

VEGETATION SURVEY OF FRANK HANN NATIONAL PARK

By D. MONK, R.J. HNATIUK
and A.S. GEORGE

Western Australian Herbarium, South Perth, W.A. 6151

ABSTRACT

Frank Hann National Park, east of Lake King, Western Australia (ca. 32°20'S lat., 120°22'E long.) has a woodland and shrubland flora characteristic of the Roe Botanical District but also has representatives of the Coolgardie District to the north and the Eyre District to the south. Seven vegetation formations, each with several subdivisions, are described. The vascular flora is listed and consists of 264 species in 47 families. The Myrtaceae (53 species) and Proteaceae (41 species) dominate the area.

INTRODUCTION

This is the first of a series of reports on the region covered by System 11 (Fig. 1) of the Report of the Conservation Through Reserves Committee (Anonymous, 1974). The region under study extends from about Grass Patch (33°14'S lat., 121°44'E long.) northwards to Wiluna (26°35'S lat., 120°14'E long.) and from about Bodallin (31°22'S lat., 118°51'E long.) eastwards to Zanthus (31°02'S lat., 123°34'E long.). The greater, northern part is within the Eremaean Botanical Province and the south western part within the South West Botanical Province (Beard, 1978).

Because the biological resources of the region as a whole are relatively poorly known, it was selected for detailed survey by a special committee coordinating biological surveys of the Department of Fisheries and Wildlife, the National Parks Authority, the Western Australian Herbarium, and the Western Australian Museum. Aspects of the flora, vegetation, and fauna are to be documented for the area.

The purpose of the interim reports is to make the results of the survey, which is expected to take several years, available as quickly as possible. At the conclusion of the entire survey, a summary report will be produced.

The selection of Frank Hann National Park as the starting point for the botanical portion of the survey was determined largely by consideration of

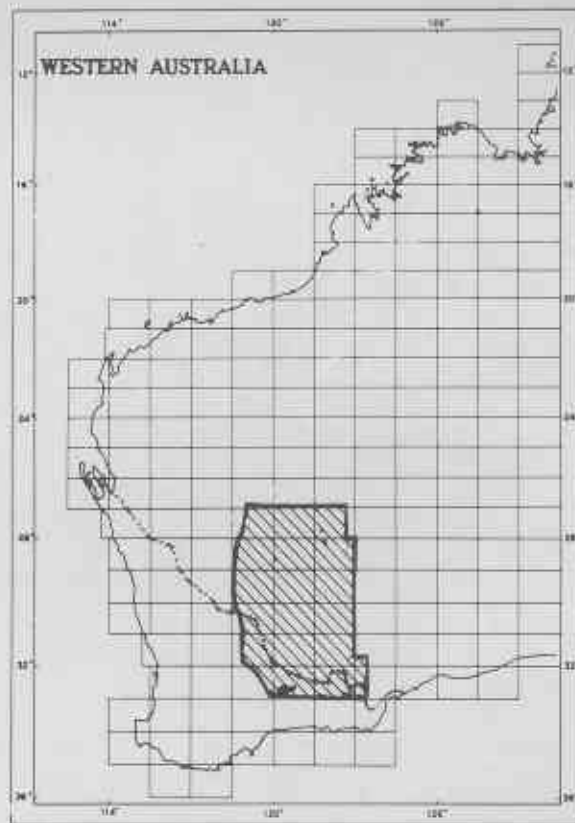


Fig. 1. Western Australia showing the location of the general survey area with Frank Hann National Park in the south west. The boundary between the Eremaean and South West Botanical Provinces is marked as a dotted line.

finance. The methods used were chosen to allow fulfilment of 3 immediate objectives: a) to produce a vegetation map, b) to describe the vegetation and flora, and c) to collect quantitative data on the vegetation for use in comparison with other areas to be surveyed in the general study.

Methods

Vegetation mapping was done by examination of aerial photographs, ground-checking the photo-patterns, then drawing a map combining field and photo information (Fig. 2). Aerial photos taken in different years permitted some of the fire history of the Park to be determined.

The vegetation was classified to Formations using the system of Muir (1977) so that comparison with his work, further west in the adjacent "wheatbelt", would be readily possible. For this classification, the height and canopy cover and growth form of the dominant and subordinate strata of plants were recorded.

Quantitative sampling of the vegetation was done at 25 sites, selected as representative of the patterns observed on aerial photographs. The sites chosen are all in the vicinity of the main road that traverses the southern areas of the Park (Fig. 3). The large northwestern sector of the Park was

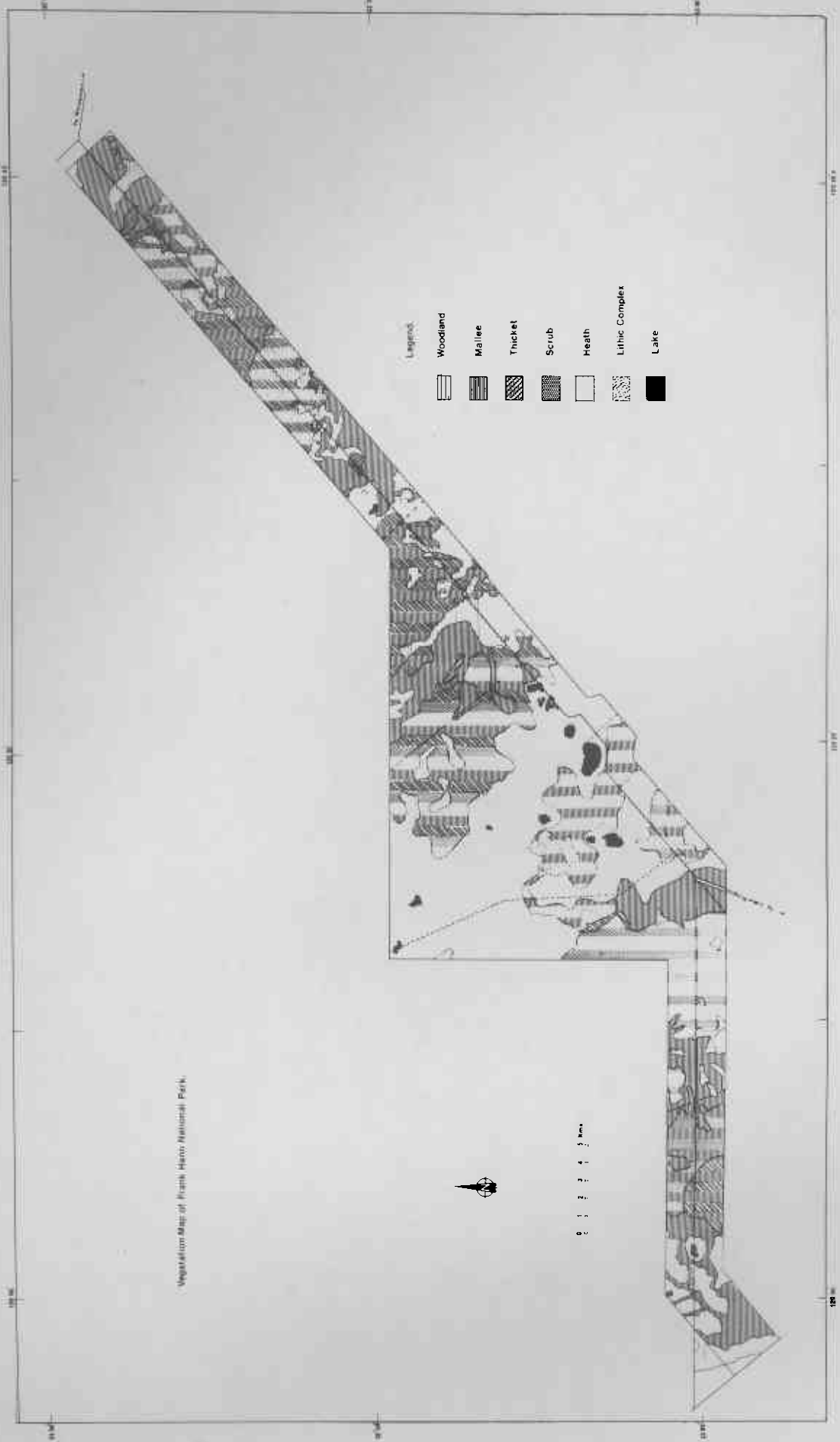


Fig. 2 A vegetation map of Frank Hann National Park.

