DEPT. OF CONSERVATION AND LAND MANAGEMENT
SWAN REGION

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NATURE RESERVE NOS 17759 & 17760

– INTERIM GUIDELINES FOR FIRE PROTECTION & CONTROL OF FUNGAL DISEASE

KATTANNING DISTRICT

1988

PREFACE

This interim guideline provides Katanning District personnel with a five year works programme for fire protection and control of fungal disease on Reserve Nos 17759 and 17760. The guideline is written in a format that readily allows sections to be added, and therefore it can be developed into a formal management plan.

Fire protection and control of fungal disease are two management issues which require priority attention. A section dealing with the control of declared plants and animals is proposed for 1988.

Unless previously superseded by a formal management plan, the guideline will be revised in 1992. The effectiveness of the guideline will be reviewed annually and updated as necessary. Any major changes which are deemed necessary will be referred to the Director, Nature Conservation for approval.

INDEX

PART 1: Description of the Reserves

1. DESCRIPTION

1.1 Location & Tenure

Reserve Nos 17759 and 17760 are the largest nature reserves in the Shire of Kojonup. They are vested in the NPNCA (National Parks and Nature Conservation Authority) for the purpose of "Conservation of Flora and Fauna". The reserves lie approximately 25 km south-west of Kojonup (Figure 1) on the Kojonup-Frankland Road which serves as their eastern boundary. The two reserves are bounded on all sides by privately-owned agricultural land (Figure 2), and are separated by a 300m tract of partially cleared land.

The reserves are 427 ha (Reserve No. 17759) and 551 ha (Reserve No. 17760) in area, and have a combined area of 978 ha.

1.2 Topography, Soils & Climate

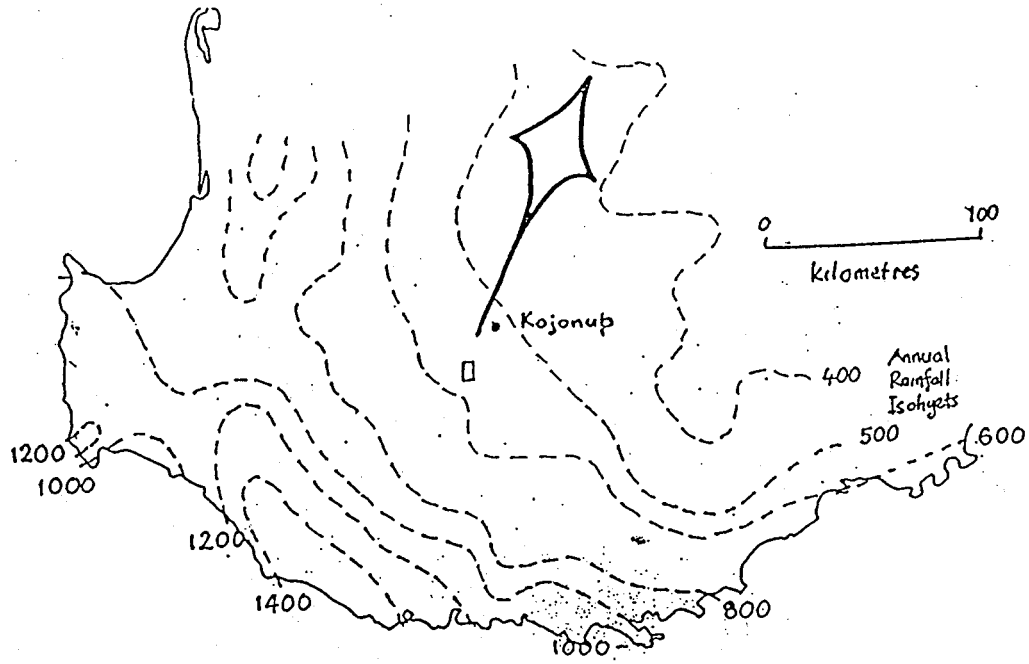
Apart from a few small areas, both reserves lie between 300 and 360m above sea level and occupy the upper part of the surrounding topography. The local landform pattern is generally undulating to steep, low hills. Drainage from the reserves is by depressions and gullies. There are also two very small areas of internal drainage into closed depressions. These areas, both on Reserve No. 17759, are indicated by vegetation associations containing Melaleuca hamulosa (Figure 4). Small, shallow pools of surface water sometimes collect at the northern site, and probably also the southern.

Soils are generally lateritic with smaller amounts of sands, loams and sandy loams (Figure 3). Small pockets of dolerite and quartzite also occur.

A more detailed description of soils and geology is given in Griffin (1985).

Beard (1981, Figure 8) classifies the Kojonup area as Dry Mediterranean (5-6 dry months).

FIGURE 1 : LOCATION



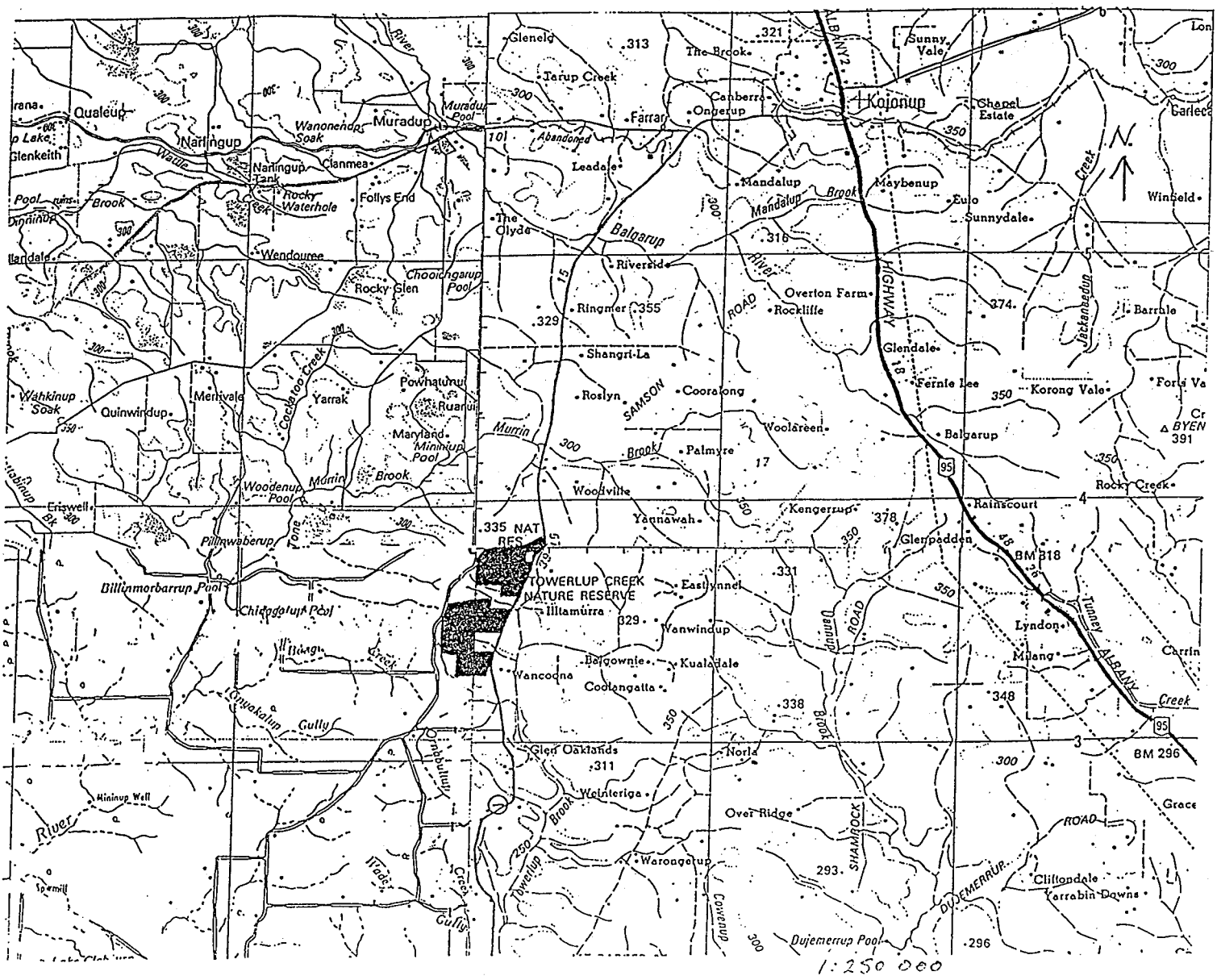


FIGURE 2: ADJOINING LAND TENURE

Lands & Surveys 1:50 000 Maps

Kojonup 2330 III

Uannup 2329 IV

Lake Clabburn 2229 I

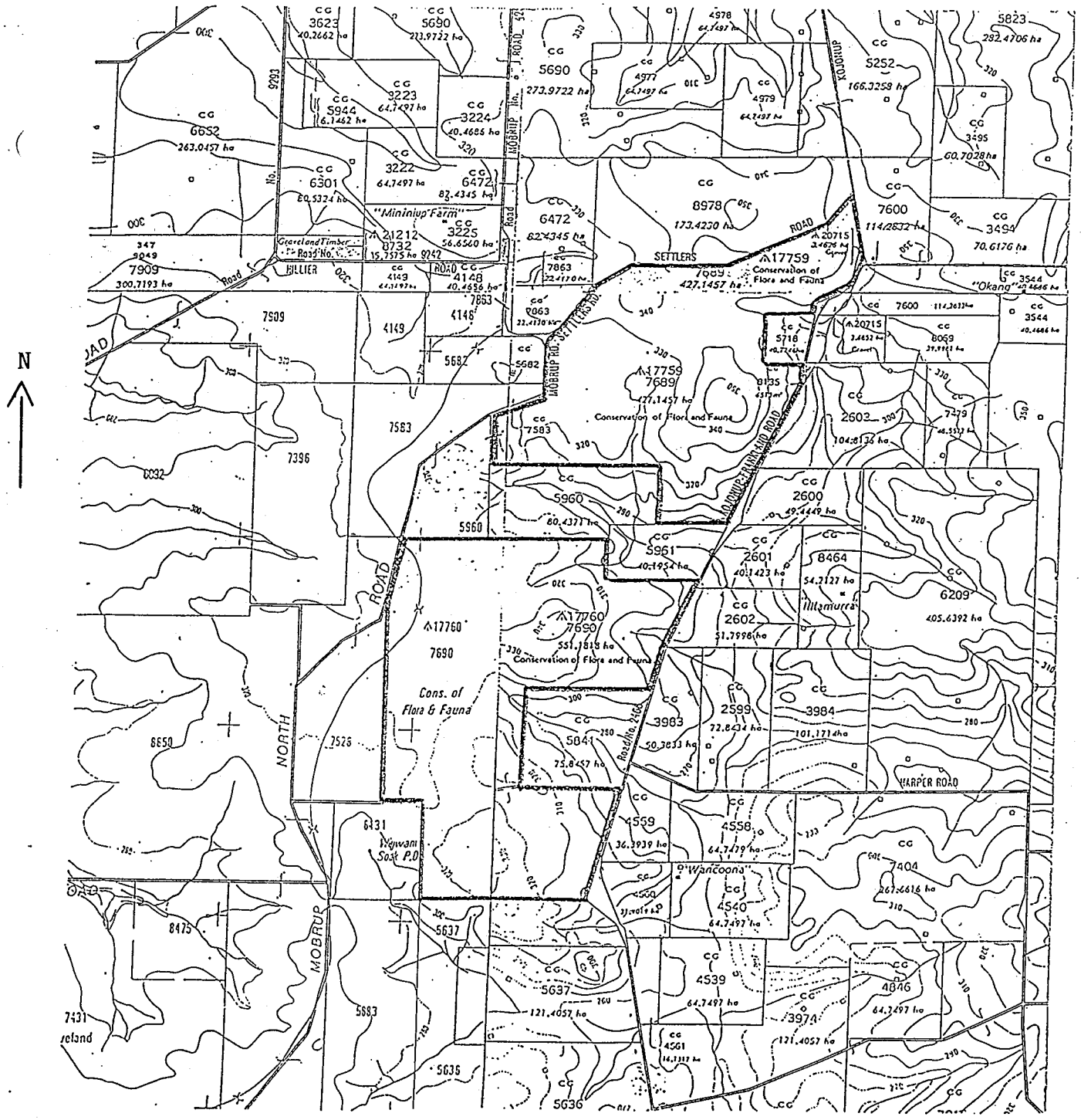
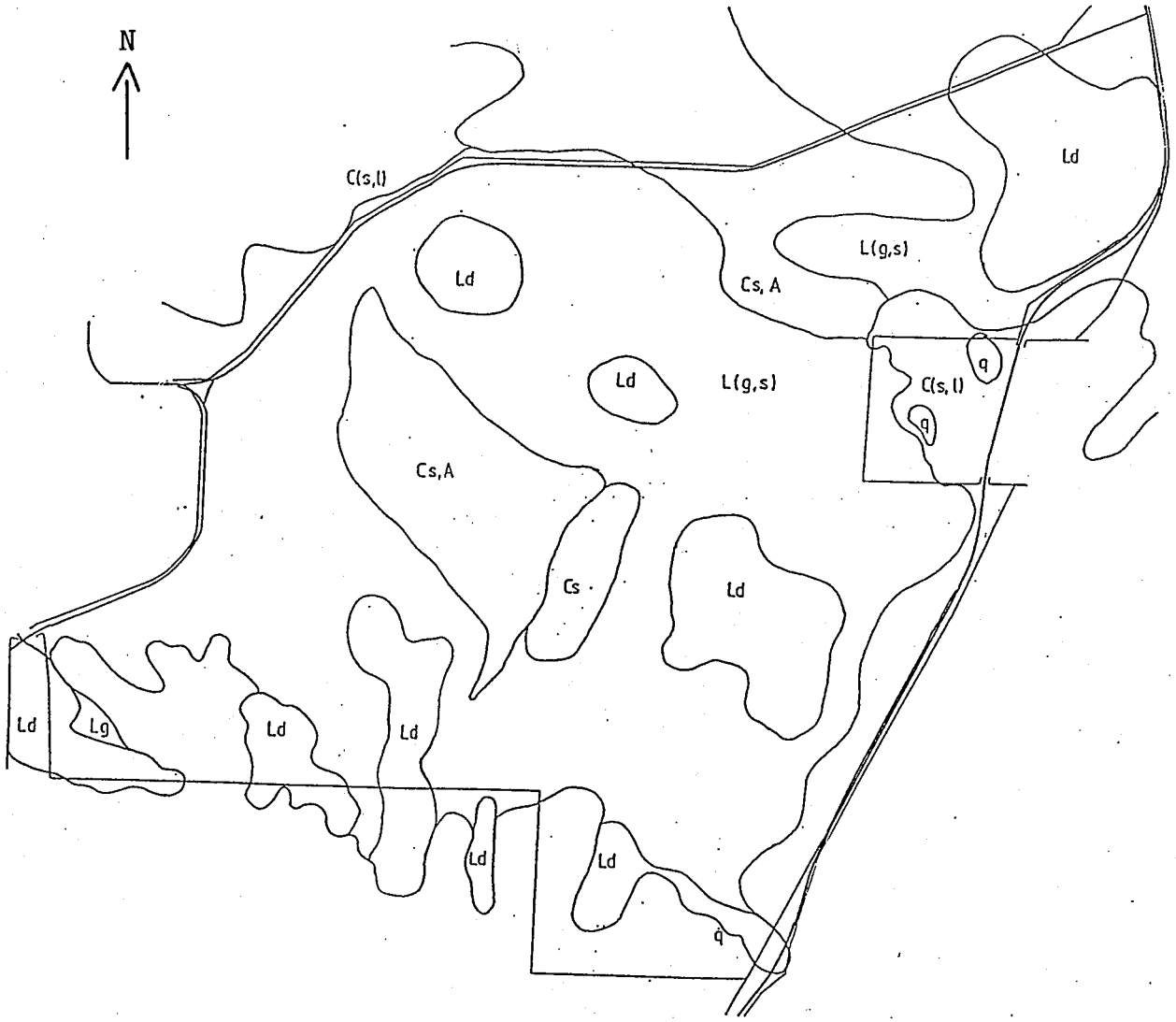


