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DEPARTMENT OF CONSERVATION
& LAND MANAGEMENT
WESTERN AUSTRALIA

VEGETATION SURVEY OF BOOLANELLING

NATURE RESERVE.

Prepared for:

Reserve Management Officer

Pingelly Management District

Department of Conservation and Land Management.

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1.0 INTRODUCTION

1.1 DESCRIPTION OF PROJECT

Boolanelling Nature Reserve (668.8153 ha) is one of the largest Nature Reserves in the Bruce Rock Shire and the Western or Central Wheatbelt. The reserve has no major areas of granite outcropping or salt lakes and is thus one of the largest blocks of central wheatbelt vegetation.

Part of the reserve was surveyed by B.G. Muir in 1978, but a more detailed analysis, and total reserve coverage is required to fully document the vegetation. In his report B. Muir (1978) stated that Boolanelling Nature Reserve was one of the finest reserves he had encountered in that region of the wheatbelt. It carries a rich vegetation both structurally and floristically and represents some of the dominant vegetation types of the region prior to clearing.

The objective of this project is to undertake an extensive vegetation survey of the reserve.

1.2 PROJECT REQUIREMENTS

The specific objectives of the vegetation survey as set out in the Consultancy offer and agreement are as follows:-

- (a) Produce a vegetation map for the reserve of the floristic/structural vegetation types identified. The map should also include dominant geomorphological features such as granite rocks and stream lines.
- (b) Provide a series of association descriptions, based on Muir (1977) with floristic clarification, which cover the range of associations found on the reserve. The site of each description should be recorded on the appropriate vegetation map.
- (c) Identify vegetation types, or specific sites which require management considerations.

- (d) Collect and identify a representative sample of the flora of the reserve, and lodge any flowering specimens with the W.A. Herbarium, and voucher specimens with the Reserve Management Office, Pingelly. Compile a flora species list.
- (e) Record the identity, location and estimated population size of any gazetted rare plant, or other plants of interest (restricted distribution) which may occur on the reserve.

1.3 LOCATION

Boolanelling Nature Reserve (No. 22792) is located in the South West corner of the Bruce Rock Shire, approximately 25.5 km north north-west of Corrigin townsite (figure 1).

1.4 PHYSICAL ENVIRONEMENT

A) Geology and Soils

Beard (1980) describes the geology of the Corrigin area in which the reserve is situated. The area is part of the Yilgarn Block a very ancient rigid "Shield" area composed mainly of Archaen granite and gneiss with some altered volcanics and sediments.

Over the millions of years since the Yilgarn Block was first formed, it has been levelled by glaciation and traversed by sluggish meandering rivers. When the climate became drier and more seasonal, rivers degenerated to chains of salt lakes, and although weathering continued there was no removal of the resultant products. Hence, valleys have been gradually filling up, as rivers no longer flow through the area. The landscape is therefore gently undulating and of low relief, the only exception being occasional granite outcrops.

The soils of this area have been mapped in Sheet 5 of the Atlas of Australian Soils (Northcote et. al., 1967). Northcote et. al. describes the area as gently undulating to rolling terrain with some ridges and uneven slopes, and with the variable presence

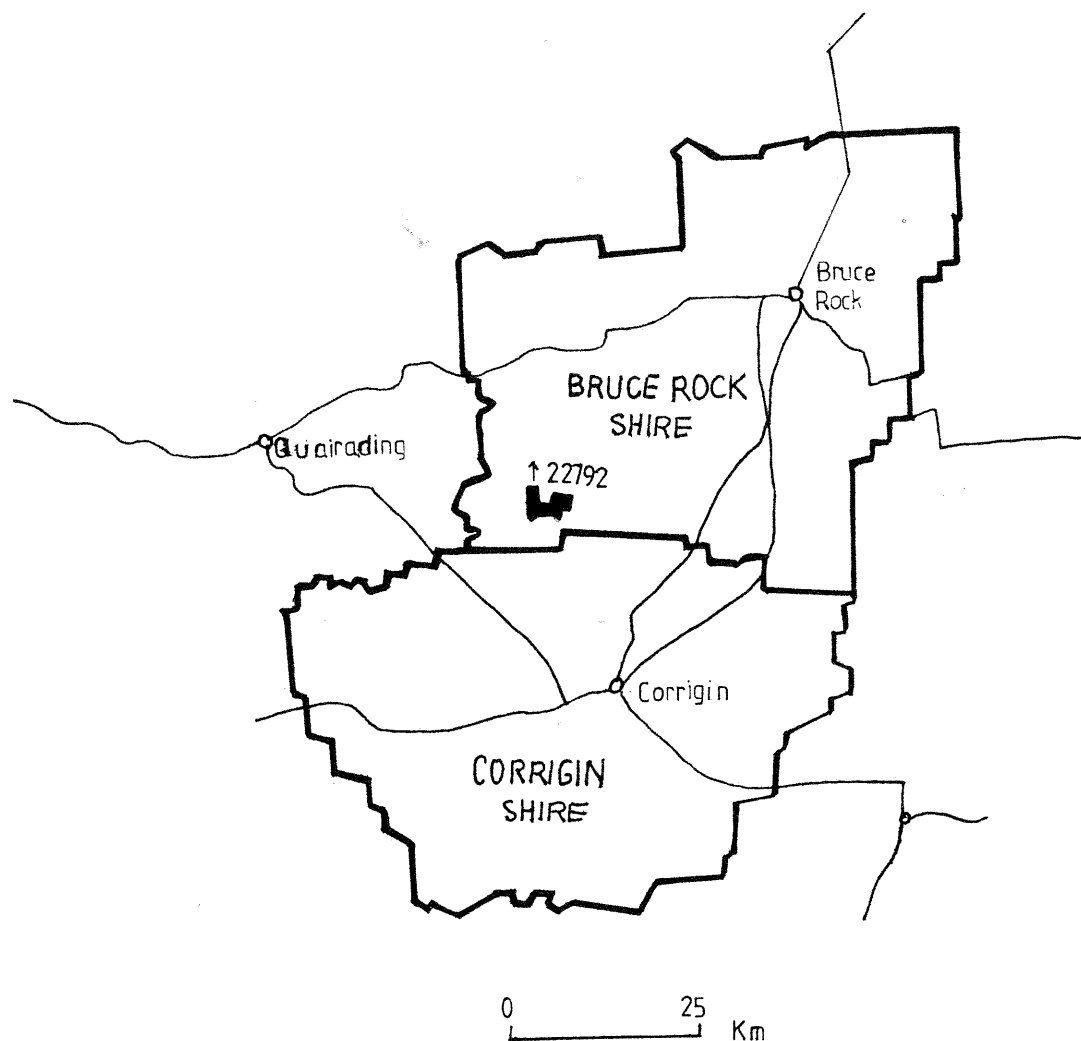


Figure 1. Location of Boolanelling Nature Reserve (22792)

of lateritic mesas and buttes and granitic tors and bosses. The chief soils of the area are hard alkaline yellow mottled soils. Shallow and often stony or gritty sandy soils form a soil scree around areas of bare rock.

B) Climate

The area has a typical wheatbelt climate with hot dry summers and mild wet winters. Meteorological data from Corrigin Post Office is given in Table 1. The region of the reserve is characterised by an average yearly rainfall of 379 mm. Most of the rain is received in winter from May to August with occasional thunderstorms in late summer and early autumn. Winters are mild with the mean temperature of the coldest month above 10° C. The mean temperature of the hottest month exceeds 25° C and absolute maxima above 40° C occur.

Beard (1980) classes the Corrigin regime with it's 7 dry months as Dry Warm Mediterranean.

TABLE 1. SUMMARY OF METEOROLOGICAL DATA RECORDED AT CORRIGIN
(FROM BUREAU OF METEOROLOGY 1985).

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN or TOTAL
Mean Rain- fall (mm)	11	17	23	23	49	65	62	49	30	24	14	12	379
No. Rainy Days	2	3	3	5	10	13	15	12	9	7	4	2	85
Mean Max. Temp. °C.	32.5	31.4	28.6	23.6	19.5	16.3	15.2	16.1	18.6	22.8	27.0	30.8	23.5
Mean Min. Temp. °C.	16.0	16.1	14.3	10.9	7.3	6.4	5.1	4.5	5.6	8.2	11.3	14.2	10.0
Rel. Hum- idity % 3pm.	25	28	31	41	49	61	61	55	47	34	27	24	40.0

1.5 RESERVE HISTORY

The Boolanelling Nature Reserve was originally gazetted on the 30th April, 1948 for "Public Utility" and was 283 ha in area. Its purpose was then changed to "Conservation of Flora" on 15th June, 1962. It was decreased in size to 279 ha on 7th June, 1968 by creating extensions to road 136.36, then to 260 ha on 2nd July, 1971 by excluding Avon location 28350. It was later increased to 277.5 ha on 18th August, 1972 by inclusion of Avon location 28456. No reasons were given for the addition or subtraction of these locations. On 12th October, 1979 the purpose was changed to Conservation of Flora and Fauna and was vested in the Western Australian Wildlife Authority.

In 1979 Reserve Management Officer Ken Wallace examined uncleared land adjacent to Boolanelling Reserve and recommended the purchase of some of this land by the Department of Fisheries and Wildlife. On 15th February, 1982, Avon location 28350 and portions of Avon locations 23980 and 25760 were purchased and added to the reserve to realise the present area of 668.8153 ha.

1.6 PHYSICAL FEATURES OF THE RESERVE

Boolanelling Nature Reserve (22792) is irregular in shape with a total perimeter of ca 18.3 km. Gravel roads run along the southern and western boundaries and Copestakes road runs through the western portion.

The reserve is surrounded by privately owned land most of which has been cleared and is used for cropping and as pasture for stock. Uncleared land adjoining the reserve is shown in Figure 2.

The reserve lies between 330 and 380 m above sea level. The highest point is a laterite hill in the centre towards the northern boundary. There is a decline to 340 m ASL at the eastern boundary, 350 m at the S-E end and 330 m at the N-W corner. (Figure 3).

The tracks in the eastern section were made before the purchase of this land by the Department in 1982 and are now becoming overgrown in places. There are some areas of exposed granite mainly in the eastern section.

FIGURE 2.

