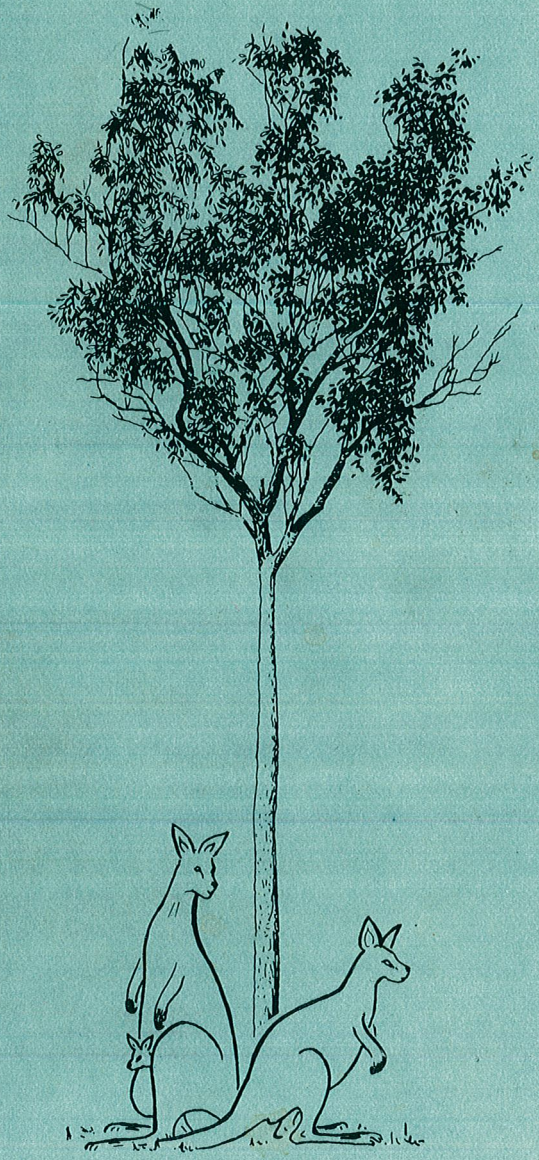
DRAFT MANAGEMENT PLAN

number 3

Nature Reserves of the Shire of Serpentine-Jarrahdale



by

Ian G. Crook

DEPARTMENT OF
FISHERIES AND WILDLIFE,
108 ADELAIDE TERRACE,
PERTH
1980

Department of Fisheries and Wildlife

108 Adelaide Terrace

PERTH

DRAFT MANAGEMENT PLAN
No. 3.

NATURE RESERVES OF THE SHIRE OF SERPENTINE-JARRAHDALE

BY

IAN G. CROOK

1980

Western Australian Wildlife Research Centre, P.O. Box 51,
Wanneroo, W.A. 6065.

PREFACE

This draft management plan is the first of a series in which provision is made for the management of all the Nature Reserves in a particular Local Authority District - in this case the Shire of Serpentine-Jarrahdale.

This approach to management planning for Nature Reserves has a number of advantages. It allows Reserves to be placed in some sort of regional context, and it facilitates comparisons between Reserves. The arbitrary boundaries of Local Authority areas are not ideal for these purposes in any ecological or biogeographical sense, but the administrative advantages of using them help to offset disadvantages on the more scientific side.

One other hoped-for advantage of the "Shire" Plans is that they will encourage members of local communities as well as the broader public to comment and make submissions on them, and so play their part in the planning. This is important, because it is only through the participation of all the community in their management that Nature Reserves can best serve the interests of the people for whom they were set aside.

B.K. BOWEN

Director
Department of Fisheries and Wildlife,
April 1980.

CONTENTS

ACKNOWLEDGEMENTS

Of all the people who contributed to this draft management plan I am particularly grateful to Mr and Mrs Richard and Krystyna Lancaster, neighbours of Reserve No. 25886, for their continued interest and assistance. Mr T. Evans (Wildlife Research Centre) and Mrs Gillian Crook (Department of Fisheries and Wildlife) helped with inspection of Reserves and Mr Graeme Chatfield prepared the diagrams.

PART 1. INTRODUCTION: THE SHIRE OF SERPENTINE-JARRAHDALE

The Shire of Serpentine-Jarrahdale lies partly on the Swan Coastal Plain and partly on the Darling Scarp and Plateau. It is south of Perth and South-east of Fremantle, being bordered by the Shire of Armadale-Kelmscott to the north, Kwinana to the west, Murray in the south and the Shire of Wandering to the east. The Shire is centred on the towns of Serpentine, Mundijong and Jarrahdale.

1. LANDFORMS, SOILS AND VEGETATION OF THE SHIRE

Because of its location the Shire thus includes a cross-section of the sedimentary landforms of the Plain, the laterite-covered foothills of the Darling Range (the Ridge Hill Shelf), the steep, rocky slopes of the Darling Scarp and portions of the lateritic uplands of the Darling Range itself.

1.1. THE SWAN COASTAL PLAIN

The Swan Coastal Plain consists of two wide bands of sediments, one of aeolian (wind-borne) and the second of alluvial (mainly fluviatile or stream-borne) deposits. In "A Sense of Place" (University of Western Australia Press, 1972), G. Seddon describes four landform/soils/vegetation systems for the Plain which are represented in the Shire of Serpentine-Jarrahdale.

The Ridge Hill Shelf: A narrow strip of foothills to the Darling Scarp, sloping gently westward, being deeply dissected and consisting of lateritic gravels and sandy soils developed on sandstones and beach conglomerates. The natural vegetation is forests and woodlands of Jarrah *(Eucalyptus marginata)* and Marri *(E. calophylla)* with lower storeys of *Banksia* species, *Casuarina fraseriana* and the Woody Pear *Xylomelum occidentale*.

The Pinjarra Plain: The easternmost of two broad bands of sediments which make up the Swan Coastal Plain, the Pinjarra Plain is of flat topography with relatively fertile, but some poorly drained, clay soils. The Plain is mostly cleared for agriculture, but in its natural state supports forests of Wandoo *(Eucalyptus wandoo)* and Flooded Gum *(E. rudis)*.

The Bassendean Dune System: This is the oldest of three systems of dunes which make up the western band of deposits on the Coastal Plain. It consists of low dunes of consolidated, grey quartz sands, poor in calcium and other minerals, excessively drained on the ridges and very poorly drained in interdunal depressions. The natural vegetation is very diverse.

On the drier slopes and ridges there are a variety of woodland and forest formations dominated by *Banksia* species with varying admixtures of eucalypts including Jarrah and Pricklybark *(Eucalyptus todtiana)*. The interdunal depressions sometimes contain wetlands and support swampy vegetation, typically heaths and woodlands, the latter dominated by the Swamp Paperbark *Melaleuca preissiana*.

The Spearwood Dune System: Younger than the Bassendean series the Spearwood dunes are of higher relief and are less leached. On the inland side of the band of Spearwood dunes the soils are typically deep yellow to yellow-brown sands which support forests of Tuart *(Eucalyptus gomphocephala)*, Jarrah and Marri. The eastern fringe and outlying pockets of soils of the Spearwood dune system extend into the Serpentine-Jarrahdale Shire in places.

1.2. THE DARLING SCARP AND PLATEAU

The Darling Scarp is characterised by steeply sloping land with outcrops of granite and other rocks between areas of shallow red and yellow earths. The vegetation is generally low woodland of Wandoo, with Marri and *Eucalyptus haematoxylon* being major tree species in the Serpentine-Jarrahdale area.

The Darling Plateau includes a wide variety of landforms and soils, its lateritic uplands being dissected to form a complex series of minor and major valleys. The vegetation is principally Jarrah forests, but forest structure and composition vary greatly from place to place.

2. THE RESERVES

There are six Nature Reserves in the Shire (Fig. 1, Table 1), two of which are vested in the Western Australian Wildlife Authority and one in the Shire of Serpentine-Jarrahdale. The remaining three Reserves are unvested. This management plan deals with the five Nature Reserves which are either unvested or vested in the Western Australian Wildlife Authority.

2.1. CLASS A* RESERVE No. 25886 (Unnamed)

Class A Reserve No. 25886 (153.6 ha) is in the Peel Estate on Thomas Road 8 km east of Medina. It is of low relief, consisting mainly of low forests and woodlands of *Banksia* species, Jarrah *(Eucalyptus marginata)* and Pricklybark *(E. todtiana)* with low woodlands of Swamp Paperbark

---

* Class A in terms of the Land Act 1933.