FIGURE 3(a) : SOILS OF RESERVE NO. 17759

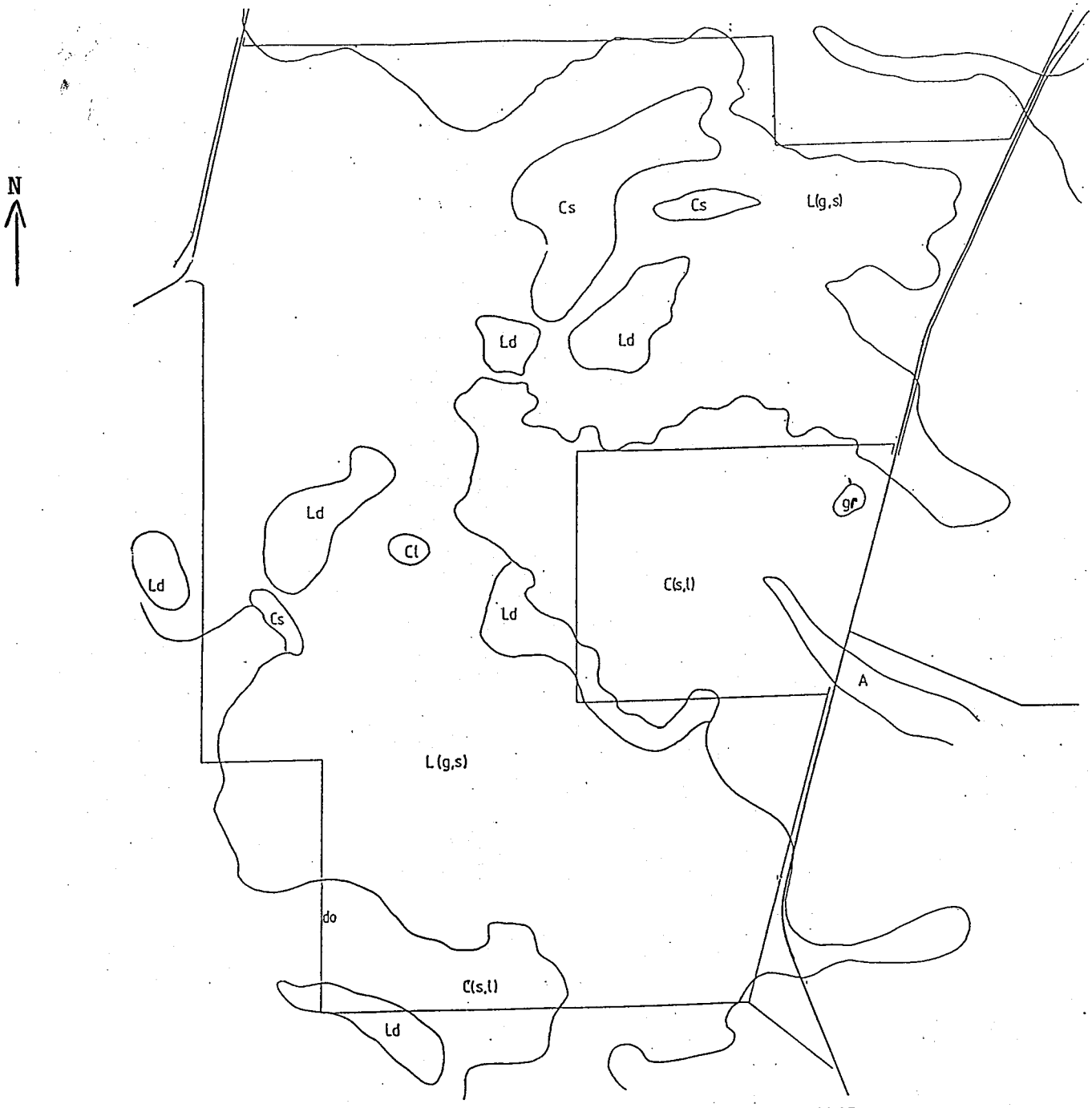


JINGALUP & JINGALUP SOUTH NATURE RESERVES
SOIL MAP (INDICATIVE) (from E.A. Griffin & Assoc 1985)

L	Laterite	d	duricrust
C	Colluvium	g	gravel
A	Alluvium	s	sand
		l	loam
		q	quartzite
		do	dolerite

0 1.0
km

FIGURE 3(b) : SOILS OF RESERVE NO. 17760



JINGALUP & JINGALUP SOUTH NATURE RESERVES
SOIL MAP (INDICATIVE) (from E.A. Griffin & Assoc 1985)

L	Laterite	d	duricrust
C	Colluvium	g	gravel
A	Alluvium	s	sand
		l	loam
		q	quartzite
		do	dolerite
		gr	granite

0 1.0
km

Table 1, extracted from Griffin's (1985) report on the reserves, gives the mean monthly minimum and maximum temperatures and mean rainfall for Kojonup, the nearest weather recording station.

1.3 Flora & Fauna

Vegetation and floristics of the reserves are described in a report by Griffin (1985) who surveyed the areas under contract to CALM (Department of Conservation and Land Management). Vegetation maps produced from this survey are given in Figures 4 and 5, and the following vegetation description is quoted from the final report (pages 10 and 11):

> "The vegetation of the Jingalup reserves is essentially a Low Forest A (sometimes Low Woodland A) of Jarrah and Wandoo in varying proportions. Jarrah dominates the lateritic uplands and sandy gravelly slopes while Wandoo is important on the steeper erosional slopes and alluvial areas where clays and loams (probably more poorly drained) are more important. Marri is only of minor importance in the reserve. It reaches its local peak in sandy alluvial areas, but can occur in most parts of the landscape, particularly the sandier area in 17759. The only other tree species to reach any importance is Mallett which is confined to two small mono-specific areas in 17760 where certain lateritic uplands have been eroded. Banksia grandis and Nuytsia floribunda can be very locally the main tree species where there are certain sandy soils. A small area of Eucalyptus decipiens occurs as a subordinate low tree in an upper part of an old drainage line in reserve 17759 (site T24). There are a couple of different types but the main one is clayey drainage depressions where Melaleuca ?hamulosa forms a Low Scrub. Leptospermum erubescens and Hakea undulata can form small patches of Heath where the tree cover is more open."

Griffin's report should be consulted for a detailed description of each reserve's vegetation.

TABLE 1: Monthly Climatic Data for Kojonup (from Griffin & Assoc 1985)

Station Name: KOJONUP POST OFFICE WESTERN AUSTRALIA

Number 010582 Latitude 33 Deg 50 Min S Longitude 117 Deg 9 Min E Elevation 304.8M

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Daily Maximum Temperature (C)													
Mean	29.3	28.8	25.9	21.3	17.7	14.9	14.3	14.5	16.4	19.7	23.4	28.0	21.2
86 Percentile	35.0	35.0	31.8	26.2	21.1	17.2	16.7	17.1	19.5	24.5	28.8	34.0	
14 Percentile	24.1	23.3	20.9	16.7	14.5	12.6	12.1	11.9	13.1	15.5	18.8	22.7	
Daily Minimum Temperature (C)													
Mean	13.4	14.2	12.6	10.3	8.3	7.0	6.0	5.7	6.0	7.7	9.6	12.3	9.4
86 Percentile	16.2	17.4	16.1	14.4	11.7	9.8	8.9	8.8	9.2	11.0	12.9	15.5	
14 Percentile	10.5	10.8	8.9	6.1	4.8	4.0	3.0	2.6	2.6	4.3	6.2	8.8	
Rainfall (mm)													
Mean	12	5	23	33	69	92	89	75	53	44	22	15	542
Median	5	6	13	26	64	85	87	71	50	38	17	10	527
Raindays (No.)													
Mean	3	3	5	8	14	17	19	17	14	12	7	4	123

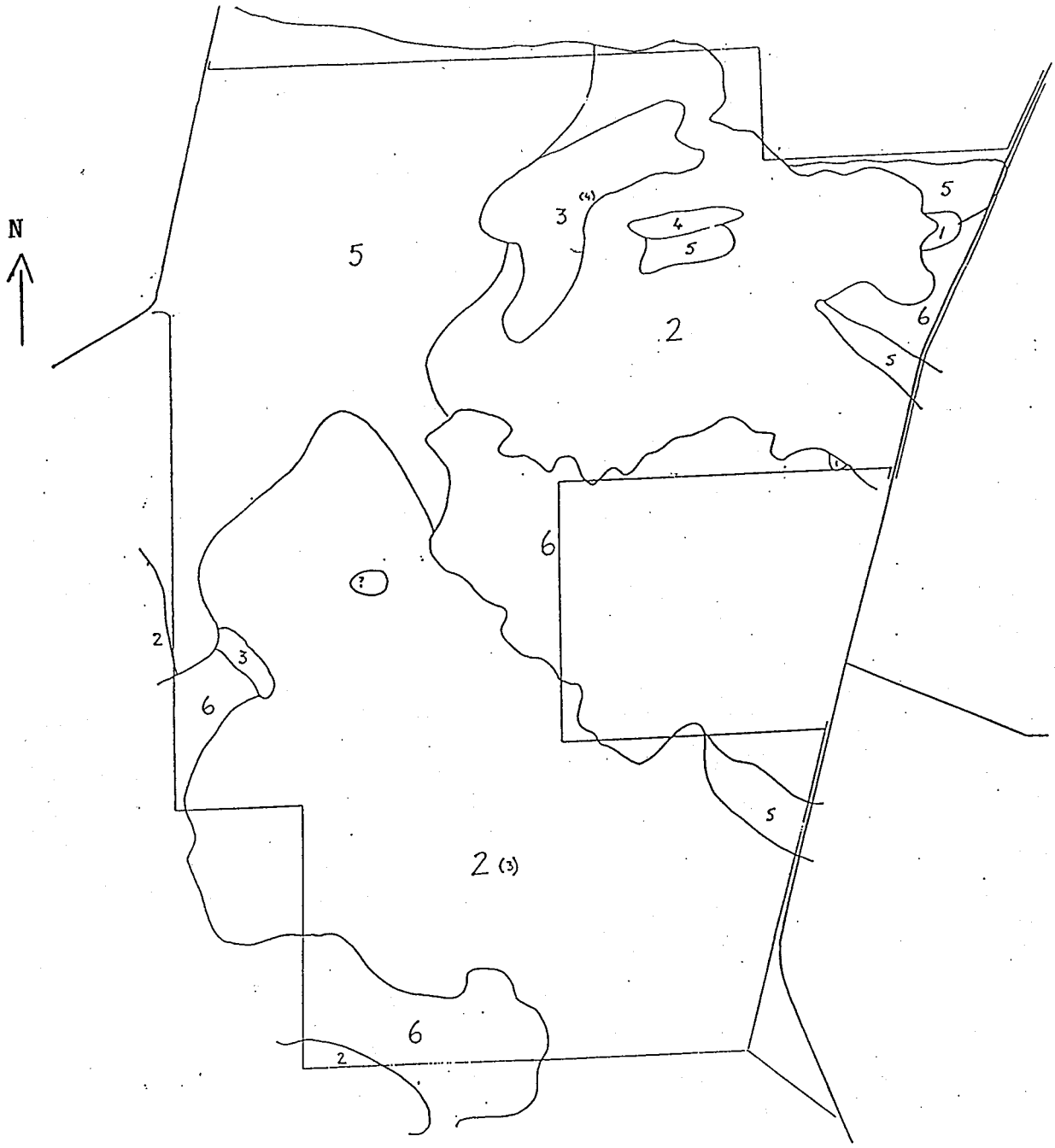
FIGURE 4 : VEGETATION OF RESERVE NO. 17759

JINGALUP & JINGALUP SOUTH NATURE RESERVES
VEGETATION MAP (from E.A. Griffin & Associates 1985)

VEGETATION UNITS

1 - Mallet Low Forest A
2 - Jarrah Low Forest A (laterite upland type)
3 - Jarrah Low Forest A (sandy slope type)
4 - Jarrah - Leptospermum erubescens Low Woodland A/Low Heath C
5 - Jarrah - Wandoo Low Forest A
6 - Wandoo Low Forest A
7 - Wandoo - Hakea prostrata Low Forest A/Scrub B
8 - Melaleuca ?hamulosa Low Scrub A

FIGURE 5 : VEGETATION OF RESERVE NO. 17760



JINGALUP & JINGALUP SOUTH NATURE RESERVES
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5 - Jarrah - Wandoo Low Forest A
6 - Wandoo Low Forest A
7 - Wandoo - Hakea prostrata Low Forest A/Scrub B
8 - Melaleuca ? hamulosa Low Scrub A

0 1.0 km

Plant species of interest listed by Griffin include Tetratheca nuda which, if identified correctly by Wallace, is outside its previously known range; and Lepidosperma leptostachyum which has been poorly collected. Other species which appear to be at the south-western limit of their distribution include Eucalyptus astringens and E. celastroides. It must be stressed that few botanical collections have been made from the reserves during winter and spring when annuals could be readily identified. Further collections may, for example, demonstrate the importance of the reserves for plant groups such as orchids.