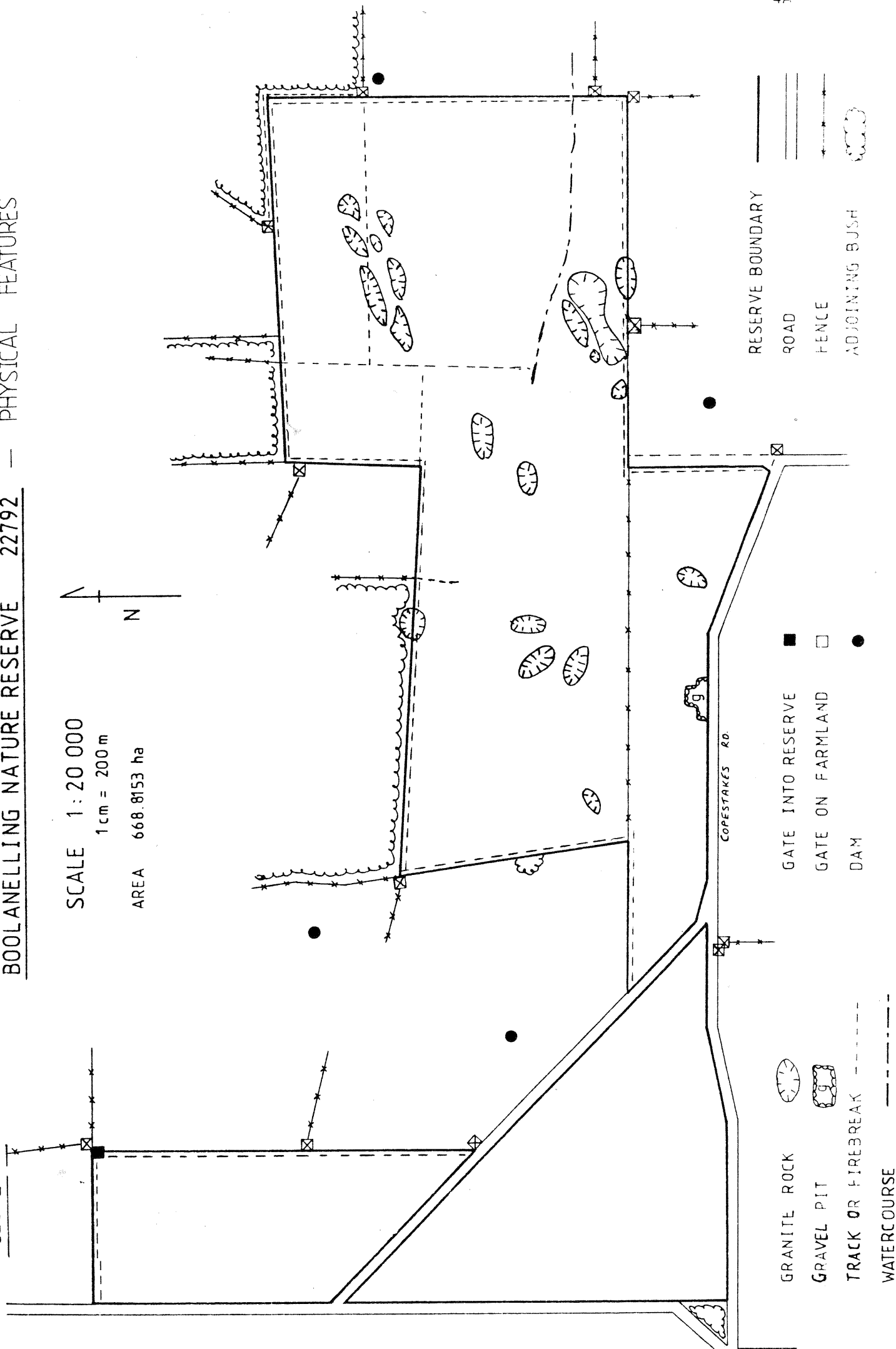
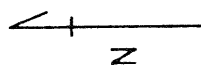
BOOLANELLING NATURE RESERVE 22792 — PHYSICAL FEATURES

4A

SCALE 1:20 000

1 cm = 200 m

AREA 668.8153 ha



RESERVE BOUNDARY

ROAD

FENCE

ADJOINING BUSH

GATE INTO RESERVE

GATE ON FARMLAND

DAM

GRANITE ROCK

GRAVEL PIT

TRACK OR FIREBREAK

WATERCOURSE

FIGURE 3.

BOOLANELLING NATURE RESERVE. (22792)

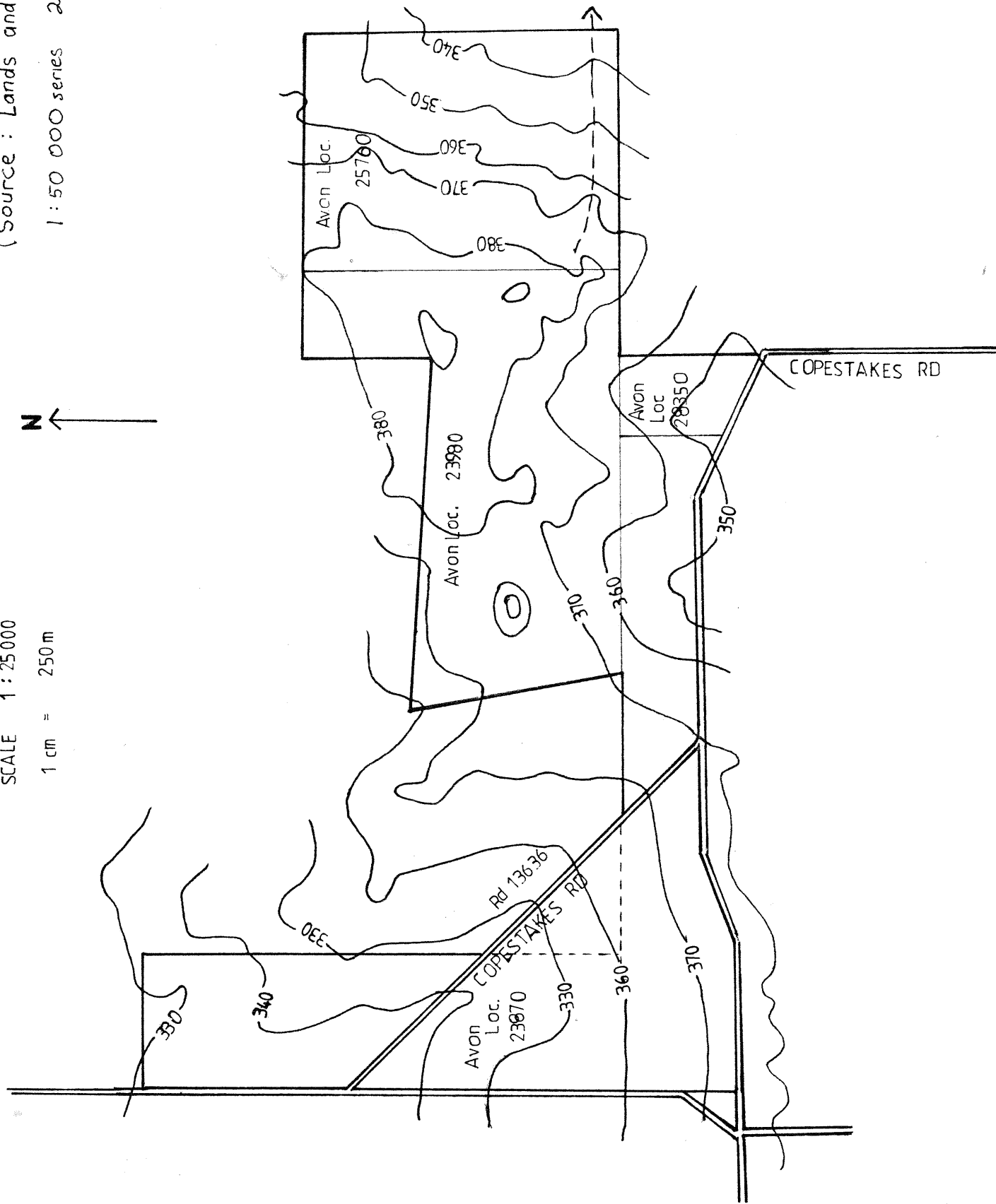
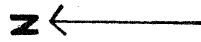
Cadastral Information + Contour Lines

(Source : Lands and Survey

1 : 50 000 series 2433-1)

SCALE 1 : 25000

1 cm = 250 m



No permanent water exists on the reserve, temporary watercourses are shown in Figure 2.

1.7 FIRE HISTORY

Evidence of fire in the form of burnt "Stays" of *Allocasuarina huegeliana* were found on granite outcrops examined towards the eastern boundary. This area was added to the reserve in 1982 and was probably burnt at least 15 to 20 years ago.

No evidence of fire was found in other sections of the reserve. B. Muir (1978) reports information gained from a local farmer (Mr Copestakes) which indicates that the reserve was burnt ca 30 years ago.

2.0 METHOD

The reserve was visited on two occasions for a total of seven days during April, 1985.

The vegetation survey was based on the use of aerial photographs, Lands and Survey Department 1:40,000 scale black and white. The photographs were examined under a stereo viewer and approximate boundaries of vegetation types drawn on the photographs. Areas thus delineated were examined in the field and the vegetation and soils at selected sites described.

Vegetation was classified using Muirs (1977) system (Table 2) which was designed specifically for describing wheatbelt vegetation.

Voucher specimens of most plant species were collected and taken to the Western Australian Herbarium for identification. Most specimens were collected at the selected vegetation sites, but a number were collected outside these areas.

Due to time limitations a few areas were not examined in detail and these were mapped directly from aerial photographs and information gained from brief visits in the field.

MUIR SYSTEM OF VEGETATION CLASSIFICATION

TABLE 2.

