Department of Conservation and Land Management, W.A.

Nature Reserves of the Shires of York and Northam Management Plan

1987-1997

Management Plan No. 4

NATURE RESERVES OF THE SHIRES OF YORK AND NORTHAM

MANAGEMENT PLAN

1987-1997

Project Team:

Susan Moore	-	Coordinator, Planning Officer, Planning Branch
Jeni Alford	-	Botanist, Wildlife Research
Tony raven	-	District Manager, Mundaring
Andy Williams	-	Zoologist, Wildlife Research

This management plan was prepared in accordance with Sections 53-61 of the Conservation and Land Management Act (1984).

The management plan was adopted by the National Parks and Nature Conservation Authority on 12 December 1986 and approved by the Hon. B.J. Hodge M.L.A., Minister for Conservation and Land Management, on 19 May 1987.

This management plan was endorsed by the Bush Fires Board, under the provisions of Section 34(l) of the Bush Fires Act (1954), on 21 May 1987.

Department of Conservation and Land Management
State Operations Headquarters
50 Hayman Road
COMO WA 6152

MANAGEMENT PLAN NO. 4

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PREFACE

The Conservation and Land Management Act (1984) requires that:

'A management plan for any land shall contain -

1. a statement of the policies or guidelines proposed to be followed; and
2. a summary of the operations proposed to be undertaken,'

(Section 55(1))

and

'… management plans shall be designed -

3. in the case of nature reserves, … to maintain and restore the natural environment, and to protect, care for, and promote the study of, indigenous flora and fauna;'

(Section 56 (1))

This plan is one of a series of management plans produced by the Department of Conservation and Land Management (CALM) for the National Parks and Nature Conservation Authority (NPNCA) or the Lands and Forests Commission, or both, to fulfil the requirements of the above Act. Completion of each plan involves three stages. First, the plan is published as a draft, and members of the local community (particularly reserve neighbours), government departments, local government authorities, tertiary institutions, conservation groups and the general public are encouraged to submit comments. Second, the draft is reviewed in the light of these comments, and an amended draft and summary of public submissions produced. These documents are then submitted by the NPNCA or the Lands and Forests Commission, or both, to the Minister for Conservation and Land Management for approval. Third, once approved, the plan is published in its final form.

The purpose of this plan is to detail management for two nature reserves in the Shire of York - St Ronans (No. 30591) and Wambyn (No. 21981) - and four nature reserves in the Shire of Northam - Clackline (No. 32400), Moking (No. 31211), Throssell (No. 7220) and Meenaar (No. A29977). Nature reserves are areas vested in the NPNCA and set aside for the conservation of flora and fauna.

In all plans in this series, vegetation is described according to Muir (1977) and plan species are named according to Green (1985). The scientific and common names used for mammals are

according to Strahan (1983), reptiles according to Storr et al. (1981, 1983) and Cogger (1983) and frogs according to Tyler et al. (1984) and Cogger (1983). The W.A. Museum is also used as a reference. Birds are named according to Blakers et al. (1984).

This draft plan is in eight parts. Part 1 introduced the six nature reserves and summarises the biological and physical attributes of the Shires of York and Northam. This part also gives general management objectives for the six nature reserves covered by the plan. Parts 2-7 discuss the individual nature reserves. Each part is split into two sections - A. The Reserve and B. Plan for Management. Section A details the biological and physical attributes of the nature reserve, as well as outlining its historic and nature conservation values. Section B details management objectives and the strategies necessary to achieve these objectives. Part 8 contains general management strategies.

PART 1. INTRODUCTION - THE SHIRES OF YORK AND NORTHAM

The Shires of York and Northam lie approximately 75 km to the east of the Perth metropolitan region (Fig.1). Each centres on the town of the same name, although the town of Northam forms a discrete local government authority. Together, the two Shires encompass much of the fertile upper reaches of Avon River valley. The Shire of York, with an area of 2010 sq. km, is one of the largest local government authorities in the Avon region. The Shire of Northam, on the other hand, with an area of 1389 sq. km, is one of the smallest. The two Shires have populations of a very similar size, with the largest and second largest populations of the 10 Shires in the Avon region - Northam has a population of 2620 people and York has a population of 2200 people (Australian Bureau of Statistics 1981-82). Northam Town local government authority has the highest population of all the local government authorities in the Avon region, with 7000 people (ABS 1981-82).

1. THE RESERVES

There are 11 nature reserves in the two Shires - 4 in York and 7 in Northam (as at October 1986). This plan details management for six of these reserves (Fig. 2, Table 1). These six are discussed, from west to east - from the Darling Range in the west with its higher rainfall, to the wheatbelt in the east which receives moderate to low rainfall.

The remaining 5 nature reserves (No.'s 24179 and A39149 in the Shire of York, and Nos. 5644, 30363 and A39247 in the Shire of Northam) have come under the control of CALM since the draft management plan was completed. Although management for these areas is not detailed, the management philosophies advocated in this plan can equally be applied to all the York-Northam nature reserves.

Three additional nature reserves were proposed in the Cabinet-endorsed System Six recommendations (Department of Conservation and Environment, 1983). One of these has been set aside as a nature reserve (No. 30363, formerly recommendation C30) and discussions are underway regarding the other two proposals (Recommendations C28 and C29, Fig. 2).

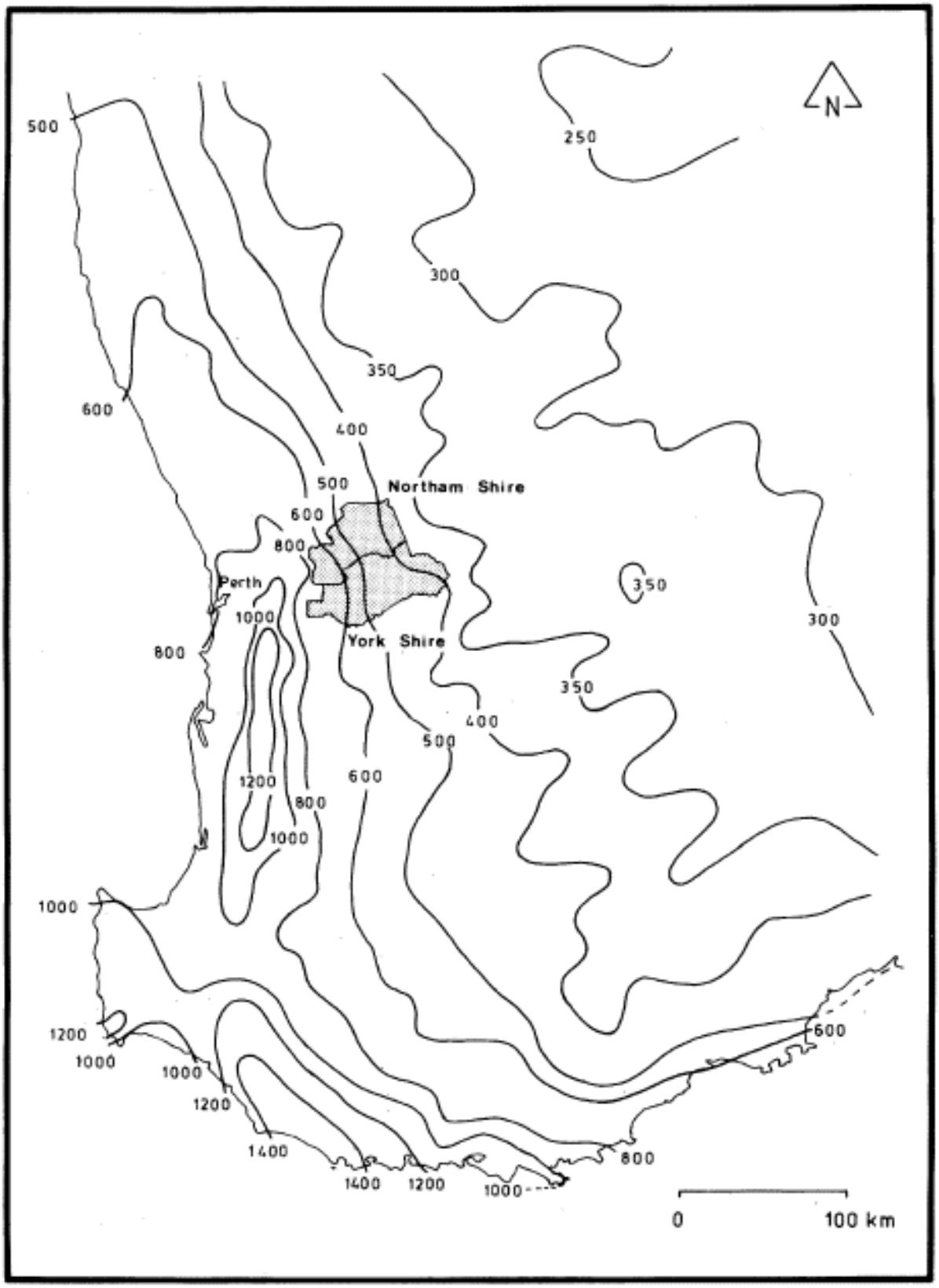

Figure 1. Location of the Shires of York and Northam, and their relationship to annual isohyets (mm). (Source: W.A. Department of Land and Surveys, 1984 and Bureau of Meteorology, 1984.)

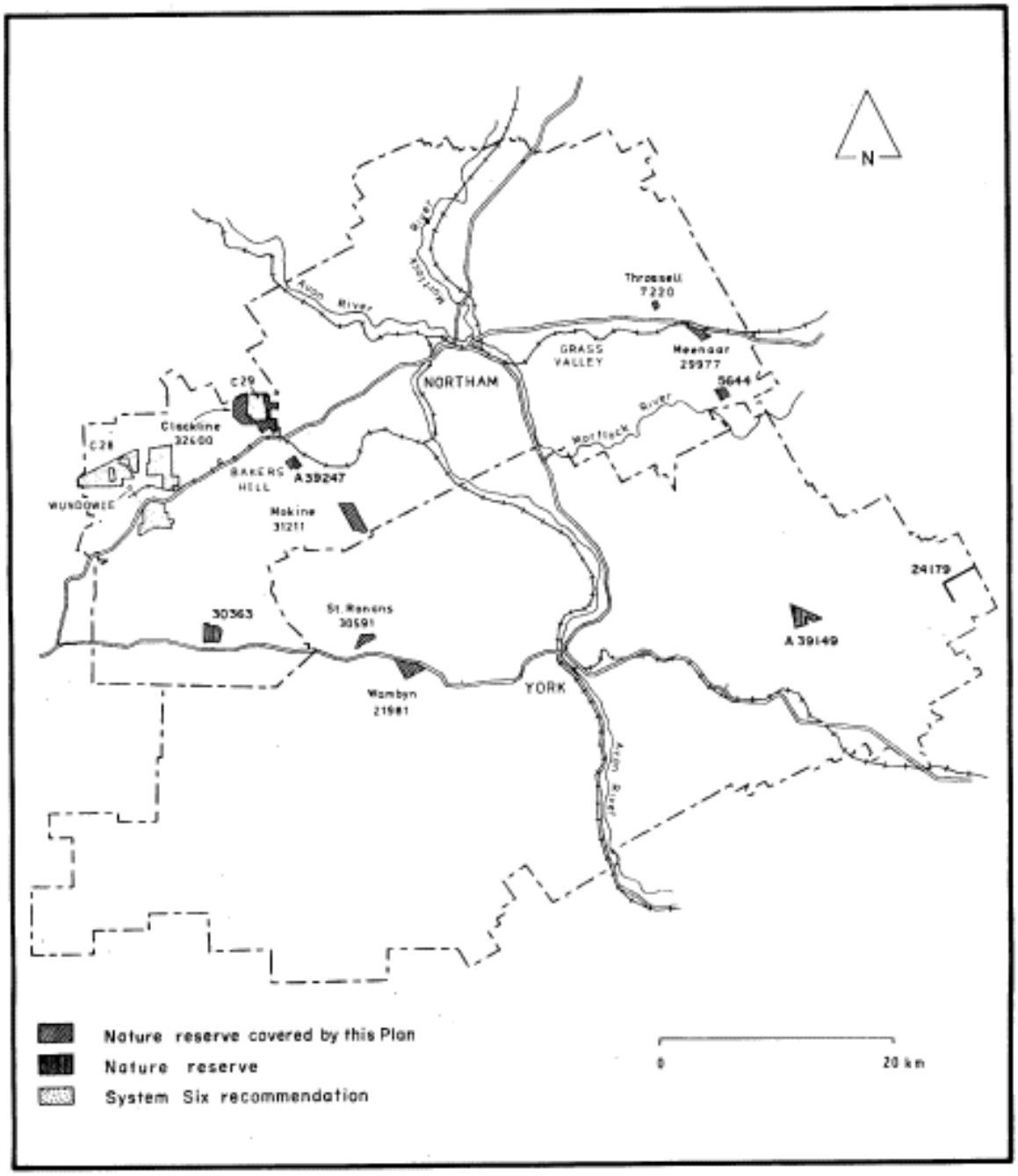

Figure 2. Shires of York and Northam showing location of nature reserves (October 1986). (Source: W.A. Department of Land Administration 1:50 000 series.)

TABLE 1. NATURE RESERVES IN THE SHIRES OF YORK AND NORTHAM COVERED BY THIS MANAGEMENT PLAN

RESERVE NO.	RESERVE NAME	SHIRE	AREA (HA)	POSITION IN LANDSCAPE	DOMINANT VEGETATION FORMATIONS[+]
C32400	Clackline	Northam	458.9	Eastern ridge of Darling Range	wandoo WOODLAND: powderbark FOREST/WOODLAND: jarrah/marri WOODLAND/OPEN WOODLAND
C30591	St Ronans	York	119.2	Eastern edge of Darling Range	Powderbark LOW WOODLAND A; jam, sheoak and marri LOW FOREST A/LOW WOODLAND A; marri wandoo and jam OPEN LOW WOODLAND A; wandoo LOW WOODLAND A
C21981	Wambyn	York	215.2	Eastern ridge of Darling Range	Powderbark WOODLAND; wandoo WOODLAND
C31211	Mokine	Northam	289.1	Eastern side of Darling Range	Powderbark WOODLAND; wandoo LOW WOODLAND A; sheoak and jam LOW WOODLAND A/LOW FOREST A
C7220	Throssell	Northam	17.7	Mortlock River plain	Wandoo WOODLAND: salmon gum, wandoo and york gum WOODLAND/LOW WOODLAND A
A29977	Meenaar	Northam	71.8	Mortlock River plain	York gum LOW WOODLAND A; sandalwood, blackboy, jam and sheoak SCRUB; tamma HEATH A

[+] structural vegetation categories according to Muir (1977)

2. CLIMATE

The climate of the Shires of York and Northam is characterised by hot dry summers and mild wet winters. The summers are occasionally relieved by short periods of heavy rain of tropical cyclonic origin. The mean monthly maximum and minimum temperatures in summer are 34°C and 16°C respectively, while in winter they are 18°C and 5°C respectively. (Data collected at Northam by the Bureau of Meteorology).

The Shire lies between the 800 and 350 mm isohyets, with rainfall decreasing from west to east (Fig. 1). This gradient is the result of increasing distance from the coast. Thus two climatic types of regimes, as defined by Bagnouls and Gaussen (1957), prevail across the York-Northam region. In the western part the climate is defined as Warm Mediterranean, which is characterised by five to six 'dry' months (in which potential evapo-transpiratoin exceeds precipitation), while to the east, where seven to eight months are dry, the climate is defined as Dry Warm Mediterranean. The boundary between these two climatic types corresponds roughly with the 500 mm isohyet. Warm Mediterranean climates are well suited for forestry, horticulture and dairying; while Dry Warm Mediterranean climates are better suited to cereal production and sheep grazing.

In the York-Northam region the seasonality, variability and gradient of rainfall from west to east are significant factors in the determination of vegetation types and their distribution. These factors interact with geology, geomorphology and soils to determine the vegetation patterns across the two Shires. Nature reserves such as Clackline in the west and Meenaar in the east have a 30-40% difference in rainfall, and the vegetation shows corresponding differences. Clackline lies near the eastern edge of the jarrah (*Eucalyptus marginata*) forest belt. This species does not occur further to the east on Throssell and Meenaar Nature Reserves.

3. GEOLOGY AND GEOMORPHOLOGY

A combination of geology, geomorphic and climatic factors and variable soil types is responsible for the diversity of habitats within the York-Northam region.

The York-Northam area is geologically diverse. The western third is underlain by Archaean granites, the remainder being dominated by migmatites and acidic gneisses. The boundary between these two areas is marked by a narrow disjunct 'greenstone' belt of basic volcanic rocks and undifferentiated, non-granitic, layered rocks. This belt runs from Clackline south through York to north of Beverley (Geological Survey of Western Australia 1975).

There have been two main physiographic influences in the York-Northam area - weathering and laterisation of the Yilgarn Block and entrenchment of the Avon River. The Yilgarn Block, which is of Archaean origin, was subjected to laterisation during the Tertiary, resulting in extensive areas being covered by massive laterite, ironstone gravel and sand overlying a thick layer of clay. At the same time several uplifts of the land mass led to entrenchment of the Avon and, to a lesser extent, its tributaries such as the Mortlock.

A third influence led to the formation of sandplains in the eastern parts of the Shires. These are a product of extensive reworking of surface sand deposits during the dry and windy glacial periods of the Pleistocene.

There are three main landform zones across the two Shires. In the west the Shire is dominated by the relatively high elevation and relief of the Darling Range. This range contains the highest point in the two Shires - a major hill rising to 44 m at Coates Siding, immediately to the east of Wundowie township. An elevated ridge at Clackline provides a further break between the generally undulating uplands of the Range and the fall to the Avon Valley. The Avon Valley forms the second landform zone. East of the Avon the land rises, through steep rocky slopes, to the undulating surface of the plateau. In this third landform zone the original lateritic surface has generally been removed, except for areas of laterite and sands on isolated higher areas, often with perimeter breakaways exhibiting active erosion. In the eastern parts of this zone the old plateau surface of sands and laterite is dominant.

4. SOILS

Detailed soil surveys have not been carried out for either Shire. Rather, the following discussion is drawn from derivations by Taylor and Burrell 91984), based on Northcote et al. 91967). They described the soils according to the three landform zones identified above:

i. The western third of the Shires, occupied by the dissected features of the Darling Range, is dominated by ironstone gravels and hard, acidic, yellow-mottled soils.

ii. The central portion comprises the hard, alkaline, red soils of the Avon and Mortlock River terraces, flanked by the hard, red, neutral soils of the surrounding undulating-to-hilly terrain. These soils extend into both the eastern and western portions of the York-Northam area.

iii. On the sandplains to the east of the Mortlock River, intrusions of hard, alkaline, yellow-mottled soils occur, while further east again a mixture of neutral sandy soils and acidic, yellow-mottled earths occur, as well as small areas of acidic, yellow earths.

5. VEGETATION

The vegetation of the Shires of York and Northam has been mapped at a broad scale (1:250 000) by Beard (1979a, 1979b, 1980). A total of 17 vegetation associations can be distinguished (Fig. 3). These are ordered from higher to lower rainfall and from higher to lower in the landscape:

1. Jarrah (*Eucalyptus marginata*) and marri (*E. calophylla*) forest on plateau, wandoo (*E. wandoo*) in valleys, sandy swamps with tea-tree (*Melaleuca spp.*) and *Banksia spp.*
2. Jarrah, wandoo and powderbark (*E. accedens*) woodland.
3. Marri and wandoo woodland.
4. Open wandoo woodland and heath.
5. Heath.
6. Jarrah, marri and wandoo forest.
7. Open wandoo woodland.
8. Tea-tree swamps.
9. York gum (*E. loxophleba*) woodland.
10. York gum and sheoak (*Allocasuarina spp.*) woodland.
11. Wandoo woodland.
12. Salmon gum (*E.salmonophloia*) and morrell (*E. longicornis*) woodland.
13. York gum and salmon gum woodland.
14. Scrub-heath on sandplain.
15. Sheoak (*Allocasuarina spp.*) thickets on sandplain, mallet (*E. astringens*) on breakaways.
16. Tea-tree and samphire (*Halosacrcia spp.*).
17. York gum and wandoo woodland.

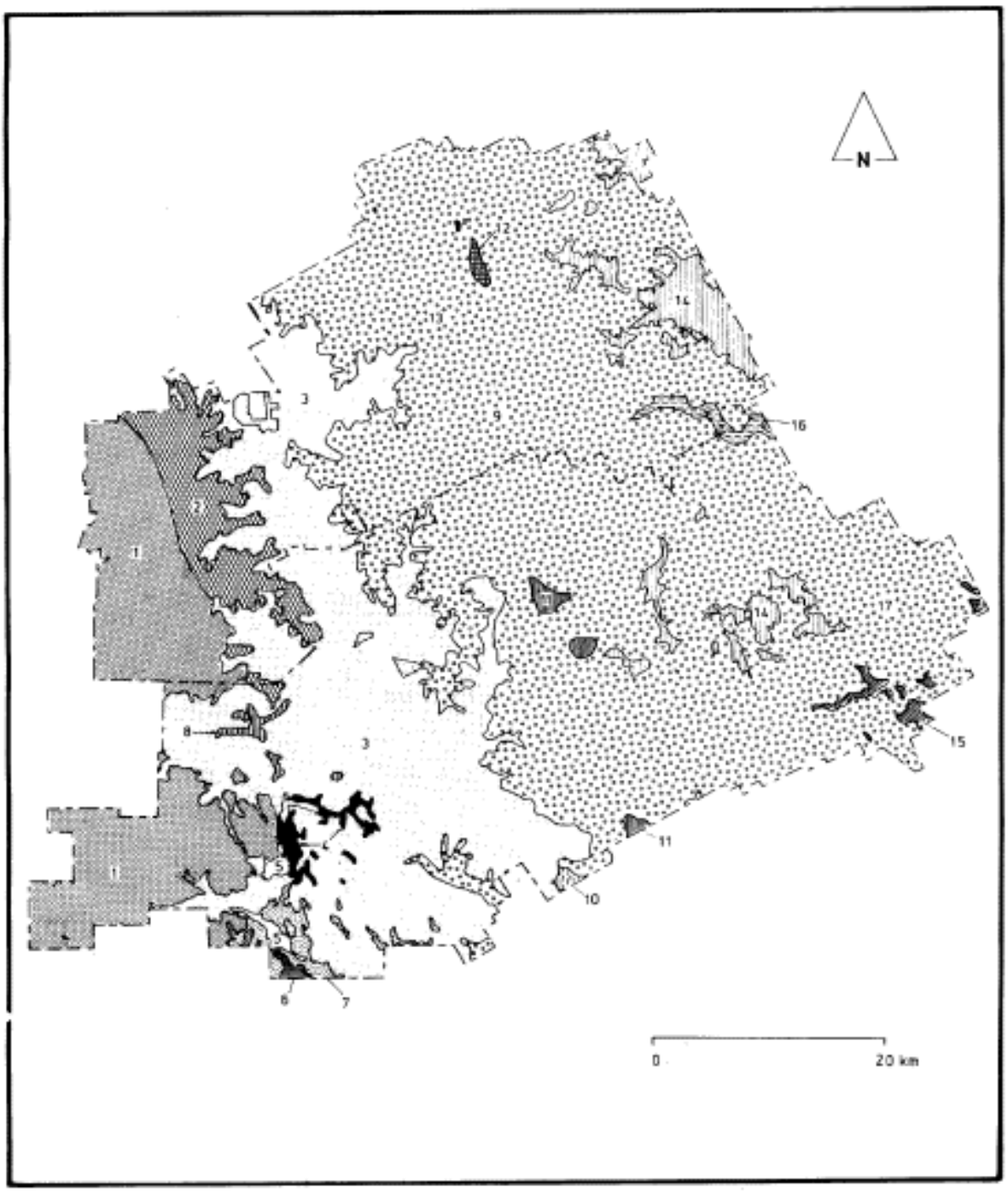

Figure 3. Original vegetation of the Shires of York and Northam (Source:Beard, 1979a, 1979b, 1980). Numbered associations are described in the accompanying text.

The jarrah and marri forest occupies the highest rainfall area in the western part of the York and Northam Shires. With the decline in rainfall in a northerly and easterly direction this forest grades into a series of open woodlands of jarrah, wandoo and powderbark, and marri and wandoo. Within the latter association, marri shows a preference for the more sandy soils, while wandoo occurs on more clayey soils. Clackline is the only nature reserve in the York-Northam area on which stands of jarrah occur - growing in a woodland association with marri. The four nature reserves on the eastern edge of the Darling Range (Clackline, St Ronans, Wambyn and Mokine) are dominated by powderbark, wandoo and marri woodlands. (Mokine Nature Reserve, although indicated in Figure 3 as carrying York gum, actually supports the aforementioned woodlands.)

The eastern half of the York-Northam area is dominated by York gum woodland. Most of this country owes its character to the relatively fertile red loam soils and a surface of gentle relief. This has led to a unique situation in which York gum is no longer confined to the soils of the lower slopes, but may occur as the sole species forming woodland over the whole landscape. Its usual associate, wandoo, is confined to less basic rocks. In the northern part of this association (in the two Shires) salmon gum shares dominance wit the York gum, while in the eastern parts wandoo becomes reinstated as a co-dominant (Beard 1979a). Both Meenaar and Throssell nature Reserve lie towards the eastern edge of the York gum association (in the two Shires). On both reserves wandoo is an important component. Salmon gums share dominance on Throssell Nature Reserve.

Extensive sandplains occur near the eastern boundary of the York-Northam area (Fig. 3). These are for the most part on higher ground, and appear to be of primarily aeolian origin, consisting of yellow, earthy sands (Beard 1979a). The original vegetation was scrub-heath or banksia low woodland. Along major drainage lines yellow, alkaline loams support tea-tree and samphire on extensive salt flats. Meenaar is the only nature reserve in the York-Northam area to contain a sample, albeit small, of these associations.

Appendix 1 lists the plant species found on the York and Northam nature reserves.

6. FAUNA

Detailed fauna surveys of the York and Northam nature reserves have revealed a wealth of wildlife. Mammals recorded include echidnas, western grey kangaroos, western brush wallabies, euros, dunnarts, western pigmy-possums, white-striped mastiff-bats, foxes, cats, rabbits and house mice (App. 2). A total of 24 lizard, 7 snake and 7 frog species have been recorded.

The detailed fauna surveys included bird species, with a total of 95 bird species being recorded on the six nature reserves in the York-Northam area (App. 3). Meenaar Nature Reserve had the greatest number recorded don one area, with 64 species. This compares favourably with an average of 65 species recorded by Kitchener et al. (1982) in their surveys of 23 wheatbelt nature reserves. Obviously, the York-Northam nature reserves contain a diverse fauna. This emphasises the value of these small isolated remnants, particularly for bird and retile species.