The current (February 1987) plant species list for the reserves is given in Appendix 1.

The vertebrate fauna of the reserves was assessed by Ninox Wildlife Consulting during 1985. As with plants, opportunistic records of fauna have also been collected by district personnel from CALM.

Eight native mammal, 50 bird, 4 amphibian and 15 reptile species have been recorded from the reserves as at January 1987 (see Appendix 2). With the exception of small native mammals, the reserves contain a representative sample of the vertebrate fauna which could be expected to have occurred on local upland areas prior to the arrival of Europeans.

In their final report, which included an assessment of the larger nature reserves in the Kojonup Shire, Ninox Wildlife Consulting concluded that "all the reserves ..... act as valuable conservation areas for a broad range of fauna, especially birds, and are of further note since they lie in the previously mentioned interzone [between the Darling System and the Wheatbelt]". Of the reserves surveyed by Ninox Wildlife Consulting, Reserve No. 17759 was the richest in reptiles.

It should be stressed that a number of nomadic and migratory bird species - such as Purple-crowned Lorikeets (Glossopsitta porphyrocephala) and Rainbow Bee-eaters (Merops ornatus)- utilise the reserves.

It should also be noted that Majer (1980) undertook a short study of invertebrates on the reserves. This work concentrated on ants, but some other data on invertebrates is also presented.

1.4 Past History

Reserve Nos 17759 and 17760 were set aside in 1921 with the purpose of "Timber for Settlers". Consistent with this purpose, the reserves were cut over for Jarrah sawlogs during 1947 (D. Wilson pers. comm.). Tracks and tree stumps resulting from logging are still visible.

Both reserves were subject to pastoral leases (Nos 392/462 and 392/463) issued to Mr R.H. Reid, an adjoining landholder. These leases were cancelled in July 1967, however grazing of the reserves ceased in 1947 (R. Reid pers. comm).

In December 1969 Fauna Warden A.T. Pearce inspected both reserves and recommended to the Director of the Department of Fisheries and Wildlife that the purpose of the reserves be changed to "Conservation of Flora and Fauna" and both reserves were vested in the Western Australian Wildlife Authority. The purpose of the reserves remains unchanged, however the vesting is now with the National Parks and Nature Conservation Authority.

1.5 Existing Use

Apart from illegal activities such as rubbish dumping and gravel mining the current use of the reserves reflects their gazetted purpose.

PART 2: GENERAL MANAGEMENT OBJECTIVES

2. GENERAL MANAGEMENT OBJECTIVES

The general management objectives for Reserve Nos 17759 and 17760 are:-

1. to conserve any assemblage of flora or fauna occurring on the the reserves which is identified as being of restricted distribution, at the limit of its known geographic range, or otherwise of scientific interest;
2. to conserve the sample of interzone (Darling/Wheatbelt) biota found on the reserves;
3. to conserve the landscape features of the reserves;
4. to provide for the proper use and management of the scientific and educational resources of the reserves; and
5. to ensure, as far as is practicable, that the management of the reserves is compatible with adjoining land uses.

Where appropriate, these objectives are developed in greater detail in the following sections.

PART 3: INTERIM GUIDELINES FOR FIRE PROTECTION

3. FIRE PROTECTION

3.1 Introduction

3.1.1 Past Fire History

The fire history of the reserves is not well documented. The following history has been pieced together from Departmental files and with the aid of reserve neighbours.

193? to 1947 - areas subject to pastoral lease issued to Mr R.H. Reid. Periodic "spot" burns carried out to provide suitable vegetation for sheep grazing.

1947 - timber milling - area cut for Jarrah sawlogs. Fences pulled down, cessation of grazing by Mr Reid.

1957 - (13th May) fire escaped from Mr. D. Wilson's property (west side of Reserve No. 17760) and burnt out a section of Reserve No. 17760 (Figure 6).

1963 - (18th February) a severe wildfire originating from Orchid Valley and driven by north-west winds burnt through Reserve No. 17760 from the north-west to the south-east (Figure 6).

1965 - heavy regeneration noticed by Mr D. Wilson.

1972 & 1973 - some edge burning on ? both reserves by local brigades (CALM file records unclear).

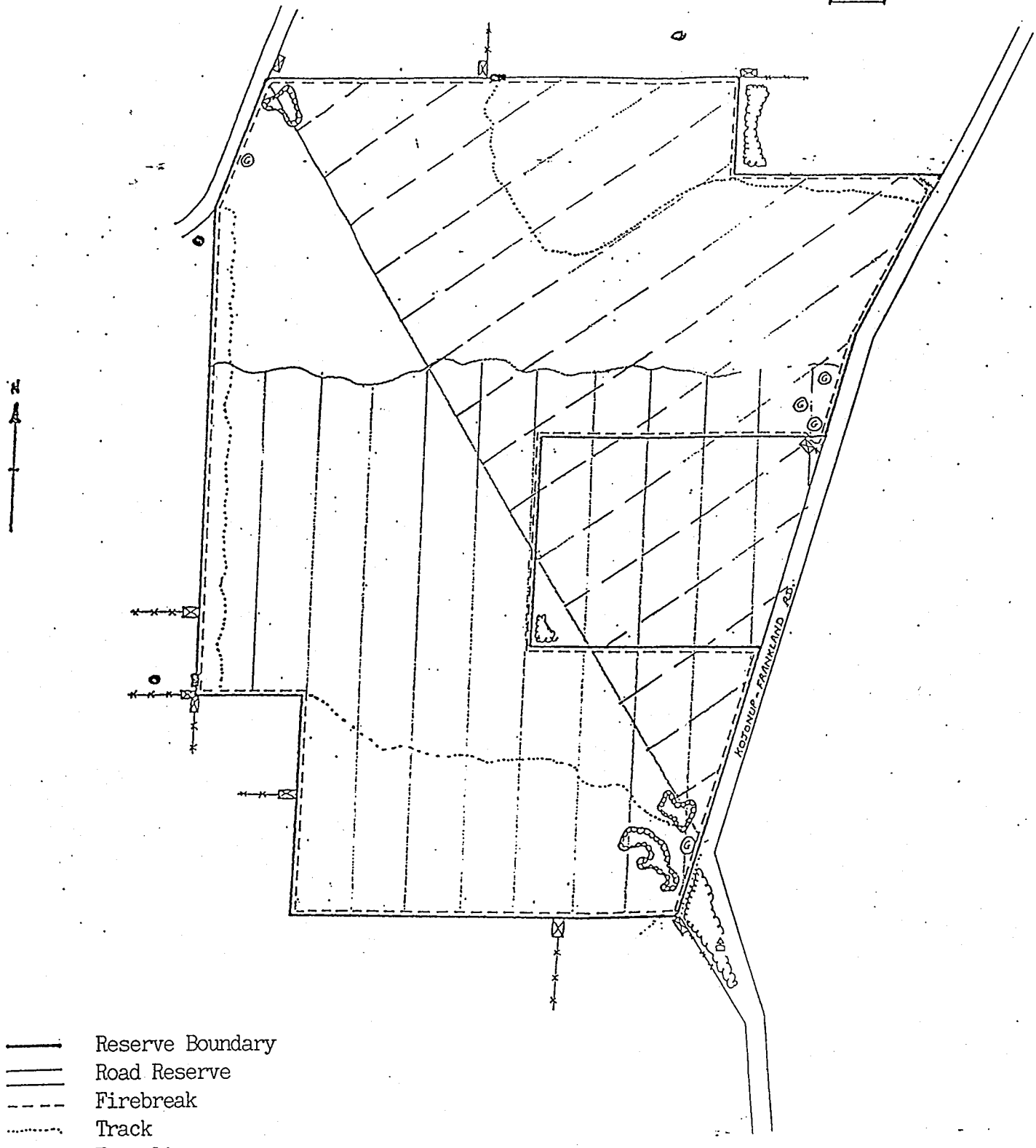
1977 to 1980 - controlled "block" burning by the Department of Fisheries and Wildlife in both reserves (Figures 7 & 8).

1986 - prescribed buffer burn on the southern end of Reserve No. 17760 carried out by CALM district personnel.

FIGURE 6 . WILDFIRES

↑17760

551.1818 ha
Scale 200m



Reserve Boundary
Road Reserve
Firebreak
Track
Fenceline
Gate onto Reserve
Gate: Private Access
Dam
Bush Adjoining Reserve
G Gravel Pits
Reserve Sign

1957 Wildfire

1963 Wildfire

As stated by Mr D. Wilson (reserve neighbour), timber milling was carried out during 1947. Residue from the operation would have included heavy tops and slash fuels, and this accumulation of slash, together with the cessation of grazing of the areas in 1947, probably led to a high fuel build up over the next 10 years.

In 1957 and 1963 wildfires burnt out most of Reserve No. 17760 and presumably heavy fuels led to high intensity fires which scorched all vegetation heavily. The present lack of logging debris through the area also suggests that extremely hot fires burnt away most of the debris. This probably provided conditions under which Dryandra sessilis was favoured and resulted in the present thickets. It is also possible that the Jarrah and Wandoo cut was carried out in a non-seed year, which may account for the fact that very little eucalypt regeneration occurred following the fires.

A number of times in the past reserve neighbours and Shire Officials have expressed concern with regard to fire protection of the reserves and adjoining land. These concerns resulted in a programme of prescribed burns (Figures 7 & 8) conducted by personnel from the Department of Fisheries & Wildlife in liaison with local brigades. These burns were of varying success, with the percentage of ground fuels burnt ranging between 80% and "very patchy" (quote from Departmental report).