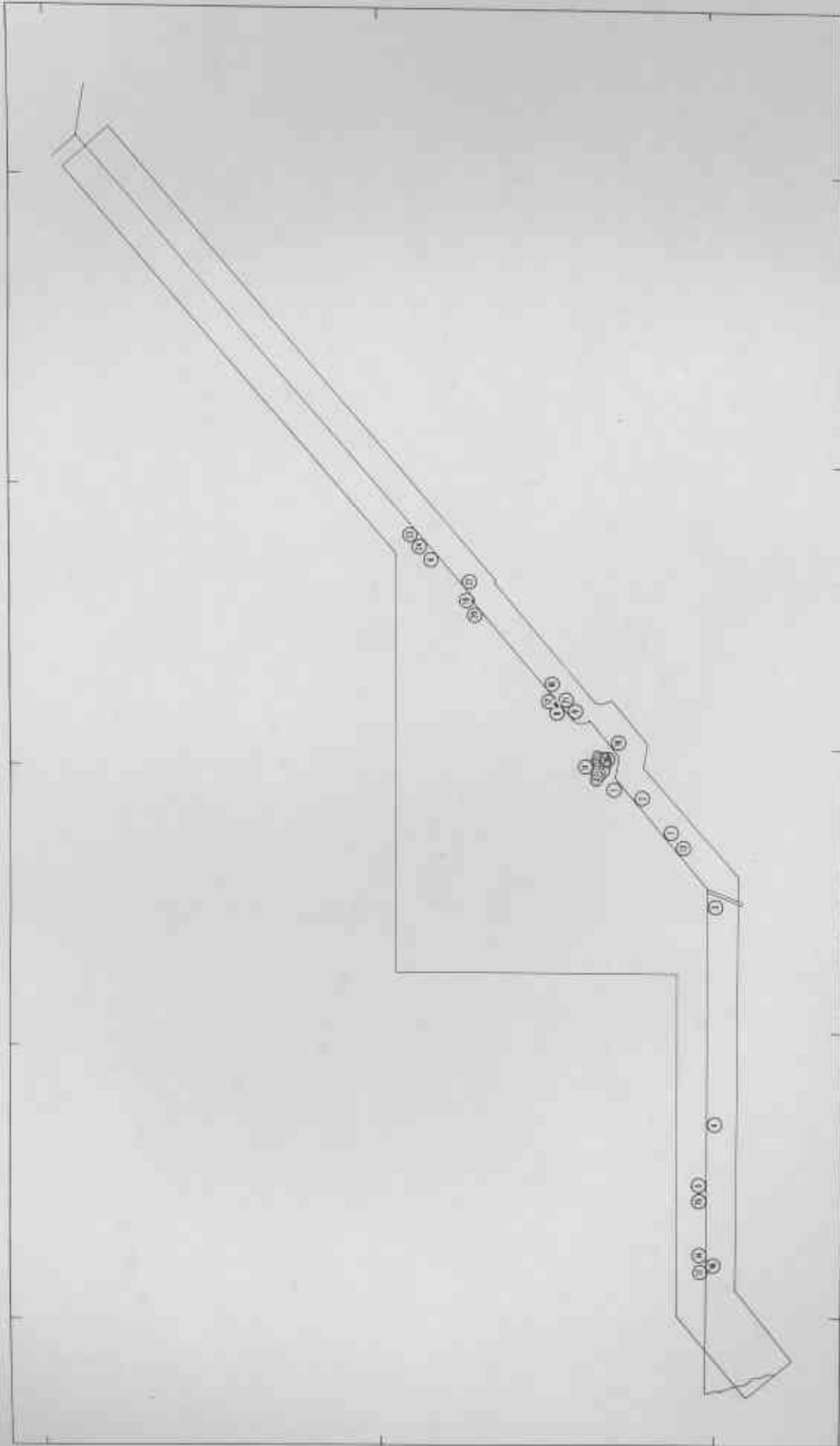


Fig. 3 The numbers and locations of sampled sites referred to in the text.

