'SAVE THE BUSH'

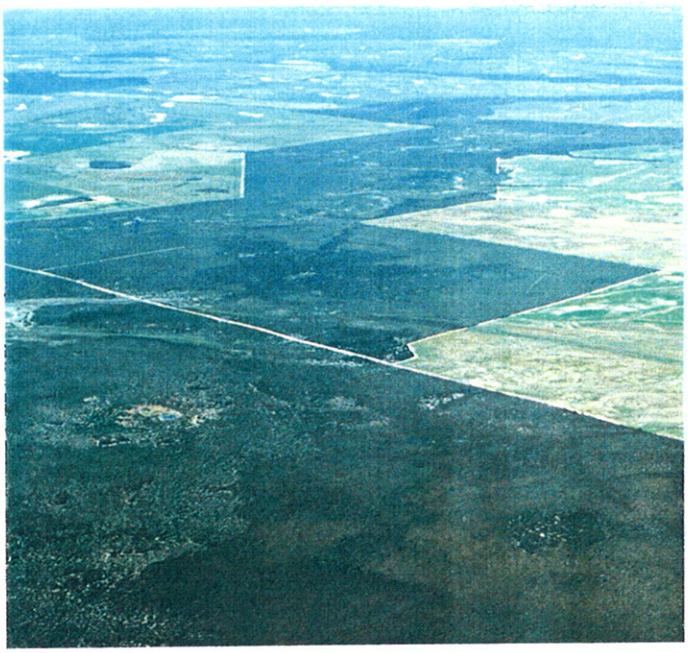
SOUTH COAST

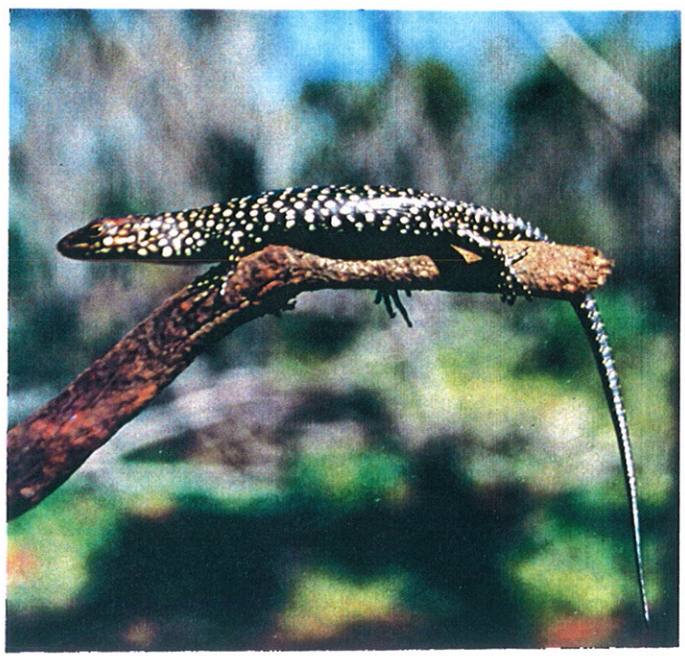
RIVER CORRIDOR PROJECT

A Preliminary Biological Survey of Four River Foreshore Reserves along the South Coast of Western Australia.

Department of Conservation and Land Management - South Coast Regional Office, Albany, January, 1992.

by Sylvia Leighton and John Watson.





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SUMMARY

Four river foreshore corridors along the south coast of Western Australia were surveyed in Spring of 1991 to ascertain their potential to act as functional corridors for wildlife and their value as nature reserves in their own right.

The surveys comprised examination of historical records, field inspection, discussions with local landowners and detailed biological survey work at selected sites in each corridor.

The results indicated that all four corridors had significant value for nature conservation. It was also found that each corridor contained substantially different faunal communities from the others.

A number of damaging influences were identified in each corridor including weed invasion, stock grazing, feral animals, fire, changes in water quality and fungal diseases. Such effects appeared to be more serious at the narrow 'bottleneck' sections of the reserves and at physical breaks in the corridors caused by road crossings. This degradation raises doubts about the value of the corridors for fauna movement and it is proposed that biological surveys be undertaken at these narrow sections during spring 1992 to provide comparative data and information on how the corridors function for lateral movement of fauna.

Generally local landowners recognise the importance of the corridors for nature conservation and the value of retaining remnant vegetation in the landscape to help combat increasing water salinity and wind erosion which have a detrimental effect on farming success. Further liaison is now required with landowners to encourage improved fencing and voluntary widening of the corridors using adjacent privately owned bushland. It is also clear that local landowners wish to be closely involved in the future management of the river foreshore corridors and this should certainly be supported wherever possible.

The financial assistance of the 'Save The Bush' grant scheme and the efforts of the numerous volunteers and CALM personnel who made this study possible is gratefully acknowledged.

INTRODUCTION

The South Coast Region of the Department of Conservation and Land Management in Western Australia (CALM), extends from near Albany in the west to the South Australian border in the east and up to 400 km inland. There is an existing network of national parks and nature reserves in the area. Some of the larger areas are of international repute, e.g. Stirling Range National Park and Fitzgerald River National Park. These areas are renowned for their florisitic diversity (e.g. Fitzgerald River National Park with over 20% of W.A. flora), their high degree of florisitc endism, and their rare flora.

In addition to these better known conservation reserves, substantial sections of the coastal fringe throughout the area are protected in other parks and reserves and are mainly under the protection and management of CALM.

The area of specific interest for this report lies in the western part of the region, between Albany and Esperance (refer to Figure 1). It incorporates country which has been heavily cleared for agriculture. However, it is traversed by several major rivers some of which are the Corackerup Creek, Fitzgerald River, Young River and Lort River. These rivers are generally lying within "river foreshore reserves" of 200 to 2 000 metres in width.

These foreshore reserves are currently either vacant Crown land or unvested reserves. As such they do not have any active protection or management. Nevertheless, they provide a corridor link between existing coastal reserves and significant inland nature reserves or with other uncleared land to the north which in essence extends unbroken to the interior of Australia (refer to Figure 2).

It is possible that these corridors reduce the isolation of the existing national parks and nature reserves by facilitating the movement of fauna. In times of natural disaster, like a major fire, they probably not only provide a potential escape route at the time, but also an avenue for the fauna to return to the area later on. They may also reduce the effect of the national parks and nature reserves of becoming isolated genetic islands by allowing interbreeding of the separate populations.

Through its regional planning process, CALM expressed an interest in having these river reserves formally gazetted as conservation reserves to be managed in an integrated manner as part of the region's conservation network to ensure ongoing protection of their biological diversity (CALM 1989) .

CALM was successful in its application for a grant from the Australian National Parks and Wildlife Service "Save The Bush Grants Scheme" to undertake a detailed biological study with the intention that any special conservation values of the corridors and requirements for protection and management be identified. This report describes the methodology and the findings of the survey.

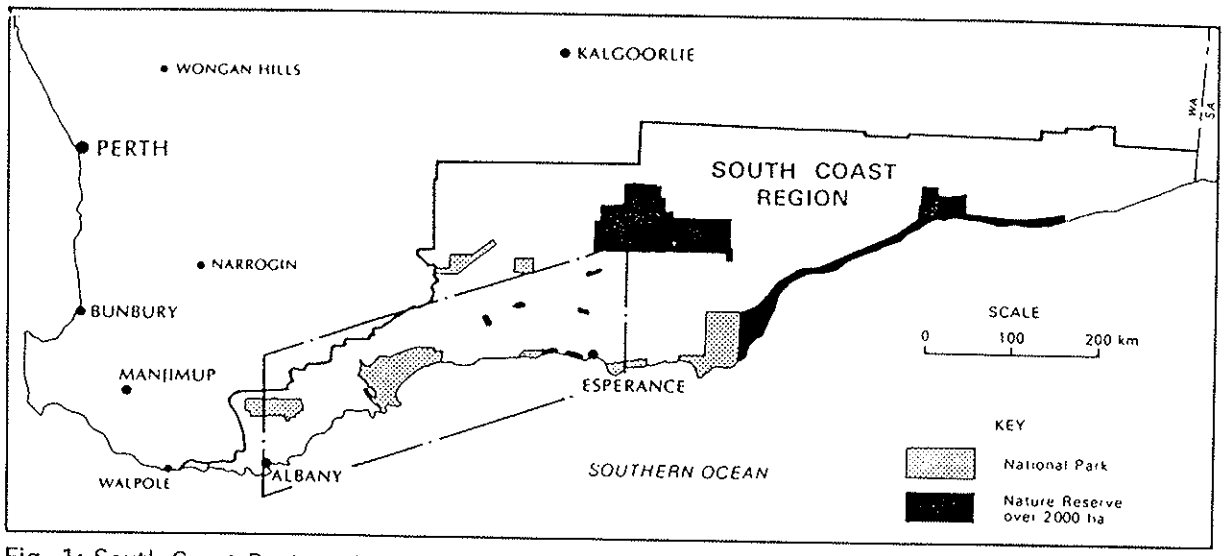


Fig. 1: South Coast Region of Department of Conservation and Land Management showing area of primary interest

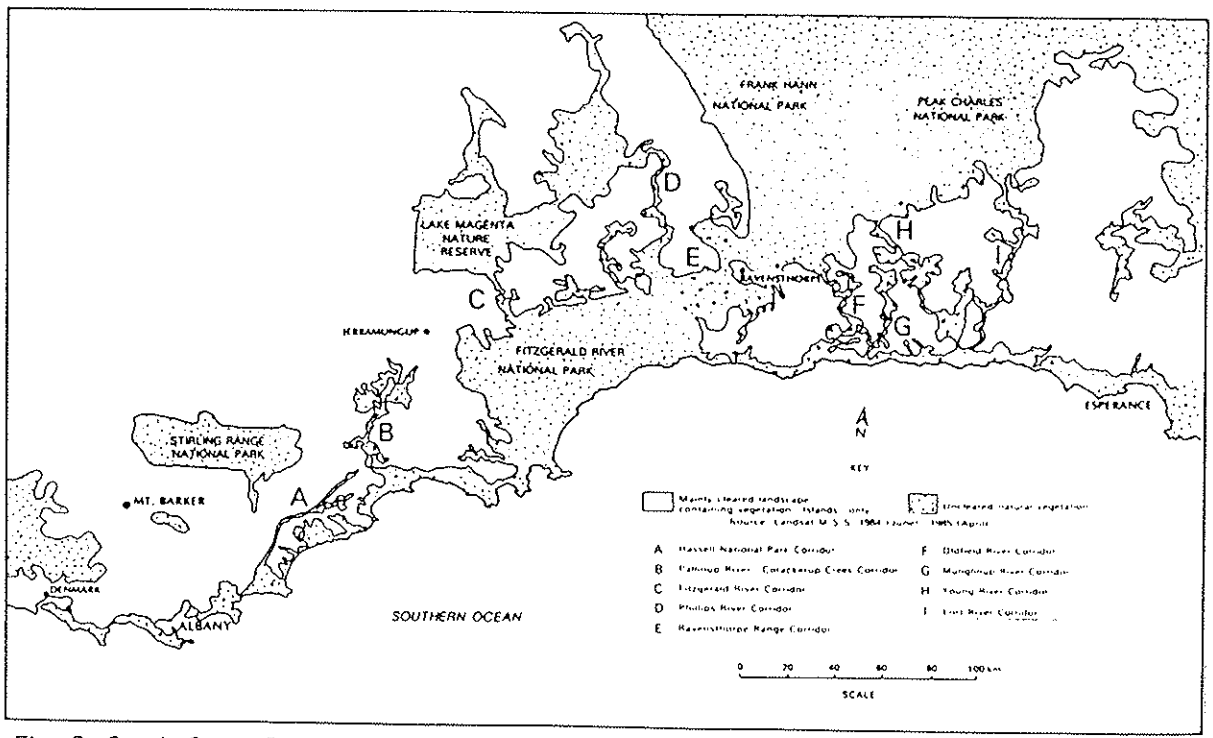


Fig. 2: South Coast Region vegetation corridors.

AIMS OF THE SURVEY.

1. To identify the values of river corridors in Western Australia' s South Coast Region:

    (a) as habitat in their own right for native fauna and flora

    (b) as potential corridors for movement of native fauna

2. To identify damaging influences such as stock grazing, weed invasion, feral animals, dieback disease *(Phytophthora cinnamomi)*, and fire etc.....and the degree to which any badly degraded sections can be rehabilitated.

3. To identify the potential for increasing the effective width of river corridors through:

    (a) encouraging farmers to fence off adjacent uncleared land through schemes such as the Remnant Vegetation Protection Scheme (State Government).

    (b) identifying farmers who are willing to sell adjoining bushland back to the government.

4. To maintain public awareness of the project through direct liaison with Land Conservation Groups (and particularly catchment based Landcare Groups) and with adjacent landowners.

PRE-SURVEY

In 1988, the CALM South Coast Regional Office undertook a review of the region's system of nature reserves and national parks. This review was designed to meet several objectives including the assessment of remnant vegetation as a means of linking larger areas of uncleared land. Biologist, Libby Sandiford, examined aerial photographs and undertook limited field inspections. One outcome was the development of recommendations for establishment of major "corridor" reserves, primarily as links or potential corridors for movement of fauna but also as long linear areas of natural habitat in their own right.

Her inspections indicated that four river foreshore corridor systems were probably suitable for reservation as linear nature reserves in the study area. These were the lower Pallinup River and Corackerup Creek system linking coastal reserves with the Corackerup and proposed Peniup Nature Reserve; the upper Fitzgerald River linking Fitzgerald National Park with Lake Magenta Nature Reserve; and the Young and Lort Rivers each of which links coastal reserves between Hopetoun and Esperance with the southern Goldfields and Australian interior. Each corridor appeared to be in a relatively pristine condition but contained various levels of degradation in some sections. It was felt that each of these systems could function not only as a potential corridor for the movement of fauna between the larger remnant areas, but also as an area of natural habitat with intrinsic conservation value.

In 1988-89 the South Coast Regional Office of CALM drafted a Regional Management Plan in which the recommendation was made that the four river corridors be listed for future description as nature reserves.

In 1989, interest in corridors increased within the scientific community when a conference was held in Bunbury, Western Australia, resulting in the publication of thirty six papers on the many aspects of corridors including recent data on corridor function and management issues. The South Coast Regional Manager of CALM, John Watson, also presented a paper at this conference on identification of river foreshore corridors for nature conservation (Watson, 1991). He recommended that further research and monitoring was required to assess more clearly the current and future value of river foreshore corridors.

John Watson pursued this recommendation by submitting an application to the Australian National Parks and Wildlife Service - Save The Bush Grant Scheme in 1990/91. This resulted in CALM being awarded a fifteen thousand dollar grant for further research to be carried out in the four selected river corridors on the south coast coast of Western Australia.

SURVEY METHODOLOGY

In June through to December of 1991, biological surveys were undertaken within the four river corridors at 24 localities. One survey site was selected for each of the Corackerup Creek and the Lort River whilst two survey sites were selected for each of the Fitzgerald River and Young River corridors with a view to obtaining the best possible coverage of representative vegetation habitats for each corridor within limited time parameters.

For each survey, two to four people camped out near the survey area and, after digging in the trap grids spent the next five days recording, searching, trapping, numbering and collecting. The basic method employed was as follows:

(1) Preplanning

(a) Relevant background data was examined to gain knowledge on the physiographic features of each corridor. The geology, landforms, soils and water quality were detailed from aerial photographs, satellite imagery, previous surveys and surface recordings made by other researchers.

(b) The major plant associations found in the corridors were mapped by referencing back to previous surveys, notes taken on a pre-survey ground inspection and analysis of aerial images.

(c) Aerial flights were made over the Corackerup and Fitzgerald corridors for familiarization with the area.

(d) Trapping sites were selected for each corridor based on aerial photography interpretation, field notes and accessability. Each site had to contain four representative riverine vegetation associations in a relatively undegraded condition so that they were favourable for faunal habitation .

(e) Examination of aerial photos and field surveys provided data for making maps of those sections the corridor areas which have been effected by degrading factors: stock grazing, weed invasion, feral animals, dieback disease and fire.

(2) Equipment Washdown

Prior to entering any of the survey areas, the equipment and vehicles were washed down with water to eliminate the possibility of transporting of the soil borne fungus *Phytophthora cinnamomi* ,'Dieback', into the survey area (refer to plate 1).

(3) Trapping

(a) Pitfall Traps with a drift fence.
At each site, four trap grids were laid out in the four selected plant associations. The grid composed of two parallel lines 20 metres apart each containing 5 pit traps. Each pit trap was 20 metres apart and had 5 metres of aluminium drift fence on either side of it (refer to plate 2). The drift fence stood 20 cm in height and ran over the centre of the pit. A large pit trap was selected for use due to its more productive capture rates (Friend et al. 1989), consisting of a 20 litre'Rheem' white plastic bucket, 28 cm in diameter and 39 cm deep with a large clip on lid , which could be installed if trapping conditions became too wet. Fauna trapped in the pits were identified and released. Mammals had a mark made in their fur to aid recognition if they were recaptured. Any animals not positively identified were collected for museum identification.

(b) Metal Trap Line
20 medium sized Elliot traps were spaced in a circuit around the Pitfall traps within the same plant association (refer to plate 4). These traps were baited with "the mix" : honey, rolled oats, sardines, bacon, peanut paste.
Elliot trap lines were also laid down at other interesting sites obtain additional opportunistic data.

(c) Bat Trap
A harp design bat trap was set up along tracks and the rivers in the hope that bats would be caught. This was not successful as spotlighting revealed that the bats flew higher than the top level of the trap. This was probably due to the lack of a tall upper vegetation storey in the survey areas (refer to plate 3).

(d) Insect Pitfall Trap
Lines of small plastic cups filled with water were installed in the ground in the different vegetation types so that a collection of the ground beetles/insects was made. Of particular interest were the Scarob beetles which were sent to the Australian National University to be included in a nationwide survey (refer to plate 6).

(4) Plant Collections

A collection was made of the plants found within the plant associations in which trapping occurred. Specimens from all vegetation storeys were collected so that a detailed floral list could be made for each trapping site. Duplicates of each specimen were collected so that one specimen could be retained by the CALM herbarium in Albany and the other could be given to the Western Australian Herbarium. The plant list for each association is not exhaustive and can be added to in the future.

(5) Bird Census.

As much time as possible was spent on bird watching as birds were thought to be the main indicators of the possibilty that these riverine areas are being used as corridors. Birds were recorded mainly during the first few hours in the morning before and after dawn. Measures were made to make sure that each vegetation association was surveyed for birds. It was also noted if a bird was breeding.

(6) Opportunistic Data.

Additional vegetation, vertebrate and invertebrate data was recorded while travelling between sites and doing exploratory work within the corridor. Turning over litter, removing bark, spot lighting, and observations at water holes are the other activites which contributed to these recordings (refer to plate 5).
Fox scats were also collected and sent to the Woodvale Wildlife Research Station (CALM) to be examined for fur content.

(7) Liaison with Adjoining Landowners and Land Conservation Groups.

Efforts were made to contact all landowners adjoining each corridor and to inform them about the biological research undertaken in the corridors, the benefits of corridors and CALM's interest in them. A questionnaire was sent to each of them to gauge their opinions of the proposal. This questionnaire also identified how many landowners had unfenced land adjoining the reserve and asked their opinion on management strategies for the reserves. Farmers who had uncleared land adjoining the reserve and who might be willing to sell back to the government were also identified.
The Landcare Groups for each relevant district were also notified of the project.

(8) Personnel

Unless otherwise stated the fieldwork forthis project was undertaken by contract biologist, Sylvia Leighton, with assistance provided by other CALM staff and volunteers.

Plate 1: Equipment was washed down before installment to eliminate the possibility of spreading dieback disease. *(Phytophthora cinnamomi)*

Plate 2: Pitfall trap with drift fence.

Plate 3: Harp design bat trap.

Plate 4: Elliot trap with Southern Bush rat emerging.

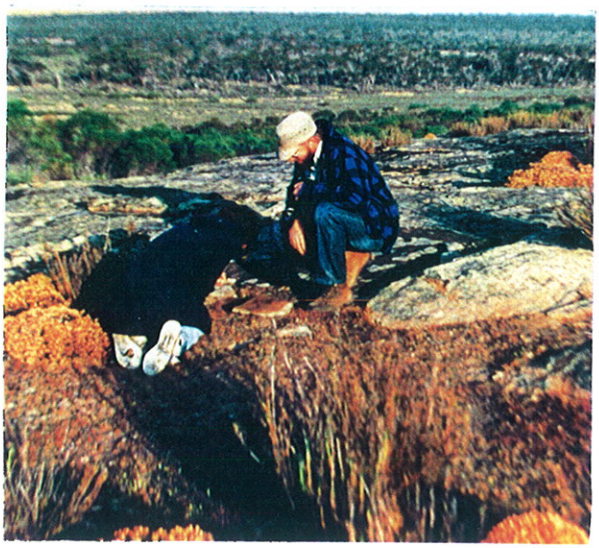


Plate 5: Looking under rocks for opportunistic data.

Plate 6: Insect pitfall trap.

DESCRIPTION OF CORRIDOR

BOUNDARIES AND PHYSICAL FEATURES

Corackerup Creek foreshore reserve is approximately 24 kilometres long running in a N.N.E. direction between Toompup Road in the south and Cowalellup Road in the north (refer to figure 3). Its area is comprised of approximately 1795 hectares of vacant Crown land. The northern section of the corridor forks, with the north western branch following the upper reaches of the Corackerup Creek and the north eastern branch following Peniup Creek.

The north eastern branch borders onto Peniup Reserve which is currently a C class reserve, No. 29500, which is 6529 .7 hectares in size. This reserve has been proposed as an A class nature reserve in the South Coast Regional Management Plan. The western branch of the Corackerup Creek corridor links up with Corackerup Nature Reserve through Cowallelup and Boxwood-Ongerup road reserves and uncleared bush on private property. Corackerup Nature Reserve (No. 26793) is already managed by CALM and is 4333. 9 hectares in size. It encompasses a large amount of the upper catchment drainage of Corackerup Creek.

The southern end of the corridor adjoins the Lower Pallinup River Foreshore Reserve (No. 33257) which links up with the coastal Beaufort Inlet Reserve.

The Corackerup Creek foreshore reserve is accessible to the public in three places - Cowallelup Road, Boxwood Hill - Ongerup Road and Toompup Road. Elsewhere access is via private farming land.

CLIMATE

The mean annual rainfall is about 600 mm at the coast (571 mm at Cape Riche and 626 mm at Bremer Bay) decreasing to 400 mm inland (451 mm at Jerramungup). This is mainly winter rain (refer to figure 4). However, cyclonic storms may precipitate 200 mm or more in a few days. Gnowangerup recorded 232 mm of rainfall in February 1955 and 206 mm in January 1982. At Millers Point (Beaufort Inlet) 172 mm fell in 3 days in January 1982. In May 1988, Jerramungup recorded 289 mm and Bremer Bay 210 mm, with most falling over three days at the beginning of the month. These storms caused extensive flooding and broke the bar at Pallinup Estuary (Hodgkin & Clark, 1988).

GEOLOGY

The Corackerup catchment lies on the southern edge of the Archaean Yilgarn Block plateau and the northern edge of the Proterozoic Albany Frazer Geological Province. Hard granitic bedrock is overlain by the Plantagenet Group composed of clays, sponge spicules, sand and scarce fossil shells. This softer rock is readily eroded and has been cut into V shaped valleys with steep slopes and sometimes cliffs composed of both the Pallinup Siltstone and the Werillup Siltstone (Witham, W. pers. comm. 1991).

SOILS

There are three main groups of soils in the catchment: heavy, light and alluvial. They are characterised by different vegetation types.

The heavy soil is mainly found where the York Gum (*Eucalyptus loxophleba*), Morrel (*E.*

longicornis) and Moort (*E. platypus*) grow (Beard 1981).

Lighter soils are common mainly on the sand plain. These soils are some of the most ancient in the world and have been leached over millions of years. In some places the topsoil consists of almost pure sand which is more than 30 centimetres deep. There are scattered patches of mallees, with *Eucalyptus redunca* on loam rich sands and *E. transcontinentalis* on clay rich sands. Scattered Lerp's Mallee (*E. incrassata*) may be present on the poorer soils, or there may be no mallee at all (Beard ,1981).

Alluvial soils occur mainly in narrow strips along the river with Flat Topped Yate and small patches of Flooded Gum (*Eucalyptus rudis*). The Swamp Oak *Allocasuarina obesa*, is also common in this area (Beard, 1981).

VEGETATION TYPES

The vegetation within the corridor was mapped on a broad scale by J.S. Beard as part of the Vegetation Survey of Western Australia (Beard, 1972(a)).

Beard classified the vegetation communities found along the Corackerup Creek to belong to the Quaalup system. This system is co-extensive with the outcrop of the Geological Plantagenet strata. The predominant vegetation type is mallee heath with *Eucalyptus tetragona* on the old laterised land surface of the plain where the soil profile is differentiated with a surface horizon of bleached sand over a layer of ironstone nodules, and this over a dense mottled subsoil.

The mallee heath flora is a rich one with numerous species of mallees and other large shrubs. Where the creek has cut down through the Plantagenet Beds, *E. redunca,* and *E. uncinata* are the dominant species together with *E. flocktoniae, E. incrassata and E. conglobata*. A dense understorey of Melaleuca spp. such as *M. uncinata, M. thyoides* and *M. subtrigona* covers the grounds below. In wet and clay rich soil, thickets of *E. platypus, E. spathulata* and *E. annulata* replace the above.

Yate woodland and Paperbark scrub appear along the steep sided trenches cut by rivers. The young soil of these valleys supports mallee, or woodland of *E. loxophleba* and/or *E. occidentalis* which generally lacks an understorey other than annual grass and ephemerals. In part this may be due to grazing (Beard, 1981).

Beard, 1972(a), differentiated 3 vegetation formations in the river foreshore reserve as follows (refer to figure 5):

Shrublands

e_{27}Si	Mallee on granite loam

Woodlands

e_{6}Mi	York Gum - *Eucalyptus loxophleba*

Mosaic Unit

eSi/e_{26}SZc	Mallee & mallee-heath

Special note is made of one of the State's rarest Eucalypts, of which only two populations are known and one of these occurs in the area under study. For confidential reasons the name and exact location of this plant will not be published. An orchid which is a declared rare species also occurs near this area.

FAUNAL RECORDS

Previous surveys done in 1980/1981 by R. Smith of the then, Department of Fisheries and Wildlife, produced unpublished faunal and floral lists for the Pallinup reserve and the Peniup Creek reserve.

The Tammar Wallaby was sighted in the Pallinup reserve, no. 28687 north of Hassell Highway in 1983 (they have not been sighted south of the Highway) and also in Peniup Creek reserve 29500, in 1981. It is recognised that the range of this species on the mainland has been greatly reduced in recent years. A report *The Status of Kangaroos and Wallabies in Australia* (Burbidge, 1977) notes that the tammar is "in need of further reservation and/or intensive management in existing reserves" and lists the species as being one that is "in most urgent need of habitat reservation".

Other mammals found within Peniup or Pallinup reserve are the Pygmy Possum, Brush Tail Possum, Western Brush Wallaby, Fat Tailed Dunnart along with scratchings of the Short Nosed Bandicoot and Echidna.

Peniup Creek reserve also contains two bird species of special significance: the Western Whipbird, declared rare or endangered under the Wildlife Conservation Act, and the Mallee Fowl, which is rapidly declining in numbers throughout the southwest. Other bird species of particular interest are the Crested Bellbird, Pink Eared Duck, Red Eared Firetail and Stone Curlew.

RIVER DATA

Corackerup Creek is approximately 35 kilometres in length from its headwaters near Needilup to where it joins the Pallinup River near Chillinup. Several small creeks flow into it with the major tributary of Peniup Creek incorporating a large catchment from near Jerramungup. Much of the bed of Corackerup Creek is sandy with long permanent pools which are scoured by floods in winter (refer to plate 8).

Runoff and River Flow

Corackerup Creek has no major dams or constructions built along or across its reaches.There is only one Water Authority gauging station in the area: 602001 (AMG coordinates), which is located on the Pallinup just before the Corackerup tributary joins the main river channel. This makes the quantitative data not applicable for the study of Corackerup Creek, however the monthly flow means of the Pallinup are probably comparable to those of the Corackerup Creek. The flood of July 1978 produced 86% of the total flow for the year and the January 1982 flood accounted for 90% of the year's flow. The flash flood of May 1988 was also a major part of the Pallinup River flow for the year. There is often no flow for approximately 80 days of the year in prolonged periods of summer. Hodgkin and Clark (1988), compared average annual runoff and flow against rainfall data for three major catchment systems in the area and concluded that runoff is only about 15% of rainfall.

Sediment Transport

Sediment is mostly transported by major floods. At such times fine sediment is washed by sheet erosion from cleared land, coarser material is eroded by gullying and from the river beds. The only data on sediment transport are for the January 1982 flood. This was estimated to have brought down 100 000 tons of sediment from the bed of the Pallinup River to Beaufort Inlet (Hodgkin & Clark 1988).

There is little doubt that there has been a considerable increase in the amount of sediment being mobilised in the catchments as the result of clearing and the consequent sheet erosion and gully wash. This is especially true of the Pallinup River catchment area of which 90% is cleared. The loss of soil would have been greatest while the land was being cleared in the 1950's and 1960's.

It is reported that much sediment collected in the river pools in the 1950's and 1960's, though this would since have been scoured out by major floods and carried downstream (Hodgkin & Clark,1988).

Water Salinity

River water in most of southwest W.A. has become increasingly saline. It can vary from about 10% of sea water salinity (3 to 4 parts per thousand of total dissolved salts) when the rivers are flowing to 150% (over 50pp thousand) in stagnant pools in the river beds in summer. There are two sources of salt: connate salt which continues to seep from the Eocene (65 - 20 million years before present) marine spongolite rock and cyclic salt, which is sea salt deposited from rainfall within the last 100 000 years. The latter has collected in the subsoil and now comes to the surface following clearing. In the long term this salt will decrease as it is washed out by rainfall, probably over hundreds of years (Hodgkin & Clark, 1988).