LIFE FORM/HEIGHT CLASS	CANOPY COVER			
	DENSE d 70-100%	MID-DENSE c 30-70%	SPARSE i 10-30%	VERY SPARSE r 2-10%
T Trees >30m M Trees 15-30m LA Trees 5-15m LB Trees <5m	Dense Tall Forest Dense Forest Dense Low Forest A Dense Low Forest B	Tall Forest Forest Low Forest A Low Forest B	Tall Woodland Woodland Low Woodland A Low Woodland B	Open Tall Woodland Open Woodland Open Low Woodland A Open Low Woodland B
KT Mallee tree form KS Mallee shrub form	Dense Tree Mallee Dense Shrub Mallee	Tree Mallee Shrub Mallee	Open Tree Mallee Open Shrub Mallee	Very Open Tree Mallee Very Open Shrub Mallee
S Shrubs >2m SA Shrubs 1.5-2.0m SB Shrubs 1.0-1.5m SC Shrubs 0.5-1.0m SD Shrubs 0.0-0.5m	Dense Thicket Dense Heath A Dense Heath B Dense Low Heath C Dense Low Heath D	Thicket Heath A Heath B Low Heath C Low Heath D	Scrub Low Scrub A Low Scrub B Dwarf Scrub C Dwarf Scrub D	Open Scrub Open Low Scrub A Open Low Scrub B Open Dwarf Scrub C Open Dwarf Scrub D
P Mat plants H Hummock Grass GT Bunch grass >0.5m GL Bunch grass <0.5m J Herbaceous spp.	Dense Mat Plants Dense Hummock Grass Dense Tall Grass Dense Low Grass Dense Herbs	Mat Plants Mid-Dense Hummock Grass Tall Grass Low Grass Herbs	Open Mat Plants Hummock Grass Open Tall Grass Open Low Grass Open Herbs	Very Open Mat Plants Open Hummock Grass Very Open Tall Grass Very Open Low Grass Very Open Herbs
VT Sedges >0.5m VL Sedges <0.5m	Dense Tall Sedges Dense Low Sedges	Tall Sedges Low Sedges	Open Tall Sedges Open Low Sedges	Very Open Tall Sedges Very Open Low Sedges
X Ferns Mosses, liverwort	Dense Ferns Dense Mosses	Ferns Mosses	Open Ferns Open Mosses	Very Open Ferns Very Open Mosses

3.0 RESULTS

3.1 VEGETATION

Boolanelling Nature Reserve is situated in the Avon Botanical District. Beard (1980) places the reserve in the Pikaring Vegetation System and more specifically the area is described as *Allocasuarina* thicket with scattered wandoo.

Twenty one vegetation types were found on the reserve and are described in the following pages. These include 5 types of woodland, 4 types of Mallee, 9 types of heath and 3 vegetation types associated with granite outcrops.

A list of species recorded at each site can be found in Appendix 2.

A) Woodland Formations

SITE 21. Gimlet woodland with scattered Salmon Gums.

Key Description: Woodland on pink clay loam, poorly drained.

Stratum 1. *Eucalyptus salubris* trees with scattered *Eucalyptus salmonophloia* trees emergent. Mature to senescent, stratum 15-20 m, emergents to 25 m, 10-30% cover.

Comments. Scattered shrubs <2% canopy cover are also present along with *Eucalyptus gracilis*, *Eucalyptus loxophleba*, *Eucalyptus myriadena* and *Eucalyptus wandoo*.

This vegetation type also occurs at site 29. Here the gimlet is immature, stratum 4-12 m, and *Eucalyptus myriadena* and *Eucalyptus gracilis* were not recorded.

Photograph 1. Gimlet woodland with scattered salmon gum.



SITE 2. Wandoo woodland Type 1.

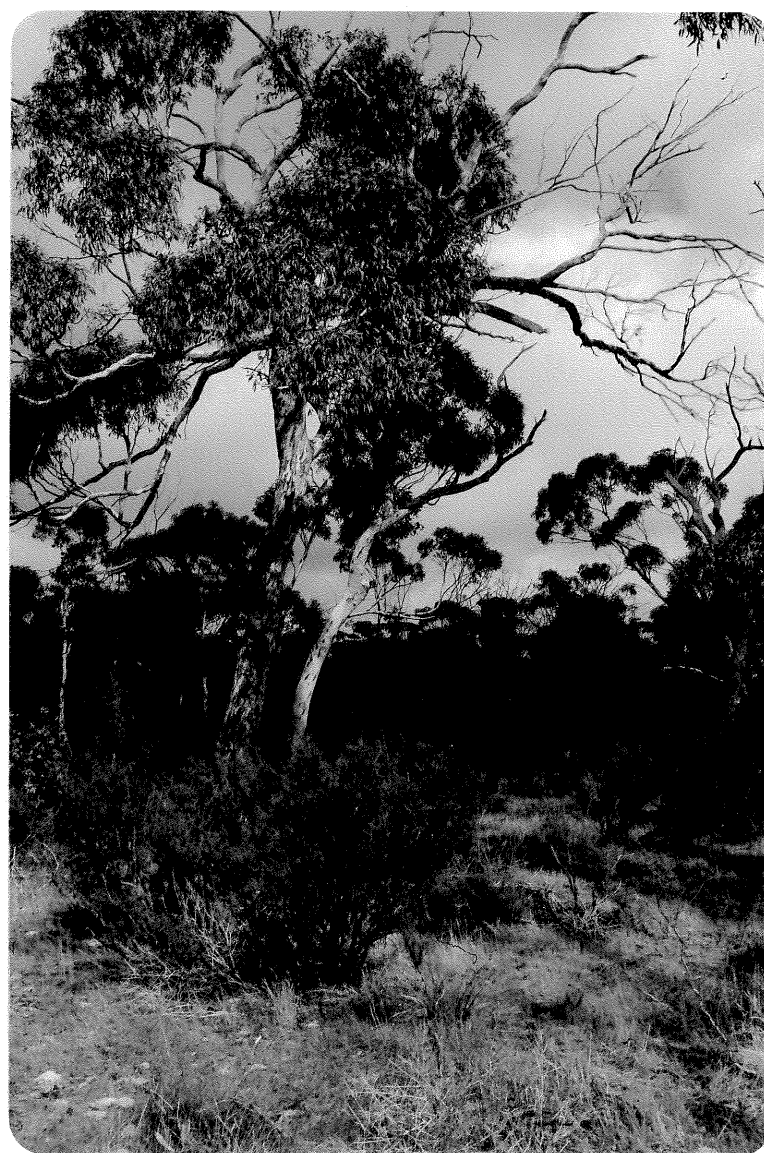
Key description. Woodland over low Scrub A over very Open Low Sedge on pink, clay loam, poorly drained.

Stratum 1. *Eucalyptus wandoo* trees. Mature, stratum 12-20 m, 10-30% cover.

Stratum 2. *Allocasuarina campestris* and *Leptospermum erubescens* shrubs. Mature, stratum 0.5 - 2 m, 10-30% canopy cover. Other species present, scattered, 0.5-1 metre.

Stratum 3. *Loxocarya pubescens* sedge, 20cm tall, 2-10% canopy cover.

PHOTOGRAPH 2. Wandoo woodland with *Allocasuarina* and *Leptospermum* (Type 1).



SITE 18. Wandoo woodland Type 2.

Key description. Woodland over open low sedge on pink, clay loam, poorly drained.

Stratum 1. *Eucalyptus wandoo* trees, stratum 8-12 m, 10-30% cover.

Stratum 2. *Loxocarya pubescens* sedge, 20 cm tall 10-30% cover.

Comments. Scattered shrubs are also present in this vegetation type cover
< 2%.

PHOTOGRAPH 3. Wandoo woodland with the understorey almost absent (Type
2). Note weed invasion.



SITE 1. Mixed woodland.

Key description. Low Forest A on pink, clay loam, poorly drained.

Stratum 1. *Eucalyptus wandoo*, *Eucalyptus* sp., *Eucalyptus anceps*,
Eucalyptus celastroides, *Eucalyptus calycogona*, *E.*
aff. occidentalis trees and mallee forms with emergent *E.*
salmonophloia trees. Mature and immature species present.
stratum 8-15 m, emergents to 20 m, 30-70% cover.

Comments. Scattered shrubs <2% cover were also present in this vegetation type .

PHOTOGRAPH 4. Mixed woodland with scattered Salmon Gums.



SITE 22. *Eucalyptus astringens* woodland.

Key description. Low Forest A on pink clay loam ca 80% laterite.

Stratum 1. *Eucalyptus astringens* with scattered *E. wandoo* trees,
stratum 8-12 m, 30-70% cover.

Comments. *Eucalyptus anceps* and *Eucalyptus flocktoniae* are
present on the edge of this vegetation type with scattered shrubs.

PHOTOGRAPH 5. Mallet woodland with scattered wandoo.

The photograph was taken from the top of a lateritic hill.



B) Mallee species

SITE 3. Mallee type 1.

Key description. Dense tree mallee on pale brown, sandy clay loam, poorly drained.

Stratum 1. *Eucalyptus eremophila*, *Eucalyptus celastroides* and *Eucalyptus flocktoniae* mallee. Stratum 4-8 m, 70-100% canopy cover.

Comments. Scattered shrubs, cover <2% also occur in this association.

PHOTOGRAPH 6. Mallee area type 1. *Eucalyptus flocktoniae* in foreground *Eucalyptus eremophila* and *Eucalyptus celastroides* in the background.



SITE 4. Mallee type 2.

Key description. Dense tree mallee over Open Dwarf Scrub D on yellowish brown, sandy clay loam, poorly drained.

Stratum 1. *Eucalyptus eremophila*, *Eucalyptus anceps* and *E. aff. redunca* mallee. Mature, stratum 3-5 m, 70-100% cover.

Stratum 2. Mixed shrubs (no particular dominant) stratum 0.0-0.5 m, 2-10% cover.

Comments. This vegetation type was also recorded at Site 13.

PHOTOGRAPH 7. Mallee area type 2. *Eucalyptus aff. redunca* is in the foreground (rough bark).



SITE 32. Mallee type 3.

Key description. Dense tree mallee on pale brown, sandy clay loam.

Stratum 1. *Eucalyptus calycogona*, *E. celastroides*, and *E. anceps* mallee. Stratum 4-6 m, 70-100% cover.

PHOTOGRAPH 8. Mallee type 3. *Eucalyptus calycogona*, *Eucalyptus celastroides* and *E. anceps*.



SITE 10. Mallee type 4.

Key description. Tree Mallee over Open Dwarf Scrub C over open low sedges on light brown sandy loam.

Stratum 1. *Eucalyptus albens* mallee. Stratum 3-8 m, 30-70% cover.