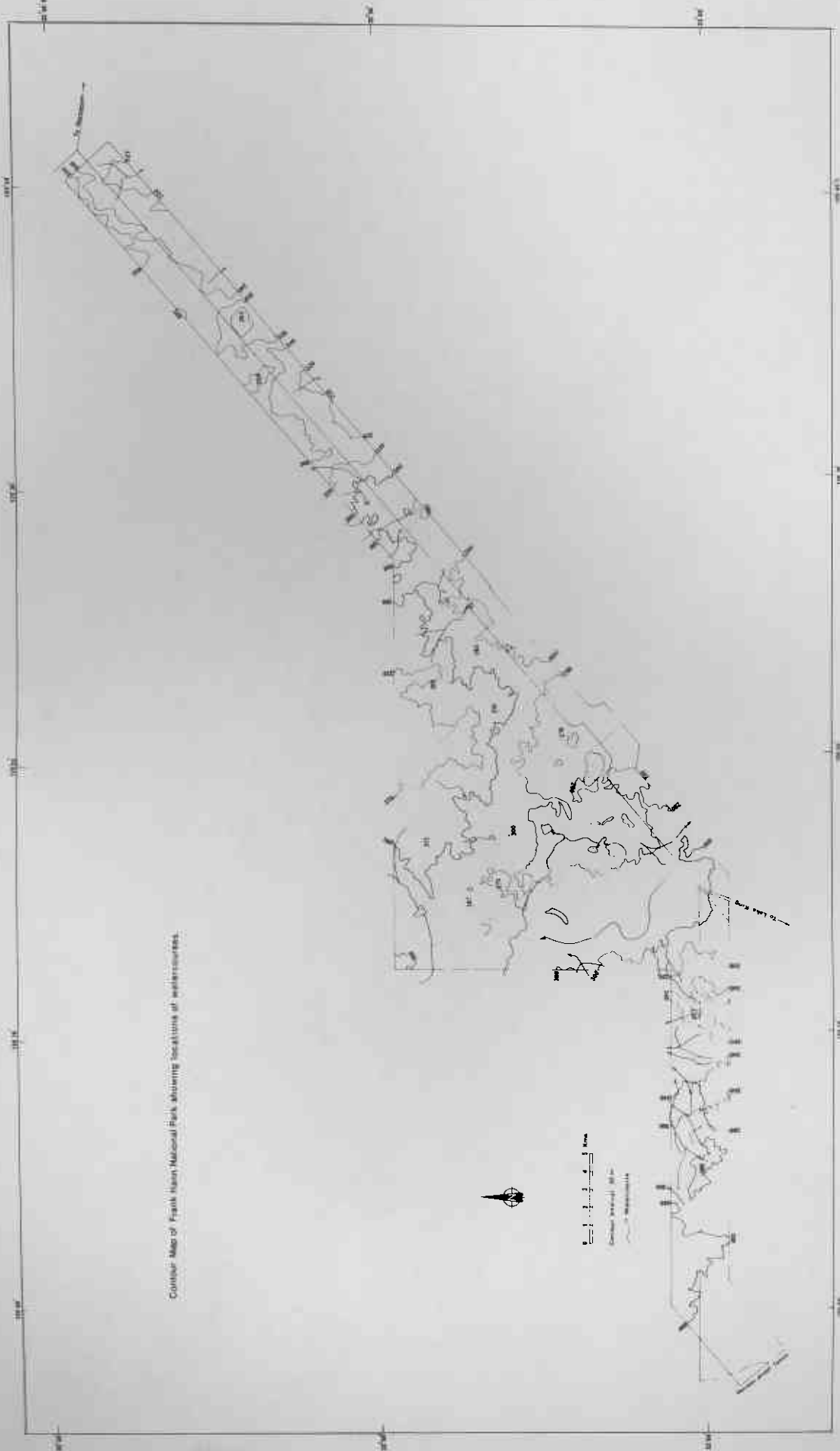


Fig. 4 Elevational contours and water courses of Frank Hann National Park

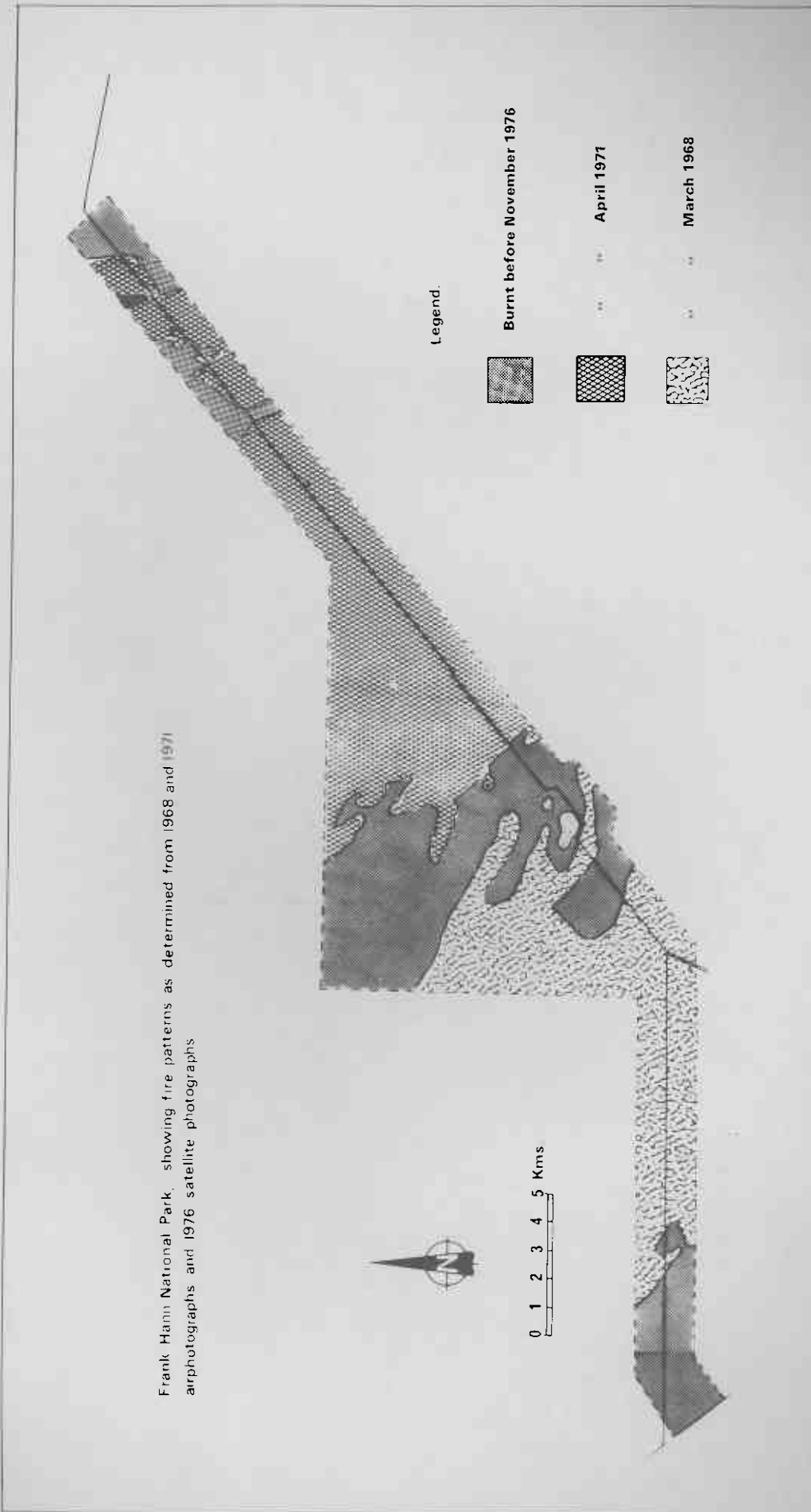


Fig. 5. Fire history of Frank Hann National Park.

examined on the photos and by traverse and found not to contain vegetation not represented along the road. Thus for ease of access, sites near the road were chosen. At least two samples representing each kind of photo-pattern were collected in order to assess variation.

Sampling sites were located by pacing a randomly determined number of paces in towards the central area of each pattern unit. At the site, a square 10 m x 10 m plot was laid out. All species present within it were listed, and the height, canopy cover, vitality, and sociability (Mueller Dombois & Ellenberg, 1974) were noted for each. Species occurring nearby but not in the plot were recorded separately. The phenological state of the species, presence of dead plants, litter accumulation, and evidence of fire were recorded. A soil sample was collected, using an auger, to a depth of 1 m where possible. A voucher specimen for each plant species found in the Park was collected and was deposited in the Western Australian Herbarium (PERTH).

Location and History

The Frank Hann National Park (Reserve no. C 27023), ca. 50 km east of Lake King township and lying between lat. 32°41'S and 33°01'S and between long. 119°58'E and 120°43'E, lies in both the Dundas and Philips River Goldfields. Named after the surveyor and explorer, Frank Hann, who travelled the area in 1901, the Park has an area of ca. 49,877 ha and occupies a portion of the Ravensthorpe Shire on Western Australian Department of Lands and Surveys Lithograph Nos. 2831, 2931, 2932 and 3032.

The area was vacant Crown land until May 1970, when the reserve was gazetted and vested in the National Parks Board of Western Australia in trust for the purpose of National Park. On August 18, 1973, an additional area was added to the northeastern arm of the National Park increasing the area to almost twice that of the original (Lands and Surveys Misc. Plan 310).

Physiography and Basic Geology

Most of the geological substrate of the National Park is Quaternary marine and sedimentary rocks. The western extremity of the Park is situated on granites of the Yilgarn Block, the oldest of the Precambrian complexes of Western Australia (Clarke *et al.* 1967, Gower and Bunting 1976). Jennings and Mabutt (1971) discuss the overall physiography and drainage of this part of the State. The gentle, long slopes of the hills indicate erosion which has planed the original land surface to near flatness. Lateritic-capped "breakaway" complexes are present, but are smaller and less steep than in the western wheatbelt. They appear to represent residuals of the old peneplain (Mulcahy in Jennings and Mabutt 1971).

At the western extremity of the Park the high ground represents areas where granitic residuals are exposed whereas at the northeastern boundary the high ground overlies laterite of the old peneplain. The overall topography is characterized by gentle undulations varying between 280 and 420 m above sea level (Fig. 4). The Park, therefore, has an altitudinal range of 140 m. The watercourses of this Park are all intermittent, narrow and shallow. Some of these watercourses drain towards large lakes (mostly saline, but may be fresh after heavy rains) present in the Park. Other watercourses pass off the Park onto adjacent Crown Land. Salt accumulation

occurs in low lying areas, particularly around the lakes and along low-lying areas of the Lake King-Norseman Road.

Soil mapping of the region on a large scale has been done by Prescott (1931, 1933) and at a finer scale by Northcote *et al.* (1967). Within the Park, a variety of soil types can be recognized. The western section of the Park lies on duplex, alkaline, yellow soils which are quite variable in structure. They are characterized by hard-setting loamy soils with yellow, clayey subsoils. The soil of the middle section of the Park tends to have a gradational-texture profile of highly calcareous grey, brown or red loamy earths. The northeastern section has soils with a uniform-texture profile, consisting of sandy soil-matrices with ironstone gravels.

Fire History

No actual records of fires are available for the Park. However, from air photographs taken in March 1968 and April 1971 (made available by the Department of Lands and Surveys) and N.A.S.A. Land Satellite photographs, November 16, 1976, a number of fire patterns of varying ages can be seen. Most of the northeastern section of the Park was burnt by a fire just prior to November 1976 (Fig. 5). The middle section of the park was burnt by a fire that occurred between March 1968 and April 1971; however this fire did not enter the northeastern section. Air photographs of the western section of the park show fire scars that are evidence of fires previous to March 1968.

If the age of vegetation is related to the time since the last fire in that area, then the above-ground parts of the vegetation in the northeastern section of the park are ca. 2-7 years old; the middle section 7-10 years old and the western section older than 10 years.

Isolation

The National Park is contiguous with the virgin bush except for an area on the western boundary. Here an area adjacent to the Vermin fence has been cleared for agricultural use. The bush surrounding the remainder of the Park extends for over 100 km to the north and east and for ca. 30 km to the southwest. There are no firebreaks ploughed around the boundaries of the Park.

Climate

There are no climatic records for the Frank Hann National Park. Data are taken from the nearest three recording localities; Lake King, lat. $33^{\circ}06'S$, long. $119^{\circ}20'E$ (ca. 60 km W of the Park centre); Lake Grace, lat. $33^{\circ}06'S$, long. $118^{\circ}26'E$ (ca. 175 km W of the Park centre); and Norseman, lat. $32^{\circ}16'S$, long. $121^{\circ}40'E$ (ca. 170 km NE of the Park centre). These data are presented in Table 1.

Flora and Vegetation

Because the area has been easily accessible only since the early 1960's, botanical collecting in Frank Hann National Park has been confined to recent years.

Table 1. Climatic data for Lake Grace, Lake King and Norseman.

	<u>Lake Grace</u>	<u>Lake King</u>	<u>Norseman</u>
Average annual rainfall (mm)	359	344	279
Average winter rainfall (May to Oct.)	254	128	152
Average summer rainfall (Nov. to April)	105	116	127
Evaporation, annual average (mm)	1,397	1,397	1,824
Average relative humidity (%) at 1500 hrs	35	NA	37
Agricultural growing season (months)	4.7	4.3	2.5
Break of growing season	Late April	Early May	Late May

Temperature ($^{\circ}\text{C}$)

daily average*

spring (Sept. to Nov.)	15	15	17
summer (Dec. to Feb.)	22	22	23
autumn (Mar. to May)	17	17	18
winter (Jun. to Aug.)	10	11	11
Mean max. for hottest month (Jan.)	32	31	33
Average number of days per annum where temperature exceeds 32°C	53	NA	63.3
Average number of days per annum where temperature exceeds 38°C	12	NA	15
Average minimum for coldest month (July)	5	5	5
Number of frosts per annum (below 2°C)	19	NA	26.5
Average cloud cover per annum (eighths)			
9.00 am	3.9	NA	3.2
3.00 pm	4.1	NA	3.3
Average duration of sunshine (hours per day)	6.5	6.5	8.4

Wind

Summer: Jan. 9.00 am	direction	SE,E,NE	NA	E,NE,N
	speed	50% 8 knots	NA	50% 6 knots
	3.00 pm	direction	SE,E,NE	S,SE
		speed	50% 8 knots	50% 6 knots
Winter: July 9.00 am	direction	W,NW,N	NA	W,NW
	speed	50% 8 knots	NA	50% 8 knots
	3.00 pm	direction	SW,W,NW,N	SW,W,NW
		speed	50% 8 knots	60% 8 knots

NA = Not available

* = $\frac{1}{2}$ (max. + min.)