A water sample was collected from a permanent pool of the Corackerup Creek in its lower reaches in September 1991 and its salinity was 610 mSm-1 (millisiemens per metre). This is still fresh enough for consumption by most kinds of stock. Farmers often used the large permanaent pools of the Corackerup to water their stock during dry summers in the earlier days of settlement.

ABORIGINAL CULTURAL HISTORY IN THE AREA

Aborigines, like hunter-gatherer people everywhere, often camped on riverine terraces. Archaeological records in arid or semi-arid areas, indicate that they used river valleys as major thoroughfares in their regular movements, and made much less intensive use of more elevated, drier areas. Between Albany and Esperance, one can often find stone artifacts on alluvial terraces, but almost never are there plentiful artifacts on the rocky divides separating valleys.

Corackerup Creek was most probably a place regularly visited by Aboriginal people in the past due to the permanent freshwater pools the Creek contains (now mildly salty). The name of the water way is also of Aboriginal origin - "Corackerup". Qua~rq-~ar-ap has been interpreted to mean a creek where (in, on or near) a man's cloak (worn with the furry side outward, not against the skin) played a certain unspecified role being lost in a fight, a death or some other illusion (pers. comm., C.G. von Brandenstein, 1991).

The area around where Peniup Creek joins Corackerup Creek is called "Nyunk Nawainup" on the topographic map of the area. This place name has been transposed by Dr von Brandenstein to "Niun(a)g - naavainap" and he has interpreted it to mean " rubbing this here on to you" (this could be taken as an advice). (pers. comm. C.G. von Brandenstein, 1991)

FIRE HISTORY

There is no record of fires having burned through the Corackerup Creek River Foreshore reserve for the last 30 years. The vegetation in the reserve shows no signs of fire in the past and local farmers have no recollection of fires having passed through the reserve country.

In Peniup Creek Reserve there is evidence of fire having burned through the north-western section within the last 5 - 8 years.

AGRICULTURAL DEVELOPMENT

The very productive sandalwood industry of the 1840's preceded clearing in the area. John Hassell took up land at Jerramungup in 1849 and developed a large pastoral business, using ringbarking and burning to assist the growth of natural pastures. Small scale clearing for

agriculture began in the 1850's along the Pallinup River where there was the best grazing for sheep. More extensive clearing began for mixed farming from 1910 to 1912 on heavier soils in the Ongerup area. It was not until the 1950's, following the discovery of trace element deficiency, that there was widespread clearing on sandy soils north of Chillinup and in the upper catchment around Ongerup. Clearing involved the broadscale removal of almost all the bush, transforming the face of the area (Hodgkin & Clark 1988).

Fig. 3: Location map of Corackerup Creek corridor and adjoining reserves.

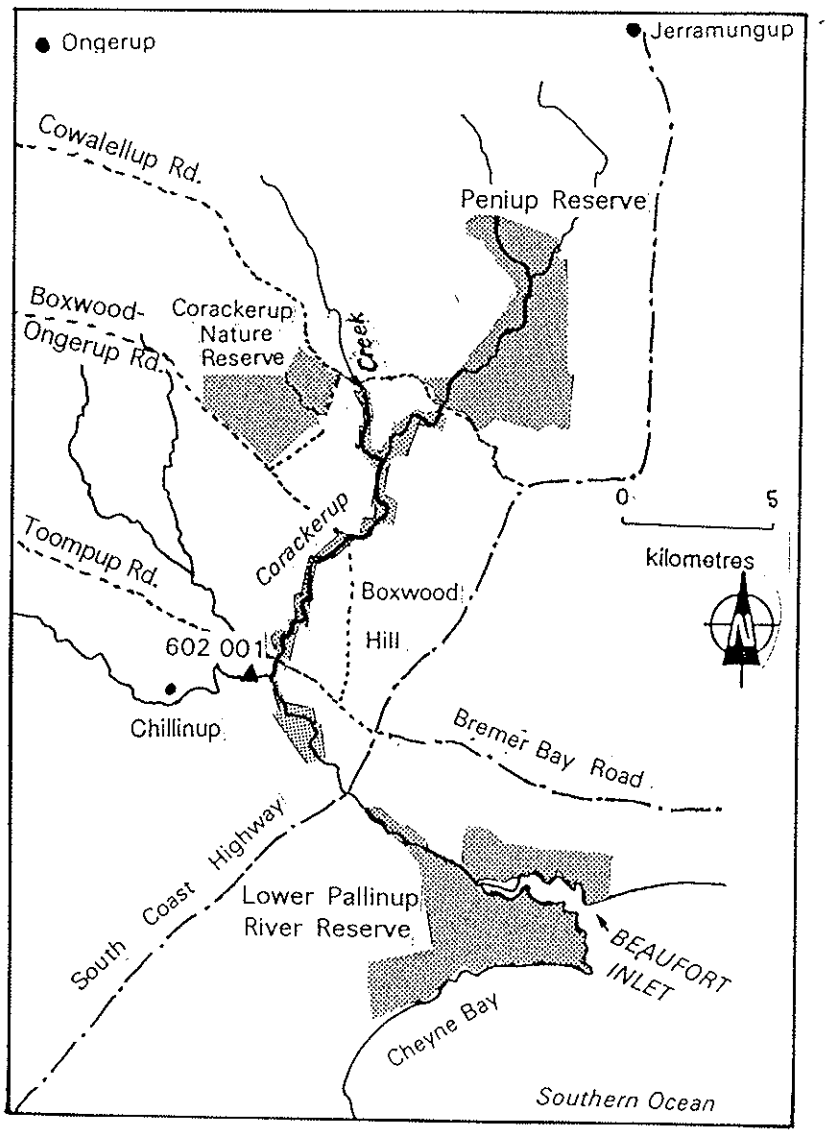


Fig. 4: Mean monthly rainfall (mm) for Cape Riche and Jerramungup. Means ▨, medians ▩. (Hodgkin & Clarke, 1988)

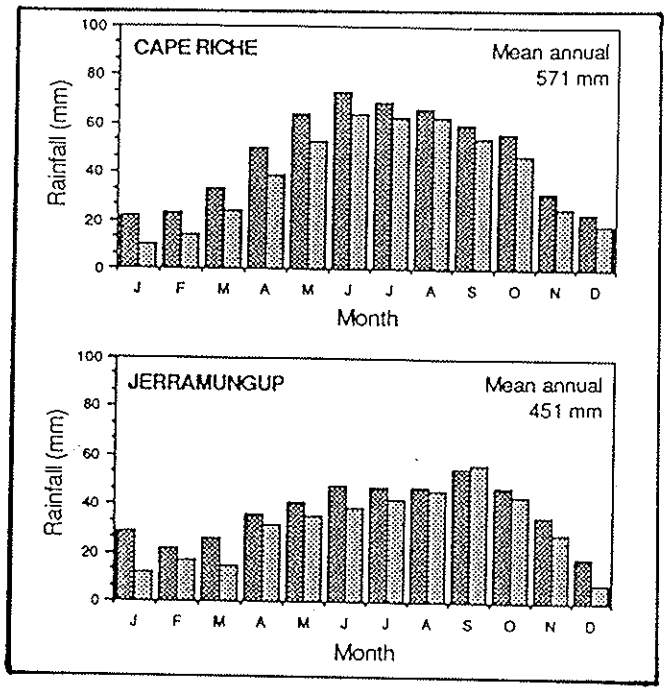
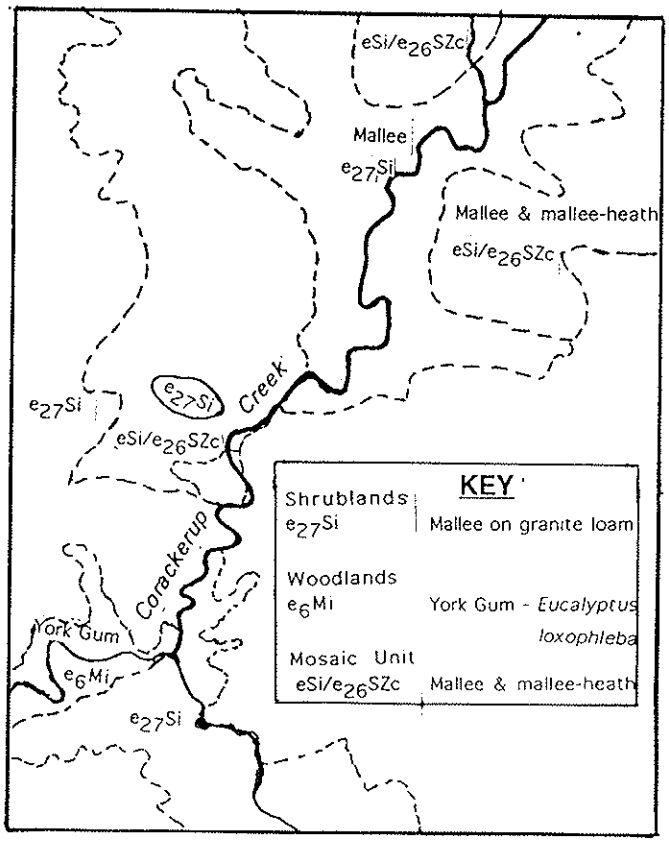


Fig. 5: Vegetation Map of Corackerup Creek area. (Veg. Survey of W.A., Bremer Bay: Sheet no. S1-50-12, Beard, 1972).



DESCRIPTION OF SURVEY SITES

Due to the limited time and funds for this study, only one site was trapped on the Corackerup Creek Corridor. The four grids were located in the southern end of the corridor on the western bank of the river providing easy access (refer to figure 6 for location of grids). Forty pit traps and eighty Elliot traps were installed and opened for five nights. Bird and floral surveys were undertaken during this time.

Four representative riverine habitats were selected for the trapping grids in the Corackerup Creek Corridor. More detailed vegetation lists for each grid are presented in Table 1 but a brief description of each is given below.

Grid 1
This grid was located approximately two and a half kilometres north of the Corackerup Creek crossing on Toompup Road, on the western side of the river. It was accessed through private property, and the grid was installed about fifty metres in from a firebreak on the western border of the corridor, and approximately 200 metres from the river bed. The vegetation association consisted of an open/closed *Banksia media* and *Melaleuca hamulosa* shrub storey with little understorey except for a few grasses and native herbs. The soil was a compacted clay and this area was obviously subject to flooding in very wet years.

Grid 2
This grid was located about one kilometre further up the fenceline from Grid 1. The pit traps were installed adjacent to the river channel on a flat sand plain 10 metres above the river bed. The vegetation association was dominantly an open woodland of *Allocassuarina fraseriana* with an occasional middle storey of *Banksia media, Isopogon axillaris and Hakea prostrata.* The understorey contained *Leptospermum ellipticum* with quite a few invasive agricultural grasses and a few native herbs.

Grid 3
This grid was located about one and a half kilometres further north of Grid 2 in an open woodland of *Eucalyptus occidentalis* with a middle storey of *Banksia media* and *Leptospermum ellipticum.* The understorey is composed of *Melaleuca hamulosa.* This location also contained invasive agricultural grasses and was probably subjected to grazing in the past. This grid was about 400 metres from the river bed.

Grid 4
Grid 4 was situated a further 400 metres along the corridor border from grid 3. It was about 200 metres from a long permanent freshwater pool of the river and about 100 metres from the firebreak on the western border of the corridor. This grid was installed in a low open heath (mixed species) dominated by *Eucalyptus tetragona, E. flocktoniae, E. conglobata* and *Banksia media.* It had a thick understorey of *Banksia violacea, Calothamnus gracilis, Hakea nitida, Cassia shatalaineana and Calytrix sp.*

FAUNAL SURVEY RESULTS FOR CORACKERUP CREEK CORRIDOR.

At Site 1 of Corackerup Creek Corridor, the survey recorded six native mammals, three feral mammals, thirty eight avifauna (birds), six amphibians, ten reptiles and sixteen invertebrates (molluscs and insects). (Refer to Tables 2 & 3)

The mammal species included the Pygmy and Honey possums, the Grey Kangaroo and Black Gloved Wallaby, a Common Dunnart (refer to plate 11), the Southern Bushrat, the fox, rabbit and domestic mouse.

The frog species included representatives from the Leptodactylidae family including the more commonly known burrowing frogs; the Spotted Moaning Frog (refer to plate 9), Banjo Frog, and Shoemaker Frog. The more commonly known reptile species included the Long Necked Tortoise (refer to plate 10), the Bearded Dragon, the Thorny Devil the Blue Tongued Lizard and five skink lizards. The invertebrate species included one species of land snail, the beetles belonging to the Carabidae, Cleridae, Scarabaeidae, Curculionidae and Geotrupidae families. The birds encompassed species from both the greater orders of Passerine and Non Passerine. This also included the Rare Western Whipbird, the Crested Bellbird, the Forest Kingfisher, Red Winged Wren and some actively nesting Malleefowl (refer to plate 12).

Species that have been recorded in the Corackerup Creek area that were not recorded on the surveys have been obtained from Museum records in Table 4. This includes three gekko species; the Barking Gekko - *Underwoodisaurus milii, Crenadactyluso. ocellatus* and the Marbled Gekko - *Phyllodactylus marmoratus*. Sitings by farmers suggest that the Ring Tail Possum may be in the area as well (pers. comm., Alex Hams,1991).

DESCRIPTION OF DEGRADED AREAS

In the northern area of the reserve, much of the open woodland and reparian thickets within the corridor are moderately degraded with infestations/proliferations of exotic and native grasses and rabbit diggings. In some areas the shrub cover is low (<10%) with many dead shrubs present. Heavy grazing by rabbits may be the cause of low regeneration. In other areas of the corridor there is very little to no disturbance of the lower storey giving 10-70% shrub cover.

Proliferation of native grasses (especially Stipa spp) may be indicative of repeated burnings or stock grazing in the past. The introduced grass, *Erhartia longiflora,* is also abundant.

A farm track crossing the Peniup Creek part of the reserve is the only evidence of human disturbance in the northern section of the reserve. In the southern half of the reserve there are old 4 wheel drive tracks through the bush though no evidence of recent human use. A local farmer said that these tracks had been installed by the Agricultural Protection Board (APB) in the days when they used to rip rabbit warrens in the reserve.

There is still evidence of heavy erosion of the river banks due to flooding in 1988. Large areas of the banks have been cut away leaving them vulnerable to continuous erosion.

To detect the presence of the soil fungus, 'Dieback' *(Phytophthora cinnamomi)* in the corridor, visual assessment of plant health was made. No evidence of the fungus was observed but this does not confirm it is not present. Examination was also made of vegetation communities which may change in the future if the fungus does begin to degrade the corridor.

Visual assessment was also made for the presence of aerial canker fungi which are causing degradation in native species along the south coast of Western Australia. (*Botryosphaeria ribis, Cytospora spp., Diplodina spp., Endothina spp. & Zythiostroma spp.).*

LOCAL COMMUNITY RESPONSE TO SURVEY

Twelve landowners adjoin the Corackerup Creek corridor reserve. Personal contact was made with eleven of these owners to discuss the proposed nature reservation of the river corridor and each was provided with a survey questionnaire which they could voluntarily respond to.

Farmers in the northern region of the corridor expressed extreme concern about the control of the vermin fauna in the area. Emus seem to cause considerable damage to crops on these properties and farmers indicated they would like to see a more efective management programme undertaken if CALM was to manage the river foreshore reserve. Farmers adjoining the southern part of the Corackerup Creek corridor have less problems with the emus, but a much greater problem in trying to control rabbit numbers. Large numbers of rabbits were observed to be using the reserve bush adjoining the pasture lands to establish large warrens.

Farmers complained that the current Agricultural Protection Board Programme did not control the rabbit numbers effectively and the river foreshore reserve harboured the rabbits.

Only 46 percent of the landowners responded to the questionnaire. (Refer to Table 5 for questionnaire results). Of these, all of them agreed that the river corridor had conservation value for native fauna and flora and acted as a corridor between Pallinup reserve and Corackerup Nature Reserve and Peniup reserve. However they also all agreed that feral animal control was an important management issue for the proposed reserve. 80% of them also rated weed control as an important management issue, with 60 % rating fire management as important and the other 40 % saying it was somewhat important. 60 % of the farmers said that kangaroo management was important, 20% said it was somewhat important and 20% said it was not an important management issue. Two of the farmers who responded to the questionnaire indicated they had property which was not fenced off from the reserve. This amounted to about 7.5 kilometres and it is thought that there are also quite a number of the other farmers who did not respond to the questionnaire who have unfenced sections adjoining the reserve. One farmer has approximately 180 hectares of uncleared native bushland adjoining the river reserve which could be considered for inclusion into the reserve in the future.

One farmer who owns property on either side of the river corridor reserve along the Peniup Creek branch, moves his stock through the reserve when moving them from property to property. Cowalellup Road is not a suitable alternative for moving his stock between these properties as it is extremely unsafe with low visibility to oncoming traffic.

A meeting with these landowners is to be organised in the near future to discuss the proposed management strategies for the proposed river reserve. The landowners expressed a strong interest for their involvement in contributing to management decisions for the proposed nature reserve.

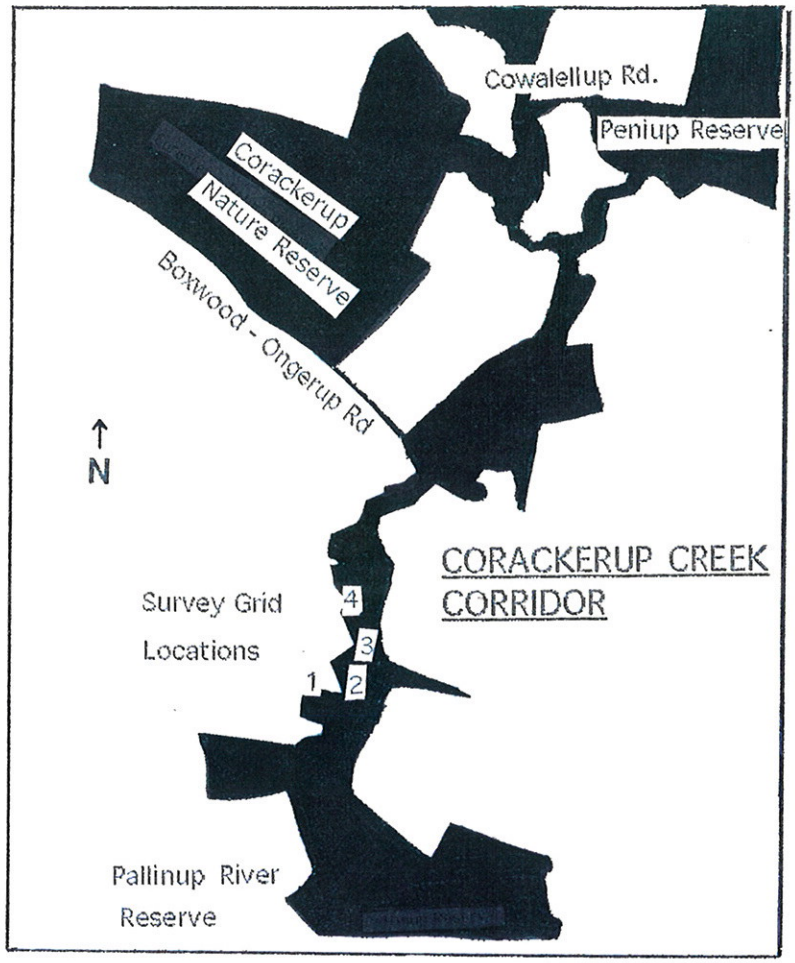


Fig. 6: Location map of survey grids for Sites 1 in the Corackerup Creek corridor.

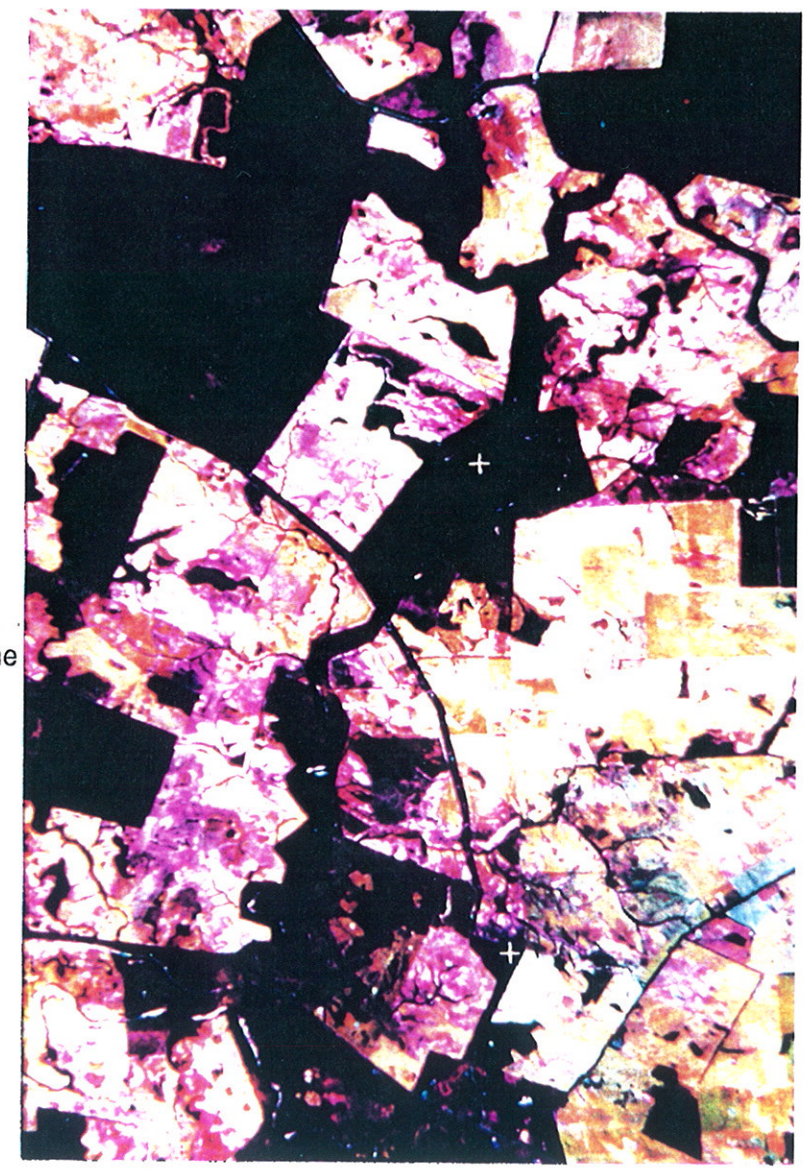


Plate 7: Satellite image from 1988 showing Corackerup Creek corridor and the adjoining reserves.

Table 1 - Corackerup Plant List

SITE 1			
GRID 1	**GRID 2**	**GRID 3**	**GRID 4**
Banksia media	Acacia sp.	Acacia sp.	Acacia aff. divergeus
Melaleuca hamulosa	Allocasuarina fraseriana	Avana sp.	Banksia media
Melaleuca uncinata	Banksia media	Banksia media	Banksia violacea
	Callitris preissii	Eucalyptus ocidentalis	Boronia sp.
	Calytrix sp.	Leptospermum ellipticum	Callitris preissii
	Chaeaescilla corymbosa		Calothamus gracilis
	Gahnia		Calytrix sp.
	Hakea prostrta		Cassia chatalaimeana
	Isopogan axillaris		Chamelaucium sp.
	Isopogan buxifolius		Choretrum sp.
	-var obouatus		Daviesia halceords
	Leptospermum		Eucalyptus conglobata
	Leptospermum ellipticum		Eucalyptus flocktoniae
	Melaleuca sp.		Eucalyptus tetragona
	Watzia aurea		Exocarpus sparteus
			Grevillea pectinata
			Hakea nitida
			Hibbertia sp.
			Hibertia sp. 2
			Melaleuca sp.
			Oxylobium
			aff. heterophyllum
			Petrophile sp.

TABLE 2 : Fauna trapping results for Corackerup Creek Corridor - Site 1. Total numbers (Column 1) of each species trapped in pit traps and Elliot traps in the vicinity of each sampling grid. Sightings (S) are also recorded but not included in total numbers.

LOCATION:	LATITUDE	LONGITUDE
Grid 1	118 40.5' E	034 18.9' S
Grid 2	118 40.6' E	034 18.8' S
Grid 3	118 40.7' E	034 18.2' S
Grid 4	118 40.8' E	034 17.8' S

Common Name	Scientific Name	Total No's	Grid No. (See map) 1	2	3	4
MAMMALS						
Pygmy Possum	Cercartetus concinnus	2		1	1	
Common Dunnart	Sminthopsis murina fuliginosa	1		1		
Western Grey Kangaroo	Macropus fuliginosus		S	S	S	S
Black gloved Wallaby	Macropus irma					S
Honey Possum	Tarsipes rostratus	11	1			10
Domestic Mouse	Mus musculus	12		12		
Fox	Vulpes vulpes					S
Rabbit	Oryctolagus cuniculus		S	S	S	S
AMPHIBIANS						
Spotted Moaning Frog	Heleioporus albopunctatus	7	2	2	1	2
Frog (Dots on side)	Heleioporus psammophilus	2	1		1	
Bull or Banjo Frog	Limnodynastes dorsalis	1		1		
Shoemaker Frog	Neobatrachus sutor	3	1	2		
Frog (Robust bodied)	Pseudophryne occidentalis	1		1		
Frog (Variable sized)	Ranidella glauerti	3		1	1	1
REPTILES						
Long Necked Tortoise	Chelodina oblonga	1		1		
Legless lizard	Aprasia repens	3		2	1	
Small Dragon	Ctenophorus maculatus griseus	1				1
Small Dragon	Pogona minor minor	1				1
Skink	Cryptoblepharus virgatus	1	1			
Skink	Ctenotus sp. (to be ident.)	3		3		
Skink	Hemiergis initialis brookeri	5			3	2
Skink	Hemiergis peronii	3	2		1	
Skink	Morethia obscura	28		12	16	
Bobtail	Teliqua rugosa	3			3	

TABLE 2 CONT'D: Fauna trapping results for Corackerup Creek Corridor - Site 1. Total numbers (Column 1) of each species trapped in pit traps and Elliot traps in the vicinity of each sampling grid.

Common Name	Scientific Name	Total No's
INVERTEBRATES		
Mollusc	Bothriembryon dux	3
Scorpion		4
	CARABIDAE	
Beetle	Cerotalis sp.	4
Beetle	Neocarenum sp.	2
Beetle	Scaraphites sp.	1
Beetle	Gnathoxys sp.	1
	CLERIDAE	1
	SCARABAEIDAE	
Beetle	Liparetrus sp. 1	1
Beetle	Liparetrus sp. 2	1
Beetle	Liparetrus sp. 3	1
Beetle	Heteronyx sp.	1
Beetle	CURCULIONIDAE 1	1
Beetle	CURCULIONIDAE 2	3
Beetle	CURCULIONIDAE 3	1
Beetle	CURCULIONIDAE 4	1
Beetle	CURCULIONIDAE 5	1
	GEOTRUPIDAE	
Beetle	Blackburnium sp.	1

Extra line of Elliot traps set by creek at LOCATION 5

2 Southern Bush Rats *(Rattus fuscipes)*
3 Domestic Mouse *(Mus musculus)*
5 Long Necked Tortoises sighted in pool at this location. *(Chelodina oblonga)*

TABLE 3: Bird list for surveyed corridors. (+) Species sited at **(C) Corackerup**, (F) Fitzgerald, (Y) Young and (L) Lort River Corridors. (?) if identification was not definite.

COMMON NAME.	SCIENTIFIC NAME	C	F	Y	L
Australian Bustard	*Ardeotis australis*				+
Australian Magpie	*Cracticus tibicen*	+	+	+	+
Australian Raven	*Corvus coronoides*	+	+	+	+
Australian Wood Duck	*Chenonetta jubata*	+	+	+	+
Banded Plover	*Vanellus tricolor*		+	+	+
Barn Owl	*Tyto alba*	+	+		
Barn Swallow	*Hirundo rustica*			+	
Black Duck	*Anas superciliosa*			+	
Black Faced Cuckoo Shrike	*Coracina novaehollandiae*		+	+	+
Black Fronted Dotterel	*Charadrius melanops*		+	+	
Black Swan	*Cygnus atratus*			+	
Black Tailed Native Hen	*Gallinula ventralis*		+		
Blue Breasted Wren	*Malurus pulcherrimus*	?	?	?	?
Broad Tailed Thornbill	*Acanthiza apicalis*				+
Brown Headed Honeyeater	*Melithreptus brevirostris*				+
Brown Falcon	*Falco berigora*				+
Brush Bronzewing Pidgeon	*Phaps elegans*	+	+	+	+
Chestnut Teal	*Anas castanea*	+	+	+	
Common Bronzewing	*Phaps chalcoptera*	+		+	+
Coot	*Filica atra*	+		+	
Crested Bellbird	*Oreoica gutturalis*	+		+	+
Crested Pidgeon	*Ocyphaps lophotes*	+	+	+	+
Dusky Woodswallow	*Artamus cyanopterus*			+	
Eastern Reef Heron	*Egretta sacra*			+	
Elegant Parrot	*Neophema elegans*		+		
Emu	*Dromaius novaehollandiae*		+	+	+
Fan Tailed Cuckoo	*Cuculus flabelliformis*			+	
Forest Kingfisher	*Halcyon macleayii*	+			
Galah	*Cacatua roseicapilla*		+	+	
Golden Whistler	*Pachycephala pectoralis*	+	+	+	+
Grey Breasted White Eye	*Zosterops lateralis*	+	+	+	
Grey Butcher Bird	*Cracticus torquatus*		+	+	
Grey Currawong	*Strepera versicolor*	+		+	+
Grey Falcon	*Falco hypoleucos*				+
Grey Teal	*Anas gibberifrons*	+	+		
Hoary Headed Grebe	*Podiceps poliocephalus*	+	+	+	
Horsefields Bronze Cuckoo	*Chrysococcyx basalis*		+		
Little Black Cormorant	*Phalacrocorax carbo*	+		+	
Little Grebe	*Podiceps ruficollis*	+		+	
Little Pied Cormorant	*Phalacrocorax melanoleucos*	+		+	
Little Wattle Bird	*Anthochaera chrysoptera*			+	+
Magpie Lark	*Grallina cyanoleuca*	+	+	+	+
MalleeFowl	*Leipoa ocellata*	+	+		+
Mallee Heath Wren	*Sericornis cautus*	+	+	+	+
Mountain Duck	*Tadorna tadornoides*	+	+		
Nankeen Kestrel	*Falco cenchroides*		+	+	+
Native Swamp Hen	*Porphyrio porphyrio*		+		

TABLE 3 CONT"D: Bird list for surveyed corridors. (+) Species sited at **(C) Corackerup**, (F) Fitzgerald, (Y) Young and (L) Lort River Corridors. (?) if identification was not definite.