Stratum 2. Mixed shrubs, stratum 0.5 - 1.0 m, cover 2-10%.

Stratum 3. *Lorocarya pubescens*. 20 cm tall 10-30% cover.

C) Heath

SITE 5. *Metaleuca* heath.

Key description. Dense low heath C on pale brown, sandy loam, well drained.

Stratum 1. Mixed shrubs with *Metaleuca* ? *spathulata* and *Leptospermum erubescens* prominent. Mature, stratum 0.5 - 1 metre, 70-100% cover with emergent *Eucalyptus albens* to ca 4 metre tall <2% cover.

Comments. This vegetation type was also found at site 14. although species typical of the tall mixed heath were also recorded at this site.

PHOTOGRAPH 9. *Metaleuca* heath with emergent *Eucalyptus albens*.



SITE 8. Low mixed heath.

Key description. Dense Low Heath D on very pale brown, sandy loam, well drained.

Stratum 1. Mixed shrubs, no particular dominant. Mature to senescent, stratum 0.0-0.5 m, 70-100% cover. *Allocasuarina campestris* emergent to 1 metre, <2% cover.

PHOTOGRAPH 10. Low mixed heath.



SITE 7. Mixed heath with emergent *Eucalyptus macrocarpa*.

Key description. Low Heath C on very pale brown, sandy loam, well drained.

Stratum 1. Mixed shrubs, no particular dominant, *Beaufortia micrantha*, *Dryandra cirsioides* and *Melaleuca leptospermoides* prevalent. Mature, stratum 0.5 - 1.0 metre, 30-70% cover with *Eucalyptus macrocarpa* emergent to 3 metre, cover <2%.

Comments. The vegetation at Site 16 has the same structure as that found above but also contains species found in the tall and low mixed heath areas. It therefore appears to be a transition zone.

PHOTOGRAPH 11. Mixed heath with emergent *Eucalyptus macrocarpa*.



SITE 15. Tall mixed heath.

Key description. Low Heath C on yellow, sandy clay loam with ca 50% laterite, well drained.

Stratum 1. Mixed shrubs, no particular dominant but *Dryandra ferruginea*, *Banksia sphaerocarpa* and *Petrophile* sp. prominent. Mature, stratum 0.5 - 1.0 metre, 30-70% cover.

PHOTOGRAPH 12. Tall mixed heath.



SITE 17. *Dryandra horrida* heath.

Key description. Low heath C on light yellow-brown sandy loam, well drained.

Stratum 1. Mixed shrubs with *Dryandra horrida* prominent.
Mature, stratum 0.5-1 metre, 30-70% cover with emergent
Grevillea excelsior to 4 metres, <2% cover.

PHOTOGRAPH 13. *Dryandra horrida* heath.



SITE 35. *Eremaea pauciflora* and *Leptospermum erubescens* heath.

Key description. Low Heath C on light brown sandy loam.

Stratum 1. *Eremaea pauciflora* and *Leptospermum erubescens*
shrubs. Stratum 0.5 - 1 metre; 30-70% cover.

PHOTOGRAPH 14. *Eremsea pauciflora* and *Leptospermum erubescens* heath.



SITE 31. Tamma heath Type 1.

Key description. Heath B over Open Dwarf Scrub C on light brown sandy loam ca 40% laterite.

Stratum 1. *Allocasuarina campestris* shrubs. Immature, 1.0-1.5 metres, 30-70% cover.

Stratum 2. Mixed shrubs stratum 0.5-0.1 m cover 2-10%.

Comments. This vegetation type was also recorded at sites 31 and 33. It appears from the aerial photographs that this area was cleared at least 10-15 years ago. On the western side of this section is a small area of *Dryandra* heath with *Dryandra cirsioides*, *Hakea gilbertii*, *Beaufortia micrantha* and *Petrophile ericifolia* prominent. Stratum 0.5 - 1 m, 70-100% cover. This area was too small to include on the vegetation map.

SITE 11. Tamma heath type 2.

Key description. Heath A over Open Dwarf Scrub D on pale brown sandy loam with patches of ca 20% laterite.

Stratum 1. *Allocasuarina campestris* shrubs. Stratum 1-2 metres. 30-70% cover.

Stratum 2. Mixed shrubs. Stratum 0.0-0.5 m, 2-10% cover.

Comments. This vegetation type also occurred at sites 6 and 9. The *Allocasuarina campestris* appears to become more dense in areas where lateritic pebbles are found.

PHOTOGRAPH 15. Tamma heath type 2.



SITE 19. Tamma heath type 3.

Key description. Low Scrub A over Low heath C over open low sedges on yellow brown sandy loam 50% laterite.

Stratum 1. *Allocasuarina campestris* shrubs. Mature, stratum 1.5-2.0 m, 10-30% cover with emergent *Eucalyptus macrocarpa* and *Grevillea excelsior* to 3 metres.

Stratum 2. Mixed shrubs. Mature, stratum 0.5 - 1.0 m 30-70%.

Stratum 3. *Mesomelaena preissii* sedge, 0.5 m tall, 10-30% cover.

Comments. This vegetation type was also recorded at sites 23 and 30.

PHOTOGRAPH 16. Tamma heath type 3.

D) Granite outcrops

SITE 28. Exposures of bare rock. Where the outcrop is subsurface a cover of *Borja nitida* was recorded. Scattered shrubs were recorded on shallow coarse loam surrounding the outcrop on the edge of the *Allocasuarina* thicket.

SITE 28. Tamma thicket type 1.

Key description. Low Woodland A over dense thicket on brown sandy loam.

Stratum 1. *Allocasuarina huegeliana* trees.
Stratum 5-8 metres, cover 10-30%.

Stratum 2. *Allocasuarina campestris* shrubs. Stratum 2-3 metres, 70-100% cover.

Comments. This vegetation type was also recorded at site 34.

PHOTOGRAPH 17. Granite outcrops showing the tamma thicket in the background. The photograph was taken from the top of the exposed granite.



SITE 20. Exposures of bare rock. Where the outcrop is subsurface a cover of *Eorysa nitida* was recorded. Scattered shrubs were recorded on the edge of the *Allocasuarina* thicket.

SITE 20. Tamma thicket type 2.

Key descriptions. Dense thicket on brown sandy loam.

Stratum 1. *Allocasuarina campestris* shrubs. Mature, stratum 2-4 m, 70-100% cover with emergent *E. wandoo* to 8 m, cover <2%.

Comments. This vegetation type also occurred at sites 24, 25, and 26 but *Eucalyptus wandoo* was not recorded at these sites. At site 25 *Leptospermum* aff. *erubescens* and *Melaleuca uncinata* were prominent.

SITE 27. Tamma thicket type 3.

Key description. Dense heath A on pale brown sandy loam.

Stratum 1. *Allocasuarina campestris* shrubs. Stratum 1-2m 70-100% cover.

Comments. The vegetation type was also recorded at site 36.

**VEGETATION OF BOOLANELLING NATURE RESERVE
KEY TO VEGETATION TYPES.**

WOODLAND FORMATIONS

	Muir Vegetation code (see Table 2)
W1 <i>Eucalyptus salubris</i> woodland	e Mi
W2 <i>Eucalyptus wandoo</i> woodland - type 1	e Mi. x SAi. n ₁ VLi
W3 <i>Eucalyptus wandoo</i> woodland - type 2	e Mi. n ₁ VLi
W4 Mixed woodland	e LAc
W5 <i>Eucalyptus astingens</i> woodland	e LAc

MALLEE AREAS

M1 Mallee type 1	eKTd
M2 Mallee type 2	eKTd. x SDr
M3 Mallee type 3	eKTd.
M4 Mallee type 4	eKTo. x SCr. n ₁ VLi

HEATH

H1 <i>Metaleuca</i> heath	x SCd
H2 Low mixed heath	x SDd
H3 Mixed heath with <i>Eucalyptus macrocarpa</i>	x SCc
H4 Tall mixed heath	x SCc
H5 <i>Dryandra horrida</i> heath	x SCc
H6 <i>Eremaea pauciflora</i> and <i>Leptospermum</i> <i>erubescens</i> heath	x SCc
H7 Tamma heath type 1	a SBo
H8 Tamma heath type 2	a SAc. x SDr
H9 Tamma heath type 3	a SAi. x SCi. n ₂ VLi