The recorded flora totals 257 species in 112 genera of 46 families (Appendix 1). The principal families are Myrtaceae (53 species), Proteaceae (41), Mimosaceae (22), and Papilionaceae (12). The largest genera are *Acacia* (22 species), *Eucalyptus* (17) and *Melaleuca* (16). Collecting during summer through to mid winter would increase the known flora, especially of

Epacridaceae, which in southern heaths is usually well represented.

The Park lies towards the northern edge of the Roe Botanical District (Beard 1978). There is much interdigitation of vegetation representative of the Coolgardie District, itself an interzone between the South West and Eremaean Botanical Provinces. In the woodland, thicket and some mallee formations much of the flora of the Park is typical of this interzone and occurs here towards the southern limit of its range. In other mallee formations, as well as the heath and scrub, the species are mostly typical of southern heaths but lack those of coastal situations. Many of the heath species have extensive distributions to the west and south of the Park.

Several species are confined to the Park and its vicinity (within 100 km). These are *Acacia crassuloides*, *A. diaphylloidea*, *Adenanthos gracilipes*, *Eucalyptus cerasiformis* and *E. deflexa*. An unnamed *Melaleuca* (Monk 332/333) is a previously unknown species. Gardner's (1952) vegetation map of Western Australia shows the area as Sclerophyllous Woodland, which, having regard to the scale of the map (1:8,000,000), is intended as a broad generalization. Beard visited the area in 1964 and mapped the following vegetation units: Salmon Gum woodland, mallee, scrub heath, heath, and thicket (Beard, 1968).

VEGETATION UNITS PRESENT IN FRANK HANN NATIONAL PARK

In the following discussion, formation and life form nomenclature follow that of Muir (1977).

Seven vegetation units have been delineated, although mosaics of two or more units occur (Fig. 3).

1. Woodland formations

The dominant life-form of the upper stratum was trees. The height of the upper stratum varied from 5-30 m and its canopy cover ranged from 5-50%. Mixed woodlands were more common than pure-stand woodlands although those dominated by Salmon Gum, *Eucalyptus salmonophloia*, occurred throughout low-lying areas of the park.

Dominant species of the upper stratum included *Eucalyptus diptera*, *E. eremophila*, *E. flocktoniae*, *E. gracilis*, *E. longicornis*, *E. pileata*, *E. salmonophloia* and *E. transcontinentalis*. *Melaleuca pauperiflora* occurred as a co-dominant in some of the woodlands. The understorey of the woodlands was dominated by *Melaleuca eleutherostachya*, *M. pauperiflora* and *M. uncinata*. The most common species occurring in the third stratum were *Boronia inornata*, *Cryptandra polyclada*, *C. tomentosa*, *Phebalium filifolium*, *P. lepidotum* and *P. tuberculosum*. In low-lying woodlands a ground cover of moss was present.

Generally the woodland formations were restricted to low-lying areas of the park, i.e. below 350 m altitude. The soil was a loamy clay, red, orange or light brown, with low forest and tall woodland occurring on the red loams while the low woodland occurred on the light brown, sandier soils. Litter accumulation varied between formations but the quantity was never considerable, the bulk of the litter input being from the eucalypts.

The following woodland formations were noted in the park; Forest, Low Forest A, Tall Woodland, Woodland, Low Woodland B, and Open Low Woodland A.

2. Mallee formations

The dominant life-form of the upper stratum was mallee, either of the shrub-form or the tree-form. The canopy cover varied from 2-70%. Tree mallees tended to occur adjacent to woodlands with an ecotone of both Tree Mallee and Low Woodland.

The dominant species of the upper stratum of the mallee formations were *Eucalyptus celastroides*, *E. eremophila*, *E. foecunda*, *E. longicornis*, *E. micranthera* and *E. pileata*. The other strata of these formations were dominated by species of the Myrtaceae, Proteaceae and Mimosaceae. Mallee formations were restricted to areas that have sandy soil. Where the sand was very fine and white or yellow only the shrub-form mallee occurred as an emergent to 3 m tall. The amount of litter varied between formations, the older formations having the greatest accumulation. The bulk of the litter input was bark from the mallees.

The following mallee formations were noted in the park; Open Shrub Mallee, Very Open Shrub Mallee, and Very Open Tree Mallee. Some of the formations were regenerating after fire and therefore, when these formations have fully regenerated, one would also expect to find Shrub Mallee, Open Tree Mallee and Tree Mallee.

3. Thicket formations

The dominant life-form of the upper stratum was the shrub form. Structurally, the upper stratum had a canopy cover from 30-85% and the upper stratum was greater than 2 m. One or several species dominated the upper stratum. There were species of *Acacia*, *Casuarina* and Myrtaceae.

Thicket formations appeared to be restricted in their distribution to upland areas of the park (ca. 380 m above sea level), although thickets of *Melaleuca pauperiflora* occurred in low lying areas adjacent to *E. salmonophloia* and *E. transcontinentalis* woodlands. Thickets occurred on a variety of different soils throughout the park, with the exception that *M. pauperiflora* was restricted to the red clay that was subject to inundation in winter. Heavy litter accumulation was found in thickets, the major input coming from species of the upper stratum.

Thicket and Dense Thicket formations were noted in the park.

4. Scrub formations

The dominant life-form of the upper stratum was the shrub form. The height of the tallest stratum varied from less than 10 cm to in excess of 2 m and the canopy cover varied from 2-25%. When the canopy cover exceeds the critical value of 30% the formation may be described as a heath (see 5 below).

The upper stratum of the scrub formations was dominated by *Banksia media*, *Casuarina acutivalvis*, *Isopogon scabriusculus* and *Santalum acuminatum*. The second stratum was dominated by species of Myrtaceae and the third stratum was dominated by species of Cyperaceae and Poaceae.

Scrub formations, which occur on sand that varied in colour from white or light brown to yellow, were restricted to the upland areas of the park. Litter accumulation was very poor and concentrated about the base of larger plants. No large debris was present.

The following scrub formations were noted in the park; Scrub, Low Scrub A and Open Dwarf Scrub C. The Open Dwarf C formation was young regrowth after fire and therefore we would expect it to develop into Dwarf Scrub C and Low Scrub B formations when it has matured.

5. Heath formations

The dominant life form of the upper stratum was the shrub form. The height of the upper stratum did not exceed 2 m above ground level and the canopy cover varied from 30-45%. Emergents that occasionally occurred were *Banksia laevigata*, *B. media*, *Callitris preissii*, *C. roei*, *Casuarina acutivalvis* and *C. campestris*. The heath formations were composed mainly of species of the Myrtaceae and Proteaceae.

Heath formations were restricted to the upland areas of the park where the soil was of a sandy texture. They occurred on white or yellow sand, that contained a variable amount of laterite. Very little accumulation of litter occurred.

Low Heath C and Heath B were noted in the park. One of the Low Heath C formations was regenerating after fire, and therefore may grow into a Heath B formation with maturation.

6. Lithic complexes

The lithic complexes were mosaics of life-forms (including cryptogams, sedges, shrubs and trees) that were directly affected by their proximity to granite or other rock exposures. The lithic complexes included all species growing in crevices or soil-filled depressions and all annual species occupying rock pools. The rock pools were usually filled with water after rain and were fresh to taste. The soil was very shallow, dark brown and gritty. Species most commonly found on the lithic complexes were *Borya nitida*, *Calytrix brachyphylla*, *Drosera macrantha*, *Gahnia ancistrophylla*, *Lepidosperma resinosum*, *Neurachne alopecuroides* and *Melaleuca elliptica*, the latter being found in deeper soil at the edges of the exposed granite.

7. Salt complexes

All salt complexes noted in the National Park were salt lakes which differed between themselves in species composition. Lakes dominated by a new species of *Arthrocnemum* had a cracked and fissured, brown surface when dry. Soil samples were taken to a depth of 80 cm from the centre of one of these lakes. Soil from the top 10 cm was light brownish-

grey clay with a pH of 8.3 and a salt content (NaCl) of 0.24%. Clay from between 10-40 cm was of the same colour but had a salt content of 1.05% and a pH of 5.9. The lakes received rainfall run-off from a gravel road and the surrounding vegetation.

Lakes dominated by *Arthrocnemum lylei* had a smooth grey surface when dry. Soil samples to a depth of 40 cm were taken from the centre of one of these lakes. Because the clay was difficult to core, a precise depth of the clay sample cannot be given. The profile was uniform, being grey with a pH of 4.4 and a salt content (NaCl) of 2.48%. The run-off these lakes received was from the surrounding vegetation only.

ACKNOWLEDGEMENTS

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APPENDIX I

Site descriptions

1. Woodland formations

Plot 7

Key Description: Low Forest A over Open Low Scrub A over Dwarf Scrub C.

Stratification:

Stratum 1: All *Eucalyptus gracilis*, mature, 7.2-9 m tall, canopy cover 33-50%.

Stratum 2: *Melaleuca thyooides*, 1.8 m tall with very scattered distribution.

Stratum 3: *Boronia inornata*, *Daviesia acanthoclona*, *Lepidosperma resinosum* and *Grevillea huegelii*. 40-100 cm tall, canopy cover 10-30%.

Comments: No recent fires (within previous 10 years) have occurred in this area.

Litter: covered 1-5% of plot.

Soil: 0-36 cm powdery loam; light brown/orange
36-40 cm light brown/yellow clay
below 40 cm kaolinized rock.