COMMON NAME.	SCIENTIFIC NAME	C	F	Y	L
New Holland Honeyeater	*Phylidonyrus novaehollandiae*	+	+	+	+
Pallid Cuckoo	*Cuculus pallisus*		+	+	
Pied Butcher Bird	*Cracticus nigrogularis*	+	+	+	
Pink Eared Duck	*Malacorhynchus membranaceus*			+	
Port Lincoln Parrot	*Barnardius zonarius*	+	+	+	+
Purple Crowned Lorrikeet	*Glossopsitta porphyrocephala*		+		
Rainbow Bee Eater	*Merops ornatus*			+	
Red Capped Parrots	*Platycercus spurius*	+	+	+	+
Red Wattle Bird	*Anthocheara carunculata*		+	+	+
Red Winged Wren	*Malurus elegans*	+	?		
Restless Flycatcher	*Myiagra inquieta*	+			+
Richard's Pipit	*Anthus novaeseelandiae*			+	
Singing Honeyeater	*Meliphaga virescens*	+	+	+	+
Splendid Wren	*Malurus splendens*	+	+	+	
Striated Pardelote	*Pardalotus striatus*		+		+
Yellow Rumped Pardelote?	*Pardelotus xanthopygus*			+	
Tawny Frogmouth	*Podargus strigoides*		+	+	+
Tawny Crowned Honeyeater	*Phylidonyris melanops*		+		+
Variegated Wrens	*Malurus lamberti*	?	?	+	+
Wedgetailed Eagle	*Aquila audax*		+	+	+
Weebill	*Smicrornis brevirostris*				+
Welcome Swallow	*Hirundo neoxena*	+	+	+	
Western Grey Shrike Thrush	*Colluricincla harmonica*		+	+	+
Western Rosella	*Platycercus icterotis*	+			
Western Spinebill	*Acanthorhynchus superciliosus*	+			
Western Whip Bird	*Psophodes cristatus*	+			
White Browed Babbler	*Pomatostomus temporalis*	+	+	+	+
White Browed Scrubwren	*Sericornis frontalis*			+	
White Cheeked Honeyeater	*Phylidonyris albifrons*		+		
White Eared Honeyeater	*Meliphaga ornata*			+	+
White Faced Heron	*Ardea novaehollandiae*	+	+	+	
White Fronted Chat	*Ephthianura albifrons*				+
White Naped Honeyeater	*Melithreptus lunatus*			+	
WhiteTailed Black Cockatoo	*Calyptorhynchus baudinii*			+	
White Winged Triller	*Lalage sueurii*			+	+
Willy Wagtail	*Rhipidura leucophrys*	+	+	+	+
Yellow Rumped Thornbill	*Acanthiza chrysorrhoa*			+	
Yellow Throated Miner	*Manorina flavigula*	+	+	+	+

TABLE 4 : Museum Records of other additional species found within the Corackerup Creek Corridor or in it's vicinity. The W.A.M. Accession Numbers is the reference number the Museum has given that specimen.

SPECIES	LOCATION		WAM
	Longitude (Degrees East)	Latitude (Degrees South)	A.No.'s
MAMMALS			
MACROPODIDAE			
Macropus fuliginosus	118 40	034 19	6799
REPTILES			
GEKKONIDAE			
Crenadactylus ocellatus ocellatus	118 38	034 20	27384
Phyllodactyllus marmoratus marmoratus		118 38	034
20	27414		
Underwoodisaurus millii	118 38	034 20	27375
VARANIDAE			
Varanus	118 381	034 20	26420

Table 5: Results (in percentages) of questionnaire completed by adjoining landowners to the Corackerup Creek corridor. Not all responses calculate to 100% as some landowners prefferred not to respond on some issues.

Eleven landowners sent questionnaire, five replied ..... 46% response

Do you feel the river corridor has conservation value;	YES	UNSURE	NO
for preserving native plants ?	[100%]	[ ]	[ ]
for preserving native animals ?	[100%]	[ ]	[ ]
to act as a corridor ?	[100%]	[ ]	[ ]

Would you rate the following issues as important, somewhat important or not important in the proposed reserve ?

	IMP.	S.I.	N.I.
weed control	[80%]	[ ]	[ ]
feral animal control	[100%]	[ ]	[ ]
fire management	[60%]	[40%]	[ ]
kangaroo management	[60%]	[20%]	[20%]

	YES	NO
Would you like to have the opportunity to participate in management decision making for this reserve ?	[82]	

Is your fence completely fenced off from this reserve ?

[2 farmers said "no" with a total of 7.5 kilometres unfenced]

One landowner telephoned to say he could not be bothered sending in the questionnaire but that he was very supportive of CALM 's proposed nature reserve along the river foreshore.

Plate 8: View of permanent pool in the lower reaches of Corackerup Creek.

Plate 9: Spotted Moaning Frog
Heleioporus albopunctatus

Plate 10: Long Necked Tortoise
Chelodina oblonga

Plate 11: Common Dunnart
Sminthopsis murina fuliginosa

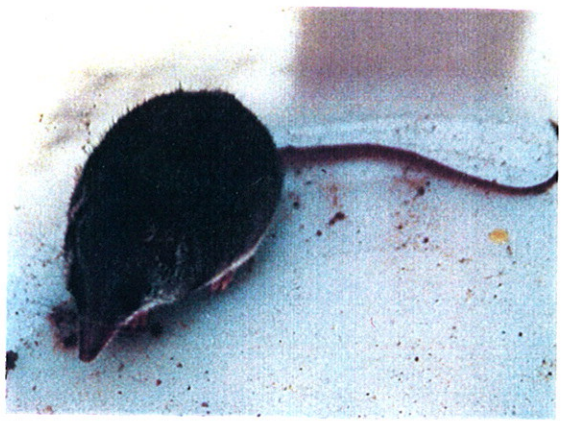


Plate 12: Active Mallee Fowl nest found near Grid 4.

Plate 13: Open mallee heath of
Eucalyptus tetragona

DISCUSSION OF FINDINGS.

Corackerup Creek foreshore reserve contains a rich variety of flora and fauna associations. It contains mallee heaths and Eucalypt woodlands in a relatively pristine condition. It also has one of the two known populations of one of the rarest Eucalypts in Western Australia.

As a corridor it links the Pallinup River reserve with Corackerup Nature Reserve and Peniup reserve. These reserves are home to some flora and fauna which are either rare or in urgent need of habitat reservation. These include a rare orchid, the Tammar Wallaby, Western Whipbird and the Mallee Fowl.

Corackerup Creek is a fairly unique inland waterway in the south coast region of Western Australia in that it contains large permanent pools which remain fresh enough for fauna (and stock) consumption all year round. It is also a relatively undisturbed waterway providing a perfect breeding site for water birds and Long Necked Tortoises.

Although no official Aboriginal Sites have been recorded along the waterway, it is probable that it was used by Aboriginal people in the past. The creek is still called by an Aboriginal Nyungar word giving a small indication of the cultural significance this permanent water supply once held in the past for these people.

The age of the vegetation in the reserve is fairly unique to the area due to the lack of burning in the reserve for the last thirty years. Since the development of broadscale agricultural development in the area in the 1950's, fire hazard preparedness by the community has kept fire out of the foreshore reserve. This is also an indication that this remnant vegetation is not a major fire hazard for the farming community.

Along the reserve borders adjacent to pasture land, there is intrusion of some exotic grasses. This weed intrusion is also present at the three creek crossings along the roads dissecting the corridor and in other areas of disturbance where old 4 wheel drive vehicle tracks occur. In other areas of the corridor, there is very little disturbance and it is in a pristine condition.

The community as a whole is a little wary of the proposed nature reservation of this foreshore reserve. This was reflected in the low response to the questionnaire and opinions expressed during personal communication with the adjoining landowners. Their concern is due to perceived restrictions of access which may occur if the reserve is a nature reserve and under CALM management. With one farmer owning property on either side of the reserve, it will be necessary to allow him to move stock through the reserve bushland from property to property at certain times of the year.

The community has also experienced problems with increased emu and rabbit populations causing damage to their crops and pasturelands. They would like to see a better control programme instigated. They would also very much like to participate in contributing to management decisions for the proposed reserve.

Corackerup Creek foreshore reserve has special conservation value for preserving the native fauna and flora populations within it's boundaries and to act as a corridor between Pallinup River reserve and Corackerup nature reserve and Peniup Reserve. The proposal to establish it as a nature reserve should be instigated as soon as possible.

FITZGERALD RIVER CORRIDOR

DESCRIPTION OF CORRIDOR

BOUNDARIES AND PHYSICAL FEATURES

The Fitzgerald River flows from a north-west to south-east direction from its headwaters in Lake Magenta Nature Reserve 80 km from the coast and 300 metres above sea level to Fitzgerald Inlet (refer to figure 7). Between the nature reserve and the Fitzgerald River National Park boundary, the river flows in a narrow strip of river foreshore reserve stretching over approximately 25 kilometres. The foreshore reserve incorporates Reserve No. 26172 (Water , 964 .5 ha) , Reserve No. 36207 (Recreation and Parklands, 409.7 ha), Reserve No. 1028 (Resting Place, 239.7 ha) and Reserve No. 35298 (Recreation, 60. 5 ha) and also incorporates Road No. 8792. The combined total area of the Fitzgerald corridor under study is 1674.4 hectares.

The Lake Magenta Nature Reserve (A Class Reserve No. 25113) on the northern border of the corridor is 94 170 hectares in size and Fitzgerald River National Park on the southern border of the corridor is 329 039 hectares in size.

CLIMATE

Rainfall is about 500 - 600 mm at the coast falling to 400 mm north of the South Coast Highway in the upper catchmment of the Fitzgerald River. Evaporation is high, at about 1700 mm, and river flow is seasonal. Rainfall is seasonal with most of the rain falling in winter (refer to figure 8). However cyclonic rains sometimes preciitate 100 to 200 mm in a few days and these distort the monthly means (Hodgkin & Clark, 1990).

GEOLOGY

The upper part of the catchment of the Fitzgerald River lies on gently undulating sandplain that covers the hard granitic and gneissic Archaean rocks of the Yilgarn Block at about 300 metres above sea level. Near the South Coast Highway, the river has cut down through the sandplain to the underlying bedrock, exposing the granitic river beds (Hodgkin & Clark, 1990).

SOILS

In the northern region of the Fitzgerald River catchment the dominant soils are consistent with the S1 30 soil unit of the CSIRO "Atlas of Australian Soils" viz:

> S1 30: Gently undulating pediments with narrow ironstone gravel ridges. Hard - setting loam rich soils with yellow clay rich subsoils.
> (Crook & Burbidge, 1982)

This general description covers a variety of soil types to be found in the northern areas of the foreshore reserve, ranging from eroded kaolinised ridges capped with thin layers of laterite through to gravelly loams and sandy soils. Further down the river reserve as the catchment valley becomes deeper, the granite bedrock is exposed intermittently with alluvial deposits of

coarse grained quartzitic sands.

The variety of soil types is reflected in the sequence of vegetation formations which can be observed in the reserve. The undulating sandplain in the northern region carries an open mallee

dominated by *E. tetragona.* The sandy loam rich soils of the gorge floors are dominated by open mallee of either *E. conglobata* or *E. incrassata*, with low forest of Moort (*E. platypus var. platypus*) dominant on clay soils. The granite bedrock is often exposed on valley slopes which are vegetated by shrublands and low woodlands dominated by species of Acacia, Allocasuarina and Proteaceae. Swamp Yate (*E. occidentalis*) woodland is dominant along the river flats (Beard, 1981).

VEGETATION TYPES

The vegetation within the corridor was mapped on a broad scale by J.S. Beard, (refer to figure 9), as part of the Vegetation Survey of Western Australia in 1972(b). Beard differentiated 3 vegetation formations in the river foreshore reserve as follows:

Shrublands

xSZc	Scrub heath-Mixed Proteaceae-Myrtaceae
e_{15}Si	Mallee on lateritic soil-*E. eremophila, E. oleosa* assoc.

Woodlands

e_6Mi	York Gum-*Eucalyptus loxophleba*

Mosaic Unit

eSi/e_7Mi	Mallee with small patches of woodland-*E. occidentalis*
eSi/e_{26}SZc	Mallee and mallee heath

Detailed floral surveys have been done at the northern and southern ends of the corridor in both Lake Magenta Nature Reserve and Fitzgerald River National Park. Lake Magenta Nature Reserve covers a substantial portion of a distinct vegetation unit defined by the mallees and woodland formations. This diverse block of mallee and woodland species was originally almost isolated from expanses of similar vegetation by areas of heathland and scrublands to the north, west, south and east of the reserve. Due to its size and remoteness, the Reserve has remained in a very undisturbed state (Crook & Burbidge, 1982).

Fitzgerald River National Park is noted internationally for its great diversity of native vegetation. Over 1750 plant species have been identified, (over 20% of W.A.'s flora), of which 75 are endemic to the Park and another 50 are restricted to it and the surrounding region. Many are rare (Chapman & Newbey, 1987).

FAUNAL RECORDS

Faunal Records for Lake Magenta Nature Reserve - Area North of Fitzgerald Corridor

A survey done in 1980 by the Department of Fisheries and Wildlife in Perth, discovered that some unusual fauna live in the Lake Magenta Nature Reserve at the north end of the Fitzgerald corridor. Three of these species; the Honey Mouse (*Tarsipes spencerae*), the Red Tailed Wambenger (*Phascogale calura*) and Mitchell's Hopping Mouse (*Notomys mitchelli*) are very rare and in danger of disappearing. Mallee Fowl are also recorded as being very active in the

area with the moort (*E. platypus*) providing a suitable habitat for the protection of this bird. Other special bird species present in the reserve are the Southern Scrub Wren (*Dryomodes brunneopygia* - almost confined to mallee areas), the shy Ground Wren (*Hylacola cauta* - also confined to mallee areas and now very rarely seen in the wheatbelt), the Blue Breasted Wren

(*Malurus pulcherrimus* - characteristic of the mallee habitat and once considered the rarest of the Blue Wrens) and the Rufous Tree Creeper (*Climaacteris rufa* - a eucalypt woodland species once common but which now disappearing from a large portion of the south-west).

Faunal Records for Fitzgerald River National Park - Area South of Fitzgerald Corridor

Fitzgerald River National Park (F.R.N.P.) had a very detailed biological survey done within its boundaries in 1987 by the late Mr Ken Newbey. It was discovered that it has more species of fauna than any other conservation reserve in the south west of W.A with twenty species of native mammal, of which five are gazetted "threatened". These are the Tammar Wallaby (*Macropus eugenii*), the Dibbler (*Parantechinus apicalis)*, the Red Tailed Wambenger *(Phascogale calura)* , the Western Mouse *(Pseudomys occidentalis)* and the Short Nosed Bandicoot *(Isoodon obesulus)* .

Ken Newbey deduced that he saw the northern area of the F.R.N.P. as a small remnant of a formerly widespread and rich faunal area. It was the source area for much of the present day fauna found within the park. He also stated that it is quite possible that river valleys might be corridors which the fauna use to disperse through the landscape. It is this possibility which makes the Fitzgerald River corridor very important. It joins the National Park on the north western border, near where many of these rare fauna have been observed.

RIVER DATA

The Fitzgerald River water flow is seasonal and there is often no flow for much of the year. The dry river bed has a string of pools with dense growth of trees and shrubs between them in the upper reaches (refer to plate 15). The smaller pools dry up in summer, but larger pools remain permanent all year round. Flood waters may flow several metres deep and scour the channels. River water is saline, seldom less than a quarter of sea water salininty and evaporation increases this greatly in shallow pools. Nevertheless, some permanent pools support a number of plant and animal species including Black Bream and three other species of fish in the lower reaches of the river in the Fitzgerald National Park (Hodgkin & Clark, 1990).

Runoff and River Flow.

The Western Australian Water Authority had a gauging station installed at Jacup on the Fitzgerald River just south of the southern border of the corridor under study between 1974 and 1986 (Station 602001 AMG coordinates). Runoff to the estuary averages about 6mm from cleared catchments and 3.8 mm from bushland in the park. Bushfires cause a temporary increase in runoff. In 1976, 94 % of the years flow was in August, more than half of it in one day. There was almost no flow in the three years 1979 - 1981. High flow in the Fitzgerald River in 1976 and 1977 was followed by flood flow in July 1978 causing the sand bar at Fitzgerald Inlet to break. Flood flow following sustained above average flow is probably the main cause of the bars breaking (Hodgkin & Clark, 1990).

Sediment Transport

There are no data on sediment transport, however it is evident that large amounts of coarse and fine sediment are washed down to Fitzgerald Inlet, principally during major floods. Some of this

comes from the cleared agricultural land in the upper reaches of the river, but it is also scoured from the river chanels. Evidence from the Beaufort Inlet and Stokes Inlet shows that clearing has greatly accelerated the rate of sedimentation in estuaries (Hodgkin & Clark, 1990).

Water Salinity.

All the river water is saline, where it flows from cleared catchments and within the park, but salinity varies from almost fresh to that of greater salinity than sea water. The salinity (Total

Soluble Salts) of strongly flowing water at Jacup appears in PWD records to have been between 3 parts per thousand (ppt) and 8 ppt, though with some higher figures. Too few samples have been taken of water flowing into South Coast estuaries for any reliable estimate to be made of the salt load contributed by river water to estuary water (Hodgkin & Clark, 1990).

ABORIGINAL CULTURAL HISTORY IN THE AREA

Early journal records of the first European explorers in the south coastal region refer to the fact that there was evidence of Aborignal peoples habitation throughout the Fitzgerald area.

> Mathew Flinders, 7/1/1802 after Doubtful Isles and possibly Fitzgerald Inlet commented "with smokes rising there" (Flinders, 1814, p. 77)
>
> E.J. Eyre, 28/6/1841, just west of Culham Inlet:
> "Upon getting up this morning we saw the smoke of native fires along the margin of the lake, at less than a mile from us. They had already noticed our fire, and called out repeatedly to us." (Eyre, 1845, p. 97)
>
> J.S. Roe 2/1/1849, Reef Beach Environs.
> "To move at all amongst these animated sandheaps without loaded horses seemed at first a proceeding of rather doubtful issue, on account of fancied quicksands, but on Bob's assurance it was a safe road, always used by the black fellows to avoid the adjoining rocky, scrubby country, we advanced into it." (Roe, 1848 , p. 204)

The place name of Twertup (meaning 'as a dog') given to a spot on the Fitzgerald River further south of the area being studied, suggests that Aboriginal people probably did move in the corridor area. As mentioned in the Corackerup Creek section, riverine habitats were regularly used as thoroughfares by Aboriginal people.

FIRE HISTORY

There are no records indicating that the river corridor area has burnt in the past forty or fifty years. An adjoining landowner who has lived in the area since 1920, could not recall the bush having been burned. Field observations showed no fire scars in the vegetation.

A detailed study of fire history in Lake Magenta reserve indicated that 60% of the Nature Reserve has been burnt in eight major fires during the past 20 years. All but the last of these fires started outside the reserve, either as a result of lightning strike (2 recorded occasions) or the accidental escape of clearing burns. Prior to the 1960's, fires seem to have been a less common occurence.

It was concluded that the frequent fires in the Lake Magenta Nature Reserve of the past 20 years are thought to have been an unusual occurrence and mostly associated with the development of

the surrounding farmlands. It was considered that regrowth of the plant associations in the reserve is extremely slow and unlikely to provide a suitable habitat for fauna like Mallee Fowl for many years following a fire (Crook & Burbidge, 1982).

Fire records in F.R.N.P. can be traced back right to the very early days of European arrival in the area. References to vegetation burning have been collected from early journals by Keith Bradby in 1989. He concluded that only the Yate, *(Eucalyptus occidentalis)* valleys may have received regular burning by Aboriginal People. The bulk of the region would not have been burnt at less than 25 - 30 year intervals. Some of these early journal recordings which relate to the Fitzgerald corridor area and the vegetation which existed their due to burning are included below.

> J.S. Roe 21-22 /10/1848, Jerramungup
> Numerous comments on good grass and abundance of kangaroos and emus i.e."well grassed valley, with beautiful lightly wooded hills or slopes on either hand." (Roe, 1848, Expl. Diaries Vol. 4, p. 139)

> John Forrest, 14/4/1871, Old Jerramungup:
> "Left Jerramungup, steering a little to the north of east expl. over scrubbing and undulating sandplains.....Camped on a small branch of the Fitzgerald River on some granitic rocks called "Dwertup": very little feed for our horses."
> (Forrest 1870, Expl. Diaries Vol 6, p. 267)

> Ethel Hassell, 1870's, Old Jerramungup:
> "As the natives burn large tracts of country every year, to ensure the grass and herbage coming up green and sweet at the first rains, also to drive out the game for hunting purposes. All the young of the birds that built on the ground were hatched and able to fly, also all the young ground rats were running about, so it was quite time for the man carls (fire)."
> "In a few days the whole country was on fire and the smoke driving down in the station made life very intolerable." (=Hassell, 1975, p. 110)

Since these early days of European settlement there have been many fires but there are accurate records only since 1977. There were 32 small fires between the years of 1977 and 1986. One fire burnt a larger area near Dempster Inlet and a small fire in 1986 entered the northern boundary of the park and burnt in a south easterly direction for about 6 kilometres following the Fitzgerald River Valley. Since then there have been another 16 fires with a large percentage of the park being burnt in the summer months of 1989 due to lightning strikes. However, the Fitzgerald River valley in the northern half of the park was not burnt at this stage.

AGRICULTURAL DEVELOPMENT

As a result of Roe's reports of good grazing land, John Hassell took up the first large pastoral lease in the area at Jerramungup Spring in 1849. It was not until the early 1900's that the first pastoral settlement along the Fitzgerald River catchment was established but it is quite possible that the woodland areas along the river were grazed prior to this. The majority of the other agricultural land was cleared for agriculture in the 1950's and 1960's and is used for broad scale cereal and wool production. This area comprises about 40 % of the Fitzgerald River catchment (Hodgkin & Clark, 1990).

Fig. 7: Location map of Fitzgerald River corridor and adjoining reserves.

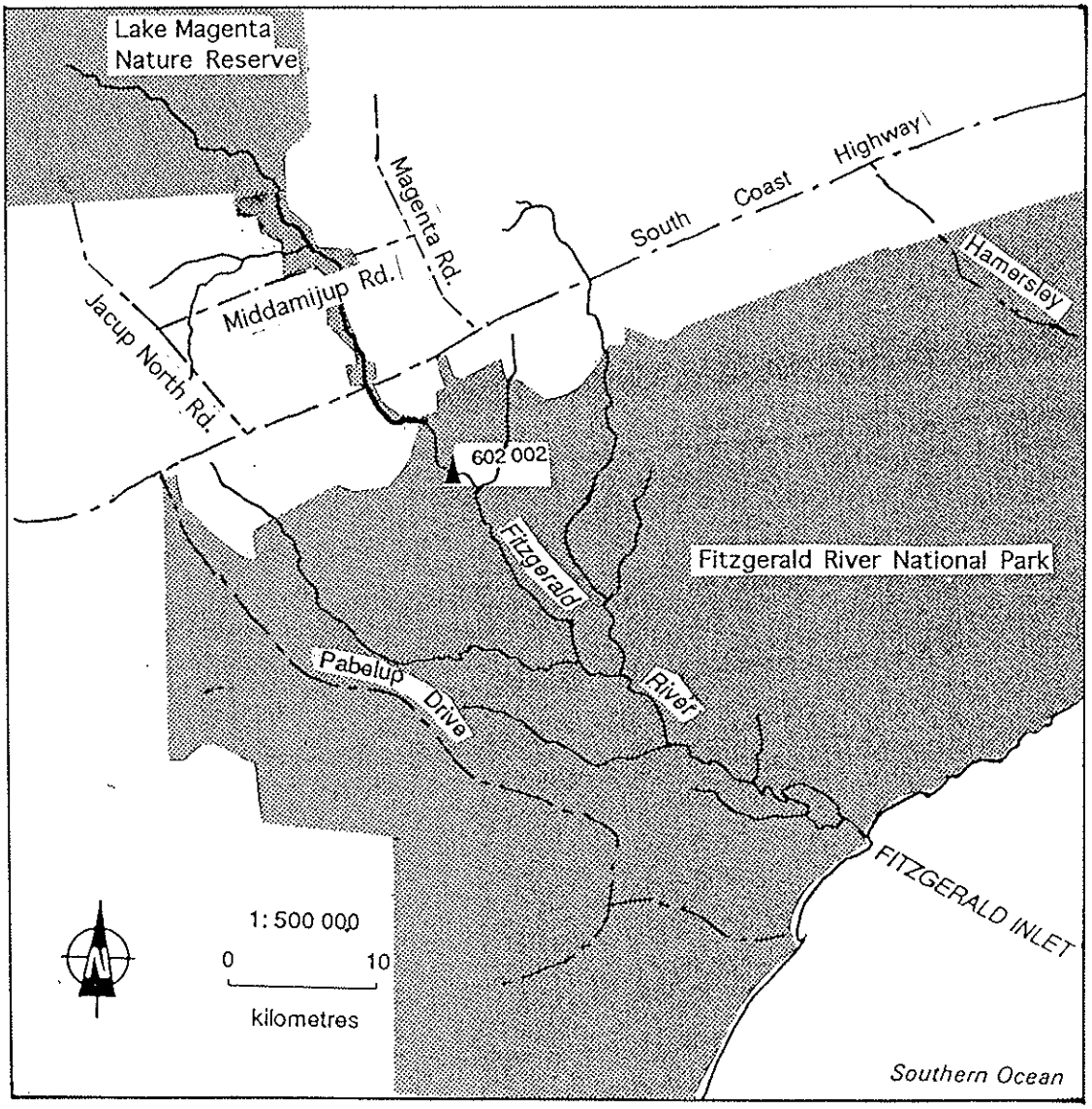


Fig. 8: Mean monthly rainfall (mm) for Jerramungup. Means ▩, medians ▦. (Hodgkin & Clarke, 1990)

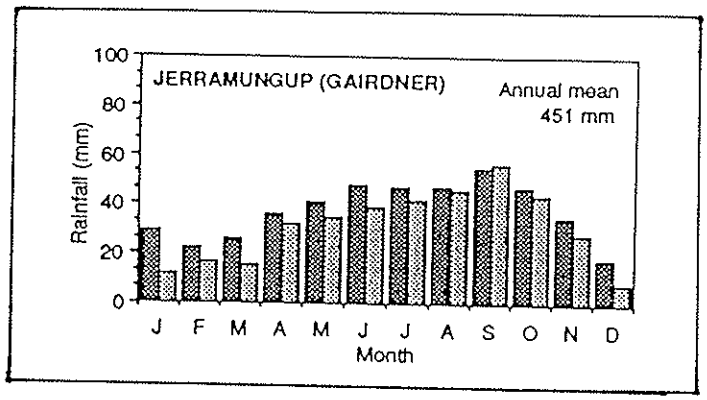
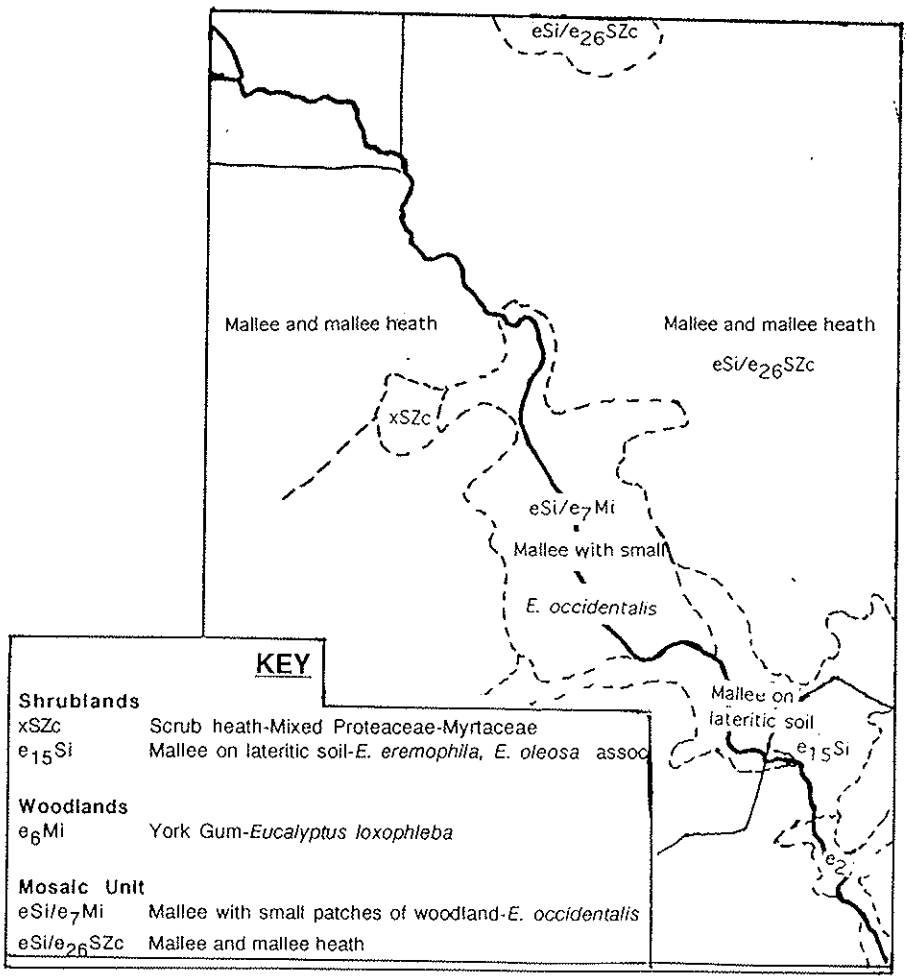


Fig. 9: Vegetation Map of Fitzgerald River corridor area. (Veg. Survey of W.A., Newdegate: Sheet no. S1-50-8, Beard, 1972).