7. LAND USE

The Avon River valley, which forms the central part of the Shires of York and Northam, was settled by Europeans soon after colonisation. York was established in 1831 by Ensign Dale, who led a party of settlers into the area. Dale continued his explorations down the Avon Valley, passing near the future site of Northam. This town was gazetted in 1836 (Garden 1979). Northam had a slow and uneventful beginning, with little early development. One of the main reasons was its lack of a direct link to Perth. Northam was linked only to York and Toodyay, whereas roads directly linked the latter two towns to Perth.

Development throughout the Avon Valley was slow until the 1850s, when the influx of convicts provided cheap labour. This enabled large areas to be cleared and crops established. The availability of cheap labour, plus an increasing demand for produce for domestic consumption, stimulated agriculture and promoted development in the Avon Valley. The goldrush in the 1890s and the continued growth of Perth led to increased demand for produce such as wool, wheat, lamb and mutton, hay, fruit and vegetables. Production to meet these needs, plus many men initially attracted to Western Australia by the goldrush turning to farming, assured the continued development and consolidation of agriculture in the Avon Valley (L. Talbot, pers. Comm., 1986). Sandalwood cutting also contributed to the development of the Avon Valley at that time.

The development of Northam was assured by Throssell (an influential Northam businessman who became the second premier of Western Australia in 1901) who secured the route of the Yilgarn railway via Northam, rather than via York or Toodyay. In 1891, again due primarily to the influence of Throssell, the railway was extended from Northam to Southern Cross. Northam was the nearest settled town to the immensely wealthy areas to the east (the goldfields) and became a centre of great commercial importance. By 1929 Northam was a thriving and prosperous municipality of modern appearance.

The 1940s (post World War II) saw the introduction of the bulldozer and mechanised clearing became widespread, particularly in the western parts of the York-Northam area. Formerly this region had been difficult to clear because of the rugged nature of the country. In the ensuing years the fertility problems of the laterite soils and sandplains were solved. Development for cropping and grazing followed.

Today the Shires of York and Northam, with the Shires of Toodyay to the: north and Beverley to the south, lie on the western edge of the wheatbelt. Although cereal growing is an important land use in both Shires, over half the area of agricultural establishments in both Shires is devoted to pasture. From the early days of this century Northam has been one of the most important hay-producing areas in the State. Sheep are the main stock, with over half a million animals in the two Shires (Australian Bureau of Statistics 1981-82). Beef cattle are of lesser importance, with 6 638 bead in the Shire of Northam and 3 597 in York.

An analysis of land tenure in the Shires of York and Northam, by the Department of Lands and Surveys (now the Department of Land Administration) in June 1985, provided the following details. Private holdings, which are predominantly rural, contribute 85.1% to the area of the Shire of Northam and 71.3% to the Shire of York. Crown reserves occupy a further 9.1% of the former and 2.6% of the latter. Nature reserves contribute only 0.6% to the total area of the Shire of Northam and 0.2% to the Shire of York. This deficiency is offset to some degree by State forest, which covers 'almost a quarter (24%) of the Shire of York. Table 2 gives a more complete analysis. In the intervening period (to October 1986) the total area of nature reserves in the two Shires has increased slightly, but only by 0.1 to 0.27.

TABLE 2. LAND STATUS TN THE SHIRES OF YORK AND NORTHAM (AT JUNE 1985)

STATUS	SHIRE OF YORK		SHIRE OF NORTHAM	
	AREA (HA)	%	AREA (HA)	%
FREEHOLD	143,424	71.3	120,763	85.1
RESERVE (i) FLORA & FAUNA	332	0.2	857	0.6
(ii) OTHER	1,728	0.9	91990	7.0
ROAD & RAILWAY RESERVES	3,015	1.5	2,128	1.5
VACANT CROWN LAND	1,948	1.0	683	0.5
LEASEHOLD	2,187	1.1	3,655	2.6
STATE FOREST	48,366	24.0	3,823	2.7
TOTAL AREA OF SHIRE	201,000	100.00	141,900	100.00

Source: Department of Land and Surveys.

8. GENERAL MANAGEMENT OBJECTIVES

Management of the six nature reserves covered by this plan will be directed towards the enhancement and maintenance of their collective and individual nature conservation values. This general objective will b~: achieved by a consideration of the following strategies: protection from fire, pests and dieback; rehabilitation of degraded areas; management of public use; and research and monitoring.

The determination of each strategy has been based on one or more specific objectives

For protection from fire: to protect human life; to protect the natural values of nature reserves as well as the assets of reserve neighbours; to minimise the risk of wildfires on nature reserves; and to suppress wildfires that occur.

For protection from pests: to protect the reserve and surrounding farmlands from damage by plant and animal pests.

For protection from dieback: to prevent the spread of dieback into uninfected areas; and to minimise its spread in infected areas.

For rehabilitation of degraded areas: to rehabilitate degraded areas; and to minimise further disturbance.

For management of public use: to encourage an appreciation of the nature conservation values of the York-Northam nature reserves.

For research and monitoring: to encourage use of nature reserves f or research, by both amateurs and professionals; and to implement monitoring programs to provide data on the effects of management actions.

Strategies specific to a particular nature reserve are given in the Plan for Management for the individual reserve. General management strategies are given at the end of this plan (Part 8).

PART 2. CLACKLINE NATURE RESERVE (NO. 32400)

A. THE RESERVE

1. PHYSICAL CHARACTERISTICS AND RELATIONSHIPS

Clackline Nature Reserve is the western-most of the York-Northam nature reserves, being I km to the north of the old Clackline siding and 18 km west-south-west of Northam, in the Shire of Northam (Fig. 2). It is an irregular 'U'-shape, with a perimeter of 19 km and an area of 458.9 ha. An unnamed road touches the western boundary of the Reserve and then joins Refractory Road which runs roughly parallel (1 km to the south) of the southern boundary. Refractory Road joins the Great Eastern Highway which continues eastward, approximately I km south of the southern boundary (Fig. 4). The Clackline-Toodyay Road runs roughly parallel to the eastern boundary of the Reserve, again at an average distance of 1 km.

Tenure of the land surrounding the Reserve is complex (Fig. 4). The land on the southern boundary is privately owned. Although much of it remains uncleared, it is riddled with tracks. An area of vacant Crown land abuts the south-eastern corner of the Reserve. The eastern edge of the Reserve adjoins private holdings which, towards the northern end, carry patches of uncleared bush. A privately owned, uncleared holding, cut by numerous tracks, abuts the western boundary. The disjointed northern boundary abuts two mineral leases, one of which retains a large area of little disturbed bush. The middle of the 'U' includes a cleared, privately owned agricultural holding in the south, uncleared vacant Crown land and a water Reserve (No. 3307) in the centre, and an uncleared timber Reserve (No. 20014) in the north (Fig. 4).

The elevated ridge on which Clackline Nature Reserve centres is of considerable landscape significance, as it forms a break between the generally undulating uplands of the Darling Range and the fall to the valley of the Avon (Taylor and Burrell 1984). Altitude ranges from 380 m in the north to 260 m on the southern boundary where the Reserve rapidly falls away to Clackline Brook (Fig. 5). Clackline Nature Reserve also overlies part of the mineral-rich greenstone belt (see Part Is 3. Geology and Geomorphology).

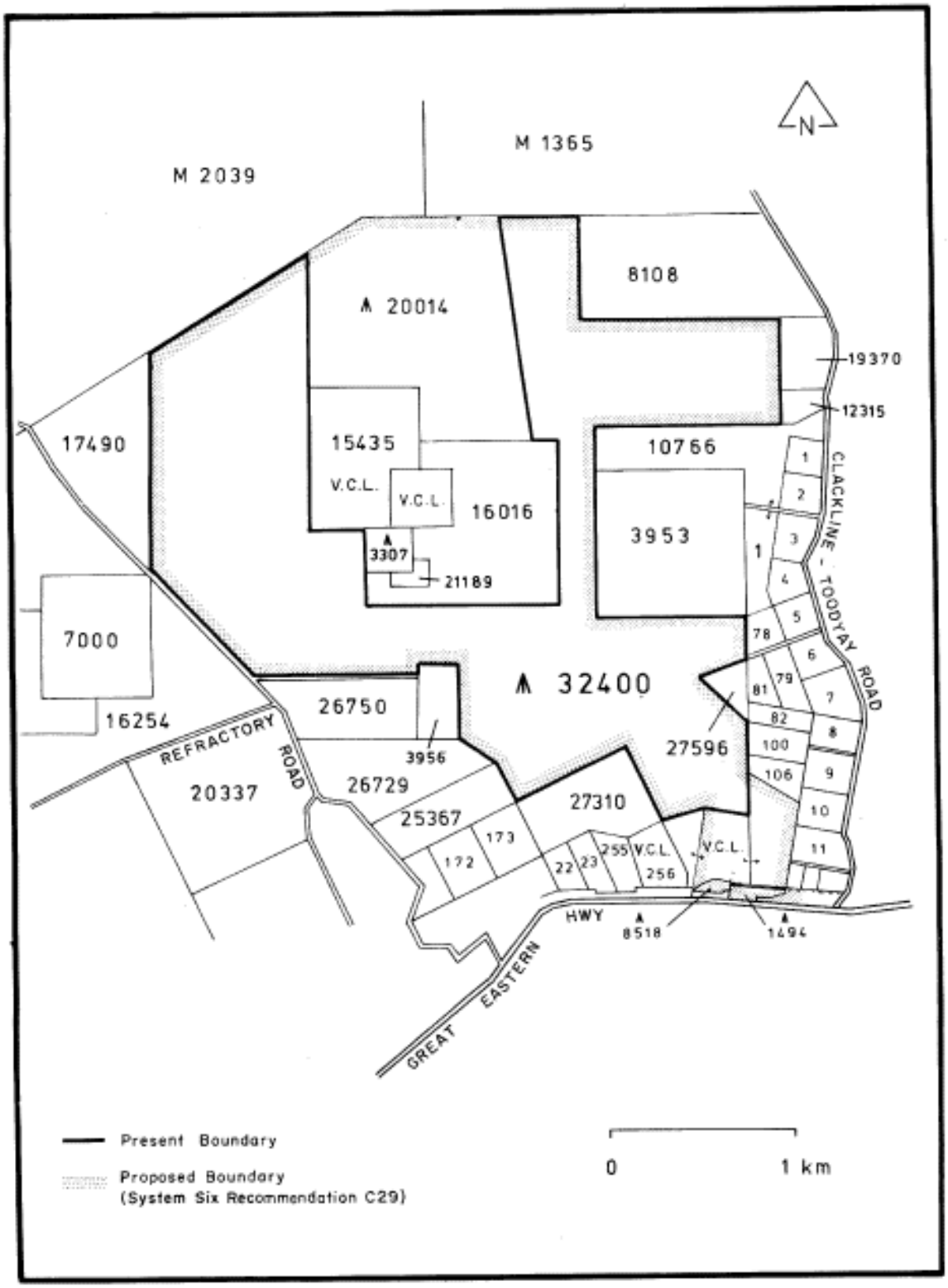

Figure 4. Clackline Nature Reserve showing its relationship with surrounding lands. (Source: W.A. Department of Land and Surveys 1:50 000 series.)

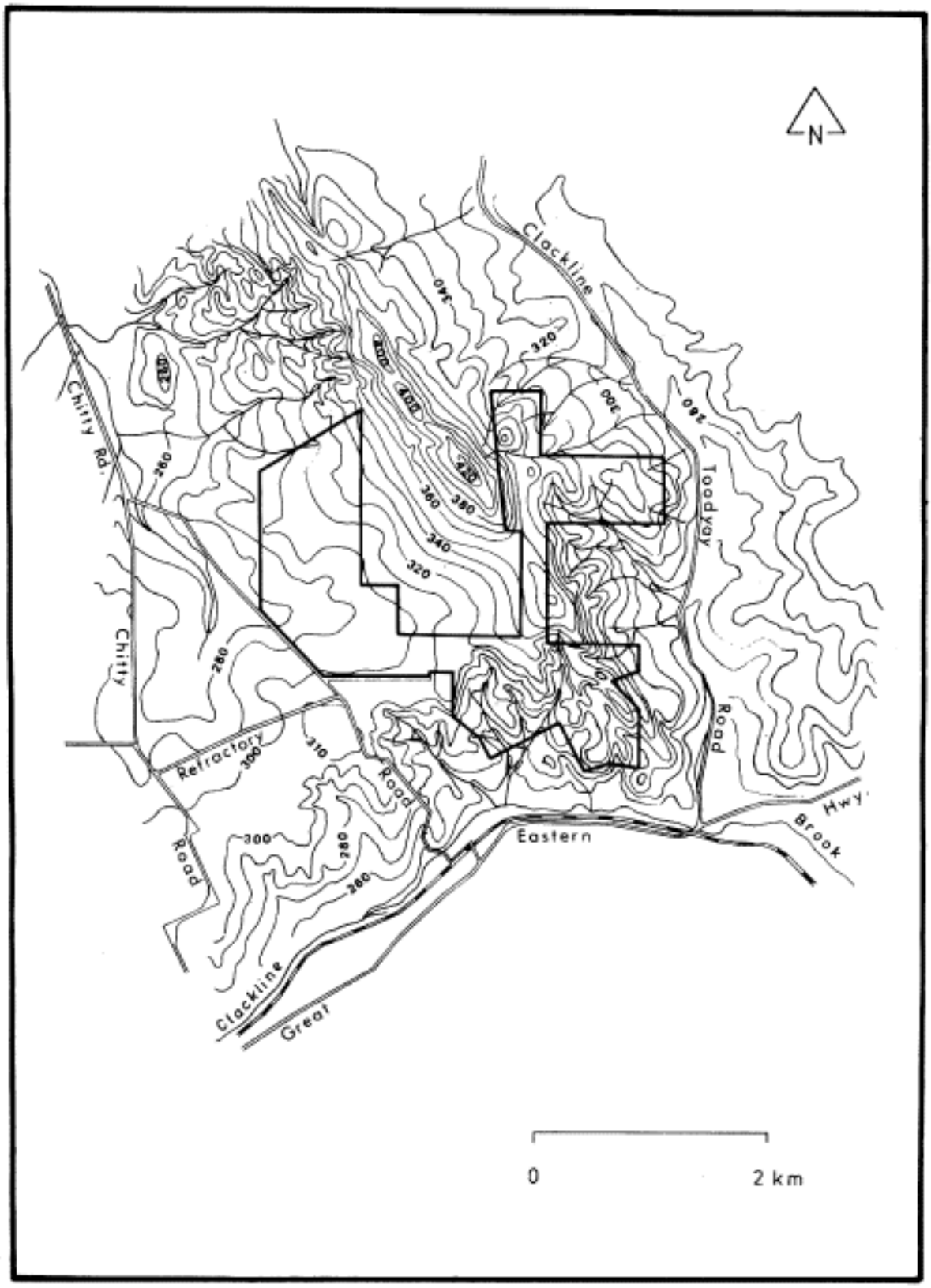

Figure 5. Clackline Nature Reserve showing the associated, contours (m). (Source: W.A. Department of Land and Surveys 1:50 000 series.)

2. HISTORY

The Clackline Brook passes through a gap in the north-south ridge system, providing passage for the Great Eastern Highway, the Goldfields water pipeline and the old railway line (Taylor and Burrell 1984). Thus, the Clackline area has been readily accessible for many years. Only the rugged nature of the area directly to the north prevented its early release for agriculture and settlement.

The north-west part of Clackline Nature Reserve is believed to have been the site of the State's first iron ore mine.

> The principal ... quarry is on Loc. 17584 about two miles north-west of Clackline railway station. About 40,000 tons of high grade ironstone flux have been excavated...and used principally in smelting a mixture of lead and gold ores at Fremantle.
>
> (Simpson 1951)

By 1928, the Clackline area had been subdivided and given location numbers. In September of the same year an application was made for the conditional purchase of Avon Location 19469 (now Timber Reserve No. 20014). In response, the Conservator of Forests wrote to the Under Secretary for Lands (26 October 1928):

> This block is reported to be carrying good stands of Wandoo, and I shall be glad if you will have some withdrawn from selection and reserved on account of the timber.

On 6 January 1929 an area of 544 acres was set aside for Timber (Reserve No. 20014). Requests for release of the area continued. By 21 December 1973 the reserved area had decreased to 130 ha.

Strong local interest, instigated and coordinated by local botanist and Reserve neighbour Ray Paynter, in protecting the conservation values of the Clackline area culminated in the following communication between the Director of the Department of Fisheries and Wildlife and the Under Secretary for Lands, Department of Lands and Surveys (22 January 1969):

> ... After considerable discussion and investigation it has been recommended by local residents and departmental officers that all the available land ... be reserved for the conservation of flora and fauna, together with other such purposes, i.e. -timber and water and minerals, for which some of this area is already reserved.

This suggestion was opposed by the Department of Mines on 3 April 1969, and they continued to oppose the idea, even after a local mining company (Clackline Refractories) expressed their support for the proposal.

The local community, and particularly Ray Paynter, continued to enthusiastically advocate the Nature Reserve proposal:

> Timber Reserve 19469 (Reserve No. 20014) is rugged country containing a rich flora, a spring where animals and birds drink and the remains of animal traps used by aboriginals.
>
> The significant drop in rainfall from Bakers Hill 25" (625 mm) to 17" (425 mm) at Northam makes this a meeting place of inland and coastal floras. This fact is also verified in the variety and number of birds in the area, inland and coastal species being represented.
>
> ... the area supports a wide range of orchids, including *Thelymitra, Diuris, Pterostytis, Prasophyllum, Lyperanthus, Elythranthera* and *Caladenia,* including *Caladenia triangularis,* an orchid found only in this area.
>
> Seventy odd specimens of birds use this type of habitat.
>
> Three species of kangaroo are known in this area
>
> 1. the Grey Kangaroo
> 2. the Black-gloved Wallaby
>   1. the Red Wallaroo - or Hill Euro
>   2.
>
> Brushtail Possums are in good numbers. Quendas or Short-eared Bandicoots are known to be in the area.
> (Ray Paynter to Mr K. McIver M.L.A. Northam, 3 March 1973)

On 21 December 1973, Reserve No. 32400 was set aside for the Conservation of Flora and Fauna and vested in the Western Australian Wildlife Authority (now the NPNCA).

In 1983 the Department of Conservation and Environment prepared the System Six recommendations for the Environmental Protection Authority to review. These recommendations, which covered existing and proposed conservation reserves, were cudorsed by the W.A. Government in the same year. With respect to Clackline it was recommended:

> That Reserves C1494 and C8518 be cancelled and their areas added to Reserve C32400.

That the vacant Crown land be declared a Class C Reserve for Conservation of Flora and Fauna, vested for a limited term of 10 years in the W.A. Wildlife Authority and managed under a published management plan.

That the respective purposes of Reserves C3307 and C20014 be amended to Conservation of Flora and Fauna, and that the Reserves be vested in the W.A. Wildlife Authority for a limited term of 10 years and managed under a published management plan.

That ways and means of protecting the conservation value of Avon Locations 16016 and 21189 be sought through planning procedures to be developed as recommended.

These recommendations, which will increase the area of Clackline Nature Reserve by 278 ha, are currently with the Department of Land Administration.

3. SOILS AND VEGETATION

The complex topography of Clackline Nature Reserve supports a diversity of soil types. Soils range from clays, sandy clays and loamy soils in the lower parts of the landscape, to pallid zone clays exposed on erosional slopes, to gravelly soils on the top of breakaways. The vegetation is similarly diverse, with wandoo occurring lower in the landscape, powderbark forest/woodland on the breakaways and breakaway slopes and jarrah/marri woodland on the breakaway tops. Five associations have been mapped at a broad scale-, using the overstorey species as the chief distinguishing feature. These associations are distributed as shown in Figure 6 and described as follows:

1. Wandoo *(Eucalyptus wandoo)* WOODLAND, 15-18 m in height, with some marri (E. *calophylla)* and jarrah (*E. marginata)* and patches of sheoak *(Allocasuarina huegeliana).* The understorey is generally open and dominated by blackboys *(Xanthorrhoea preissii),* parrot bush *(Dryandra sessilis)* and pingle (D. *carduacea).* Patches of pingle THICKET, 2-3 m. in height, occur occasionally.

2. Powderbark *(Eucalyptus accedens)* FOREST/WOODLAND, 15-18 m in height, with a variable component of wandoo, marri and Jarrah. The percentage cover of the undetstorey is highly variable, ranging from very sparse to dense. Dominant species include blackboys, parrot bush, *Hakea trifurcata* and bullock poison *(Gastrolobium trilobum).*

3. Jarrah/marri WOODLAND/OPEN WOODLAND, 1.5-20 m in height, over a highly diverse understorey. Much of this diversity is a direct response to changes in soil type, from

laterite-gravel loams to sand. A pingle and *Hakea trifurcata* dominated SCRUB/THICKET occurs on the gravelly surfaces, while the understorey on the sandplain areas varies from *Eremaea pauciflora* and mountain kunzea *(Kunzea recurva)* TPICKET/DENSE THICKET, 2-3 m in height, to *Leptospermum, erubescens* and *Hakea trifurcata* dominated THICKET/SCRUB to 2.5 m.

4. Marri WOODLAND, 15-17 m in height, over jam *(Acacia acuminata)* and sheoak LOW WOODLAND A over LOW GRASS.

5. Sheoak LOW WOODLAND A/LOW FOREST A, 6-8 m in height, with an open understorey. Jam appears occasionally.

Clackline also contains a gazetted rare species of spider orchid, *Caladenia triangularis.*

Also of interest is the occurrence of *Lomandra nutans* on the Reserve. Formerly this species had only been recorded as far north as Narrogin. *Lomandra spartea,* also recorded on Clackline, was previously thought to be confined to the Darling Scarp (G. Keighery, pers. comm., 1985).

Appendix 1 includes a plant species list for Clackline Nature Reserve.

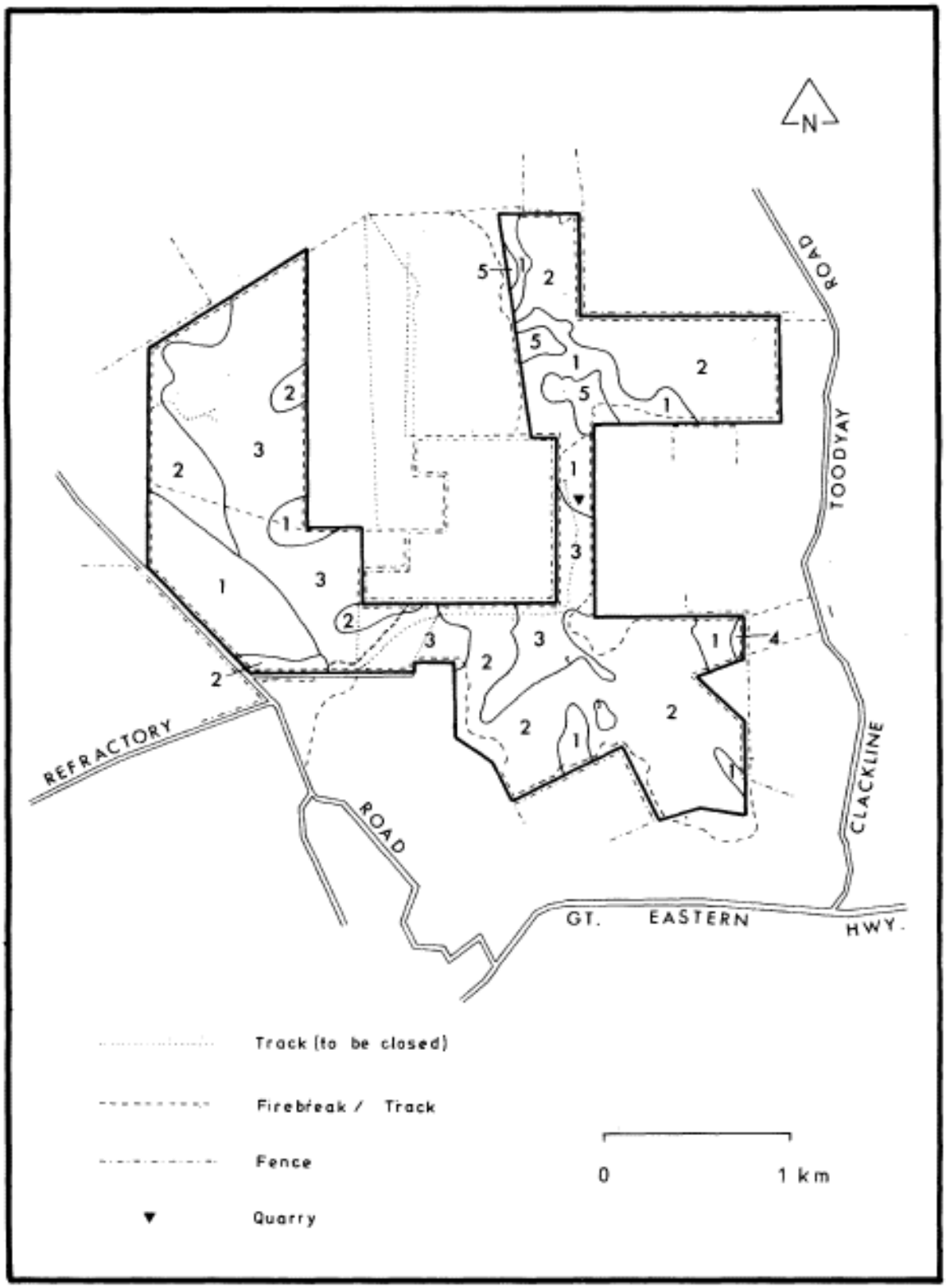

Figure 6. Clackline Nature Reserve showing features and vegetation associations (identified by number and described in the associated text).

4. FAUNA

Mammals sighted include the western grey kangaroo *(Macropus fuliginosus*), western brush wallaby (*M. irma*), euro (*M. robustus),* echidna *(Tachyglossus aculeatus)* and rabbit. A two day survey by the W.A. Naturalists' Club in September 1985 revealed a diversity of animal life. Five frog, four gecko, three legless lizard, one dragon, two goarina, five skink, and five snake species were recorded (App. 2).

Fifty two bird species have been recorded on the Reserve (App. 3). Several records are of particular interest. First, a pair of Wedge-tailed Eagles seen on the Reserve suggests that this species breeds in the vicinity. Second, Dusky Woodswallows, whose range has been reduced through competition with Black-faced Woodswallows (Serventy and Whittell 1976) are numerous.