Plot 9

Key Description: Forest over Low Woodland B over Open Dwarf Scrub D over Very Open Mosses.

Stratification:

Stratum 1: *Eucalyptus transcontinentalis*, mature, 15-18 m tall, canopy cover 25-33%.

Stratum 2: *Eucalyptus eremophila*, *E. pileata* and *Melaleuca pauperiflora*, 4-6 m tall, canopy cover 25-33%.

Stratum 3: *Olearia meulleri*, 20 cm tall, canopy cover less than 1%.

Stratum 4: Moss, canopy cover less than 1%.

Outside plot: *Lepidosperma resinosum*, *Boronia inornata*.

Comments: No evidence of recent fire in this area.

Litter: Abundant, bark, leaves and large debris.

Soil: 0-1 cm dark brown, coarse sand mixed with litter
1-10 cm light brown fine sand
10-80 cm compacted clay white/light brown.

Plot 10

Key Description: Low Woodland B over Very Open Shrub Mallee over Open Dwarf Scrub D over Open Hummock Grass.

Stratification:

- Stratum 1: *Eucalyptus flocktoniae*, 4-6 m tall, canopy cover 10-25%.
 Stratum 2: *Eucalyptus* (Monk 124), 3 m tall, canopy cover 1-5%.
 Stratum 3: *Melaleuca eleutherostachya*, *Choretrum pritzelii* (several other species present all with normal vitality), 30-60 cm tall, canopy cover 2-20%.
 Stratum 4: Hummock and grass species, 20-40 cm tall, canopy cover 2-10%.

- Comments: 1. Plot in regeneration state following fire.
 2. On transitional ecotone between Shrub Mallee and Low Woodland A.

Litter: Sparse, but dead wood on ground has a cover of 12%.

Soil: 0-80 cm gradation from very fine, chocolate/orange sand to orange clay particles of medium size. Roots evident in top 10 cm.

Outside plot: *Eucalyptus gracilis*, *Bossiaea leptacantha*.

Plot 11

N.B. This plot is characterized by a species that was rooted outside of the plot boundaries, but the canopy of which overhung the plot.

Key Description: Open Low Woodland A over Open Low Scrub A over Open Dwarf Scrub D over Very Open Mosses.

Stratification:

- Stratum 1: *Eucalyptus flocktoniae*, 5.5-7 m tall, canopy cover 5-10%.
 Stratum 2: *Melaleuca uncinata* and *M. eleutherostachya*, 1.5-2 m tall, canopy cover 5-10%.
 Stratum 3: Several species present, dominated by the family Myrtaceae, 20-40 cm tall, canopy cover 1-5%.
 Stratum 4: Mosses of the genera *Bryum* and *Tortula*, canopy cover less than 1%.

Comments: No evidence of recent fires, although dead wood covered about 2% of the plot.

Soil: 0-20 cm very fine chocolate brown sand.
 20-80 cm very fine light-brown/orange sand. Roots observed in top 20 cm.

Outside plot: *Acacia camptoclada*, *Eremophila decipiens* and *Callitris preissii*.

Plot 13

Key Description: Woodland over Open Low Scrub B over Open Dwarf Scrub D over over Open Dwarf Scrub D over Very Open Mosses.

Stratification:

- Stratum 1: *Eucalyptus salmonophloia*, 26-30 m tall, canopy cover 25-33%.
 Stratum 2: *Cassia nemophila* and *Pittosporum phylliraeoides*, 1-1.5 m tall, canopy cover 5-10%.

Stratum 3: *Atriplex vesicaria*, *Eremophila glabra*, 30-40 cm tall, canopy cover 1-4%.

Stratum 4: *Ptilotus spathulatum* and *Sclerolaena diacantha*, 0-5 cm tall, canopy cover was very scattered and less than 1%.

Stratum 5: Lichens and mosses, very scattered with insignificant canopy cover.

Comments: No evidence of recent fire.

Litter: Abundant, leaves and large debris.

Soil: 0-24 cm powdery light brown loam
 24-34 cm yellow/light brown clay
 34-80 cm kaolinized clay/rock layer.

Outside plot: *Melaleuca cuticularis* to a height of 3.5 m.

2. Mallee formations

Plot 1

Key Description: Open shrub Mallee over Dwarf Scrub D over Open Dwarf Scrub D.

Stratification:

Stratum 1: Young *Eucalyptus eremophila*, 1-2 m tall, canopy cover 22%.

Stratum 2: Several species present including *Santalum acuminatum*, 30-50 cm tall, canopy cover 10%.

Stratum 3: Several species present, together with seedlings of species of other strata, 0-30 cm tall, canopy cover less than 2%.

Comments: This plot was burnt by a fire between 1968 and 1971 and is now regenerating.

Litter: None, bare ground covered 5%.

Soil: 0-26 cm very fine, chocolate/orange sand. Roots present in top 6 cm of profile.
 26-80 cm kaolinized rock.

Plot 3

Key Description: Very Open Tree Mallee over Dwarf Scrub C over Dwarf Scrub D.

Stratification:

Stratum 1: Young *Eucalyptus celastroides*, 1 m tall, but dead branches projected above this to 6 m, canopy cover 1-5%.

Stratum 2: Dominated by Proteaceae and Myrtaceae, 40-70 cm tall, canopy cover 15-20%.

Stratum 3: Dominated by Mimosaceae, 0-40 cm tall, canopy cover 1-5%.

Comments: A recent fire burnt this area and when fully regenerated it would be an Open Tree Mallee.

Litter: None.

Soil: 0-15 cm chocolate-brown, fine loam
 15-80 cm yellow clay.

Plot 6

Key Description: Very Open Shrub Mallee over Open Dwarf Scrub C over Open Hummock Grass.

Stratification:

Stratum 1: *Eucalyptus eremophila*, 2 m tall, canopy cover 1-5%.

Stratum 2: *Conospermum teretifolium* and *Hakea corymbosa* were emergent from this strata, several other species present, 30-100 cm tall, canopy cover 5-10%.

Stratum 3: *Loxocarya cinerea* dominated and seedlings of other species in higher strata were present, height 0-15 cm and canopy cover was insignificant (i.e. less than 1%).

Comments: A recent fire burnt this area and when regenerated it should be Open Shrub Mallee over Heath.

Litter: None.

Soil: 0-0.5 cm white sand
 0.5-15 cm very fine, light-brown sand. Roots present in top 10 cm
 15-70 cm very fine, white sand.

Plot 20

Key Description: Open Shrub Mallee over Open Dwarf Scrub C over Open Dwarf Scrub D.

Stratification:

Stratum 1: *Eucalyptus longicornis*, 1 m tall, canopy cover 10-25%.

Stratum 2: *Grevillea huegelii* and *Myoporum beckeri*, 50-60 cm tall, canopy cover 5-10%.

Stratum 3: *Cryptandra tomentosa*, *Cryptandra glabriflora*, *Westringia rigida*, *Melaleuca cuneata* and three species of *Acacia*, 0-30 cm tall, canopy cover 1-5%.

Comments: Fire burnt this area between 1968 and 1971.

Litter: Very little.

Soil: 0-30 cm light-brown sand
 30-80 cm yellow clay.

Plot 22

Key Description: Open Shrub Mallee over Open Dwarf Scrub D over Open Dwarf Scrub D.

Stratification:

Stratum 1: *Eucalyptus micranthera*, and *Exocarpus sparteus*, 1.7 m tall, canopy cover 10-25%.

Stratum 2: *Platysace maxwellii*, *Pimelea sulphurea* and an unnamed *Acacia*, 40-50 cm tall, canopy cover 1-5%.

Stratum 3: *Glischrocaryon roei*, *Goodenia watsonii*, *Melaleuca scabra*, *Lepidosperma resinosum*, *Gahnia polyphylla* and several other species, 0-30 cm tall, canopy cover 5-10%.

Comments: A fire burnt this area between 1968 and 1971.

Litter: Very small amount present in plot.

Soil: 0-0.5 cm white sand
 0.5-10 cm light-brown sand
 10-25 cm white/light brown sand
 25-50 cm white clay
 50-80 cm red/orange clay

3. Thicket formations

Plot 8

Key Description: Thicket over Very Open Dwarf Scrub over Very Open Mosses.

Stratification:

Stratum 1: Dominated by *Melaleuca pauperiflora*, 3-3.5 m tall with canopy cover of 30-35%.

Stratum 2: Only two species present, *Olearia muelleri* and *Stipa elegantissima*, both with scattered and insignificant cover.

Stratum 3: Very open mosses.

Comments: This was an almost pure stand of *Melaleuca pauperiflora* surrounded by woodland. The area was subject to inundation during winter.

Litter: Dead branches of *M. pauperiflora* covered about 1% of the plot.

Soil: 0-15 cm fine red clay
15-80 cm light brown clay with coarse white particles
80 cm compact clay.

Plot 12

Key Description: Dense Thicket over Dwarf Scrub C over Open Dwarf Scrub D over Very Open Herbs.

Stratification:

Stratum 1: *Acacia* (unnamed) and *Melaleuca uncinata*, 2.5-3.5 m tall, canopy cover 70-100%.