DESCRIPTION OF SURVEY SITES

Two sites were trapped on the Fitzgerald River Corridor. Site 1 was located about a third of the way down the vegetation corridor and Site 2 about two thirds down its length. (refer to figure 10 for location sites and trap grids.) Eighty pit traps and one hundred and sixty elliots traps were installed. Due to wet, cold weather, Site 1 pit traps were closed for one of the five trapping nights and Site 2 pit traps were also closed for one night. Bird and flora surveys were undertaken during this time.

Eight representative riverine habitats were selected for the trapping grids in the Fitzgerald Creek Corridor. More detailed vegetation lists for each grid are presented on Table 6 but a brief description of each is given below.

Site 1

Grid 1
This grid was located on the northern side of Middamijup Road approximately eight hundred metres from the crossing. The grid was about eighty metres in from the road and located in Low open Mallee (mixed species) dominated by *Eucalyptus anceps, E. xanthonema, E. dissimulata phaenophylla* and *E. tetragona*. (four E. species). The understorey was dominantly *Petrophile heterophylla, Dryandra tridentata, Synaphea polymorpha* and *Grevillea tripartita.*

Grid 2
This grid was located on the northern side of Middamijup Road on the western bank approximately one hundred metres north of the crossing and eighty metres from the river bed. It was the flat colluvial flood plain for the river which would probably flood in excessively wet years. The soil was deep sandy loam and was dominantly covered by *Melaleuca hamulosa with a heath understorey composed of Jacksonia furcellata, Petrophile sp. and Leptospermum sp.*

Grid 3
This grid was located approximately fifty metres from the river bed on the east bank and on the south side Middamijup Road about one hundred metres from the crossing. The traps were set in an almost pure, thick stand of *Allocassuarina heugelliana* woodland with no understorey except for a few grass species (refer to plate 17). The woodland was bordered by fruiting *Santalum acuminatum* (Quandong), *Melaleuca cuticularis* and a few *Acacia sp.* The Allocasuarina were growing in a deep yellow quartzitic sand.

Grid 4
This grid was located approximately two kilometres south of Middamijup Road on the western side of the river about sixty metres in from the western firebreak bordering the corridor. The grid was placed in open woodland of Yates, *Eucalyptus occidentalis* , with no middle storey and a sparse, open understorey of *Acacia sp* , some agricultural grasses though many native herbs, grasses, orchids and sedges are also present. e.g *Waitzia aurea, Mirbelia ramulosa, Ptilotus villisiflorus.* As at this site, the Yates in the Jerramungup area are all badly damaged by a Lerp Beetle.

Site 2

Grid 1
This grid was located on the eastern side of the river about one hundred and fifty metres north of the South Coast Highway and eight hundred metres from the river. It was accessed from the Telecom cable cleared line. The traps were installed amongst exposed granitic/gneiss rocks in quartzitic sands. The vegetation was an open mallee heath dominated by flowering *Hakea varia*

as the dominant upper storey with a thick understorey of herbaceous and mallee species. e.g. *Dodonaea ptarmicaefolia, Melaleuca uncinata and Acacia sp.*. This vegetation community was bordered by an open woodland of Yates with an understorey of Mallee species.

Grid 2
This grid was located about 1.2 kilometres in from the South Coast Highway off the western firebreak which borders Reserve no. 1028 on the western side of Fitzgerald River. It was about eighty metres in an eastern direction from the firebreak located in under an open woodland vegetation association dominated by *Eucalyptus annulata* , *E. aff. spathulata* and *E, anceps.* with an open understorey of *Acacia sp. Cassia chatelainiana, Hibiscus heuglii leptochlamus, Dodonaea ptarmcifolia* and *Waitzia sp.* etc. The soils for this vegetation habitat had a medium clay clay content, making it difficult to dig where it was very compacted.

Grid 3
Grid 3 was located on the northern boundary of Reserve 1028 on the western side of the river about four hundred metres from the river bed. The grid was placed about seventy metres in from the firebreak in a depression dominated by open/closed scrub of *Melaleuca hamulosa* with little understorey. The soil was compacted clay.

Grid 4
Grid 4 was located two hundred metres north of the South Coast Highway accessed on the firebreak on the western side of Reserve 1028. The grid was installed about fifty metres in from the firebreak in an Allocassuarina habitat with little understorey, just a few herbaceous species. The soil was deep, yellow/brown quartzitic sands.

FAUNAL SURVEY RESULTS FOR FITZGERALD RIVER CORRIDOR.

Fauna trapping at Site 1 and Site 2 at the Fitzgerald Corridor recorded six native mammals, two feral mammals, forty avifauna (birds), eight amphibians, eight reptiles and fourteen invertebrates(molluscs and insects). (Refer to Tables 7, 8 & 9)

The mammal species included the Pygmy and Honey possums (refer to plates 16 & 20), the Grey Kangaroo, a Fat Tailed Dunnart (refer to plate 18), the Southern Bushrat, the Ash Grey Mouse, rabbit and domestic mouse. The frog species included representatives from the Leptodactylidae family including the more commonly known burrowing frogs; the Spotted Moaning Frog, Banjo Frog (refer to plate 19), the Humming Frog and Shoemaker Frog. The small legless lizard *Aprasia repens* five skink lizards and the common Bobtail (refer to plate 21). The invertebrate species included one species of land snail, the beetles belonging to the Carabidae, Cleridae, Scarabaeidae, Curculionidae and Tenebrionidae families. The birds encompassed species from both the greater orders of Passerine and Non Passerine. This included the Crested Bellbird, the Black Tailed Native Hen, Elegant Parrot, Horsefields Bronze Cuckoo, Purple Crowned Lorrikeet, White Cheeked Honeyeater and some actively nesting Malleefowl.

Species that have been recorded in the Fitzgerald River corridor area that were not recorded on the surveys have been obtained from Museum records in Table 10. These included the dragon lizard *Ctenophorus ornatus,* the spiny tailed gekko - *Diplodactylus spinigerus inornatus,* a frog called *Ranidella pseudinsignifera* and two fish called *Galaxias masculatus* and *Pseudogobius olorum.* . Sitings by farmers recorded that the Ring Tail Possum and Brush Tail Possum used to both be quite prevalent in the area at one stage. It was also remembered when the Burrowing Bettong and the Southern Brown Bandicoot lived in the area.) It has also been that some Tammar Wallabies were seen crossing the South Coast Highway near the Fitzgerald River crossing earlier in 1991 (Don Reid, pers. comm. 1991).

DESCRIPTION OF DEGRADED AREAS

In the northern area of the reserve near Lake Magenta, there is no evidence of stock grazing, human degradation or weed invasion (except along the boundary fences.) Along Middamijup Road where the river bed vegetation consists mainly of Open Yate Woodland, there are some agricultural grasses, e.g. Avena sp. present in the understorey. There is also an old tip site on the south eastern side of Middamijp Road and the Fitzgerald River crossing with some exotic weeds growing in it.

Within Reserve 1028 just north of the South Coast Highway, there is greater evidence of degradation. As this Woodland area adjoins property which has been farmed since the 1910's, it is highly likely that this area was grazed by stock fairly regularly and it is known to be still used for recreational horse riding. There is an old 4 Wheel drive track running in a N.N.W - S.S.E. direction through Reserve 1028 and also an old track made by a dozer moving through the area at some stage. The understorey in this particular reserve has a moderate proportion of exotic grasses present. Nevertheless, there is a good cover of native vegetation in the form of trees and shrubs. The Telecom Optic Fibre Cable installed north of the highway through Reserve 1028 in early 1991, has left a very disturbed track parallel to the highway and prone to drainage erosion. There is also evidence of human disturbance near the resting place on the north western side of the South Coast Highway from the river crossing.

The reserve south of the highway is indicative of the most disturbed area of the corridor. There is an old fence line running across the river between locations 558 and 1045. There was evidence of cattle having been present within the reserve and grazing along the river. Agricultural grasses had invaded the undergrowth in this area and there were limited native herbs and shrubs.

To detect the presence of the soil fungus, 'Dieback' *(Phytophthora cinnamomi)* in the corridor, visual assessment of plant health was made by the regional CALM researcher. Soil and vegetation samples were tested for the presence of the fungus in vulnerable areas of the corridor. No evidence of the fungus was found but this does not confirm it is not present. Examination was also made of vegetation communities which may change in the future if the fungus does begin to degrade the corridor.

Visual assessment was also made for the presence of aerial canker fungi which are causing degradation in native species along the south coast of Western Australia. (*Botryosphaeria ribis, Cytospora spp., Diplodina spp., Endothina spp. & Zythiostroma spp.).*

LOCAL COMMUNITY RESPONSE TO SURVEY

Nine landowners adjoin the Fitzgerald River corridor reserve and personal contact was made with seven of these owners to discuss the proposed Nature Reserve.

Farmers feel that it is important that access into the corridor continues as two of them own land on either side of the corridor. They regularly move stock through the bushland corridor when moving stock from property to property. The alternative route of moving stock by road makes it about a twelve kilometre trip.

78 percent of the landowners replied to the questionnaire.(Refer to Table 11 for questionnaire results). Of these, all of them agreed that the river corridor had conservation value for preserving the native fauna and flora and to act as a corridor between Fitzgerald River National Park and and Lake Magenta Nature Reserve. However they also all agreed that feral animal control was an important management issue for the proposed reserve. 86 % of the farmers said that kangaroo management was important, with the remaining 14 % saying it was not an

important management issue. 71% of them rated fire control as an important management issue with the others saying it was only somewhat important. 43% of the farmers saw weed control as an important management issue, with the remining farmers seeing it as only somewhat important or not important at all. Two of the farmers who responded to the questionnaire indicated they had property which was not fenced off from the reserve amounting to about 9 kilometres in total.

Farmers in this area are very supportive of the Land Care District Committee activites which have occurred in the district and recognise the importance of protecting the Fitzgerald River catchment.

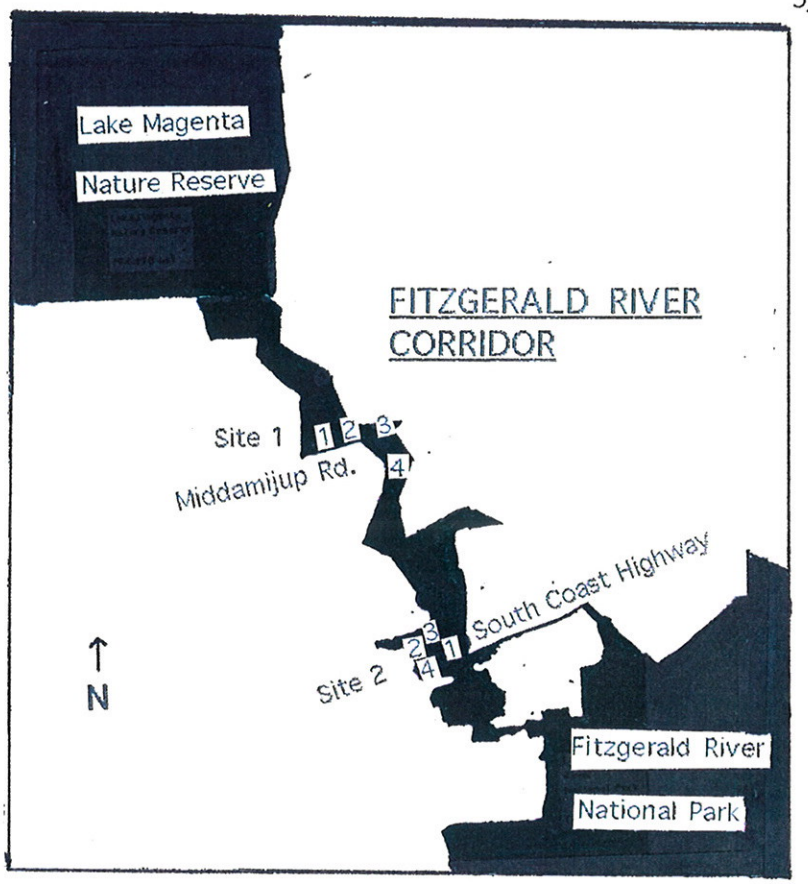


Fig. 10: Location map of survey grids for Site 1 in the Fitzgerald River corridor.

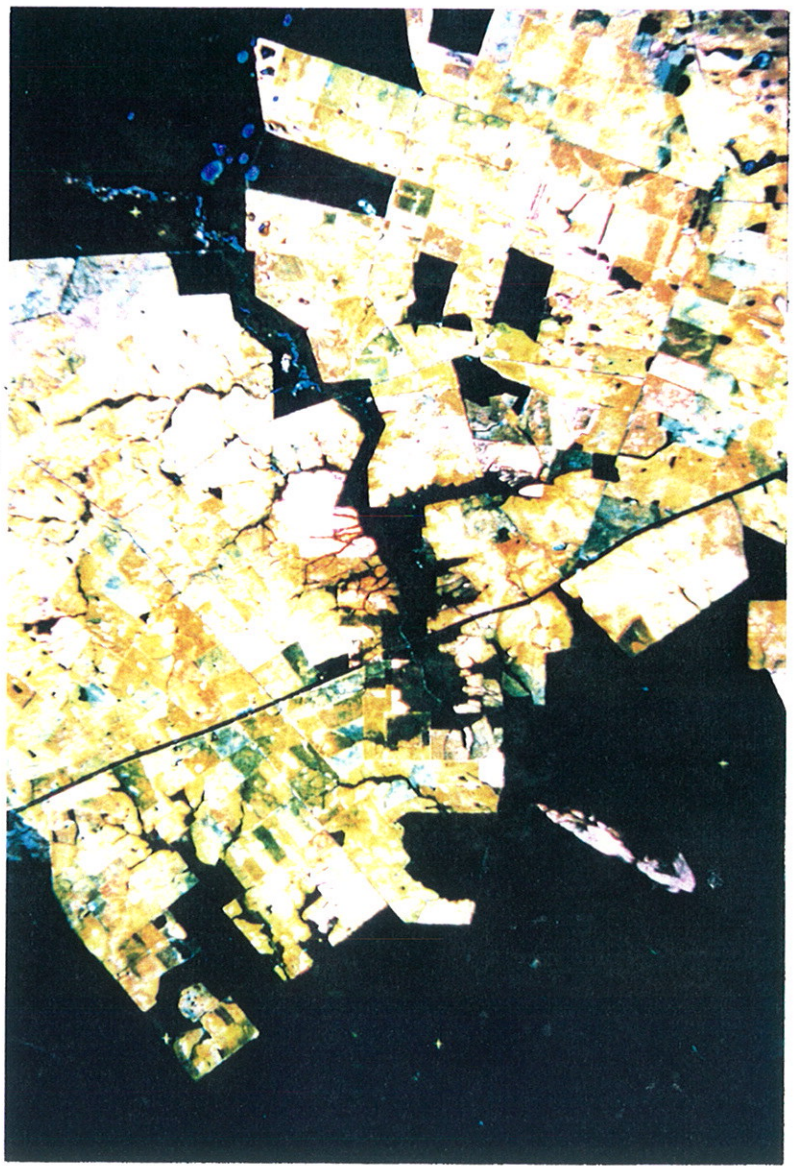


Plate 14: Satellite image from 1988 showing Fitzgerald River corridor and the adjoining reserves.

Table 6 - Fitzgerald Plant List

SITE 1			
GRID 1	**GRID 2**	**GRID 3**	**GRID 4**
Banksia media	Agonis sp.	Acacia sp.	Acacia sp.
Callitris preissii	Boronia sp.	Allocasuarina huegliana	Acacia sp.
Calytrix stipulosa	Eucalyptus uncinata	Caladenia flava	Avena barbata
Cassia chatelainiana	Hakea nitida	Diuris longifolia	Bossiae strigillosa
Chorizema sp.	Jacksonia aff. furcellata	Elythranthera brunonis	Brachycome oncocarpa
Conospermum sp.	Leptocarpus canus	Eucalyptus perangusta	Caladena roei
Daviesia aff. hakeoides	Leptospermum sp.	Exocarpus sparteus	Caladena sericea
Dryandra tridentata	Melaleuca hamulosa	Hakea lissocarpha	Carpobrotus sp.
Eriochilus aff. scaber	Neaurachne alopecuroidea	Hakea varia	Cassia chatelainiana
Eucalyptus anceps	Petrophile heterophylla	Lyperanthus nigricans	Chamaescilla corymbosa
Eucalyptus dissimulata	Synaphea polymorpha	Melaleuca cuticularus	Conosperma flavum
phaenophylla	Verticordia sp.	Pterostylis barbata	Diuris hirta
Eucalyptus xanthonema		Pterostylis recurva	Elythranthera brunonis
Grevillea sp.		Santalum acuminatum	Eucalyptus occidentalis
Grevillea tripartia		Santalum murrayanum	Gahnia sp.
Hakea corymbosa			Goodenia affinis
Hakea nitida			Guichenotia ledifolia
Hakea pressii			Mirbelia ramulosa?
Lysinema ciliatum			Mirbelia sp.
Mesomelaena tetragona			Oxalis corniculata
Petrophile heterophyllum			Phyllanthus calycina
Petrophile squamata			Pimelia argentea
Synaphea polymorpha			(inland form)
Templetonia sp.			Ptilotus holosericeum
			Ptilotus villisiflorus
			Stipa spp.
			Stypandra imbricata
			Ursinia anthemoides
			Waitzia aurea

Table 6 - Fitzgerald Plant List

SITE 2			
GRID 1	**GRID 2**	**GRID 3**	**GRID 4**
Acacia sp.	Acacia (triangle leaf)	Borya laymannia	Allocasuarina huegliana
Beaufortia micrantha	Acacia sp.	Calytria sp.	Caladena roei
Borya laymannia	Cassia chatelainiana	Craspedia glauca	Caladena sp.
Brachychome oncocarpa	Dononaea ptarmicifolia	Daviesia acanthoiclona	Diuris longifolia
Craspedia glauca	Eucalyptus aff. occidental	Dodonaea ptarmicifolia	Elythranthera brunonii
Daviesia acanthodona	Eucalyptus anceps	Drosera aff. sulphurea	
Dodonaea ptarmicifolia	Eucalyptus annulata	Eucalyptus aff. spathulata	
Eucalyptus spathulata	Hibbertia spp.	Eucalyptus anceps	
Gastrolobium bilobum	Hibiscus hueglii leptochla	Eucalyptus annulata	
Hakea aff. lissocarpa	Leptospermum erubescens	Hakea variata	
Hakea varia	Oxalis corniculata	Hibbertia sp.	
Isopogan teretifolius	Ptilotus spathulatus	Melaleuca hamulosa	
Melaleuca sp.	Waitzia citrina		
Stipa sp.			
Waitzia citrina			
South of Site 1			
Eucalyptus aff. redunca			
Eucalyptus anceps			
Eucalyptus anceps			
Eucalyptus calycogona			
Eucalyptus celastroides			
Eucalyptus dissimulata			
Eucalyptus pileata			
Eucalyptus scyphocalyx			
Eucalyptus spathulata			
Eucalyptus uncinata			
Eucalyptus xanthonema			

TABLE 7 : Fauna trapping results for Fitzgerald River Corridor - Site 1. Total numbers (Column 1) of each species trapped in pit traps and Elliot traps in the vicinity of each sampling grid. Sightings (S) are also recorded but not included in total numbers.

LOCATION:	LATITUDE	LONGITUDE
Grid 1	119 12.1' E	033 45.8' S
Grid 2	119 12.9' E	033 45.5' S
Grid 3	119 14.7' E	033 45.5' S
Grid 4	119 14.2' E	033 46.6' S

Common Name	Scientific Name	Total No's	Grid No. (See map) 1	2	3	4
MAMMALS						
Pygmy Possum	Cercartetus concinnus	2	2			
Western Grey Kangaroo	Macropus fuliginosus		S			
Honey Possum	Tarsipes rostratus	10	5	3		2
Domestic Mouse	Mus musculus	6			6	
Rabbit	Oryctolagus cuniculus				S	
AMPHIBIANS						
Short limbed frog	Crinea georgiana	6	1	3	2	
Spotted Moaning Frog	Heleioporus albopunctatus	4		2	1	1
Bull or Banjo Frog	Limnodynastes dorsalis	7	1	3	2	1
Humming Frog	Neobatrachus pelabatoides	1				1
Shoemaker Frog	Neobatrachus sutor	7	2	3		2
REPTILES						
Semi arboreal gekko	Diplodatylus granariensis	1	1			
Legless lizard	Aprasia repens	1		1		
Skink	Cryptoblepharus virgatus	1		1		
Skink	Hemiergis initialis brookeri	1	1			
Skink	Hemiergis peronii	2		2		
Skink	Lerista distinguenda	3	3			
Skink	Morethia obscura	16	4	4	2	4
Bobtail	Teliqua rugosa	8	1	4	2	1
INVERTEBRATES						
Mollusc	Bothriembryon dux	6				
	CARABIDAE					
Beetle	Cerotalis sp.	3				
Beetle	Neocarenum sp.	2				
Beetle	Scaraphites sp.	1				
Beetle	Lecanomerus sp.	3				

TABLE 7 CONT'D : Fauna trapping results for Fitzgerald River Corridor - Site 1. Total numbers (Column 1) of each species trapped in pit traps and Elliot traps in the vicinity of each sampling grid.

Common Name	Scientific Name	Total No's
INVERTEBRATES CONTINUED		
Beetle	CLERIDAE	1
	SCARABAEIDAE	
Beetle	Liparetrus sp. 1	2
Beetle	CURCULIONIDAE 1	1
Beetle	CURCULIONIDAE 2	1
Beetle	CURCULIONIDAE 3	1
Beetle	CURCULIONIDAE 4	1
Beetle	Celibe sp.	1

FITZGERALD RIVER CORRIDOR - Freshwater Swamp north of Location 5.

Southern Bush Rats (Rattus fuscipes)	1
Ash Grey Mouse (Pseudomys albocinereus)	1

TABLE 8 : Fauna trapping results for Fitzgerald River Corridor - Site 2. Total numbers (Column 1) of each species trapped in pit traps and Elliot traps in the vicinity of each sampling grid. Sightings (S) are also recorded but not included in total numbers.

LOCATION:	LATITUDE	LONGITUDE
Grid 1	119 15.8' E	033 49.8' S
Grid 2	119 14.5' E	033 49.8' S
Grid 3	119 15.0' E	033 49.4' S
Grid 4	119 14.5' E	033 50.4' S

Common Name	Scientific Name	Total No's	Grid No. (See map) 1	2	3	4
MAMMALS						
Pygmy Possum	Cercartetus concinnus	6	1	5		
Fat Tailed Dunnart	Sminthopsis crassicaudata	1			1	
Western Grey Kangaroo	Macropus fuliginosus	S	S		S	
Honey Possum	Tarsipes rostratus	1			1	
Domestic Mouse	Mus musculus	1		1		
Rabbit	Oryctolagus cuniculus		S			
1 bat seen flying around						
AMPHIBIA						
Spotted Moaning Frog	Heleioporus albopunctatus		2			2
Humming Frog	Neobatrachus pelabatoides		1			1
Shoemaker Frog	Neobatrachus sutor		1			1
Robust Bodied Frog	Pseudophryne occidentalis	1	1			
Robust Bodied Frog	Pseudophryne guentheri	1			1	
REPTILES						
Gekko	Diplodatylus granariensis	1			1	
Skink	Hemiergis peronii	2	2			
Skink	Morethia obscura	1	1			
Bobtail	Teliqua rugosa	2			2	
INVERTEBRATES						
Molluscs	Bothriembryon dux	7				
Beetle	Cerotalis sp.	1				
Beetle	Curculionidae	1				
	TENEBRIONIDAE					
Beetle	Hypanlax	2				

TABLE 9: Bird list for surveyed corridors. (+) Species sited at (C) Corackerup, **(F) Fitzgerald**, (Y) Young and (L) Lort River Corridors. (?) if identification was not definite.

COMMON NAME.	SCIENTIFIC NAME	C	F	Y	L
Australian Bustard	*Ardeotis australis*				+
Australian Magpie	*Cracticus tibicen*	+	+	+	+
Australian Raven	*Corvus coronoides*	+	+	+	+
Australian Wood Duck	*Chenonetta jubata*	+	+	+	+
Banded Plover	*Vanellus tricolor*		+	+	+
Barn Owl	*Tyto alba*	+	+		
Barn Swallow	*Hirundo rustica*			+	
Black Duck	*Anas superciliosa*			+	
Black Faced Cuckoo Shrike	*Coracina novaehollandiae*		+	+	+
Black Fronted Dotterel	*Charadrius melanops*		+	+	
Black Swan	*Cygnus atratus*			+	
Black Tailed Native Hen	*Gallinula ventralis*		+		
Blue Breasted Wren	*Malurus pulcherrimus*	?	?	?	?
Broad Tailed Thornbill	*Acanthiza apicalis*				+
Brown Headed Honeyeater	*Melithreptus brevirostris*				+
Brown Falcon	*Falco berigora*				+
Brush Bronzewing Pidgeon	*Phaps elegans*	+	+	+	+
Chestnut Teal	*Anas castanea*	+	+	+	
Common Bronzewing	*Phaps chalcoptera*	+		+	+
Coot	*Filica atra*	+		+	
Crested Bellbird	*Oreoica gutturalis*	+		+	+
Crested Pidgeon	*Ocyphaps lophotes*	+	+	+	+
Dusky Woodswallow	*Artamus cyanopterus*			+	
Eastern Reef Heron	*Egretta sacra*			+	
Elegant Parrot	*Neophema elegans*		+		
Emu	*Dromaius novaehollandiae*		+	+	+
Fan Tailed Cuckoo	*Cuculus flabelliformis*			+	
Forest Kingfisher	*Halcyon macleayii*	+			
Galah	*Cacatua roseicapilla*		+	+	
Golden Whistler	*Pachycephala pectoralis*	+	+	+	+
Grey Breasted White Eye	*Zosterops lateralis*	+	+	+	
Grey Butcher Bird	*Cracticus torquatus*		+	+	
Grey Currawong	*Strepera versicolor*	+		+	+
Grey Falcon	*Falco hypoleucos*				+
Grey Teal	*Anas gibberifrons*	+	+		
Hoary Headed Grebe	*Podiceps poliocephalus*	+	+	+	
Horsefields Bronze Cuckoo	*Chrysococcyx basalis*		+		
Little Black Cormorant	*Phalacrocorax carbo*	+		+	
Little Grebe	*Podiceps ruficollis*	+		+	
Little Pied Cormorant	*Phalacrocorax melanoleucos*	+		+	
Little Wattle Bird	*Anthochaera chrysoptera*			+	+
Magpie Lark	*Grallina cyanoleuca*	+	+	+	+
MalleeFowl	*Leipoa ocellata*	+	+		+
Mallee Heath Wren	*Sericornis cautus*	+	+	+	+
Mountain Duck	*Tadorna tadornoides*	+	+		
Nankeen Kestrel	*Falco cenchroides*		+	+	+
Native Swamp Hen	*Porphyrio porphyrio*		+		

TABLE 9 CONT"D: Bird list for surveyed corridors. (+) Species sited at (C) Corackerup, **(F) Fitzgerald**, (Y) Young and (L) Lort River Corridors. (?) if identification was not definite.

COMMON NAME.	SCIENTIFIC NAME	C	F	Y	L
New Holland Honeyeater	*Phylidonyrus novaehollandiae*	+	+	+	+
Pallid Cuckoo	*Cuculus pallisus*		+	+	
Pied Butcher Bird	*Cracticus nigrogularis*	+	+	+	
Pink Eared Duck	*Malacorhynchus membranaceus*			+	
Port Lincoln Parrot	*Barnardius zonarius*	+	+	+	+
Purple Crowned Lorrikeet	*Glossopsitta porphyrocephala*		+		
Rainbow Bee Eater	*Merops ornatus*			+	
Red Capped Parrots	*Platycercus spurius*	+	+	+	+
Red Wattle Bird	*Anthocheara carunculata*		+	+	+
Red Winged Wren	*Malurus elegans*	+	?		
Restless Flycatcher	*Myiagra inquieta*	+			+
Richard's Pipit	*Anthus novaeseelandiae*			+	
Singing Honeyeater	*Meliphaga virescens*	+	+	+	+
Splendid Wren	*Malurus splendens*	+	+	+	
Striated Pardelote	*Pardalotus striatus*		+		+
Yellow Rumped Pardelote?	*Pardelotus xanthopygus*			+	
Tawny Frogmouth	*Podargus strigoides*		+	+	+
Tawny Crowned Honeyeater	*Phylidonyris melanops*		+		+
Variegated Wrens	*Malurus lamberti*	?	?	+	+
Wedgetailed Eagle	*Aquila audax*		+	+	+
Weebill	*Smicrornis brevirostris*				+
Welcome Swallow	*Hirundo neoxena*	+	+	+	
Western Grey Shrike Thrush	*Colluricincla harmonica*		+	+	+
Western Rosella	*Platycercus icterotis*	+			
Western Spinebill	*Acanthorhynchus superciliosus*	+			
Western Whip Bird	*Psophodes cristatus*	+			
White Browed Babbler	*Pomatostomus temporalis*	+	+	+	+
White Browed Scrubwren	*Sericornis frontalis*			+	
White Cheeked Honeyeater	*Phylidonyris albifrons*		+		
White Eared Honeyeater	*Meliphaga ornata*			+	+
White Faced Heron	*Ardea novaehollandiae*	+	+	+	
White Fronted Chat	*Ephthianura albifrons*				+
White Naped Honeyeater	*Melithreptus lunatus*			+	
WhiteTailed Black Cockatoo	*Calyptorhynchus baudinii*			+	
White Winged Triller	*Lalage sueurii*			+	+
Willy Wagtail	*Rhipidura leucophrys*	+	+	+	+
Yellow Rumped Thornbill	*Acanthiza chrysorrhoa*			+	
Yellow Throated Miner	*Manorina flavigula*	+	+	+	+

TABLE 10 : Museum Records of other additional species found within the Fitzgerald River Corridor or in it's vicinity. The W.A.M. Accession Numbers is the reference number the Museum has given that specimen.