FIGURE 7 : DEPARTMENT OF FISHERIES & WILDLIFE PRESCRIBED BURNING

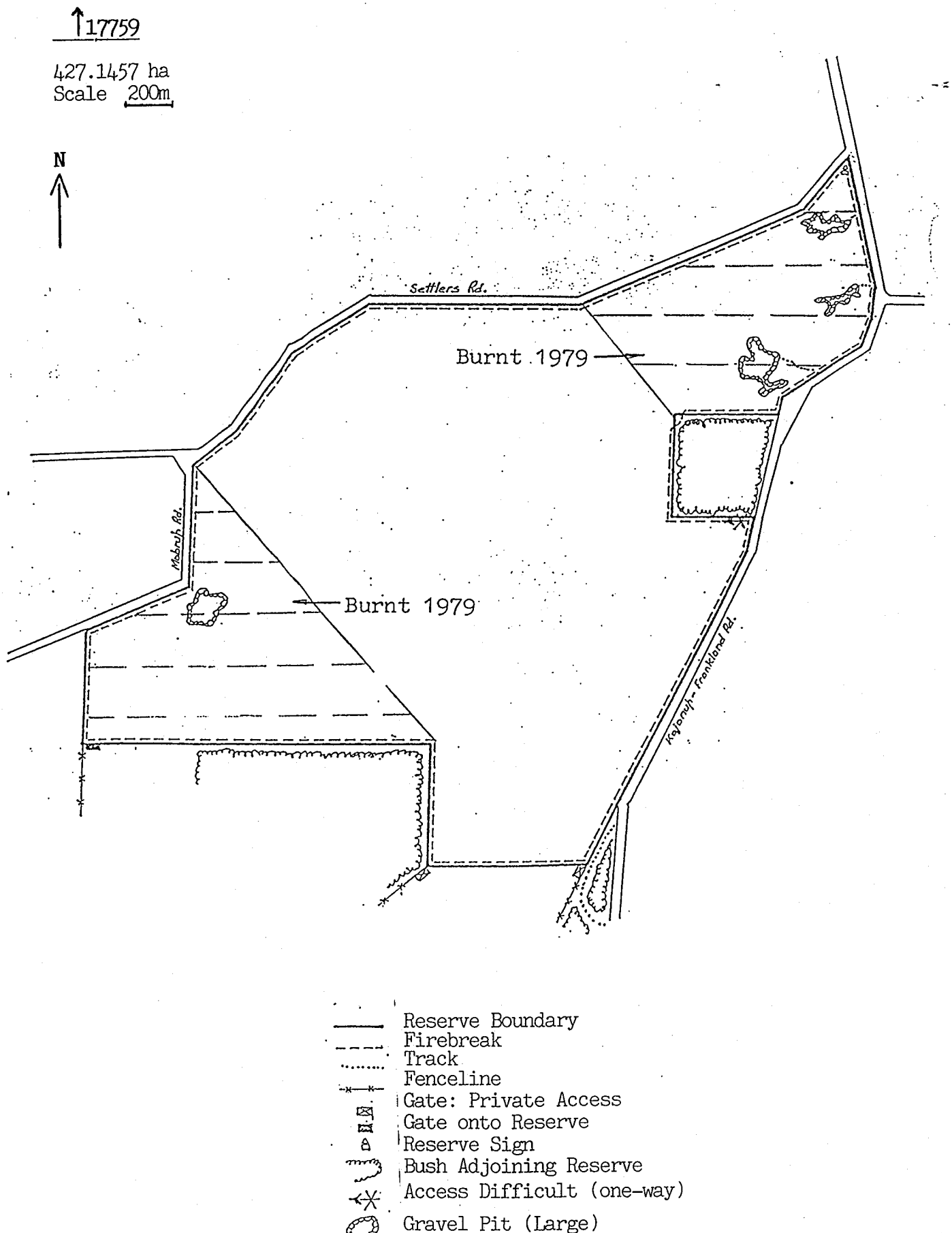
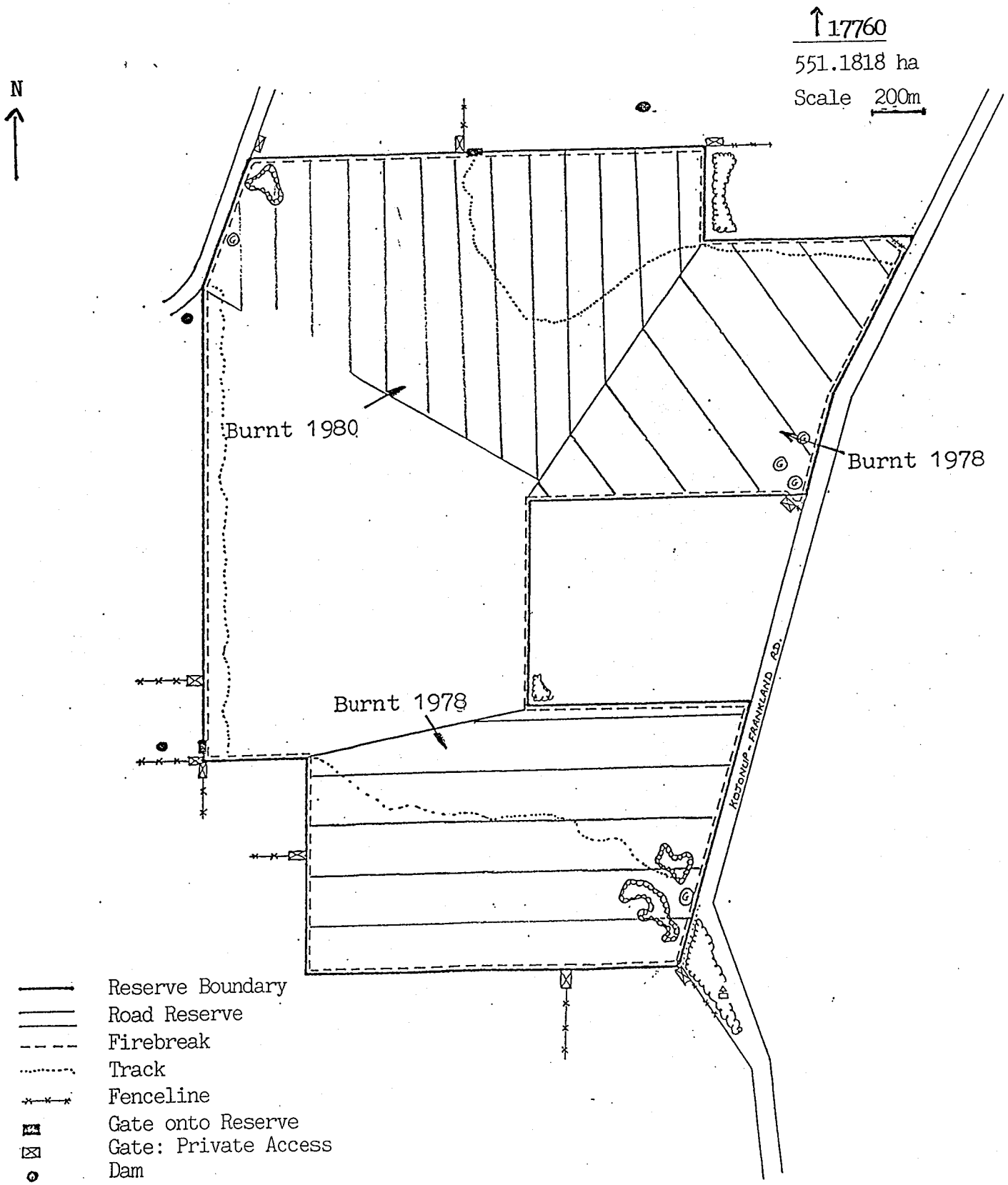


FIGURE 8 : DEPARTMENT OF FISHERIES & WILDLIFE PRESCRIBED BURNING



3.1.2 Current Fuel Levels

Records for Reserve No. 17759 show that only the north-east and south-west sections (Figure 7) of the reserve were burnt during the 1977-80 programme. These areas are currently (1986) seven years old and are carrying fuels between 6 and 9 tonnes/ha. The large core of the block seems to have remained unburnt for some time, but measurements suggest that litter accumulation in this area is very slow due to the sparse canopy following logging operations. Fuels in this area are between 3.4 and 8.6 tonnes/ha (Figure 9).

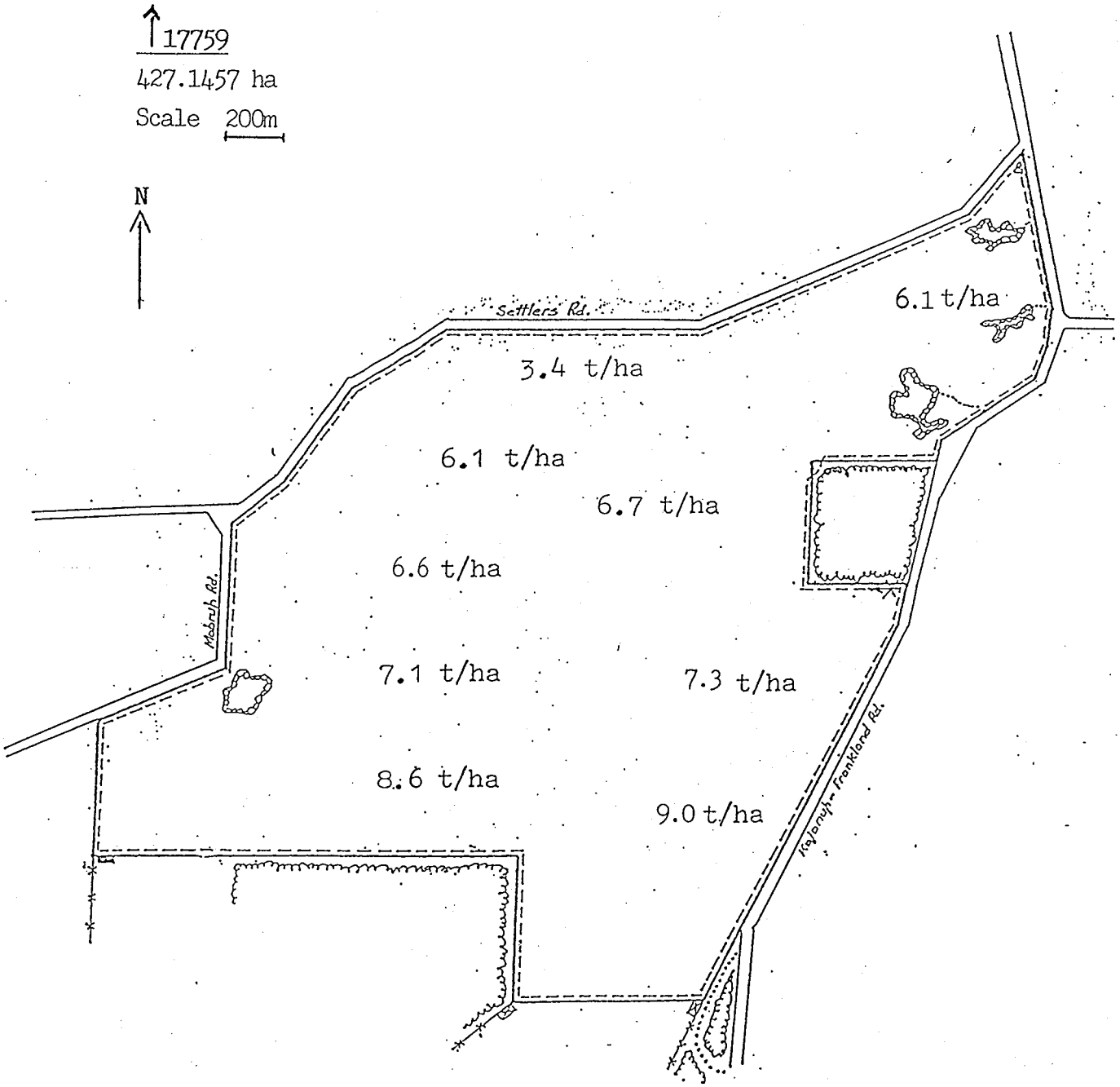
Most fuels on Reserve No. 17760 appear to have been reduced by prescribed burning between 1977 and 1980. Fuel ages are 6-9 years old, and fuel loads range from 5.0 to 7.0 tonnes/ha (Figure 10). The only area that remains unburnt is a mid-western core where measurements indicate a very low accumulation rate for litter.

The outstanding fuel characteristic through both reserves is the patchy build-up of litter which is probably due to the open eucalypt canopy over much of the area. Associated with this is the dominance of Dryandra sessilis (Parrot Bush) as a Jarrah understorey. This species may suppress denser shrub growth and thus lessen the probability of severe fire behaviour. Fuel accumulation is generally patchy under denser woodland canopies and minimal under more open canopies.

3.2 Fire Management Objectives

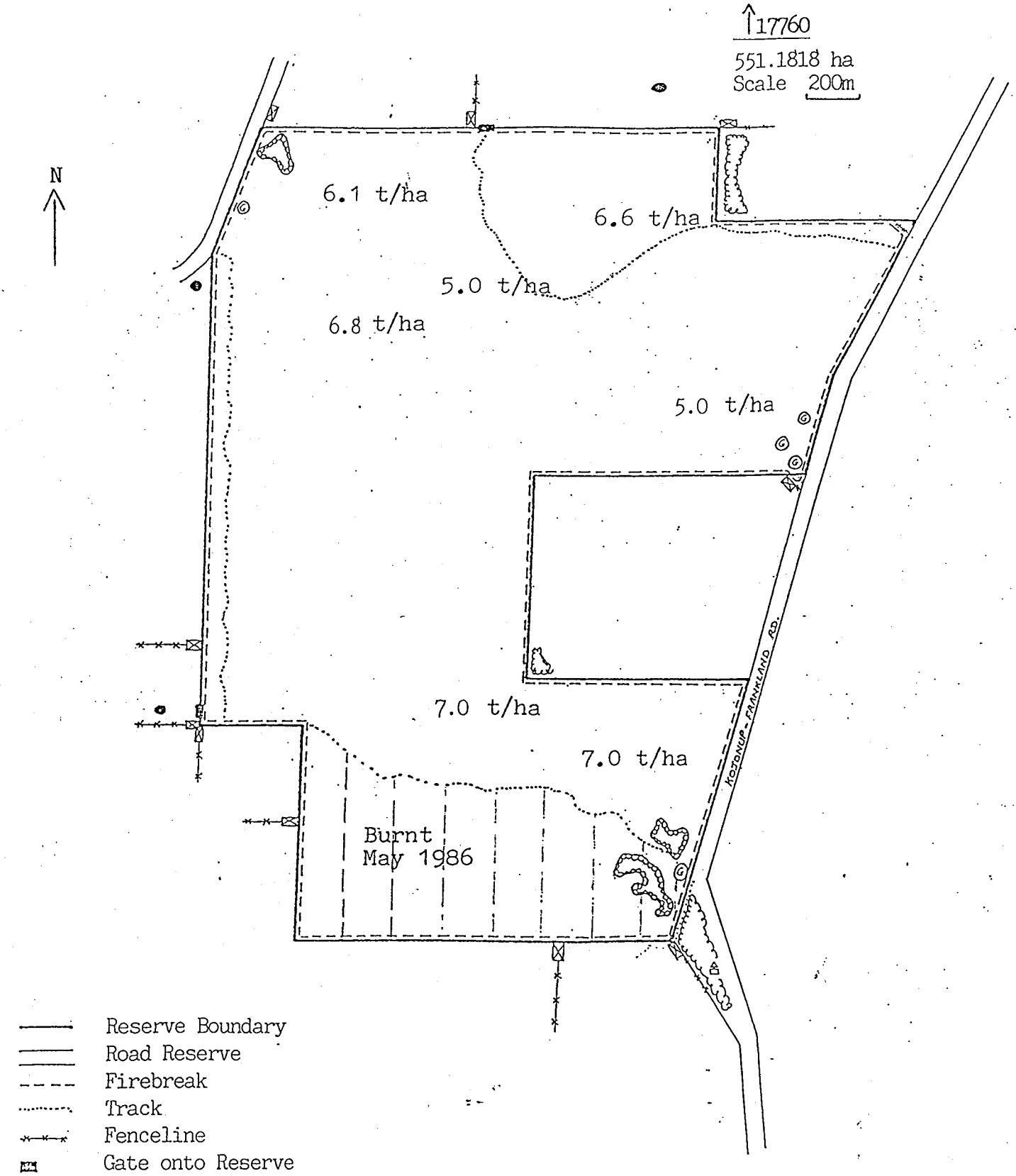
1. to protect the reserves from fires burning on adjoining land;
2. to minimise the size of any wildfire which occurs on the reserves;

FIGURE 9 : FUEL LEVEL MEASUREMENTS



Reserve Boundary
Firebreak
Track
Fenceline
Gate: Private Access
Gate onto Reserve
Reserve Sign
Bush Adjoining Reserve
Access Difficult (one-way)
Gravel Pit (Large)
Gravel Pit (Small)

FIGURE 10 : FUEL LEVEL MEASUREMENTS



3.2 (cont.)