5. PAST USES, MANAGEMENT AND FIRE HISTORY

The Reserve has been subject to a variety of uses. It has been cut over for timber, and various licences and permits for this purpose have been held over parts of the Reserve for the last 30 to 40 years. Industrial Extracts Limited held a licence to use wandoo (and perhaps brown mallet) from the area for tannin extraction. During the 1960s the wood distillation, charcoal, iron and steel industry was interested in using log tops and remaining trees as a source of firewood.

As Clackline overlies part of the mineral-rich greenstone belt there has been and continues to be a strong interest shown in the area by the mining community. The western side of the Reserve has numerous diggings and excavations, probably remnants of the early iron ore mining days. A quarry on the central ridge (Fig. 6) was used as a source of stone. The vegetation in these formerly disturbed areas appears to have largely regenerated.

Clackline Nature Reserve was part of the Pacminex Agreement Area, which was established in 1972. The Agreement was cancelled in 1985 and the area is now regarded as prospective. An application to mine silica sand for decorative masonry, from Avon Locations 16016 and 21189 (private property, Fig. 4) was made in 1986. Land immediately to the south of the Reserve is used by Clackline Refractory Limited for the production of refractory clay.

The Reserve is presently being used by off-road motor-cyclists and horse-riders. This use is incompatible with the purpose of the Reserve - the conservation of flora and fauna. The Reserve and adjacent uncleared land are riddled with tracks (Fig. 6). Most of the Reserve boundary is fenced (Fig. 6). Very little rubbish has been dumped, the only exception being a small quantity on the eastern boundary.

The Reserve has not carried a major fire in the last 20 years, although small areas have been burnt on frequent occasions under cool conditions (Shire of Northam, pers. comm., 1986). Before the railway line was closed in 1966 the Reserve was burnt approximately every 11 years, by fires originating from the railway line (Ray Paynter, pers. comm., 1986).

6. NATURE CONSERVATION VALUES

Taylor and Burrell (1984) drew attention to the landscape significance of the Clackline area in the Shire of Northam Town Planning Scheme.

> The area centred on Clackline, where the Clackline Brook passes through the gap in the north-south tending ridge system... is of considerable importance from an environmental point of view. The topography reflects a somewhat complex geological structure and a major vegetation change.

In addition, all of the main tree species of the Darling Range are found on Clackline - marri, jarrah, wandoo, powderbark, sheoak, bull banksia *(B. grandis)* and christmas tree *(Nuytsia floribunda).*

Clackline is the only conservation reserve on which the rare spider orchid *Caladenia triangularis* has been found. The presence of this orchid was a contributing factor in the nomination of Clackline Nature Reserve to the Australian Heritage Commission for placement on the Register of the National Estate. The Reserve was placed on the Register on 21 March 1978.

A final important conservation value of the Reserve is the frequent use made of the area by local naturalists and conservation groups, such as the W.A. Naturalist Club and W.A. Wildflower Society. Use of nature reserves by such groups provides many benefits, one of the most important being the provision of additional biological data which can then be used in management.

B. PLAN FOR MANAGEMENT

1. MANAGEMENT OBJECTIVES

Management will be directed towards enhancing and maintaining the nature conservation values of Clackline Nature Reserve. This will be achieved by managing the existing Nature Reserve and proposed additions as one conservation unit.

Management strategies to achieve this objective will include: protection from fire, pests and dieback; rehabilitation of degraded areas; rationalization of Reserve boundaries; management of public use; and research.

Any strategies not discussed below are covered in Part 8. General Management Strategies.

2. PROTECTION FROM FIRE

Clackline Nature Reserve contains some of the few areas on the Darling Scarp that have not been frequently burnt. This makes the Reserve valuable for reference purposes, and thus it is important that the majority of the Reserve is kept free from fire. It is equally important to protect the assets and properties of Reserve neighbours.

Protection from fire for the Nature Reserve and Reserve neighbours is complicated by the rugged nature of the Reserve (Fig. 5), which makes the establishment of a safe firebreak system within the Reserve boundary impossible. The existing system is inaccessible to vehicles in places due to the steep grade. Also, steep sections are highly susceptible to erosion.

Management Strategies

An integrated approach to protection from fire for Clackline Nature Reserve and adjoining properties will be implemented. An advisory committee, chaired by a representative from the Shire of Northam, will be formed with representatives from the CALM Mundaring District Office, Bush Fires Board and Reserve neighbours. Working to achieve the goal of exclusion of fire from the majority of the Reserve area and protection of the assets and properties of Reserve neighbours, the committee will advise CALM on ways of developing an integrated system of fire control, based on a safe, stable firebreak network. Development of this firebreak system will be based on recognition of the need to minimize erosion and environmental disturbance.

The committee's first responsibility will be to provide advice on ways of rationalising the existing firebreak system. Tracks suggested for closure are shown as dotted lines in Figure 6.

A buffer of frequently burnt vegetation will be established adjacent to the northern boundary of the Reserve, as first, are most likely to move onto the Reserve from the bushland to the north. The buffer, 100-200 m in width, will follow the northern boundaries of Location 17490, the Nature Reserve, Timber Reserve No. 20014 and Avon Location 8108 (Fig. 4).

3. REHABILITATION AND MAINTENANCE OF THE NATURAL ENVIRONMENT

Management Strategy

Tracks which do not form a part of the rationalised firebreak system will be closed (Fig. 6) and, if necessary, ripped to encourage regeneration.

4. RATIONALISATION OF BOUNDARIES

The boundary of Clackline Nature Reserve is irregular, with farmland and land used for other purposes intruding in many places (Fig. 4). Final implementation of the System Six recommendations (DCE, 1983) will alleviate this problem to some degree. Further rationalisation of the Reserve boundaries, however, is essential.

Management Strategy

Any land which becomes available will be added to the Reserve, particularly if it effectively decreases the, length of the Reserve boundary.

5. PUBLIC USE

Clackline is highly suited for use as an educational resource by the interested public. It is readily accessible, being only a kilometre north of the Great Eastern Highway. Furthermore, it provides a diversity of landform, vegetation (combining elements of Darling Range and wheatbelt flora) and birdlife.

Management Strategies

Use of Clackline Nature Reserve and its surrounds, by local and Perth-based conservation groups, will continue to be encouraged. In the past this approach has developed a two-way information exchange, with the Department receiving additional data which aids management and members of the conservation groups developing an increased perception of an area's conservation values and management problems. School groups will also be encouraged to use Clackline for educational purposes. Appropriate uses include nature study, photography and bird-watching.

Two approaches will be used to minimise use of the Nature Reserve by motor-cyclists and horse-riders. First, signs will be erected which will clearly indicate permitted and non-permitted forms of public use. These signs, which will also give the Reserve name, will be erected at access points on the southern, western and eastern boundaries. Second, wildlife officers will patrol the Reserve more frequently.

6. RESEARCH

Clackline is being used as a key site for research into techniques for monitoring changes in vegetation. The project, conducted by the W.A. Wildlife Research Centre (CALM), aims to monitor structural changes and changes in species composition over time in a number of woodland communities.

Management Strategies

Further work of this type will be encouraged, particularly research which investigates the effect of management actions on ecological processes. As such, accompanying zoological studies would be invaluable.

The diversity of research areas offered by Clackline Nature Reserve and its close proximity to the metropolitan area make it a particularly attractive research site for tertiary institutions. Such use will be encouraged.

PART 3. ST RONANS NATURE RESERVE (NO. 30591)

A. THE RESERVE

1. PHYSICAL CHARACTERISTICS AND RELATIONSHIPS

St Ronans Nature Reserve is located 17 km west of York in the Shire of York (Fig. 2) . It is roughly triangular, with an area of 118.2 ha and a perimeter of 5.5 km. Wambyn Road follows the western boundary (Fig. 7). All land surrounding the Reserve is cleared and privately owned.

St Ronans Nature Reserve occupies the dissected country on the eastern edge of the Darling Range. It has a significant variation in altitude, from 370 m on the northern boundary, which lies on the southern slopes of Mt Ronan (390 m) , to 290 m in the south-western corner where St Ronans Brook cuts through the Reserve (Fig. 7).

St Ronans Well, after which the Reserve is named, is I km to the south on the Great Southern Highway. The well lies in the centre of St Ronans Well Reserve (No. 10895) (Fig. 7). This Reserve, with an area of 19.4 ha, was set aside for the Preservation of an Historic Site and vested in the W.A. National Parks and Reserves Association on 25 September 1981.

2. HISTORY

The location now known as St Ronans Nature Reserve first came to the attention of the Department of Fisheries and Wildlife in 1970:

> Avon Location 27703 has been recently inspected by an officer of this Department and found to be suitable as a fauna sanctuary.
>
> Evidence of 3 different species of mammal was observed as well as sightings of 7 different bird species and 4 species of reptiles.
>
> This Reserve has an area of approximately 292 acres and although in the vicinity of State Forest No. 13 there are presently no reserves for flora and fauna conservation in the York Shire.
>
> I request, therefore, that action be taken to amend this Reserve to or include, Conservation of Flora and Fauna and be vested in the Western Australian Wildlife Authority.

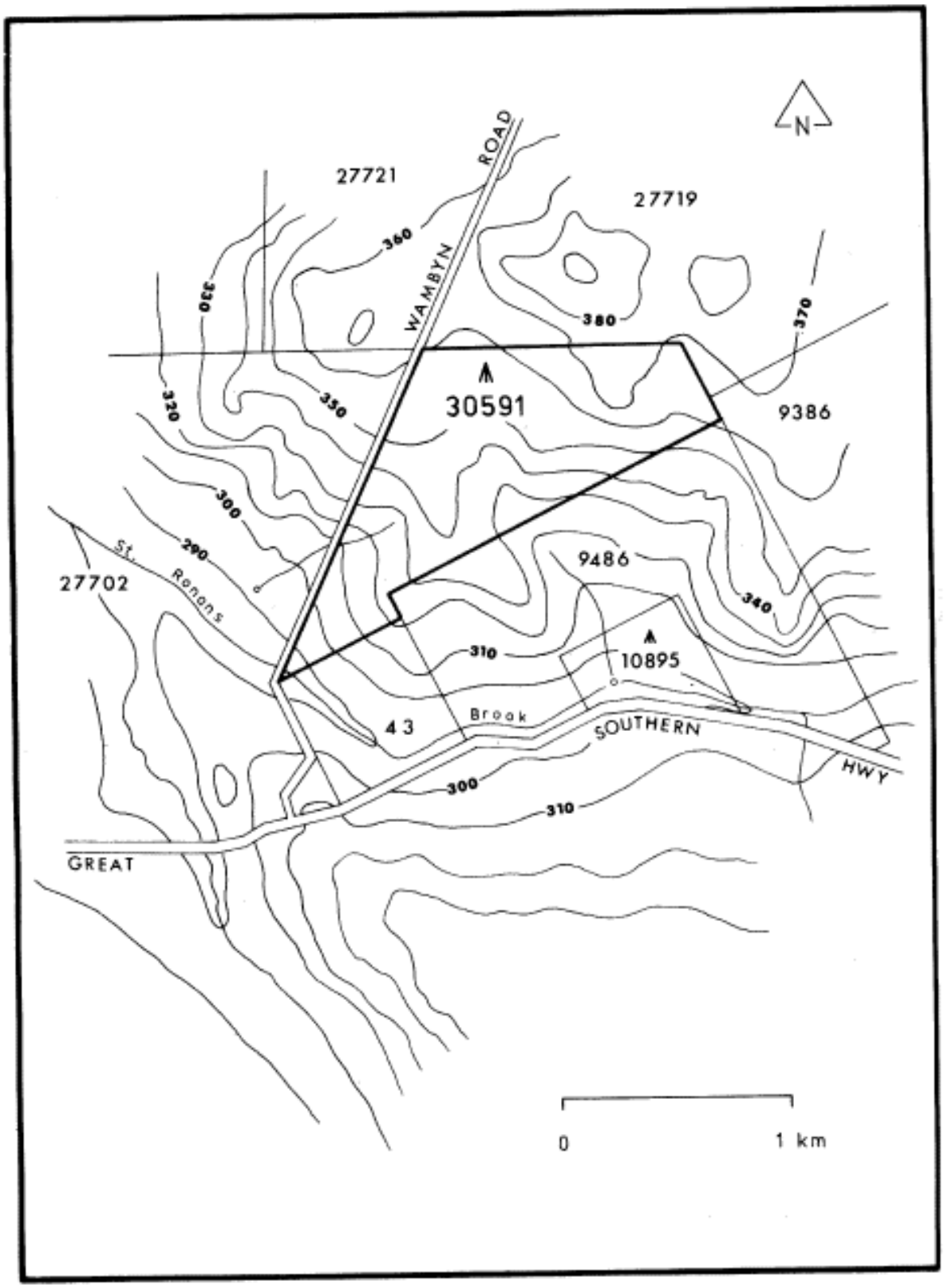

Figure 7. St Ronans Nature Reserve showing its relationship with surrounding lands and associated contours W (Source: W. A. Department of Land And Surveys 1 : 50 000 series.)

(Director, Department of Fisheries and Wildlife to Under Secretary for Lands, Department of Lands and Surveys, 7 May 1970)

On 23 October 1970 St Ronans was set aside for the Conservation of Flora and Fauna, and vested in the Western Australian Wildlife Authority (now the NPNCA).

3. SOILS AND VEGETATION

St Ronans supports a complex mosaic of vegetation. Powderbark woodland on laterite-gravel dominated loams is the most extensive association. Lower in the landscape wandoo woodland occurs on grey loam-clays. Several small areas of white and yellow sands support marri woodland. Various combinations of sheoak, marri, j am and wandoo occur on yellow-brown and grey loams and are generally associated with granite outcrops.

The vegetation on St Ronans is distributed as shown in Figure 8 and described as follows:

1. Granite rock surface with occasional patches of pincushions *(Borya nitida).* Around the edges a THICKET of *Thryptomene australis,* cliff net-bush *(Calothamnus rupestris),* sea-urchin hakea *(Hakea petiotqris)* and tamma *(Allocasuarina campestris)* occurs.

2. Tamma and *Thryptomene australis* THICKET/HEATH A, 1.5-2.0 m in height, with *Thruptomene australis* and cliff net-bush THICKET fringing the granite sheets. At the northern end of this unit the association becomes DENSE THICKET to 3 m.

3. LOW HEATH C of *calothamnus rupestris, Hakea trifurcata,* rose cone bush (*Isopogon dubius)* and scrub sheoak (*Allocasuarina humilis).*

4. Marri *(Eucalyptus calophylla) , w*andoo *(E. wandoo)* and jam *(Acacia acumnata)* OPEN LOW WOODLAND A, 7-10 m in height, over occasional tamma 1.0-1.5 m, over LOW SCRUB A/OPEN LOW SCRUB A of *Leptospermum erubescens.* Jam to 4-5 m becomes dominant around the edges of the numerous outcrops of sheet granite. Pincushions occur on the shallow soils associated with the granite. Occasional blackboys *(Xanthorrhoea preissii)* to 2 m occur.

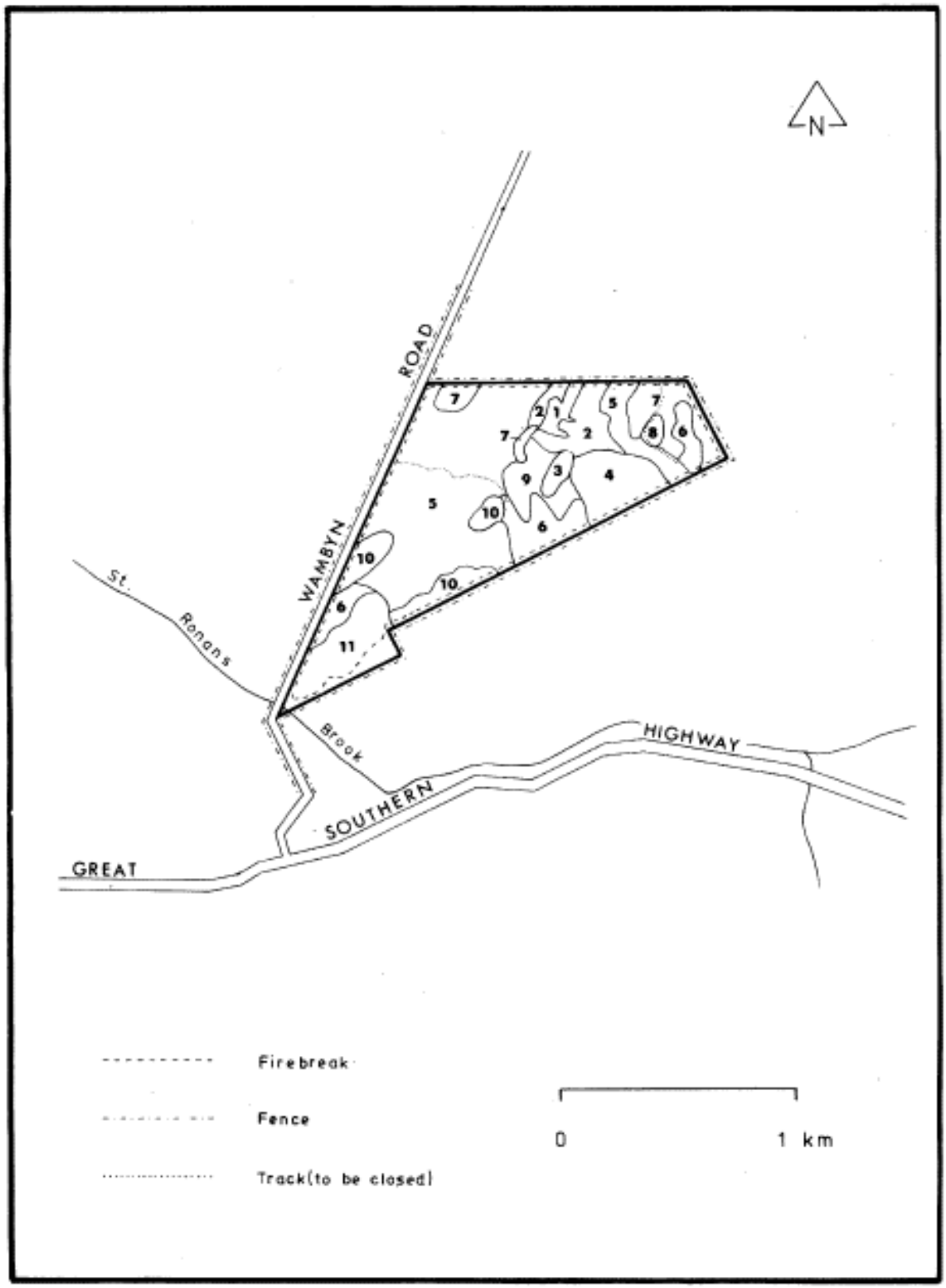

Figure 8. St Ronans Nature Reserve showing features and vegetation associations (identified by number and described in the associated text).

5. Powderbark *(E. accedens)* LOW WOODLAND A, 10-12 m in height, over OPEN DWARF SCRUB C *of Hakea trifurcata* and rose cone bush and DWARF SCRUB D of scrub sheoak, *Hibbertia polystachya, H. enervia, Petrophile serruriae,* prickly dryandra *(Dryandra armata)* and prickly moses *(Acacia pulchella).* The understorey is highly variable, in many places becoming HEATH A of rose cone bush, *Petrophile divaricata, Hakea trifurcata,* prickly dryandra and silky-leaved blood flower *(Calothamnus sanguineus).* Drummond's gum *(E. drummondii)* occasionally appears in the woodland overstorey.

6. Wandoo LOW WOODLAND A, with very occasional marri, 13-15 m in height, over OPEN LOW SCRUB A of *Hakea trifurcata, Leptospermum erubescens* and blackboys. Beneath the stands of pure wandoo which dominate most of this unit, there are occasional blackboys to 1.5 m and little else.

7. Marri LOW WOODLAND A over DENSE HEATH A/B *Hakea trifurcata,* pingle *(Dryandra carduacea), Adenanthos cygnorum, Leptospermum erubescens* and blackboys. This understorey grades into LOW SCRUB A in the eastern part of this unit.

8. Drummond's gum LOW WOODLAND A over DENSE HEATH B of *Hakea trifurcata, Adenanthos cygnorum,* pingle and *Petrophile serruriae.*

9. Powderbark and marri LOW WOODLAND A over DENSE HEATH B of *Hakea trifurcata, Adenanthos cygnorum,* pingle and *Petrophile serruriae.*

10. DWARF SCRUB D/LOW HEATH C dominated by *Benufortia bracteosa.* Species present include *Hakea trifurcata,* scrub sheoak, painted featherflower *(Verticordia picta),* silky-leaved blood flower, prickly dryandra, *Dryandra aff. nivea* and *Petrophile brevifolia.* OPEN LOW SEDGES are a significant component of this association. Powderbark are occasionally emergent to 8 to 9 m.

11. Jam, sheoak *(Mocasuarina hueaeliana),* marri (and occasionally wandoo) LOW FOREST A/LOW WOODLAND A, 8-10 m in height, over LOW SCRUB A/HEATH A of *Leptospermum erubescens,* wavy-leaved Hakea *(Hakea undulata)* and prickly poison *(Gastrolobium spinosum),* with occasional blackboys. Outcropping granite is common, with accompanying expanses of pincushions. In the south-western corner of this association the overstorey is dominated by jam and the understorey changes to DENSE LOW GRASS and HERBS.

Many interesting finds were made during surveys of this Reserve. The discovery of *Lomandra spartea,* both on this Reserve and on Clackline, Wambyn and Mokine, indicates that it is not confined to the Darling Scarp as previously thought. Also, finding *Lomandra nutans* on this Reserve, as well as on Clackline and Wambyn, has greatly extended its known range. Formerly this species had not been recorded north of Narrogin (G. Keighery, pers. comm., 1985).

Other species of interest were *Darwinia sp. nov., Stylidium pycnostachyum* and *Calothamnvs rupestris.* The *Darwinia* is an undescribed species closely allied to *D. thymoides,* a Darling Scarp endemic. This is the only known population. The *Stylidium* is at the south-east edge of its known range. The *Calothamnus* normally occurs on the Darling Scarp, plus two isolated inland populations; one on Boyagin Nature Reserve, the other on St Ronans. This species is fire sensitive.

An introduced cormous perennial herb, *Moraea fugax* is invading the south-west firebreak. It appears to have been introduced during firebreak construction and is being spread by routine maintenance.

Appendix 1 includes a plant species list for St Ronans Nature Reserve.

4. FAUNA

St Ronans Nature Reserve is one of the three nature reserves in the York-Northam area which has been intensively surveyed for fauna, the other two being Wambyn and Mokine. Surveys were conducted in the autumn and spring of 1985, with systematic and opportunistic sampling and trapping over 5 days in each season. Results from these surveys indicate that St Ronans supports a wealth of mammal, bird, reptile and frog life (App. 2).

Nine mammal species were recorded. To date this is the highest number recorded on a nature reserve in the York-Northam area. Western grey kangaroos (*Macropus fuliginosus)* and western brush wallabies (*M. irma*) were sighted, although neither were particularly common. Although echidnas (*Tachyglossus aculeatus)* were not sighted, numerous diggings indicate that they were plentiful. Small native mammals recorded include the dunnart *(Sminthopsis dolichura)* and western pigmy-possum. *(Cercartetus concinnus)*. The white-striped mastiff-bat *(Tadarida australis)* was the only bat species positively identified during this survey. Three introduced mammals were recorded -rabbits *(Oryctolaqus cuniculus*), cats *(Felis catus)* and house mouse (*Mus Musculus*). It is likely that the fox *(Vulpes vulpes)* also occurs on this Reserve.

Of the 95 bird species recorded on the York-Northam nature reserves, 55 occurred on St Ronans (App. 3). In the late spring at least 12 of these, including the Splendid Fairy-wren and 3 species of thornbill, were nesting. Of particular interest was the high number of honeyeater species recorded.

Reptiles and frogs were common throughout St Ronans, with 20 lizard, I snake and 4 frog species recorded (App. 2). Many of the lizards occur over a wide range of habitats, while others showed distinct habitat preferences. The small burrowing skink *Lerista distinguenda* was common in all the vegetation types sampled. Similarly, the geckos *Crenadactylus ocellatus* and *Diplodactylus granariensis*, the legless lizard (*Delma fraseri*), the bobtail (*Tiliqua rugosa*) and bungarra (*Vananus gouldii*) were all widespread. On the other hand, the gecko *Oedura reticulata* was recorded only in wandoo woodland and the ornate dragon (*Ctenophorus ornatus*) only on outcropping granite. The western bearded dragon (*Pogona minor*) appeared to be restricted to woodlands.

The gecko *Phyllodactylus marmoratus* and the common scaly-foot *Pygopus lepidopodus* (a legless lizard) have not been recorded on any other reserve in this area.

5. PAST USES, MANAGEMENT AND FIRE HISTORY

One of the most noticeable past uses of St Ronans has been timber removal. Most of the remaining trees have small girths and many of the powderbarks art multi-stemmed having regenerated from sawn stumps. A number of large wandoos remain and it appears as if the powderbark woodland was the most heavily exploited.

The other obvious use has been the removal of grey sand from a shallow pit on the eastern boundary. The pit is small, covering less than half a hectare, and is reasonably inaccessible, being separated from Wambyn Road by several kilometres of rough firebreaks.

The Reserve is currently being used by horse-riders, a use which has increased markedly over the last couple of years.

St Ronans has a complete perimeter firebreak. There are no internal breaks, although several old tracks, probably used during timber logging days, wind through the Reserve. All boundaries shared with private land are fenced.

From 1972 aerial photography, it appears that the eastern end of the Reserve was either parkland-cleared or subjected to a small fire which cleared the understorey. This area has since regenerated to be barely distinguishable from surrounding areas.

The Reserve does not appear to have experienced any major fires over the last two to three decades. Remnants of charred wood, however, indicate that most of the Reserve has been burnt at some time in the last 40-50 years.

6. NATURE CONSERVATION VALUES

St Ronans Nature Reserve, although small in area, supports a diversity of vegetation types. The plant communities range from powderbark woodland on the plateau surfaces through mixed woodlands of marri, wandoo, jam and sheoak, to stands of wandoo on the valley floors. At the lowest point in the landscape, adjacent to St Ronans Brook, jam woodland becomes dominant. Sheoak fringes areas of outcropping granite.