SPECIES	LOCATION Longitude (Degrees East)	Latitude (DegreesSouth)	WAM A.No.'s
REPTILES			
AGAMIDAE			
Ctenophorus ornatus	119 05	033 40	68262
GEKKONIDAE			
Diplodactylus spinigerus inornatus	119 05	033 42	96964
HYLIDAE			
Littoria cyclorhynchus	119 15	033 50	33065
LEPTODACTYLIDAE			
Neobatrachus pelabatoides	119 06	033 53	101176
Pseudophryne guentheri	119 07	033 55	101176
Ranidella Pseudinsignifera	119 06	033 55	88093
SCINIDAE			
Hemiergis initialis initialis	119 19	033 52	36853
Hemiergis peronii	119 07	033 52	36874
FISH			
FAMILY 102.1			
Galaxias masculatus	119 19	033 053	
29117.002			
FAMILY428			
Pseudogobius olorum	119 19	033 53	
29117.001			

Table 11: Results (in percentages) of questionnaire completed by adjoining landowners to the Fitzgerald River corridor. Not all responses calculate to 100% as some landowners prefferred not to respond on some issues.

Nine landowners sent questionnaire, seven replied ..... 78% response

Do you feel the river corridor has conservation value;	YES	UNSURE	NO
for preserving native plants ?	[100%]	[ ]	[ ]
for preserving native animals ?	[100%]	[ ]	[ ]
to act as a corridor ?	[100%]	[ ]	[ ]

Would you rate the following issues as important, somewhat important or not important in the proposed reserve ?

	IMP.	S.I.	N.I.
weed control	[40%]	[30%]	[30%]
feral animal control	[100%]	[ ]	[ ]
fire management	[71%]	[29%]	[ ]
kangaroo management	[86%]	[ ]	[18%]

	YES	NO
Would you like to have the opportunity to participate in management decision making for this reserve ?	[100%]	[ ]

Is your fence completely fenced off from this reserve ?

[2 farmers said "no" with a total of 9 kilometres unfenced]

Plate 15: Fitzgerald River just north of the South Coast Highway crossing, bordered by Melaleuca spp. and *Eucalyptus occidentalis* woodland.

Plate 16: Honey Possum
Tarsipes rostratus

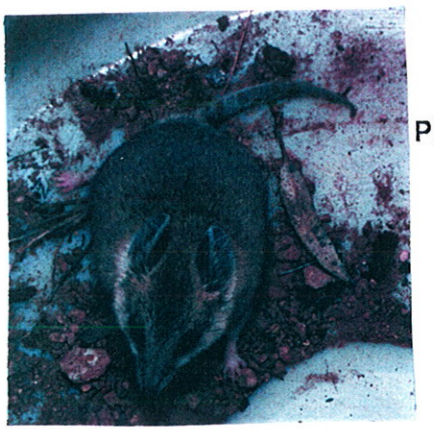


Plate 18: Fat Tailed Dunnart
Sminthopsis crassicaudata

Plate 17: *Allocasuarina hueglian* at Site 1, Grid 3.

Plate 19: Bull or Banjo Frog
Limnodynastes dorsalis

Plate 20: Pygmy Possum
Cercartetus concinnus

Plate 21: Bobtail *Teliqua rugosa*

DISCUSSION OF FINDINGS.

Fitzgerald River foreshore reserve contains a rich variety of mallee shrublands, scrub heath and Eucalypt woodlands. It is a corridor of remnant vegetation exisiting between two large reserves, acclaimed for their vegetation diversity. Fitzgerald River National Park contains over 20 % of Western Australia's flora including many endemic and rare plants. Lake Magenta Nature Reserve consists almost entirely of Eucalypt woodlands and mallees, which were once characterisitic of the wheatbelt and which have largely disappeared due to heavy clearing for agriculture. Some of the Eucalypts represented are in the most southern extent of their distribution range.

These two large reserves on either end of the Fitzgerald River foreshore reserve are also home to fauna which are on the 'threatened' list. Fauna such as the Dibbler, Tammar Wallaby, Honey Mouse, Red Tailed Wambenger, Mitchell's Hopping Mouse, Western Mouse and the Short Nosed Bandicoot are found these reserves. Both also have a range of birds which are very restricted in their distribution like the Mallee Fowl, Southern Scrub Wren, Ground Parrot etc.
The survey indicated that the Fitzgerald River corridor is home to a good range of native fauna and could act as a corridor for other fauna who may use it as a means of escape from the large reserves in times of natural disaster.

Historical journal records by early European explorers through the Fitzgerald River region, describe the presence of Aboriginal people. Although no official Aboriginal sites have been recorded in the Fitzgerald River foreshore reserve it can be assumed that Aborigines moved regularly through the area.

Following agricultural development along the river valley in the 1920's, there is little recollection of fire along the river. It appears that most of the fires that did occur, were caused by humans lighting the bushland. The lack of fires starting in the reserve indicates it is not a major fire hazard area for the neighbouring farming community.

The wider sections of the reserve which occur in the northern area of the foreshore reserve, lack any evidence of human disturbance and the only form of degradation is a little weed intrusion along the borders of the reserve adjacent to pastureland. In the more southern reaches of the corridor, agricultural clearing to less than 200 metres of the river channel has probably reduced the effectiveness of this section of the reserve to function as a corridor. Lack of fencing by adjoining owners has also caused the continual degradation of the reserve by grazing livestock. In some areas, the understorey is lacking in native species and there are many grasses and weeds.

The local community is very supportive of the proposed nature reserve status of the river foreshore reserve. As most members of the community are active members of the local Land Care Group, they are very aware of the value of the river corridor to preserve native plant and animal species.

YOUNG RIVER CORRIDOR

DESCRIPTION OF CORRIDOR

BOUNDARIES AND PHYSICAL FEATURES

The Young River flows in a north west - south east direction over about 95 kilometres to join the coast at Stokes Inlet within Stokes National Park (80 kilometres west of Esperance). Its headwaters are about 75 kilometres from the coast in vacant Crown land south of Frank Hann National Park at about 300 metres above sea level. Between the southern border of the Crown land and Stokes National Park boundary, the river flows in a narrow strip of river foreshore reserve stretching over approximately 50 kilometres (refer to Figure 11). The foreshore reserve incorporates Reserve No. 31763 (Park and Protection of River Foreshore, 57.0 ha), Reserve No. 31762 (Parklands, 3478.0 ha), Reserve No. 31751 (Park, 2909.0 ha), Reserve No. 31750 (Parklands, 2956.0 ha), Reserve No. 31749 (Park, 1279.0 ha). The combined total area of the Young corridor under study is 10 679 hectares.

From West Point Road to Mills Road (approximately 34 km in length) the reserve is generally over 1 kilometre in width with several wider blocks occurring. From Mills Road to the Yerritup Road, approximately 24 kilometres long) the reserve is approximately 0.5 - 1 kilometre wide and south of Yerritup Road less than 300 metres wide, though the reserve abutts an uncleared belt of land to the west of approximately 1 kilometre wide between Yerritup Road and the South Coast Highway. From the South Coast Highway to Stokes National Park (approximately 8 kilometres) the Reserve is less than 200 metres wide.

CLIMATE

Rainfall is highest near the coast with an annual average of 541 mm at the Young River Station, decreasing to about 350 mm in its upper reaches. The rainfall is mainly winter-spring rain, (refer to Figure 12. However, it should be noted that most rainfall records in the area are less than 20 years old (except for the Young River Station record which is 32 years old) and that summer storms with over 100 mm distort the monthly means. Such storms include 145mm in February 1955, 103mm in Jan. 1966 and 105mm in February 1970 at Young River Rainfall station and further inland.

GEOLOGY

The Young River's headwater catchment straddles the geological boundary between the older Yilgarn Block and the younger Albany Fraser Province. The catchment creeks gather over the sand and gravel plains which cover the old Archaen granitic rocks . As the river channel develops further southward, it exposes some of the underlying Proterozoic metamorphosed granites and gneiss. In some places the Young River has carved a well defined path into the underlying bedrock forming steep-sided valleys 30 to 45 metres deep and flanked by breakaways 3 to 10 metres high. In its lower reaches it passes through areas of Plantagenet Group sediment deposits before assuming youthful characteristics where it cuts through Eocene rocks. (Thom, Lipple, Sanders 1977)

A vermiculite deposit is located on the Young River, 23 kilometres northeast from Munglinup (121 00' E 033 33' S), Mining Lease M74/1561 (transitional application for M74/8) situated in the centre of reserve 31751, between Rollands Road and Mills Road. (Refer to Figure 11). Ultramafic and sedimentary rocks have been metamorphosed and subsequently intruded by muscovite bearing granite. Prior to 1953, the deposit yielded 1720 t valued at $22 000 which

constitutes most of the states production. However, more recently there has been an increased market for the mineral and production has increased (refer to plate 24). The vermiculite is in thick, impersistent seams, and reserves could be large (Thom, Lipple, Sanders 1977). It is thought that the Young River vermiculite deposit is the best in Australia and will be needed to supply further demands within the country should imports from South Africa continue to be cut off by trade embargos. In addition to the vermiculite, the reserve also contains deposits of nickel and graphite.

SOILS

In the Precambrian granite country there are ancient lateritic plateau soils with an upper horizon of yellow sand overlying laterite, or decomposed granite. These soils carry scrub heath. Where granite outcrop is close to the surface, it supports broombush thicket. On middle slope sites mallee soils are found except for occasional patches of clay which support low forest of *Eucalyptys platypus* and its associates. In the bottom lands the soils are deep, sandy and calcareous and have mainly carried woodland (Thom, Lipple, Sanders 1977).

The soils developed on the Tertiary sediments are Miocene (12 to 26 million years ago)or post Miocene in age and it is noticeable that laterite is confined to a belt along the coast where the rainfall today is higher than inland. The mallee soils show profile differentiation but no laterite, suggesting that they have developed under a rainfall distribution pattern similar to that of present (Thom, Lipple, Sanders 1977).

VEGETATION TYPES

The vegetation within the corridor was mapped and described on a broad scale by J.S. Beard as part of the Vegetation Survey of Western Australia in 1973 (refer to Figure 13). Beard differentiated two vegetation formations in the river foreshore reserve as follows:

Shrublands	
$e_{15}Si$	Mallee on lateritic soil - *E. eremophila, E. oleosa* assoc.
$e_{26}SZc$	Mallee heath - *E. tetragona*
$e_{27}Si$	Mallee in valleys - *E. redunca, E. uncinata*
$e^{15}{}_{32}Si$	Mallee on gilgai country - *E. eremophila, E . forrestiana*
Low Forest	
$e_{33}Lc$	Moort - *E. platypus* The vegetation within the corridor has been described

The lower reaches of the Young River have been identified as being within the 'Esperance' system of plant communities (Beard, 1979). The vegetation of this is mallee-heath characterised by *Eucalyptus tetragona* except where the surface sand is 90 cm or more in depth where there is a change to scrub heath with Banksia dominant. The valley slopes support mallees or *E. occidentalis* woodland.

The upper reaches of the Young River are within the Lort vegetation system, containing the flat plain which lies about 180 metres above sea level and succeeds the gentle rising coastal plain of the Esperance system. The plain, due to its flatness, is winter wet, and the soil with its sand-over-clay mallee soil profile, becomes waterlogged in the rainy season. The most swampy areas are "gilgai" with a hummocky surface. The general plant cover is mallee but there are scattered granite outcrops, patches of sand with mallee heath, clay patches with *E. platypus* low

forest, and scattered pans which tend to carry or be surrounded by stands of *E. occidentalis*. The mallee in this system is a distinct community with *E. eremophila* dominant in association with *E. forrestiana*. Strictly speaking, neither of the two dominants is a mallee as they are killed by fire, regenerating each time from seed as a single stemmed tree, as does *E. platypus* (Beard, 1979). Other casual mallee species include *E. redunca, E. uncinata, E. goniantha and E. flocktoniae*. The trees reach 3-4.5 metres in height and have the usual dense understorey about 1 metre tall of *Melaleucas spp. , M. pungens, M. cliffortioides, M. scabra* and *M. deltoides.*

Other communities found in sandy patches on the plain include *Banksia media, Grevillea asparagoides* and *Hakea spp.* in the mallee. Deep sand brings in *Eucalyptus tetragona* and many other of its associates from the coastal mallee heath. Granite outcrops sometimes protrude, and *Baecka crispiflora, Hakea commutata, Eriostemon rhomboides* and locally *Allocasuarina heugliana* have been collected on the outcrops. Where there is a thin skin of soil over granite one finds broombush thicket in which *Allocasuarina campestris* is dominant. *Hakea multilineata* and *Verticordia preisii* have also been noted.

FAUNAL RECORDS

A Biological Survey was done in the Stokes National Park in 1989 by Brenda Newbey and Keith Bradby. A total of 104 species were recorded ranging through from the mammals to the amphibians and reptiles. The more interesting of the recorded mammals included a Grey Bellied Dunnart, an Echidna. Of the birds, the Grey Tailed Tattler, Bar Tailed Godwit and Eastern Curlew. twenty three reptile species were recorded.

RIVER DATA

Runoff & Riverflow

The Young River has had a W.A. Water Authority gauging station (601001, AMG coordinates) in the lower reaches of the river just north of Yerritup Road for about 12 years (refer to plate 25). The runoff from the catchment is small, with an average of 0.9 mm or less than 1% of the rainfall. River flow is erratic with no flow being recorded in the Young River in 1981 and 1982. However a storm in March 1976 produced over 2 x 10^6 m^3 which was two thirds of the years flow. Apart from these storm flows, the main river flow is from July to October. There are large pools in the lower reaches of the river which are permanent all year round (refer to plate 23). Year and monthly averages clearly do not give a true picture of the flow characteristics of the rivers, or the effect river flow has on the estuaries (Hodgkin & Clarke,1989).

Sediment Transport

This probably largely results from major floods. A such times fine sediment is washed by sheet erosion from cleared land, coarser material is eroded by gullying and from river beds. Evidence of increased sediment transport following clearing is recorded below (Hodgkin & Clarke,1989).

Water Chemistry

Surveyor General Mr J.S. Roe on his 1848 expedition, records the saline character of the river.

> "....and at 10 miles from its mouth quitted it.....Where I quitted this river it was coming from the northwest and lay in irregular pools, nearly salt."
>
> (Roe, 1848)

The Young River is saline at about 6 parts per thousand (sea water is 35 parts per thousand, Water Resources Branch, PWD, 1984), but with a great range in salinity depending on the time of the season (Hodgkin & Clarke,1989).

ABORIGINAL CULTURAL HISTORY IN THE AREA.

As discussed in the Corackerup Creek corridor chapter, the rivers on the south coast of Western Australia were often used as major thoroughfares by the Aboriginal people as they travelled through the landscape. This is especially true of the inland Esperance landscape which is semi arid and fairly inhospitable on its open sandplains.

Research by Dr. von Brandenstein in 1988, concluded that a group of Aboriginal people called the 'Shell People' lived along the south coast between Bremer Bay and Israelite Bay. These people were divided into two groups; the Wudjaarri in the west who did not practise circumcision and the Nyungarra in the east who did practise circumcision. The Young River represented the

border line between the Wudjaari people and the Nyungarrra. There are six official Aboriginal Sites along the Young River listed with the Western Australian Museum.

During explorations by Surveyor General Mr J.S. Roe of the Young River and Stokes Inlet area in 1848, noted that;

> "Tracks and fires of the natives were numerous in this vicinity, but none showed themselves, nor could I spare the time necessary for finding them out." (Roe. 1848)

An oral history recording made by the Museum of Western Australia tells an Aboriginal story set on the the Young River and Stokes Inlet. The story came from Tommy Bullen of Norseman.

> "Walidj bewenerup: once everyone was camped way up the Young River, but the eagle chased everyone away from the freshwater to keep it for himself. Because of his greed, the water eventually all dried up, but in the meantime the eyes of the crows (people) had all turned white because they'd been forced to drink salt water. In the fight that eventuated the crows speared the eagle and killed him. His wife, the mallee hen, brough this body downstream and buried him. His grave looks like a mallee hens's nest all scraped up into a mound. This is the hill on the east side of Stokes Inlet. "

During the field work for this project, several stone artifacts were found along the banks of the Young River and brought to the attention of the W.A. Museum.

FIRE HISTORY

Prior to European habitation of the Young River region, Aboriginal people had previously been in the habit of burning the country as a method of obtaining food and had undoubtedly modified the vegetation by doing so. The adaptations of the heath plants indicate a history of fire and couldbe that fire started by lightning may have swept through this area regularly for millions of years.

In recent years, wildfires escaping from farmers' burning off operations have swept into the foreshore reserve. A list of the more recent burns is supplied below;

TABLE12: Fire History of the Young River foreshore reserve

approx. 1984	Fire burned in a north westerly direction from Mills Road east of the river crossing across to the western border of the reserve just south of Rawlinson Road.
1990	Fire started just north of the South Coast highway and burnt through the Young River foreshore reserve to Yerritup Road
1990/1991	A large wildfire burnt through the vacant Crown land north of the Young River corridor through Frank Hann National Park.

EUROPEAN HISTORY AND AGRICULTURAL DEVELOPMENT

Young River was named by Surveyor General Mr J.S. Roe on an expedition southeast of Perth between the months of September 1848 and February 1849. He named the river after the

Governor of South Australia . He includes detailed descriptions of the river valley in his journal as he examined the river from its southern mouth into Stokes Inlet.

> "....I commenced examination upwards. The low level banks soon rose to more undulating land, of light sandy character, clothed with some good grass , extending half a mile back and growing nuytriae, gigantic zamia, yeit, tea-trees and Jacksoniae. In less than 3 miles the width of the open water had contracted to 100m yards, ...we soon afterwards recrossed and finally encamped on one of the above tributaries at the first fresh-water hole we had found in connection with the river. " (Roe, 1848)

He goes on further to describe the country he observed as he explored 10 miles up the river channel.

Alex and John Moir were the first European settlers to take up land in the area. They were granted a pastoral lease of 7000 acres each side of the inlet making 14 000 acres in all. Their first crop was Barley of which five acres was planted. In 1877 , John was killed by Aboriginal people but a William Moir left his Lake Grace property and moved to Stokes Inlet to help Alex. They had 500 head of cattle and sheep at that time.

In 1888, William and George Cheyne were granted a pastoral lease of over 57 000 acres and in that same year they built a homestead at Fanny Cove. In 1889 William went searching for further pastoral country but instead found gold at Dundas. This began a small gold rush with men coming by boat to Fanny Cove and others coming overland through Broomehill.

From these early times a track existed from Albany to Esperance passing through Ravensthorpe. However it was not until the 1950's that farming on the Esperance Plains began to go ahead and large scale development of the light and relatively infertile heath and mallee soils was undertaken. In 1949 the original Moir Station was sold to Noel White of Young River Station.

The majority of clearing in this area was done in the late 1970's and by 1987, 60 % of the catchment on the Lort and Young Rivers had been cleared for cereal production and sheep grazing, with some beef production near the coast.

Fig. 11: Location map of Young River corridor and adjoining reserves and vacant Crown land.

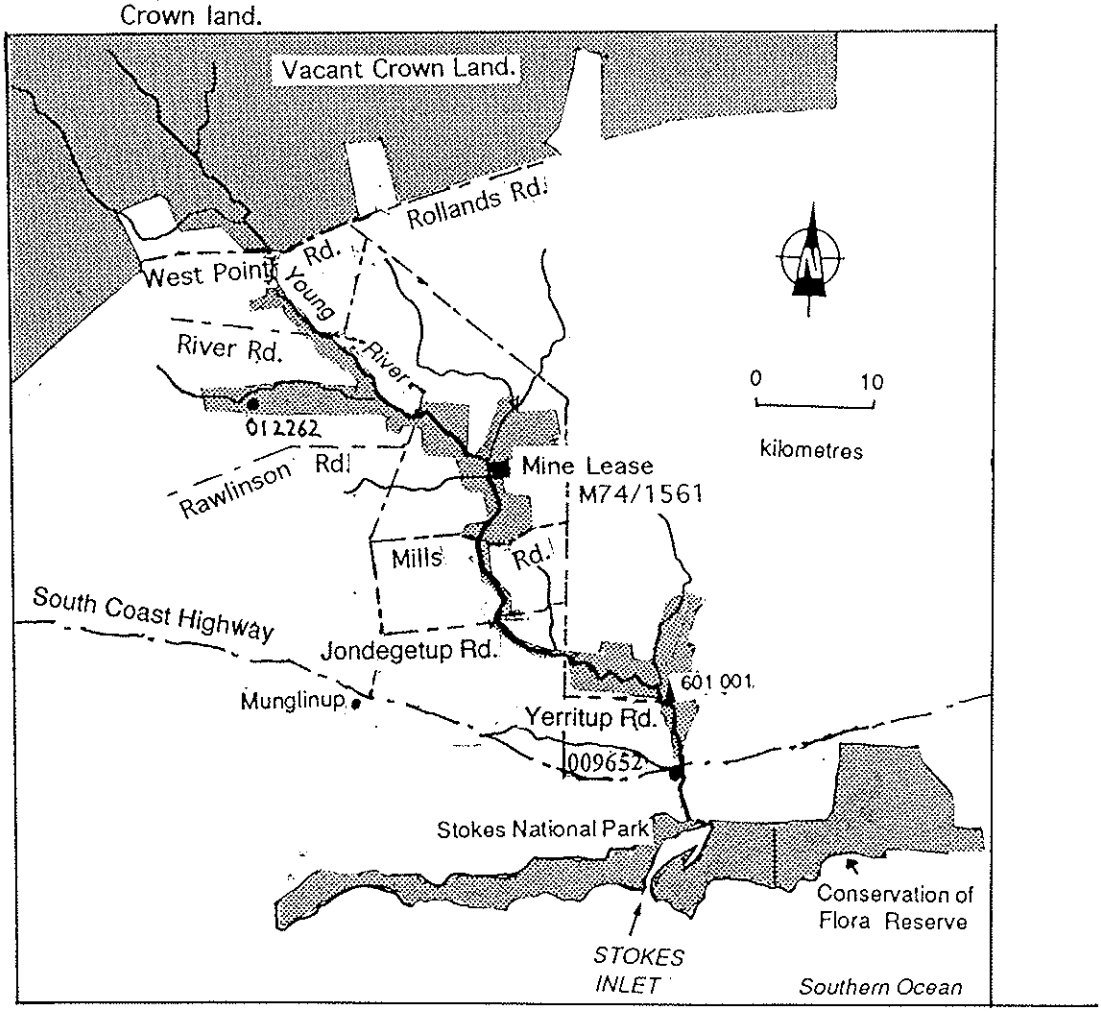


Fig. 12: Mean monthly rainfall (mm) for Young River Station and Scadden (Young River). Means [ ], medians [ ]. (Hodgkin & Clarke, 1989)

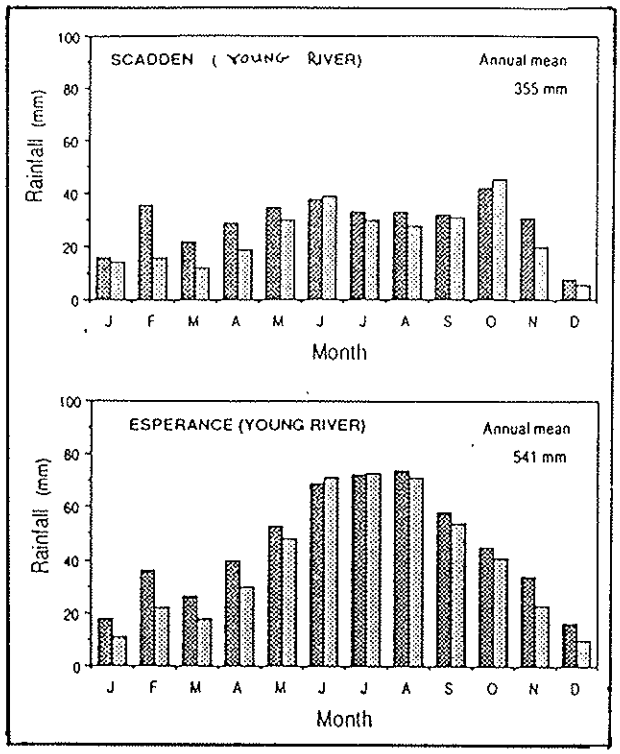


Fig. 13: Vegetation Map of Young River corridor area. (Veg. Survey of W.A., Ravensthorpe: Sheet no. S1-51-5, Beard, 1973).

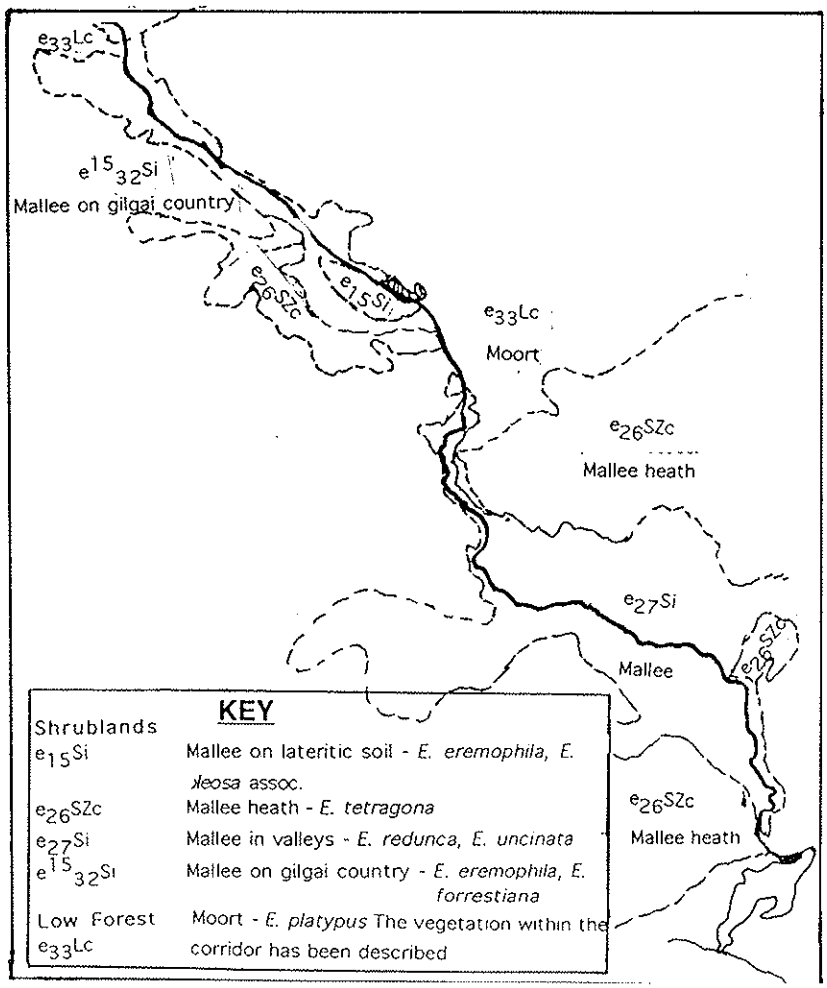


Plate 23: Permanent pool of the Young River near Site 1, Grids 3 and 4.

Plate 24: Open cut excavation of the vermiculite mine in the Young River corridor.

Plate 25: W.A. Water Authority gauging station 601 001 on the Young River

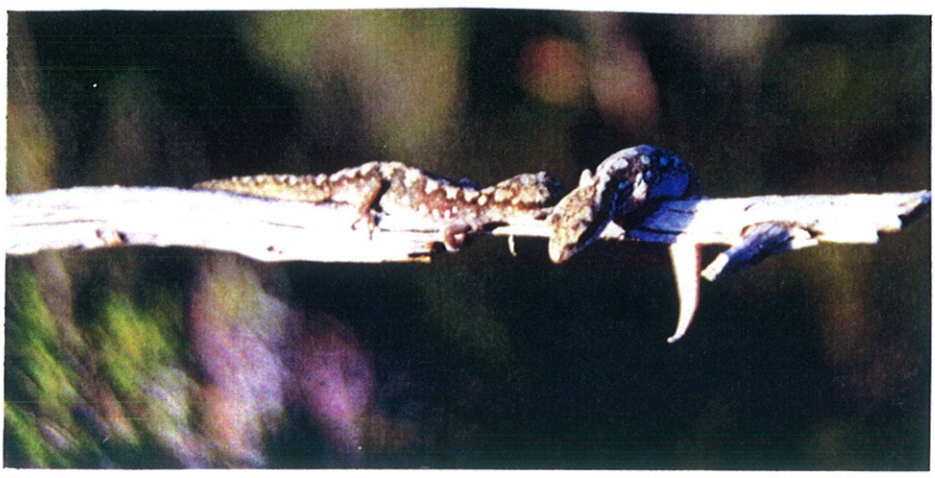


Plate 26: Two marbled gekkos *Phyllodactylus m. marmoratuss*

YOUNG RIVER CORRIDOR SURVEY RESULTS

LOCATION OF SURVEY SITES.

Two sites were trapped on the Young River Corridor. Site 1 was located about three quarters of the way down the length of the vegetation corridor north of Yerritup Road. The grids for Site 2 were dispersed over a large area between Mills Road and West River Road (refer to Figure 14 for location of sites and trap grids). Eighty pit traps and one hundred and sixty Elliots traps were installed. Due to wet weather, Site 1 pit traps were closed for one of the five trapping nights.

Eight representative riverine habitats were selected for the trapping grids in the Young River Corridor. More detailed vegetation lists for each grid are presented on Table 13 but a brief description of each is given below.

Site 1

Grid 1
This grid was located on the northern bank of the river opposite the vermiculite mineral diggings at the end of a Water Authority Road running north off Yerritup Road. It was installed about fifty metres from the river channel on the river flat which must flood very rarely in excessively wet years. The grid began in a *Callistemon phoeniscens / Macrozamia riedlei* plant association under a large outcropping granite/ gneiss boulder in very dark, loam rich soil with high organic content. This location also had a fresh water soak and permanent pool about twenty metres from it which was surrounded by a thick reed bed of *Typha dugustifolia* The rest of the grid ran parallel to the river in deep colluvial sand and open sparse woodland of *Eucalyptus occidentalis* with *Acacia sp.* and an understorey of rye grass and agricultural grasses. There was evidence that this area had been grazed in the past.