Stratum 2: *Baeckea maidenii*, *Micromyrtus drummondii*, *Thryptomene australis* and *Beyeria lechenaultii*, 60-100 cm tall, canopy cover 20-25%.

Stratum 3: *Conospermum distichum*, *Platysace effusa*, *Eriostemon rhomboideus* and *Conostephium drummondii*, 30-40 cm tall with insignificant cover.

Stratum 4: *Waitzea aurea* and *Helichrysum apiculatum*, 0-10 cm tall with insignificant cover.

Comments: There was no evidence of fire having affected this plot.

Litter: Fallen branches and leaves have accumulated.

Soil: 0-20 cm orange loam
20-80 cm orange/red clay.

Plot 18

Key Description: Thicket over Open Dwarf Scrub C over Open Dwarf Scrub D over Very Open Herbs.

Stratification:

Stratum 1: *Acacia* sp. and *Melaleuca uncinata*, 3-3.5 m tall, canopy cover 45-50%.

Stratum 2: *Micromyrtus drummondii*, 70 cm tall with 3-7% canopy cover.

Stratum 3: *Platysace maxwellii* and *Baeckea maidenii*, 40 cm tall with canopy cover of 5-10%.

Stratum 4: *Waitzea aurea* and several species of lichens, 0-10 cm tall, with very scattered distribution and insignificant cover.

Comments: No evidence of fire damage in this plot.

Litter: Covers about 70% of the plot, being *Acacia* branches and phyllodes.

Soil: 0-30 cm light-brown/orange loam
 30-80 cm light-brown/orange loam.

Plot 24

Key Description: Thicket over Low Scrub B over Open Dwarf Scrub D.

Stratification:

Stratum 1: *Casuarina acutivalvis*, 3 m tall, canopy cover 30-35%.

Stratum 2: *Micromyrtus drummondii* and *Melaleuca cordata*, 1-1.5 m tall, canopy cover of 20-25%.

Stratum 3: *Phebalium filifolium*, *Persoonia tortifolia*, *Hibbertia* sp. and *Acacia* sp., 25-70 cm tall, canopy cover 1-3%.

Comments: No fire has burnt in this area since 1968. There are dead plants of *Callitris preissii*, *Hakea falcata* and *Acacia* sp. in the plot.

Litter: From the above 3 species.

Soil: 0-80 cm very dry, powdery loam with gravel with large pebbles at low end of the profile.

4. Heath formations

Plot 5

Key Description: Low Heath C over Open Dwarf Scrub D.

Stratification:

Stratum 1: Several species present, dominated by Myrtaceae and Proteaceae, 30-60 cm tall, canopy cover 25-33%.

Stratum 2: Several species present, dominated by Myrtaceae and Proteaceae, 0-30 cm tall, canopy cover 1-5%.

Comments: 1. A fire burnt in this area between 1968 and 1971.
 2. *Casuarina campestris*, *Banksia laevigata* and *Callitris preissii* occurred outside plot.

Litter: None.

Soil: 0-40 cm sand and gravel
 40-80 cm compacted gravel.

Plot 14

Key Description: Low Heath C over Low Heath D over Open Dwarf Scrub D over Very Open Herbs.

Stratification:

Stratum 1: *Hakea falcata* and *Isopogon scabriusculus*, 50-70 cm tall, canopy cover 30-35%.

Stratum 2: Dominated by *Verticordia roei*, *Verticordia chrysantha* and *Beaufortia micrantha*, several other species present, 30-50 cm tall, canopy cover 40-45%.

Stratum 3: Dominated by *Calytrix brachyphylla*, several other species present, 20-30 cm tall, canopy cover 5-10%.

Stratum 4: *Stylidium breviscapum*, *S. squamellosum*, *Conostylis petrophiloides* and several other species, 0-20 cm tall, canopy cover insignificant.

Litter: Dead plants of *Isopogon scabriusculus*, *Verticordia roei* and *Beaufortia micrantha* are contributing most to litter accumulation.

Soil: 0-15 cm powdery, light-brown gravel
15-80 cm compacted clay/gravel.

Plot 15

Key Description: Heath B over Open Dwarf Scrub D over Open Dwarf Scrub D.

Stratification:

Stratum 1: *Banksia media*, *Casuarina corniculata*, *Pimelia suaveolens* and *Grevillea* sp., 60-80 cm tall, canopy cover 35-40%.

Stratum 2: Dominated by the Proteaceae and Myrtaceae, 25-40 cm tall, canopy cover 3-5%.

Stratum 3: Dominated by Myrtaceae and Cyperaceae, 0-25 cm tall, canopy cover 3-5%.

Comments: A fire burnt this area between 1968 and 1971.

Litter: None.

Soil: 0-38 cm powdery, brown loam and gravel
38-80 cm dark-orange gravel/clay.

5. Scrub formations

Plot 4

Key Description: Open Dwarf Scrub C over Open Dwarf Scrub D over Open Hummock Grass.

Stratification:

Stratum 1: Dominated by *Casuarina acutivalvis*, 60 cm tall, canopy cover 1-5%.

Stratum 2: Several species present dominated by Myrtaceae, 20-40 cm tall, canopy cover 5-10%.

Stratum 3: Dominated by *Borya nitida*, 0-15 cm tall, canopy cover 1-5%.

Comments: Although this plot was designated Open Dwarf Scrub C it will probably grow into a thicket when mature.

Litter: None.

Soil: 0-20 cm loamy gravel
20-80 cm gravel with clay.

Plot 21

Key Description: Scrub over Low Scrub A over Open Dwarf Scrub D over Very Open Low Grass.

Stratification:

Stratum 1: *Santalum acuminatum*, *Melaleuca uncinata*, *Eucalyptus cylindriflora* and *Melaleuca acuminata*, 2.5-3.5 m tall, canopy cover 25-30%.

Stratum 2: *Micromyrtus drummondii*, *Baeckea maidenii*, *Acacia* sp. and *Lepidosperma resinosum*, 1-1.5 m tall, canopy cover 25-30%

Stratum 3: *Acacia multispicata* and *Grevillea huegelii*, 40-50 cm tall, canopy cover insignificant.

Stratum 4: *Danthonia setacea* and *Stipa elegantissima*, 0-30 cm tall, canopy cover insignificant.

Comments: 1. No evidence of fire in this area.
2. Area receives water from runoff from gravel road.

Litter: Small amount.

Soil: 0-1 cm wet clay layer
1-5 cm light-brown clay
5-80 cm dark-brown clay.

Plot 23

Key Description: Low Scrub A over Open Scrub A over Dwarf Scrub C over Open Dwarf Scrub D

Stratification:

Stratum 1: *Santalum acuminatum*, *Melaleuca densa* and *Casuarina acutivalvis*, 2-2.5 m tall, canopy cover 20-25%.
Stratum 2: *Melaleuca uncinata*, *Hakea falcata*, *Melaleuca scabra* and *Eucalyptus pileata*, 1-2 m tall, canopy cover 5-10%.
Stratum 3: Dominated by *Lepidosperma resinsum*, 40-60 cm tall, canopy cover 20-25%.
Stratum 4: Several species of the Myrtaceae present, stratum 15-25 cm tall, canopy cover 1-3%.

Comments: *Callitris preissii* grows outside plot.

Litter: Accumulated since last fire (between 1968 and 1971).

Soil: 0-10 cm powdery, light-brown sand with gravel
10-50 cm powdery, light-brown sand with large pieces of gravel
50-80 cm light-brown sand with yellow clay.

6. Lithic complexes

Plot 16

Key Description: Dwarf Scrub C over Open Dwarf Scrub D over Mid-Dense Hummock Grass.

Stratification:

Stratum 1: *Thryptomene australis*, 1 m tall, canopy cover 20-25%.
Stratum 2: *Calytrix brachyphylla*, *Melaleuca elliptica*, and *Dodonaea microzyga*, 20-30 cm tall, canopy cover 5-10%.
Stratum 3: Dominated by *Borya nitida*, 5-15 cm tall, canopy cover 50-55%.

Comments: No fire damage.

Litter: Very small amount.

Soil: 0-19 cm dark-brown, gritty soil (depth variable).
19 cm solid granite.

Plot 17

Key Description: Heath A over Open Low Sedges over Very Open Mat Plants.

Stratification:

Stratum 1: *Melaleuca elliptica*, 1.5 m tall, canopy cover 45-50%.
Stratum 2: *Lepidosperma resinsum*, *Gahnia ancistrophylla*, and *Spartochloa scirpoidea*, 30-50 cm tall, canopy cover 15-20%.
Stratum 3: Dominated by *Borya nitida*, 10-25 cm tall, canopy cover 5-10%.

Comments: No fire damage.

Litter: None.

Soil: 0-38 cm down-brown, gritty soil.
38-43 cm dark-brown clay.
43 cm solid granite.

7. Saline complexes

Plot 19

Key Description: Dwarf Scrub D

Stratification:

Only 1 stratum was noted. *Arthrocnemum* sp. grew as a pure population, stratum 0-15 cm tall, canopy cover 20-25% at sample point.

Comments: The lake had a large run-off from a gravel road.

Litter: None.