The range of plant communities ensures that a plentiful supply of nectar is available year round. This provides a reliable food source for at least 10 honeyeater species and for small mammals such as the western pigmy-possum *(Cercartetus concinnus).*

These conservation values are enhanced by the relatively undisturbed nature of the Reserve. Now that timber removal has ceased more trees will reach maturity, providing more nest hollows for small mammals and birds. In addition, the continued exclusion of fire will retain ground cover, fallen timber and dead blackboys, all of which provide habitat for small mammals, reptiles, frogs and invertebrates.

A final important consideration is the value of St Ronans as an outdoor laboratory. Murdoch University is currently involved in studies of the flora and fauna of the Reserve. These studies will contribute to the development of a comprehensive data base for the Reserve, thereby providing a firm basis for future management decisions.

B. PLAN FOR MANAGEMENT

1. MANAGEMENT OBJECTIVES

Management will be directed towards enhancing and maintaining the, conservation values of St Ronans Nature Reserve. Minimisation of disturbance to the Reserve is particularly important considering its small size.

Management strategies co achieve these objectives will include: protection from fire, pests, and dieback; rehabilitation of degrade areas; minimisation of public use; and research.

Any strategies not discussed below are covered in Part 8. General Management Strategies.

2. PROTECTION FROM FIRE

It is important to exclude wildfires from St Ronans for several reasons. First, the small size of the Reserve and its isolation amidst cleared farmland means that any fire on the Reserve is likely to burn the whole area, leaving no unburnt patches as sources of recolonisation. Second, most of the highly diverse reptile fauna found on the Reserve is dependent on fallen timber and standing dead blackboys for habitat. If a fire sweeps through the area these habitats will be lost. Third, the close proximity of most of the Reserve to agricultural land makes it highly susceptible to weed invasion. The grass-choked soutb-western corner of the Reserve bears testament to this problem. Cool burns would lead to a similar result. Fourth, although cool burns, used as a management tool, would prevent the whole Reserve being burnt at any one time, such management would adversely affect the reference function of the Reserve, as an area of long unburnt vegetation. Also, because of its small size, fires are unlikely to start naturally.

Fire protection is best achieved by maintaining the existing perimeter firebreak. The construction of an internal firebreak was considered.9 however, the idea wa6 dismissed for two reasons: the small size of the Reserve (118 ha) means that any further construction of firebreaks would significantly reduce the vegetated area of the Reserve; and construction of an internal firebreak would only encourage trail-bike and horse riders to explore the centre of the Reserve.

Management Strategy

Access to, and adequate fire protection for the Nature Re-serve are provided by a complete perimeter firebreak. This firebreak will be regularly maintained at its present width.

3. REHABILITATION AND MAINTENANCE OF THE NATURAL ENVIRONMENT

It is important for both fire protection and for protection of the conservation values of St Ronans that the centre of the Reserve remains inaccessible to vehicles. Vehicle access encourages camping and campfires, the latter creating a fire hazard.

Management Strategies

The two tracks which cut through the central and eastern parts of St Ronans (Fig. 8) are becoming overgrown. Both tracks will be closed and left to regenerate. The western end of the central track will be blocked off to prevent access from Wambyn Road. The number of access points from Wambyn Road to the western firebreak will be minimised. This will ensure that people are discouraged from driving their vehicles onto the Reserve.

The sand pit on the eastern boundary will be levelled and the access track ripped to encourage regeneration. As a substantial degree of natural regeneration has occurred in the mined area, any rehabilitation works will avoid damaging areas of regeneration.

4. PUBLIC USE

St Ronans, with its high diversity of flora and fauna and close proximity to Perth, provides an ideal reference area and outdoor laboratory. Its rugged topography, associated susceptibility to erosion and small size, however, make it less suitable for public use than other nature reserves in the York-Northam area.

Horse-riding on St Ronans will be discouraged, as it adversely affects the conservation values of the Nature Reserve. The reasons for this are threefold. First, horse's hooves lead to rapid erosion of firebreaks and damage to sensitive plant communities, particularly those associated with granite outcrops, Second, weed seeds are introduced, either via material caught in the animals hooves or in its droppings, into parts of the Reserve which were formerly protected from weed invasion by their inaccessibility. Third, horse manure acts as a fertiliser, again introducing and encouraging weed growth, and possibly giving rise to changes in the composition of the understorey.

Timber removal, whether it is for firewood or fencing materials, is also an inappropriate use for nature reserves.

Management Strategies

Horse-riding and timber cutting on the Reserve will be prevented by: signs indicating that these activities are not allowed on the Reserve; ii1forming Reserve neighbours that the Reserve is not to be used for these purposes; and more frequent patrols by wildlife officers.

Signs identifying the Reserve as St Ronans Nature Reserve and providing information on public use will be erected at the north-western and south-western corners of the Reserve adjacent to Wambyn Road.

5. RESEARCH

The survey of fauna conducted prior to production of this plan provides a basis for ongoing monitoring. In this way, changes in faunal populations over time can be recognised and a greater appreciation obtained of the relationship between management and the biota.

Management Strategy

Ongoing research into both the flora and fauna of St Ronans, by students of Murdoch University (guided by Dr Bernie Dell), will continue to be encouraged. All information collected will be used to guide and temper future management decisions.

PART 4. WAMBYN NATURE RESERVE (NO. 21981)

A. THE RESERVE

1. PHYSICAL CHARACTERISTICS AND RELATIONSHIPS

Wambyn Nature Reserve, with an area of 215.2 ha and a perimeter of 6.6 km, is located 13 km to the west of York, in the Shire of York (Fig. 2). The Great Southern Highway follows the northern boundary of this triangular Reserve (Fig. 9). Wambyn lies 4 km to the east-south-east of St Ronans Nature Reserve and similarly lies in the dissected country on the eastern edge of the Darling Range. It is surrounded by privately owned land, most of which has been cleared, the only exception being a block of uncleared land which touches the southern tip of the Reserve.

The Reserve is undulating with a gentle ridge running north-south through its centre (Fig. 9). Altitude ranges from 360 m on this ridge, to 320 m in the north-western corner and 300 m in the north-east. Wambyn forms part of the headwater of St Ronans Brook, a seasonal stream leaving the Reserve at the north-western corner.

2. HISTORY

The location, now known at Wambyn Nature Reserve, was selected by A.D. Ashworth in 1920, transferred to another member of the family in 1925, and cancelled in 1928. Early in 1929 the holding was re-instated at the request of the first owner, using the justification that the land was his home, and he had an iron house which had cost 60 pounds.

(Under Secretary of Lands, Department of Lands and Surveys to Deputy Conservator of Forests, Forests Department, 24 September 1942)

. . this area was inspected by the District Forest Officer in March 1929 and he then recommended that it be set apart as a Reserve to provide firewood for local requirements.

(Conservator of Forests, Forests Department to Under Secretary for Lands, Department of Lands and Surveys, 13 February 1939)

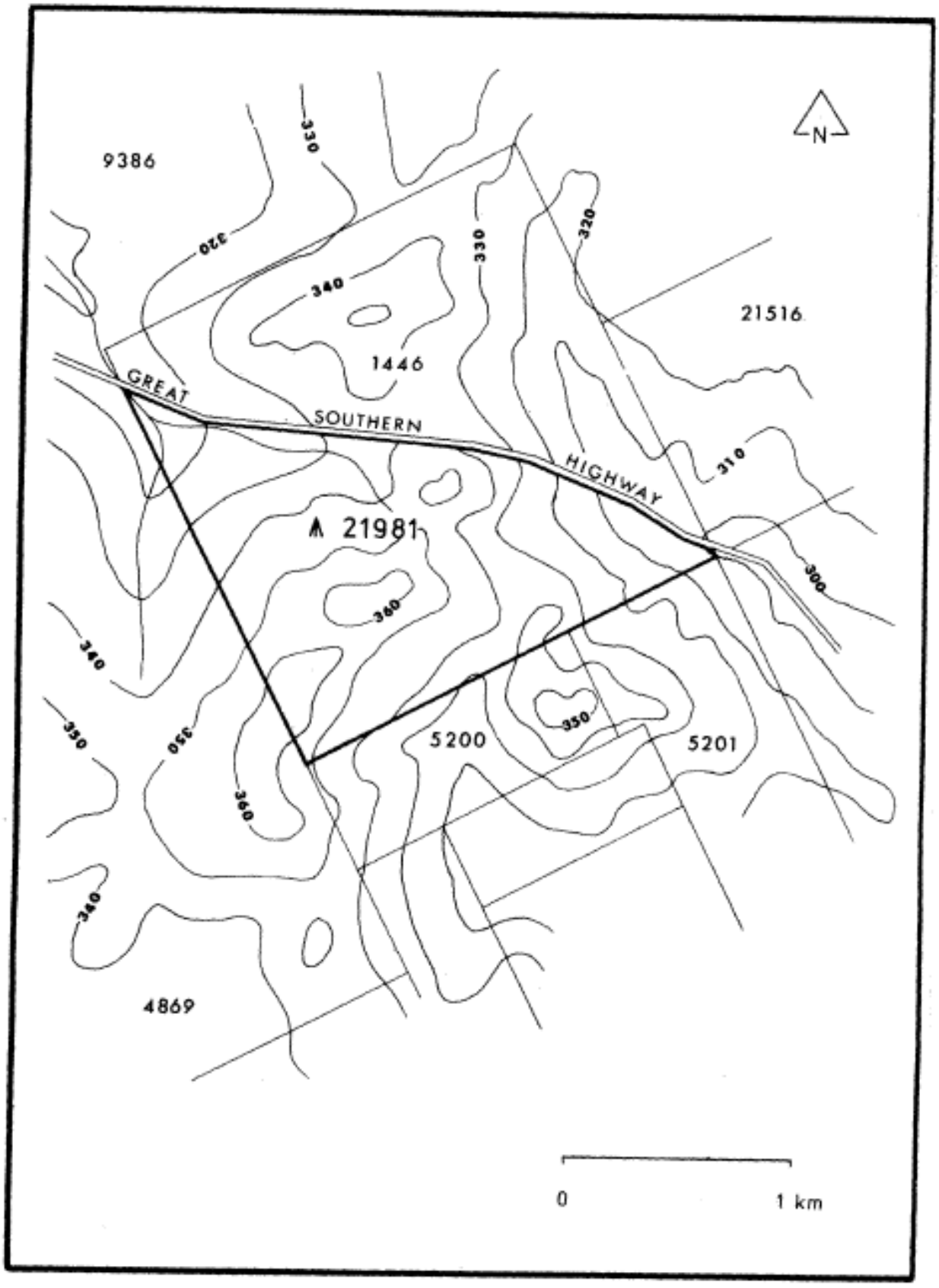

Figure 9. Weanbyn Nature Reserve showing its relationship with surrounding lands and associated contours (m). (Source: W.A. Department of Land and Surveys 1 : 50 000 series.)

On 4 April of the same- year the Reserve was set aside f or Timber (Settlers' Requirements). Soon after (4 September 1941) requests began for its release. The following response by the Forests department to one such request indicates the value placed on the Reserve:

> I have to advise that the Reserve is reported to be carrying a considerable quantity of Wandoo timber suitable for sawmilling and tannin extract. For this reason, I am not agreeable to the area being released for selection.
>
> (Conservator of Forests, Forests Department to Under Secretary for Lands, Department of Lands and Surveys, 20 March 1956)

Requests for the release of the area, however, continued:

> My Board ... considers that early consideration should be given to throwing the land open for agricultural development.
>
> (York Road Board to Under Secretary for Lands, Department of Lands and Surveys, 16 November 1960)

Requests to lease the area for grazing were treated in a similar manner to selection requests:

> Grazing activity would be expected to aggravate the deterioration of the Reserve due to salt encroachment as a result of clearing on neighbouring farms on which water courses have become salty and salt patches are becoming a serious problem.
>
> (Conservator of Forests, Forests Department to Under Secretary for Lands, Department of Lands and Surveys, 7 December 1966)

This is the first mention of the increasing salt problem on the Reserve, a problem which is now particularly evident in the north-west corner.

In 1970 the first suggestion was made that the area be set aside as a nature reserve:

> Reserve 21981 has been recently inspected by an officer of this Department and found to be suitable as a fauna sanctuary.
>
> Evidence of 3 different species of mammal was observed, as well as 6 species of birdlife and 1 species of reptile.

> Although not a large Reserve and not particularly rich in flora and fauna, there are no reserves of this type in the York Shire at the moment.
>
> I request, therefore, that action be taken to amend Reserve 21981 to Conservation of Flora and Fauna and be vested in WAWA.
>
> (Director, Department of Fisheries and Wildlife to Under Secretary for Lands, Department of Lands and Surveys, 7 May 1970)

The Forests Department had no objection to such a change in purpose:

> ...no objections ... the area would be of value for tourism.
>
> (Acting Officer-in-Charge, Roads and Reserves to Under Secretary for Lands, Department of Lands and Surveys, 6 August 1970)

On 18 September 1970 the purpose of the Reserve was changed to Conservation of Flora and Fauna, with vesting in the Western Australia Wildlife Authority (now the NPNCA).

The name 'Wamybn' is aboriginal and is the local name for the area.

3. SOILS AND VEGETATION

Wambyn Nature Reserve is dominated by powderbark woodlands on gravelly loams, with wandoo woodlands on grey clay-loams also covering a significant area. Sheoaks appear around the granite outcrops, with heath being the dominant association in shallower soils.

The vegetation on Wambyn is distributed as shown in Figure 10 and described as follows:

1. DENSE HERBS and DENSE LOW GRASS with occasional regenerating parrot bush *(Dryandra sessilis),* harsh hakea *(Hakea prostrata) and* wavy-leaved hakea *(Hakea undutata) to* 1.5-2.0 m.

2. Jam *(Acacia acuminata)* LOW WOODLAND A, 4-7 m in height, over HERBS and LOW GRASS.

3. Wandoo *(Eucalyptus wandoo)* WOODLAND, 8-10 m in height, over sheoak *(Allocasuarina huegetiana)* OPEN LOW WOODLAND A, 5-8 m in height, over blackboy *(Xanthorrhoea*

preissii) SCRUB. DWARF SCRUB D of honey bush *(Hakea lissocarpha), Acacia lasiocarpa, Gastrolobium spp*. and *Dryandra fraseri.* Occasional expanses of pincushion's *(Borya nitida)* also occur. In much of the eastern part of this association (Fig. 10) the understorey is non-existent due to old gravel scrapes and the passage of vehicles.

4. Sheoak LOW FOREST A/DENSE LOW FOREST A, 8-10 m in height, with marri *(Eucalyptus calophylla)* occasionally emergent to 12-15 m. A LOW FOREST A of wandoo and sheoak occurs around the edges of this association.

5. Wandoo WOODLAND, 10-12 m in height, over HERBS. The understorey is structurally variable, with occasional blackboys, areas of box poison *(Oxylobium parviflorum)* HEATH B/LOW SCRUB B and occasional DWARF SCRUB D of *Gastrolobium spp., Acacia lasiocarpa* and zamias *(Macrozcania reidlei).*

6. Powderbark (*E. accedens)* WOODLAND, 15-17 m in height, with occasional marri, over LOW SCRUB B/HEATH B of bullock poison *(Gastrotobium trilobum)* and *Gastrotobium spp.* on the sides of breakaways and lower slopes. On the tops of breakaways the understorey is dominated by a HEATH A/SCRUB of *Dryandra stuposa,* parrot bush, prickly dryandra *(Dryandra armata)* and *Petrophile divaricata.*

7. Wandoo OPEN LOW WOODLAND A, 8-10 m in height, over blackboy OPEN LOW SCRUB A over DWARF SCRUB D of *Gastrolobium spp.* and *Dryandra fraseri.* Pincushions are a significant component of this association .

8. One-sided bottlebrush *(Calothamnus quadrifidus)* dominate DENSE HEATH A. Other species present include prickly dryandra, *Petrophite squamata, Hakea trifurcata* and blackboys. Wandoos are occasionally emergent to 10 m.

9. Species-rich HEATH B/DENSE HEATH B of one-sided bottlebrush, scrub sheoak (*Mocasuarina humilis*), *Hakea trifurcata, Petrophile squcanata, Leptospermum erubescens, Petrophile divaricata* and *Hakea incrassata*. Wandoo, powderbark and marri are occasionally emergent to 20 m. This association has strong affinities with Association 8; however, there is not the strong dominance by *Calothamnus.*

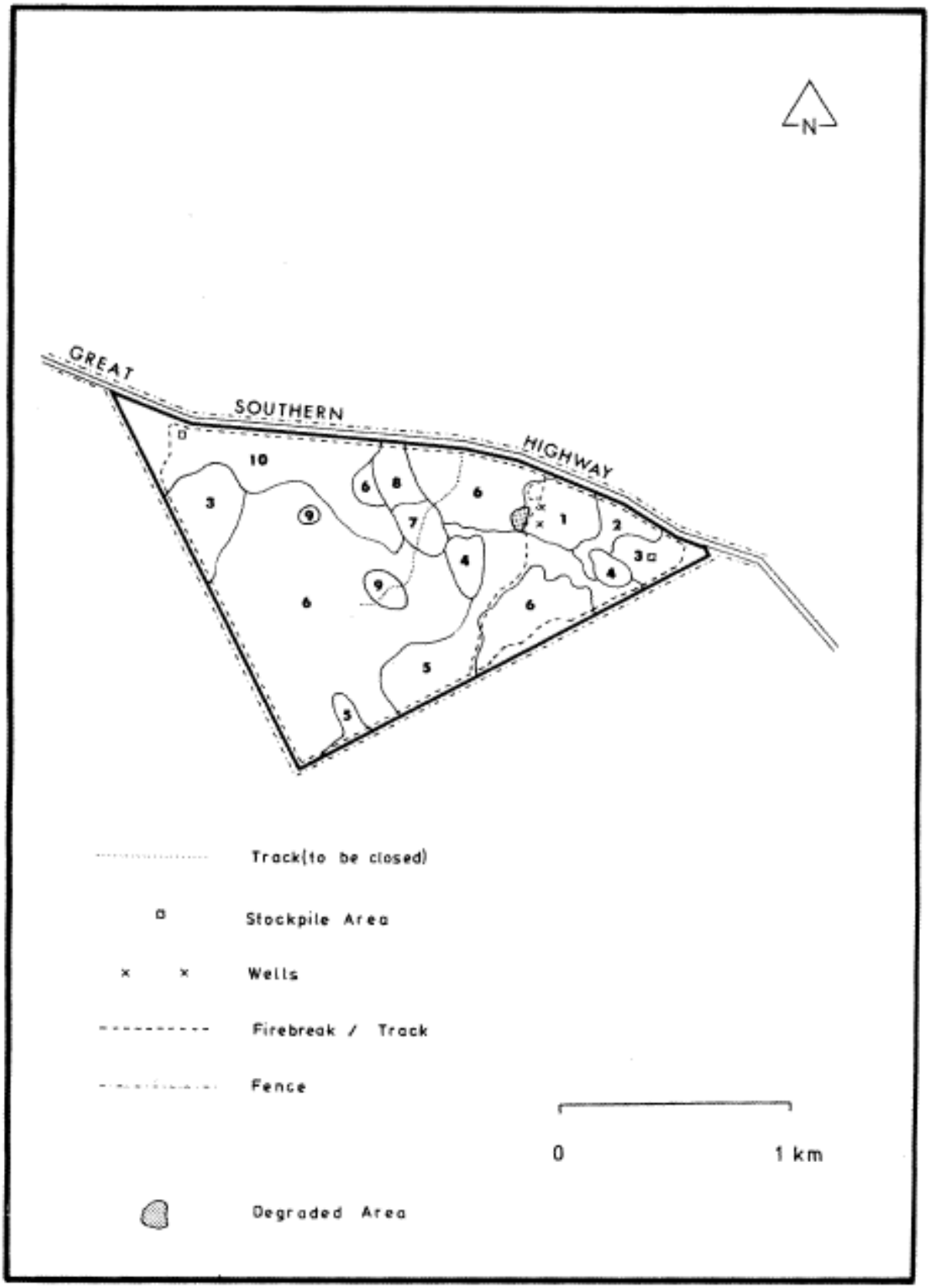

Figure 10. Wambyn Nature Reserve showing features and vegetation associations (identified by number and described in the associated text).

10. Wandoo WOODLAND, 8-10 m in height, with occasional marri, over OPEN DWARF SCRUB C of york road poison *(Gastrolobium calycinum),* with very occasional zamias and blackboys, over LOW GRASS and HERBS.

The results of survey work on Wambyn have extended the known range of several plant species. As mentioned previously, *Lomandra spartea was* previously thought to be restricted to the Darling Scarp, and *Lomandra nutans* and *Acacia chrysocephala* had not been recorded further north than Narrogin.

Of particular interest is *Schoenus sesquispiculus* which, until recently, had only been recorded from Newdegate and areas to the south. The only other record north of Newdegate was from Badgingara. Therefore, the Wambyn population is a significant new find (G. Keighery, pers. comm., 1985).

Appendix 1 includes a flora species list for Wambyn Nature Reserve.

4. FAUNA

Detailed fauna surveys of Wambyn have produced a wealth of information.

Eight mammal species were recorded (App. 2). Western gray kangaroos (*Macropus fuliginosus*) and western brush wallabies (*M. irma*), although occasionally sighted, were considered uncommon. Echidna (*Tachyglossus aculeatus*) diggings were noted ever most of the area, and two individuals were sighted. Dunnarts *(Sminthopsis dotichura) were* recorded in the heath, sheoak and powderbark associations. Western pigmy-possums *(Cercartetus concinnus)* were recorded in the wandoo and powderbark woodlands. House mice (*Mus musculus*) were recorded throughout the Reserve; other introduced species recorded included the rabbit *(Oryctolagus cuniculus)* and fox *(Vulpes vulpes).*

Fifty bird species have been recorded on the Reserve (App. 3). Eight of these were honeyeaters of particular interest is the Yellow-plumed Honeyeater which is regarded as uncommon in this area (Jim Masters, pers. comm., 1985). Most of the bird species recorded were noted either in the wandoo or powderbark woodlands.

A wealth of reptile life was recorded on Wambyn - 18 lizard, 5 snake and 1 frog species (App. 2). Many of these were common and widespread across the Reserve. The skink *Lerista distinguenda* was found in all habitats sampled. On the other hand, the beautifully patterned skink *Eremiascincus richardsonii* and the legless lizard *Aprasia pulchella* were only recorded on granite outcrops. These outcrops were not extensive enough to support the ornate dragon *(Ctenophorus ornatus).* The gecko

Oedura reticulata was restricted to the wandoo woodland. Goannas were not recorded on this Reserve.

Snakes, particularly burrowing species, were relatively common. The, blind snake *Ramphotyphlops australis* was recorded in three different habitats across the Reserve, while the giant blind snake (*R. pinguis*) which is considered rare, was only recorded from the heath.

The only frog recorded from Wambyn was Guenther's toadlet *(Pseudophryne guentheri).* The low number of frog species appears to be a function of the high percentage of the Reserve area dominated by laterite upland, the lack of sandplain and therefore a corresponding lack of suitable burrowing habitat, and the saline conditions of the lowlands included in the Reserve.

The gecko *Diptodactylus putcher,* which was widely distributed on Wambyn, was only found at one site on St Ronans and was not recorded on Mokine.

5. PAST USES, MANAGEMENT AND FIRE HISTORY

Although Wambyn was on the main route from Perth to the Yilgarn goldfields, it was not used as a stopping place either by travellers or by people moving stock. The reasons for this were twofold. First, difficulties were experienced in obtaining lasting water supplies and second, much of the understorey in the area was dominated by bullock poison *(Gastrolobium trilobum)* making it unsuitable for stock. Eradication of the poison was considered, but costs were prohibitive. Thus, grazing pressure on the area has been minimal.

The impact of past uses, however, can still be seen. The first of these is timber removal. Originally the Reserve would have been covered by wandoo and powderbark forest, whereas now the only large trees which remain are those which were unsuitable for fencing or building timber. Fortunately, similarly to St Ronans, there has been substantial regeneration from stumps.

Second, part of the Reserve was cleared (Association 1, Fig. 10) in the 1920s. During this decade an iron house was built on the western edge of the cleared area. Two wells and a pile of rubble are all that remain. Natural regeneration is gradually occurring across the area.

Third, gravel and road-building materials have been stock-piled in the north-eastern and north-western corners, as well as on part of the cleared area in the centre of the Reserve (Fig. 10) . This stock-piled material has since been removed and the areas ripped.

Fourth and finally, a recent inappropriate use of the Reserve has been the dumping of many tonnes of spoil over an area of some 3-5 ha (degraded area in Fig. 10). This has introduced weeds to the centre of the Reserve, reducing its aesthetic value and increasing the fire hazard. The spoil heaps were subsequently removed and the area ripped.

Past and present use of surrounding lauds has had an obvious impact on the Reserve. One such impact has been increasing salinity and salt: damage to vegetation in the north-western and, to a lesser extent, the north-eastern corners. This is a direct result of clearing on adjacent lands.

Past management has involved construction and maintenance of boundary, firebreaks. A track cuts from north to south through the eastern part of the Reserve. An old, disused track winds its way into the centre of the Reserve from the northern boundary (Fig. 10). All boundaries shared', with private property are fenced.

The Reserve does not appear to have been burnt recently (in the last 20 years) although there are many burnt stumps, fire scars on trees, charcoal remains and occasional standing fire-killed shrubs indicating past hot fires.

6. NATURE CONSERVATION VALUES

Wambyn Nature Reserve is important for a number of reasons. First, it carries extensive stands of powderbark. Many of these are mature trees' and as such provide nest hollows for birds and small mammals. Second, the small areas of heath in the centre of the Reserve are rich in reptile species. Third, the numerous rocky outcrops and standing dead blackboys provide further habitat for reptile species. Fourth, Wambyn seems to be favoured habitat for the echidna, with all parts of the Reserve showing evidence of echidna diggings.

B. PLAN FOR MANAGEMENT

1. MANAGEMENT OBJECTIVES

Management will be primarily directed towards the enhancement and maintenance of the conservation values of Wambyn Nature Reserve. Located on the Great Southern Highway, and readily accessible from it, Wambyn has been subjected in the past to several inappropriate uses. Future management will aim to ensure that these uses cease and are not repeated.

Management strategies to achieve these objectives will include protection from fire, posts and dieback; rehabilitation of degraded areas, management of public use; and research.

Any strategies not discussed below are covered in Part 8. General Management Strategies.

2. PROTECTION FROM FIRE

Fire should be excluded from Wambyn for several reasons. First, if fire sweeps through the entire Reserve small habitats, such as the Jam woodland in the eastern corner and the heath in the Centre, will be, completely burnt leaving no unburnt sources for recolonisation. Second, close proximity to agricultural land makes the Reserve highly susceptible to weed invasion. The existence of dense grasses throughout the north-eastern corner is indicative of the problem. Third, removal of the understorey by burning makes the Reserve more accessible to vehicles and thus more susceptible to the associated damage. Fourth, areas planned for rehabilitation (including replanting) during the currency of the plan will be particularly sensitive to fire. Cool burns, used as a management tool to prevent the whole Reserve being burnt at any one time, would have a similarly adverse of fact. These adverse effects apply equally to wildfires and Cool burns for the last three of the above four reasons.