3. to protect adjoining land from wildfires which may occur on the reserves;
4. to use prescribed fire to:
   (a) maintain a diversity of vegetation seral stages on the reserves; and
   (b) enhance fire protection of the reserves;
5. to maintain an effective fire protection system which is compatible with the management objectives (section 2) for the reserves. It should be noted that fire suppression priorities will be 1. life; 2. property; & 3. nature conservation values; and
6. to monitor the effects of prescribed burns on fuel accumulation, vegetation structure and floristics. (There are insufficient resources to monitor fauna.)

3.3 Fire Management Strategies

To achieve the objectives listed under 3.2, the following strategies will be adopted:

1. Maintenance of existing external firebreaks.
2. Construction of temporary internal firebreaks for prescribed burning.
3. A programme of prescribed burning which will improve fire protection through fuel reduction and maintain a diversity of seral stages.
4. Establishment of procedures for notification of CALM of wildfires on or adjacent to the reserves.
5. Involvement of CALM in suppression of wildfires on or adjoining the reserves.
6. Involvement of local volunteer fire brigades in fire suppression and prescribed burning programmes on the reserves.
7. Establishment of vegetation and litter monitoring sites at a minimum of three locations.

3.4 Fire Management Actions

3.4.1 Firebreak Systems

Firebreaks have been constructed to a minimum width of three metres around the perimeters of both reserves. These firebreaks will be maintained in a condition trafficable by four-wheel drive vehicles. They will also be maintained in a fuel condition which prevents the ready passage of grass fires.

The need to maintain external firebreaks will be assessed annually under the Katanning District maintenance programme which is the responsibility of the Katanning District Manager (CALM).

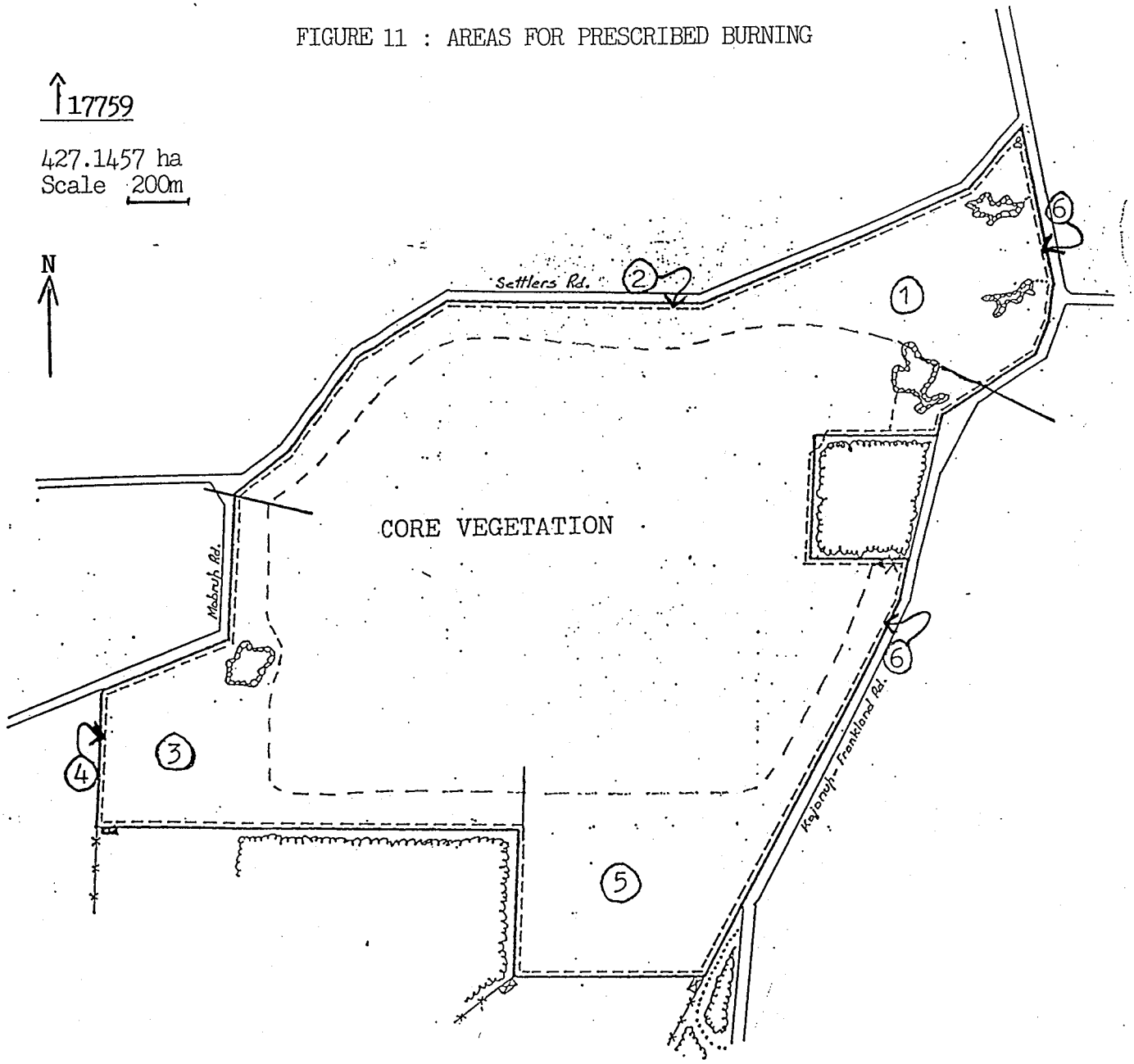
Given that an area on Reserve No. 17760 is infected with dieback (*Phytophthora cinnamomi*) and another area contains *Armillaria luteoburbalina*, maintenance programmes will be conducted under strict hygiene to prevent the artificial spread of these diseases (see section 4 below).

Temporary firebreaks will be constructed within the reserves to assist the prescribed burning programme for buffer and block burns on the reserves. The tracks will be roughly constructed by a bulldozer or similar machine to one blade width and trafficable by four wheel drive vehicles. They will be used for prescribed burning only and will be blocked when not in use. They will not be maintained after their initial construction and use. Again, strict hygiene measures will be employed in the construction phase to prevent disease spread.

3.4.2 Prescribed Burning - Programme

Core areas have been designated which contain a representative sample of the vegetation associations found on the reserves. No prescribed burning is proposed for these areas during the currency (5 years) of this programme, however the areas will be re-assessed in 1991 and their status reconsidered. Core areas are shown in Figures 11 & 12.

FIGURE 11 : AREAS FOR PRESCRIBED BURNING

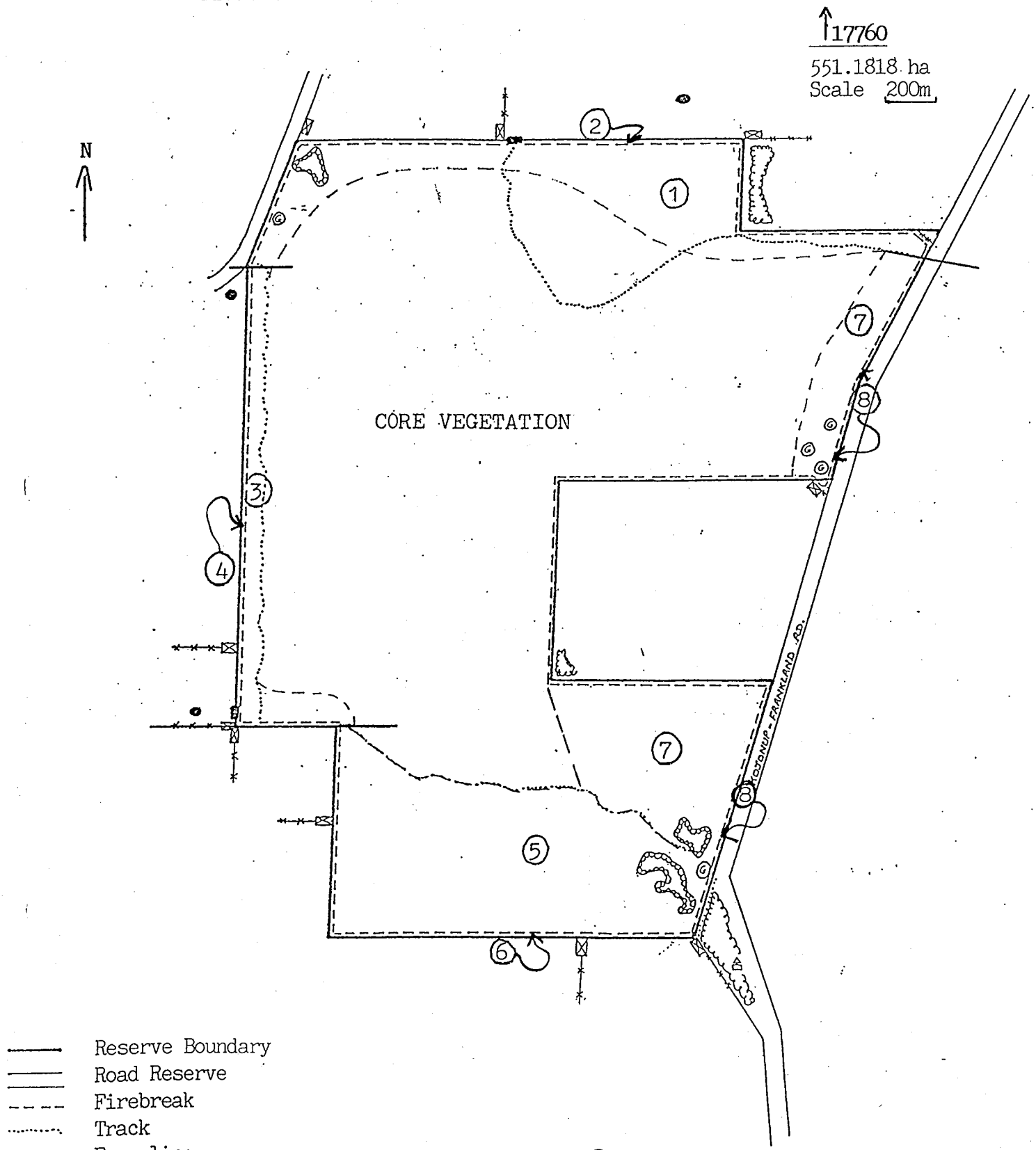


BURNT 1987 - EXTERNAL BUFFER (6)
PROPOSED 1988 - EXTERNAL BUFFERS (2) & (4)
PRIORITY 1 - INTERNAL BUFFER (1)
PRIORITY 2 - INTERNAL BUFFER (3)
PRIORITY 3 - INTERNAL BUFFER (5)

Proposed to complete Priority 1,2 & 3 burns by end of autumn 1993.

Reserve Boundary
Firebreak
Track
Fenceline
Gate: Private Access
Gate onto Reserve
Reserve Sign
Bush Adjoining Reserve
Access Difficult (one-way)
Gravel Pit (Large)
Gravel Pit (Small)

FIGURE 12 : AREAS FOR PRESCRIBED BURNING - RESERVE NO. 17760



Reserve Boundary
Road Reserve
Firebreak
Track
Fenceline
Gate onto Reserve
Gate: Private Access
Dam
Bush Adjoining Reserve
G Gravel Pits
Reserve Sign

1986 - BLOCK (5) (COMPLETE)
1987 - EXTERNAL BUFFER (8) (COMPLETE)
PRIORITY 1 - EXTERNAL BUFFERS (6) (4) & (2)
PRIORITY 2 - INTERNAL BUFFER (3)
PRIORITY 3 - INTERNAL BUFFER (7)
PRIORITY 4 - INTERNAL BUFFER (1)

Proposed to complete Prioirty 1,2,3 & 4 burns by end of autumn 1993

The small buffer areas between the reserves' external firebreaks and private property or roads, i.e. Settlers Road and the Kojonup-Frankland Road, will be burnt in sequence (Figures 11 & 12) subject to approval from the Local Authority to burn road reserves. These areas will be burnt in different years from adjoining (inside) areas proposed for prescribed burning.

Internal temporary tracks will be constructed parallel to, and at least 100 metres inside all boundaries of both reserves to provide a network of buffers and blocks for prescribed burning. Old tracks will be utilized where practical. Provided resources and weather permit, these buffers/blocks will be burnt during the currency of this plan. The programme for these buffers is set out in Figures 11 & 12.

It is recognised that the prescribed burning programme should eventually be based on pre-determined fuel levels - for example, that the programmed areas should not be burnt until fuel levels reach 8.0 - 8.5 tonnes/ha. However, little is known of fuel accumulation and associated fire behaviour in the region. Therefore the first sequence of burns (Figures 11 & 12) will be undertaken irrespective of fuel levels. The information generated will be used to establish criteria for future burning.

3.4.3 Prescribed Burning - Operations

All prescribed burning operations will comply with the following conditions.

