

SOME NATURE RESERVES OF THE WESTERN AUSTRALIAN

WHEATBELT

PART 3 : WONGAN - BALLIDU SHIRE

B.G. MUIR

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Department of Fisheries and Wildli

## SOME NATURE RESERVES OF THE WONGAN-BALLIDU SHIRE

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WESTERN AUSTRALIA

## Preamble

Wongan-Ballidu Shire lies in the north-central wheatbelt and has an area of about 3384 square km. There are 13 Nature Reserves within the Shire, totalling about 12.37 square km or ca 0.4% of the area of the Shire. Of the 13 Nature Reserves within the Shire 11 are less than 200 ha in extent. Four of the Reserves have an "A" classification (A22289, A25808, A27026, and A33530). The remainder enjoy no particular protection and have variable (or no) vestings. The only Reserves previously studied are a brief examination of 23313 (Kenneally, 1977) and of A22289 (A. George, unpublished data).

The current survey took place in March 1978 and consisted of brief examinations of 9 Reserves: 13306, 13494, 17778, A22289, 23313, 23665, 24060, 25984, and 33854. Reports on the Reserves are presented. Methodology of survey is presented in Appendix II.

## Overview

Of the 9 Reserves examined, one was mostly salt flat and one mostly granite outcrop. Both these Reserves did, however, have substantial areas of other associations. All the other Reserves examined were in excellent condition and preserved a wide variety of plant species, associations, and faunal habitats.

There is little doubt that in spite of their small areas, these Reserves, perhaps fortuitously, contain representatives of what must have been typical vegetation in the Wongan-Ballidu Shire prior to clearing for agriculture. This, together with the unusual nature of some of the vegetation found in the area (see Kenneally, 1977) makes all the Nature Reserves in the Shire of great scientific importance and essential strongholds for plant and animal species.

## References

A. GEORGE, botanist, Western Australian State Herbarium.

KENNEALLY, K.F. (coord) (1977). The Natural History of the Wongan Hills.  
West. Aust. Naturalist Handbook No. 11.

Located ca 6 km NE Burakin Siding, and shown on lithograph 65/80, C3.

### Background

Originally set aside 10 March 1911 for "Water" reserve and vested in Minister for Water Supply on 10 May 1912. Converted to "Protection of Native Flora" on 20 June 1930 but not vested.

### Physical characteristics

The Reserve is roughly square, has a perimeter of ca 1.4 km and an area of 16.8931 ha. The reserve is relatively flat, having a difference of only 1 or 2 m between its highest and lowest altitudes. There are spot altitudes of 337 m above sea level (ASL) ca 4 km SW of the Reserve and 314 m ASL 6 km E.

### Vegetation

Three associations are present on the Reserve.

SW corner: Acacia acuminata (Jam) and A. dentifera Low Woodland B on red, heavy clay, poorly drained.

NW corner: Melaleuca uncinata (Broombush) and Acacia Dense Thicket with no understory. Soil reddish yellow, sandy clay, poorly drained.

Eastern woodland: Eucalyptus salubris (Gimlet) Low Forest A with no understory. Soil red, heavy clay, poorly drained.

The most significant feature of the Reserve is the almost total absence of understory species except those very spiny and inedible for sheep. This is emphasised by the presence of abundant Bassia diacantha, B. forrestiana, Enchylaena tomentosa, Eremophila clarkii and Grevillea acuaria on the road verge outside the Reserve. Apparently these species (all palatable) have been completely grazed out by sheep entering from adjacent paddocks.

### Plant species

Thirty-three plant species were recorded on the Reserve, and an additional 5 species on uncleared, adjacent road verge. The Broombush shrubland on the NW corner of the Reserve contains a Baeckea, a Darwinia, an Epacrid and a possible Scholtzia which I have not encountered elsewhere in the wheatbelt.

Eight of the plant species recorded are exploited by the wildflower seed trade.