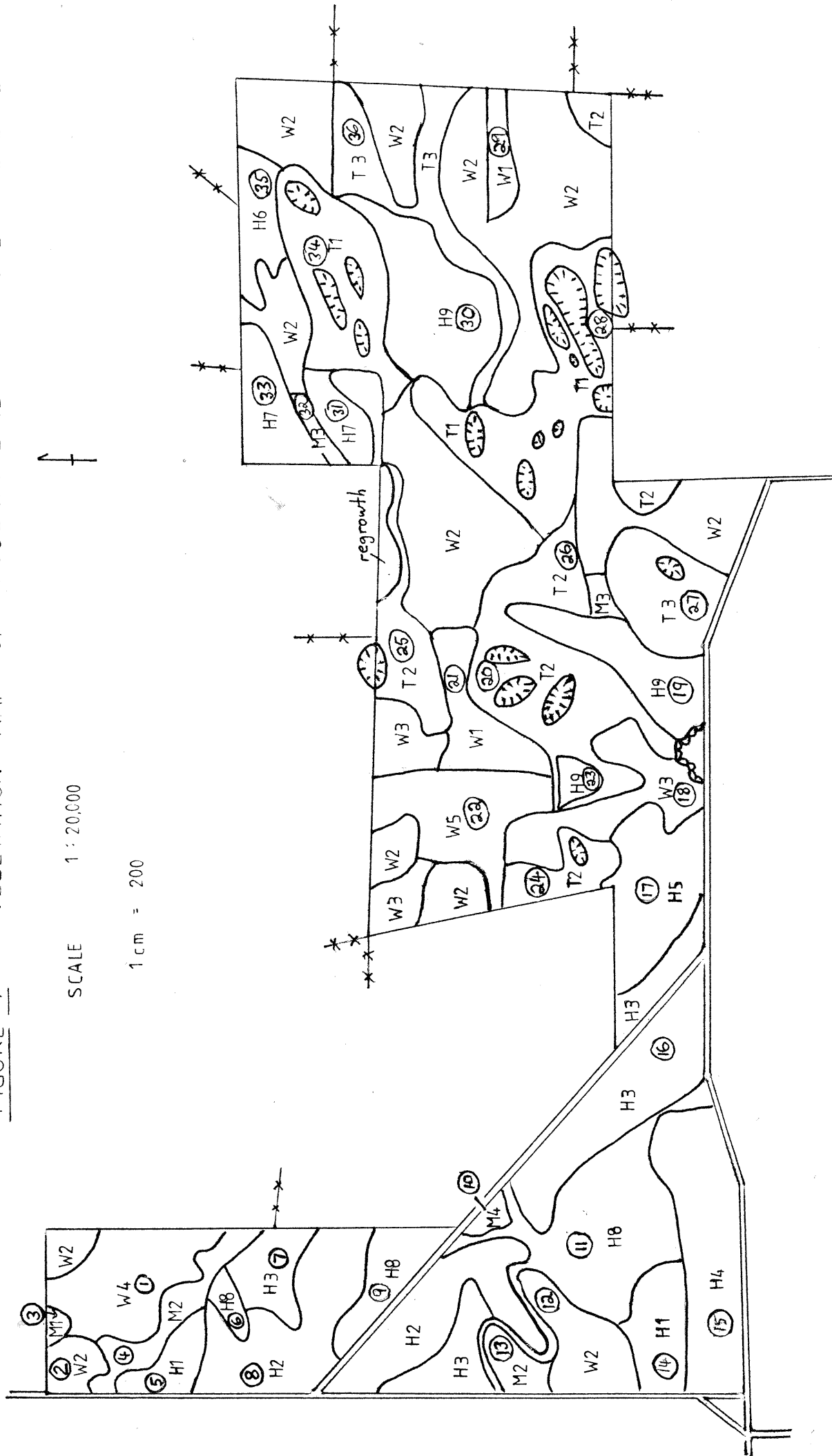
ALLOCASUARINA THICKETS

T1 Tamma thicket type 1	a LAi. a Sd
T2 Tamma thicket type 2	a Sd
T3 Tamma thicket type 3	a SAd

- a = *Allocasuarina*
e = *Eucalyptus*
x = Mixed species
n₁ = *Loxocarya pubescens*
n₂ = *Mesomelaena preissii*

① = Site number

FIGURE 4 VEGETATION MAP OF BOOLANELLING NATURE RESERVE



3.2 FLORA

The number of native plant species recorded during the survey was 178. This probably only represents about 60% of the total flora of the reserve, as many species would not have been recorded due to the limitations of the survey.

These limitations include lack of flowering material because of the time of year in which the survey had to be conducted. This meant the identity of some plants was uncertain, plants that are inconspicuous when not in flower may have been missed and many annual herbs and geophytes were not found. Also time limitations meant that not all sections of the reserve were examined in detail especially some areas of Tamma heath and thicket. Two to three days collecting in the spring is suggested.

Myrtaceae, Proteaceae, Papilionaceae and Mimosaceae were the most abundant amongst the dicotyledons, and monocotyledons are dominated by Cyperaceae. The number of plant species recorded in each family is as follows:

Myrtaceae	52
Proteaceae	40
Papilionaceae	12
Mimosaceae	10
Cyperaceae	9

The floristic diversity of the reserve can be estimated at approximately 28.4 species/km². This large number of species per square kilometer reflects the large area of the reserve which is covered by heath but should be regarded with caution. As Muir (1977) points out such estimates depend on the distribution of vegetation types within the reserve boundaries and reserve size both of which are largely a matter of chance. Tutanning Reserve which has been intensively studied and is in a higher rainfall area has a floristic diversity of 22 species/km².

SPECIES OF INTEREST

No gazetted rare plants were found on the reserve but the following species are of interest.

Daviesia pachyloma

Crisp (1985) recorded *Daviesia pachyloma* as rare with a maximum geographical range of <100 km and confined entirely or mostly to roadsides in otherwise cleared land.

This species was found in the mixed woodland area surrounding site 1, usually under Mallee and was only occasionally seen in this vegetation type.

Daviesia ? purpurascens

This species was not in flower at the time at which the survey was conducted and therefore the identity of the material collected is not certain. However, *Daviesia purpurascens* has been reported by Crisp (1985) as endangered with a maximum geographical range of <100 km and confined entirely or mostly to roadsides in otherwise cleared land. It is therefore worth noting that this species may occur on this reserve. The specimen was collected near site 3 under mallee.

Dryandra horrida

Leigh et al (1981) describe *Dryandra horrida* as vulnerable but not presently endangered with know populations limited in range (usually <100 km). Herbarium specimens lodged in the W.A. Herbarium have been collected from localities ranging from 20 miles north of Meckering to Corrigin.

This species is common on the reserve occuring in most of the heath vegetation types.

Eucalyptus gardneri

Leigh et. al. (1981) describes *Eucalyptus gardneri* as not currently considered endangered or vulnerable with a range > 100 km but occurring only in small populations which are mainly restricted to highly specific habitats.

Only one mallee was seen on the reserve near site 14.

Hakea baxteri

Leigh et. al. (1981) place *Hakea baxteri* in the same category as *Eucalyptus gardneri*, occurring only in small populations which are mainly restricted to highly specific habitats but not considered endangered or vulnerable at the present time. However, Leigh et. al. do not record this species as occurring in national parks or other declared reserves.

Hemigenia viscida

Rye (1982) reports this species as geographically restricted with a range < 100 km. Herbarium specimens examined at the W.A. Herbarium were collected from Tammin and Wongan Hills only. Leigh et. al. (1981) also describes this species as poorly known but suspected of being rare and geographically restricted. Only three plants of this species were seen near site 16.

Xanthorrhoea nana

Leigh et. al. (1981) report *Xanthorrhoea nana* as vulnerable with a range >100 km but occurring only in small populations which are restricted to highly specific habitats. This species was common in most of the heath vegetation types.

Leigh et. al. (1981) described *Cryptandra leucopogon* and *Platysace commutata* as poorly known species with a geographical range of less than 100 km. *Cryptandra leucopogon* is now represented by 24 specimens in the W.A. Herbarium ranging from Wickpin to Ravensthorpe. *Platysace commutata* is represented by only five specimens collected from Tammin, Albany, Stirling Range, Cranbrook and Esperance.

3.3 MANAGEMENT CONSIDERATIONS

a) Weed and Animal Control.

As yet weeds are not a problem in the reserve although they are beginning to invade some areas adjacent to cleared farm land. These areas include woodlands where little understorey is present, the low mixed heath surrounding site 8 and the granite outcrop area surrounding site 28.

It is unlikely that these weeds will increase significantly in number if the area is left undisturbed.

Rabbits and foxes are abundant on the reserve. The size of animal pest populations and the extent of weed invasion should be monitored from time to time. If numbers increase steps should be taken to control these pests in order to protect the reserve environment and its flora and fauna.

b) Protection from Fire.

It is important to exclude fire from the reserve for the protection of rare and geographically restricted species (on which the effect of fire may not be known) and fire sensitive species such as Salmon Gums. Also to maintain animal habitats and areas of scientific interest. A firebreak has been constructed around the perimeter of the reserve adjoining farmland where no roads occur (north and east boundaries). This fire break should be maintained but the effects on weed numbers and erosion should be monitored.

Areas of exposed granite rock on the reserve form natural fire breaks but these areas are only small. There is little litter build up in the woodland areas but closed associations of tamma thicket and heath will be fire sensitive.

c) Areas of Scientific Interest

The rare species of *Daviesia* reported in the flora section occur in woodlands and mallee areas in the north-west section of the reserve. The woodlands are also of interest because of the large number of *Eucalyptus* species occurring in a relatively small area.

The heaths in the western section of the reserve are also of interest. Most of the rare or geographically restricted species reported in the flora section occur in this area. Muir (1977) reports that the reserve may be of considerable scientific importance in evolutionary and genetic studies in reference to the tall mixed heath which contains species commonly found further to the south.

The heaths in the western section are surrounded by gravel roads which means easy access, however the reserve is relatively isolated away from main roads and is little used by the public.

d) Gravel Pit.

The gravel pit on Copestakes Road should be closed and the area rehabilitated.

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ACKNOWLEDGEMENTS

I am extremely grateful to the following people:-

Dr. I. Brooker and Dr. S. Hopper for identification of the *Eucalyptus* species
and Mr B. Maslin for the identification of the *Acacias*.

The curator of the W.A. Herbarium for permission to consult the collection.

Debbie Reading for her word processing and her time and patience and Mr
M. Trudgeon for the use of his word processor.

APPENDIX 1.

FLORA SPECIES LIST FOR THE BOOLANELLING NATURE RESERVE.

MONOCOTYLEDONS

Specimen voucher number.

POACEAE

*Aira cupaniana	168
*Avena fatua	
*Bromus ? rubens	
Spartochloa scirpoidea	277
Stipa ? trichophylla	

CYPERACEAE

Caustis dioica	214
Lepidosperma angustatum	360
Lepidosperma drummondii	195,267
Lepidosperma gracile	226
Lepidosperma pruinsum	276
Lepidosperma pubisquameum	227,249,310
Lepidosperma tenue	260,365
Lepidosperma sp. aff. tuberculatum	284
Mesomelaena preissii	197

RESTIONACEAE

Ecdiocola monostachya	209
Harperia ? lateriflora	
Loxocarya pubescens	

XANTHORRHOACEAE

Lomandra effusa (recorded by Ken Atkins)	
Xanthorrhoea nana	

PHORMIACEAE

Dianella revoluta
Stypandra imbricata

ANTHERICACEAE

Borya nitida
Laximannia paleacea 286

HAEMODORACEAE

Conostylis petrophiloides 302
Haemodorum laxum 287

IRIDACEAE

Patersonia juncea 336
Patersonia occidentalis 246

DICOTYLEDONS

CASUARINACEAE

Allocasuarina campestris 254
Allocasuarina huegeliana
Allocasuarina humilis
Allocasuarina microstachya

PROTEACEAE

Adenanthos argyreus 224
Banksia attenuata
Banksia sphaerocarpa var. caesia 194
Conospermum stoechadis 353
Dryandra cirsioides 185
Dryandra conferta 352