Grid 2
This grid was located on the northern bank of the river opposite the vermiculite mineral diggings at the end of the Water Authority Road running north off Yerritup Road. It was installed about three hundred metres north of the river channel, on the sloping open Yate woodland of the hill. This location had much dead *Eucalyptus occidentalis* debris revealing the fact that it had not been burnt for a very long time (maybe over 40 years). There was very little understorey except for the grasses and mosses.

Grid 3
This grid was located on the eastern bank of the river opposite the Water Authority Recording station No. 601 001 on the Water Authority Road running north off Yerritup Road. The grid was installed in an open mallee *Eucalyptus tetragona* vegetation over heath (mixed) species e.g.*Jacksonia furcellata, Baeckia sp. Beaufortia macranta* and *Gastrolobium spinosum*. The soils are sandy with laterite gravel content and compacted clay about forty centimetres down.

Grid 4
This grid was located on the eastern bank of the river about one hundred metres south of the Water Authority Recording station No. 601 001 on the opposite side of the river off the Water Authority Road running north off Yerritup Road. The grid was installed in an open mallee of *Eucalyptus tetragona* and flowering *Lambertia inermis* over a low understorey of mixed mallee species. The soil was similar to that of Grid 3.

Site 2

Grid 1
This grid was located on the western side of the river parallel to one of the permanent pools one kilometre south of the vermiculite mine site. It was accessed along the track which runs off Mills Road in a north easterly direction to the vermiculite mine site. The grid was installed parallel to the river under *Eucalyptus tetragona, E. (sporadica), E. aff. redunca E, spathulata grandiflora* with a mallee heath (mixed) undergrowth. Along the river bank there was *Melaleuca uncinata, Melaleuca cuticularis , Acacia saligna.* with a collection of native reeds and herbs. This grid bordered onto the heavily burnt area which saw fire in approx. 1984 and regrowth has been fairly slow.

Grid 2
This grid was located on the northern bank of the river on a sandy floodplain flat. It was accessed from the track which runs in a westerly direction along the north eastern boundary of agricultural block 1024. This track runs between the vermiculite mine and Oldfield Road. The site was dominantly covered in a low closed scrub of waist height *Allocassuarina heugliana* vegetation community. Bordering this low closed community there was a taller Allocassuarina community interspersed with *Acacia scabra.* Due to the closed character of this community there was very little understorey except for a few native herbs and reeds. These were all sitting on top of a very deep colluvial sand soil horizon.

Grid 3
Grid 3 was located on the western bank of the river, two hundred metres south of the Young River crossing on River Road. A small Main Roads Department track provided access to the vicinity of the grid. This location was on top of a deep white sandy plain which hosted a *Eucalyptus tetragona, e. incrassata* and *Banksia media* community with an understorey of mallee heath mix species including *Banksia blechnifolia.* The river channel does not contain permanent pools which would remain through summer months and there is salt crusting on the evaporated sections of the river bank with dead trees indicating the effects of the salinity.

Grid 4
Grid 4 was located on the western bank of the river, eighty metres north of the Young River crossing on River Road in a dense, closed *Banksia media* plant association with an understorey of *Calytrix leschenaultia, Verticordia preissi* & *Hakea prostrata.* The soil was a deep quartzitic sand.

FAUNAL SURVEY RESULTS

Fauna trapping at Site 1 and Site 2 at the Young River River recorded five native mammals, three feral mammals, fifty nine avifauna, eight amphibians, eighteen reptiles and fourteen invertebrates. (Refer to Tables 14, 15 & 16)

The mammal species include the Grey Kangaroo and Black Gloved Wallaby, a White Mastiff Bat, the Southern Bushrat (refer to plate 29), the Honey Possum, rabbit, fox and domestic mouse. The frog species included representatives from the Hylidae and the Leptodactylidae family including the more commonly known burrowing frogs (refer to plate 30), the Banjo Frog, the Turtle Frog and Slender Tree Frog (refer to plate 28). The reptiles ranged from the colourful legless lizard *Pygopus lepidopodus* , to a Blind Snake, Tiger Snake, a juvenile King Skink (refer to plate 27), a goanna, two dragon lizards and six skin lizards (refer to plate 32). The invertebrate species included two species of land snail, the very rare Elytron beetle of the Buprestidae family and beetles belonging to the Carabidae, Scarabaeidae, Curculionidae, Tenebrionidae and Trogidae families. The birds encompassed species from both the greater orders of Passerine and Non Passerine. This included the Black Swan, Pink Eared Duck, Dusky Woodswallow, Eastern Reef Heron, Rainbow Bee Eater, White Naped Honeyeater, Crested Bellbird and White Tailed Black Cockatoo. Some birds were observed breeding with nests, eggs and chicks (refer to plate 31).

Species that have been previously recorded in the Young River area that were not recorded on the surveys have been obtained from Museum records in Table 17. These included the dragon lizard *Ctenophorus ornatus* , the dugite snake, the *Cryptoblepharus virgatus clarus* skink, a frog called *Ranidella pseudinsignifera* and two fish called *Atherinosoma elongata* and *Pseudogobius olorum*. Sitings by farmers recorded that an echidna *(Tachyglossus aculeatus)* and a Carpet Python *(Morelia spilota)* have been seen near the river (Tim Carmody, pers. comm. 1991).

DEGRADED AREAS

South of the Highway the reserve is 100 - 200 metres wide and the vegetation very disturbed. Predominant vegetation is the open Yate woodland over open scrub, *Acacia saligna - Acacia cyclops* over exotic grassland (*Erhartia calycina/ Arena sp.*) This section is approximately 6 kilometres in length and runs through cleared private property. It was only inspected from the highway. It is apparent from aerial photography (Project R31, Run 7, 5096) that tree cover at least is present throughout the section but it is likely the understorey layers are very depaupate and disturbed. It appears the river reserve is fenced off from adjacent private land but that grazing has occurred within the reserve.

The length of the river extending 8 kilometres north of the South Coast Highway has been cleared to within a few metres of the waters edge and stock grazing has left very little native vegetation remaining. Throughout this degraded section, weed intrusion is very bad. Further north there is weed intrusion at most of the road crossings over the river and foreshore reserve.

In the region of the vermiculite mine, there has been no attempt to vegetate the open cut excavations or the exploratory costines. Water pipes extend down to large permanent pools on the river so that water can be pumped up to the plant during operation. There has been increased surface erosion in this degraded area resulting in an increasing amount of sediments being washed into the river.

LOCAL COMMUNITY RESPONSE TO SURVEY

Contact was made with eight landowners adjoining the Young River foreshore reserve. There may be more owners, but as many of these properties are not resided upon, contact could not be made. Most of the properties are very large and recent years have been fairly difficult financially for this agricultural community.

62% of the landowners responsed to the questionnaire.(Refer to Table 18 for questionnaire results). Of these, 80% of them agreed that the river corridor had conservation value for preserving the native fauna and flora with 20 % saying it held no value. 60 % stated that it required conservation so it could act as a corridor between Stokes National Park and Frank Hann National Park, with 20 % unsure whether it would act as a corridor and 20% saying it had no value as a corridor. 40% felt that feral animal control was an important management issue for the proposed reserve, with 20 % stating it was only somewhat important, 20% stating it wasn't important and the other 20% didn't respond to that question. 60% of them rated weed control as not being an important management issue with the other 40% stating that it was important. 60% rated fire management as important with the other 40 % saying it was not important. 40 % of the farmers said that kangaroo management was important, 20% said it was somewhat important, 20% said it was not an important management issue and the other 20% said to "shoot them and eat them." Two of the farmers who responded to the questionnaire indicated they had property which was not fenced off from the reserve. This amounted to over 4 kilometres and it is thought that there are also quite a number of the other farmers who did not respond to the questionnaire who have unfenced sections adjoining the reserve. One farmer has approximately 300 hectares of chained native bushland adjoining the river reserve which he would like CALM to purchase and include in the corridor.

Two farmers expressed concern of CALM "having control" over the reserve in the future. Both use the reserve for recreational purpose, e.g. fishing, swimming and picnics, and would not like any restrictions on access into the bushland.

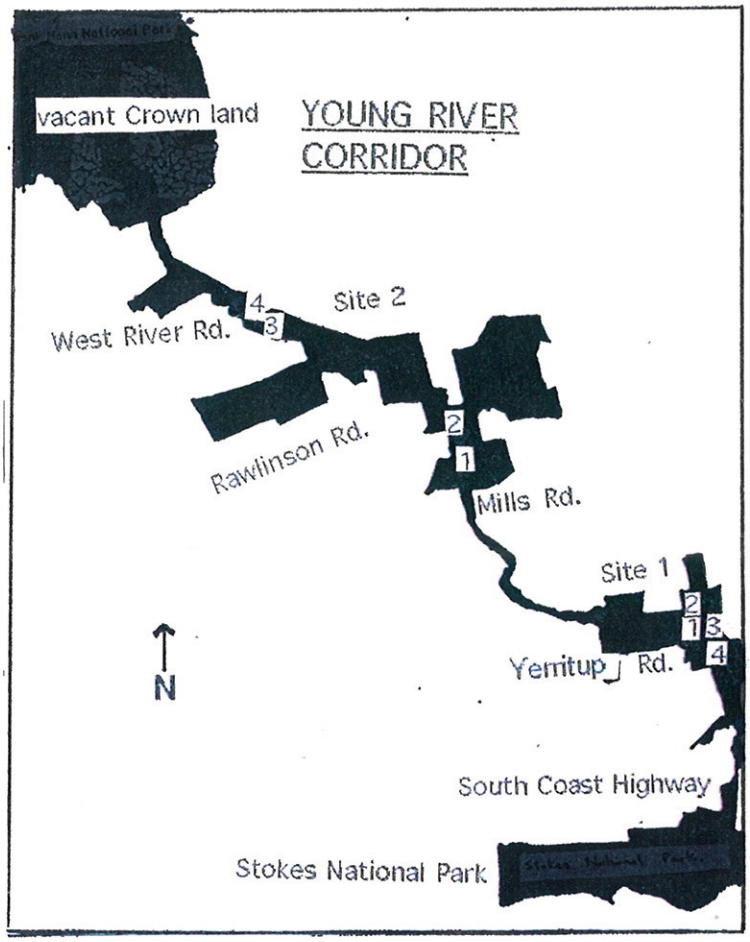


Fig. 14: Location map of survey grids for Sites 1 and 2 in the Young River corridor.

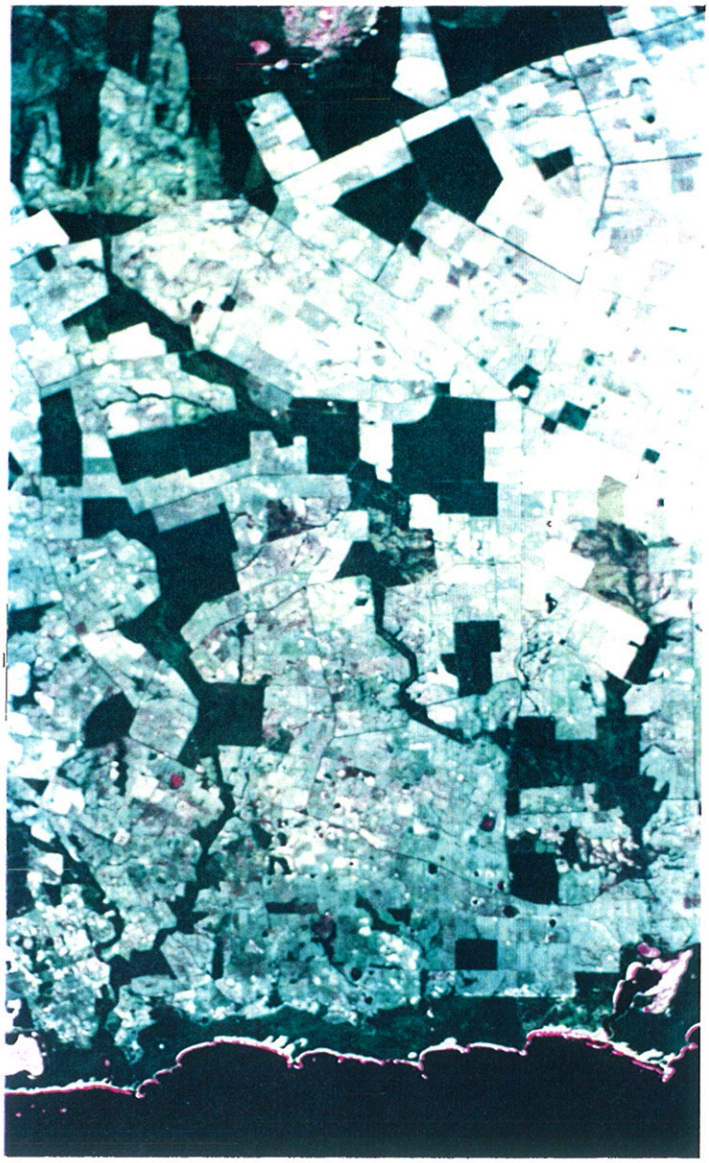


Plate 22: Satellite image (1991) showing Young River corridor and adjoining reserves. The vacant Crown land in the north shows evidence of the 1990/91 wildfire.

Table 13 - Young Plant List

SITE 1			
GRID 1	**GRID 2**	**GRID 3**	**GRID 4**
Acacia sp.	Acacia sp.	Agonis spathulata	Agonis spathulata
Banksia media	Allocasuarina humilus	Allocasuarina humilus	Allocasuarina huegliana
Beaufortia macrantha	Banksia media	Allocasuarina thuyoides	Callistmon phoeniceus
Callistemon phoenisceus	Eucalyptus occidentalis	Anthocercis genistoides	Callothamnus villosses
Calytrix leschenaultia	Stipa sp.	Baeckia sp.	Calytrix sp.
Calytrix sp.		Baeckia sp.	Calytrix sp.
Daviesia sp.		Banksia media	Chamaescilla corymbosa
Eucalyptus occidentalis		Beaufortia macrantha	Eucalyptus spathulata
Macrozamia riedlei		Calytrix leschenaultia	- grandiflora
Melaleuca scabra		Dampiera juncea	Eucalyptus tetragona
Typha angustifolia		Eucalyptus (sporadica)	Gastrolobium spinscens
		Eucalyptus tetragona	Hakea varia
		Gastrolobium spinosum	Helipterum cotula
		Jacksonia furcellata	Hibbertia sp.
		Jacksonia ulicina	Leptospermum
		Juncus sp.	Leptospermum erubescens
		Labichea lanceolata	Leptospermum sp.
		Lambertia inermis	Melaleuca pentagonia
		Leptospermum erubescens	Melaleuca scabra
		Leptospermum gladiatum	Thelymitra sp.
		Leptospermum spinescens	Verticordia preissi
		Leucopogon paviflorus	Waitzia citrina
		Macrozamia riedlei	Waitzia suareolens
		Mesiobranthum sp.	
		Stylidium sp.	
		Waitzia paniculata	
		Watzia citrina	

Table 13 - Young Plant List

SITE 2			
GRID 1	**GRID 2**	**GRID 3**	**GRID 4**
Acacia saligna	Adenanthos cuneata	Baeckia sp.	Acacia saligna
Banksia media	Allocasuarina aff.	Banksia blechnifolia	Acacia sp.
Billaridiera lehmanniana	hueglience humilus	Banksia media	Allocasuarina huegliana
Callitris preisii	Allocasuarina huegliana	Boronia caerulescens	Banksia media
Callothamnus graullas	Boronia sp.	Callothamnus graullas	Billardiera lehmanniana
Calytrix tetragona	Calytrix leschenaultia	Calytrix decandra	Calytrix leschenaultia
Cassia chatelainaina	Calytrix sp.	Calytrix leschenaultia	Calytrix sp.
Eucalyptus (sporadica)	Cynosorus spp.	Conothamnus aureus	Chamaescilla corymbosa
Eucalyptus aff. redunca	Dampiera cuneata	Eucalyptus incrassata	Eucalyptus sp.
Eucalyptus spathulata	Gyaphea polymorpha	Eucalyptus tetragona	Eucalyptus spathulata
grandifolia	Hakea varia	Grevillea oncogyne	Hakea prostrata?
Grevillea plurijunga	Hibbertia sp.	Hakea cynarea?	Heritulum cotula
Grevillia nudiflora	Hibbertia sp.	Hakea strumosa	Hibbertia sp.
Hakea oleifolia	Isopogon sp.	Helichrysum obtusifolium	Leptospermum erubescens
Isopogan villosus	Jacksonia furcelluta	Hibbertia sp.	Leptospermum sp.
Melaleuca cuculata	Kunzea sp.	Isotropis sp.	Melaleuca pentagonia
Trachymene ornata	Leptospermum sp.	Leptospermum erubescens	Thelymitra sp.
Verticordia brownii	Melaleuca scabra	Lysinema aff. cileatum	Verticordia preissi
Verticordia preissi	Synaphea polymorpha	Melaleuca cuculada	Waitzia aurea
	Waitzia aurea	Melaleuca pentagona	Waitzia suareolens
	Waitzia suaveolens	Melaleuca scabra	
		Petrophile aff. media	
		Petrophile squamata	
		Petrophile teretifolia	
		Petrophile trilobus	
		Stylidium sp.	
		Syaphea polymorpha	

TABLE 14 : Fauna trapping results for Young River Corridor - Site 1. Total numbers (Column 1) of each species trapped in pit traps and Elliot traps in the vicinity of each sampling grid. Sightings (S) are also recorded but not included in total numbers.

LOCATION:	LATITUDE	LONGITUDE
Grid 1	121 08.2' E	033 42.4' S
Grid 2	121 08.2' E	033 42.4' S
Grid 3	121 09.0' E	033 42.9' S
Grid 4	121 09.0' E	033 42.9' S

Common Name	Scientific Name	Total No's	Grid No. (See map) 1	2	3	4
MAMMALS						
Western Grey Kangaroo	Macropus fuliginosus	10	10			
White Striped Mastiff Bat	Tadarida australis	1	1			
Domestic Mouse	Mus musculus	5	3	1		1
Native Bush Rat	Rattus fuscipes	14	7		3	4
Fox	Vulpes vulpes					S
Rabbit	Oryctolagus cuniculus	2				2
AMPHIBIANS						
Slender bodied frog	Litoria cyclorhynchus	2	2			
Slender Tree Frog	Litoria adelaidensis	1	1			
Spotted Moaning Frog	Heleioporus albopunctatus	1	1			
Dots on side of frog	Heleioporus psammophilus	2			2	
Bull or Banjo Frog	Limnodynastes dorsalis	3	1		2	
Turtle Frog	Myobatrachus gouldii	1			1	
Robust Bodied Frog	Pseudophryne guentheri	2	1		1	
Variable sized frog	Ranidella glauerti	3	2	1		
REPTILES						
Spines on Tail gekko	Diplodactylus spinigerus	2			1	1
Legless lizard	Pygopus lepidopodus	1				1
Goanna	Varanus rosenbergi	2	1			1
Skink	Ctenotus imoar	1				1
Skink	Ctenotus catenifer	1				1
King Skink	Egernia Kingii	1	1			
Skink	Hemiergis initialis brookeri		1		1	
Skink	Hemiergis peronii peronii	4			2	2
Skink	Leiolopisma trilineatum	6		1	2	3
Skink	Lerista distinguenda	7	1		3	3
Skink	Morethia obscura	4	1			3

TABLE 14 CONT'D : Fauna trapping results for Young River Corridor - Site 1. Total numbers (Column 1) of each species trapped in pit traps and Elliot traps in the vicinity of each sampling grid. Sightings (S) are also recorded but not included in total numbers.

Common Names	Scientific Name	Total	Sampling			
Loc.		No's	1	2	3	4
REPTILES CONTINUED						
Bobtail	Teliqua rugosa	1				1
Thorny Mountain Devil	Tympanocryptis a. adelaidensis	6	1	5		
Blind snakes	Ramphotyphlops australis	1		1		
Tiger Snake	Notechis scutatus	2	2			
Dugite	Pseudonaja affinis affinis	1	1			
INVERTEBRATES						
Molluscs	Bothriembryon dux	3				
Scorpion		13				
Beetle	BUPRESTIDAE ELYTRON	1 wing found on ground				
	CARABIDAE					
Beetle	Demitrida sp.	1				
Beetle	Gnathoxys sp.	3				
	SCARABAEIDAE					
Beetle	Heteronyx sp. 1	2				
Beetle	Heteronyx sp. 2	1				
Beetle	CURCULIONIDAE 1	5				
Beetle	CURCULIONIDAE 2	1				
Beetle	CURCULIONIDAE 3	1				
Beetle	CURCULIONIDAE 4	1				
	TENEBRIONIDAE					
Beetle	Celibe sp.	2				
Beetle	Chalcopteroides	3				

Survey peg at Grid 1 MC 74
1379

ELLIOT LINE ALONG RIVER

LOCATION 5

Domestic Mouse	Mus musculus	2
Western Grey Kangaroo	Macropus fuliginosus	2
Rabbits	Oryctolagus cuniculus	5

TABLE 15 : Fauna trapping results for Young River Corridor - Site 2. Total numbers (Column 1) of each species trapped in pit traps and Elliot traps in the vicinity of each sampling grid. Sightings (S) are also recorded but not included in total numbers.

LOCATION:	LATITUDE	LONGITUDE
Grid 1	120 58.8' E	033 33.3' S
Grid 2	120 58.5' E	033 32.7' S
Grid 3	120 51.3' E	033 27.2' S
Grid 4	120 51.2' E	033 26.9' S

Common Name	Scientific Name	Total No's	Grid No. (See map) 1	2	3	4
MAMMALS						
Western Grey Kangaroo	Macropus fuliginosus			S		S
Western Brush Wallaby	Macropus irma			S		
White Striped Mastiff Bat	Tadarida australis			S		
Honey Possum	Tarsipes rostratus	11	1		7	3
Southern Bush Rat	Rattus fuscipes	11	10	1		
Fox	Vulpes vulpes					S
AMPHIBIANS						
Spotted Moaning Frog	Heleioporus albopunctatus	10		4	3	3
Banjo Frog	Limnodynastes dorsalis	7	2	5		
Robust Bodied Frog	Pseudophryne guentheri	1				1
REPTILES						
Spines on tail gekko	Diplodactylus spinigerus	2	2			
Legless lizard	Aprasia repens	3			3	
Legless Lizard	Pygopus lepidopodus	1				1
Small dragon lizard	Ctenophorus maculatus griseus	6	1	5		
Bearded Dragon	Pogona minor minor	1				1
Goanna	Varanus rosenbergi	1				1
Skink	Ctenotus impar	6	1		2	3
Skink	Ctenotus impar	6	3	3		
Skink	Hemiergis peronii peronii	3				3
Skink	Leiolopisma trilineatum	1		1		
Skink	Lerista distinguenda	14	1	5	3	5
Skink	Morethia obscura	14	1	2	2	9
Bobtail	Teliqua rugosa	7		6	1	
Bobtail	Telqua occipitalis	1				1
Blind Snake	Ramphotyphlops australis	3			2	1
Tiger Snake	Notechis scutatus	1	1			

TABLE 15 CONT'D: Fauna trapping results for Young River Corridor - Site 2. Total numbers (Column 1) of each species trapped in pit traps and Elliot traps in the vicinity of each sampling grid.

Common Name	Scientific Name	Total No's
INVERTEBRATES		
Mollusc	Bothriembryon dux	3
Mollusc	Bothriembryon balteolus	1
Scorpion		11
	CARABIDAE	
Beetle	Scaraphites sp.	1
Beetle	CURCULIONIDAE 1	3
Beetle	CURCULIONIDAE 2	1
	TENEBRIONIDAE	
Beetle	Celibe sp.	1
Beetle	Chalcopteroides	1
	TROGIDAE	
Beetle	Trox sp.	1

TABLE 16: Bird list for surveyed corridors. (+) Species sited at (C) Corackerup, (F) Fitzgerald, **(Y) Young** and (L) Lort River Corridors. (?) if identification was not definite.

COMMON NAME.	SCIENTIFIC NAME	C	F	Y	L
Australian Bustard	*Ardeotis australis*				+
Australian Magpie	*Cracticus tibicen*	+	+	+	+
Australian Raven	*Corvus coronoides*	+	+	+	+
Australian Wood Duck	*Chenonetta jubata*	+	+	+	+
Banded Plover	*Vanellus tricolor*		+	+	+
Barn Owl	*Tyto alba*	+	+		
Barn Swallow	*Hirundo rustica*			+	
Black Duck	*Anas superciliosa*			+	
Black Faced Cuckoo Shrike	*Coracina novaehollandiae*		+	+	+
Black Fronted Dotterel	*Charadrius melanops*		+	+	
Black Swan	*Cygnus atratus*			+	
Black Tailed Native Hen	*Gallinula ventralis*		+		
Blue Breasted Wren	*Malurus pulcherrimus*	?	?	?	?
Broad Tailed Thornbill	*Acanthiza apicalis*				+
Brown Headed Honeyeater	*Melithreptus brevirostris*				+
Brown Falcon	*Falco berigora*				+
Brush Bronzewing Pidgeon	*Phaps elegans*	+	+	+	+
Chestnut Teal	*Anas castanea*	+	+	+	
Common Bronzewing	*Phaps chalcoptera*	+		+	+
Coot	*Filica atra*	+		+	
Crested Bellbird	*Oreoica gutturalis*	+		+	+
Crested Pidgeon	*Ocyphaps lophotes*	+	+	+	+
Dusky Woodswallow	*Artamus cyanopterus*			+	
Eastern Reef Heron	*Egretta sacra*			+	
Elegant Parrot	*Neophema elegans*		+		
Emu	*Dromaius novaehollandiae*		+	+	+
Fan Tailed Cuckoo	*Cuculus flabelliformis*			+	
Forest Kingfisher	*Halcyon macleayii*	+			
Galah	*Cacatua roseicapilla*		+	+	
Golden Whistler	*Pachycephala pectoralis*	+	+	+	+
Grey Breasted White Eye	*Zosterops lateralis*	+	+	+	
Grey Butcher Bird	*Cracticus torquatus*		+	+	
Grey Currawong	*Strepera versicolor*	+		+	+
Grey Falcon	*Falco hypoleucos*				+
Grey Teal	*Anas gibberifrons*	+	+		
Hoary Headed Grebe	*Podiceps poliocephalus*	+	+	+	
Horsefields Bronze Cuckoo	*Chrysococcyx basalis*		+		
Little Black Cormorant	*Phalacrocorax carbo*	+		+	
Little Grebe	*Podiceps ruficollis*	+		+	
Little Pied Cormorant	*Phalacrocorax melanoleucos*	+		+	
Little Wattle Bird	*Anthochaera chrysoptera*			+	+
Magpie Lark	*Grallina cyanoleuca*	+	+	+	+
MalleeFowl	*Leipoa ocellata*	+	+		+
Mallee Heath Wren	*Sericornis cautus*	+	+	+	+
Mountain Duck	*Tadorna tadornoides*	+	+		
Nankeen Kestrel	*Falco cenchroides*		+	+	+
Native Swamp Hen	*Porphyrio porphyrio*		+		

TABLE 16 CONT"D: Bird list for surveyed corridors. (+) Species sited at (C) Corackerup, (F) Fitzgerald, **(Y) Young** and (L) Lort River Corridors. (?) if identification was not definite.

COMMON NAME.	SCIENTIFIC NAME	C	F	Y	L
New Holland Honeyeater	*Phylidonyrus novaehollandiae*	+	+	+	+
Pallid Cuckoo	*Cuculus pallisus*		+	+	
Pied Butcher Bird	*Cracticus nigrogularis*	+	+	+	
Pink Eared Duck	*Malacorhynchus membranaceus*			+	
Port Lincoln Parrot	*Barnardius zonarius*	+	+	+	+
Purple Crowned Lorrikeet	*Glossopsitta porphyrocephala*		+		
Rainbow Bee Eater	*Merops ornatus*			+	
Red Capped Parrots	*Platycercus spurius*	+	+	+	+
Red Wattle Bird	*Anthocheara carunculata*		+	+	+
Red Winged Wren	*Malurus elegans*	+	?		
Restless Flycatcher	*Myiagra inquieta*	+			+
Richard's Pipit	*Anthus novaeseelandiae*			+	
Singing Honeyeater	*Meliphaga virescens*	+	+	+	+
Splendid Wren	*Malurus splendens*	+	+	+	
Striated Pardelote	*Pardalotus striatus*		+		+
Yellow Rumped Pardelote?	*Pardelotus xanthopygus*			+	
Tawny Frogmouth	*Podargus strigoides*		+	+	+
Tawny Crowned Honeyeater	*Phylidonyris melanops*		+		+
Variegated Wrens	*Malurus lamberti*	?	?	+	+
Wedgetailed Eagle	*Aquila audax*		+	+	+
Weebill	*Smicrornis brevirostris*				+
Welcome Swallow	*Hirundo neoxena*	+	+	+	
Western Grey Shrike Thrush	*Colluricincla harmonica*		+	+	+
Western Rosella	*Platycercus icterotis*	+			
Western Spinebill	*Acanthorhynchus superciliosus*	+			
Western Whip Bird	*Psophodes cristatus*	+			
White Browed Babbler	*Pomatostomus temporalis*	+	+	+	+
White Browed Scrubwren	*Sericornis frontalis*			+	
White Cheeked Honeyeater	*Phylidonyris albifrons*		+		
White Eared Honeyeater	*Meliphaga ornata*			+	+
White Faced Heron	*Ardea novaehollandiae*	+	+	+	
White Fronted Chat	*Ephthianura albifrons*				+
White Naped Honeyeater	*Melithreptus lunatus*			+	
WhiteTailed Black Cockatoo	*Calyptorhynchus baudinii*			+	
White Winged Triller	*Lalage sueurii*			+	+
Willy Wagtail	*Rhipidura leucophrys*	+	+	+	+
Yellow Rumped Thornbill	*Acanthiza chrysorrhoa*			+	
Yellow Throated Miner	*Manorina flavigula*	+	+	+	+

TABLE 17 : Museum Records of other additional species found within the Young River Corridor or in it's vicinity. The W.A.M. Accession Numbers is the reference number the Museum has given that specimen.