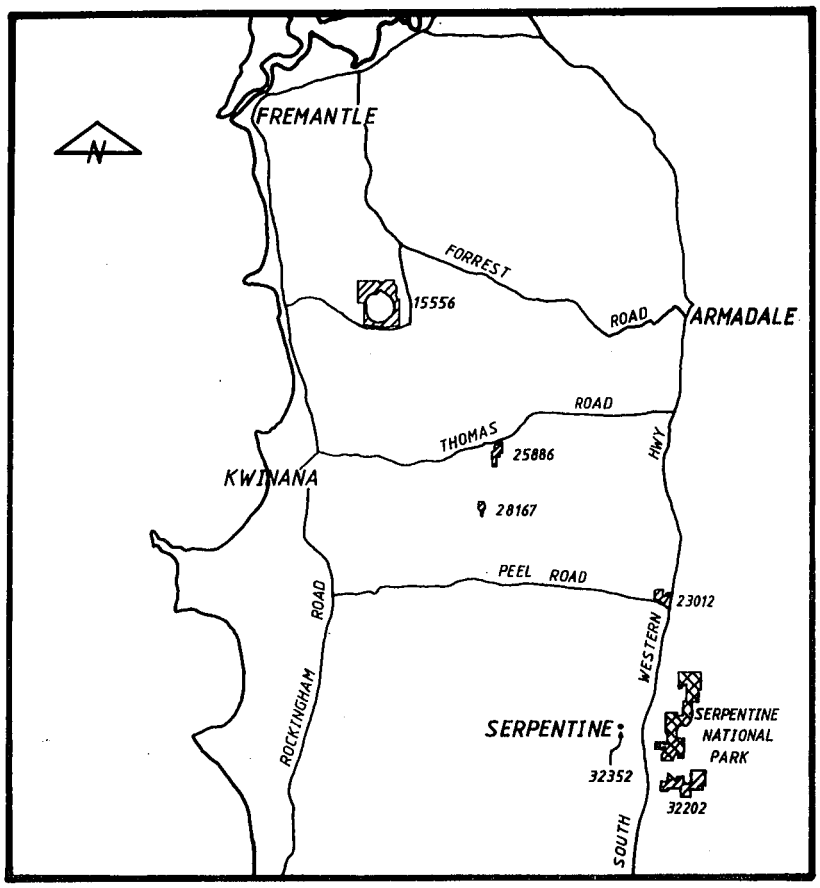


Figure 1. Location of Nature Reserves in the Serpentine-Jarrahdale Shire and Thompson Lake Nature Reserve in the City of Cockburn. Each Reserve is identified by its Reserve number as in the following text.

Table 1. Nature Reserves in the Serpentine-Jarrahdale Shire.

Reserve No.	Name	Area (ha)	Purpose	Vesting
25886	-	153.6	Flora & Fauna	W.A.W.A.
28167	"Banksia Road"	33.0	Flora & Fauna	W.A.W.A.
36433	-	1.0	Flora	Shire
23012	-	28.6	Flora	Unvested
32202	"Karnet"	302	Flora & Fauna	Unvested
32352	-	1.7	Flora	Unvested

(Melaleuca preissiana). The vegetation is typical of the Bassendean soils of the region, examples of which are also represented at Thompson Lake Nature Reserve (Fig. 1 - Reserve No. 15556) in the City of Cockburn, and Reserve No. 28167, also in the Shire of Serpentine-Jarrahdale. (Thompson Lake Nature Reserve is the subject of Draft Management Plan Number 2 in this series).

2.2. RESERVE No. 28167 ("BANKSIA ROAD" NATURE RESERVE)

This Reserve of 33 ha is also in the Peel Estate, being 2 km south of Reserve No. 25886, which it resembles, in topography, soils and vegetation. The Reserve was completely burnt out by an intense fire in the summer of 1979-80.

2.3. RESERVE No. 23012 (Unnamed)

A small (28.5 ha) unvested Reserve 2 km east of Mundijong at the junction of Watkins Road and the South Western Highway. The Reserve lies at the base of the foothills of the Darling Range and supports a variety of heath, woodland and forest formations on a succession from west to east of grey sands, yellow-brown sands and yellow clays and gravels. The latter soils occur on the west-facing slope of a low hill. The Reserve is, unfortunately, divided across the succession of soils and vegetation by a railway line and a rubbish dump and access track.

2.4. RESERVE No. 32202 ("KARNET" NATURE RESERVE)

This is a Reserve of 302 ha lying across the western edge of the Darling Plateau south of the Serpentine National Park. It consists mainly of Jarrah/Marri *(Eucalyptus marginata/E. calophylla)* forests with Wandoo *(E. wandoo)* forests in the shallow valleys. It contains some particularly fine stands of forest, especially on its western side, and offers excellent views from the summit of the Scarp.

2.5. RESERVE No. 32352 (Unnamed)

Situated in the Townsite of Serpentine, this Reserve is a 1.8 ha block of open woodland over ground vegetation which contains a variety of weeds and introduced grasses as well as native species. The main tree species in the southern part of the Reserve is Marri *(Eucalyptus calophylla)* while the northern part includes a winter-wet swamp fringed with Swamp Paperbarks *(Melaleuca preissiana)*.

PART 2. CLASS A RESERVE No. 25886

1. INTRODUCTION = Location and an expanded background.

The grey quartz sands of the Bassendean series of dunes, widespread in the region and the principal soils present on this Nature Reserve, have low agricultural value, but they support a rich flora and fauna. They are also subject to considerable pressure of development in the Perth - Rockingham area for industrial, urban and urban-rural purposes. It was for these reasons and the general lack of reserve land in the area that Lot numbers 405, 409, 410, 411, 700 and 1238 of the Peel Estate were recommended for reservation by the Senior Surveyor of the Department of Lands and Surveys in February 1961 (W.G. Henderson *in litt.*, Lands and Surveys Department file 4644/49 folio 35). Reserve number 25886, consisting of these Lots and totalling 354 acres 3 roods and 20 perches (140 ha) was Gazetted for the Purpose of "Conservation of Flora" on 22 March 1961.

Later, in 1967, the Conservator of Forests noted that the area "...carries a good representation of native flowering species." He recommended that: "...in view of the extremely limited area of Crown land in the area...Lot 122...be included in the adjoining Reserve 25886." The addition was approved and Gazetted on 2 February 1968, increasing the area of the Reserve to 153.6 ha.

Development and further subdivision of surrounding lots gathered pace during the 1970's and a number of holders of land adjoining the Reserve, namely Mr and Mrs R. and K. Lancaster, F. & P. Lee and N. & S. Connolly, expressed their concern to the Under Secretary for Lands that the Reserve should be upgraded to Class A, the Purpose of the Reserve changed to include "Protection of Fauna" and that control of the Reserve be vested in the Western Australian Wildlife Authority. These requests were agreed, and the Reserve was vested in the Western Australian Wildlife Authority on 13 December 1978.

2. PHYSICAL CHARACTERISTICS AND RELATIONSHIPS

The Reserve ($32^{o}14'S$, $115^{o}53'E$) is irregular in shape (Fig. 2), 153.6 ha in area and has a perimeter of approximately 5.5 km. The northern and parts of the eastern and southern boundaries front onto bitumen roads, namely Thomas Road, King Road and Orton Road, respectively. Thomas Road is the main thoroughfare between the Kwinana industrial development and the South Western Highway near Armadale (Fig. 1). The remainder of the eastern and southern boundaries and the western boundary of the Reserve adjoin rural small holdings (Fig. 2).