Fortunately, the small size of the Reserve and its isolation amidst cleared agricultural land reduces the probability of fire occurring on the Reserve, or originating from clearing burns in the surrounding country and moving onto the Reserve. A regularly maintained perimeter firebreak together with one strategically placed internal break should provide adequate fire protection for the Reserve and adjacent landholders.

Management Strategies

The perimeter firebreak and the internal firebreak linking the northern and south-eastern boundary (Fig. 10) will be maintained to their present standards.

3. REHABILITATION AND MAINTENANCE OF THE NATURAL ENVIRONMENT

Management Strategies

The three stockpile areas (north-eastern, north-western and central) plus the area degraded by spoil heaps, require re-planting. Seedlings propagated from seeds collected from plants growing adjacent to the degraded areas should be used. Both tree and understorey species should be considered in this replanting project. Such a project is the re6ponsibility of the authority who used the Reserve for stockpiling in this case the Main Roads Department.

The internal track indicated by a dotted line in Figure 10 will be closed by blocking its northern end.

4. PUBLIC USE

Wambyn Nature Reserve with its open, attractive woodlands and immediate proximity to the Great Southern Highway is ideally suited for conservative public use.

Management Strategies

The ready accessibility and diverse habitats of Wambyn make it highly suitable for use by members of the public interested in nature conservation. This use will continue to be encouraged.

Signs identifying the Reserve as Wambyn Nature Reserve and providing 4nformation on public use will be erected adjacent to the Great Southern Highway.

RESEARCH

The survey of fauna conducted prior to production of this plan provides a basis for ongoing monitoring. Continuation of this program will provide a greater appreciation of responses by the biota, to the given management strategies.

PART 5. MOKINE NATURE RESERVE (No. 31211)

A. THE RESERVE

1. PHYSICAL CHARACTERISTICS AND RELATIONSHIPS

Mokine Nature Reserve is located 17 km south-west of Northam and 21 km north-west of York in *the* Shire of Northam. It has an area of 289.1 ha and a perimeter of approximately 7.8 km. The Reserve is roughly rectangular with the longer axis running north-south. Leaver Road passes along the southern boundary (Fig. 11). The privately owned land adjacent to the Reserve is cleared, although small uncleared patches abut parts of the eastern and western boundaries.

Mokine lies on the eastern edge of the Darling Range and encompasses numerous rocky outcrops, breakaways and dissected gullies. The altitude ranges from 250-260 m where perennial streams cut through the northern and southern parts of the Reserve, to 320 m on the central plateau (Fig. 11) . Another perennial stream flows north, along the western edge of the Reserve, from the northern foot of the plateau.

2. HISTORY

The area now known as Mokitia Nature Reserve was originally part of Inkpen Estate subdivision. On 22 May 1967, an application to withdraw the lot from public selection was made so that its viability for grape growing could be determined. In the same year the Department of Agriculture carried out the necessary soil survey:

> … a very small percentage of the total acreage would be suitable
> ... seek more suitable land elsewhere.
>
> (Director, Department of Industrial Development to Under Secretary for Lands, Department of Lands and Surveys, 11 December 1967)

No correspondence held by the Department of Lands and Surveys mentions the area until March 1971 when the Director of the Department of Fisheries and Wildlife, following advice from Ray Paynter, wrote to the Under Secretary for Lands:

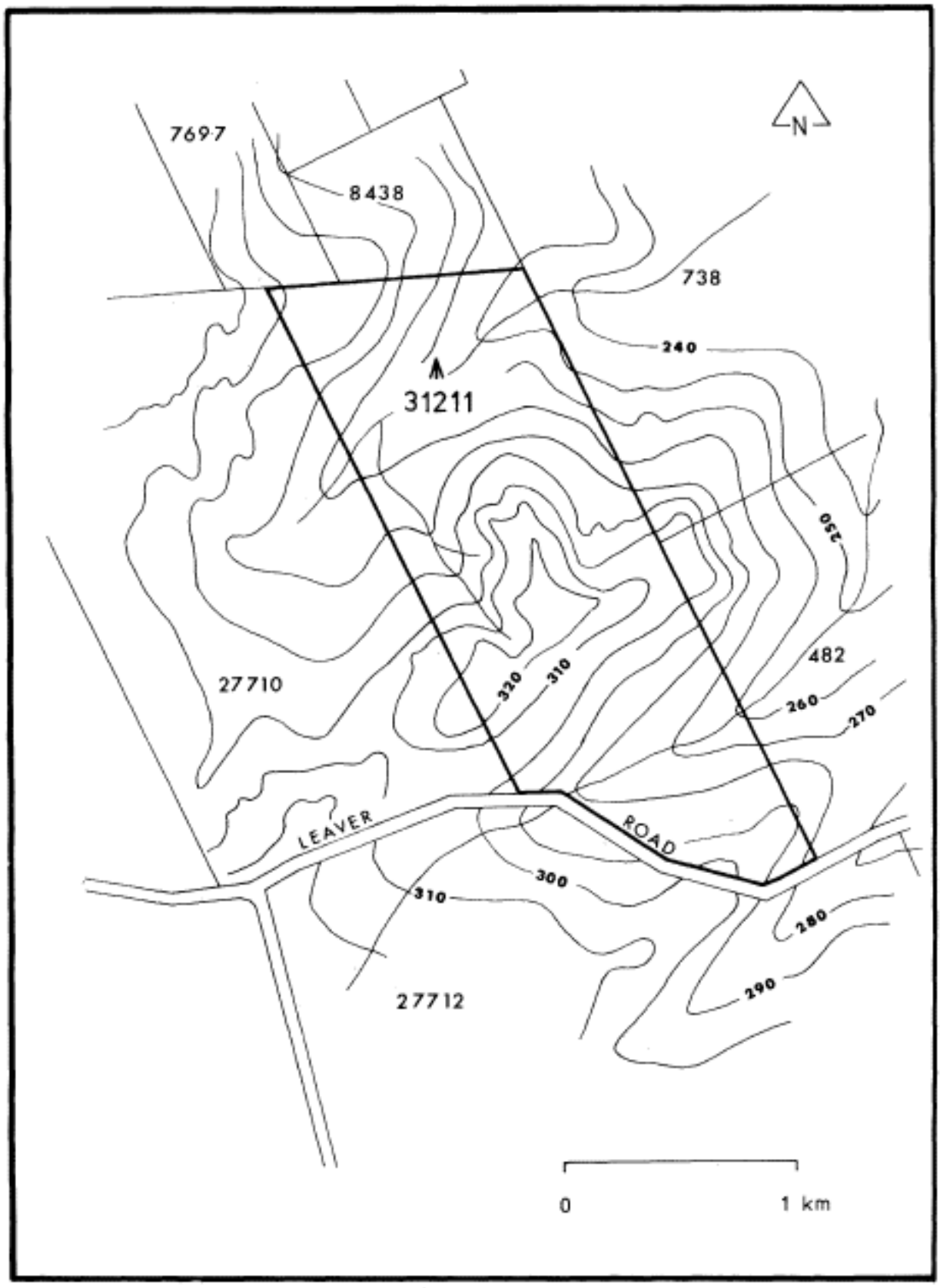

Figure 11. Mokine Nature Reserve showing its relationship with surrounding lands and associated contours W. (Source: W.A. Department of Land and Surveys 1 : 50 000 series.)

> This Department's Reserve Management Officer has recently inspected this location and reported it to be in excellent condition for the purposes of a flora and fauna Reserve.
>
> Positive identifications were made of macropod and possum scats and echidna diggings were numerous.
>
> … I would appreciate action being taken to have (it) set aside as a Reserve for Conservation of Flora and Fauna and be vested in WAWA.

At the same time Muresk Agricultural College also wrote to the Under Secretary for Lands:

> Over the last few years students of this College have made a great deal of use of this virgin block for soil surveys, botanical field trips and related field work. It was chosen because soil survey data were available following a feasibility study for Valencia wines carried out by the Department of Agriculture.
>
> ....I would be grateful if you could outline the necessary steps which should be taken to have the block vested in the Western Australian Institute of Technology.

On 11 February 1972 the area was bet aside for the Conservation of Flora and Fauna. Following requests from the Department of Fisheries and Wildlife the Nature Reserve was vested in the Western Australian Wildlife Authority (now the NPNCA) on 23 January 1976.

3. SOILS AND VEGETATION

Several associations dominate Mokine Nature Reserve. Powderbark woodland on gravelly loams dominates the laterite ridges and breakaways. Associated with granite outcrops are mixed woodlands of wandoo, marri, sheoak and jam. Wandoo becomes dominant on the lower loam-clay flats. Various combinations of these species and several other minor associations give a total of eight broad vegetation associations. These are delineated in Figure 12 and described as follows:

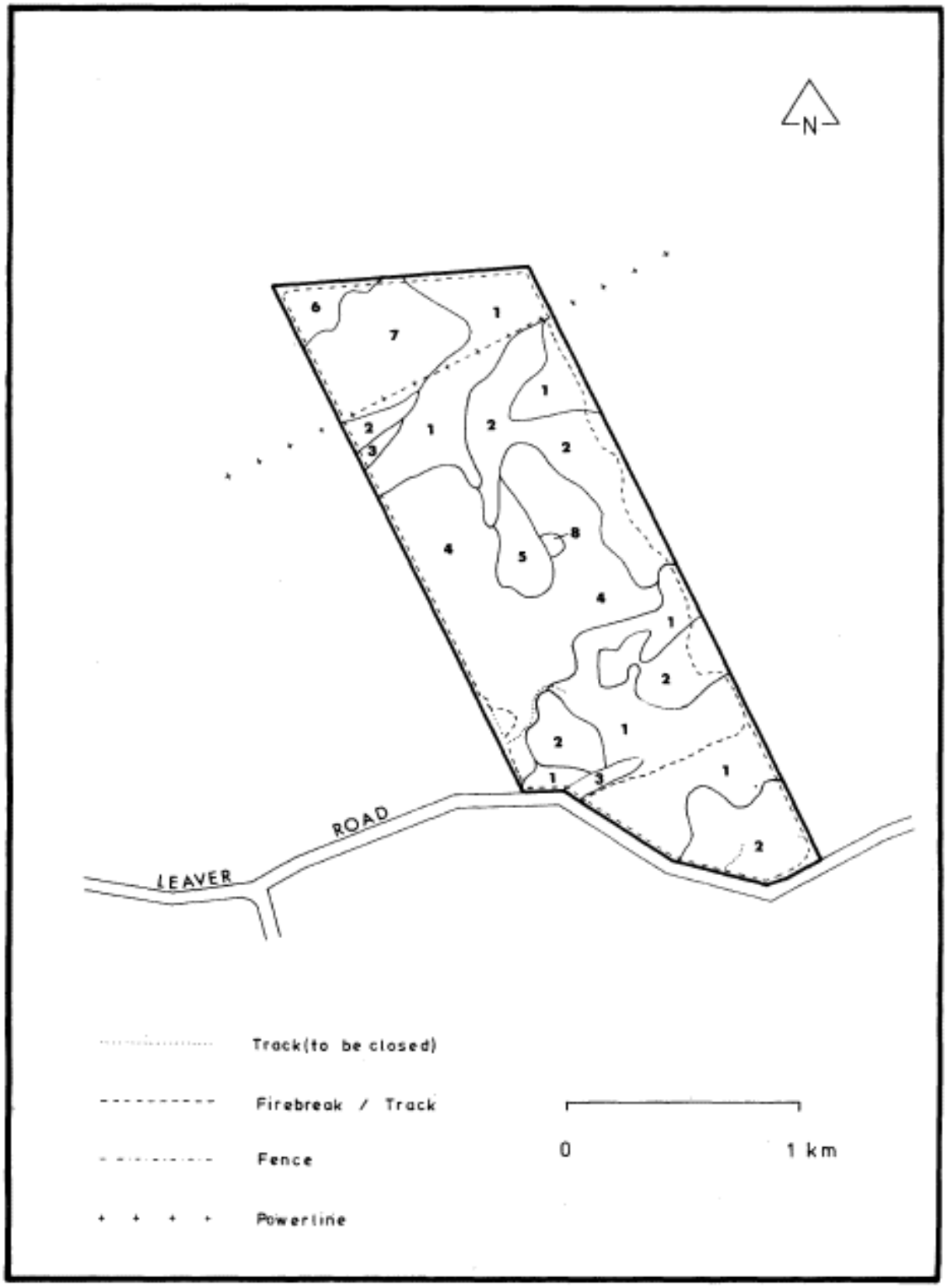

Figure 12. Mokine Nature Reserve showing features and vegetation associations (identified by number and described in the associated text).

1. Wandoo (*E. Wandoo)* LOW WOODLAND A, 8-9 m in height, over jam *(Acacia acuminata)* OPEN LOW WOODLAND B, 5-7 m in height, with occasional sheoak *(Allocasuarina huegeliana).* There is little understorey except OPEN HERBS and LOW GRASS. Areas of DWARF SCRUB D of honey bush *(Hakea lissocarpha), Acacia lasiocarpa* and *Hibbertia spicata,* plus pincushions *(Borya nitida)* on shallow soil around granite outcrops, occasionally occur.

2. Occasional wandoo and marri (*E. catophylla) to* 10 m, over LOW WOODLAND A/LOW FOREST A of sheoak and jam, 6-8 m. in height. There is little understorey except for an occasional DWARF SCRUB D of pincushions and OPEN HERBS and LOW GRASS. Shrubs of *Leptospermum erubescens* and prickly moses *(Acacia pulchella)* to 1.5 m., occasionally appear. This unit contains numerous rocky outcrops, and in the intervening areas blackboys *(Xanthorrhoea preissii),* to 2 m., are common.

3. Wandoo LOW FOREST A, 8-10 m. in height, over sheoak OPEN LOW WOODLAND B, 5-7 m. in height, over white myrtle *(Hypocalymma angustifolium)* HEATH A.

4. Powderbark (*E. accedens)* WOODLAND, 10-12 m in height, over a diverse, species-rich HEATH A/B. On the top of breakaways the understorey contains prickly moses, *Leptospermum erubescens,* parrot bush *(Dryandra sessilis),* white myrtle, wavy-leaved hakea *(Hakea undulata), Dryandra stuposa, Bossiaea eriocarpa.* bullock poison *(Gastrolobium trilobum), Petrophile divaricata,* scrub sheoak *(Allocasuarina humilis),* pronged grevillea *(Grevillea tridentifera)* and *Adenanthos cygnorum.* On the valley flours the understorey is dominated by *Dryandra stuposa.* Mid-slope the understorey decreases in height and density to become a DWARF SCRUB C/D, with prickly moses, *Hibbertia spicata* and sedges important components. In most places the mid-slope understorey dominates.

5. Wandoo WOODLAND, 10-12 m in height, over jam OPEN LOW WOODLAND A, 7-8 m in height, over LOW GRASS. Blackboys occasionally occur.

6. Wandoo LOW WOODLAND A, 8-10 m in height, over SCRUB to 3-4 m of regenerating jam, York Road poison *(Gastrolobium calycinum)* and *Leptospermum erubescens, over* OPEN LOW GRASS and OPEN HERBS.

7. Marri and wandoo OPEN WOODLAND, 8-10 m in height, over OPEN LOW WOODLAND A/B, 5-7 m in height, of regenerating sheoak and Jam, over OPEN LOW GRASS and OPEN HERBS. Acacia *restiacea occasionally* occurs to 1.5 m. Blackboys are common throughout. This unit contains numerous rocky outcrops.

8. Brown mallet (E. *astringens)* LOW FOREST A, 10-12 m in height.

A gazetted rare wattle *Acacia aphylla* and the geographically restricted plant *Hibbertia montana* occur on this Reserve. *Lomandra spartea,* previously thought to be confined to the Darling Scarp, also occurs. (G.Keighery, pers. comm., 1985).

Also of interest is a previously unrecorded form of box poison *(Oxylobium parviflorum)* and a broad-leaved form of York Road poison *(Gastrolobium calycinum).* The latter is the rarest subform of this species and is only found near Northam. It is non-suckering and is killed by fire (all other subforms can regenerate by suckering). Quadrants have been established to monitor the population structure of these two species.

Appendix 1 includes a plant species list for Mokine Nature Reserve.

4. FAUNA

Mokine is the third Nature Reserve in the York-Northam area an which detailed fauna surveys have been carried out.

Eight species of mammal were recorded (App. 2). Western grey kangaroos *(Macropus fuliginosus)* were noted as common, while western brush wallabies (*M irma*) were more cryptic and were only recorded in the dense understorey of the powderbark woodland. Only one western pigmy-possum *(Cercartetus concinnus)* was recorded. No dunnarts were noted, although numerous house mice *(Mus Musculus)* were recorded. Two other introduced species were also recorded - foxes (*Vulpes vulpes*) and rabbits (*Oryctotagus cuniculus*).

Forty-six species of bird were recorded on Mokine (App. 3), the majority of these in wandoo-dominated associations.

Fourteen lizard species were noted (App. 2). The racehorse goanna (*Varanus tristis*) was common in all areas sampled, including granite outcrops. The bungarra (*Varanus gouldii*) was not sighted. Five species of frog were noted (App. 2). This relatively high number is a result of the suitable habitat offered by the fresh seasonal stream, which runs through the northern part of the Reserve and the friable soils of the wandoo-dominated woodlands (which provide an ideal habitat for burrowing species).

5. PAST USES, MANAGEMENT AND FIRE HISTORY

As with most nature reserves in agricultural areas, particularly in the older well-established districts, Mokine has been used as a supply of timber for fencing, stock-yards, sheds and general housing. The only older trees remaining are those which were unsuitable for timber -fortunately these usually contain numerous nest hollows.

Although the Reserve is remote from major highways it is still readily accessible to campers and kangaroo shooters. Both uses conflict with the purpose of the Reserve - the conservation of flora and fauna. The former use is confined to the southern end of the Reserve and is directly associated with ready access from Leaver Road. In the past camping has led to rubbish dumping, an activity which has decreased the aesthetic appeal of the area is well as adding nutrients to the soil and thereby encouraging weed invasion. Furthermore, the inevitable camp fire, particularly during summer and autumn, presents a severe fire hazard.

Mokine has a complete perimeter firebreak, plus two internal breaks. These effectively divide the Reserve into three blocks (Fig. 12). In the south-western corner a small section of the perimeter break has been re-routed to avoid a steep breakaway. Several short tracks meander into the centre of the Reserve (Fig. 12). A powerline cuts through the northem part of the Reserve, following one of the two internal firebreaks. All boundaries shared with private property are fenced.

Several wildfires have occurred on Mokine over the last two decades. Small patches at the southern end of the powderbark woodland (Fig. 12) appear to have been burnt in the past 10-15 years, with standing dead remnants of *Dryandra stuposa* persisting. In 1980, the section of Nature Reserve north of the: powerline was burnt by a wildfire, which began as a clearing burn to the north of the Reserve. The older, larger trees such as marri and wandoo and a few sheoak survived, however, the understorey was completely burnt. Prior to these fires, the Reserve had not been burnt in 'living memory' (Ray Paynter, pers. comm.2 1986).

6. NATURE CONSERVATION VALUES

Mokine has a number of important conservation values.

First, the numerous rocky outcrops provide habitat for many reptile species, with both dragon & and geckos being well represented. In addition, dead blackboys provide favourable habitat for reptiles, particularly the racehorse goanna.

Second, the rich understorey, including genera such as dryandra, beaufortla and calothamnus which flower profusely, provides a reliable source of nectar and pollen for numerous birds and small mammals. This understorey is associated with powderbark woodland, one of the most extensive associations on Mokine (covering about a quarter of the area).

Third, the system of pools which forms a seasonal stream at the northern end of the Reserve (Fig. 11) supports at least five species of frog. Streamlines retaining fresh water into the summer months art; rarely found on nature reserves. Usually such features are found lower in the landscape, in areas which were claimed early in the history of settlement and valued for their good soils and ready supply of water. The Mokine streamline is doubly important at, it shows no signs of salinity, a long recognised problem in the York-Northam area.

B. PLAN FOR MANAGEMENT

1. MANAGEMENT OBJECTIVES

The two recent fires, problems with kangaroo shooters and rubbish dumping all necessitate a conservative program of management, directed towards the maintenance and enhancement of the nature conservation values of the Reserve.

Management strategies to achieve this objective will include protection from fire, pests and disease; rehabilitation of degraded areas; management of public use; and research.

Any strategies not discussed below are covered in Part 8. General Management Strategies.

2. PROTECTION FROM FIRE

Since Mokine is now surrounded by cleared land and clearing in the area has virtually ceased, the fire risk from clearing burns need no longer be considered. Also, much of the Reserve carries low fuels, particularly the extensive areas of wandoo woodland (Fig. 12). Thus, the risk of an uncontrolled fire moving through Mokine is low to minimal.

Furthermore, it is vitally important that fire is excluded from the Reserve until more is known about the ecology, and particularly the response to fire, of species such as *Acacia aphylta, Oxylobium parviflorum* and *Gastrolobium calycinum* (see Part A, 3. Vegetation and Soils).

Management Strategies

The existing perimeter firebreak and two internal firebreaks (Fig. 12) will be regularly maintained.

3. REHABILITATION AND MAINTENANCE OF THE NATURAL ENVIRONMENT

Management Strategies

The steep section of firebreak at the southern end of the western boundary has been closed and an alternative used for several years. Further management input is needed, however, to halt erosion and encourage regeneration. This will be achieved by cutting several lateral drains across the old firebreak as well as laying logs and brush. These two measures will slow the rate of movement of water (and therefore erosion) and trap seed. The brush also provides an additional source of seed.

The two internal tracks, which meander into the Reserve, one running northwards from the southern boundary and the other eastwards from the southern end of the western boundary, will be closed and ripped to encourage regeneration.

The rubbish scattered along the southern internal firebreak and in the south-eastern corner of the Reserve will be removed.

4. PUBLIC USE

The remote location of Mokine and its history of frequent fires and inappropriate use suggest that public use should remain low key.

Management Strategies

Uses such as birdwatching and wildflower study, which are based on an appreciation of the nature conservation values of the Reserve, will continue to be encouraged.

Signs indicating that kangaroo shooting is not permitted will be erected and the number of patrols by wildlife officer increased.

Signs identifying the Reserve as Mokine Nature Reserve and providing information on public use will be erected at the junction of the southern boundary firebreak and the western end of the southern internal firebreak, and at the south-eastern corner of the Reserve.

5. RESEARCH

As part of planning surveys, a program monitoring the fauna of Mokine, Wambyn and St Ronans was established. This program should continue during and beyond the currency of this plan.

Management Strategy

Use of the Reserve by conservation groups, such as the W.A. Naturalists' Club and W.A. Wildflower Society, will be encouraged. Information collected by these groups is a valuable addition to the resource base which guides management.

PART 6. THROSSELL NATURE RESERVE (NO. 7220)

A. THE RESERVE

1. PHYSICAL CHARACTERISTICS AND RELATIONSHIPS

Throssell Nature Reserve is 18 km to the east of Northam (Fig. 2) and 15 km west of Meckering. This square Reserve has an area of 17.7 ha and a perimeter of 1.6 km. Moore Road follows the southern boundary. The Reserve lies 1.n flat to undulating country (Fig. 13) and is surrounded by privately owned land which is either under crop or used for grazing.

2. HISTORY

In March 1900 Reserve No. 7220, with an area of 150 acres, was excepted from sale and set aside for Timber (for mining purposes and the use of settlers). From this time onwards requests were made for the release of the Reserve for selection:

> .... this Reserve ..(should be)... thrown open for selection, as it is of no use f or the purpose it was set apart. There is only about 50 acres of mixed timber upon it and the balance is sandplain.
>
> (Government Land Agent, Northam to Under Secretary for Lands, Department of Lands and Surveys, 26 July 1909)

Such requests were refused as the paucity of reserved land in this area had already been recognised:

1. A good many requests have been received to throw open for selection Reserve 7220.

1. There is so little Crown Land in this locality that I think it would be advisable to retain this Reserve for possible future requirements.

2. Portion of the Reserve, however, has at the request of the Road Board, been marked as a Reserve for gravel.

(Surveyor General to Under Secretary for Lands, Department of Lands and Surveys, 7 August 1912)

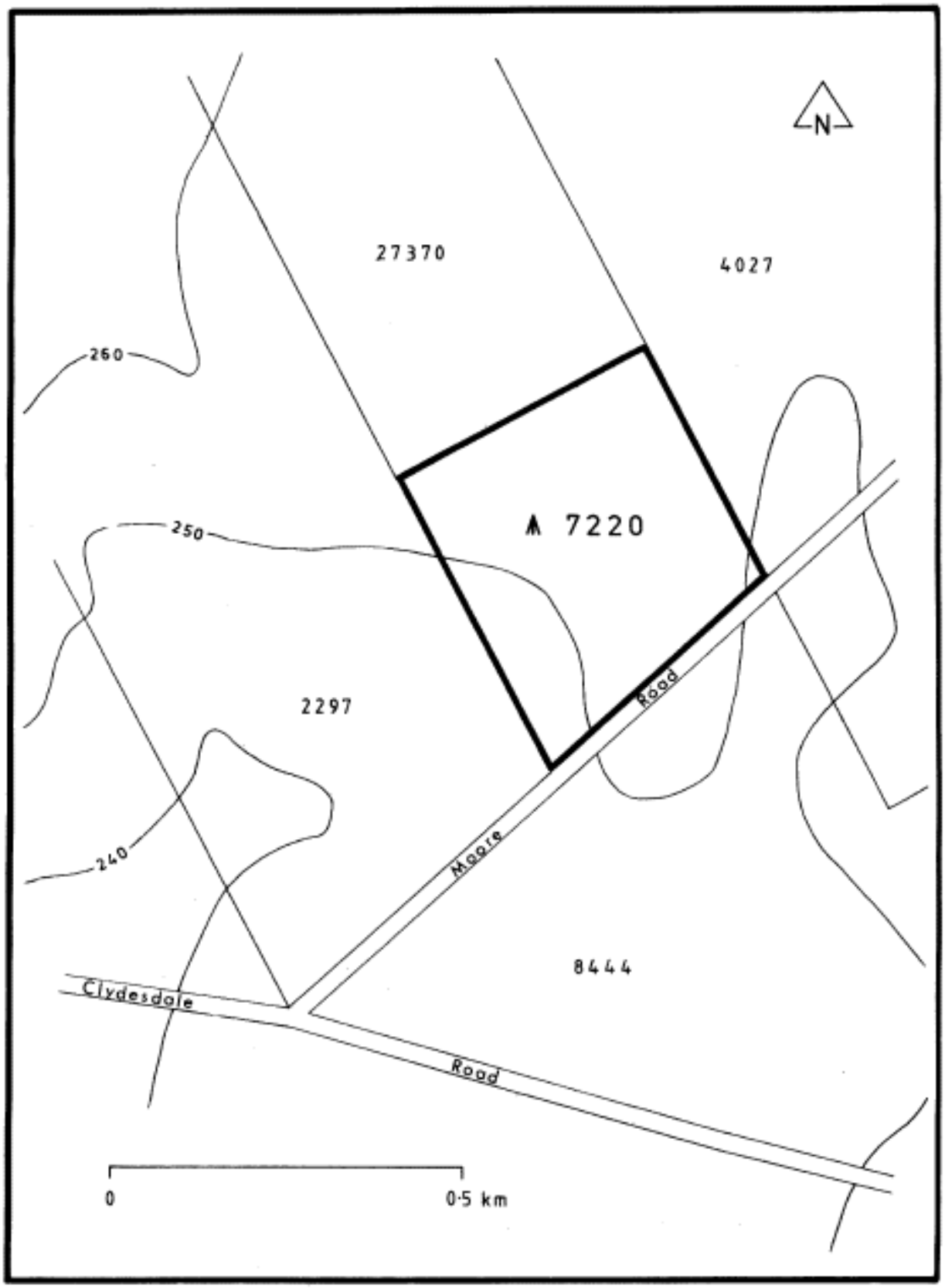

Figure 13. Throssell Nature Reserve showing its relationship with surrounding lands and associated contours W. (Source: W.A. Department of Land and Surveys 1 : 50 000 series.)