Soil: When dry the lake surface had a cracked surface.
0-10 cm pH = 8.3 ; % NaCl = 0.24, colour 2.5 Y 6/2
light-brown clay
10-40 cm, pH = 5.9 % NaCl = 1.05; colour 2.5 Y 6/2
light-brown clay

Plot 25

Key Description: Open Dwarf Scrub D

Stratification:

Only 1 stratum was noted: *Arthrocnemum lylei* grew as a pure population, 0-30 cm tall, canopy cover 5-10%.

Comments: The plot was in a large salt lake surrounded by wind-blown dunes.

Litter: None.

Soil: 0-40 cm ; pH = 4.4 ; % NaCl - 2.48 ; colour 5 Y 5/1 grey clay.

APPENDIX II SPECIES LIST OF FRANK HANN NATIONAL PARK

All specimens are lodged with the Western Australian Herbarium (PERTH).
Collecting numbers of D. Monk (and R.J. Cranfield (RJC))
are given for taxa that are indeterminate or doubtful.

Species	Coll. No.	Family
<i>Acacia bidentata</i> Benth.		Mimosaceae
<i>A. brachyclada</i> W.V. Fitzg.		"
<i>A. camptoclada</i> C. Andrews		"
<i>A. crassuloides</i> Maslin		"
<i>A. densiflora</i> A. Morrison		"
<i>A. diaphyllodinea</i> Maslin		"
<i>A. eremophila</i> W.V. Fitzg.		"
<i>A. erinacea</i> Benth.		"
<i>A. harveyi</i> Benth.		"

Species	Coll. No.	Family
<i>Acacia ixiophylla</i> Benth.		Mimosaceae
<i>A. ? jutsonii</i> Maiden	060	"
<i>A. merrallii</i> F. Muell.		"
<i>A. multispicata</i> Benth.		"
<i>A. nodiflora</i> var. <i>ferox</i> E. Pritzel		"
<i>A. poliochroa</i> E. Pritzel		"
<i>A. spinosissima</i> Benth.		"
<i>A. unifissilis</i> A.B. Court		"
<i>A. sp. (sulcata-nitidula group)</i>	322	"
<i>A. sp.</i>	473	"
<i>A. sp.</i>	234	"
<i>A. sp.</i>	347	"
<i>A. indet.</i>	053	"
<i>A. indet.</i>	410	"
<i>Adenanthos argyraeus</i> Diels		Proteaceae
<i>A. cuneatus</i> Labill.		"
<i>A. gracilipes</i> A.S. George		"
<i>Alyxia buxifolia</i> R.Br.		Apocynaceae
<i>Anthocercis microphylla</i> F. Muell.		Solanaceae
<i>A. aromatica</i> C.A. Gardn.		"
<i>Arthrocnemum lylei</i> (Ewart & White) J.M. Black		Chenopodiaceae
<i>Arthrocnemum sp.</i>	482	"
<i>Atriplex vesicaria</i> (Ewart) J.M. Black		"
<i>Baeckea fumana</i> (Schau.) F. Muell.		Myrtaceae
<i>B. maidenii</i> Ewart & White		"
<i>Banksia elderana</i> F. Muell.		Proteaceae
<i>B. laevigata</i> Meisn. subsp. <i>fuscolutea</i> George		"
<i>B. media</i> R.Br.		"
<i>B. violacea</i> C.A. Gardn.		"
<i>Beaufortia micrantha</i> Schau.		Myrtaceae
<i>B. schaueri</i> Preiss		"
<i>Beyeria lechenaultii</i> (DC.) Baill.		Euphorbiaceae
<i>Billardiera coriacea</i> Benth.		Pittosporaceae
<i>Boronia crassifolia</i> Benth.		Rutaceae
<i>B. inornata</i> Turcz.		"
<i>B. ramosa</i> (Lindl.) Benth.		"
<i>B. ternata</i> Endl. var. <i>ternata</i>		"
<i>Borya nitida</i> Labill.		Liliaceae
<i>Bossiaea leptacantha</i> E. Pritzel		Papilionaceae
<i>B. rufa</i> R.Br. var. <i>foliosa</i> Benth.		"
<i>Brachycome ciliaris</i> (Labill.) Less.		Asteraceae
<i>Brachyloma concolor</i> F. Muell.		Epacridaceae
<i>Brachysema daviesioides</i> (Turcz.) Benth.		Papilionaceae
<i>Calectasia cyanea</i> R.Br.		Xanthorrhoeaceae
<i>Callitris canescens</i> (Parl.) S.T. Blake		Cupressaceae
<i>C. preissii</i> Miq. subsp. <i>verrucosa</i> (A. Cunn. ex Endl.) J. Garden		"
<i>C. roei</i> (Endl.) F. Muell.		"
<i>Calothamnus quadrifidus</i> R.Br.		Myrtaceae
<i>Calytrix brachyphylla</i> Turcz.		"
<i>C. affin. fraseri</i> A. Cunn.		"
<i>Cassia nemophila</i> A. Cunn. ex Vog.		Caesalpiniaceae
<i>Casuarina acutivalvis</i> F. Muell.		Casuarinaceae
<i>C. campestris</i> Diels		"
<i>C. corniculata</i> F. Muell.		"

Species	Coll. No.	Family
<i>Casuarina humilis</i> Otto. and Dietr.		Casuarinaceae
<i>C. microstachya</i> Miq.		"
<i>Chamelaucium ciliatum</i> Desf.		Myrtaceae
<i>C. megalopetalum</i> (Benth.) F. Muell.		"
<i>Choretrum pritzelii</i> Diels		Santalaceae
<i>Chorizema aciculare</i> (DC.) C.A. Gardn.		"
<i>Codonocarpus cotinifolius</i> (Desf.) F. Muell.		Phytolaccaceae
<i>Comesperma calymega</i> Labill.		Polygalaceae
<i>C. volubile</i> Labill.		"
<i>Conospermum distichum</i> R.Br.		Proteaceae
<i>C. teretifolium</i> R.Br.		"
<i>Conostephium drummondii</i> (Stschegl.) C.A. Gardn.		Epacridaceae
<i>C. affin. roei</i> Benth.		"
<i>Conostylis androstemma</i> Lindl. subsp. <i>argentea</i> J.W. Green		Haemodoraceae
<i>C. petrophiloides</i> F. Muell.		"
<i>Cooperhookia strophiolata</i> (F. Muell.) Carolin		Goodeniaceae
<i>Cryptandra glabriflora</i> Benth.		Rhamnaceae
<i>C. polyclada</i> Diels		"
<i>C. pungens</i> Steud.		"
<i>C. tomentosa</i> Lindl.		"
<i>Dampiera eriocephala</i> De Vriese		Goodeniaceae
<i>D. lavandulacea</i> Lindl.		"
<i>D. sacculata</i> (F. Muell.) Benth.		"
<i>D. sp.</i>	401	"
<i>Danthonia setacea</i> R.Br.		Poaceae
<i>Darwinia sp.</i>	422,004	Myrtaceae
<i>Daviesia acanthoclona</i> F. Muell.		Papilionaceae
<i>D. uniflora</i> Herbert		"
<i>D. sp.</i>	401	"
<i>Dianella revoluta</i> R.Br.		Liliaceae
<i>Dodonaea bursariifolia</i> Behr & F. Muell.		Sapindaceae
<i>D. microzyga</i> F. Muell.		"
<i>Drosera macrantha</i> Endl.		Droseraceae
<i>Dryandra erythroclada</i> C.A. Gardn.		Proteaceae
<i>D. ferruginea</i> Kipp		"
<i>D. sp.</i>	305,277	"
<i>Drummondita hasselli</i> F. Muell.		Rutaceae
<i>Duboisia hopwoodii</i> (F. Muell.) F. Muell.		Solanaceae
<i>Enchylaena tomentosa</i> R.Br.		Chenopodiaceae
<i>Eremophila calhorrhabdos</i> Diels		Myoporaceae
<i>E. decipiens</i> Ostf.		"
<i>E. dichroantha</i> F. Muell.		"
<i>E. glabra</i> (R.Br.) Ostf.		"
<i>E. pachyphylla</i> Diels		"
<i>Eriostemon gardneri</i> P.G. Wils.		Rutaceae
<i>E. rhomboideus</i> P.G. Wils.		"
<i>Eucalyptus celastroides</i> Turcz.		Myrtaceae
<i>E. cerasiformis</i> Brooker & Blaxell		"
<i>E. cylindriflora</i> Maiden & Blakely		"
<i>E. deflexa</i> Brooker		"
<i>E. diptera</i> C.R. Andrews		"
<i>E. eremophila</i> (Diels) Maiden		"