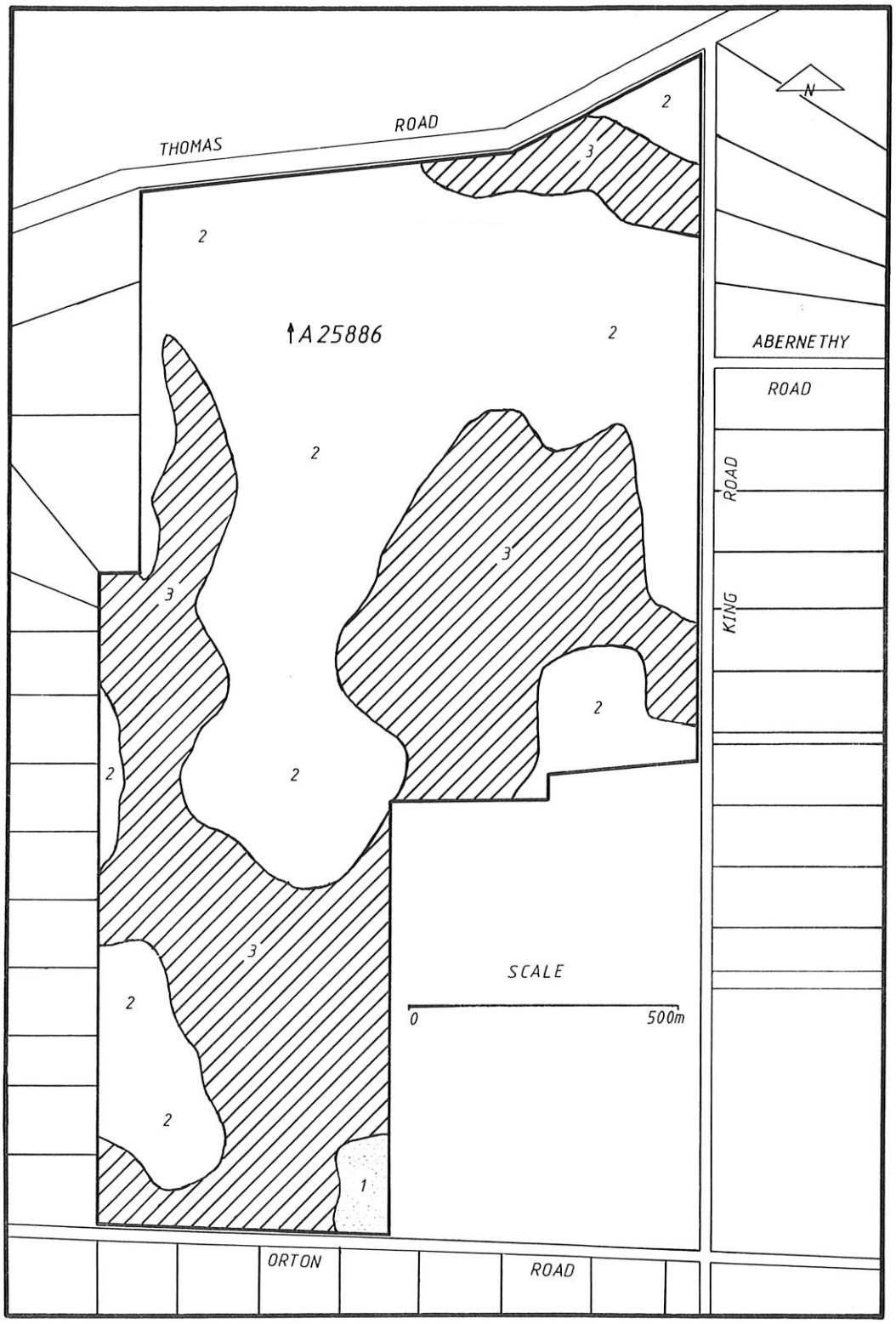


Figure 2. Class A Reserve No. 25886 showing relationships to surrounding lands. The vegetation formations are identified by numbers as in the text descriptions on page 11.

The northern quarter of the Reserve takes in a low sandy ridge running east to west from which two subsidiary ridges extend southwards: one along the eastern boundary and the second down the centre of the Reserve. The central ridge ends in an isolated low dune. Similar, smaller dunes occur in the south-eastern and south-western corners of the Reserve. The remainder of the Reserve is low-lying.

3. SOILS AND VEGETATION

The soils are grey quartz sands of the Bassendean dune system which are characteristically highly leached and have a poor mineral nutrient status. In the low-lying areas, of which there are extensive areas on the Reserve, the soils are poorly drained and support winter-wet swamps, so adding to the diversity of the vegetation.

The vegetation of the Reserve is almost entirely woodland, the density of the canopy approaching that for a forest classification in some places, particularly in drier parts of the north of the Reserve. Three formations were recognised according to the classification of Muir (1977)* which are mapped in Figure 2.

1. Marri Woodland: *Eucalyptus calophylla* Woodland (15 m) over *Melaleuca* species Heath A. Restricted to the south-eastern corner of the Reserve, *Melaleuca* shrubs having been cut for bean sticks.

2. *Banksia* Low Forest A/Low Woodland A: *Banksia attenuata, Banksia ilicifolia, B. menziesii* Forest/Woodland to 10 m height with Sheoak *(Casuarina fraseriana)*, Pricklybark *(Eucalyptus todtiana)*, Christmas tree *(Nuytsia floribunda)* and occasional emergent Jarrah *(E. marginata)*. A mixed and species rich Heath A of *Kunzea vestita* and *Pultinaea reticulata* occurs below this association in which *Daviesia* spp. *Xanthorrhoea preissii* and *Adenanthos cygnorum* are prominent (Fig. 3).

3. Paperbark Low Woodland/Open Low Woodland A: *Melaleuca preissiana* Woodland/Open Woodland to 10 m over dense Heath B of principally *Melaleuca* sp. and Myrtle *(Hypocalymma angustifolium)* with *Pultinaea reticulata* in better drained areas. *Eriostemon* sp., *Adenanthos obovata, Boronia, Tetratheca, Calytrix* and *Leptospermum* spp. were also flowering in these Heaths at the time of inspection (Spring 1979) (Fig. 4).

---

* Muir, B.G. (1977) Biological Survey of the Western Australian Wheatbelt. Part 2. Vegetation and Habitat of Bendering Reserve. Records of the Western Australian Museum Supplement No. 3. 1977.

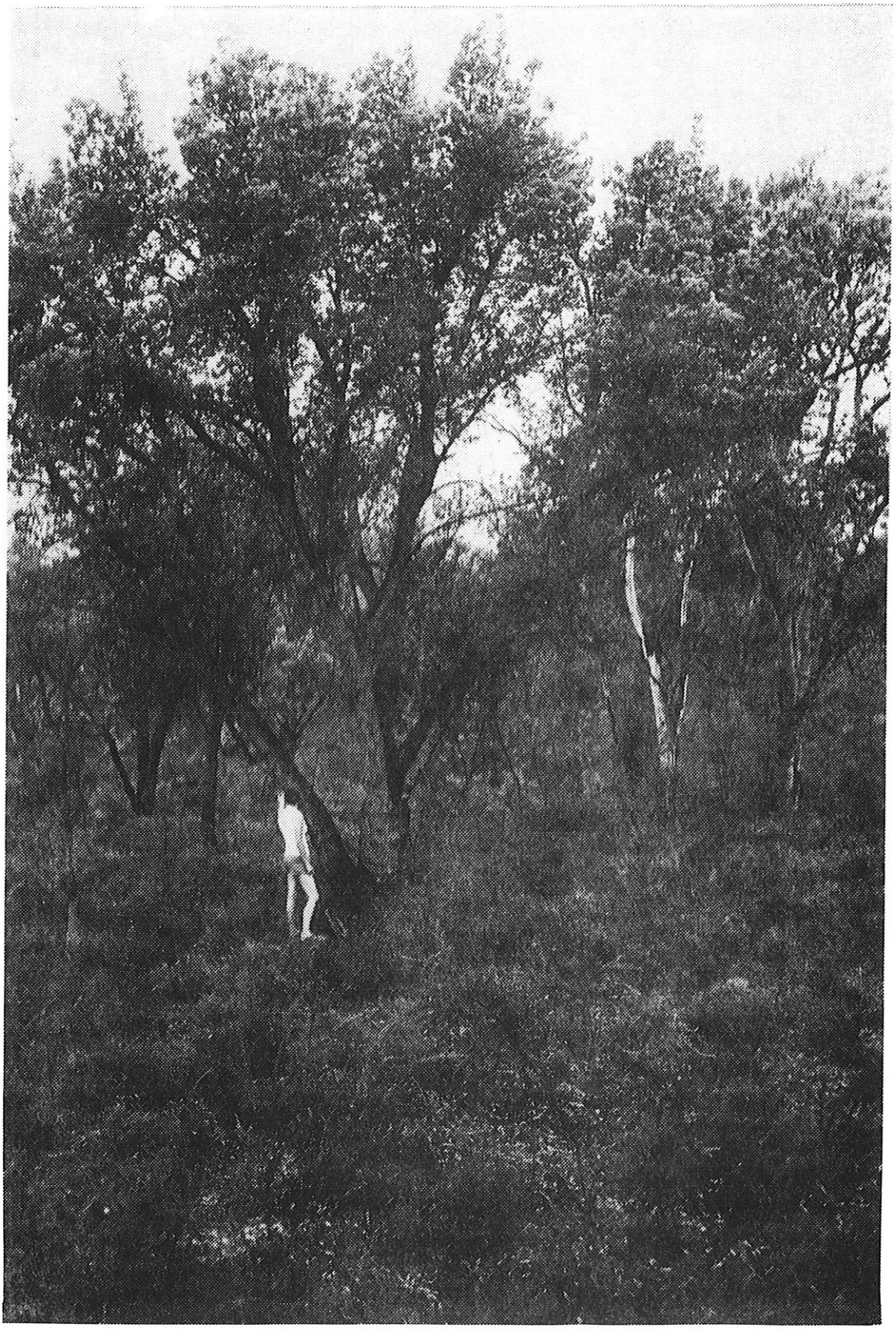


Figure 3. *Banksia* woodland showing a large *Banksia ilicifolia* tree and the species rich heath understorey characteristic of this kind of vegetation.