<i>Dryandra ferruginea</i>	219
<i>Dryandra fraseri</i>	274
<i>Dryandra horrida</i>	229
<i>Dryandra nivea</i>	213
<i>Dryandra vestita</i>	186
<i>Grevillea eryngioides</i>	
<i>Grevillea excelsior</i>	184
<i>Grevillea integrifolia</i>	225
<i>Grevillea ? paniculata</i>	165
<i>Grevillea patentiloba</i>	145
<i>Grevillea ? petrophiloides</i>	341
<i>Grevillea pritzellii</i>	296
<i>Hakea baxteri</i>	
<i>Hakea circumalata</i>	200
<i>Hakea falcata</i>	258
<i>Hakea gilbertii</i>	183
<i>Hakea incrassata</i>	190
<i>Hakea lissocarpha</i>	
<i>Hakea platysperma</i>	
<i>Hakea scoparia</i>	180
<i>Hakea subsulcata</i>	323
<i>Hakea trifurcata</i>	
<i>Isopogon divergens</i>	216
<i>Isopogon polycephalus</i>	179
<i>Isopogon scabriusculus</i>	272
<i>Isopogon villosus</i>	221b
<i>Petrophile brevifolia</i>	188
<i>Petrophile ericifolia</i>	189
<i>Petrophile trifida</i>	191
<i>Petrophile sp. nov.</i>	221a
<i>Persoonia coriacea</i>	212
<i>Persoonia striata</i>	192
<i>Synaphaea petiolaris</i>	
<i>Synaphaea polymorpha</i>	

SANTALACEAE

<i>Leptomeria ? preissiana</i>	
<i>Santalum acuminatum</i>	
<i>Santalum murrayanum</i>	150

LORANTHACEAE

Amyema miquelii (recorded by Ken Atkins)

LAURACEAE

Cassytha pomiformis 345

PITTOSPORACEAE

Billardiera bicolor 248

MIMOSACEAE

Acacia acuminata

Acacia densiflora 349

Acacia erinacea 143

Acacia flavopila 148

Acacia lasiocalyx 270

Acacia lasiocarpa var. *sedifolia* 163

Acacia multispicata 266

Acacia phaeocalyx 351

Acacia sphacelata 265

Acacia sp. nov. (*rigida* m/s) 297

PAPILIONACEAE

Chorizema ? *aciculare* 261

Daviesia ? *benthamii* 160

Daviesia nudiflora 264

Daviesia pachyloma 146

Daviesia ? *purpurascens* 147b

Daviesia teretifolia

Daviesia sp. aff *hakeoides* 246

Gastrolobium spinosum

Gastrolobium trilobum

Jacksonia nematoclada	347
Oxylobium parviflorum	149
Pultenaea capitata	230

RUTACEAE

Diploleena microcephala var. drummondii	280
Phebalium tuberosum var. tuberosum	170,178
Phebalium tuberosum var. megaphyllum	173

POLYGALACEAE

Comesperma scoparium	
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SAPINDACEAE

Dodonaea bursariifolia	147a,155
Dodonaea pinifolia	334
Dodonaea viscosa ssp. angustissima	156

RHAMNACEAE

Cryptandra leucopogon	326
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STERCULIACEAE

Lysiosepalum involucreatum	172
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DILLENACEAE

Hibbertia ? verrucosa	332
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MYRTACEAE

Beaufortia ? bracteosa	233
Beaufortia incana	
Beaufortia micrantha var. puberula	182

<i>Calothamnus quadrifidus</i>	343,350
<i>Calothamnus sanguineus</i>	220
<i>Calothamnus</i> sp. aff. <i>villosus</i>	251,306
<i>Calytrix leschenaultii</i>	344
<i>Calytrix sapphirina</i>	330,361
<i>Eremsea pauciflora</i>	367
<i>Eucalyptus albida</i>	228,299
<i>Eucalyptus anceps</i>	307,317
<i>Eucalyptus astringens</i>	
<i>Eucalyptus calycogona</i>	238,348
<i>Eucalyptus celastroides</i>	141,161
<i>Eucalyptus eremophila</i>	144
<i>Eucalyptus flocktoniae</i>	308,364
<i>Eucalyptus foecunda</i>	303b
<i>Eucalyptus gardneri</i>	303a
<i>Eucalyptus gracilis</i> (photograph)	
<i>Eucalyptus incrassata</i>	196,300
<i>Eucalyptus loxophleba</i>	236
<i>Eucalyptus macrocarpa</i>	
<i>Eucalyptus myriadena</i>	366
<i>Eucalyptus redunca</i> var. <i>subangusta</i>	164
<i>Eucalyptus salmonophloia</i>	
<i>Eucalyptus salubris</i>	
<i>Eucalyptus wandoo</i>	
<i>Eucalyptus</i> sp. aff. <i>occidentalis</i>	314
<i>Eucalyptus</i> sp. aff. <i>redunca</i>	176
<i>Eucalyptus</i> sp.	
<i>Hypocalymma puniceum</i>	223
<i>Kunzea pulchella</i>	
<i>Leptospermum erubescens</i>	166,234
<i>Leptospermum spinescens</i>	
<i>Leptospermum</i> sp. aff. <i>erubescens</i>	208
<i>Melaleuca acuminata</i>	158
<i>Melaleuca adnata</i>	154
<i>Melaleuca cordata</i>	298
<i>Melaleuca fulgens</i>	269
<i>Melaleuca lateriflora</i>	199
<i>Melaleuca laxiflora</i>	177
<i>Melaleuca leptospermoides</i>	187

Melaleuca ? scabra	328
Melaleuca ? spathulata	203
Melaleuca spicigera	174,288
Melaleuca ? subtrigona	322
Melaleuca uncinata	
Melaleuca undulata	162
Verticordia brownii	
Verticordia chrysantha	268
Verticordia densiflora	335
Verticordia pennigera	241

HALORAGACEAE

Glischrocaryon aureum	368
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APIACEAE

Platysace commutata	354
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EPACRIDACEAE

Andersonia lehmanniana spp. pubescens	339
Astroloma serratifolium	
Astroloma ? pallidum	252
Astroloma sp. aff. epacridis	291,319,320
Leucopogon dielsianus	231
Leucopogon minutifolius	324
Lysinema ciliatum	346

APOCYNACEAE

Alyxia buxifolia	305
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CHLOANTHACEAE

Pityrodia bartlingii	
Pityrodia ? terminalis	

LAMIACEAE

Hemigenia viscida	355
Westringia rigida	151

OROBANCHACEAE

* Orobanche minor

ASTERACEAE

Chrysocoryne pusilla	294
Olearia muelleri	140
Olearia revoluta	293
Podolepis capillaris	292
*Ursinia anthemoides	
Weitzia acuminata	

*significes introduced species

APPENDIX 2

LIST OF PLANT SPECIES RECORDED AT VEGETATION SITES.

SITE 1. Mixed Woodland.

<i>Acacia erinaceae</i>	<i>Lepidosperma pubisquameum</i>
<i>Acacia flavopila</i>	<i>Loxocarya pubescens</i>
<i>Acacia lasiocarpa</i> var. <i>sedifolia</i>	<i>Lysiosepalum involucreatum</i>
<i>Borya nitida</i>	<i>Melaleuca acuminata</i>
<i>Chrysocoryne pusilla</i>	<i>Melaleuca lateriflora</i>
<i>Daviesia pachyloma</i>	<i>Melaleuca spicigera</i>
<i>Daviesia</i> ? <i>purpurescens</i>	<i>Melaleuca uncinata</i>
<i>Dianella revoluta</i>	<i>Melaleuca undulata</i>
<i>Dodonaea bursariifolia</i>	<i>Olearia muelleri</i>
<i>Dodonaea viscosa</i> ssp. <i>angustissima</i>	<i>Olearia revoluta</i>
<i>Eucalyptus anceps</i>	<i>Oxylobium parviflorum</i>
<i>Eucalyptus calycogona</i>	<i>Phebalium tuberosum</i> var. <i>megaphyllum</i>
<i>Eucalyptus celastroides</i>	<i>Santalum acuminatum</i>
<i>Eucalyptus</i> sp. aff. <i>occidentalis</i>	<i>Santalum murrayanum</i>
<i>Eucalyptus</i> ? <i>salubris</i>	<i>Stipa</i> ? <i>tricophylla</i>
<i>Eucalyptus salmonophloia</i>	<i>Westringia rigida</i>
<i>Eucalyptus wandoo</i>	* <i>Ursinia anthemoides</i>
<i>Grevillea patentiloba</i>	

SITE 2. Wandoo woodland Type 1.

• <i>Aira cupaniana</i>	<i>Hakea lissocarpa</i>
<i>Allocasuarina campestris</i>	<i>Hakea trifurcata</i>
<i>Astroloma serratifolium</i>	<i>Harperia lateriflora</i>
<i>Borya nitida</i>	<i>Leptospermum erubescens</i>
* <i>Bromus rubens</i>	<i>Loxocarya pubescens</i>
<i>Calytrix leschenaultii</i>	<i>Melaleuca adnata</i>
<i>Dianella revoluta</i>	<i>Melaleuca uncinata</i>
<i>Dodonaea viscosa</i> ssp. <i>angustissima</i>	<i>Melaleuca undulata</i>
<i>Gastrolobium spinosum</i>	<i>Phebalium tuberosum</i> var. <i>tuberosum</i>
<i>Grevillea</i> ? <i>paniculata</i>	* <i>Ursinia anthemoides</i>
<i>Grevillea patentiloba</i>	<i>Waitzia acuminata</i>

SITE 3. Mallee area Type 1.

Daviesia ? benthamii	Melaleuca acuminata
Eucalyptus celastroides	Melaleuca adnata
Eucalyptus eremophila	Melaleuca spicigera
Eucalyptus flocktoniae	Melaleuca undulata
Eucalyptus redunca var. subangusta	Olearia muelleri

SITE 4. Mallee area type 2.

Acacia flavopila	Leptospermum erubescens
Astroloma aff. epacridis	Melaleuca adnata
Borya nitida	Melaleuca lateriflora
Dodonaea bursariifolia	Melaleuca laxiflora
Dodonaea viscosa ssp. angustissima	Melaleuca spicigera
Eucalyptus anceps	Melaleuca uncinata
Eucalyptus eremophila	Melaleuca undulata
Eucalyptus flocktoniae	Oxylobium parviflorum
Eucalyptus aff. redunca	Phebalium tuberosum
Gastrolobium spinosum	Phebalium var. tuberosum
Grevillea patentiloba	Phebalium tuberosum var. megaphyllum
Isopogon scabriusculus	Santalum acuminatum
Lepidosperma ? tuberosum	Santalum murrayanum

SITE 5. Melaleuca heath.

