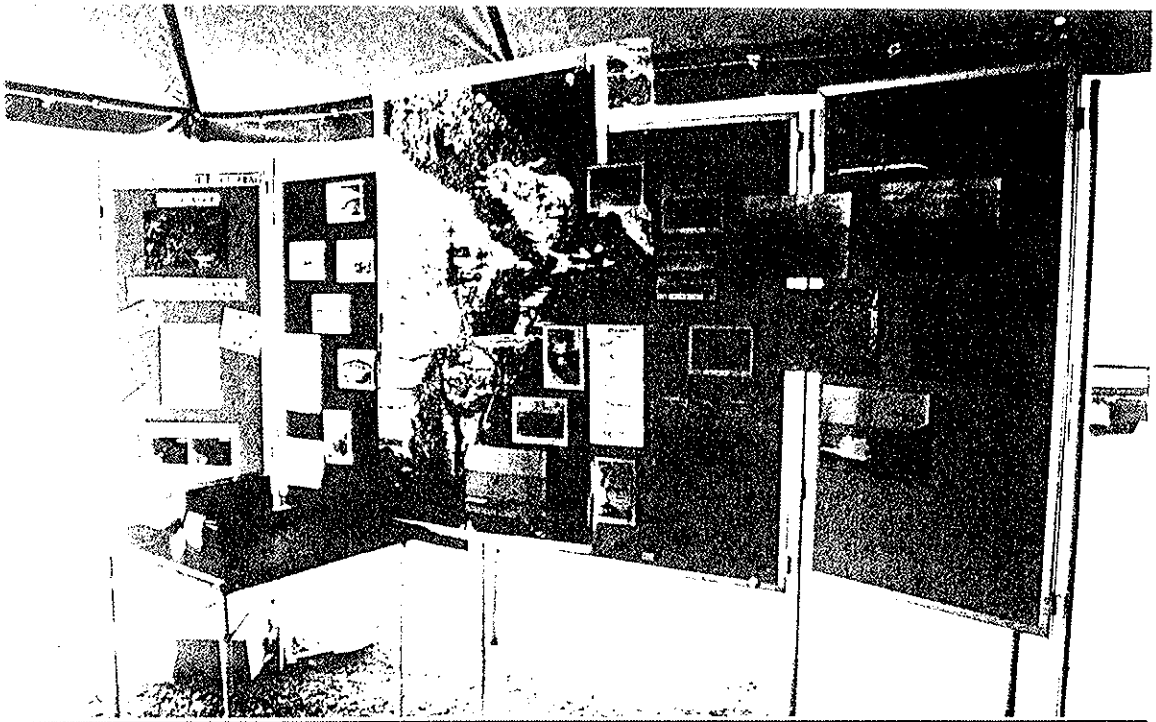
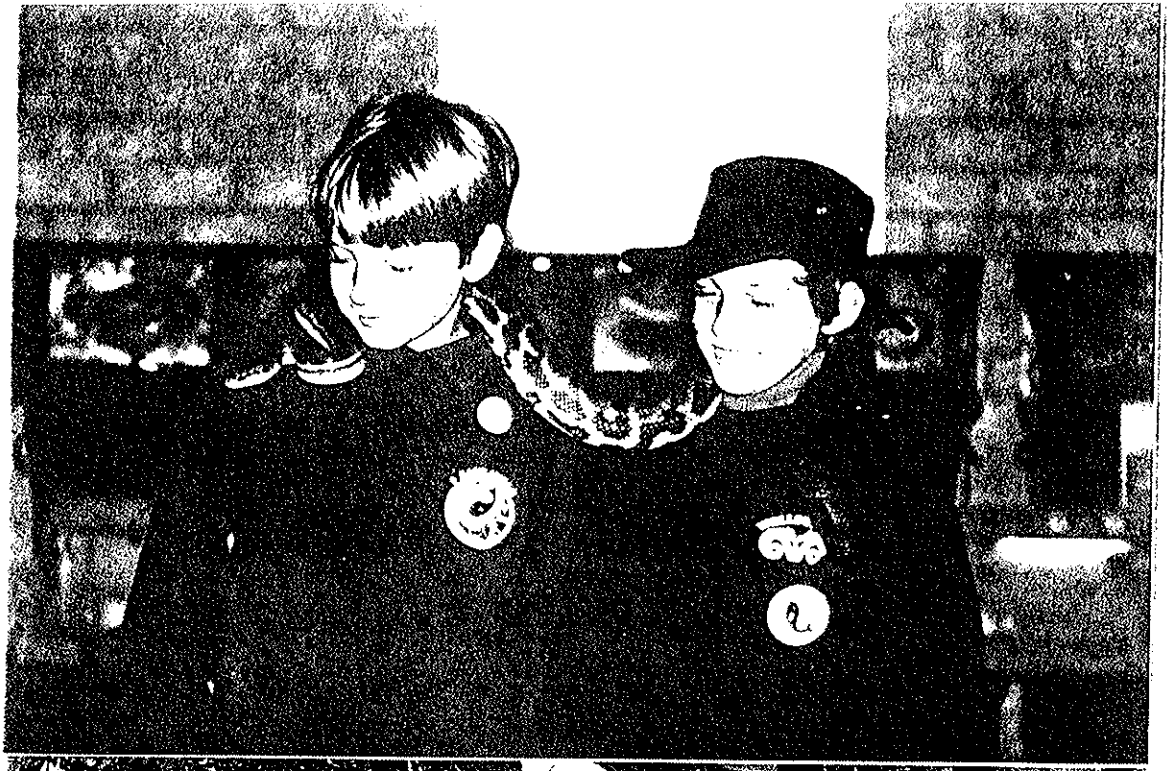