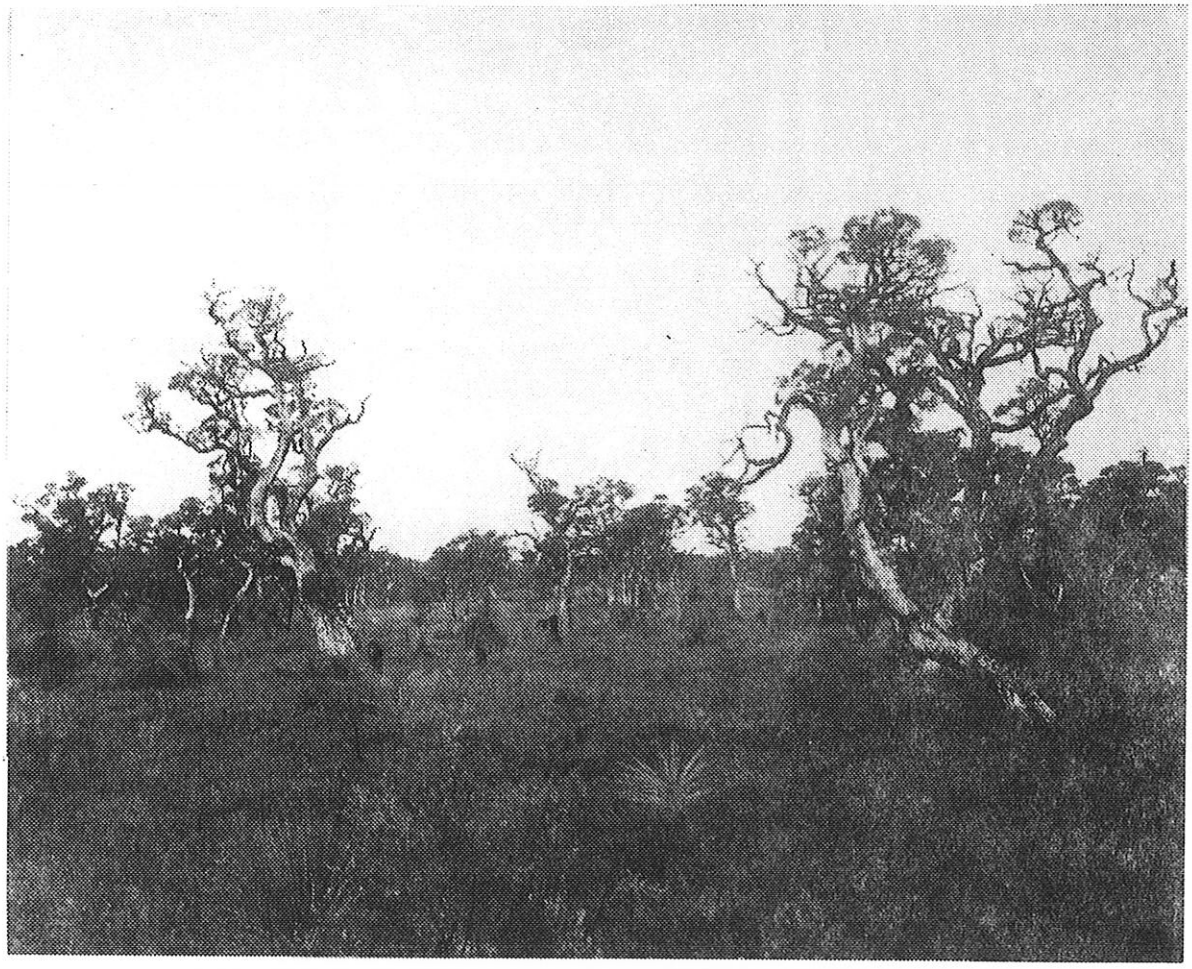


Figure 4. Open woodland of Swamp Paperbark *(Melaleuca preissiana)* with a dense heath understorey of *Kunzea vestita* and Myrtle *Hypocalymma angustifolium*.

4. PAST MANAGEMENT, USE AND FIRE HISTORY

At some time prior to 1963, the year of the earliest aerial photography available for the Nature Reserve, two drains were dug between Orton Road and the main swampy areas on the Reserve. These had two connecting drains between them, and a further drain had been dug across the north-eastern corner of the Reserve (Fig. 5a).

The first of a known series of wildfires burned through the *Banksia* woodlands in the central part of the Reserve as far as the north-western corner in the summer of 1966-67 (Fig. 5b). During the Spring of 1966 the Forests Department carried out a controlled burn of the eastern half of the Reserve (Conservator of Forests *in litt.* to the Under Secretary for Lands, 13 July 1967) which may have retarded the spread of the wildfire during the following summer.

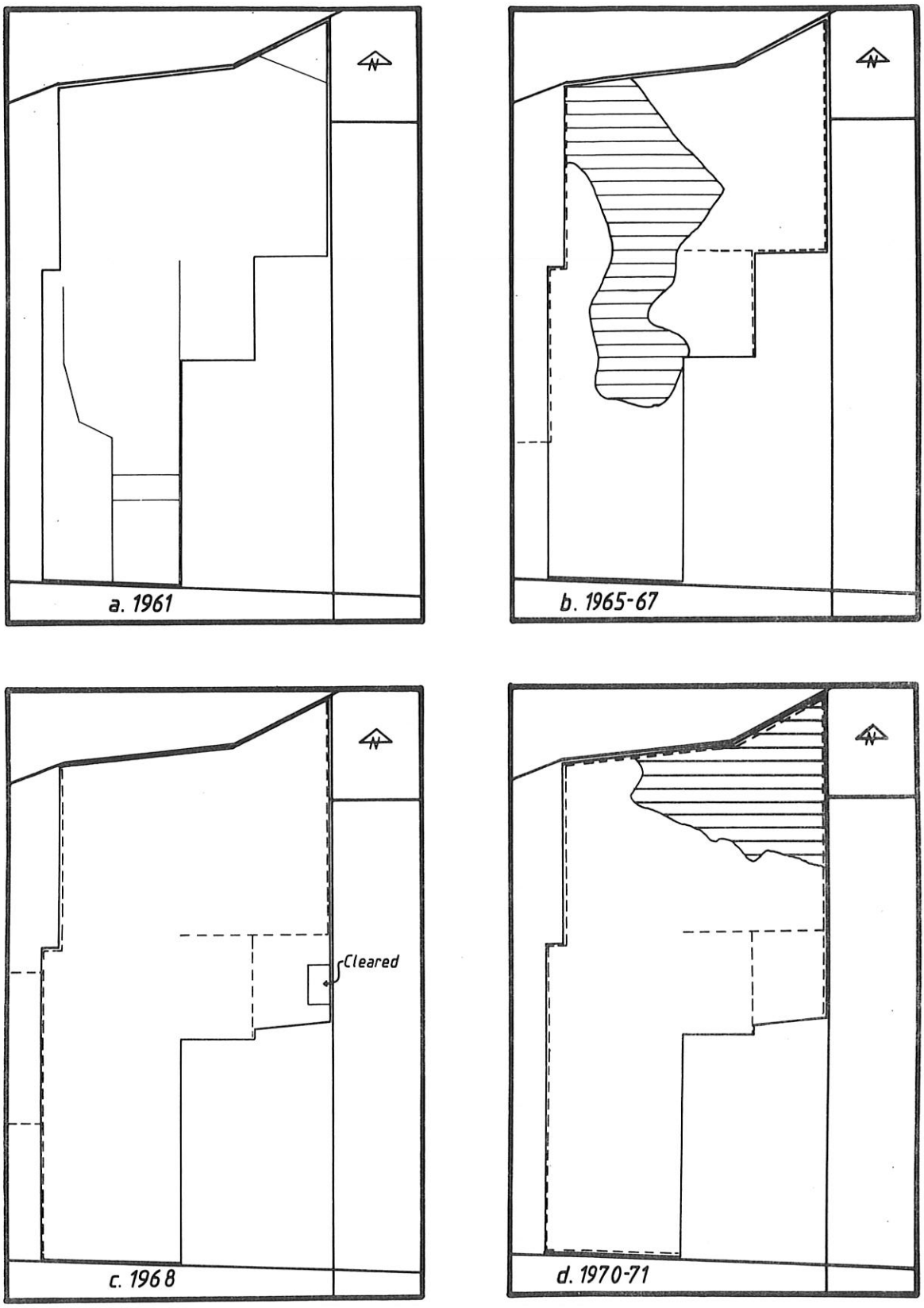


Figure 5. History of Reserve 25886. (a) The Reserve at the time of Gazettal showing drains dug prior to 1963. (b) Area burned by wildfire in 1966-67 and tracks constructed between 1965 and 1967. (c) Addition to the Reserve and tracks constructed by 1968. (d) Area burnt in wildfire of 1970-71 and additions to the track system.

Figure 5. Cont'd.. History of Reserve 25886. (e) The fire of 1972-73 and the completion of the peripheral tracks.
(f) Area burnt in the fire of 1977-78.
(g) Reserve enclosed by 6 m peripheral firebreaks in December 1979.

By 1967 perimeter tracks had been cut along part of the eastern and western boundaries and around Lot 122 which was taken into the Reserve in 1968 (Fig. 5b,c). Lot 122 had been partly developed prior to its inclusion in the Reserve. Remains of a fence are still evident on the northern boundary of the Lot and a small part of the Lot on the King Road frontage had been cleared prior to the 1963 photography, apparently for an experimental pine plantation (Fig. 5c).

A fire burned the north-eastern part of the Reserve in the summer of 1970-71 and the system of perimeter tracks had been extended to include all the northern, western and southern boundaries and part of the eastern boundary by mid-1971 (Fig. 5d).

The most severe fire since 1963 burnt over the whole Reserve in the summer of 1972-73 (Fig. 5e). Aerial photography flown the following winter shows that all the vegetation was severely affected by this fire.

The perimeter tracks were complete by 1973 (Fig. 5e) and the Nature Reserve remained free of further fire until the summer of 1978-79 when a fire escaped from a Lot adjoining the north-western corner of the Reserve and burned eastward through *Banksia* woodland adjacent to the northern boundary. This fire was contained by a flanking firebreak cut on its southern side (Fig. 5f).