Acacia flavopila	Hakea falcata
Acacia lasiocarpa var. sedifolia	Hakea gilbertii
Adenanthos argyreus	Hakea incrassata
Allocasuarina campestris	Hakea lissocarpa
Astroloma serratifolium	Hakea scoparia
Astroloma aff. epacridis	Hakea subsulcata
Banksia spaerocarpa var. caesia	Isopogon polycephalus
Beaufortia micrantha var. puberula	Isopogon scabriusculus
Billardiera bicolor	Lepidospermum drummondii
Borya nitida	Leptospermum erubescens
	Melaleuca cordata
	Melaleuca leptospermoides
	Melaleuca ? spathulata

Calothamnus quadrifidus
Comesperma scoparium
Dryandra cirsioides
Dryandra vestita
Eucalyptus albida
Eucalyptus foecunda
Eucalyptus incrassata
Eucalyptus macrocarpa
Grevillea excelsior
Grevillea petrophiloides
Gastrolobium spinosum
Hakea circumalata

Melaleuca uncinata
Mesomelaena preissii
Persoonia striata
Petrophile brevifolia
Petrophile ericifolia
Petrophile trifida
Santalum acuminatum
Synaphaea petiolaris
Synaphaea polymorpha

SITE 6. Tamma heath - Type 2.

Allocasuarina campestris
Borya nitida
Daviesia teretifolia
Dryandra cirsioides
Hakea incrassata
Hakea scoparia

Harperia lateriflora
Melaleuca cordata
Melaleuca leptospermoides
Mesomelaena preissii
Petrophile trifida

SITE 7. Low mixed heath with emergent *Eucalyptus macrocarpa*.

Adenanthos argyreus
Allocasuarina campestris
Allocasuarina humilis
Allocasuarina microstachya
Banksia spaerocarpa var.
 caesia
Beaufortia micrantha
Borya nitida
Calothamnus quadrifidus
Caustis dioica
Conostylis stylidioides
Daviesia nudiflora
Daviesia teretifolia
Dryandra cirsioides
Dryandra horrida
Dryandra nivea
Dryandra vestita

Hakea circumalata
Hakea falcata
Hakea gilbertii
Hakea incrassata
Hakea platysperma
Harperia lateriflora
Hypocalymma puniceum
Isopogon divregens
Isopogon polycephalus
Leptospermum erubescens
Leptospermum aff. *erubescens*
Melaleuca leptospermoides
Melaleuca subtrigona
Melaleuca uncinata
Mesomelaena preissii
Persoonia coriaceae
Persoonia striata

Ecdiocollea monostachya
Eremaea pauciflora
Grevillea excelsior
Grevillea integrifolia
Grevillea petrophiloides

Petrophile ericifolia
Petrophile trifida
Synaphea petiolaris
Xanthorrhoea nana

SITE 8. Low mixed heath.

Acacia lasiocarpa var.
 sedifolia
Acacia sp. nov.
Allocasuarina campestris
Allocasuarina humilis
Allocasuarina microstachya
Andersonia lehmanniana
Astroloma serratifolium
Banksia sphaeocarpa var.
 caesia
Beaufortia bracteosa
Beaufortia micrantha
Borya nitida
Calytrix leschenaultii
Calytrix sapphirina
Calothamnus quadrifidus
Calothamnus aff. *villosus*
Cassytha pomiformis
Caustis diocia
Cryptandra leucopogon
Daviesia aff. *hakeoides*
Dodonaea pinifolia
Dryandra cirsioides
Eremaea pauciflora

Hakea circumalata
Hakea falcata
Hakea incrassata
Hakea scoparia
Harperia lateriflora
Hibbertia ? *verrucosa*
Isopogon divergens
Jacksonia nematoclada
Leptomeria ? *preissiana*
Leptospermum erubescens
Leucopogon dielsianus
Leucopogon minutifolius
Lysinema ciliatum
Melaleuca leptospermoides
Melaleuca ? *scabra*
Mesomelaena preissii
Patersonia juncea
Persoonia striata
Petrophile ericifolia
Synaphea polymorpha
Verticordia brownii
Verticordia densiflora
Xanthorrhoea nana

SITE 9. Tamma Heath type 2.

Allocasuarina campestris
Andersonia lehmanniana
Daviesia teretifolia
Hakea incrassata
Lepidosperma gracile

Lepidosperma pubisquameum
Leucopogon dielsiana
Melaleuca leptospermoides
Mesomelaena preissii
Persoonia striata
Petrophile trifida

SITE 10. Mallee area type 4.

Borya nitida	Harperia lateriflora
Calothamnus quadrifidus	Leptospermum erubescens
Calothamnus sp. nov.	Leptospermum aff. erubescens
Daviesia aff. hakeoides	Melaleuca subtrigina
Hakea circumalata	Melaleuca uncinata
Hakea incrassata	Mesomelaena preissii
Hakea lissocarpha	

SITE 11. Tamma Heath - Type 2.

Andersonia lehmanniana	Melaleuca cordata
Beaufortia micrantha	Melaleuca leptospermoides
Borya nitida	Melaleuca spicigera
Hakea incrassata	Mesomelaena preissii
Hakea scoparia	Persoonia striata
Isopogon scabriusculus	Synapheae petiolaris

SITE 12. Salmon gum woodland (very small area).

Acacia enriacea
Dodonaea bursariifolia
Eucalyptus salmonophloia

SITE 13. Mallee area - type 2.

Acacia densiflora	Eucalyptus eremophila
Dodonaea viscosa ssp. angustissima	Eucalyptus aff. redunca
Eucalyptus anceps	Leptospermum erbuscens
Eucalyptus calycogona	Melaleuca uncinatum

SITE 14. Melaleuca heath.

Acacia lasiocarpa	Eucalyptus albida
Acacia sphacelata	Eucalyptus foecunda
Adenanthos argyrus	Eucalyptus gardneri
Allocasuarina campestris	Gastrolobium spinosum
Allocasuarina humilis	Hakea gilbertii
Astroloma ? epacridis	Hakea incrassata
Beaufortia incana	Harperia lateriflora

Calothamnus quadrifidus
Daviesia teretifolia
Daviesia aff. *hakeoides*
Dryandra cirsioides
Dryandra conferta
Dryandra vestita
Eremaea pauciflora

Isopogon polycephalus
Loxocarya pubescens
Mesomelaena preissii
Melaleuca leptospermoides
Petrophile brevifolia
Petrophile ericifolia
Persoonia striata
Verticordia brownii

SITE 15. Tall Mixed Heath.

Acacia phaseocalyx
Adenanthos argyreus
Banksia spaerocarpa var.
 caesia
Beaufortia incana
Beaufortia micrantha
Calothamnus sanguineus
Cassytha pomiformis
Daviesia aff. *hakeoides*
Dryandra cirsioides
Dryandra ferruginea
Dryandra horrida
Dryandra vestita
Eucalyptus macrocarpa
Gastrolobium spinosum
Grevillea integrifolia
Hakea baxteri
Hakea falcata

Hakea gilbertii
Hakea incrassata
Hakea scoparia
Hypocalymma puniceum
Isopogon polycephalus
Isopogon villosus
Leptospermum aff. *erubescens*
Leptospermum spinescens
Lysinema ciliatum
Melaleuca leptospermoides
Melaleuca ? *subtrigona*
Mesomelaena preissii
Persoonia striata
Petrophile ericifolia
Petrophile sp. nov.
Pityrodia bartlingii
Xanthorrhoea nana

SITE 16. Low mixed heath with emergent *Eucalyptus macrocarpa*.

Acacia sp. nov.
Adenanthos argyreus
Allocasuarina campestris
Allocasuarina humilis
Allocasuarina microstachya
Beaufortia bracteosa
Calytrix leschenaultii
Daviesia teretifolia
Dryandra cirsioides
Dryandra horrida
Dryandra nivea

Grevillea excelsior
Grevillea integrifolia
Hakea baxteri
Hakea falcata
Hakea platysperma
Leptospermum erubescens
Leptospermum spinescens
Melaleuca leptospermoides
Melaleuca subtrigona
Mesomelaena preissii
Petrophile brevifolia

Dryandra vestita
Eremaea pauciflora
Eucalyptus macrocarpa

Petrophile ericifolia
Pityrodia bartlingii
Pultenaea capitata
Verticordia brownii
Xanthorrhoea nana

SITE 17. Dryandra horrida heath.

Acacia sp. nov.	Grevillea excelsior
Adenanthos argyreus	Grevillea integrifolia
Allocasuarina campestris	Hakea falcata
Allocasuarina microstachya	Hakea incrassata
Astroloma aff. epacridis	Hakea scoparia
Beaufortia micrantha	Harperia lateriflora
Banksia attenuata	Isopogon scabriusculus
Banksia spaerocarpa var. caesia	Laxmannia paleacea
Calytrix leschenaultii	Lepidosperma angustatum
Caustis diocia	Leptospermum erubescens
Comesperma scoparium	Leucopogon dielsiana
Conospermum stoechardis	Melaleuca leptospermoides
Cryptandra leucopogon	Mesomelaena preissii
Daviesia nudiflora	Persoonia striata
Dryandra cirsioides	Petrophile ericifolia
Dryandra horrida	Pultenaea capitata
Dryandra vestita	Synaphaea petiolaris
Eremaea pauciflora	Synaphaea polymorpha
Grevillea eryngioides	Verticordia brownii
	Xanthorrhoea nana

SITE 18. Wandoo woodland - type 2.

Acacia lasiocarpa	Dodonaea pinifolia
Allocasuarina campestris	Eucalyptus wandoo
Alyxia buxifolia	Hakea lissocarpa
Astroloma serratifolia	Hakea scoparia
Astroloma ? pallidum	Harperia lateriflora
Astroloma aff. epacridis	Lepidosperma pubisquameum
Billardiera bicolor	Loxocarya pubescens
Borya nitida	Melaleuca leptospermoides
Calothamnus quadrifidus	Melaleuca uncinata
Calothamnus aff. villosus	Patersonia occidentalis
Calytrix leschenaultii	Petrophile trifida

Daviesia aff. hakeioides
Dianella revoluta

Stipa ? trichophylla
*Ursinia anthemoides

SITE 19. Tamma heath - type 3.