On 18 September of the same year, the area of Reserve No. 7220 was reduced to 141 acres and a gravel reserve (No. 14330) with an area of 10 acres, was excised from the 6outh-western corner. The area of the timber reserve was reduced further to 32 acres on 18 April 1935. A special lease wa6 granted over this area on 17 March 1952, and the area was grazed until 1962-63. The block immediately to the north (Avon Loc. 27370) which was originally part of the Reserve, was purchased and cleared in approximately 1955 (A. Cooke, pers. comm., 1986).

Requests for release of the area for agriculture continued. Recognition of the value of the area for conservation, however, counterbalanced these demands:

> ... reserves .... have been heavily grazed ... As a consequence ... natural scrub growth is fast disappearing …
>
> … very little scrub growth remains, some tussocky grasses, whole area would be subject to flooding in winter.
>
> ... the country surrounding these Reserves is virtually cleared out the timber growth is a pleasant break in the local countryside.
>
> In view of the above I would strongly recommend the following:
>
> ... the immediate cancellation of grazing permits on both reserves.
>
> ... Incorporating both Reserves to 'Flora and Fauna or Camping', which ... would ... benefit the State and the community.
>
> (Inspector to Officer-in-Charge Inspections, Department of Lands and Surveys, 8 July 1962)

On 5 April of the following year (1963) both Reserves (Nos. 14330 and 7220) were set aside for the Conservation of Flora. The Reserves have changed very little over the last 40 years, the only exception being a decrease in the number of trees due to timber removal for firewood.

As part of the regional review which accompanies the development of a two Reserves were combined under one management plan, the Reserve number (No. 7220) on 22 March 1985, for the common purpose of Conservation of Flora and Fauna, with vesting in the NPNCA.

3. SOILS AND VEGETATION

This flat Reserve is dominated by wandoo woodland on pale sandy clays. A small pocket of salmon gum, wandoo and York gum occurs on more clayey soils in the southern corner. These two associations are delineated in Figure 14 and described as follows:

1. Wandoo *(Eucalyptus wandoo)* WOODLAND, 12-16 m, in height, over an understorey dominated by LOW GRASS. Occasional blackboys *(Xanthorrhoea preissii)* to 1-2 m occur.

2. Salmon gum *(E. salmonophloia),* wandoo and York gum (*E. loxophleba)* WOODLAND/LOW WOODLAND A, 8-17 m in height, over DWARF SCRUB C of *Daviesia incrassata* and *Rhagodia crassifolia,* over LOW GRASS. *Acacia erinacea* forms a sparse prostrate ground cover.

Of particular interest is a large clump of *Choretrum glomeratum var. chrysanthum.* This is a considerable range extension northwards for this species.

Appendix 1 includes a flora species list for Throssell Nature Reserve.

4. FAUNA

Intensive surveys of the fauna on Throssell Nature Reserve have not been undertaken. The small size of this Reserve and 'the lack of understorey suggests that small native mammals may be absent and reptile species limited in number. The only reptile which has been sighted on the Reserve is the bobtail (*Tiliqua rugosa).*

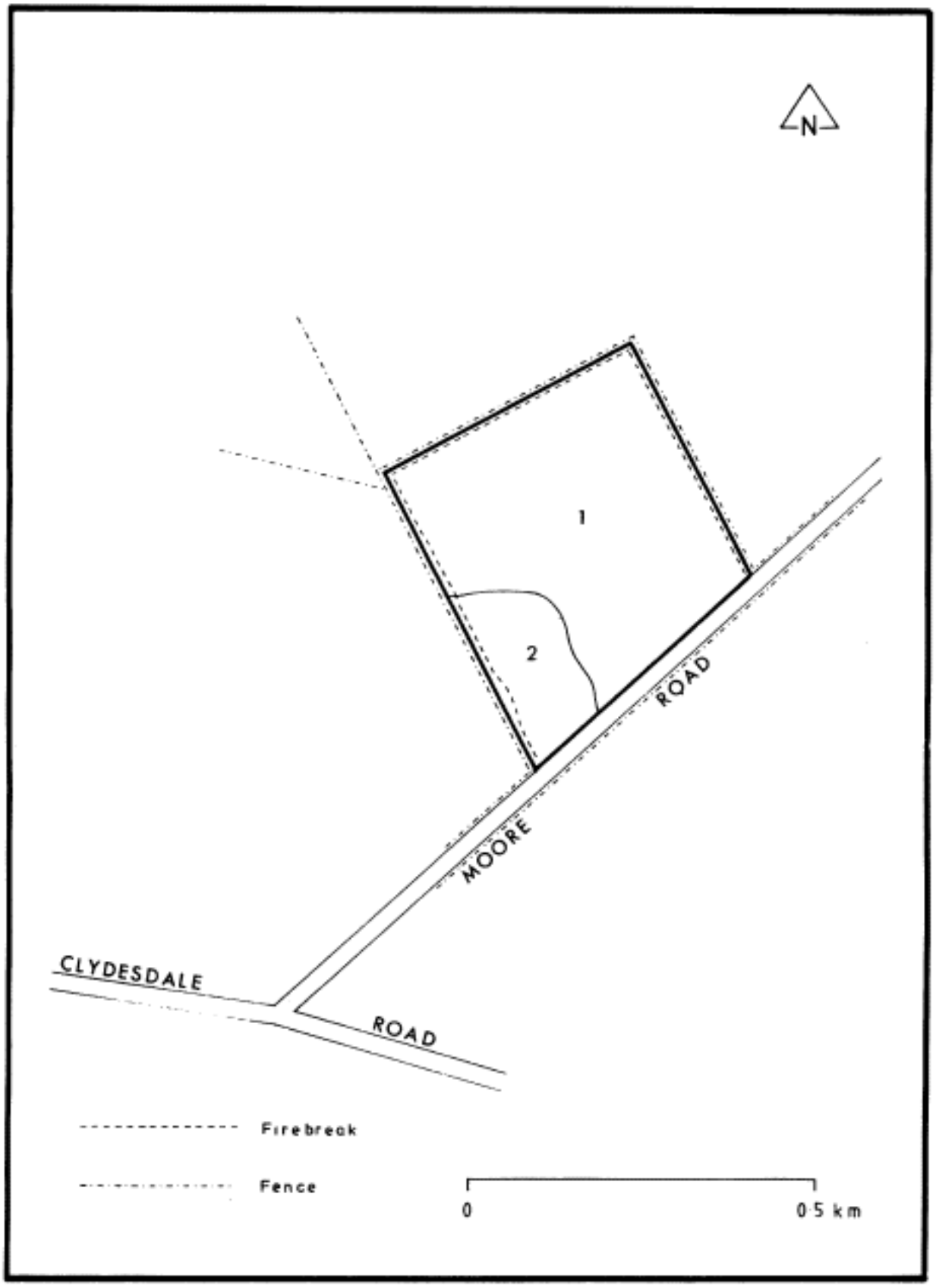

Figure 14. Throssell Nature Reserve showing features and vegetation associations (identified by number and described in the associated text).

The mature woodland, however, provides a good habitat for birds. Twenty-two bird species have been recorded (App. 3); at least four of these species nest on the Reserve. Throssell and Meenaar are the only two nature reserves in the York-Northam area on which the Chestnut-rumped Thornbill has been recorded. In the neigbbouring Shire of Toodyay this species has been described as scarce (Toodyay Naturalists' Club 1979).

5. PAST USES, MANAGEMENT AND FIRE HISTORY

Throssell Nature Reserve, although originally much larger, only ever carried 50 acres of timber, the remainder of the area being sandplain. Therefore, this limited area of woodland was subjected to considerable pressures, particularly as it lies on the edge of extensive sandplains. A strong demand for timber would have occurred in the mid-twentieth century, when the fertility problems of sandplain areas were overcome. These areas subsequently became available for grazing and cropping and timber was needed for fencing. A number of old trees still remain on this Reserve, however, removal of timber for firewood is gradually depleting this resource.

The Reserve has also been used for grazing.

Throssell Nature Reserve has firebreaks on the three boundaries shared with private property (Fig. 14). Moore Road follows the fourth boundary. All boundaries shared with private property are fenced.

The Reserve has not been burnt for at least 40 years (A. Cooke, pers. Comm., 1986).

6. NATURE CONSERVATION VALUES

The woodlands on Throssell. Nature Reserve are particularly important c they provide refuge and nesting sites for numerous bird species. Many of these species survive for most of the year in the cleared wheatbelt environment, only requiring trees for occasional refuge and as nesting sites. The mature trees on Throssell provide hollows for; hollow-nesting birds, plus foliage for refuge and nesting. The Reserve also functions as a windbreak in an almost completely cleared landscape.

Although the Reserve is small, the stands of salmon gum it contains are of great value. This is the only Nature Reserve in the York-Northam area on which salmon gum occurs. Prior to European settlement at least a quarter of the York-Northam area carried York and salmon gum woodlands (Beard 1979a). This indicative of the value of salmon gum country for agriculture that, in the York-Northam area, only a few hectares have been set aside for conservation.

B. PLAN FOR MANAGEMENT

1. MANAGEMENT OBJECTIVES

Management will be directed towards enhancement and maintenance of the conservation values of the Reserve.

Management strategies to achieve this objective will include: protection from fire, pests and disease; rehabilitation of degraded areas; and management of public use.

Any strategies not discussed below are covered in Part 8. General Management Strategies.

2. PROTECTION FROM FIRE

This small Reserve, isolated amidst cleared agricultural land and with a sparse understorey, presents little to no fire risk to adjacent landholders. Furthermore, it is important to exclude fire from Throssell Nature Reserve for several reasons. First, salmon gums are particularly sensitive to fire and following severe fire will only regenerate from seed, whereas many other eucalypts can regenerate from rootstock. Second, even if a fire of low intensity moved through the Reserve, many of the tree hollows and foliage used by the birds would be lost. Third, any fire on the Reserve will encourage weed invasion, further reducing the competitive ability of the native understorey species.

Management Strategy

Although fire is unlikely to occur on the Reserve, it is important to protect the area from fires originating on adjacent holdings. This will be achieved by maintaining the existing perimeter firebreak to its present standkrd.

3. REHABILITATION AND MAINTENANCE OF THE NATURAL ENVIRONMENT

Management Strategy

The Reserve will be disturbed as little as possible, thus encouraging natural regeneration of the understorey.

4. PUBLIC USE

Management Strategy

Throssell Nature Reserve appears to be unused by the public, except for firewood collecting. In view of the need to minimise disturbance to the Reserve, thereby encouraging understorey regeneration, signs giving information on public use and the Reserve name will be erected at the south-western and south-eastern corners of the Reserve adjacent to Moore Road.

PART 7. MEENAAR NATURE RESERVE (NO. A29977)

A. THE RESERVE

1. PHYSICAL CHARACTERISTICS ANT RELATIONSHIPS

Meenaar Nature Reserve, with an area of 71.8 ha and a perimeter of 4.8 km, is located 21 km east of Northam (Fig. 2) and 13 km west of Meckering. It is 3 km south-east of Throssell Nature Reserve. The Great Eastern Highway and Perth-Kalgoorlie railway follow the northern boundary of this triangular Reserve (Fig. 15). Meenaar South Road cuts through the centre of the Reserve and then runs along the southern half of the south-western boundary. Meiklem. Road runs in from the west to join Meenaar South Road. The Goldfields water pipeline and a State Energy Commission powerline run through the centre of the Reserve in an east-west direction (Fig. 16).

The land to the south-west and south-east of the Reserve is cleared and privately owned, while to the north the land abutting the Reserve has been set aside as a gravel reserve (No. 34772). The eastern corner of the northern boundary abuts cleared, privately owned land which was originally part of the proposed subdivision for Meenaar townsite.

Meenaar Nature Reserve lies in gently undulating country., and within the Reserve altitude varies by only 10 w (230-240 m) (Fig. 1-5). A small sandy-bottomed perennial stream flows eastwards through the Reserve.

2. HISTORY

It was first suggested that a townsite be set aside at Meenaar in June 1898, two years after the Perth-Kalgoorlie railway line was completed. A total of 360 acres spanning the railway line was recommended for reservation (Chief Inspector of Lands, Department of Lands and Surveys, 23 June 1898).

There was some disagreement, even in these early days, as to the value of a townsite reserve at Meenaar:

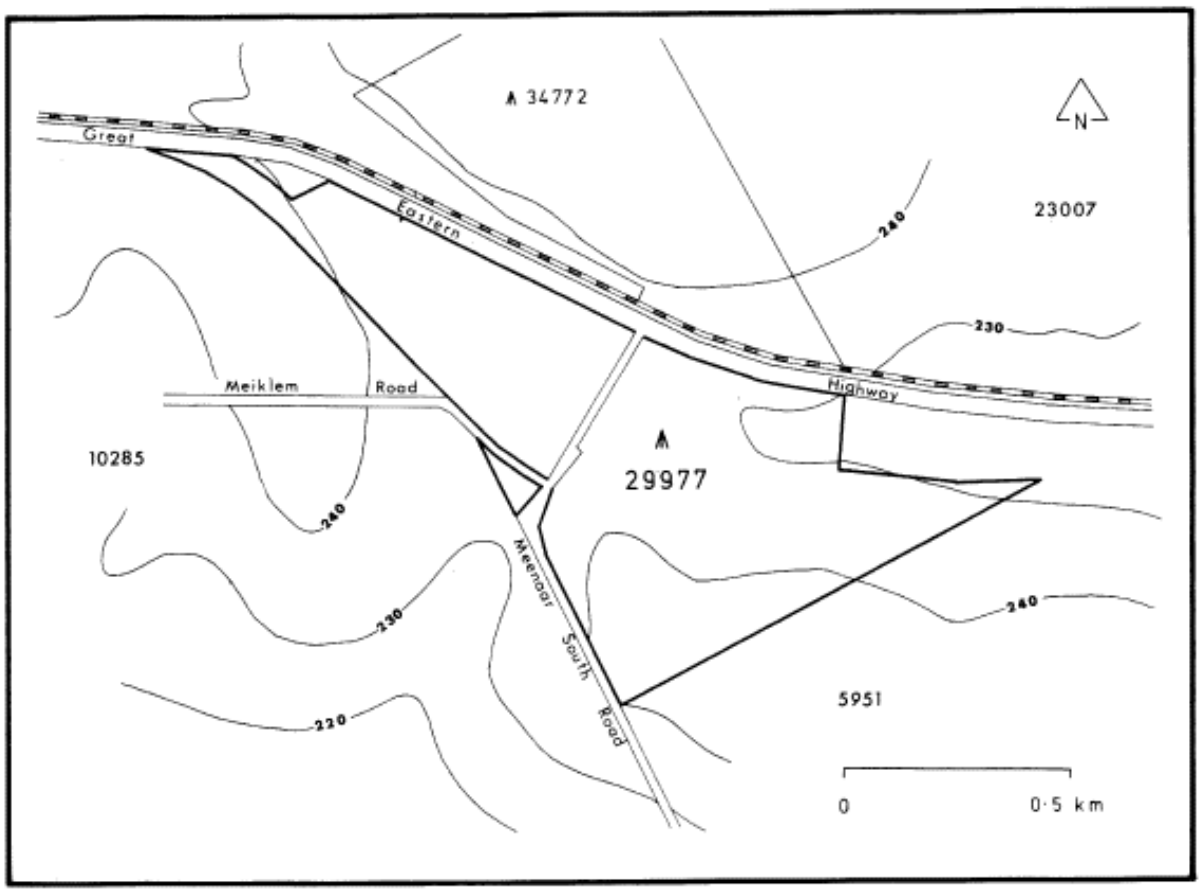

Figure 15. Meenaar Nature Reserve showing its relationship with surrounding lands and associated contours (m).

(Source: W.A. Department of Lands and Surveys 1 : 50 000 series.)

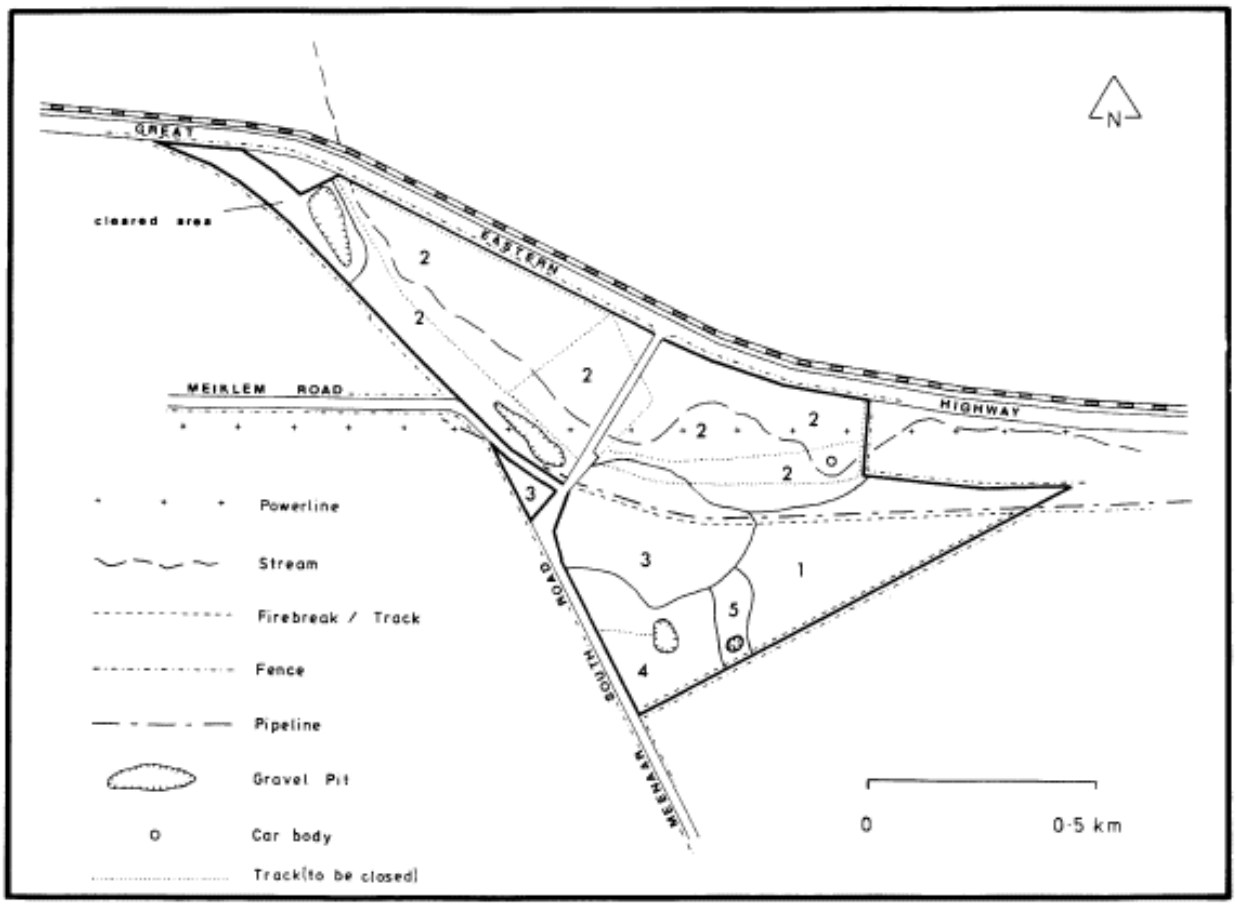

Figure 16. Meenaar Nature Reserve showing features and vegetation associations (identified by number and described in the associated text).

> ...So far as I can see the railway staff are the only likely applicants for small holdings at Meenaar which is essentially a farming district.
>
> ... Neither the rainfall nor the land around the station are especially suitable f or gardeners, except for a few months in the year.
>
> ... In my judgement the probability of a demand arising for many small holdings near Meenaar siding is remote.
>
> (Inspector, Northam to Under Secretary for Lands, Department of Lands and Surveys, 28 September 1899)

Meenaar was set aside as a townsite on 30 October 1908, with problems in delineating the boundaries being experienced from the earliest days.

The predictions made in 1899, by the Lands Inspector (Northam), proved correct with only one or two of the lots ever being purchased and occupied. In September 1968 application was made for the release of a further three lots. Release - was refused and the following recommendations made:

> ... The area.... contains a good growth of jam and Bulloak tree, and shrubs. The area adjoins the Great Eastern Highway and should be retained in its natural state.
>
> … It is recommended that:
>
> i. applications for the release of Meenaar lots 41, 42 and 43 be refused.
> ii. Meenaar lots 41, 42 and 43 and the two portions of closed road (included) be cancelled
> iii. One new lot be created for the area and this lot be reserved for the purpose of Conservation of Flora.
>
> (Divisional Surveyor, Narrogin to Deputy Surveyor General, Department of Lands and Surveys, 5 February 1969).

On 26 September 1969, 45 acres was set aside for the Conservation of Flora. This area was decreased to 17.5 ha in 1977, and increased to its present size of 71.8 ha in July 1979. On 6 June 1980, the Reserve was given Class A status and its purpose was changed to the Conservation of Flora and Fauna, with vesting in the Western Australian Wildlife Authority (now the NPNCA). This change was based on recommendations by Muir following surveys of the area (Muir 1979a).

3. SOILS AND VEGETATION

Three discrete woodland associations occur on Meenaer - York gum on grey-brown sandy clays adjacent to the streamline, a small area of jam on yellow sandy loams slightly higher in the landscape and wandoo on grey clays in the southern corner of the Reserve. The remaining third of the Reserve is covered by a mosaic of heath, including sandalwood, blackboys, jam and sheoak on pale sandy loams and pale, grey-yellow sands.

These associations are distributed as shown in Figure 16 and described below:

1. SCRUB of sandalwood *(Santalum spicatum),* blackboys *(Xanthorrhoea preissii),* jam *(Acacia acuminata)* and sheoak *(Allocasuarina huegeliana),* 3-5 m in height, over patches of tamma *(Allocasuarina campestris)* THICKET, 2-3 m. in height, over LOW SEDGES and LOW GRASS. *Hakea incrassata, Dryandra fraseri,* spreading cone bush *(Isopogon divergens),* prickly dryandra *(D. armata), Daviesia aff. nudiflora,* common smokebush *(Conospermum stoechadis), Eremaea Pauciflora,* cat's paw *(Anigozanthos humilis),* bristly conostylis *(Conostylis setigera)* and *Grevillea spp.* occasionally occur in the THICKET. An area of sheoak LOW WOODLAND B over *Leptospermum erubescens* and tamma SCRUB, 2-3 m in height, also contributes to this association.

2. York gum *(Eucalytpus loxophleba)* LOW WOODLAND A, 5-10 m in height, over jam *(Acacia acuminata)* LOW WOODLAND B/LOW FOREST B, 4-5 m in height, over LOW GRASS, with occasional patches of sheoak, 5-8 m in height.

3. Tanma BEATH A to 2 m, over LOW HEATH C/DWARF SCRUB C of yellow morrison *(Verticordia chysantha),* painted featherflower *(V. picta)., Hakea incrassata, Dryandra fraseri,* spreading cone bush, *Catytrix brachyphylla,* one-sided bottlebrush *(Calothamnus quadrifidus)* and prickly dryandra.

4. Wandoo (*E. wandoo)* OPEN LOW WOODLAND A, 10-15 m in height, Over LOW GRASS with occasional patches of sheoak LOW FOREST B/LOW WOODLAND B, to 5 m, and tamma SCRUB to 3 m.

5. Jam LOW WOODLAND B, 4-5 m in height, over LOW GRASS and LOW SEDGES.

4. FAUNA

A brief inventory of the fauna on Meenaar was made during planning surveys. No detailed surveys of the fauna have been undertaken. The only native mammal recorded on the Reserve was the echidna *(Tachyglossus aculeatus).* Rabbits *(Oryctolagus cuniculus)* were present in small numbers.

Meenaar is particularly rich in bird species, many of which have not been recorded on the nature reserves in the western part of the York-Northam area. Of these, 13 - the White-faced Heron, Laughing Turtle Dove, Regent Parrot, Mulga Parrot, Red-backed Kingfisher, Welcome Swallow, Jacky Winter, Crested Bellbird, White-winged Fairy-wren, Spiny-cheeked Honeyeater, Yellow-throated Miner, White-fronted Chat, Zebra Finch, - were not listed for any other nature; reserve in the York-Northam area. Although Meenaar is relatively small, it is used for nesting by at least 17 species.

Limited information is available regarding reptile species on Meenaar. Three species have been recorded - two geckos *Crenadactylus ocellatus* and *Gehyra variegata,* and the skink *Menetia greyii.*

5. PAST USES, MANAGEMENT AND FIRE HISTORY

Meenaar is a service corridor for the Perth-Kalgoorlie railway line, Great Eastern Highway, Goldfields water pipeline and State Energy Commisaion powerlines. Hence, the vegetation on the Reserve is highly dissected and disturbed. Firebreaks follow the south-eastern and western half of the northern boundary and the southern side of the water pipeline. The remainder of the Reserve is also cut by numerous tracks (Fig. 16) . The extent of boundary fencing is also given in Figure 16.