Finally, Department of Fisheries and Wildlife staff increased the width of the existing perimeter firebreaks to a standard 6 m in December 1979.

Growth of the vegetation in the years since they were installed has largely hidden drains, fences and internal tracks on the Reserve, and there has been a rapid regeneration of woodland cover since the last severe fire in the summer of 1973-74.

Some trees, especially some *Banksias* near the southern boundary of the Reserve and Jarrahs on the central dune and ridge, were killed in the 1973-74 fire, but others recovered. There is also some invasion by weeds and grasses along the northern boundary in areas burned in 1978-79, but the vegetation generally shows little evidence of damage by too frequent fire. This is in marked contrast to the forests and woodlands on Thompson Lake Nature Reserve to the north (Fig. 1)*.

---

* Thompson Lake Nature Reserve is the main site of representation of the Bassendean soils/vegetation complex in the Nature Reserve system south of Perth. (See Crook, I.G. and T. Evans 1980. "Draft Management Plan No. 2 : Thompson Lake Nature Reserve. Class A Reserve No. 15556". Department of Fisheries and Wildlife, Perth).

Apart from these affects of fire the Reserve is largely undisturbed. It is also subject to little public use. The Marri woodland in the south-east corner may have been used from time to time as a picnic site, some of the *Kunzea vestita* understorey having been cleared, possibly for use as bean poles by adjoining landholders. The perimeter tracks are used for riding and driving horses, but, on this Reserve, neither use has been detrimental to nature conservation values. The dense heath understorey discourages use of the body of the Reserve.

5. NATURE CONSERVATION VALUES

Although small, Class A Nature Reserve 25886 contains a good representation of the consolidated dunes of the Bassendean system and their characteristic vegetation. Well-drained and poorly-drained areas are present in near-equal proportions, and the vegetation has not been damaged by fires of too great a frequency. It should therefore be regarded as a key site representing the vegetation and habitats typical of the Bassendean dune system.

With similar soils/vegetation complexes on Thompson Lake Nature Reserve and Reserve No. 28167 (p. 19) (the latter having been burned by an intense fire in December 1979) this Nature Reserve is a valuable site for the study of regeneration of woodland vegetation on Bassendean soils following fire.

The margins of the Reserve have considerable potential for recreation which, if suitably controlled, should not detract from the research or conservation values of the Reserve as a whole.

6. MANAGEMENT OBJECTIVES

Management of this Reserve will be directed toward maintaining its nature conservation values and to establishing and maintaining it as one of a series of sites of Bassendean soils and their attendant vegetation in a variety of stages of regeneration following fire. The primary objective in doing this is to provide sites for the study of the effects of fire on the vegetation of the Bassendean dunes and the role of fire in the management of these and other woodland Nature Reserves close to the west coast.

6.1. FIRE PROTECTION

Consistent with the need to protect the assets of adjacent landholders and to conserve the natural values of the Reserve, to prevent the occurrence of wildfires on the Reserve and to suppress such wildfires as may occur.

6.2. USE OF THE RESERVE - RECREATION

To permit use of the Reserve for passive recreational activities and to make provision around the margins of the Reserve for a strip of land on which the public may ride, drive and exercise horses.

6.3. USE OF THE RESERVE - RESEARCH

To establish the Reserve as one of a series of sites for the study of the fire ecology of *Banksia* woodlands and other vegetation characteristic of Bassendean soils.

7. MANAGEMENT - FIRE PROTECTION

The perimeter firebreaks constructed in December 1979 will be maintained to a width of 6 m and kept free of vegetation. Fires may be prescribed from time to time for all or parts of the Reserve with the dual purposes of fuel reduction if required and as part of any research work being done on the Reserve.

8. MANAGEMENT - RESEARCH AND PUBLIC USE

Research will be regarded as the predominant use of the Reserve, and for this reason all parts of the Reserve inside a perimeter strip 6 m wide will be classified as a Limited Access Area under Section 12A of the Wildlife Conservation Act. This means that all of the Nature Reserve inside the boundary firebreak will be accessible to the public on foot, but not in vehicles of any kind, nor on horseback. All existing internal tracks will be closed to vehicles and horses.

That part of the Reserve outside the Limited Access Area, that is the part covered by the boundary firebreak, will not be Classified under Section 12A of the Wildlife Conservation Act, and it will be maintained as a track for riding and exercising horses. In all other respects management of the public use of the Reserve will be as per Regulation 46 of the Wildlife Conservation Regulations.

To lay the foundation for studies of the fire ecology of the vegetation on this and other Reserves in the area, a research contract may be let to an appropriate Institution or individual to survey the flora and fauna of the Reserve in greater detail.

9. MANAGEMENT - GENERAL

During the currency of this Plan the Department of Fisheries and Wildlife may, with the approval of the Chairman of the Western Australian Wildlife Authority, undertake or authorise such other

work and research as may be seen to be necessary or desirable to properly promote the stated objectives of management of the Nature Reserve.

PART 3. RESERVE No. 28167, "BANKSIA ROAD" NATURE RESERVE

1. INTRODUCTION

Recommendation that Reserve No. 28167 be established on Peel Estate Lot No. 442 came initially from the Conservator of Forests in September 1961. Following an inspection by Wildlife Officers of the Department of Fisheries and Wildlife this recommendation was endorsed by the Chief Warden of Fauna:

> "As the Conservator of Forests has pointed out, very little uncleared land will be left in this area in the near future, and it might be desirable to keep it [the Reserve] as a piece of natural bush land, which would act as a small sanctuary for bird life."
>
> (Chief Warden of Fauna, Department of Fisheries and Wildlife, *in litt.* to the Under Secretary for Lands, October 1961).

In 1963 the land to be included in the proposed Reserve was changed to take in a small swamp at the southern end. (Part of Lot 442 was excluded and part of Lot 26 of the Peel Estate included in the Proposed Reserve). The Reserve was subsequently declared for the Purpose of Conservation of Flora and Fauna and vested in the Fauna Protection Advisory Committee, now the Western Australian Wildlife Authority, on 29 June 1966. It is known, unofficially, as the "Banksia Road" Nature Reserve.

2. PHYSICAL CHARACTERISTICS AND RELATIONSHIPS

The Reserve ($32^{o}15'S$, $115^{o}53'E$, 33.0 ha) is 2 km south of Reserve 25886 (Fig. 1), lying about the junction of Banksia Road, which runs along its southern boundary and Casuarina Road, which forms part of its western boundary. The Reserve is irregular in shape and has a perimeter of 2.5 km (Fig. 6). It is bounded by partly cleared land on its northern and most of its western sides and by a sand quarry on its eastern side. An intensive poultry farming operation has been instituted on the land making up the remainder of Lot 26 at the south-western corner of the Reserve (Fig. 6).

The eastern boundary of the Reserve roughly follows the crest of a low dune, the other side of which is being mined for sand. The small swamp in the southern part of the Reserve lies at the bottom of the western flank of this dune. In the northern part the western slopes of the dune fall away more gently to a flat but dry area of woodland.