SPECIES	LOCATION				WAM
	Longitude (Degrees East)		Latitude (DegreesSouth)		A.No.'s
MAMMALS					
MACROPODIDAE					
Macropus fuliginosus	121	12	033	45	15188
MURIDAE					
Rattus fuscipes	121	06	033	47	19170
TARSIPEDIDAE					
Tarsipes rostratus	121	10	033	46	15989
REPTILES					
AGAMIDAE					
Ctenophorus ornatus	121	01	033	39	36281
Pogona minor ninor	121	01	033	39	36285
ELAPIDAE					
Pseudonaja affinis	121	01	033	36	93241
LEPTODACTYLIDAE					
	121	10	033	48	
100828					
Pseudophryne guentheri	121	10	033	46	38136
Ranidella pseudinsignifera	121	10	033	46	38646
SCINIDAE					
Cryptoblepharus virgatus clarus	121	01	033	39	36286
Tiliqua rugosa rugosa	121	10	033	46	15006
VARANIDAE					
Varanus rosenbergi	120	59	033	34	14898
FISH					
FAMILY 246					
Atherinosoma elongata	121	10	033	47	27168.001
FAMILY 428					
Pseudogobius olorum	121	10	033	47	27168.002

Table 18: Results (in percentages) of questionnaire completed by adjoining landowners to the Young River corridor. Not all responses calculate to 100% as some landowners prefferred not to respond on some issues.

Eight landowners sent questionnaire, five replied ..... 62% response

Do you feel the river corridor has conservation value;	YES	UNSURE	NO
for preserving native plants ?	[80%]	[ ]	[20%]
for preserving native animals ?	[80%]	[ ]	[20%]
to act as a corridor ?	[60%]	[20%]	[20%]

Would you rate the following issues as important, somewhat important or not important in the proposed reserve ?

	IMP.	S.I.	N.I.
weed control	[40%]	[-%]	[60%]
feral animal control	[40%]	[20%]	[20%]
fire management	[60%]	[ ]	[40%]
kangaroo management	[40%]	[20%]	[20%]

	YES	NO
Would you like to have the opportunity to participate in management decision making for this reserve ?	[60%]	[20%]

Is your fence completely fenced off from this reserve ?

[2 farmers said "no" with a total of 4 kilometres unfenced]

Plate 27: King Skink, *Egernia kingii*

Plate 28: Slender Tree Frog
Litoria adelaidensis

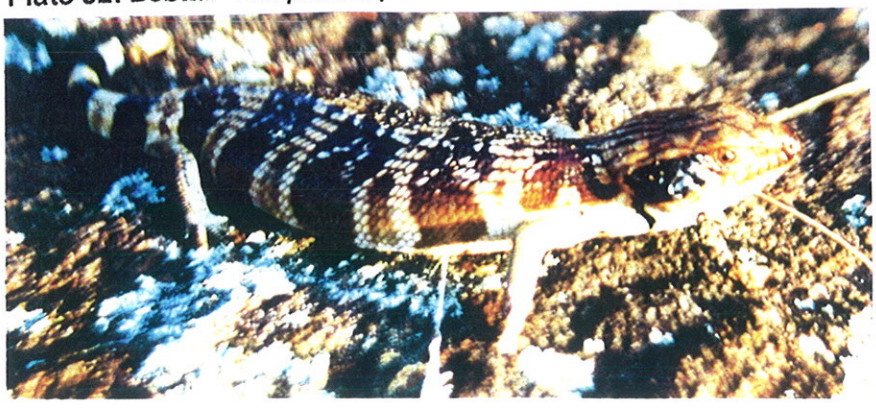
Plate 29: Southern Native Bush Rat
Rattus fuscipes

Plate 30: Burrowing frog
Heleioporus psammophilus

Plate 31: Grey Butcher Bird chicks
Cracticus torquatus

Plate 33: Flowering Calothamnus

Plate 32: Bobtail *Teliqua occipitalis*



DISCUSSION OF FINDINGS.

The Young River foreshore reserve extends as a strip of remnant vegetation with varying width ranging over a length of 50 kilometres through agricultural land. It links the vacant Crown land and Frank Hann National Park on its northern end to Stokes National Park on its southern end. Rainfall decreases by about 150 mm from the southern reaches of the river to its upper reaches about 75 kilometres north of the coast.

The reserve passes through two distinct vegetation systems recognised by Beard in 1973 encompassing mallee shrublands and low forest associations of Moort in a relatively undisturbed condition. The Young River has large pools of water which are permanent through summer as it flows across the semi arid plains of the region. The main water channel is fairly saline but freshwater soaks can be found along its length. It is this freshwater source which made the river a popular camping place of the Aboriginal people of the past with six official Aboriginal sites having been recorded along the river.

The foreshore reserve has recently experienced bushfires in different sections of its length. All of these fires have been started on farming pasture land and have entered into the reserve. There are no records of fires naturally occurring (e.g. lightning strikes) in the reserve and causing a wildfire. With the fairly regular dissection of the reserve into blocks caused by roads passing through the reserve, there is potential for control of wildfires.

The fauna survey revealed that in the examined sections of the reserve, native fauna populations are healthy and range from birds and mammals through to reptiles, amphibians and invertebrates. Evidence was obtained that these native fauna were also breeding within the reserve.

Agricultural development in the southern portion of the reserve occurred over a century ago and clearing up to less than 50 metres from the river channel has left this section of the reserve in a very degraded state. There are still a few remaining native plants of the upper storey present but stock have grazed out the native understorey and this is replaced with agricultural grasses. This is the weakest section of the reserve and if it is to fuction as a corridor, it would require attention in the form of revegetation. Further north in the reserve, where agricultural clearing only occurred in the 1970's, the corridor ranges from 200 to 1000 metres in width and there is little evidence of degradation except for the intrusion of exotic grasses at road crossings.

The vermiculite mining between Rollands Road and Mills Road appears to be a productive industry. As the mine uses water from the river for the processing and there appears to be very large vermiculite deposit, it may not be to the mining industries advantage to have this area established as a nature reserve.

The local community generally agreed that the reserve had conservation value for the protection of the native flora and fauna but were less certain of its capabilities to function as a corridor. Fire and feral animal control were thought to be the two more important management issues and there was concern that the proposed nature reserve would restrict the recreational use that some local people have for the reserve.

LORT RIVER CORRIDOR

DESCRIPTION OF CORRIDOR

BOUNDARIES AND PHYSICAL FEATURES

The Lort River flows in a north north east - south south west direction over approximately 130 kilometres to join the coast at Stokes National Park (80 kilometres west of Esperance). Its headwaters are about 95 kilometres from the coast in Peak Charles National Park with surrounding vacant Crown land at about 230 metres above sea level. Between the southern border of the vacant Crown land and Stokes National Park boundary, the river flows in a narrow strip of river foreshore reserve stretching over approximately 45 kilometres (refer to figure 15). The foreshore reserve incorporates Reserve no. 31761 (Park and Protection of River Foreshore, 809 ha) , Reserve no. 31739 (Parklands, 11963 ha), Reserve no. 26913 (Parks, 1304.3423 ha). The combined total area of the Lort corridor under study is 14076.3423 hectares.

Between Rolland Road and Cascades Road (approximately 44 kilometres) the reserve is generally at least 2 kilometres wide, with some wider extensions. From Cascades Road to the South Coast Highway, (approximately 25 kilometres) the reserve is approximately 500 metres wide and for the most of the length abuts cleared land, though a cleared strip of land occurs to the east of the reserve, just north of the highway. From the South Coast Highway to Stokes National Park (~8 kilometres) the reserve is less than 200 metres wide, with the exception of the first 2 kilometres south of the highway where the reserve abuts uncleared land on the east side.

An adjoining Reserve, no. 30583 (Conservation of Flora, 5417 .7 ha), is located on the western side of the corridor in its northern region.

CLIMATE

Rainfall is highest near the coast with an annual average of 541 mm at the Young River Station, and decreases to less than 350 mm in its upper reaches. (Grass Patch Post Office-353mm , Salmon Gums Research Station-338 mm)The rainfall is mainly winter-spring rain (refer to figure 16). However, summer storms with over 100 mm of rain tend to distort the monthly means. Such storms include 145mm in February 1955, 103mm in Jan. 1966 and 105mm in February 1970 at Young River weather station. Further inland at the Lort River rainfall station, 117 mm was recorded in February 1976 (Hodgkin & Clark,1989).

GEOLOGY

The Lort River headwater catchment straddles the geological boundary between the south eastern edge of the Archaean Yilgarn Block and the younger Proterozoic Albany Fraser Province. The catchment creeks gather over the sand and gravel plains which cover the old Archaen porphyritic adamellites and migmatites. As the river channel develops further southward, it exposes some of the underlying Proterozoic metamorphosed granites and gneiss (more than 1200 million years old) of the Albany Fraser Province. Near the coast these basement rocks are covered by Eocene Plantagenet Group sediments like Pallinup Siltstone (40 million years old). This rock consists of flat bedded marine sediments with many sponge spicules. In its lower reaches the Lort River passes through these areas of Plantagenet sediment deposits (Thom, Lipple, Sanders 1977) .

In the Precambrian granite country the ancient lateritic plateau soils occur with an upper horizon of yellow sand overlying laterite, or clay rich subsoils. Sometimes there is clay to the surface in the northern part of the Lort River Catchment (Hodgkin &Clark,1989). These soils carry scrub heath or Broombush. Where granite outcrops close to the surface it supports broombush thicket. On middle slope sites mallee soils are found except for occasional patches of clay which support low forest of *Eucalyptus platypus* and its associates. In the bottom lands the soils are deep, sandy and calcareous and mainly carry woodland (Beard,1979).

The soils developed on the Tertiary sediments are Miocene or post Miocene in age and it is noticeable that laterite is confined to a belt along the coast where the rainfall today is higher than inland. The mallee soils show profile differentiation but no laterite, suggesting that they have developed under a rainfall distribution pattern similar to that of present. The soils of the Lort catchment area are saline. (Beard,1979)

VEGETATION TYPES

The vegetation within the corridor was mapped and described on a broad scale by J.S. Beard as part of the Vegetation Survey of Western Australia, 1973. Beard differentiated the shrubland vegetation formation in the river foreshore reserve as follows:

Shrublands

$e_{27}Si$	Mallee in valleys - *E. redunca, E. uncinata*
$e_{26}SZc$	Mallee - heath - *E. tetragona*
$e_{15}Si$	Mallee on domed clay soil - *E. eremophila*
$e^{15}{}_{32}Si$	Mallee on gilgai country - *E. eremophila, E.forestiana*
c_3Sc	Broombush thicket - *Allocasuarina campestris,* Calothamnus & Melaleuca
$e^{15}{}_{22}Si$	Mallee on Calcareous soil - *E. eremophila, E. oleosa*

The catchment headwaters of the Lort River are within an area of interior drainage around a number of playa lakes, e.g Lake Mends. Slopes are gentle, duricrust remnants are not extensive and barely mappable so that most of the area is covered with mallee and woodland, or with burnt out woodland which has been reduced to the equivalent of mallee (Beard,1979).

The middle reaches of the Lort River are within the Lort Vegetation System, containing the flat plain which lies about 180 metres above sea level and succeeds the gentle rising coastal plain of the Esperance system. The plain, due to its flatness, is winter wet, and the soil with its sand-over-clay mallee soil profile, becomes waterlogged in the rainy season. The most swampy areas are "gilgai" with a hummocky surface. The general plant cover is mallee but there are scattered granite outcrops, patches of sand with mallee heath, clay patches with *E. platypus* low forest, and scattered pans which tend to carry or be surrounded by stands of *E. occidentalis* (Beard,1979).

The mallee in this system is a distinct community with *E. eremophila* dominant in association with *E. forrestiana.* Strictly speaking, neither of the two dominants is a mallee as they are killed by fire, regenerating each time from seed as a single stemmed tree, as does *E. platypus.* Other casual mallee species include *E. redunca, E. uncinata, E. goniantha and E. flocktoniae.* The trees reach 3-4.5 metres in height and have the usual dense understorey about 1 metre tall of *Melaleucas, M. pungens, M. cliffortioides, M. scabrta, M. deltoides* (Beard,1979).

Other communities found in sandy patches on the plain include B*anksia media, Grevillea asparagoides* and *Hakea spp.* in the mallee. Deep sand brings in *Eucalyptus tetragona* and many other of its associates from the coastal mallee heath. Granite outcrops sometimes protrude, and *Baecka crispiflora, Hakea commutata, Eriostemon rhomboides* and locally *Allocasuarina heugliana* have been collected on the outcrops. Where there is a thin skin of soil over granite one finds broombush thicket in which *Allocasuarina campestris* is dominant. *Hakea multilineata* and *Verticordia preisii* have also been noted (Beard,1979).

The lower reaches of the Lort River have been identified as being within the Esperance system of plant communities. The vegetation of this is mallee-heath characterised by *Eucalyptus tetragona* except where the surface sand is 90 cm or more in depth and there is a change to scrub heath with Banksia dominant. The valley slopes support mallees or *E. occidentalis* woodland (Beard,1979).

FAUNAL RECORDS

A Biological Survey was done in the Stokes National Park in 1989 by Brenda Newbey and Keith Bradby. A total of 104 species were recorded ranging through from the mammals to the amphibians and reptiles. The more interesting of the recorded mammals included a Grey Bellied Dunnart, an Echidna. Of the birds, the Grey Tailed Tattler, Bar Tailed Godwit and Eastern Curlew. twenty three reptile species were recorded.

RIVER DATA

Runoff & Riverflow

The Lort River has had a W.A. Water Authority gauging station (601004 AMG coordinates) in the lower reaches of the river for about 12 years. The runoff from the catchment is small, with an average of 0.9 mm or less than 1% of the rainfall. River flow is erratic with no flow being recorded in the Lort River in 1981 and 1982 but in 1975, 9×10^6 m^3 flowed down the Lort of which 80% was in November. Apart from these storm flows, the main river flow is from July to October(refer to plate 35). Year and monthly averages clearly do not give a true picture of the flow characteristics of the rivers (Hodgkin & Clark,1989).

Sediment Transport

This probably largely results from major floods. At such times fine sediment is washed by sheet erosion from cleared land, coarser material is eroded by gullying and from river beds. Evidence of increased sediment transport following clearing is recorded below (Hodgkin & Clark,1989).

Water Chemistry

The Lort River is saline at about 16 parts per thousand of Total Dissolved Salts in comparison to sea water which is 35 ppt (W. A. Water Resources Branch, PWD, 1984). However the river does experience a great range of salinity of the water with it being less saline following heavy rain in the catchments (Hodgkin &Clark,1989).

ABORIGINAL CULTURAL HISTORY OF THE AREA

The Lort river has seven official Aboriginal sites recorded along its length. With the surrounding landscape of the Lort River being a semi arid sand plain, it could probably be assumed that the Aboriginal people who lived in this area spent a lot of their time along the river valleys which extended through the landscape.

FIRE HISTORY

Aborigines had previously been in the habit of burning this country for food and have undoubtedly modified the vegetation by doing so. Fire started by lightning in summertime may also have swept through this area regularly for millions of years.

In more recent years, wildfires escaping from farmers burning off operations have swept into the reserve. Records are very limited but the most recent fires are listed in a table below.

TABLE 19: Fire history in the Lort River foreshore reserve in recent years.

approx. 1980	A small fire entered the reserve north of Griggs Road Another small fire burnt in the block between Griggs and Bishops Road
approx. 1985	A fire burnt through the vacant Crown land adjoining the north end of the corridor
1990-1991	A wildfire swept through the vacant Crown land north of the corridor and through Peak Charles National Park

EUROPEAN SETTLEMENT AND AGRICULTURAL DEVELOPMENT

The Lort River was named by Surveyor General Mr J.S. Roe on an expedition southeast of Perth between the months of September 1848 and February 1849. He named the river after his good friend Captain J. Lort Stokes, R.N..He includes detailed descriptions of the lower reaches of the river valley in his journal as he made his way down the river on his way to to Stokes Inlet.

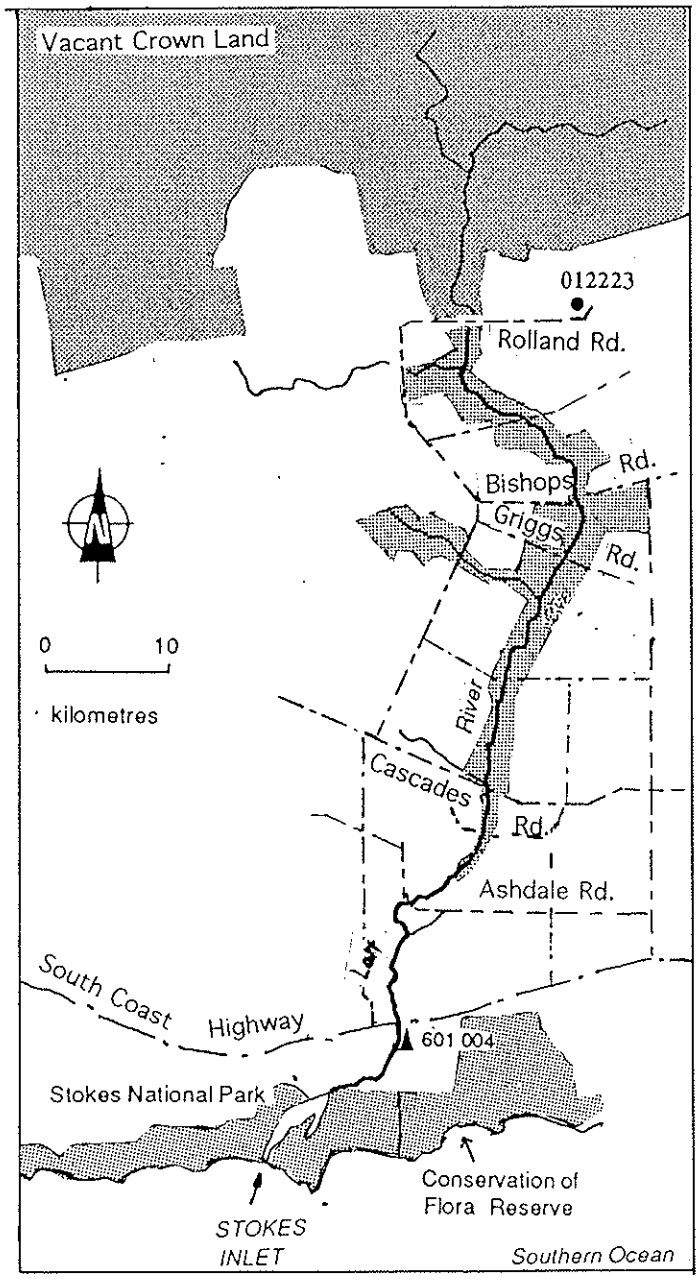
> " Five miles further westward over similar country brought us to the abrupt rocky banks of another river (the Lort), with a samphire -bed 70 or 80 yards wide, in which pools of salt water 20 yards by 6 or 7, but not a vestige of
>
> grass.....I proceeded at once down to its bed to the southward, came soon to good grass where the banks opened out, and in less than 3 miles encamped in the midst of abundance of it and drinkable water at the junction of several branches, some of which were observed to cut their way through white, yellow and red cliffs.
> .....we resumed our examination down the river.....and at 1/2 a mile from the mouth of the river....the water here was quite salt and about 20 feet deep, tennanted by many fine large fish, resembling bream, upwards of a foot in length." (Roe, 1848)

Alex and John Moir were the first European settlers to take up land in the area. They were granted a pastoral lease of 7000 acres each side of Stokes Inlet making 14 000 acres in all. Their first crop was barley of which five acres was planted. In 1877, John was killed by Aboriginal People but a William Moir left his Lake Grace property and moved to Stokes Inlet to help Alex. They had 500 head of cattle and sheep at that time.

In 1888, William and George Cheyne were granted a pastoral lease of over 57 000 acres and in that same year they built a homestead at Fanny Cove. In 1889 William went searching for further pastoral country but instead found gold at Dundas. This began a gold rush with men coming by boat to Fanny Cove and others coming overland through Broomehill.

From these early times a track existed from Albany to Esperance passing through Ravensthorpe. However it was not until the 1950's that farming on the Esperance Plains began to go ahead and large scale development of the light and relatively infertile heath and mallee soils was undertaken. Most of the clearing in the area occurred in the late 1970's and by 1987, 60 % of the catchment on the Lort and Young Rivers had been cleared for cereal production and sheep grazing, with some beef production near the coast (Beard,1979).

Fig. 15: Location map of Lort River corridor and adjoining reserves and vacant Crown land.



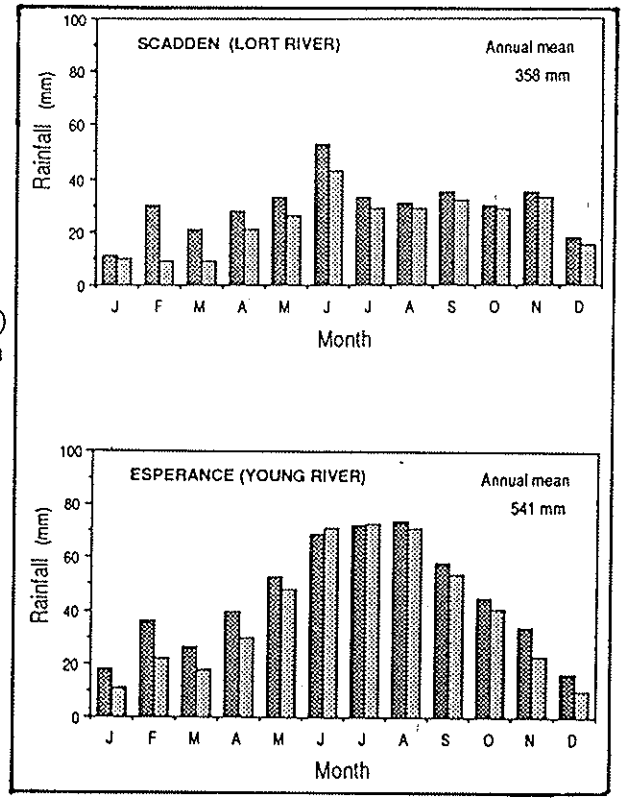


Fig. 16: Mean monthly rainfall (mm) for Young River Station and Scadden Means ▨, medians ▩.
(Hodgkin & Clarke, 1989).

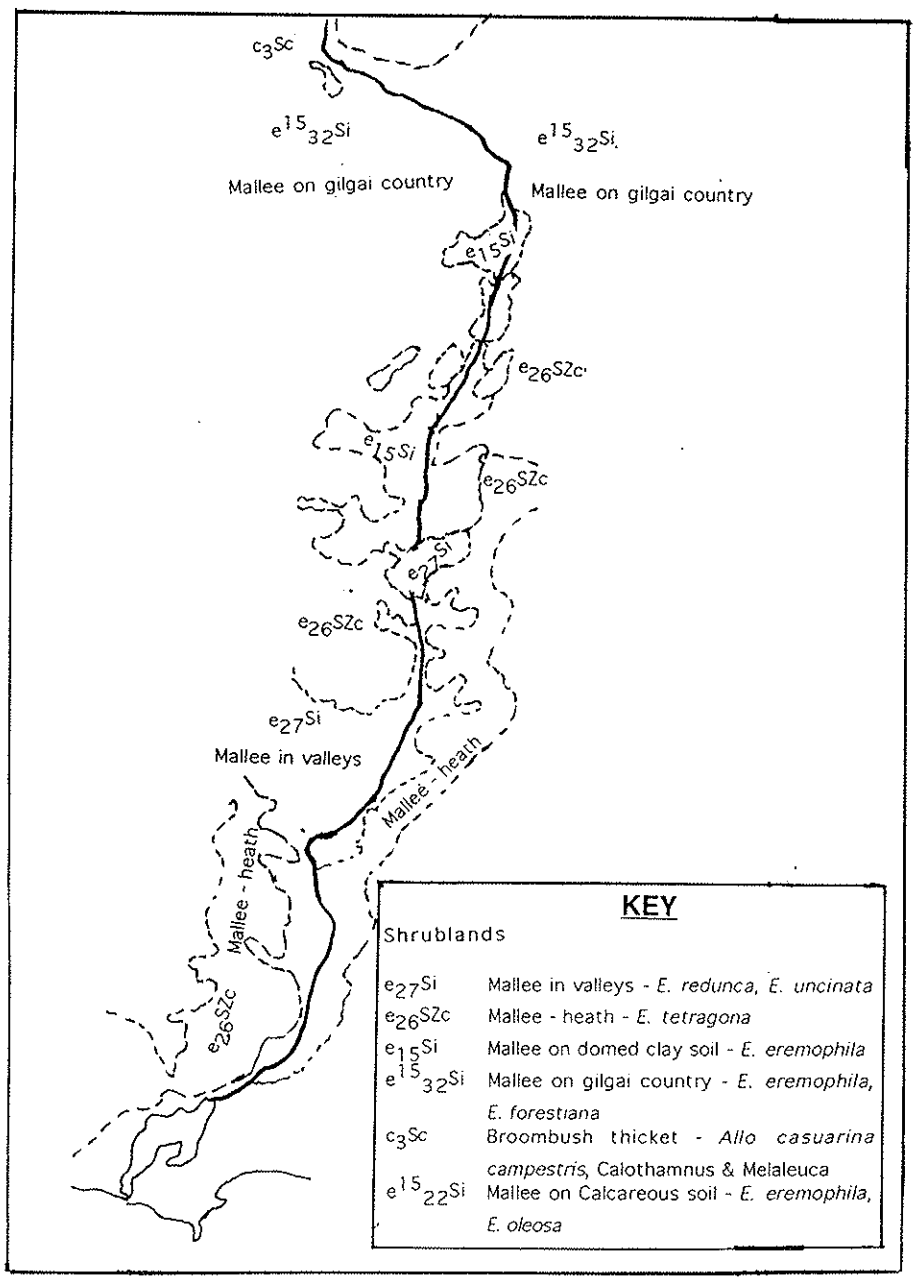


Fig. 17: Vegetation Map of Lort River corridor area. (Veg. Survey of W.A., Ravensthorpe: Sheet no. S1-51-5, Beard, 1973).

LORT RIVER CORRIDOR SURVEY RESULTS

DESCRIPTION OF SURVEY SITES.

Due to the limited time and funds for this study, only one site was trapped on the Lort River Corridor. The four survey grids were located near the Griggs Road river crossing in the northern half of the corridor (refer to Figure 18 for location of grids.) Forty pit traps and eighty Elliot traps were installed. These were opened for five nights.

Four representative riverine habitats were selected for the trapping grids in the Lort River Corridor. More detailed vegetation lists for each grid are presented on Table 20, but a brief description of each is given below.

Site 1

Grid 1
This grid was located on the eastern side of the river about eight hundred metres north east of the Lort River crossing on Griggs Road. Access was on a Main Roads Department track which led from the cleared campsite on the north side of the crossing and extended in a north - easterly direction to rejoin Griggs Road. The grid was installed in a fairly sandy soil which contained laterite pebbbles and 40 centimetres underground the laterite crust was fairly hard to break through. The vegetation consisted of *Eucalyptus f. forrestiana S. (sporadica), E. eremophila, E. uncinata, E. conglobata, E. tumida, E. pileata* and *Banksia media* with a mixed heath understorey.

Grid 2
This grid was located on the southern side of the river about two kilometres southeast of the Lort River crossing on Griggs Road. Access was on a Main Roads Department track which ran parallel to the property boundary running southward and then turned westward to end up at Bald Rock. The grid was installed in a fairly sandy yellow soil which overlaid the granite outcrop. The vegetation consisted of a low open scrub dominantly composed of *Calothamnus gibbosus, Melaleuca cucilata* and *Verticordia shrubs*, (refer to plate 38), about four feet in height. This vegetation association was surrounded by a *Eucalyptus tetragona* community.

Grid 3
This grid was located on the southwestern side of the river about eight hundred metres southwest of the Lort River crossing on Griggs Road. Access was on an old four wheel drive track across the dry river bed. The grid was installed on top of the laterite outcrop which borders the western river bank. The vegetation association incorporated *Eucalyptus salubris* and *Eucalyptus kessellii.* The understorey was fairly open with a few *Leptospermum erubescens*, and *Allocasuarina thuyoides*. The *Callistemon sp.* was flowering where the granite outcropped a few metres from the trap line. The soil was grey, white sands which overlay the laterised rock.

Grid 4
This grid was located on the northern side of the river about six hundred metres west of the Lort River crossing on Griggs Road. Access was on the Main Roads Department track which ran past the gravel pit to the corner of the farmers property (Block no. 1080). The grid was installed on the westward side of this track in the open Mallee Heath comprising of *Eucalyptus tetragona* and mixed species of heath for the understorey, *Grevillea Plurijaga, Grevillea h. heuglii, Dodonaea spp., Davieasia microphylla* and *Leptomeria spinos.*

FAUNA SURVEY RESULTS.

At Site 1 of the Lort River Corridor the survey recorded five native mammals, three feral mammals, sixty four avifauna (birds), one amphibian, seventeen reptiles and fourteen invertebrates (refer to Table 21 & 22).

The mammals species included the Pygmy and Honey possums, the Grey Kangaroo, a White Striped mastiff Bat, the fox, cat and domestic mouse. The frog species was the burrowing Spotted Moaning Frog. The more commonly known reptile species included the Marbled Gekko and the spiny tailed gekko (refer to plate 41), three Dragon lizards (refer to plate 39), a snake-like legless lizard called *Delma butleri* (refer to plate 36), and mainly skinks from the Ctenotus genus. The invertebrate species included one species of land snail, the beetles belonging to the Carabidae, Cleridae, Scarabaeidae, Curculionidae and Geotrupidae families and many scorpions (refer to plate 40). The birds encompassed species from both the greater orders of Passerine and Non Passerine. This included the Broad Tailed Thornbill, Brown Headed Honeyeater, Striated Pardelote, Weebill, White Fronted Chat, Nightjar and the Bustard.

Species that have previously been recorded in the Lort River area but were not recorded on the survey have been obtained from Museum records presented in Table 23. This list included; one dragon lizard, eight species of snake, two gekkos, four species of frog, five species of pygopods, six speceis of skink, one monitor and two species of fish. Fauna sitings by farmers in the area have recorded the Echidna, a Dunnart and what could be the Black Footed Rock Wallaby (*Petrogale lateralis*).