Meenaar has been used as a source of timber. The stand of wandoo in the southern corner has been extensively cut over and only large trees unsuitable for timber remain. Gravel has been removed from the southern and north-western corners and the central section of the south-western boundary. Rubbish dumping has occurred across most of the Reserve. Much of this is comprised of old tins and bottles from Meenaar Siding. There is also an old car body in the eastern end of the Reserve.

No fire history records exist and it appears as if the Reserve has not been burnt for at least 30-40 years.

6. NATURE CONSERVATION VALUES

Although Meenaar Nature Reserve is small and somewhat degraded it is important for a number of reasons. First, it is the only Nature Reserve in the York-Northam area which supports a significant area of York gum woodland - an association which formerly covered the eastern half of the

York-Northam area. The soils beneath these woodlands were, and still are, highly favoured by agriculture and as such York gum is poorly represented on conservation reserves.

Second, the sandplain conmunities on Meenaar are also poorly represented on conservation reserves. This is the only Nature Reserve in the York-Northam area with a significant area of sandplain. This association becomes increasingly dominant towards the eastern edge of the two Shires and is typical of much of the wheatbelt. Although sandplains were originally considered of little value for agriculture, the advent of fertilisers and improved cultivation techniques in the mid-twentieth century proved the value of these light lands (where sufficient rainfall was available).

Third, Meeubar has not been burnt for many years. In the south-eastern corner of the Reserve ancient blackboys, 2-3 m in height, with skirts reaching the ground, are a common sight. Thickets of thick-trunked tamma are also indicative of the absence of fire for many years.

Fourth, the heath provides a food source for birds and an attractive display of wildflowers in the spring months.

B. PLAN FOR MANAGEMENT

1. MANAGEMENT OBJECTIVES

Initially management will be directed towards rehabilitation of the Reserve environment, and the associated and subsequent enhancement of its conservation values. Management will also be directed toward minimising further impact by the various utilities, such as the water pipeline, railway and powerline, on the conservation values of the Reserve.

To achieve these objectives management strategies will include: protection from fire, pests and disease; rehabilitation of degraded areas; and management of public use.

Any strategies not discussed below are covered in Part 8. Gene-al Management Strategies.

2. PROTECTION FROM FIRE

This small Reserve, isolated amidst cleared farmland and cut by roads and pipelines, presents little fire risk. The absence of fire from the Reserve for many years is indicative of its low fire hazard. Fire protection and the conservation values of Meenaar could be greatly increased by rationalisiug the existing system of firebreaks and tracks.

Management Strategy

The firebreaks along the south-eastern boundary and along the southern side of the water pipeline will be regularly maintained to their present standard.

3. REHABILITATION AND MAINTENANCE OF THE NATURAL ENVIRONMENT

Management Strategies

All rubbish will be removed prior to closure of the tracks. This rubbish will be buried in the western-most gravel pit before rehabilitation commences.

All tracks not required for servicing the utilities or as part of the Reserve firebreak system (Fig. 16) will be closed and ripped to encourage regeneration.

Rehabilitation of the gravel pits will require:

(a) identification of banks and cliffs used by burrow-nesting birds. These areas will not be disturbed;

(b) pushing any available spoil heaps or topsoil onto the floor of the pit;

(c) battering the pit sides to a slope of less than 3 in 1;

(d) ripping the pit floor along the contours; and

(e) ripping and blocking off access tracks.

The edges of the old gravel pit to the west of Meenaar South Road are particularly important as they have been used for many years by Red-backed Kingfishers and White-backed Swallows as nesting sites.

4. PUBLIC USE

Management Strategies

Considering the degraded nature of the area and the need to enhance the conservation and aesthetic values, public use will remain low key.

Signs giving the Reserve name and information on public use will be erected on the western and eastern corners of the Reserve adjacent to the Great Eastern Highway, on the southern corner of the Reserve adjacent to Meenaar South Road and at the junction of Meiklem Road and the south-western boundary.

PART 8. GENERAL MANAGEMENT STRATEGIES

1. PROTECTION FROM FIRE

Management Strategies

Fire-fighting units from the Mundaring District Office of CALM will attend fires occurring on, or considered to be threatening, the York-Northam nature reserves.

Owing to the remoteness of most of these nature reserves from the Mundaring District Office, it is highly unlikely that the Department could carry out an initial attack on wildfires on or threatening these reserves. Thus, effective fire protection will depend on liaison between this Department, the local government authority and reserve neighbours. The Mundaring District Office will develop these links.

CALM will become a Notifiable Authority for the Shires of York and Northam. This means that if a permit is held to burn land adjacent to a particular nature reserve, then the permit holder is obliged to notify the Department before burning is undertaken.

2. PROTECTION FROM PESTS: ANIMAL AND WEED CONTROL

Control of pest animals and plants may be necessary to protect the flora or fauna. of a particular nature reserve (or group of reserves) or as part of organised past control in the surrounding area.

Management Strategies

Arrangements for pest control will be made between the Mundaring District Office of CALM and the Agriculture Protection Board. Details regarding pest control will be recorded.

The extent of weed invasion will be mapped and the area(s) regularly inspected. If treatments are used all relevant details will be recorded.

3. PROTECTION FROM DIEBACK

While the destructive effects of dieback on Jarrah are well publicised, the broader effects are not as well known. Dieback destroys many species of native flora and it is expected that the disease will

indirectly affect many animals through its impact on their habitat. Because dieback is so destructive, it is necessary to prevent the transport of the disease within or from a particular reserve, if it is present, or onto a reserve if it is absent.

Dieback is known to occur throughout much of the State forest immediately to the west of the York-Northam area. It is likely, therefore, that dieback may be present on the nature reserves in the western part of the York-Northam area, if not the reserves in the eastern part as well.

Management Strategies

Each nature reserve will be surveyed to determine if dieback is present. Clackline Nature Reserve will be regarded as the highest priority. The remainder of the reserves are probably less susceptible. Thus, the priority for survey of the remaining reserves is lower.

The following procedures will be implemented:

(a) Regardless of whether the particular nature reserve is infected or not (unless the entire reserve is infected) all vehicles and equipment will be cleaned down, if they have recently been used in other areas of bush, before being used on the Reserve.

(b) If dieback is present, the boundaries of the infected areas will be mapped and the infected area quarantined. Access by vehicle into the infected area will only be permitted in an emergency (e.g. wildfire suppression) with vehicles being thoroughly cleaned before moving into uninfected areas.

(c) Firebreak maintenance will be based on complete clean-down of all equipment before moving from infected to uninfected areas.

(d) Prior to the availability of conclusive evidence on the dieback status of the reserves, all work proposed and implemented under this plan will be according to (a).

4. RARE PLANTS

Management Strategy

Before operations (e.g. weed control) are carried out, the presence of rare plants must be considered. Rare plants present on each nature reserve covered by this plan are given under the relevant Soi1s

and Vegetation section. Maps giving the exact locations of these species are held by the Mundaring District Office of CALM.

5. BEEKEEPING

According to policy adopted by the W.A. Wildlife Authority (now the NPNCA) in May 1981, beekeeping is not allowed on nature reserves less than 500 ha in area. Thus, none of the nature reserves in the Shires of York or Northam are suitable.

Management Strategy

No apiary sites are located on the York-Northam nature reserves and it is not envisaged that any sites will be made available during the currency of this plan.

6. MINING

The Minister for Minerals and Energy has the power of approval or veto regarding mining applications on nature reserves. He is generally required to seek the comments or recommendations of the Minister for Conservation and Land Management (Mining Act 1981 [as amended],, Sections 23 and 24). The current approval process may change once the Bailey Committee report on Mining in National Parks and Nature Reserves has been considered by the Government.

Management Strategies

If mining, either exploratory or production, is permitted on the York-Northam nature reserves, conditions will be determined by CALM in liaison with the Department of Mines.

7. PUBLIC USE

The Mundaring District Office is working closely with the local community and community groups who have an interest in the management of lands under the control of CALM. This close liaison will readily allow the public to discuss management concerns with officers from this Department.

Management Strategies

All signs will comply with the CALM signs standard for nature reserves, which is based on wooden routed signs with primrose yellow lettering on a pine-log green background.

8. RESEARCH

Surveys and research programs by conservation groups and tertiary institutions will be co-ordinated by the Mundaring District Office of CALM, with advice from the CALM W.A. Wildlife Research Centre.

9. MANAGEMENT RECORDS

Management Strategies

The Mundaring District Office will maintain accurate and up-to-date records of all management activities undertaken on the York-Northam Nature Reserves. These records will include current inventories of the flora and fauna on the reserves.

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APPENDIX 1. FLORA OF THE NATURE RESERVES IN THE SHIRES OF YORK AND NORTHAM

(Source: Greg Keighery and Jeni Alford, W.A. Wildlife Research Centre 1986)

		CLACKLINE	ST RONANS	WAMBYN	MOKINE	THROSSELL	MEENA
SELAGINELLACEAE							
Selaginelta gracillima				x			
ADIANTACEAE							
Cheilanthes austrotenuifolia	Rock Fern	x	x	x	x	x	x
OPHIOGLOSSACEAE							
Ophioglossum Lusitanicum			x	x	x		
ASPLENIACEAE							
Pleurosorus rutifolius		x			x		
ZAMIACEAE							
Placrozamia riedlei	Zamia	x	x	x	x		
CUPRESSACEAE							
Actinostrobus pyrcanidalis	Swamp Cypress	x					
JUNCAGINACEAE							
Triglochin calcitrapa	Spurred Arrowgrass	x					
T. centrocarpa			x	x	x		
T. minutissima		x					
T. procera					x		
POACEAE							
Agrostis avenacea					x		
Aira caryophyllea *	Silvery Lair Grass	x	x	x	x	x	
Amphipogon strictus	Grey-Beard Grass	x					
A. turbinatus		x					
Aristidi contorta				x	x		x
Avena fatua *	Wild Oat	x	x	x	x	x	x
Briza maxima *	Quaking Grass	x	x	x	x	x	x
B.Minor *	Shivery Grass	x					
B. Madritensis				x		x	x
Bromus rubens *	Red Brome	x					
Brachypodium distichum *				x			
Danthonia pilosa					x		
Danthonia setacea		x		x			
Eharharta longiflora *	Annual Veldt Grass	x				x	
Eragrostis curvula *	Love Grass						x
E. dielsii				x			
Lolium sp. *	Rye Grass	x					x
Microlaena stipoides					x		
Monachather paradoxa		x					
Neurachne alopecuroidea		x	x			x	x
Paralophis incurva *						x	x
Poa drummondiana	Shaking Grass	x					
Stipa elegantissima	Feather Spear Grass		x	x	x	x	x
S. semibarbata		x		x			
S. trichophylla				x	x		
Themeda australis				x			
Vulpia bromoides *			x	x		x	

		CLACKLINE	ST RONANS	WAMBYN	MOKINE	THROSSELL	MEENA
CYPERACEAE							
Caustis dioica						x	x
Chorizandra enodis	Black Bristle Rush				x		
Cyathochaeta avenacea					x		
Gahnia drummondii		x	x	x	x	x	
G. trifida		x					
Isolepis marginata		x			x		
Lepidosperma angustatum		x	x				
L. leptostachyum				x			
L. longitudinale	Common Sword Sedge	x	x	x	x		
L. tenue						x	x
L. viscidum		x			x	x	x
Mesomelaena stygia		x	x			x	x
M. tetragona	Semaphore Sedge	x	x		x		
Schoenus clandestinus		x	x		x		
S. curvifolius			x	x			
S. globifer						x	
S. subbarbatus				x			
S. lanatus		x	x	x			
S. sesquispiculus				x			
S. sp. I		x					
Tetraria octandra			x	x			
RESTIONACEAE							
Harperia llaterilflora				x		x	x
Lepidobolus chaetocephalus		x	x	x	x	x	x
Leptocarpus sp.						x	
Lepyrodia cf. monoica					x		
Loxocarya cinerea		x	x	x	x	x	x
L. flexuosa		x			x		
Restio megclotheca	Cord Rush	x					
CENTROLEPIDACEAE							
Aphelia cyperoides		x	x	x			
A. drummondii			x	x			
A. nutans			x	x	x		
Centrolepis aristata	Painted Centrolepis	x	x	x	x		
C. pilosa		x					
C. polyqyna	Wiry Centrolepis	x		x		x	
PRILYDRACEAE							
Philydretta pygmaea		x	x				
JUNCACEAE							
Juncus acutus *				x			
J. bufonius	Toad Rush	x		x	x		
J. capitatus *				x	x		
J. cf. holoschoenus	Joint Leaf Rush	x			x		
J. kraussii					x		
J. pauciflorus						x	
DASYPOGONACEAE							
Acanthocarpos preissii						x	x
Calectasia cyanea	Blue Tinsel Lily	x					x
Chamaexeros serra							x
Lomandra brittanii				x			

		CLACKLINE	ST RONANS	WAMBYN	MOKINE	THROSSELL	MEENA
L. caespitosa		x	x		x	x	x
L. collina	Scented Mat Rush			x		x	
L. effusa				x		x	x
L. micrantha	Small Flowered Mat Rush	x	x	x	x	x	x
L. mucronata			x		x		
L. nutans		x	x	x	x		
L. preissii		x	x				
L. spartea	Silky Mat Rush	x	x	x	x		
XANTHORRHOEACEAE							
Xanthorrhoea drummondii	Blackboy	x	x	x	x	x	x
X. preissii.	Skirted Grass Tree	x	x	x	x		
PHORMIACEAE							
Dianella revoluta	Spreading Flax Lily	x	x	x	x	x	x
Stypandra imbricata	Cluster-leaved Blind Grass	x	x	x	x		x
ANTHERICACEAE							
Agrostocrinum scabram	The Grass Lily	x					x
Arthropodium capillipes		x	x	x	x	x	x
A. preissii		x			x		
A. sp. nov.			x	x	x		
Borya constricta					x	x	
B. nitida		x	x	x	x	x	x
B. scirpiodea			x				
Caesia parviflora		x		x	x	x	x
Corynotheca micrantha		x	x				
Chamaescilla corymbosa	Blue Squill	x	x		x		x
C. spiralis							x
Laxmannia grandiflora		x	x			x	x
L. ramosa		x	x	x	x		
L. sessiliflora		x					
L. squarrosa		x	x		x	x	x
L. sp. nov.			x		x	x	x
Sowerbaea laxiftora	Purple Tassles		x			x	x
Thysanotus dichotomus	Branching Fringe Lily		x				
T. multiflorus	Many Flowered Fringe Lily	x	x		x	x	
T. patersonii	Twining Fringe Lily	x	x	x	x		
T. pauciflorus				x			
T. sparteus		x	x	x	x		
Tricoryne etatior	Yellow Autumn Lily	x	x	x	x		x
ASPHODELACEAE							
BuIbine semibarbata				x			
COLCHICACEAE							
Burchardia multiflora					x		
B. umbellata	Milkmaids	x	x		x		x
Wurmbea dioica	Early Nancy		x		x		
W. drummondii				x	x		
W. tenella		x	x	x	x		
HAEMODORACEAE							
Anigozanthos humilis	Cat's Paw	x	x		x		x
A. manglesii	Mangle's Kangaroo Paw		x				
Conostylis aurea	Golden Conostylis		x	x			
C. candicans						x	x
C. caricina			x	x			

		CLACKLINE	ST RONANS	WAMBYN	MOKINE	THROSSELL	MEENA
C. setigera	Bristly Conostylis	x	x	x	x	x	x
C. sp.					x		
Haemodorum laxum			x	x	x		
H. paniculatum		x		x			
H. simplex				x	x		
H. siraulans							x
H. sparsiflorum			x				
H. spicatum		x			x		
Tribonanthes tongipetala		x				x	x
T. violacea		x	x	x	x		
AMARYLLIDACEAE							
Amaryllis belIadona *				x			
Narcissus tazetta *				x			
HYPOXIDACEAE							
Hypoxis occidentalis		x	x	x	x	x	x
DIOSCOREACFAE							
Dioscorea hastifolia		x			x		
IRIDACEAE							
Chasmanthe floribunda *				x			
Gynandriris setifolia *						x	
Homeria collina *					x		
H. flaccida *	Cape Tulip		x				
Moraea fugax *			x				
Orthrosanthus laxus	Morning Iris	x			x		
0. polystachyus						x	x
Patersonia drummondii			x	x			
P. occidentalis	Purple Flags	x	x	x	x		
P. pygmaea	Pygmy Patersonia		x	x	x		
P. sp.							x
Romulea rosea *	Onion Grass	x	x	x	x	x	x
ORCHIDACEAE							
Caladenia deformis	Blue Beard	x	x		x		x
C. filamentosa	Red Spider Orchid	x				x	
C. flava	Cowslip Orchid		x				
C. gemmata	Blue China Orchid		x				
C. patersonii	White Spider Orchid	x	x			x	
C. reptans						x	
C. triangularis	Shy Spider Orchid	x					
C. sp.							x
Diuris laxiflora	Bee Orchid		x				
D.longifolia	Common Donkey Orchid	x	x	x	x	x	x
Elythranthera brunonis	Purple Enamel Orchid	x	x				
E. emarginata	Pink Enamel Orchid		x				
Eriochilus dilatatus	White Bunny Orchid	x	x	x	x		
Leporella fimbriata	Hare Orchid	x		x		x	x
Lyperanthus serratus	Hare Orchid	x		x			
L. nigricans	Red Beaks	x		x	x		
PrasophyNum cyphochilum	Pouched Leek Orchid		x	x			
P. macrostachyum var. ringens	Laughing Leek Orchid			x			
P. parvifolium				x			
Pterostylis barbata	Bird Orchid	x					
P. nana	Snail Orchid			x			

		CLACKLINE	ST RONANS	WAMBYN	MOKINE	THROSSELL	MEENA
P. recurva	Jug Orchid	x	x	x	x		
P. sargentii					x	x	
P. vittata	Banded Greenhood	x	x	x	x	x	
Spiculea ciliata		x	x	x	x		
Thelymitra antennifera	Vanilla Orchid		x		x		
T. crinita	Blue Lady Orchid	x	x				
T. fuscolutea		x					
T. spiralis							x
T. spiralis var punctata					x		
CASUARINACEAE							
Allocasuarina campestris	Tamma	x	x	x	x	x	x
A. huegeliana	Sheoak	x	x	x	x	x	x
A. humilis	Scrub Sheoak	x	x	x	x	x	x
A. microstachya			x		x	x	x
A. thuyoides	Horned Sheoak		x				
Casuarina obesa	Swamp Sheoak		x				
PROTEACEAE							
Adenanthos cygnorum	Woolly Bush	x	x		x		
Banksia attenuata	Slender Banksia	x					
B. grandis	Bull Banksia	x	x				
B. menziessii	Menzies's Banksia	x					
B. sphaerocarpa	Round Fruited Banksia	x					
Conospermum stoechadis	Common Smoke Bush	x	x				x
Dryandra armata	Prickly Dryandra	x	x	x	x		x
D. bipinnatifida		x	x	x	x		
D. carduacea	Pingle	x	x		x		
D. cirsioides							x
D. cuneata			x				
D. fraseri		x	x	x	x		x
D. kippistiana		x					
D. nivea	Couch Honeypot	x	x	x	x		
D. cf. nivea			x				
D. nobilis	Golden Dryandra	x	x	x	x		
D. polycephala	Many-headed Dryandra	x	x	x	x		
D. proteoides	King Dryandra	x	x	x	x		
D. sessilis	Parrot Bush	x	x	x	x		x
D. stuposa				x	x		
Grevillea bipinnatifida	Fuschia Grevillea		x				
G. eriostachya	Flame Grevillea						x
G. pilulifera	Woolly-flowered Grevillea	x	x		x		
G. pulchelIa	Beautiful Grevillea		x	x	x		
G. quercifolia	Oak Leaf Grevillea	x	x	x		x	
G. synapheae			x				
G. teretifolia						x	
G. tridentifera	Pronged Grevillea				x		
G. trifida		x					
G. vestita		x			x		
Hakea cf. crassifolia	Thick-leaved Hakea				x		x
H. erinacea	Hedge-hog Hakea	x	x	x	x		
H. gilbertii	Gilbert's Hakea						x
H. incrassata		x	x	x	x	x	x
H. lissocarpha	Honey Bush	x	x	x	x	x	x
H. loranthifolia		x		x			
H. marginata		x					

		CLACKLINE	ST RONANS	WAMBYN	MOKINE	THROSSELL	MEENA
H. peticlaris	Sea Urchin Hakea	x	x	x			
H. preissii		x		x		x	x
H. prostrata	Harsh Hakea	x	x	x	x	x	x
H. ruscifolia	Candle Hakea	x	x	x	x		
H. stenocarpa	Narrow Fruited Hakea		x	x			
H. trifurcata		x	x	x	x		x
H. undulata	Wavy-leaved Rakea	x	x	x	x		
Isopogon divergens	Spreading Cone Bush	x					x
I. drummondii			x				
I. dubius	Pincushion Cone Flower	x	x		x		
I. longifolius			x				
I. teretifolius	Needle Cone Bush		x				
I. villosus		x	x	x	x		
Persoonia elliptica		x					
P. quinquenervis	Kauberry	x	x	x	x		x
P. trinervis		x	x				
Petrophile brevifolia			x	x			x
P. divaricata		x	x	x	x		x
P. ericifolia		x	x	x	x		x
P. heterophytla			x		x		
P. longifolia	Long-leaved Cone Bush	x	x	x	x		
P. macrostachya		x					
P. serruriae		x	x				
P. squamata			x	x			
P. striata			x	x			
P. trifida		x	x	x	x		
Stirlingia latifolia	Blueboy	x	x				
Synaphea petiolaris		x					
S. polymorpha	Showy Synaphea						x
S. preissii		x	x				
S. Sp.			x				x
SANTALACEAE							
Choretrum glomeratum var. chrysanthum					x		
Santalum acuminatum	Sweet Quandong			x		x	x
S. spicatum	Sandalwood						x
LORANTHACEAE							
Amyema miqueIii	Mistletoe	x	x	x	x		x
A. preissii				x			x
Nuytsia floribunda	Christmas Tree	x	x				
RAFFLESIACEAE							
Pilostyles hamiltonii			x				
POLYGONACEAE							
Muehtenbeckia adpressa	Climbing Lignum		x	x	x	x	x
Rumex crispus *	Curled Dock	x					
CHENOPODIACEAE							
Halosarcia pergranulata	*Samphire*			x			
Rhagodia crassifolia						x	
Sclerolaena diacantha						x	

		CLACKLINE	ST RONANS	WAMBYN	MOKINE	THROSSELL	MEENA
AMARANTHACEAE							
Ptilotus declinatus	Curved Mulla Mulla	x	x	x	x	x	
P. drummondii		x	x	x	x	x	
P. manglesii	Pom Poms	x	x	x	x		
P. polystachyus		x				x	x
P. villosiflorus			x	x	x	x	
AIZOACEAE							
Carpobrotus modestus	Inland Pigface						x
RANUNCULACEAE							
Ranuncutus parviflorus					x		
LAURACEAE							
Cassytha aurea							x
C. glabella		x	x	x	x		
C. melantha					x		
C. racemosa					x		x
BRASSICACEAE							
Lepidium rotundum						x	
DROSERACEAE							
Drosera barbigera					x		
D. bulbosa		x	x	x	x		
D. erythrorhiza		x	x	x			
D. gigantea		x		x			
D. glanduligera		x	x	x	x		x
D. heterophylIa			x				
D. leucoblasta		x	x				x
D. macrantha		x	x	x	x		x
D. menziesii	Pinkrainbow or Menzie's Sundew	x	x	x	x		
D. pallida	Pale Sundew	x	x	x			
D. stricticaulis			x		x		
D. subhirtella		x	x	x	x		x
D. zonaria		x	x	x			x
CRASSULACEAE							
Crassula colorata	Dense Stonecrop	x	x	x	x	x	
C. exserta			x				
C. natans				x	x		
PITTOSPORACEAE							
Billardiera bicolor						x	
Sollya heterophylla	Australian Blue-Bell		x			x	
SURIANACEAE							
Stylobasium australe							x
MIMOSACEAE							
Acacia acuminata	Jam Tree	x	x	x	x	x	x
A. aphylla	Leafless Wattle				x		
A. campylophylIa					x		
A. celastrifolia	Glowing Wattle	x				x	
A. chrysocephala				x			
A. drumondii			x				
A. erinacea						x	x

		CLACKLINE	ST RONANS	WAMBYN	MOKINE	THROSSELL	MEENA
A. huegelli					x		
A. lasiocalyx		x	x	x	x		x
A. lasiocarpa			x	x	x	x	x
A. microbotrya	Gum Wattle	x	x	x	x	x	
A. myrtifolia	Myrtle Wattle		x				
A. preissiana		x					
A. putchella	Prickly Moses	x	x	x	x		
A. restiacea					x		
A. saligna		x				x	x
A. sessilispica			x				
A. sphacetata			x		x		
A. squamata		x	x	x	x		
A. stenoptera						x	
A. urophylla		x					
A. willdenowiana		x			x		
CAESALPINACEAE							
Labichea lanceolata					x		
PAPILIONACEAE							
Bossiaea eriocarpa		x	x	x	x		
B. spinescens						x	
Burtonia viscida							x
Chorizema cf. aciculare	Needle-leaved Chorizema		x				
Daviesia brevifolia							x
D. decurrens	Thorny Bitter Pea	x	x	x	x	x	
D. incrassata						x	
D. juncea				x	x		
D. cf. nudiflora							x
D. polyphylla					x	x	x
D. rhombifolia			x		x		
D. sp. I					x	x	x
D. sp. II							x
Dillwynia cinerascens	Grey Parrot-pea			x	x		
Gastrolobiwn bilobum	Heart Leaved Poison		x				
G. calycinum	York Road Poison	x	x	x	x		
G. hookeri					x	x	x
G. ilicifolium			X				
G. microcarpum	Sandplain Poison	X					
G. obovatum	Boat-leaved Poison	X	X	X	X		
G. parvifolium	Berry Poison	X					
G. rotundifolium							
G. spinosum	Prickly Poison	X	X	X	X	X	X
G. trilobum	Bullock Poison	X	X	X	X		X
C. villosum	Crinkle Leaf Poison	X	X				
Gompholobium knightianum			X				
G. marginatum		X	X		X		
G. shuttleworthii			X				
Hovea chorizemifolia	Holly-leaved Hovea	X	X	X	X		
H. pungens	Devil's Pins	X	X	X	X		
H. trisperma	Common Hovea	X		X	X		
Isotropis cuneifolia	Common Lamb Poison	X				X	X
Jacksonia carduacea		X					
J. floribunda	Holly Pea	X					
J. sternbergiana	Stinkwood	X				X	
Kennedia coccinea	Coral Vine		X				
K. prostrata	Red Runner	X	X	X	X		