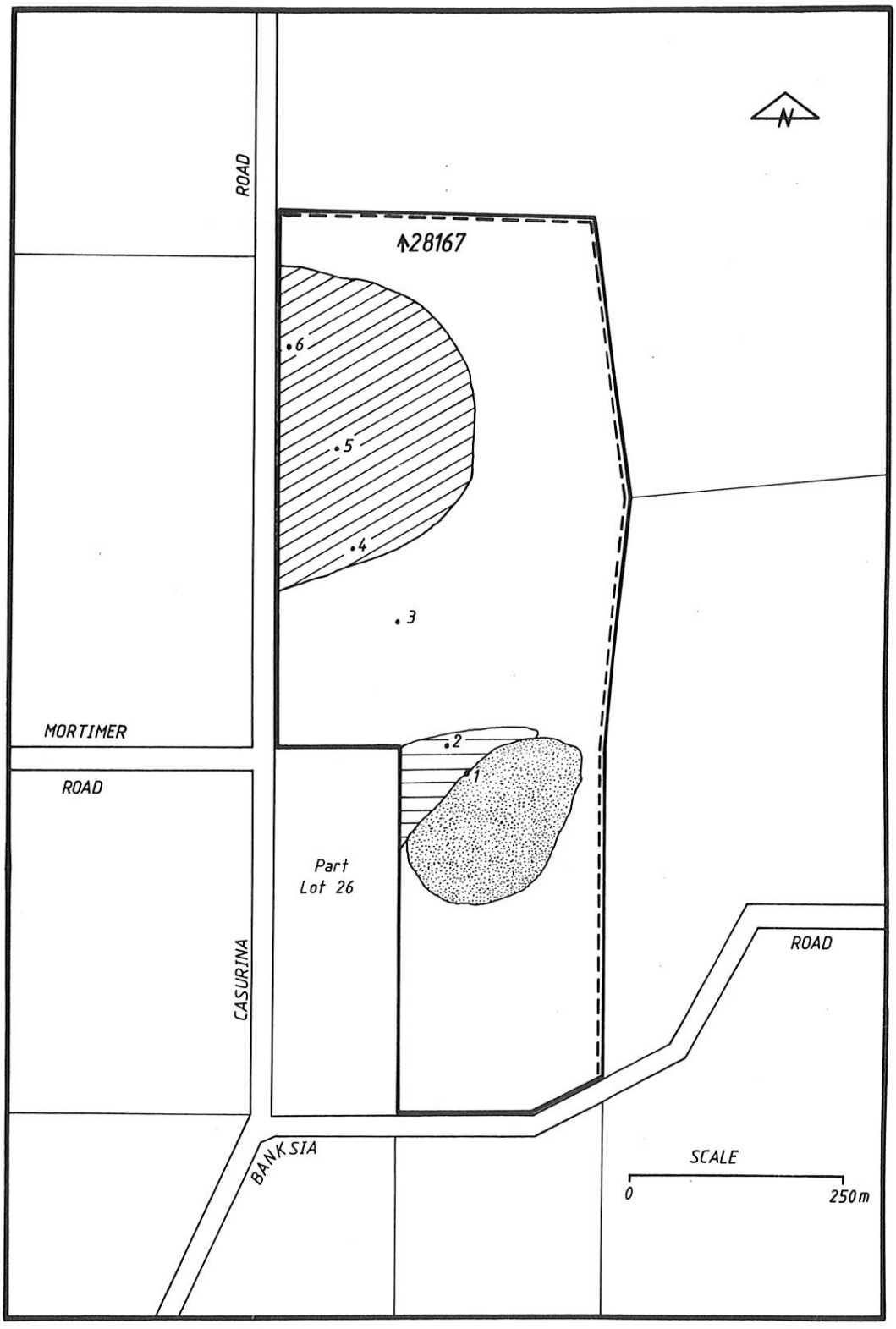


Figure 6. Nature Reserve No. 28167 showing relationships to surrounding lands, firebreaks (dashed lines), photo-points (numbered) and vegetation types (see text).

3. SOILS AND VEGETATION

The soils are predominantly the deep grey sands characteristic of the Bassendean Dune system with a pocket of deep yellow sands near the northern margin of the swamp area (Fig. 6). Description of the vegetation was hampered on inspection (February 1980) by the recent fire which burnt out most of the understorey and ground-cover vegetation. However, the following vegetation formations/associations could be recognised:

Jarrah Woodland: (Diagonal hachured area on Fig. 6) *Eucalyptus marginata* Woodland/Open Woodland (20 m) over *Banksia attenuata* Low Forest A/Low Woodland A (5-10 m) on deep grey sand.

Banksia Woodland: (Clear area on Fig. 6) *Banksia attenuata, Banksia ilicifolia, Banksia menzeisii* Low Forest A/Low Woodland A to 10 m height, lowest in density on the over-drained grey-sand ridges and most luxuriant in the area of deep yellow sand north of the swamp. Woody Pear (*Xylomelum occidentale*) occurs in this area of yellow sand (horizontal hachured area in Fig. 6).

Paperbark Low Woodland: (Stippled area in Fig. 6). *Melaleuca preissiana* Woodland/Open Woodland to 10 m over Dense Heath B of *Melaleuca* sp. and Myrtle (*Hypocalymma angustifolium*) established in and around the margins of the swamp near the southern boundary of the Reserve.

4. FAUNA

On past inspections, in 1961 and 1967, Wildlife Officers of the Department of Fisheries and Wildlife recorded a modest list of 25 bird species from the Reserve (Table 2). On the one inspection since the recent fire five bird species only were seen (Table 2). Since the fire, also, Macropods have been evident on the Reserve by their tracks, and the burnt skull of a Red Fox *(Vulpes vulpes)* beside an old den on the margin of the swamp indicates past occupation by this species.

5. PAST MANAGEMENT, USE AND FIRE HISTORY

At the time of Gazettal in 1966 firebreaks 3-6 m in width had been installed on the northern and eastern boundaries of the Reserve (Fig. 6). A track was later cut across the Reserve from east to west in line with Mortimer Road and used as a seismic line for mineral exploration purposes.

TABLE 2. BIRDS RECORDED FROM RESERVE NO. 28167

Species	1961-67	1980
Red-capped Parrot *Purpureicephalus spurius*	X	
Port Lincoln Parrot *Barnadius zonarius*	X	X
Pallid Cuckoo *Cuculus pallidus*	X	
Rufous-tailed Bronze Cuckoo *Chrysococcyx basalis*	X	
Laughing Kookaburra *Dacelo gigas*	X	
Tree Martin *Petrochelidon nigricans*	X	
Black-faced Cuckoo-Shrike *Coracina novaehollandiae*	X	
Scarlet Robin *Petroica multicolor*	X	X
Rufous Whistler *Pachycephala rufiventris*	X	X
Grey Shrike-thrush *Colluricincla harmonica rufiventris*	X	X
Grey Fantail *Rhipidura fuliginosa*	X	
White-tailed Flyeater *Gerygone fusca*	X	
Western Thornbill *Acanthiza inornata*	X	
Yellow-rumped Thornbill *Acanthiza chrysorrhoa*	X	
Red Wattlebird *Anthochaera carunculata*	X	
Little Wattlebird *Anthochaera chrysoptera*	X	
Yellow-throated Miner *Monorina flavigula*	X	
Brown Honeyeater *Lichmera indistincta*	X	
New Holland Honeyeater *Phylidonyris novaehollandiae*	X	
Western Spinebill *Acanthorhynchus superciliosus*	X	

cont'd...

TABLE 2. Cont'd...

Species	1961-67	1980
Striated Pardalote *Pardalotus substriatus*	X	
Silvereye *Zosterops lateralis gouldi*	X	
Grey Butcherbird *Cracticus torquatus*	X	X
Australian Magpie *Gymnorhina tibicen*	X	
Australian Raven *Corvus orru*	X	

Inspections prior to its Gazettal revealed no obvious signs of recent fires, and aerial photography flown between then and 1978 indicates that there were no fires on the Reserve in the intervening period. The fire that burned through the Reserve in the summer of 1979-80, therefore, appears to have been the only one to have occurred in recent years.

This fire was particularly intense, 95-100 per cent of the ground vegetation having been burnt. Leaves of eucalypts and *Banksias* have been scorched to heights of 5-12 m.

Little use has been made of the Reserve since its Gazettal although the fire has revealed some rubbish dumped along its western boundary with Casuarina Road.

6. NATURE CONSERVATION VALUES

This is a small Nature Reserve in a developing area, and it contains similar habitats to those represented on Reserve 25886, 2 km to the north. It does not, in itself, warrant the status of a "key site", but it will continue to provide habitats for a variety of wildlife, especially birds, as development of surrounding lands proceeds. It should therefore continue to be regarded as a "wildlife refuge", a status similar to that afforded it by the Chief Warden of Fauna at the time of its initial inspection by the Department.

In the immediate future, the Reserve will be a valuable site for study of the regeneration of the principally *Banksia* woodland habitats represented there. This will include studies of fuel accumulation and comparisons with similar habitats subject to different fire regimes both on Reserve 25886 and Thompson Lake Nature Reserve.

7. MANAGEMENT OBJECTIVES

Management will therefore be directed toward maintaining the conservation values of the Nature Reserve and toward establishing it as a research area.

7.1. FIRE PROTECTION

Consistent with the need to protect the assets of adjacent landholders, to maintain the Nature Reserve free from fire for such periods as may be prescribed in any programme of research which may be carried out on the Reserve.

7.2. USE OF THE RESERVE - RECREATION

To permit use of the Reserve for passive recreational activities at a level consistent with its primary use as a research area.

7.3. USE OF THE RESERVE - RESEARCH

To establish the Reserve as one of a series of sites for the study of the fire ecology of *Banksia* woodlands and other vegetation characteristic of Bassendean soils.

8. MANAGEMENT - FIRE PROTECTION

The boundary firebreaks already constructed on the Reserve will be maintained free of vegetation, and a 3 m wide firebreak will be installed around the boundary between the Reserve and the remainder of Lot 26. This will supplement the firebreak of similar width within the bounds of this Lot.

In view of the recent intense fire on the Reserve, and the previous long period free from fire, no fuel reduction burning will be prescribed in the meantime. However, provision shall be maintained in this Plan for the controlled burning of all or parts of the Reserve from time to time either for the purposes of research or fuel reduction.

9. MANAGEMENT - RESEARCH AND PUBLIC USE

The Reserve will not be Classified under Section 12A of the Wildlife Conservation Act in the meantime, but it may be Classified as a Limited Access Area during the currency of this Plan if excessive use begins to prejudice the values of the Nature Reserve or any research work being done there.

Research will be regarded as the predominant use of the Reserve.

Public use will otherwise be managed as per Regulation 46 of the Wildlife Conservation Regulations.

To lay the foundation for its establishment as a research site a series of permanent photo points have been established on the Nature Reserve (Fig. 6) for the purpose of monitoring recovery of the vegetation following the 1979-80 fire. Counts of birds will be made at intervals and compared to counts on areas of similar vegetation in Reserve 25886 to document changes in the bird fauna which may be the result of the fire and regeneration of the vegetation following the fire.