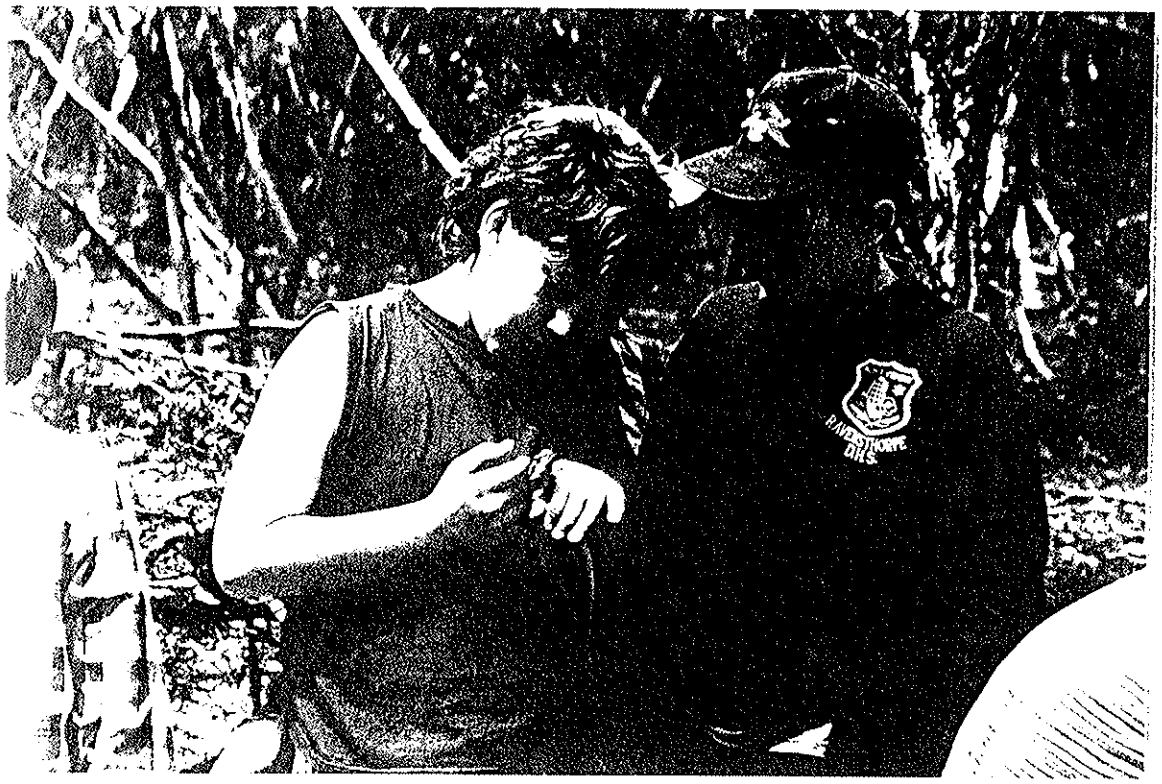
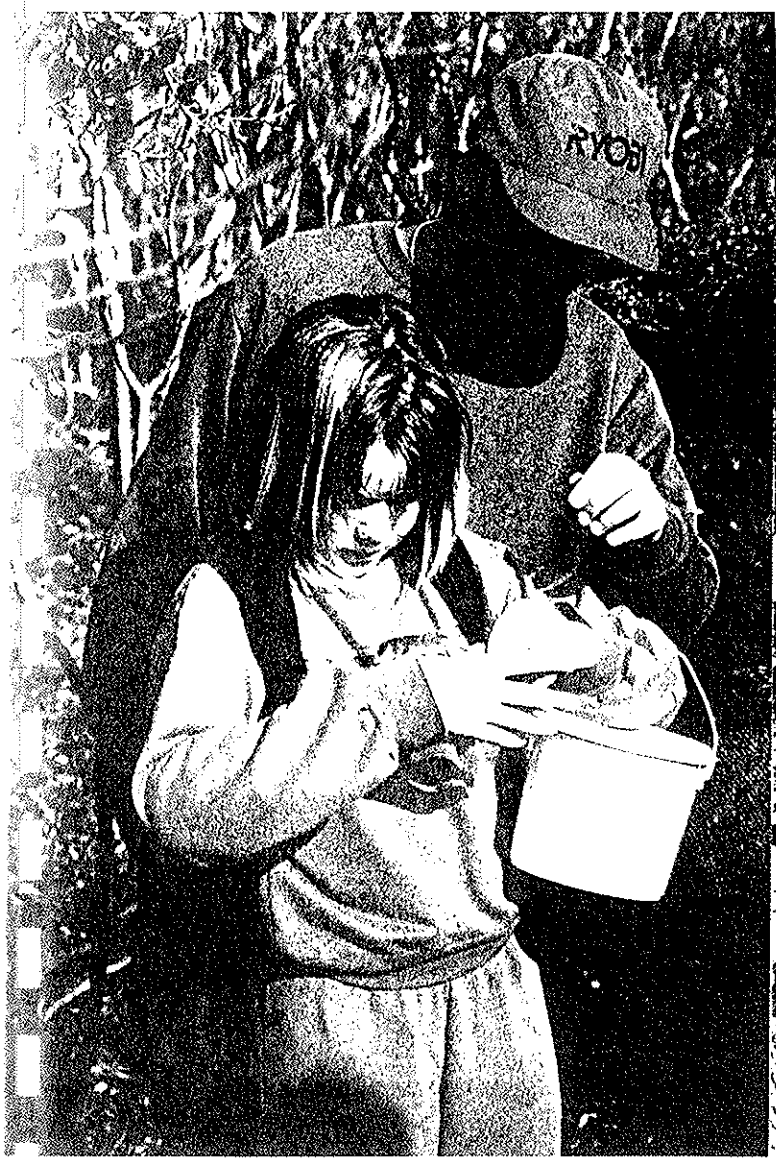



DON'T SUGGEST - VOLUNTEER




Get into our hidden environment
with CALM

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