		CLACKLINE	ST RONANS	WAMBYN	MOKINE	THROSSELL	MEENA
K. stirlingii	Bushy Kennedia	X	X				
Lupinus cosentinii *							X
Mirbelia ramulosa					X	X	X
M. spinosa							X
Oxylobium capitatum			X		X		
0. cuneatum	Wedgeleaf Oxylobium	X	X	X	X		
0. parviflorum	Box Poison	X	X	X	X		
Templetonia sulcata						X	
GERANIACEAE							
Erodium circutarium *		X					
E. cygnorum	Blue Heron's Bill	X					X
OXALIDACEAE							
Oxatis perennans		x		x	x	x	x
0. pes-caprae							x
0. polyphylla *							x
0. purpurea *							x
LINACEAE							
Linum marginale				x	x		
RUTACEAE							
Boronia busselliana		x					
B. ramosa		x			x		
Diptotaena microcephala					x		
Eriostemon spicatus		x					
TREMANDRACEAE							
Tetratheca confertifolia			x	x	x		
POLYGALACEAE							
Comesperma scoparium	Broome Milkwort		x				
C. calymega			x	x	x		
C. volubile	Love Creeper		x				
EUPHORBIACEAE							
Ampera ericoides					x		
Monotaxis sp.				x			
Poranthera microphylla				x			
Phyllanthus calycinus	False Boronia	x	x	x	x		
Ricinocarpos glaucus			x				
STACKEOUSIACEAE							
Stackhousia pubescens		x	x		x		
Tripterococcus brunonis		x	x		x		
SAPINDACEAE							
Dodonaea concinna		x	x	x	x		
D. divaricata						x	x
D. hexandra			x	x			
D. viscosa	Sticky Hop Bush		x	x	x		
RHAMNACEAE							
Cryptandra arbutiflora			x	x	x		
C. glabriflora					x		
C. polyclada					x		

		CLACKLINE	ST RONANS	WAMBYN	MOKINE	THROSSELL	MEENA
C. pungens					x		
C. tubiflora						x	x
C. tomentosa					x		x
Spyridium tridentatum			x		x	x	
S. SP.							x
Trymalium angustifolium			x				
T. ledifolium		x	x	x	x	x	
STERCULIACEAE							
Keraudrenia integrifolia	Common Fire-bush						x
Lasiopetalum quinquinervum					x		
Rutingia sp.							x
Thomasia foliosa		x	x	x	x	x	x
DILLENIACEAE							
Hibbertia acerosa						x	
H. enervia		x	x		x		x
H. hypericoides	Yellow Buttercups	x	x	x	x		
H. lineata			x				
H. montana	Mountain Primrose	x	x	x	x		
H. polystachya		x	x	x			
H. rupicola		x	x	x	x		
H. spicata					x		
H. stellaris	Orange Stars		x				
FRANKENIACEAE							
Frankenia pauciflora				x			
THYMELAEACEAE							
Pimelea argenteum						x	
P. ciliata		x	x				
P. imbricata			x		x		
MYRTACEAE							
Astartea fascicularis		x					
Baeckea crispiflora			x			x	x
Beaufortia bracteosa			x		x		
B. elegans		x					
B. incana					x		
B. macrostemon		x					
B. purpurea			x				
Calothamnus quadrifidus	One-sided Bottlebrush	x		x	x	x	x
C. rupestris	Mouse Ears		x	x			
C. sanguineus		x	x	x	x		
Calytrix angulata		x	x				
C. brachyphylla							x
C. depressa			x				
C. flavescens	Summer Starflower	x	x				
C. fraseri	Pink Summer Starflower	x					
C. glutinosa			x		x		
Chamelaucium uncinatum *	Geraldton Wax			x			
Darwinia sp. nov.			x				
Eremaea pauciflora		x			x	x	x
E. violacea					x		
Eucalyptus accedens	Powderbark Wandoo	x	x	x	x		
E. astringens	Brown Mallet	x		x	x		

		CLACKLINE	ST RONANS	WAMBYN	MOKINE	THROSSELL	MEENA
E. calophylla	Marri	x	x	x	x		
E. decurva		x					
E. drumondii	Drummmond's Gum		x				
E. loxophleba	York Gum			x	x	x	x
E. marginata	Jarrah	x					
E. rudis	Flooded Gum		x	x			
E. salmonophloia	Salmon Gum					x	
E. wandoo	Wandoo	x	x	x	x	x	x
Hypocalymma angustifolium	White Myrtle	x	x	x	x		
Kunzea recurva		x					
Leptospermum erubescens		x	x	x	x	x	x
Melaleuca holosericea		x					
M. pentagona				x			
M. platycalyx							x
M. preissiana		x					
M. radula	Graceful Honeymyrtle	x					x
M. trichophylla			x				
M. uncinata					x	x	
Pericalymma ellipticum		x	x	x			
Thryptomene austratis	Hook-leaf Thryptomene		x				
T. obovata						x	
Verticordia brownii							x
V. chrysantha							x
V. densiflora		x					
V. fimbrilepis			x				
V. grandiflora	Claw Featherflower		x				
V. huegelii	Variegated Featberflower		x				
V. insignis			x		x		
V. pennigera				x			
V. picta	Painted Featherflower		x		x		x
V. roei	Roe's Featherflower		x				
V. serrata		x	x				
HALORAGACEAE							
Glischrocaryon aureum	Conmon Pop-flower		x				x
G. flavescens					x	x	x
G. cf. flavescens			x		x		
Gonocarpus pithycides		x	x	x	x		
APIACEAE							
Actinotus leucocephalus	Flannel Flower		x				
Daucus glochidiatus	Australian Carrot	x		x	x	x	x
Eryngium vesicutosum	Prickfoot	x	x		x		
Platysace cirrosaleatoniae				x			
Homalosciadium homalocarpum		x	x	x	x		
Trachymene cyanopetala		x	x	x	x	x	x
T. ornata		x		x		x	x
T. pilosa	Native Parsnip	x	x	x	x	x	x
Xanthosia candida					x		
X. huegelii		x		x			
EPACRIDACEAE							
Andersonia sprengelioides			x				
Astrotoma compactum		x	x				
A. epacridis		x	x	x	x		
A. pallidum		x	x	x	x		
A. prostratum		x					

		CLACKLINE	ST RONANS	WAMBYN	MOKINE	THROSSELL	MEENA
A. serratifolium (var. placidum)			x		x	x	x
Brachyloma concolor					x		
Conostephium preissii							x
Leucopogon australis	Spiked Beard Heath				x		
L. capitellatus		x	x				
L. gracillimus				x	x		
L. nutans			x	x	x		
L. propinquus		x	x	x	x		
Lysinema ciliatum	Curry Flower	x					x
Styphelia tenuiflora	Common Pin Heath	x	x				
PRIMULACEAE							
Anagallis arvensis *		x			x	x	
LOGANIACEAE							
Logania flaviflora	Yellow Logania		x				
Mitrasacme paradoxa		x	x	x	x		
CONVOLVULACEAE							
Wilsonia humilis						x	
BORAGINACEAE							
Echium plantageneum *					x		
GENTIANACEAE							
Cicendia filiformis *	Slender Cicendia				x		
Centaurium erythraea *	Common Centaury	x	x	x	x		
CHLOANTHACEAE							
Cyanostegia lanceolata		x					
Lachnostachys albicans		x					
Physopsis spicata	Hill River Lambstail	x					
LAMIACEAE							
Hemiandra pungens	Snake Bush	x	x				
H. cf. pungens						x	
Hemigenia canescens			x		x	x	
H. curvifolia			x				
H. drummondii			x	x			
H. incana	Velvety Hemigenia		x				
SOLANACEAE							
Nicotiana rotundifolia	Round leaved Tobacco	x					
Solanum hystrix	Afghan Thistle						x
S. lasiophyllum	Flannel Bush						x
S. nigrum *	Black Nightshade	x			x		x
SCROPHULARIACEAE							
Bellardia trixago *				x	x		
Gratiola peruviana	Austral Brooklime				x		
Parentucellia latifolia *	Common Bartsia	x	x	x	x		x
P. viscosa *	Sticky Bartsia		x				
Stachys arvensis				x			
OROBANCHACEAE							
Orobanche australiana	Australian Broome Rape	x	x	x	x		

		CLACKLINE	ST RONANS	WAMBYN	MOKINE	THROSSELL	MEENA
LENTIBULARIACEAE							
Polypompholyx multifida	Pink Petticoats	x	x				
P. tenella			x				
RUBIACEAE							
Galium divaricatum					x		
Opercularia vaginata		x	x	x		x	x
CAMPANULACEAE							
Wahlenbergia gracilenta	Annual Bluebell	x		x			
W. capensis *	Cape Bluebell	x					
LOBELIACEAE							
Isotoma hypocrateriformis	Woodbridge Poison	x	x	x	x		
Lobelia atata	Angled Lobelia				x		
L. gibbosa					x		
L. rhombifoilia					x		
L. tenuior	Slender Lobelia	x					
Monopsis simplex					x		
GOODENIACEAE							
Dampiera alata	Winged-Stem Dampiera	x	x				
D. eriocephala			x				
D. juncea						x	x
D. oligophylla	Sparse-leaved Dampiera	x	x	x	x	x	
D. preissii			x				
D. spicigera							x
D. trigona	Angle-Stem Dampiera		x				
Goodenia affinis							x
G. caerulea			x		x		
G. fasciculata	Cluster-leaf Goodenia	x	x	x	x		
G. filiformis		x		x	x		
G. glandulosa						x	
G. mooreana						x	
G. pinifolia					x		
G. pulchella					x	x	
Leschenaultia biloba	Blue Lechenaultia	x	x	x	x		
Scaevola lanceolata			x				
S. parviflora	Small-flowered Scaevola		x				
Verreauxia reinwardtii	Felted Verreauxia	x	x				x
STYLIDIACEAE							
Levenhookia pusilla	Midget Stylewort	x	x	x	x		
L. stipitata	Common Stylewort	x	x	x	x		
Sty lidium affine					x		
S. breviscapum	Boomerang Triggerplant		x		x		
S. brunonianum	Pink Fountain Triggerplant	x	x		x		
S. bulbiferum		x		x			
S. calcaratum	Book TrIggerplant	x	x	x	x		
S. caricifolium	Milkmaid Triggerplant	x	x		x		x
S. ciliatum	Golden Triggerplant		x				x
S. dichotomum	Pins and Needles		x	x	x		x
S. emarginatum	Biddy-four-legs		x				
S. leptophyllum	Needle Leaved Triggerplant		x				
S. obtusatum	Pinafore Triggerplant.		x				
S. petiolare	Horn Triggerplant		x				
S. piliferum	Common Butterfly Triggerplant	x	x	x	x		x

		CLACKLINE	ST RONANS	WAMBYN	MOKINE	THROSSELL	MEENA
S. pycnostachyum			x				
S. repens		x					x
ASTERACEAE							
Chrysocoryne pusilla		x		x	x		
C. tenellus	Delicate Angianthus			x			
Brachycome iberidifolia	Swan River Daisy	x	x	x	x	x	
Carduus pycnocephalus *		x				x	
Centaurea melitensis *		x					
Ceratogyne obionoides							x
Chthonocephatus pseudevax						x	
Conyza canadensis					x		
Centipedia cunninghcamii	Sneezeweed				x		
Cotula coronopifolia	Water Buttons	x			x		x
Dittrichia graveolens *	Stinkweed	x		x	x		x
Helichrysum bracteatum	Golden Everlastings	x	x				
H. filifolium						x	
H. leucopsidum	Satin Everlasting	x		x		x	
Helipterum cotula			x		x	x	
H. manglesii				x	x	x	
H. stipitatum						x	
Hypochaeris radicata *	Flatweed	x	x		x	x	x
Lagenifera huegetii		x	x		x	x	x
Myriocephatus gracilis						x	
Olearia adenolasia				x			
0. paucidentata			x				
0. revotuta						x	x
0. rudis	Purple Daisy Bush	x			x	x	
Osteospermum clandestinum *		x				x	x
Pithocarpa achilleoides		x					
P. pulchella				x			
Podolepis canescens	Bright Pudolepis		x	x	x		
P. capillaris						x	x
P. lessonii				x	x	x	
Podotheca angustifolia		x			x	x	
Pogonolepis drummondii							x
Pseudognaphalium luteo-albwn		x			x		
Quinetia umillei		x	x	x			
Senecio glossanthus						x	
Sonchus oleraceus		x			x		
Siloxerus humifusus		x		x			x
Trichocline spathulata	Native Gerbera	x	x	x			
Ursinia anthemoides *	Ursinia	x	x	x	x	x	x
Vittadinia gracilis	Fuzzweed				x		
Waitzia acuminata					x		x
W. aurea		x		x			
W. citrina			x				
W. panniculata				x			

* Introduced

APPENDIX 2. FAUNA (EXCLUDING BIRDS) RECORDED ON NATURE RESERVES IN THE SHIRES OF YORK AND NORTHAM

(Source: Sue Moore and Andrew Williams, W.A. Wildlife Research Centre 1985 and W. A. Naturalists' Clul 1985)

		CLACKLINE	ST RONANS	WAMBYN	MOKINE	THROSSELL	MEENA
MAMMALS							
MONOTREMES							
Tachyglossus aculeatus	Echidna	x	x	x	x	x	x
MARSUPIALS							
Cercartetus concinnus	Western Pigmy-Possum		x	x	x		
Sminthopsis dolichura	Dunnart		x	x			
	Western Grey Kangaroo	x	x	x	x		
Macropus irma	Western Brush Wallaby	x	x	x	x		
Macropus robustus	Euro	x					
PLACENTAL MAMMALS							
VESPERTILIONIDAE (BATS)							
Tadarida australis	White-striped Mastiff-bat		x		x		
INTRODUCED MAMMALS							
Mus musculus	House Mouse		x	x	x		
Oryctotagus cuniculus	Rabbit	x	x	x	x	x	x
Vulpes vulpes	Fox			x	x		
Felis catus	Cat		x				
AMPHIBIANS							
FROGS							
LEPTODACTYLIDAE (SOUTHERN FROGS)							
Heleioporus albopunctatus	Spotted Burrowing Frog	x	x		x		
Heleioporus barycragus					x		
Heleioporus sp.			x				
Limnodynastes dorsalis	Western Banjo Frog or Pobblebonk	x	x		x		
Neobatrachus pelobatoides	Humming Frog	x					
Pseudophryne guentheri	Guentber's Toadlet	x	x		x	x	
Ranidelta sp.		x			x		
REPTILES							
LIZARDS							
GEKKONIDAE (GECKOS)							
Crenadactylus ocellatus	Clawless Gecko	x	x	x	x		x
Diplodactylus granariensis	Wood Gecko	x	x	x	x		
Diplodactylus pulcher			x	x			
Gehyra variegata		x	x	x	x		x
Oedura reticulata	Reticulated Velvet Gecko		x	x			

		CLACKLINE	ST RONANS	WAMBYN	MOKINE	THROSSELL	MEENA
Phyllodactylus marmoratus	Marbled Gecko		x				
Phyllurus millii	Barking Gecko	x	x	x	x		
PYGOPODIDAE (LEGLESS LIZARDS)							
Aprasia pulchella				x			
A. repens		x					
Delma fraseri		x	x	x	x		
Lialis burtonis	Burton's Snake-lizard	x	x	x	x		
Pygopus lepidopodus	Common Scaly-Foot		x				
AGAMIDAE (DRAGON LIZARDS)							
Ctenophorus ornatus	Ornate Dragon		x		x		
Pogona minor	Western Bearded Dragon	x	x	x	x		
VARANIDAE (GOANNAS/MONITORS)							
Varanus gouldii	Bungarra	x	x				
Varanus tristis	Racehorse Goanna	x	x		x		
SCINCIDAE (SKINKS)							
Cryptoblepharus plagiocephalus	Wood Skink	x	x	x	x		
Ctenotus pantherinus				x			
Egernia multiscutata		x	x	x			
Eremiascincus richardsonii				x	x		
Lerista distinguenda		x	x	x	x		
Menetia greyii		x	x	x	x		x
Morethia obscura			x	x			
Tiliqua rugosa	Bobtail	x	x	x	x	x	
SNAKES							
TYPHLOPIDAE (BLIND SNAKES)							
Ramphotyphlops australis		x		x	x		
Ramphotyphlops pinguis				x			
BOIDAE (PYTHONS)							
Python spilotus	Carpet Python	x					
ELAPIDAE (ELAPID SNAKES)							
Pseudechis australis	Mulga or King Brown Snake			x			
Rhinoplocephalus gouldii	Gould's Snake	x					
Vermicella bertholdi	Bandy Bandy	x		x	x		
Vermicella semifasciata	Half-girdled Snake	x	x	x	x		

APPENDIX 3. BIRDS RECORDED ON NATURE RESERVES IN THE SHIRES OF YORK AND NORTHAM

(Source: Andrew Williams, W.A. Wildlife Research Centre 1985; Jim Masters, Toodyay Naturalists' Club 1985; W.A. Naturalists' Club 1985; and Angus Cooke)

		CLACKLINE	ST RONANS	WAMBYN	MOKINE	THROSSELL	MEENA
NON-PASSERINES							
DROMAIIDAE (EMUS)							
Dromaius novaehollandiae	Emu	X	X				
Ardea novaehollandiae	White-faced Heron						X
ANATIDAE (DUCKS)							
Tadorna tadornoides	Australian Shelduck (Mountain Duck)				X	X*	X
Chenonetta jubata	Maned Duck					X*	
ACCIPITRIDAE (LARGE RAPTORS)							
Lophoictinia isura	Square-tailed Kite		X				
Accipiter fasciatus	Brown Goshawk (Australian Goshawk)	X		X	X		X
Accipiter cirrhocephalus	Collared Sparrowbawk		X				
Aquila audax	Wedge-tailed Eagle	X			X		X
Hieraaetus morphnoides	Little Eagle	X	X	X		X	X
FALCONIDAE (FALCONS)							
Falco longipennis	Australian Bobby (Little Falcon)				X	X	X
Falco berigora	Brown Falcon	X	X	X	X		X
Falco cenchroides	Australian Kestrel	X				X	X
PHASIANIDAE (QUAILS)							
Coturnix novaezelandiae	Stubble Quail	X		X		X	
TURNICIDAE (BUTTON-QUAILS)							
Turnix varia	Painted Button-quail		X	X			
RECURVIROSTRIDAE (AVOCETS AND STILTS)							
Himantopus himantopus	Black-winged Stilt						X
COLUMBIDAE (PIGEONS)							
Streptopelia senegalensis	Laughing Turtle-dove						Xl
Phaps chalcoptera	Common Bronzewing	X	X	X	X		X
Ocyphaps lophotes	Crested Pigeon			X		X	X
CACATUIDAE (COCKATOOS)							
Calyptorhynchus baudinii	White-tailed Black-Cockatoo	X	X	X	X		
Cacatua roseicapilla	Galah	X		X	X	X*	X
C. tenuirostris	Long-billed Corella					X*	
LORIIDAE (LORIKEETS)							
Glossopsitta porphyrocephala	Purple-crowned Lorikeet		X	X			
POLYTELITIDAE (PARROTS)							
Potytelis anthopeplus	Regent Parrot (Smoker Parrot)						X
PLATYCERCIDAE, (PARROTS)							
Metopsittacus undulatus	Budgerigar					X	X
Purpureicephalus spurius	Red-capped Parrot	X	X				

		CLACKLINE	ST RONANS	WAMBYN	MOKINE	THROSSELL	MEENA
Barnardius zonarius	Port Lincoln Ringneck	X	X	X	X	X*	X*
Psephotus varius	Mulga Parrot						X
Neophema elegans	Elegant Parrot		X	X	X	X	X
CUCULIDAE (CUCKOOS)							
Cucutus pallidus	Pallid Cuckoo	X	X				X*
Cuculus pyrrhophanus	Fan-tailed Cuckoo	X					
Chrysococcyx basalis	Horsfield's Bronze Cuckoo		X				X
Chrysococcyx tucidus	Shining Bronze-Cuckoo		X				X
STRIGIDAE (OWLS)							
Ninox novaeseelandiae	Southern Boobook (Boobook Owl)	X	X	X	X		
PODARGIDAE (FROGMOUTHS)							
Podargus strigoides	Tawny Frogmouth	X	X				
AEGOTHELIDAE (OWLET-NIGHTJARS)							
Aegotheles cristatus	Australian Owlet-nightjar		X		X		
ALCEDINIDAE (KINGFISHERS)							
Dacelo novaeguineae	Laughing Kookaburra	X*	X	X	X	X	X*
Halcyon pyrrhopygia	Red-backed Kingfisher						X*
Halcyon sancta	Sacred Kingfisher			X	X	X*	X
MEROPIDAE (BEE-EATERS)							
Merops ornatus	Rainbow Bee-eater (Australian Bee-eater)	X	X	X	X	X	X
PASSERINES							
HIRUNDINIDAE (SWALLOWS)							
Cheramoeca leucosternum	White-backed Swallow	X					X*
Hirundo neoxena	Welcome Swallow						X
Cecropis nigricans	Tree Martin	X	X	X	X	X*	X*
MOTACILLIDAE (PIPITS)							
Anthus novaeseetandiae	Richard's Pipit	X	X				X
CAMPEPHAGIDAE (CUCKOO-SHRIKES)							
Coracina novaehollandiae	Black-faced Cuckoo-shrike	X	X	X	X	X	X
Lalage sueurii	White-winged Triller	X	X	X	X	X	X*
MUSCICAPIDAE, (ROBINS/WHISTLERS/ MONARCHS/FANTAILS)							
Petroica multicolor	Scarlet Robin	X	X	X	X		
Petroica goodenovii	Red-capped Robin	X	X	X	X	X*	X*
Eopsaltria griseogularis	Western Yellow Robin	X	X	X	X		
Microeca leucophaea	Jacky Winter (Brown Flycatcher)						X
Pachycephala pectoralis	Golden Whistler	X	X			X	
Pachycephala rufiventris	Rufous Whistler	X	X	X	X		X
Colluricincla harmonica	Grey Shrike-thrush	X	X	X	X		X
Oreoica gutturalis	Crested Bellbird						X
Myiagra inquieta	Restless Flycatcher				X		
Rhipidura fuliginosa	Grey Fantail	X	X	X	X		X
Rhipidura leucophrys	Willie Wagtail		X	X	X	X	X
TIMALIIDAE (BABBLERS)							
Pomatostomus superciliosus	White-browed Babbler		X				X*

		CLACKLINE	ST RONANS	WAMBYN	MOKINE	THROSSELL	MEENA
SYLVIIDAE (OLD WORLD WARBLERS)							
Cinclorhamphus mathewsi	Rufous Songlark		X				X*
MALURIDAE (WRENS)							
Malurus splendens	Splendid Fairy-wren	X	X	X	X		
Malurus leucopterus	White-winged Fairy-wren						X
ACANTHIZIDAE (AUSTRALIAN WARBLERS)							
Smicrornis brevirostris	Weebill	X	X	X	X	X	X*
Gerygone fusca	Western Gerygone (Western Warbler)	X	X	X	X	X	X
Acanthiza apicatis	Inland Thornbill (Broad-tailed Thornbill)	X	X	X	X		
Acanthiza uropygialis	Chestnut-rumped Thornbill					X	X
Acanthiza inornata	Western Thornbill	X	X	X	X		
Acanthiza chrysorrhoa	Yellow-rumped Thornbill	X	X	X	X		X*
NEOSITTIDAE (SITTELLAS)							
Daphoenositta chrysoptera	Varied Sittella			X	X	X	X
CLIMACTERIDAE (TREECREEPERS)							
Climacteris rufa	Rufous Treecreeper	X	X	X	X		
MELIPHAGIDAE (HONEYEATERS)							
Anthochaera carunculata	Red Wattlebird	X	X	X			X
Anthochaera chrusoptera	Little Wattlebird	X	X	X			
Acanthagenys rufogularis	Spiny-cheeked Honeyeater						X
Manorina flavigula	Yellow-throated Miner						X
Lichenostomus virescens	Singing Honeyeater		X		X	X	X
Lichenostomus ornatus	Yellow-plumed Poneyeater			X	X		
Melithreptus brevirostris	Brown-headed Honeyeater		X	X	X		X*
Melithreptus lunatus	White-naped Honeyeater	X	X	X			
Lichmera indistincta	Brown Honeyeater	X	X	X	X		X*
Phylidonyris novaehollandiae	New Holland Honeyeater	X	X	X	X		
Phylidonyris nigra	White-cheeked Honeyeater	X	X				
Phylidonyris albifrons	White-fronted Honeyeater						X
Phylidonyris melanops	Tawny-crowned Honeyeater	X	X	X			
Acanthorhynchus superciliosus	Western Spinebill	X	X	X	X		
EPHTHIANURIDAE (CRATS)							
Ephthianura albifrons	White-fronted Chat						X
DICAEIDAE (MISTLETOEBIRD)							
Dicaeum hirundinaceum	Mistletoebird			X			X
PARDALOTIDAE (PARDALOTES)							
Pardatotus punctatus	Spotted Pardalote				X		
Pardalotus striatus	Striated Pardalote	X	X	X	X	X	X*
ZOSTEROPIDAE (WHITE-EYES)							
Zosterops lateralis	Silvereye	X	X	X	X	X	
PLOCEIDAE (FINCHES)							
Poephila guttata	Zebra Finch						X
GRALLINIDAE (MAGPIE-LARKS)							
Grallina cyanoleuca	Australian Magpie-lark			X		X	X

		CLACKLINE	ST RONANS	WAMBYN	MOKINE	THROSSELL	MEENA
ARTAMIDAE (WOODSWALLOWS)							
Artamus cinereus	Black-faced Woodswallow					X*	X*
Artamus cyanopterus	Dusky Woodswallow	X		X	X		
CRACTICIDAE (BUTCHERBIRDS/MAGPIES)							
Cracticus torquatus	Grey Butcherbird						X
Cracticus nigrogularis	Pied Butcherbird						X
Gymnorhina tibicen	Australian Magpie	X	X	X	X	X	X
Strepera versicolor	Grey Currawong	X					
CORVIDAE (CROWS/RAVENS)							
Corvus coronoides	Australian Raven	X	X	X	X	X	X*

* breeding