1. All burning on the reserves will be properly prescribed on the current CALM form CLM 763.
2. Fuel assessment sheets FD 576 will be completed before any burning is prescribed.
3. A pre-burn checklist (CLM 32), which incorporates an environmental checklist and the PACSOU notification checklist, will be completed as part of each burn prescription.
4. All prescriptions will be submitted to the Regional Manager (Wheatbelt) for approval. No burns will proceed until the prescription is approved.

3.4.3 (cont.)

5. Selected prescribed burns will be monitored for their impact on flora species. This work will be undertaken by CALM District staff.
6. Where burning is undertaken during the Restricted Burning Period, a permit will be obtained from the relevant Fire Control Officer.

3.4.4 Fire Suppression

The Department will rely on the public, reserve neighbours, Local Authorities and Bush Fire Brigades for detection of wildfires within or threatening (within 3 km) of the reserves. Provided personnel and fire units are available, one or more units will be despatched from Katanning to assist with the suppression of wildfires on or threatening the reserves. General suppression procedures are given in the Fire Control Working Plans for the Wheatbelt Region and Katanning District. To assist with notification of fires, the Katanning District Manager will ensure that contact telephone numbers for both Katanning District and the Wheatbelt Region (see Appendix 3) are sent to the Kojonup Shire Clerk by October of each year.

Command of any wildfire occurring on the reserves will be assumed by the senior Bush Fire Brigade Officer attending the fire. Subject to agreement between the District Manager and Chief Bush Fire Control Officer of the Kojonup Shire, the Fire Boss role may be shared by the senior Brigade Officer and a Forest Officer.

Other CALM personnel will assist at the fire as a Sector Boss, environmental advisor, or in direct fire suppression action.

Further Departmental assistance may be obtained from Narrogin by liaison with the Regional Duty Officer.

Fire Attack Strategies

1. Wildfires in or near the reserves will be contained to the smallest possible area either by direct attack, indirect attack or by back burning from established firebreaks or roads. Protection priorities in suppression are:-
   a) Life
   b) Property
   c) Nature Conservation Values.

2. Bulldozers and other machines will only be used on the reserves after consultation between the Fire Control Officer in charge and the senior CALM Officer present. Heavy machinery will only be used after due consideration of its likely impact on disease spread and other environmental damage.

3. Dieback hygiene maps (Figures 13 & 14) will be consulted before heavy machinery is used to suppress a wildfire on the reserves.

4. All machinery and fire units used within the reserve boundaries must be free of soil and used under proper hygiene procedures where practical.

5. Chemical fire retardant may be used to maximise the effectiveness and efficiency of water in fire attack and mop-up (refer Chemical User's Manual).

6. Direct attack with water and retardant is the preferred method to be used in open woodlands on the reserves.

7. Indirect attack using chemical retardant trails will be the secondary form of attack on the reserves.

8. Back burning, after due consideration, will be a last resort of control and may only be carried out at the direction of a Bush Fire Control Officer appointed by the Kojonup Shire Council.

9. Water supplies will be obtained from the standpipe at Kojonup Townsite, or from dams on adjoining property.

10. Fire suppression kits for the reserves showing water points, access etc will be updated as necessary.

3.4.5 Liaison

An officer from the Katanning District will attend at least one meeting annually of the Kojonup Bush Fire Advisory Committee. Other liaison activities are detailed under sections 3.4.3 and 3.4.4.

CALM is a Notifiable Authority with respect to nature reserves in the Shire of Kojonup. Therefore the Katanning District Office must be informed of all prescribed burns proposed for land adjoining the reserves. To assist notifications, contact procedures for Katanning District staff will be given to all neighbours of the reserves.

Regular consultation with the relevant District Liaison Officer from the Bush Fires Board will occur.

3.4.6 Monitoring

Monitoring sites based on the method described by Wallace (1983) will be established at one site within each of three prescribed burns. All three sites will be monitored for changes to vegetation structure and floristics. At least one site will be located near adjoining private property so that an assessment of weed encroachment can be made. Monitoring methods will be altered depending on advice from Research Branch.

The Katanning District Manager is responsible for ensuring that monitoring sites are established. Annual measurements will be made at each site during the currency of this guideline.

PART 4 -

INTERIM GUIDELINES FOR CONTROL OF DISEASE

4.1 Introduction

Reserve Nos 17759 and 17760 were assessed by Mr J. Gillard for Phytophthora spp and Armillaria spp during early autumn, 1986. Sample sites and infected areas are shown in Figures 13 and 14.

Despite the above work, further disease assessment is required to establish whether other areas are infected.

4.2 Management Objectives

Management objectives for disease control are:

(a) to assess the reserves for further Phytophthora spp and Armillaria spp infections;

(b) to map areas assessed and the boundaries of infections;

(c) to prevent the introduction of disease into disease-free areas;

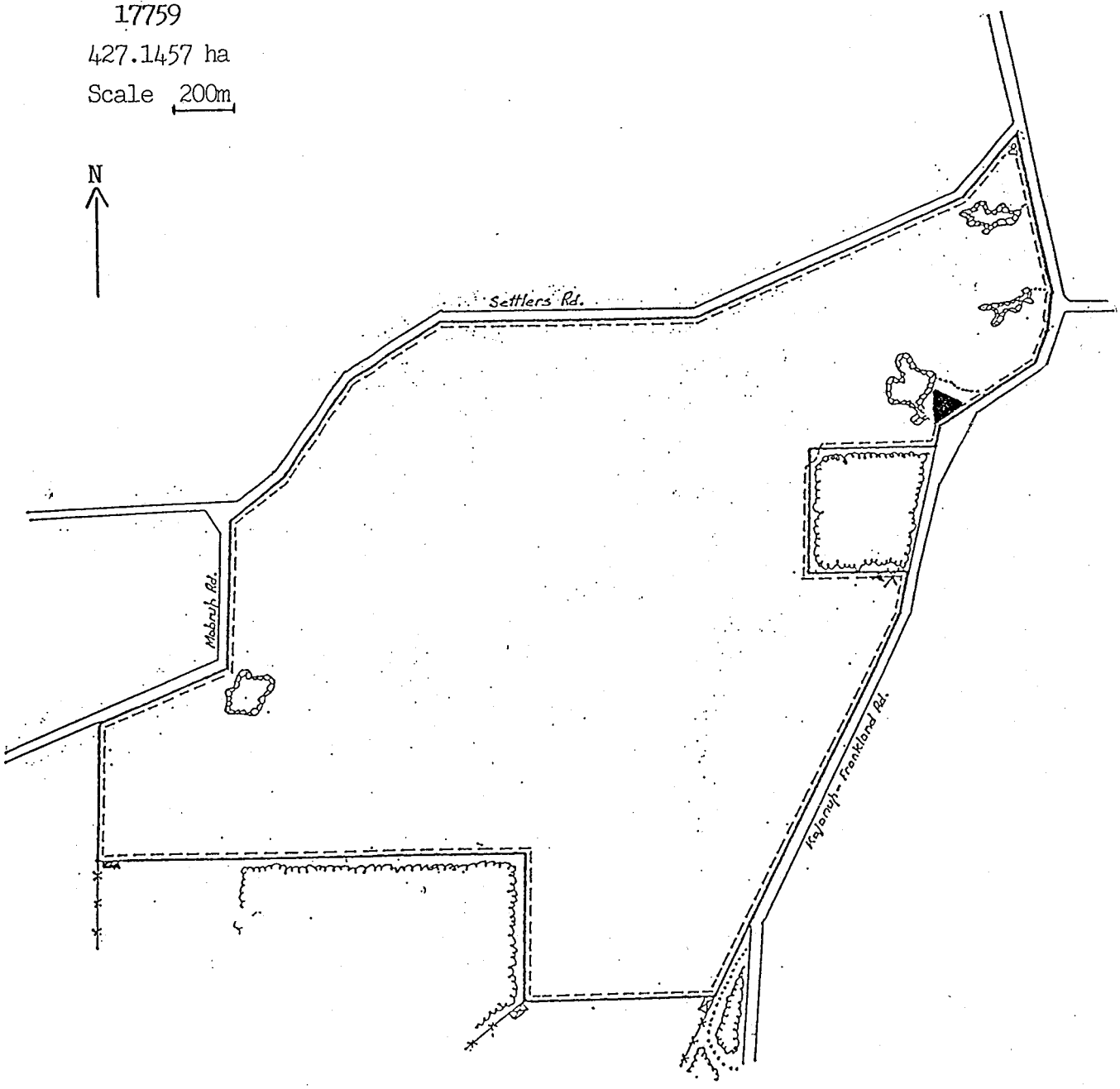
(d) to minimise the spread of disease from areas already infected; and

(e) to measure the rate of natural spread of disease at two sites.

4.3 Disease Management Actions

(a) Assessment & Mapping: Both reserves will be assessed for Phytophthora spp during late autumn (after rain) or late spring; and for Armillaria spp during the July-August period. Thorough assessments will be made every three years, however officers working in the area will report any possible new areas of infection to the District Manager.

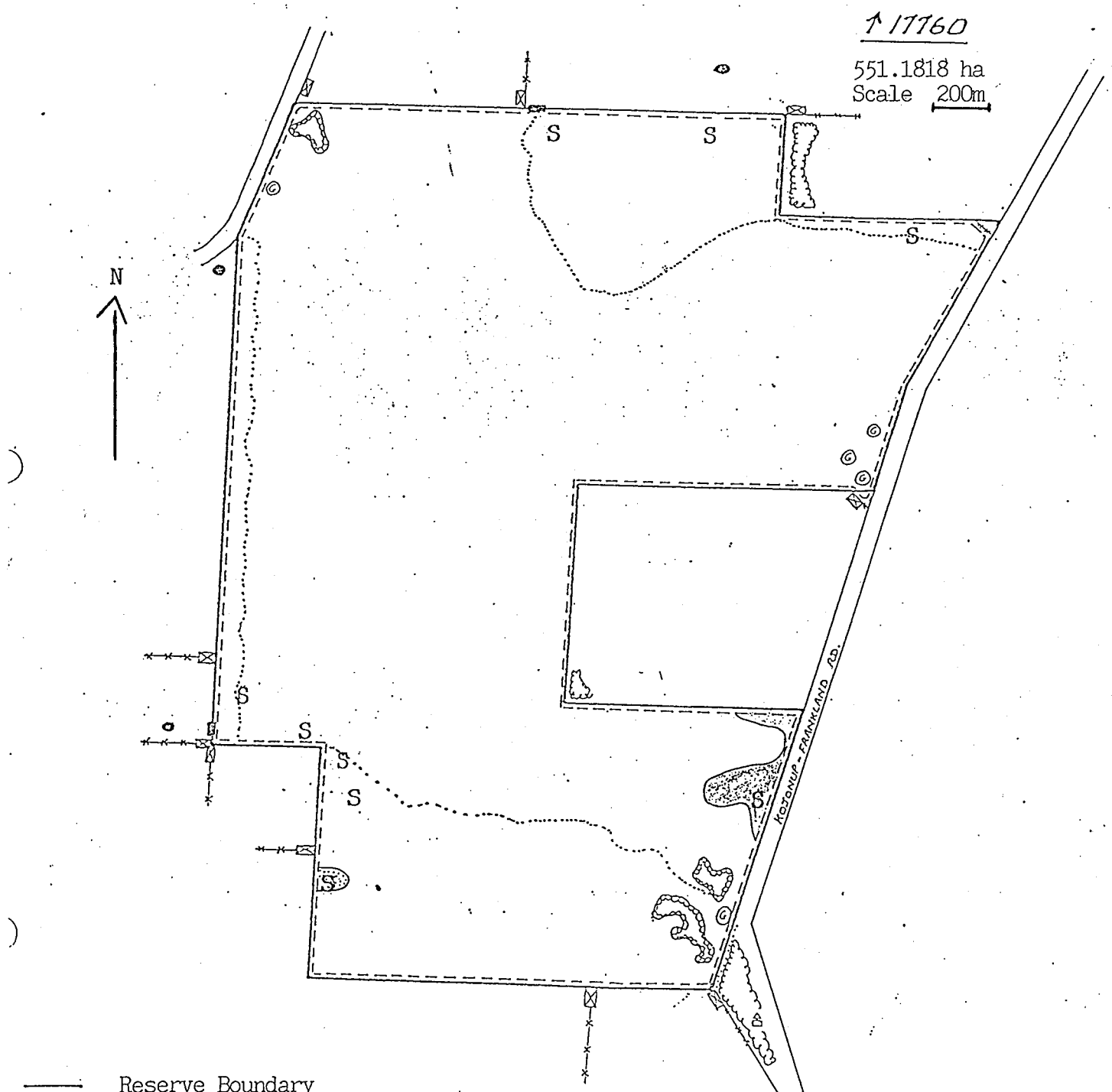
FIGURE 13: DIEBACK & ARMILLARIA SITES



SUSPECTED DIEBACK

Reserve Boundary
Firebreak
Track
Fenceline
Gate: Private Access
Gate onto Reserve
Reserve Sign
Bush Adjoining Reserve
Access Difficult (one-way)
Gravel Pit (Large)
Gravel Pit (Small)

FIGURE 14: DIEBACK & ARMILLARIA SITES



Reserve Boundary
Road Reserve
Firebreak
Track
Fenceline
Gate onto Reserve
Gate: Private Access
Dam
Bush Adjoining Reserve
Gravel Pits
Reserve Sign

Dieback

Armillaria

S Sample Sites

4.3 (cont.)

Samples from suspected disease sites will be sent to the Dwellingup Research Section for testing.

Sites assessed and sampled will be described in a report placed on the appropriate reserve file. Maps showing the location and area of all sites which are known or suspected to contain infections will be kept to the front of the relevant reserve file.

(b) Prevention of Disease Introduction, and Minimising Disease Spread: Both reserves lie within Control Area 1 as defined in the Hygiene Procedures for the Katanning District (Appendix 4). These procedures will be adhered to by CALM personnel.