## Weeds

A single Arctotheca calendula (Cape Weed) and a single Emex australis (Doublegee) plant were noted growing in a rain puddle in the Salmon Gum woodland. No other weeds were noted.

## Fire

No evidence of fire within the last 30 years.

## Fauna

Nankeen Kestrel (Falco cenchroides): one over paddock on W side of Reserve;  
Galah (Cacatua roseicapilla): common in woodland, nest sites noted;  
Boobook Owl (Ninox novaeseelandiae): one flushed from tree and flew N into shrubland on NW corner of Reserve; Wagtail (Rhipidura leucophrys): 2 on SW corner;  
Weebill (Smicrornis brevirostris): common in E. gracilis, E. oleosa trees;  
Chestnut-rumped Thornbill (Acanthiza uropygialis): 1 seen in Eastern woodland;  
Yellow-throated Minor (Manorina flavigula): 1 seen in SW woodland;  
Western Magpie (Cracticus tibicen dorsalis): several seen in woodlands;  
Australian Raven (Corvus coronoides): several seen in woodlands.

## Exotic fauna

Few old rabbit scats seen. Sheep have been in the Reserve in numbers and for some time, although none were present at time of survey.

## Firebreaks and fences

No firebreaks except adjacent to roadway. Narrow firebreaks present in adjacent farmland. Fences substantial on N, W and S sides but totally absent adjacent to Ninghan Location 2325 on the E side. Sheep have been using the Reserve extensively from this side.

## Human usage

Small amount of rubbish dumped; mostly very old. Some timber removed. Sheep grazing extensive.

## Adjacent uncleared land

None, but excellent broad and well vegetated road verges extend to the E and W of the Reserve.

## Opinion and recommendations

The Reserve has been used extensively by the farmer owning Ninghan Location 2325 as a grazing area for sheep. The total absence of even old fence remains indicates that the Reserve has been open for exploitation for some time. There is no trace of where a fence might have originally been. Canopy species show an interesting assemblage of plants and some species which may be unusual. The Reserve is an important nesting and roosting site for birds, particularly migratory species. Additionally, woodlands of any type are scarce on wheatbelt reserves and should be retained wherever possible. I recommend that Reserve 13306 be vested in the Western Australian Wildlife Authority, that signs be erected on the SE and SW corners of the Reserve indicating that it is a Fauna and Flora Reserve, and that action be taken to have the E boundary refenced to allow the undergrowth to regenerate.

## Appendix I

### Vegetation details Reserve 13306

SW corner: Acacia acuminata, A. affin. dentifera trees and shrubs, stratum 2-5 m tall, 10-30% cover. No understory. This association is variable, in some areas being dominated just by A. acuminata, 4-7 m tall and with an understory of Scaevola spinescens and mixed shrubs to 1 m tall, ca 1% canopy cover. There are occasional Eucalyptus salubris to 14 m tall and a small patch of Eucalyptus gracilis and E. oleosa trees to 9 m tall and 30-70% cover. Species recorded were: Alyxia buxifolia, Cheiranthra parvifolia, Hakea decurva, Santalum spicatum and Templetonia sulcata. There are also Acacia colletioides, A. mackayana, Eremophila oppositifolia and Exocarpus sparteus near the trees.

NW corner: Melaleuca uncinata, Acacia filifolia and A. longispinea shrubs, stratum 1.5-3.5 m tall, 70-100% canopy cover. No understory present but scattered shrubs are listed below. Acacia fragilis, Baeckea crispiflora, ?B. robusta, ?Darwinia purpurea, Ecdeiocolea monostachya, Epacridaceae sp. 2, Eremophila drummondii, Hibbertia stricta, Lepidosperma drummondii, ?Scholtzia sp.

Eastern woodland: Eucalyptus salubris trees, immature, stratum 6-9 m tall, 30-70% canopy cover. No understory, but some other plants present. Acacia acuminata, A. colletioides, A. affin. dentifera, A. mackayana, Eucalyptus redunca, E. transcontinentalis, Melaleuca cymbifolia and Scaevola spinescens.