Acacia lasiocarpa var. sedifolia	Hakea scoparia
Acacia sphacelata	Harperia lateriflora
Astroloma serratifolia	Isopogon scabrusculus
Allocasuarina campestris	Lepidospermum drummondii
Banksia spaerocarpa var. caesia	Lepidospermum ? tenue
Beaufortia micrantha	Leptospermum erubescens
Borya nitida	Loxocarya pubescens
Daviesia teretifolia	Melaleuca leptospermoides
Dryandra cirsioides	Melaleuca spicigera
Dryandra horrida	Melaleuca uncinata
Dryandra vestita	Mesomelaena preissii
Eucalyptus macrocarpa	Petrophile brevifolia
Gastrolobium spinosum	Petrophile ericifolia
Grevillea excelsior	Petrophile trifida
Grevillea integrifolia	Persoonia striata
Hakea circumalata	Synaphaea petiolaris
Hakea falcata	Xanthorrhoea nana
Hakea incrassata	

SITE 20. Granite outcrop.

1. Exposed rock and shallow soil.

Acacia lasiocalyx	Melaleuca fulgens
Borya nitida	

2. Tamma thicket - type 2.

Astroloma serratifolium	Isopogon divergens
Banksia spaerocarpa var. caesia	Leptospermum erubescens
Borya nitida	Melaleuca uncinata
Dryandra horrida	Stipa ? trichophylla
Hakea scoparia	Verticordia chrysantha
Harperia lateriflora	

SITE 21. Gimlet woodland with scattered Salmon Gums.

Acacia erinacea	Eucalyptus mynadena
Acacia lasiocalyx	Eucalyptus salubris
Acacia multispicata	Eucalyptus salmonophloia
Dodonaea bursariifolia	Eucalyptus wandoo
Eucalyptus gracilis	Grevillea ? paniculata
Eucalyptus loxophleba	Westringia rigida

SITE 22. Mallet Woodland.

Acacia erinacea	Eucalyptus wandoo
Eucalyptus anceps	Gastrolobium spinosum
Eucalyptus astringens	Grevillea patentiloba
Eucalyptus flocktoniae	Melaleuca uncinata
Eucalyptus salmonophloia	

SITE 23. Tamma heath - type 3.

Acacia sphacelata	Hakea falcata
Allocasuarina campestris	Hakea incrassata
Allocasuarina humilis	Harperia lateriflora
Allocasuarina microstachya	Leptospermum erubescens
Caustis dioica	Melaleuca leptospermoides
Calothamnus quadrifidus	Melaleuca spicigera
Chorizema aciculare	Melaleuca uncinata
Daviesia nudiflora	Mesomelaena preissii
Daviesia teretifolia	Persoonia coriacea
Daviesia aff. hakeoides	Persoonia striata
Dryandra cirsioides	Petrophile brevifolia
Dryandra horrida	Petrophile ericifolia
Dryandra nivea	Petrophile trifida
Eremaea pauciflora	Pityrodia ? terminalis
Hakea circumalata	Verticordia brownii

SITE 24. Tamma thicket - type 2.

Allocasuarina campestris	Leptospermum erubescens
Hakea scoparia	Melaleuca uncinata

SITE 25. Tamma thicket - type 2.

<i>Allocasuarina campestris</i>	<i>Melaleuca uncinata</i>
<i>Leptospermum</i> aff. <i>erubescens</i>	

SITE 26. Tamma thicket - type 2.

<i>Allocasuarina campestris</i>	<i>Hakea scoparia</i>
<i>Astroloma serratifolium</i>	<i>Harperia lateriflora</i>
<i>Borya nitida</i>	

SITE 27. Tamma thicket - type 3.

<i>Allocasuarina campestris</i>
<i>Dryandra fraseri</i>

SITE 28. Granite Outcrops.

1. Exposed rock and shallow soils.

<i>Acacia lasiocalyx</i>	<i>Kunzea pulchella</i>
* <i>Avena fatua</i>	<i>Lepidosperma pruinatum</i>
<i>Astroloma</i> aff. <i>epacridis</i>	<i>Spartochloa scirpoidea</i>
<i>Borya nitida</i>	<i>Stypandra imbricata</i>
<i>Diplolaena microcephala</i> var.	* <i>Ursinia anthemoides</i>
<i>drummondii</i>	<i>Waitzia acuminata</i>
<i>Dodonaea viscosa</i> ssp.	
<i>angustissima</i>	

2. Tamma thicket type 1.

<i>Allocasuarina campestris</i>	<i>Borya nitida</i>
<i>Allocasuarina huegeliana</i>	<i>Leptospermum</i> aff. <i>erubescens</i>

SITE 29. Gimlet - woodland with scattered Salmon Gums.

<i>Acacia erinacea</i>	<i>Eucalyptus wandoo</i>
<i>Astroloma</i> aff. <i>epacridis</i>	<i>Eucalyptus</i> sp.
<i>Dodonaea bursariifolia</i>	<i>Olearia revoluta</i>
<i>Eucalyptus salubris</i>	<i>Oxylobium parviflorum</i>
<i>Eucalyptus salmonophloia</i>	<i>Podolepis capillaris</i>

SITE 30. Tamma heath - type 3.

<i>Allocasuarina campestris</i>	<i>Hakea incrassata</i>
<i>Banksia spaerocarpa</i> var. <i>caesia</i>	<i>Hakea lissocarpa</i>
<i>Beaufortia micrantha</i>	<i>Harperia lateriflora</i>
<i>Borya nitida</i>	<i>Lepidosperma drummondii</i>
<i>Calothamnus quadrifidus</i>	<i>Leptospermum erubescens</i>
<i>Dryandra cirsioides</i>	<i>Leptospermum</i> aff. <i>erubescens</i>
<i>Dryandra horrida</i>	<i>Laxmannia paleacea</i>
<i>Dryandra nivea</i>	<i>Leucopogon dielsiana</i>
<i>Daviesia nudiflora</i>	<i>Mesomelaena preissii</i>
<i>Daviesia</i> aff. <i>hakeoides</i>	<i>Petrophile ericifolia</i>
<i>Eremaea pauciflora</i>	<i>Persoonia striata</i>
<i>Eucalyptus macrocarpa</i>	<i>Pityrodia</i> ? <i>terminalis</i>
<i>Grevillea excelsior</i>	<i>Synaphaea petiolaris</i>
<i>Grevillea integrifolia</i>	<i>Verticordia brownii</i>
<i>Haemodorum laxus</i>	<i>Xanthorrhoea nana</i>
<i>Hakea gilbertii</i>	

SITE 31. Tamma heath - type 1.

<i>Allocasuarina campestris</i>	<i>Gastrolobium spinosum</i>
<i>Andersonia lehmanniana</i>	<i>Hakea gilbertii</i>
<i>Beaufortia micrantha</i>	<i>Hakea incrassata</i>
<i>Calytrix leschenaultii</i>	<i>Hakea scoparia</i>
<i>Comesperma scoparia</i>	<i>Lysinemia ciliatum</i>
<i>Daviesia teretifolia</i>	<i>Melaleuca leptospermoides</i>
<i>Dryandra cirsioides</i>	<i>Petrophile ericifolia</i>
<i>Dryandra verstita</i>	<i>Petrophile trifida</i>
<i>Eucalyptus macrocarpa</i>	

SITE 32. Mallee area - type 3.

<i>Eucalyptus anceps</i>	<i>Eucalyptus flocktoniae</i>
<i>Eucalyptus calycogonia</i>	<i>Eucalyptus</i> aff. <i>redunca</i>
<i>Eucalyptus celastioides</i>	

SITE 33. Tamma heath type 1.

<i>Allocasuarina campestris</i>	<i>Hakea scoparia</i>
<i>Allocasuarina microstachya</i>	<i>Leptospermum erubescens</i>
<i>Astroloma serratifolium</i>	<i>Leucopogon dielsianus</i>
<i>Banksia sphaerocarpa</i>	<i>Lysinema ciliatum</i>
<i>Beaufortia micrantha</i>	<i>Melaleuca cordata</i>
<i>Billardiera bicolor</i>	<i>Melaleuca spicigera</i>
<i>Comesperma scoparia</i>	<i>Melaleuca uncinata</i>
<i>Dryandra cirsioides</i>	<i>Oxylobium parviflorum</i>
<i>Gastrolobium spinosum</i>	<i>Persoonia striata</i>
<i>Grevillea integrifolia</i>	<i>Petrophile ericifolia</i>
<i>Hakea falcata</i>	<i>Petrophile trifida</i>
<i>Hakea incrassata</i>	

SITE 34. Granite outcrop with tamma thicket type 1.

<i>Allocasuarina campestris</i>	<i>Dryandra fraseri</i>
<i>Allocasuarina huegeliana</i>	<i>Eucalyptus ? loxophleba</i>
<i>Borya nitida</i>	<i>Leptospermum aff. erubescens</i>
<i>Chrysocoryne pusilla</i>	

SITE 35. *Eremaea pauciflora* and Ti-tree heath.

<i>Acacia sp. nov.</i>	<i>Daviesia aff. hakeoides</i>
<i>Acacia sphacelata</i>	<i>Eremaea pauciflora</i>
<i>Allocasuarina campestris</i>	<i>Harperia lateriflora</i>
<i>Allocasuarina huegeliana</i>	<i>Lepidospermum tenue</i>
<i>Allocasuarina humilis</i>	<i>Leptospermum erubescens</i>
<i>Borya nitida</i>	<i>Melaleuca leptospermoides</i>
<i>Calothamnus sp.</i>	<i>Mesomelaena preissii</i>
<i>Calytrix leschenaultii</i>	<i>Petrophile brevifolia</i>
<i>Caustis dioica</i>	<i>Petrophile ericifolia</i>
<i>Dryandra nivea</i>	<i>Persoonia striata</i>

SITE 36. Tamma heath - type 3.

<i>Allocasuarina campestris</i>	<i>Leptospermum aff. erubescens</i>
<i>Eucalyptus wandoo</i>	