Species	Coll. No.	Family
<i>Eucalyptus flocktoniae</i> Maiden		Myrtaceae
<i>E. foecunda</i> Schau.		"
<i>E. gracilis</i> F. Muell.		"
<i>E. incrassata</i> Labill.		"
<i>E. longicornis</i> F. Muell.		"
<i>E. micranthera</i> Benth.		"
<i>E. occidentalis</i> Endl.		"
<i>E. pileata</i> Blakely		"
<i>E. redunca</i> Schau.		"
<i>E. salmonophloia</i> F. Muell.		"
<i>E. transcontinentalis</i> Maiden		"
<i>Exocarpos aphyllus</i> R.Br.		Santalaceae
<i>E. sparteus</i> R.Br.		"
<i>Gahnia ancistrophylla</i> Benth.		Cyperaceae
<i>G. lanigera</i> (R.Br.) Benth.		"
<i>G. polyphylla</i> Benth.		"
<i>Gastrolobium reticulatum</i> (Meisn.) Benth.		Papilionaceae
<i>G. stenophyllum</i> Turcz.		"
<i>Glischrocaryon roei</i> Endl.		Haloragaceae
<i>Goodenia affinis</i> De Vriese		Goodeniaceae
<i>G. incana</i> R.Br.		"
<i>G. watsonii</i> F. Muell. & Tate		"
<i>Grevillea acuaria</i> (F. Muell.) Benth.		Proteaceae
<i>G. concinna</i> R.Br.		"
<i>G. didymobotrya</i> (Endl.) Meisn.		"
<i>G. eriostachya</i> Lindl.		"
<i>G. extorris</i> S. Moore		"
<i>G. huegelii</i> Meisn.		"
<i>G. aff. hookerana</i> Meisn.		"
<i>G. oncogyne</i> Diels		"
<i>G. pauciflora</i> R.Br.		"
<i>G. sp.</i>	248	"
<i>Hakea corymbosa</i> R.Br.		"
<i>H. crassifolia</i> Meisn.		"
<i>H. dolichostyla</i> Diels		"
<i>H. falcata</i> R.Br.		"
<i>H. incrassata</i> R.Br.		"
<i>H. laurina</i> R.Br.		"
<i>H. lissocarpha</i> R.Br.		"
<i>H. multilineata</i> Meisn.		"
<i>H. scoparia</i> Meisn.		"
<i>Halgania andromedifolia</i> F. Muell.		Boraginaceae
<i>H. integerrima</i> Endl.		"
<i>Helichrysum apiculatum</i> (Labill.) DC.		Asteraceae
<i>H. lepidophylla</i> (Steetz.) Benth.		"
<i>Hibbertia exasperata</i> (Steud.) Briq.		Dilleniaceae
<i>H. aff. uncinata</i> (Benth.) F. Muell.	326	"
<i>H. sp.</i>	156	"
<i>H. sp.</i>	271	"
<i>Hybanthus epacroides</i> (C.A. Gardn.) Melchior.		Violaceae
<i>H. floribundum</i> (Walp.) F. Muell.		"
<i>Isopogon attenuatus</i> R.Br.		Proteaceae
<i>I. scabriusculus</i> Meisn.		"

Species	Coll. No.	Family
<i>Isopogon teretifolius</i> R.Br.		Proteaceae
<i>I. sp.</i>	403	"
<i>Lasiopetalum rosmarinifolium</i> (Turcz.) Benth.		Sterculiaceae
<i>Lepidosperma drummondii</i> Benth.		Cyperaceae
<i>L. resinosum</i> (Nees) Benth.		"
<i>Leptospermum erubescens</i> Schau.		Myrtaceae
<i>Leucopogon aff. gracillimus</i> DC.	253	Epacridaceae
<i>L. conostephioides</i> DC.		"
<i>L. fimbriatus</i> Stschegl.		"
<i>Lomandra effusa</i> (Lindl.) Ewart		Xanthorrhoeaceae
<i>Loxocarya cinerea</i> R.Br.		Restionaceae
<i>Lysinema ciliatum</i> R.Br. var. <i>ericoides</i> Ostf.		Epacridaceae
<i>Maireana enchylaenoides</i> (F. Muell.) P.G. Wilson		Chenopodiaceae
<i>Melaleuca acuminata</i> F. Muell.		Myrtaceae
<i>M. cordata</i> Turcz.		"
<i>M. cuneata</i> Turcz.		"
<i>M. cuticularis</i> Labill.		"
<i>M. densa</i> R.Br.		"
<i>M. eleutherostachya</i> F. Muell.		"
<i>M. elliptica</i> Labill.		"
<i>M. leptospermoides</i> Schau.		"
<i>M. pauperiflora</i> F. Muell.		"
<i>M. pentagona</i> Labill.		"
<i>M. scabra</i> R.Br.		"
<i>M. thyoides</i> Turcz.		"
<i>M. uncinata</i> R.Br.		"
<i>M. undulata</i> Benth.		"
<i>M. sp.</i>	413	"
<i>M. sp.</i>	322/333	"
<i>Microcorys aff. tenuifolia</i> Benth.	346	Lamiaceae
<i>Microcybe multiflora</i> Turcz.		Rutaceae
<i>Micromyrtus drummondii</i> Benth.		Myrtaceae
<i>Mirbelia spinosa</i> Benth.		Papilionaceae
<i>Monotaxis grandiflora</i> Endl.		Euphorbiaceae
<i>Muehlenbeckia adpressum</i> (Labill.) Meisn.		Polygonaceae
<i>Myoporum beckeri</i> F. Muell. ex Benth.		Myoporaceae
<i>Neurachne alopecuroides</i> R.Br.		Poaceae
<i>Olax benthamiana</i> Miq.		Olaaceae
<i>Olearia adenolasia</i> F. Muell.		Asteraceae
<i>O. muelleri</i> (Sond.) Benth.		"
<i>O. ramosissima</i> Benth.		"
<i>Opercularia vaginata</i> Labill.		Rubiaceae
<i>Oxylobium reticulatum</i> Meisn.		Papilionaceae
<i>Pelargonium sp.</i>	RJC 803	Geraniaceae
<i>Persoonia tortifolia</i> Meisn.		Proteaceae
<i>P. sp.</i>	173	"
<i>Petrophile ericifolia</i> R.Br.		"
<i>P. seminuda</i> Lindl.		"
<i>P. trifida</i> R.Br.		"
<i>Phebalium filifolium</i> Turcz.		Rutaceae
<i>P. lepidotum</i> (Turcz.) P.G. Wilson		"
<i>P. tuberosum</i> (F. Muell.) Benth.		"
<i>Pimelea suaveolens</i> (Endl.) Meisn.		Thymelaeaceae
<i>P. aff. imbricata</i> R.Br.	186	"

Species	Coll. No.	Family
<i>Pimelea sulphurea</i> Meisn.		Thymelaeaceae
<i>Pittosporum phylliraeoides</i> DC.		Pittosporaceae
<i>Pityrodia terminalis</i> (Lindl.) A.S. George		Chloanthaceae
<i>Platysace effusa</i> (Turcz.) Norman		Apiaceae
<i>P. maxwellii</i> (F. Muell.) Norman		"
<i>Podolepis lessonii</i> (Cass.) Benth.		Asteraceae
<i>Prasophyllum sargentii</i> (Nicholls) A.S. George		Orchidaceae
<i>Prostanthera microphylla</i> (R.Br.) A. Cunn.		Lamiaceae
<i>P. sp.</i>	397	"
<i>Psammomoya choretroides</i> (F. Muell.) Diels & Loes.		Celastraceae
<i>Ptilotus spathulatus</i> (R.Br.) Poir.		Amarantaceae
<i>Pultenaea conferta</i> Benth.		Papilionaceae
<i>P. dasycphylla</i> (Turcz.) C.A. Gardn.		"
<i>Santalum acuminatum</i> (R.Br.) DC.		Santalaceae
<i>Schoenus globifer</i> Nees		Cyperaceae
<i>S. subaphyllus</i> Boeck		"
<i>Sclerolaena diacantha</i> (Nees) Benth.		Apiaceae
<i>Solanum hystrix</i> R.Br.		Solanaceae
<i>Spartochloa scirpoidea</i> (Steud.) C.E. Hubbard		Poaceae
<i>Spyridium sp.</i>	090	Rhamnaceae
<i>Stackhousia brunonis</i> Benth.		Stackhousiaceae
<i>S. huegelii</i> Endl.		"
<i>Stipa elegantissima</i> Labill.		Poaceae
<i>S. scabra</i> Lindl.		"
<i>Stylidium breviscapum</i> R.Br.		Stylidiaceae
<i>S. squamellosum</i> DC.		"
<i>Stypandra imbricata</i> R.Br.		Liliaceae
<i>Synaphea sp.</i>	023,289	Proteaceae
<i>Thomasia sarotes</i> Turcz.		Sterculiaceae
<i>Thryptomene appressa</i> C. Andrews		Myrtaceae
<i>T. australis</i> Endl.		"
<i>T. kochii</i> E. Pritzel		"
<i>Verticordia chrysantha</i> Endl.		"
<i>V. humilis</i> Benth.		"
<i>V. insignis</i> Endl.		"
<i>V. picta</i> Endl.		"
<i>V. roei</i> Endl.		"
<i>Vittadinia sp.</i>	203	Asteraceae
<i>Waitzia aurea</i> (Benth.) Steetz.		"
<i>Westringia affin. dampieri</i> R.Br.		Lamiaceae
<i>W. rigida</i> R.Br.		"
<i>Zygophyllum glaucum</i> F. Muell.		Zygophyllaceae

Total Numbers

species	genera	families
264	113	47