DESCRIPTION OF DEGRADED AREAS

The length of the river extending 3 km south of the South Coast highway and 8 kilometres north of the highway has been cleared down to within a few metres of the waters edge and stock grazing has left very little native vegetation remaining. Throughout this degraded section, weed intrusion is very bad. There was little evidence of weed intrusion in other areas of the reserve except along the boundary of the reserve bordering onto pasture lands.

LOCAL COMMUNITY RESPONSE TO SURVEY

Contact was made with eighteen landowners adjoining the Lort River foreshore reserve. Most of the properties in this area are fairly large and recent years have been fairly difficult for this agricultural community.

66% of the landowners responsed to the questionnaire (refer to Table 24 for questionnaire results). Of these, 100% of them agreed that the river corridor had conservation value for preserving the native flora and 90% agreed that the river corridor had conservation value for preserving the native fauna (10 % unsure). 82 % stated that the reserve required conservation so it could act as a corridor between Stokes National Park and Peak Charles National Park, with 9 % unsure whether it would act as a corridor and 9% saying it had no value as a corridor. 100% rated fire management as an important management issue. 82% felt that feral animal control was an important management issue for the proposed reserve, with 9 % stating it was not important, and 9 % did not respond to that question. 45% of the farmers rated weed control as being an important management issue with the other 36% stating it was somewhat important, 10% stating it was not important and 9% didn't respond. 54% of the farmers said that Kangaroo management was important, 36% said it was somewhat important and 9% didn't repsond.

82% of the farmers expressed interest in contributing to management decisions for the proposed reserve.

Three farmers expressed strong support for CALM to proceed with the area being made into a nature reserve whilst one farmer objected strongly to CALM having control of the reserve.

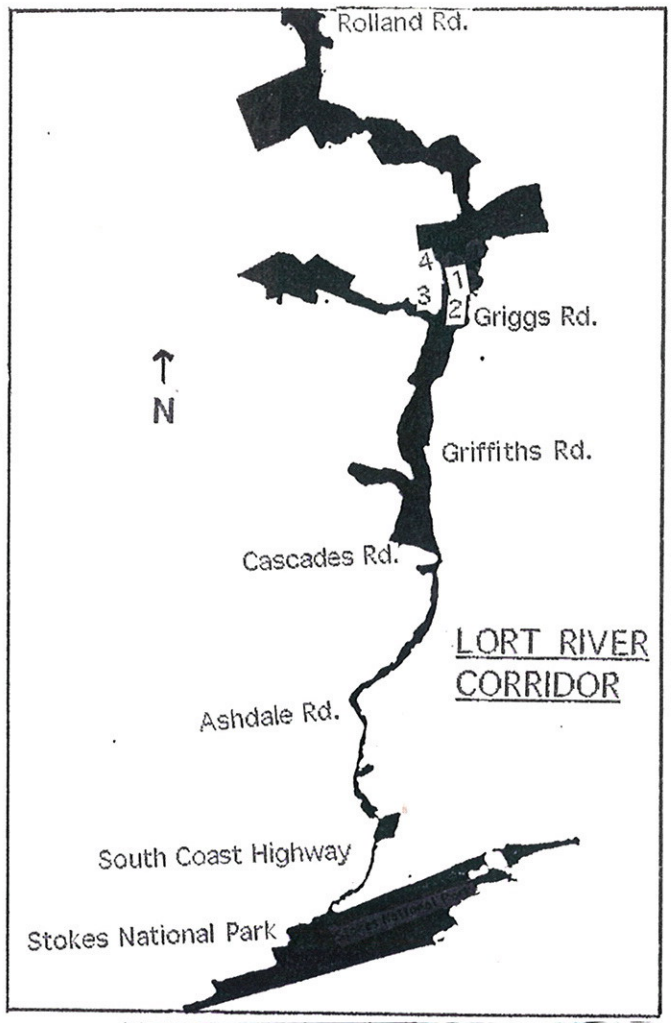


Fig. 18: Location map of survey grids for Site 1 in the Lort River corridor.

Plate 34: Satellite Image (1991) of Lort River corridor river joining Stokes National Park in its southern reaches and vacant Crown land in its northern reaches.

Table 20 - Lort Plant List

SITE 1			
GRID 1	**GRID 2**	**GRID 3**	**GRID 4**
Banksia media	Allocasuarina campestri	Allocasuarina thyoides	Allocasuarina c.campestri
Callitris preissi	Banksia media	Banksia blechnifolia	Choretrum glomeratum
Choretrum sp.	Callitris preissi	Borya nitida	Choretrum sp.
Choretrum sp.	Callothamnus pinifolius	Callistemon phoenisceus	Daviesia euphorboides
Chorizema sp.	Calothamnus gibbosus	Calytrix sp.	Daviesia microphylla
Daviesia aff. cuphorboides	Chamaescilla corymbosa	Canobrutus sp.	Dodonaea aff. filifolia
Daviesia sp.	Choretrum sp.	Eucalyptus tetragona	Dodonaea aff. stenozyga
Eucalyptus (sporadica)	Cryptandra sp.	Gastrolobium spinosum	Grevillea h. heuglii
Eucalyptus conglobata	Daviesia euphorboides	Hakea adnata	Grevillea plurijuga
Eucalyptus eremophila	Grevillea plurijuge	Hakea varia	Halosarcia spp.
Eucalyptus f. forrestiana	Hakea aff. scoparia	Helipterum sp.	Leptomeria spinosa
Eucalyptus pileata	Heriptulum cotula	Hibbertia sp.	Melaleuca sp.
Eucalyptus tumida	Isopogon aff. buxifolia	Lambertia inermis	Samphire spp.
Eucalyptus uncinata	Laxmannia grandiflora	Leptocarpus canus	Verticordia preissi
Grevillea plurijuge	Melaleuca cuculata	Leptospermum erubescens	Waitzia paniculata
Hakea sp.	Melaleuca pentagonia	Leucopogan sp.	
Hakea varia	Melaleuca seriata	Melaleuca sp.	
Jacksonia sp.	Melaleuca sp.	Oxylobium sp.	
Melaleuca cuculata	Petrophile fastigiata		
Melaleuca pentagona	Verticordia picta		
Melaleuca sp.	Verticordia preissi		
Verticordia sp.			

TABLE 21 : Fauna trapping results for Lort River Corridor - Site 1. Total numbers (Column 1) of each species trapped in pit traps and Elliot traps in the vicinity of each sampling grid. Sightings (S) are also recorded but not included in total numbers.

LOCATION:	LATITUDE	LONGITUDE
Grid 1	121 23.0' E	033 24.3' S
Grid 2	121 23.2' E	033 25.3' S
Grid 3	121 22.2' E	033 24.8' S
Grid 4	121 22.0' E	033 24.5' S

Common Name	Scientific Name	Total No's	Grid No. (See map) 1	2	3	4
MAMMALS						
Pygmy Possum	Cercartetus concinnus	1	1			
Western Grey Kangaroo	Macropus fuliginosus			S	S	
White Striped Mastiff Bat	Tadarida australis		S			
Honey Possum	Tarsipes rostratus	6	5	1		
Domestic mouse	Mus musculus	3			3	
Fox	Vulpes vulpes				S	
Cat	Felis cattus				S	
AMPHIBIA						
Spotted Moaning Frog	Heleioporus albopunctatus	10		5	4	1
REPTILES						
Semi arboreal gekko	Diplodactylus g. granariensis	4	2	2		
Spines on tail gekko	Diplodactylus spinigerus		1			1
Marbled Gekko	Phyllodactylus m. marmoratuss	3		2	1	
Legless lizard	Delma butleri	1	1			
Small Dragon	Ctenophorus maculatus griseus	3	1		1	1
Bearded Dragon	Pogona minor minor	4			4	
Dragon	Tympanocryptis adelaidensis	7		7		
Goanna	Varanus rosenbergi	1		1		
Skink	Ctenotus impar	16	4	5	2	5
Skink	Ctenotus labillardieri	4		1	1	2
Skink	Ctenotus schomburgkii	2	1		1	
Skink	Hemiergis initialis brookeri	3	3			
Skink	Lerista distinguenda	7	1		5	1
Skink	Morethia obscura	22	2	2	11	7
Skink	Sphenomormus australis	1	1			
Bobtail	Teliqua rugosa	6	1	2	2	1
Blind Snake	Ramphotyphlops australis	3	2			1

TABLE 21 CONT'D: Fauna trapping results for Lort River Corridor - Site 1. Total numbers (Column 1) of each species trapped in pit traps and Elliot traps in the vicinity of each sampling grid.

Common Name	Scientific Name	Total No's
INVERTEBRATES		
Mollusc	Bothriembryon dux	3
Scorpion		29
	CARABIDAE	
Beetle	Cerotalis sp.	3
Beetle	Gnathoxys sp.	1
Beetle	CLERIDAE	1
	SCARABAEIDAE	
Beetle	Colpochilis sp.	1
Beetle	Heteronyx sp. 1	1
Beetle	Heteronyx sp. 2	1
Beetle	Phyllotocus sp.	1
Beetle	CURCULIONIDAE 1	2
Beetle	CURCULIONIDAE 2	2
Beetle	CURCULIONIDAE 3	1
Beetle	CURCULIONIDAE 4	1
	GEOTRUPIDAE	
Beetle	Blackburnium sp.	2

TABLE 22: Bird list for surveyed corridors. (+) Species sited at (C) Corackerup, (F) Fitzgerald, (Y) Young and **(L) Lort River** Corridors. (?) if identification was not definite.

COMMON NAME.	SCIENTIFIC NAME	C	F	Y	L
Australian Bustard	*Ardeotis australis*				+
Australian Magpie	*Cracticus tibicen*	+	+	+	+
Australian Raven	*Corvus coronoides*	+	+	+	+
Australian Wood Duck	*Chenonetta jubata*	+	+	+	+
Banded Plover	*Vanellus tricolor*		+	+	+
Barn Owl	*Tyto alba*	+	+		
Barn Swallow	*Hirundo rustica*			+	
Black Duck	*Anas superciliosa*			+	
Black Faced Cuckoo Shrike	*Coracina novaehollandiae*		+	+	+
Black Fronted Dotterel	*Charadrius melanops*		+	+	
Black Swan	*Cygnus atratus*			+	
Black Tailed Native Hen	*Gallinula ventralis*		+		
Blue Breasted Wren	*Malurus pulcherrimus*	?	?	?	?
Broad Tailed Thornbill	*Acanthiza apicalis*				+
Brown Headed Honeyeater	*Melithreptus brevirostris*				+
Brown Falcon	*Falco berigora*				+
Brush Bronzewing Pidgeon	*Phaps elegans*	+	+	+	+
Chestnut Teal	*Anas castanea*	+	+	+	
Common Bronzewing	*Phaps chalcoptera*	+		+	
Coot	*Filica atra*	+		+	
Crested Bellbird	*Oreoica gutturalis*	+		+	+
Crested Pidgeon	*Ocyphaps lophotes*	+	+	+	+
Dusky Woodswallow	*Artamus cyanopterus*			+	
Eastern Reef Heron	*Egretta sacra*			+	
Elegant Parrot	*Neophema elegans*		+		
Emu	*Dromaius novaehollandiae*		+	+	+
Fan Tailed Cuckoo	*Cuculus flabelliformis*			+	
Forest Kingfisher	*Halcyon macleayii*	+			
Galah	*Cacatua roseicapilla*		+	+	
Golden Whistler	*Pachycephala pectoralis*	+	+	+	+
Grey Breasted White Eye	*Zosterops lateralis*	+	+	+	
Grey Butcher Bird	*Cracticus torquatus*		+	+	
Grey Currawong	*Strepera versicolor*	+		+	+
Grey Falcon	*Falco hypoleucos*				+
Grey Teal	*Anas gibberifrons*	+	+		
Hoary Headed Grebe	*Podiceps poliocephalus*	+	+	+	
Horsefields Bronze Cuckoo	*Chrysococcyx basalis*		+		
Little Black Cormorant	*Phalacrocorax carbo*	+		+	
Little Grebe	*Podiceps ruficollis*	+		+	
Little Pied Cormorant	*Phalacrocorax melanoleucos*	+		+	
Little Wattle Bird	*Anthochaera chrysoptera*			+	+
Magpie Lark	*Grallina cyanoleuca*	+	+	+	+
MalleeFowl	*Leipoa ocellata*	+	+		+
Mallee Heath Wren	*Sericornis cautus*	+	+	+	+
Mountain Duck	*Tadorna tadornoides*	+	+		
Nankeen Kestrel	*Falco cenchroides*		+	+	+
Native Swamp Hen	*Porphyrio porphyrio*		+		

TABLE 22 CONT"D: Bird list for surveyed corridors. (+) Species sited at (C) Corackerup, (F) Fitzgerald, (Y) Young and **(L) Lort River** Corridors. (?) if identification was not definite.

COMMON NAME.	SCIENTIFIC NAME	C	F	Y	L
New Holland Honeyeater	*Phylidonyrus novaehollandiae*	+	+	+	+
Pallid Cuckoo	*Cuculus pallisus*		+	+	
Pied Butcher Bird	*Cracticus nigrogularis*	+	+	+	
Pink Eared Duck	*Malacorhynchus membranaceus*			+	
Port Lincoln Parrot	*Barnardius zonarius*	+	+	+	+
Purple Crowned Lorrikeet	*Glossopsitta porphyrocephala*		+		
Rainbow Bee Eater	*Merops ornatus*			+	
Red Capped Parrots	*Platycercus spurius*	+	+	+	+
Red Wattle Bird	*Anthocheara carunculata*		+	+	+
Red Winged Wren	*Malurus elegans*	+	?		
Restless Flycatcher	*Myiagra inquieta*	+			+
Richard's Pipit	*Anthus novaeseelandiae*			+	
Singing Honeyeater	*Meliphaga virescens*	+	+	+	+
Splendid Wren	*Malurus splendens*	+	+	+	
Striated Pardelote	*Pardalotus striatus*		+		+
Yellow Rumped Pardelote?	*Pardelotus xanthopygus*			+	
Tawny Frogmouth	*Podargus strigoides*		+	+	+
Tawny Crowned Honeyeater	*Phylidonyris melanops*		+		+
Variegated Wrens	*Malurus lamberti*	?	?	+	+
Wedgetailed Eagle	*Aquila audax*		+	+	+
Weebill	*Smicrornis brevirostris*				+
Welcome Swallow	*Hirundo neoxena*	+	+	+	
Western Grey Shrike Thrush	*Colluricincla harmonica*		+	+	+
Western Rosella	*Platycercus icterotis*	+			
Western Spinebill	*Acanthorhynchus superciliosus*	+			
Western Whip Bird	*Psophodes cristatus*	+			
White Browed Babbler	*Pomatostomus temporalis*	+	+	+	+
White Browed Scrubwren	*Sericornis frontalis*			+	
White Cheeked Honeyeater	*Phylidonyris albifrons*		+		
White Eared Honeyeater	*Meliphaga ornata*			+	+
White Faced Heron	*Ardea novaehollandiae*	+	+	+	
White Fronted Chat	*Ephthianura albifrons*				+
White Naped Honeyeater	*Melithreptus lunatus*			+	
WhiteTailed Black Cockatoo	*Calyptorhynchus baudinii*			+	
White Winged Triller	*Lalage sueurii*			+	+
Willy Wagtail	*Rhipidura leucophrys*	+	+	+	+
Yellow Rumped Thornbill	*Acanthiza chrysorrhoa*			+	
Yellow Throated Miner	*Manorina flavigula*	+	+	+	+

TABLE 23 : Museum Records of species found within the Lort River Corridor or in it's vicinity. The W.A.M. Accession Numbers is the reference number the Museum has given that specimen.

SPECIES	LOCATION				WAM
	Longitude (Degrees East)		Latitude (Degrees South)		A.No.'s
MAMMALS					
CANIDAE					
Canis familiaris	121	22	033	43	5829
MACROPODIDAE					
Macropus fuliginosus	121	12	033	45	15188
MURIDAE					
Rattus fuscipes	121	22	033	43	12446
REPTILES					
AGAMIDAE					
Ctenophorus ornatus	121	15	033	15	73781
Tympanocryptis adelaidensis -chapmani	121	21	033	27	78161
ELAPIDAE					
Notechis coronatus	121	15	033	15	75862
Notechis curtus	121	15	033	15	73791
Notechis mastersii	121	12	033	45	40009
Notechis scutatus occidentalis	121	15	033	40	83988
Pseudonaja affinis	121	21	033	27	78178
Pseudonaja affinis affinis	121	21	033	27	78178
Rhinoplocephalus gouldii	121	24	033	14	86661
Rhinoplocephalus nigriceps	121	15	033	45	73546
GEKKONIDAE					
Crenadactylus ocellatus	121	15	033	45	86677
Crenadactylus ocellatus ocellatus	121	15	033	45	86674
Diplodactylus g. granariensis	121	19	033	18	78983
Diplodactylus spinigerus inornatus	121	15	033	45	86660
Phyllodactyluus m. marmoratus	121	22	033	43	86645
HYLIDAE					
Litoria cyclorhynchus	121	23	033	41	75865
LEPTODACTYLIDAE					
Heleioporus albopunctatus	121	22	033	43	75869
Heleioporus eyrei	121	22	043	33	75874
Neobatrachus pelabatoides	121	22	033	43	94306
Ranidella pseudinsignifera	121	22	033	43	75871
PYGOPODIDAE					
Aprasia repens	121	22	033	42	94897
Aprasia striolata	121	22	033	43	75873
Delma australis	121	23	033	41	75859
Delma fraseri	121	22	033	43	75860
Pygopus lepidopodus lepidopodus	121	19	033	18	78984

TABLE 23 CONT'D: Museum Records of other additional species found within the Lort River Corridor or in it's vicinity. The W.A.M. Accession Numbers is the reference number the Museum has given that specimen.

SCINIDAE					
Ctenotus catenifer	121	20	033	45	86650
Ctenotus gemmula	121	22	033	43	94305
Ctenotus impar	121	15	033	15	73783
Egernia kingii	121	15	033	40	83982
Hemiergis initialis initialis	121	22	033	43	86646
Hemiergis peronii	121	15	033	15	73785
Leiolopisma trilineatum	121	15	033	15	73787
Lerista distinguenda	121	18	033	38	81247
Mennetia greyii	121	15	033	15	73788
Morethia obscura	121	15	033	15	73789
Tiliqua rugosa rugosa	121	15	033	45	15008
TYPHLOPIDAE					
Ramphotyphlops australis	121	15	033	15	73790
VARANIDAE					
Varanus caudolineatus	121	22	033	43	75858
Varanus rosenbergi	121	21	033	27	78157

FISH

FAMILY 246					
Atherinosoma wallacei	121	15	033	44	27169.001
FAMILY 428					
Pseudogobius olorum	121	15	033	44	27169.002

Table 24: Results (in percentages) of questionnaire completed by adjoining landowners to the Lort River corridor. Not all responses calculate to 100% as some landowners prefferred not to respond on some issues.

Eighteen landowners sent questionnaire, twelve replied ..... 66% response

Do you feel the river corridor has conservation value;	YES	UNSURE	NO
for preserving native plants ?	[100]	[ ]	[ ]
for preserving native animals ?	[90%]	[10%]	[ ]
to act as a corridor ?	[82%]	[9%]	[9%]

Would you rate the following issues as important, somewhat important or not important in the proposed reserve ?	IMP.	S.I.	N.I.
weed control	[45%]	[36%]	[10%]
feral animal control	[82%]	[9%]	[ ]
fire management	[100]	[ ]	[ ]
kangaroo management	[54%]	[36%]	[ ]

	YES	NO
Is your fence completely fenced off from this reserve ?	[ ]	[ ]

Would you like to have the opportunity to participate in management decision making for this reserve ?	[82%]	[ ]

Plate 35: The Lort River bed is dry over the summer months - the last water of late spring. (The river just north of Bishops Road.)

Plate 38: The bright yellow of a *Verticordia preissi*

Plate 37: A flowering Grevillea of late spring

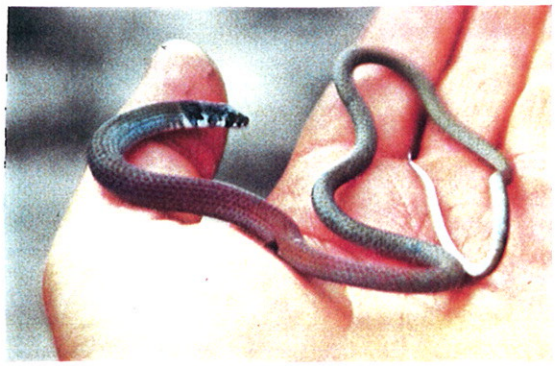


Plate 36: Legless lizard, *Delma butleri*

Plate 39: The Bearded Dragon, *Pogona minor minor*

Plate 40: Many scorpion were captured in the war humid weather

Plate 41: A well disguised gekko *Diplodactylus spinigerus*

DISCUSSION OF FINDINGS

The Lort River foreshore reserve extends as a strip of remnant vegetation with varying width ranging over a length of about 130 kilometres through agricultural land. It links the vacant Crown land and Peak Charles National Park on it's northern end to Stokes National Park on it's southern end. Rainfall decreases by about 200 mm from the southern reaches of the river to its upper reaches about 95 kilometres north of the coast.

The reserve passes through two distinct vegetation systems recognised by Beard in 1972 encompassing various mallee shrublands associations in a relatively undisturbed condition. The Lort River has very few pools of water which are permanent through summer and it is a fairly saline watercourse as it flows across the semi arid plains of the region. There are seven official Aboriginal sites recorded along the river.

The foreshore reserve has recently experienced bushfires in different sections of it's length. All of these fires have been started on farming pasture land and have entered into the reserve. There are no records of fires naturally occurring (e.g. lightning strikes) in the reserve and causing a wildfire. With the fairly regular dissection of the reserve into blocks caused by roads passing through the reserve, there is potential for control of wildfires.

The fauna survey revealed that in the examined sections of the reserve, native fauna populations are healthy and range from birds and mammals through to reptiles, amphibians and invertebrates. Evidence was obtained that these native fauna were also breeding within the reserve.

Agricultural development in the southern portion of the reserve occurred over a century ago and clearing up to less than 50 metres from the river channel has left this section of the reserve in a very degraded state. There are still a few remaining native plants of the upper storey present but stock have grazed out the native understorey and this is replaced with agricultural grasses. This is the weakest section of the reserve and if it is to fuction as a corridor, it would require attention in the from of revegetation. Further north in the reserve, where agricultural clearing only occurred in the 1970's, the corridor ranges from 200 to 1000 metres in width and there is little evidence of degradation except for the intrusion of exotic grasses at road crossings.

The local community agreed that the reserve had conservation value for the protection of the native flora and fauna within it. They also agreed that it needed conservation so that it could act as a corridor between Peak Charles National Park and Stokes Inlet into the future. Fire and feral animal control were thought to be the two more important management issues and the local community expressed interest in participating in making decisions for the proposed reserve. The Land Care Group were also very enthusiastic to learn more about revegetating corridors and were very positive toward the idea of revegetating the lower reaches of the Lort River foreshore reserve.

GENERAL DISCUSSION

Wallace and Moore (1991) report that there are 626 nature reserves in Western Australia, ranging from 0.4 to 309, 000 hectares with a median area of 120 hectares: the majority are thus small in area. The four foreshore reserve systems studied in this project range from 1 674 hectares to 14 076 hectares in size. They are therefore very large in size in comparison to most other remnant nature reserves. However, the corridors are unusual in that they all follow a particular landscape instead of crossing over an array of landscapes. This results in them being long and narrow in shape ranging from 24 to 50 kilometres long with a varying width ranging from about 200 to 2 000 metres. Each corridor traverses a range of soil types and plant formations from its northern reaches through to its southern reaches. Detailed flora lists of some of the typical riverine vegetation associations examined in each corridor revealed that each association varies with a large variety of species in all storeys and that the vegetation is still in a very pristine state. One corridor is home to one of the states rare eucalypts.

A great variety of fauna were recorded in the corridors with a total of one hundred and sixty six species listed. Of the native species, the Western Grey Kangaroo and Honey Possum were the only two native mammals to occur at all four corridors. The Spotted Moaning Frog, *Heleioporus albopunctatus* was the only amphibian, the skink called *Morethia obscura* and the Blue Tongue Bobtail *Teliqua rugosa* were the only two reptiles and the mollusc, *Bothriembryon dux* along with four species of beetle were the only invertebrates trapped in all four corridors. Only fourteen of the bird species were sighted at all four of the corridors. These results indicate that each corridor contains a substantially different faunal community to the other corridors.

Due to the fact that most of the foreshore reserves are adjoined by pastureland, boundary invasion by exotic grasses is almost inescapable. Each corridor showed evidence of increased weed invasion in areas where understorey disturbance by grazing stock has allowed weeds to intrude and where roads transect the corridor. As each corridor area is prone to experiencing high runoff, particularly during irregular summer storms, there is likely to be increased gully erosion with more sediments being washed down the rivers into the fragile estuarine ecosystems at the coastal interface.

Other damaging influences in the corridors were the presence of canker fungi in two of the foreshore reserves and the liklihood that the soil fungus *Phytophthora cinnamomi* is present. All four corridors are particularly vulnerable to this soil fungus due to the water drainage flow carrying spores down through the catchment.

The positive attitude by most of the local land care groups and adjoining landowners to the proposed nature reservation of these foreshore can help the development of management strategies which have community support. One of the benefits for farmers is that the presence of any deep rooted native plant species can help to reduce the increasing salinity problems in the south west of Western Australia and hence increase the productivity of their farms. There is little doubt that the protection of remnant vegetation of the major river valleys in an area almost entirely cleared for agriculture is a highly desirable first step against further erosion. There is already evidence that landowners are reestablishing native vegetation along creek systems and other tributaries of the major river valleys as the next step in controlling salinity and establishing protective wind belts.

The corridors also had cultural value to the indigenous people who traversed through the south coastal landscape prior to European settlement in Australia. Evidence of them having used the river landscapes as a place of food source and shelter should indicate to present residents of this region the importance of riverine habitats towards mankind's survival in this country.

ASSESSMENT OF STUDY AND RECOMMENDATIONS FOR FURTHER ACTION.

1. The survey provided a 'snapshot' insight into the fauna which may be present in the wider section of the four corridors studied at a particular time of the year. Results from the short period of fauna trapping, were influenced by factors like weather conditions, the position of the lunar cycle, sensitivity to human disturbance etc. A more long term fauna programme would be required to overcome the influences of such factors. However, this snapshot insight into the biological value of each corridor certainly revealed that each has important conservation value in its own right. It is therefore recommended that suitable reservation and management be undertaken to protect the biological value of these corridors as soon as possible in order to ensure their existence and integrity into the future.

   During the survey, only the wider less degraded sections of the river corridors were closely examined. To develop our knowledge on the potential each corridor has for faunal movement, there needs to be further surveys undertaken particularly in the narrower sections of each corridor and at 'breaks' in the corridor caused by road crossings. An application has already been submitted to the 'Save The Bush' programme to enable such a survey to be undertaken.

2. The identification of damaging influences such as stock grazing, weed invasion, feral animals, dieback disease and fire was limited being restricted to what could be observed from aerial inspection plus the relatively short sections of the foreshore reserves that were inspected in situ. Nevertheless, useful records have been obtained and a number of sites have been identified where follow up action is required. Rehabilitation programmes will be largely dependent upon further survey of boundaries by operational staff once the foreshore reserves are vested. In the meantime, voluntary work by local landowners may be an option at selected sites.

3. Aerial inspection also assisted in identification of sections of the corridors where there is potential for increasing their effective width through fencing schemes and through future land purchase from willing sellers. Any opportunities for fencing assistance should be taken immediately however, land purchase will not be an option until such time as the corridors have been vested as reserves.

4. The project has raised a great amount of local awareness with very good responses to the questionnaire, much voluntary assistance with the field work, and a genuine interst by most local landowners in being prepared to help protect the conservation values of their river foreshores.

ACKNOWLEDGEMENTS

VOLUNTARY FIELD ASSISTANCE

Corackerup Corridor

Daryl Hine
Penny Moir
Scott Moir
Edward Moir
Richard Watson
William Witham

Young River Corridor

Daniel Winton

Fitzgerald Corridor

Geff Bee
Stuart Bee
Brad Bailey
Lucy Hoeksema
Kylie Leighton

Lort River

Wayne Gill
Bev Hundley
John Platt
Mr Marshall

Special thanks to Lucy Hoeksema for the extended period of time for which she assisted on the Fitzgerald Corridor.

FIELD ASSISTANCE FROM CALM.

Corackerup Corridor

Kelly Gillen - District Manager
Corinn Hine - Interpretations officer
Nathan Mcquoid - Ranger
John Watson - Regional Manager

Young River Corridor

Bernie Haberley - Wildlife Office
Peter Collins - Wildlife Officer
John Winton - Acting District Manager

Fitzgerald Corridor

Peter Collins - Wildlife Officer
Malcolm Grant - Dieback Research
Murray - Ranger
John Watson - Regional Manager

Lort River Corridor

Tony Byrne - Technical Officer
Ian Solomon - Ranger

FINANCIAL ASSISTANCE

'Save The Bush' grant scheme for a $15 000 grant without which this work could not have proceeded.

The Conservation and Land Management Department for all their assistance in the field and office, for undertaking limited studies of the corridors prior to 1991 and for additional financial assistance of the project.

IDENTIFICATION OF COLLECTED SPECIMENS.

FLORA IDENTIFICATION -	Eileen Croxford - Albany Herbarium, Wildflower Society Brenda Hammersley - Albany Herbarium, Wildflower Society
EUCALYPT IDENTIFICATION	Nathan Mcquoid - Ranger - Fitzgerald River National Park Anne Kelly - W.A. Herbarium
INSECT IDENTIFICATION -	Graham Hall, Woodvale Wildlife Research Station
MOLLUSC IDENTIFICATION -	Shirley Slacksmith, Curator of Molluscs, W.A. Museum.
REPTILE IDENTIFICATION -	Laurie Smith, Dept. of Herpetology, W.A. Museum
MAMMAL IDENTIFICATION -	W.A. Museum
ARTIFACT IDENTIFICATION -	Charlie Dortch, Curator of Anthropology Dept., W.A. Museum

NYUNGAR WORD INTERPRETATION - Dr von Brandenstein, Albany

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