In addition, before any operations involving the movement of soil are permitted, a Seven Way Test will be carried out. The proposed activity will not proceed unless approved by the Regional Manager.

(c) Rate of Disease Spread: To provide an improved basis for defining disease impacts the rate of disease spread will be assessed at the two known infections - one Phytophthora cinnamomi and one Armillaria luteoburbalina site.

Officers from the Environmental Protection Branch will peg the disease boundaries, and measurements of spread will be made by a district officer every two years. The new infection boundary will also be pegged every two years.

REFERENCES

Beard, J.S., 1981. Vegetation Survey of Western Australia. Swan 1:1 000 000 Vegetation Series, Explanatory Notes to Sheet 7. University of Western Australia Press, Nedlands.

Griffin, E.A. and Associates, 1985. Vegetation Survey of two nature reserves near Kojonup (Jingalup 17759 and South Jingalup 17760). Unpublished report for the Executive Director, Department of Conservation and Land Management, Como.

Majer, J.D., 1980. Report on a study of invertebrates in relation to the Kojonup Fire Management plan. Department of Biology Bulletin Number 2, Western Australian Institute of Technology, Perth.

Ninox Wildlife Consulting, 1985. A vertebrate survey of five nature reserves in the Shire of Kojonup, Western Australia. Unpublished report for the Executive Director, Department of Conservation and Land Management, Como.

Wallace, K.J., 1983. A monitoring method for prescribed burning. Unpublished report, Department of Conservation and Land Management.

APPENDIX 1 -

PLANT SPECIES RECORDED FROM THE JINGALUP RESERVES

Collector/Identifier Codes

1 = K.J. Wallace
2 = WAIT
3 = Ninox Wildlife Survey Team
4 = G. Keighery (WRC)
5 = K.J. Atkins
6 = E.A. Griffin
7 = A. Coates
8 = I. Brooker
9 = S.D. Hopper
10 = A. Brown

* Number outside brackets is collector, number inside brackets is identifier.

All species listed have been recorded since 1982.

TAXA	RESERVE NO. 17759	RESERVE NO. 17760
ZAMIACEAE (16A)		
Macrozamia riedlei	*6(6)	*3(3), 6(6)
POACEAE (31)		
Aira cupaniana (E)	1(7)	
Amphipogon ?debilis	6(6)	6(6)
Briza maxima (E)	1(1),6(6)	
Briza minor (E)	1(1),6(6)	
Neurachne alopecuroidea	1(1),6(6)	1(1), 6(6)
Stipa tricophylla		2(2)
CYPERACEAE (32)		
Isolepis nodosa	6(6)	
Lepidosperma angustatum	6(6)	6(6)
Lepidosperma leptostachyum	6(6)	6(6)
Mesomelaena stygia	6(6)	6(6)
Tetraria octandra	6(6)	6(6)
Tetraria ca pillaris	1(7)	
RESTIONACEAE (39)		
Loxocarya cinerea	6(6)	6(6)
Loxocarya fasciculata	6(6)	6(6)
Loxocarya flexuosa	1(7)	
Lyginia barbata	6(6)	6(6)
Restio megalotheca	6(6)	6(6)
LILIACEAE (54)		
Borya nitida	1(1),6(6)	
Chamaescilla corymbosa	2(2)	
Chamaexeros serra	6(6)	

TAXA	RESERVE NO. 17759	RESERVE NO. 17760
LILIACEAE (54) cont.		
Dianella revoluta	6(6)	6(6)
Laxmannia ?sessiliflora	6(6)	6(6)
Laxmannia squarrosa	1(7)	
Lomandra micrantha	6(6)	
Lomandra rupestris	6(6)	
Lomandra sericea	6(6)	6(6)
Sowerbaea laxiflora	1(1)	
Stypandra imbricata	1(1)	
Thysanotus patersonii	1(1)	6(6)
Wurmbea dioica ssp. alba	1(4)	
Xanthorrhoea preissii	1(6)	6(6)
HAEMODORACEAE (55)		
Anigozanthos sp.	6(6)	6(6)
Conostylis aculeata	1(9)	
Conostylis serrulata	6(6)	6(6)
Conostylis setigera	1(1),6(6),3(3)	3(3),6(6)
Tribonanthes ?longipetala	6(6)	
T bonanthes violacea	1(7)	
HYPOXIDACEAE (56A)		
Hypoxis occidentalis	1(7)	
IRIDACEAE (60)		
Patersonia juncea	6(6)	
Patersonia occidentalis	6(6)	
Patersonia pygmaea	1(4),6(6)	
Romulea rosea (E)	1(1)	

TAXA	RESERVE NO. 17759	RESERVE NO. 17760
ORCHIDACEAE (66)		
Caladenia barbarossa	1(9)	
Caladenia filamentosa var. denticulata	1(1),6(6)	
Caladenia flava	1(1),6(6)	1(1)
Caladenia gemmata	1(1),6(6)	1(1)
Caladenia patersonii var. longicauda	1(1)	
Caladenia reptans	1(7)	
Caladenia sericea	1(7)	
Diuris longifolia	1(1),1(10)	
Pterostylis recurva	1(1)	
Thelymitra antennifera	1(1)	
CASUARINACEAE (70)		
Allocasuarina ?huegeliana	6(6)	
Allocasuarina humilis	1(1),6(6)	1(1),6(6)
PROTEACEAE (90)		
Banksia grandis	1(1),6(6)	1(1),6(6)
Conospermum caeruleum	6(6)	6(6)
Conospermum aff. debile	1(7)	
Dryandra arctotidis	2(2)	
Dryandra armata	6(6)	
Dryandra bipinnatifida	1(1),6(6),1(7)	1(1),6(6)
Dryandra fraseri	6(6)	6(6)
Dryandra nivea	1(1),6(6)	1(1),6(6)
Dryandra ?pteridifolia	2(2)	
Dryandra sessilis	1(1),6(6)	1(1),6(6)
Franklandia fucifolia	6(6)	6(6)
Grevillea sp.		6(6)

TAXA	RESERVE NO. 17759	RESERVE NO. 17760
Hakea lissocarpha	1(1),6(6)	1(1),6(6)
Hakea prostrata	1(1),6(6)	
Hakea ruscifolia	6(6)	6(6)
Hakea trifurcata		1(1)
Hakea undulata	1(1),6(6)	1(1),6(6)
Hakea varia	6(6)	
Persoonia elliptica		6(6)
Persoonia longifolia		6(6)
Petrophile media		6(6)
Petrophile serruriae	1(1),6(6)	1(1)
Synaphea petiolaris	6(6)	6(6)
Synaphea reticulata	6(6)	
SANTALACEAE (92)		
Leptomeria pauciflora	1(7)	
Leptomeria ?pauciflora		6(6)
Leptomeria squarrulosa	6(6)	6(6)
LORANTHACEAE (97)		
Nuytsia floribunda	1(1),3(3),6(6)	3(3),6(6)
AMARANTHACEAE (106)		
Ptilotus manglesii	1(7)	
FUMARIACEAE (136)		
Fumaria ?muralis (E)		1(1)
DROSERACEAE (143)		
Drosera erythrorhiza	1(1)	
Drosera gigantea	1(1),1(7)	

TAXA	RESERVE NO. 17759	RESERVE NO. 17760
DROSERACEAE (143) cont.		
Drosera glanduligera	1(7)	
Drosera macrantha	1(1),6(6)	
Drosera neesii ssp. neesii	1(7)	
Drosera pallida	1(7)	
Drosera platystigma	1(7)	
Drosera stolonifera	1(7)	
PITTOSPORACEAE (152)		
Billardiera drummondiana	1(7)	
Billardiera ?variifolia		6(6)
Sollya heterophylla	1(7)	6(6)
LEGUMINOSAE SUBFAM. MIMOSOIDEAE (163)		
Acacia nervosa	6(6)	6(6)
Acacia pulchella	1(1),6(6)	3(3),6(6)
Acacia pulchella var. pulchella	1(7)	
Acacia saligna	6(6)	6(6)
Acacia willdenowiana	6(6)	6(6)
LEGUMINOSAE SUBFAM. PAPILIONOIDEAE (165)		
Bossiaea eriocarpa	1(1),6(6)	1(1),6(6)
Bossiaea linophylla	1(7)	6(6)
Bossiaea ornata	1(1),6(6)	1(1),3(3),6(6)
Brachysema praemorsum	1(1),6(6)	1(1),6(6)
Burtonia conferta	6(6)	
Daviesia longifolia	6(6)	1(1),6(6)

TAXA	RESERVE NO. 17759	RESERVE NO. 17760
LEGUMINOSAE SUBFAM. PAPILIONOIDEAE (165) cont.		
Daviesia preissii	1(5),6(6),1(7)	6(6)
Dillwynia cinerascens	1(4)	
Gastrolobium bilobum	6(6)	6(6)
Gastrolobium calycinum	6(6)	6(6)
Gompholobium ?aristatum	6(6)	6(6)
Gompholobium capitatum		6(6)
Gompholobium ?capitatum	6(6)	
Gompholobium knightianum		6(6)
Gompholobium ?knightianum	6(6),1(7)	
Gompholobium marginatum	1(7)	
Hardenbergia comptoniana	2(2)	
Isotropis cuneifolia	1(1)	
Jacksonia horrida		6(6)
Jacksonia ?horrida	6(6)	
Kennedia sp.		1(1)
Pultenaea ericifolia	6(6)	6(6)
Pultenaea verruculosa	1(7)	
Viminaria juncea	2(2)	
RUTACEAE (175)		
Boronia crenulata	1(7)	
Boronia spathulata	1(1&4),6(6)	6(6)
TREMANDRACEAE (182)		
Tetratheca nuda		1(1)
POLYGALACEAE (183)		
Comesperma calymega		1(1)
Comesperma virgatum	1(7)	

TAXA	RESERVE NO. 17759	RESERVE NO. 17760
EUPHORBIACEAE (185)		
Phyllanthus calycinus	1(1),6(6)	6(6)
STACKHOUSIACEAE (202)		
?Stackhousia monogyna (pubescens)	1(1),1(7)	
RHAMNACEAE (215)		
Trymalium ledifolium	1(1),6(6),1(7)	6(6)
DILLENIACEAE (226)		
Hibbertia ?amplexicaulis	6(6)	6(6)
Hibbertia ?commutata		6(6)
Hibbertia commutata	6(6),1(7)	
Hibbertia enervia	1(7)	
Hibbertia hypericoides	6(6)	6(6)
Hibbertia rupicola	1(1),6(6)	6(6)
THYMELAEACEAE (263)		
Pimelea ciliata	1(7)	
Pimelea rosea	2(2)	
Pimelea sp.		1(1)
MYRTACEAE (273)		
Baeckea camphorosmae	6(6)	6(6)
Calothamnus quadrifidus	6(6)	
Calothamnus sanguineus	6(6)	
Calothamnus ?sanguineus		1(1)
Calytrix ?brachyphylla	6(6)	
Calytrix flavescens	6(6),1(7)	6(6)

TAXA	RESERVE NO. 17759	RESERVE NO. 17760
MYRTACEAE (273) cont.		
Eucalyptus astringens		6(6)
Eucalyptus calophylla	1(1),6(6)	1(1),6(6)
Eucalyptus celastroides	6(6),1(1)	1(1)
Eucalyptus celastroides ssp. virella		1(1)
Eucalyptus decipiens	6(6)	
Eucalyptus aff. longicornis	1(7)	
Eucalyptus marginata	1(1),6(6)	1(1),6(6)
Eucalyptus uncinata	1(8)	6(6)
Eucalyptus wandoo	1(1),6(6)	1(1),6(6)
Hypocalymma angustifolium	1(1),6(6)	6(6)
Leptospermum erubescens	1(1),6(6)	3(3),6(6)
Leptospermum roei	2(2)	
Melaleuca ?hamulosa	6(6)	
Melaleuca viminea	1(7)	
Pericalymma ellipticum	3(3)	
Verticordia huegelii	1(7)	
APIACEAE (281)		
E ngium rostratum	1(7)	
Trachymene pilosa	1(1&4)	1(1)
EPACRIDACEAE (288)		
Astroloma ciliatum	6(6)	6(6)
Astroloma compactum	6(6)	6(6)
Astroloma epacridis	6(6)	3(3),6(6)
Astroloma pallidum	2(2)	3(3)
Leucopogon australis	2(2)	
Leucopogon capitellatus	6(6),1(7)	6(6)
Leucopogon conostephioides	6(6)	

TAXA	RESERVE NO. 17759	RESERVE NO. 17760
EPACRIDACEAE (288) cont.		
Leucopogon ?obovatus	6(6)	
Leucopogon oxycedrus	6(6)	
Leucopogon propinquus	6(6),1(7)	6(6)
Styphelia tenuiflora	6(6),1(1)	6(6)
LOGANIACEAE (302)		
Logania serpyllifolia		2(2)
GENTIACEAE (303)		
(ıtaurium erythraea	1(7)	
LAMIACEAE (313)		
Hemiandra pungens	6(6),1(7)	6(6)
LENTIBULARIACEAE (323)		
Polypompholyx multifida	1(1&4),1(7)	
LOBELIACEAE (340)		
Lobelia rarifolia	1(7)	
GOODENIACEAE (341)		
Goodenia concinna	1(7)	
Lechenaultia biloba	1(7)	
Scaevola striata	1(1)	1(1)
STYLIDIACEAE (343)		
Stylidium affine	1(4)	
Stylidium brunonianum	6(6),1(7)	
Stylidium brunonianum ssp. brunonianum		1(1),6(6)

TAXA	RESERVE NO. 17759	RESERVE NO. 17760
STYLIDIACEAE (343) cont.		
Stylidium calcaratum	1(1)	
Stylidium obtusatum var. rubricalyx	1(7)	
Stylidium piliferum	1(1&4),6(6)	6(6)
Stylidium schoenoides	6(6),1(1)	1(1),6(6)
ASTERACEAE (345)		
Arctotheca calendula (E)	1(1),6(6)	6(6)
Carduus tenuiflorus (E)	1(7)	
Helipterum cotula	1(7)	
Helipterum manglesii	1(5)	
Podolepis gracilis	1(7)	
Podolepis lessonii	1(7)	
Waitzia citrina	1(7)	
Waitzia paniculata	6(6)	6(6)

APPENDIX 2 -

VERTEBRATES RECORDED FROM THE JINGALUP RESERVES

(Amphibians, Reptiles, Mammals, Birds)

Collector/Identifier Codes

1 = K.J. Wallace
2 = M.S. Graham
3 = Ninox Wildlife Survey Team
4 = M. Frey
5 = F.S. McCafferty
6 = W.A. Museum
7 = B. Humble
8 = R. Coughran

* Number outside brackets is the collector, number inside brackets is the identifier.