10. MANAGEMENT - GENERAL

During the currency of this Plan the Department of Fisheries and Wildlife may, with the approval of the Chairman of the Western Australian Wildlife Authority, undertake or authorise such other work and research as may be seen to be necessary or desirable to properly promote the stated objectives of management of the Nature Reserve.

PART 4. THE UNVESTED NATURE RESERVES

1. RESERVE NO. 23012

This Reserve lies on Watkins Road, north-west of its junction with the South Western Highway and 2 km east of Mundijong at 32°18'S, 116°00'E. It is both small and very irregular in shape, its eastern boundary following a curve in the road reserve of the South Western Highway. A Shire Council rubbish dump and sandpit (Reserve No. 23011) and their access track and a spur line of the South-Western Railway divide the Reserve into two parts near this irregular-shaped eastern end (Fig. 7).

The Reserve consists mainly of deep grey and yellow-brown sands, the former having a cover of, mainly, Myrtle *(Hypocalymma angustifolium)* heath in which *Casuarina* and *Calothamnus* species are prominent. A slightly elevated strip running east to west across the centre of the grey sand area carries a low woodland (5-10 m) of Jarrah and Marri *(Eucalyptus marginata* and *E. calophylla)* which merges in the east with a denser low forest of Jarrah and Marri (7-15 m) on yellow-brown sands. This formation has a dense lower storey of mixed *Banksia* species *(Banksia grandis, B. attenuata,* and *B. ilicifolia)*. Many of the Jarrah trees and some of the *Banksias* in this area are dead, possibly as a result of *Phytopthora cinnamomi* infection.

East of the railway line the land rises in the beginnings of a hill of clay and lateritic gravel which ends abruptly in a cutting for the South Western Highway. The vegetation here is taller forest of Jarrah and Marri with some Wandoo *(Eucalyptus*

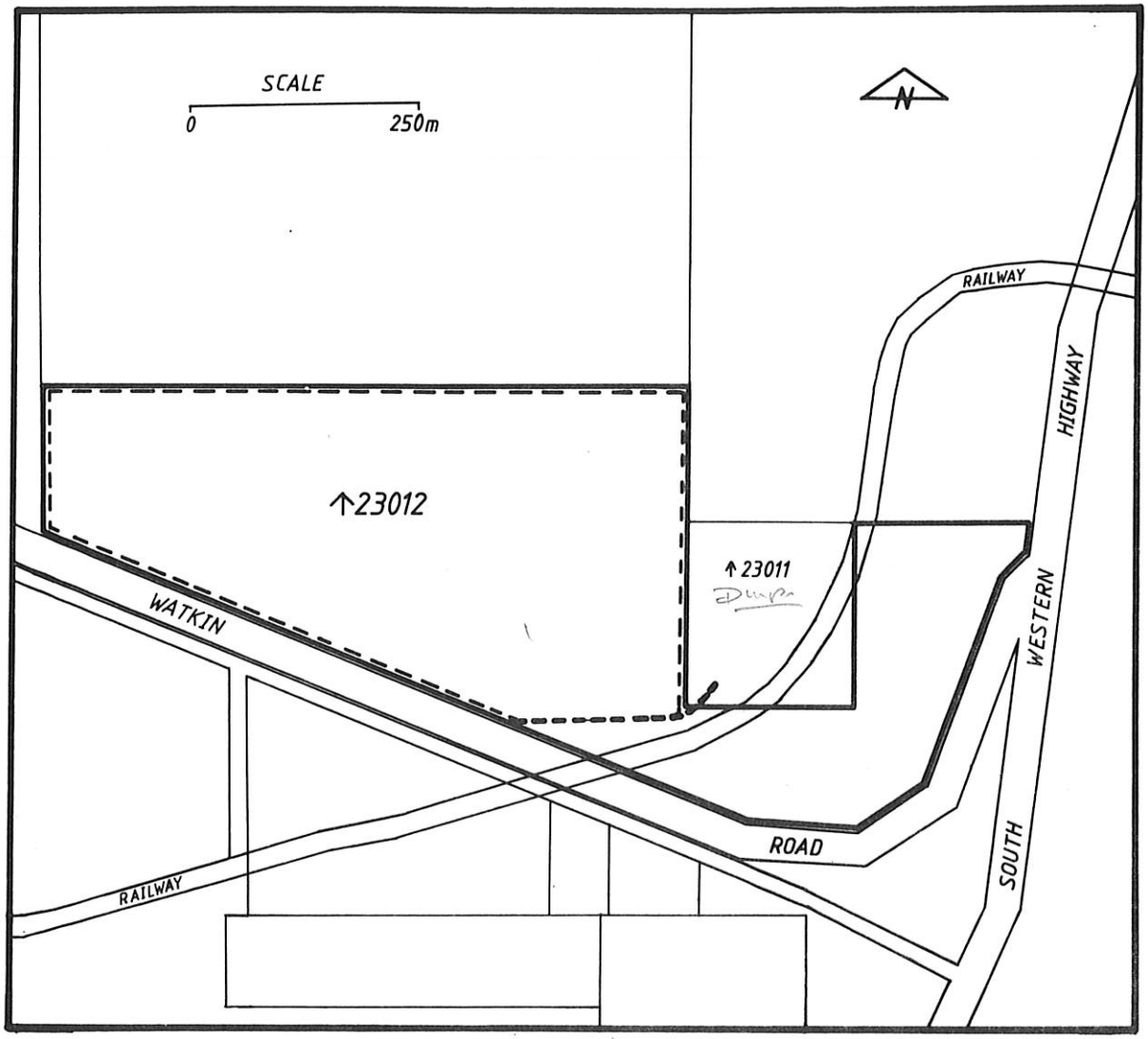


Figure 7. Reserve No. 23012 showing relationships to surrounding lands and firebreaks and access track.

wandoo) over a most disturbed ground cover of tracks, borrow pits and assorted refuse.

That part of the Reserve to the west of the rubbish dump is surrounded by a 3 m wide firebreak and shows evidence of having been burned in the recent past.

The major value of this Reserve is as a refuge for wildlife, particularly birds. No active management is envisaged, but if a vesting order is sought in favour of the Western Australian Wildlife Authority consideration should be given firstly to excising the area east of Reserve 23011, i.e. the rubbish dump and access track (Fig. 7). This excised area could, perhaps,

be added to Reserve 23011.

2. RESERVE NO. 32202 'KARNET' NATURE RESERVE

"Karnet" Nature Reserve (32°24'S, 116°01'E, 302 ha), just south of Serpentine National Park (Fig. 1) lies on the Darling Scarp and adjacent areas of the Darling Plateau, forming part of the catchment of Karnet Brook.

The Reserve is 302 ha in area and very irregular in shape (Fig. 8), consisting mainly of laterite ridges with outcrops of sheet granite around the heads of valleys of agriculturally useful land to the north, south and west. On the eastern side the Reserve adjoins State Forest No. 22.

The vegetation is principally Jarrah/Marri *(Eucalyptus marginata/ E. calophylla* and Wandoo *(E. wandoo)* forests with some particularly fine stands of forest toward the western side and the edge of the Darling Plateau itself. Typical descriptions are as follows:

> Jarrah/Marri Forest: Forest of *Eucalyptus marginata* and *E. calophylla* 20 m over Dense Low Forest A of *Banksia grandis* and *Casuarina fraseriana* (5-7 m) over Heath B of *Daviesia* sp., *Dryandra sessilis* and mixed dwarf shrubs on a rocky laterite ridge.
>
> Jarrah/Marri Forest: Forest of *Eucalyptus marginata* and *E. calophylla* 25 m over Heath B (1.0-1.5 m) of *Xanthorrhoea* spp., *Macrozamia, Hakea* sp. and mixed shrubs on a 10° west-facing slope of lateritic gravel and loams.
>
> Wandoo Forest: Forest of *Eucalyptus wandoo* (15-20 m) over Low Heath of mixed shrubs in a minor valley at the head of Karnet Brook.

Access to the Reserve is by way of Scrivener Road (Fig. 8) from the north through a scenically attractive valley with small farms on the valley floor and forest on the slopes. Old tracks which could be developed give access to some of the fine forest stands, westward to the edge of the Darling Scarp, with views over the Coastal Plain, and eastward into Special Management Priority Areas of State Forest 22.

This Reserve has considerable nature conservation value for the flora and fauna it supports, the latter including Grey Kangaroo *(Macropus fuliginosus)* and Brush Wallaby *(M. irma)* and a wide variety of forest-dwelling birds. Both its own features and its proximity to the Serpentine National Park suggest considerable potential for public use. If the National Parks Authority attains tenure over Forest and Reserve lands in the vicinity, Nature Reserve No. 32202 should be incorporated into the Serpentine National Park.