+ Bird List - Number refers to observer and identifier.

TAXA	RESERVE NO. 17759	RESERVE NO. 17760
AMPHIBIANS		
Heleioporus eyrei	* 3(3)	
Heleioporus inornatus	3(3)	
Limnodynastes dorsalis	3(3)	3(3)
Pseudophryne guentheri	3(3)	
REPTILES		
Gekkonidae (Geckoes)		
Diplodactylus granariensis	3(3)	3(3)
Lyllodactylus marmoratus	3(3)	3(3)
Phyllurus milii	3(3) 5(2)	3(3),5(6)
Pygopodidae (Legless Lizards)		
Aprasia pulchella		5(6)
Aprasia repens	3(3)	3(3)
Agamidae (Dragons & Monitors)		
Varanus gouldii		3(3)
Scincidae (Skinks)		
Ctenotus impar		3(3)
Leptoblepharus plagiocephalus	3(3)	3(3)
Egernia napoleonis	3(3),4(6)	3(3)
Lerista distinguenda	3(3)	3(3)
Menetia greyii	3(3)	3(3)
Morethia obscura	3(3)	3(3)
Tiliqua rugosa	1(1), 3(3)	1(1), 3(3)
Elapidae (Snakes)		
Ramphotyphlops australis	3(3)	
Rhinoplacephalus gouldii	3(3)	
Rhinoplacephalus nigricans	4(6)	

TAXA	RESERVE NO. 17759	RESERVE NO. 17760
MAMMALS		
Macropus fuliginosus	3(3),2(2)	3(3)
Macropus irma	3(3),2(2)	1(1)
Trichosurus vulpecula	3(3)	
Echidna	3(3)	3(3)
Tadarida australis		3(3)
Nyctophilus timoriensis	3(3)	3(3)
Nyctophilus geoffroyi		3(3)
Eptesicus regulus		3(3)
Mus musculus	3(3)	3(3)
Vulpes vulpes	2(2)	7(7)
Sus scrofa	3(3)	
Ovis aries	7(7)	
Oryctolagus cuniculus	3(3)	3(3)

TAXA (v) - identified by call alone	RESERVE NO. 17759	RESERVE NO. 17760
DROMAIIDAE		
Emu (Dromaius novae-hollandiae)	+ 2,3	+ 3
PHASIANIDAE		
Quail (unident)	1	
COLUMBIDAE		
Common Bronzewing (Phaps chalcoptera)	1,2,3	3
CACATUIDAE		
Red-tailed Black-Cockatoo (Calyptorhynchus magnificus)	3	
White-tailed Black-Cockatoo (Calyptorhynchus baudinii)	2	8
LORIIDAE		
Purple-crowned Lorikeet (Glossopsitta porphyrocephala)	2,3	2,3
POLYTELITIDAE		
Australian King Parrot (Alisterus scapularis)		8
PLATYCERCIDAE		
Elegant Parrot (Neophema elegans)	1	2
Port Lincoln Ringneck (Barnardius zonarius)	1,2,3	2,3
Red-capped Parrot (Purpureicephalus spurius)	1,2,3	1,2,3,8.
Western Rosella (Platycercus icterotis)	1,2,3	4
CUCULIDAE		
Fan-tailed Cuckoo (Cuculus pyrrhophanus)		3

TAXA (v) - identified by call alone	RESERVE NO. 17759	RESERVE NO. 17760
PODARGIDAE		
Tawny Frogmouth (Podargus strigoides)		3
AEGOTHELIDAE		
Australian Owlet-nightjar (Aegotheles cristatus)		3
ALCEDINIDAE		
Laughing Kookaburra (Dacelo novaeguineae)	1,2,3	1,3
MEROPIDAE		
Rainbow Bee-eater (Merops ornatus)	1	
HIRUNDINIDAE		
Tree Martin (Cecropis nigricans)	1,3	2,3
Welcome Swallow (Hirundo neoxena)	8	
CAMPEPHAGIDAE		
Black-faced Cuckoo-shrike (Coracina novaehollandiae)	1(v),3	2,3
MUSCICAPIDAE		
Golden Whistler (Pachycephala pectoralis)	1,3	3
Grey Fantail (Rhipidura fuliginosa)	1,3	2,3
Grey Shrike-thrush (Colluricincla harmonica)	1,3	2,3
Red-capped Robin (Petroica goodenovii)	2	
Western Yellow Robin (Eopsaltria griseogularis)	1,3	2,3
Willie Wagtail (Rhipidura leucophrys)	1,3	
MALURIDAE		
Splendid Fairy-wren (Malurus splendens)	3	3

TAXA (v) - identified by call alone	RESERVE NO. 17759	RESERVE NO. 17760
ACANTHIZIDAE		
Inland Thornbill (Acanthiza apicalis)	3	3
Weebill (Smicrornis brevirostris)	1(v),3	3
Western Gerygone (Gerygone fusca)	1(v),3	2,3
Western Thornbill (Acanthiza inornata)	1,3	3
Yellow-rumped Thornbill (Acanthiza chrysorrhoa)	1,2,3	2,3
NEOSITTIDAE		
Varied Sittella (Dapheonositta chrysoptera)	3	3
CLIMACTERIDAE		
Rufous Treecreeper (Climacteris rufa)	1,2,3	1(v),2,3
MELIPHAGIDAE		
Brown-headed Honeyeater (Melithreptus brevirostris)	3	
Brown Honeyeater (Lichmera indistincta)	1(v),3	2,3
Little Wattlebird (Anthochaera chrysoptera)	1,3	
New Holland Honeyeater (Phylidonyris novaehollandiae)	1,3	
Red Wattlebird (Anthochaera carunculata)	1,2,3	3
Singing Honeyeater (Lichenostomus virescens)	1,3	3
Tawny-crowned Honeyeater (Phylidonyris melanops)		3
Western Spinebill (Acanthorhynchus superciliosus)	1,3	3
White-naped Honeyeater (Melithreptus lunatus)	1,3	3
EPHTHIANURIDAE		
White-fronted Chat (Ephthianura albifrons)		2
PARDALOTIDAE		
Spotted Pardalote (Pardalotus punctatus)	3	3
Striated Pardalote (Pardalotus striatus)	1,3	1(v),2,3

TAXA (v) - identified by call alone	RESERVE NO. 17759	RESERVE NO. 17760
ZOSTEROPIDAE		
Silvereye (Zosterops lateralis)	3	3
GRALLINIDAE		
Australian Magpie-lark (Grallina cyanoleuca)	3	
ARTAMIDAE		
Dusky Woodswallow (Artamus cyanopterus)	1,3	
CRACTICIDAE		
Australian Magpie (Gymnorhina tibicen)	1,3	1,2,3
CORVIDAE		
Australian Raven (Corvus coronoides)	3	2,3

APPENDIX 3

DEPARTMENT OF CONSERVATION & LAND MANAGEMENT

KATANNING DISTRICT - FIRE CONTACT PROCEDURES

Business Hours (8.00 a.m. - 5.00 p.m.)

Telephone Katanning Office	098 - 211 296
also	098 - 212 622
Vocafax	098 - 212 633

After Hours

Telephone either:	District Manager	098 - 211 282
or:	Reserves Officer	098 - 211 434
or:	Forests Officer	098 - 212 620

IF KATANNING STAFF CANNOT BE CONTACTED, then during Business Hours contact the Narrogin Office (098 - 811 444 or 098 - 811 113). After Hours contact the Narrogin Duty Officer, who will be one of the following:-

District Forester - S. Gorton	098 - 811 113
Forest Ranger - R. McAlinden	098 - 811 444
Assistant Forester - G. Durell	098 - 812 628

DISTRICT MANAGER

September 1987

APPENDIX 4

GUIDELINES FOR DIEBACK HYGIENE

- KATANNING DISTRICT

Prepared by B. Humble
October 1986

HYGIENE PROCEDURES - AREA 1

Land within Control Area 1 (Figure 1) contains sites of "known" P.c. (Phytophthora cinnamomi) infections, both on CALM estate and other lands. It is also that section of the Katanning District which, on climatic grounds, is most favourable to the fungus. Therefore it is the area within which a vehicle is most likely to pick up and transport infected (P.c.) soil. Because most of the CALM estate in this area has not been inspected or "interpreted" for P.c. infections, it must be assumed that all vehicular transported soil is a potential source of P.c. infection unless otherwise confirmed by a hygiene map of the area.

That part (Area 2) of the Katanning District which lies to the east and north of Area 1 is much drier and is therefore less likely to sustain P.c. infections. No infections have been recorded from the area. It must be stressed, however, that while Area 2 is less at risk from P.c., it is possible that infections will be found. For this reason a set of general hygiene guidelines has been written for Area 2 (see page 5).

The following Hygiene Guidelines will apply for both wet and dry soil conditions and will be closely followed at all times within Area 1. It should be noted that these measures will also assist to control the transport of declared plants and other weeds by vehicles.

1. CALM District Vehicles

   a. Nissans and Isuzu:

...2/

(i) Examine the vehicle before entry onto any reserve. Any adhering soil shall be washed off before entry at a point alongside or near the reserve, preferably low in the profile, ie stream beds, depressions etc that slope away from the reserve.

(ii) Do not drive through "washed off" effluent.

(iii) Proceed on journey around/through the reserve.

(iv) When leaving the reserve inspect the vehicle and wash down only if soil is adhering as mud or clumps of dirt on the vehicle. Washdowns should be carried out as in (i) above.

(v) Avoid traversing wet stream beds, particularly on reserves with known or suspect areas of P.c. infection.

(vi) If wet stream beds cannot be avoided, and after becoming bogged, inspect the vehicle immediately upslope from the creek or bog. All soil adhering to the vehicle must be washed off on the banks of the stream or in low profile areas adjacent to the bog areas so that washdown effluent runs back into the stream or boggy area.

(vii) When traversing known boundaries of dieback infection, ie proceeding from dieback free to dieback infected or vice versa, inspect and wash the vehicle (if soil adhering) when crossing the boundary. Effluent from washdowns must run into P.c. infected, and not P.c. free areas.

(viii) Programme work in known, suspect and uninterpreted areas for dry soil conditions wherever possible.

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(ix) Use fungicides in water drawn in the field from Nature Reserves or other bush water supply locations.

b. Subaru:

(i) If any units with a fire-fighting unit are readily available, then procedure outlined above is to be followed.

(ii) If no washdown available, then avoid traversing known or suspect dieback infected or boggy stream areas, or cross such areas just prior to leaving reserves. (Preferably programme work in these areas for dry soil conditions.) Do not re-enter dieback free areas if mud or soil is adhering to the vehicle.

(iii) Proceed through these areas and back to Katanning HQ for washdown after removing as much loose soil as possible with wooden rod in the vehicle.

(iv) Do not go onto other reserves if soil is adhering to the vehicle.

(v) Programme work in known, suspect and uninterpreted areas for dry soil conditions wherever possible.

2. Other Departmental and Non-Departmental Vehicles Carrying Washdown Equipment:

(i) Personnel from outside the District must inform District staff before entry onto any reserves. Vehicles should be inspected at Katanning HQ or in the field prior to entering reserves. District staff to pass on:

(a) hygiene guidelines

...4/

(b) dieback free maps (if available)

(c) other relevant information pertaining to hygiene and dieback within the District.

(ii) Procedures listed for the Nissans and Isuzu (1.a. above) must be followed.

3. Other Departmental and Non-Departmental Vehicles Not Carrying Washdown Equipment

(i) Must inform District staff before entry onto any Nature Reserve. Vehicles should be inspected at Katanning HQ or in the field prior to entering reserves. District staff to pass on:

(a) hygiene guidelines

(b) dieback free maps (if available)

(c) other relevant information pertaining to hygiene and dieback within the District.

(ii) Procedures written for the Subaru (1.b. above) to be followed.

(iii) Entry into reserves with known or suspected areas of infection will be confined to dry soil conditions.

4. Contract Machinery Used on CALM Estate (Bulldozers, graders, tractors and ploughs)

(i) Operators shall be made aware of these dieback hygiene measures.

(ii) Operators shall ensure vehicles are soil free before starting a job on CALM lands.

(iii) Where necessary, staff supervising contracts shall clean down machinery before work commences.

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(iv) When approaching areas of known or suspect P.c. infection, blade to be lifted. These areas shall be left until last, or not done unless the machine is washed down immediately after working in the dieback area (see 1.a. above).

(v) Clean down after negotiating major water courses or low boggy areas (see 1.a. above).

NOTE: All earth-moving contract machinery shall be washed down on completion of job. If unable to do so, the contractor should be made aware of the P.c. hygiene implications.

For the purpose of these Guidelines hard surfaced, dry gravel and bitumen access roads should be regarded as suitable, low risk access.

Loose wet gravel and sand roads and tracks should be regarded as undesirable access during moist soil conditions.

Maximum hygiene measures will be undertaken if it is necessary to use high risk access routes under moist soil conditions.