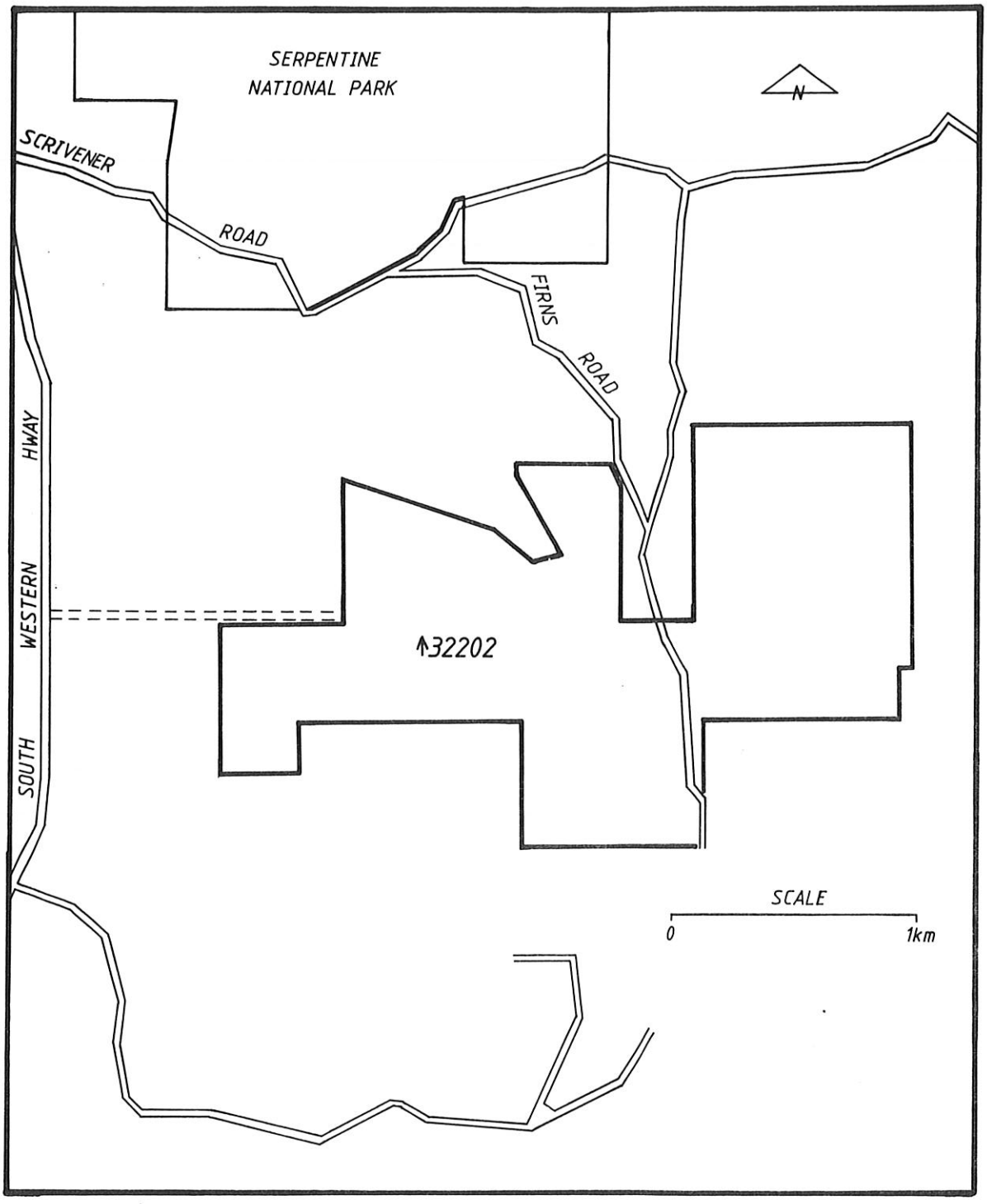


Figure 8. Reserve No. 32202 showing relationships with surrounding lands.

3. RESERVE NO. 32352

This Reserve is located in Serpentine Townsite (Fig. 9). and is a small (1.8 ha) block of Paperbark *(Melaleuca preissiana)* woodland in the north grading to heathlands with emergent Paperbarks and Marri *(Eucalyptus calophylla)* in the south. The heathland contains species such as *Casuarina humilis* but is generally dominated by introduced weeds and grasses. This Reserve appears to have been burned frequently and there is a riding track along its eastern boundary. It would undoubtedly support a variety of wildflowers in the Spring, but it probably should not be retained as a Reserve for its present purpose. The Reserve would be better vested in the Shire of Serpentine-Jarrahdale and its Purpose changed to Recreation or Parkland.

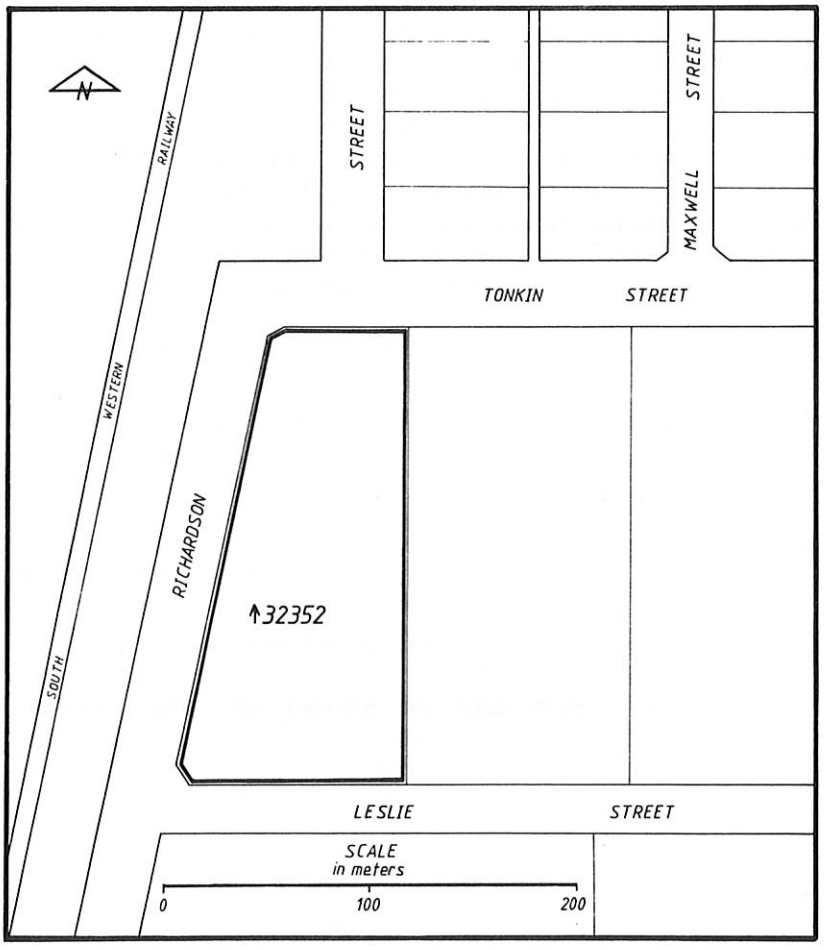


Figure 9. Reserve No. 32352 showing relationships with surrounding land.

PART 5. GENERAL CONSIDERATIONS AND CONCLUSIONS

With the Serpentine National Park and the State Forest Special Management Priority Areas the Nature Reserves in the Shire of Serpentine-Jarrahdale serve to represent several of the natural habitats of the Shire area. The Darling Plateau and Scarp are particularly well represented in Conservation Reserves. Two Nature Reserves in the Shire itself and others nearby contain examples of the consolidated dune systems of the western part of the Swan Coastal Plain.

The Ridge Hill Shelf and the Pinjarra Plain (the fluviatile surfaces of the eastern side of the Swan Coastal Plain), however, are less well represented in Conservation Reserves. Any opportunity to acquire suitable land as Conservation Reserves to represent these other landforms should be taken as they arise.

The two Nature Reserves in the Shire which are vested in the Western Australian Wildlife Authority are areas of dune systems. Both are small and surrounded by rural land or rural small holdings. Their values as sites representing these habitats, as refuges for wildlife and as areas for recreation and research, however, are considerable. Management will therefore be directed toward maintaining their values as conservation areas and towards the development of appropriate relationships between the Reserves, surrounding lands and the communities of which they are a part.

The specific provisions for the management of the individual Reserves are based on these broad objectives. In addition to the specific management measures already proposed, the following general measures will also apply in the management of the Nature Reserves in the Shire vested in the Western Australian Wildlife Authority:

Notifiable Authority:

> With regard to their protection from fire, the Department of Fisheries and Wildlife shall be regarded as a Notifiable Authority in the terms of the Bush Fires Act and Regulations with respect to those Nature Reserves in the Shire of Serpentine-Jarrahdale which are vested in the Western Australian Wildlife Authority.

Naming:

> Names shall be proposed for the Nature Reserves in the Shire vested in the Western Australian Wildlife Authority, and those names shall be submitted to the Nomenclature Advisory Committee of the Department of Lands and Surveys for adoption as official names and for publication in the Government Gazette.
>
> Members of the public are invited to propose names for the vested Reserves in the Shire. The names should preferably

relate to some natural or named feature on or in the vicinity of the Reserves concerned.

Signposting:

After names are adopted for the Reserves signs shall be erected on the Reserves identifying them by name and as Nature Reserves vested in the Western Australian Wildlife Authority and administered by the Department of Fisheries and Wildlife.

Term of the Plan:

Unless previously superseded, the term of this Management Plan shall be ten years.