# Reserve 13306

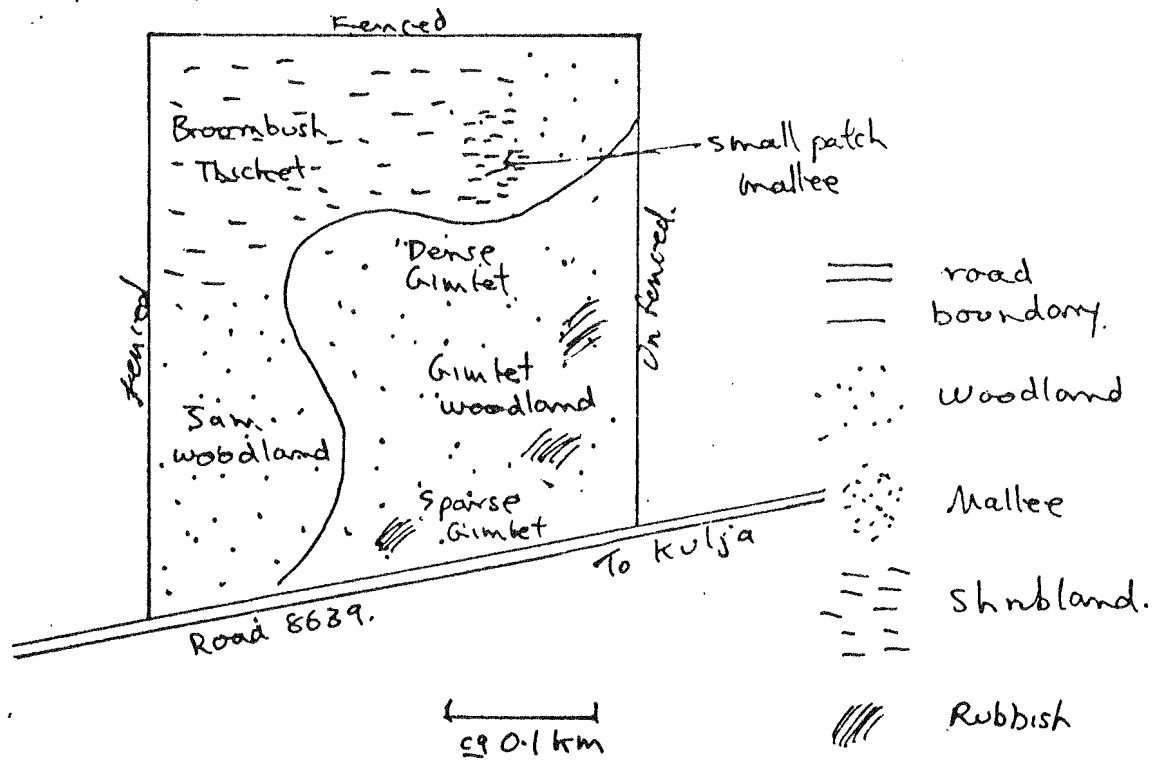


Plate 1 Reserve 13306 looking E from W side of Jam woodland on SW corner of Reserve.

Plate 2 View S from N edge of dense Gimlet stand which passes into sparser Gimlet to SE of Reserve.



Reserve 13494  
Dingo Rock Reserve

Located ca 21 km due E of Wongan Hills Townsite and shown on lithograph 56/80, A3.

### Background

Originally gazetted 16 June 1911 for 'Water' and was 40.49 ha in area. Increased to present area on 5 June 1970 and title changed to "Water and Conservation of Flora and Fauna".

### Physical characteristics

The Reserve is square, 0.63 km on a side and with an area of 63.2322 ha. It comprises a low rounded granite outcrop surrounded, particularly on the E, S, and W sides, by relatively flat areas of granite derived soil. No contour maps or spot altitudes are available but there is probably a difference of 10-20 m between the rock outcrop and the surrounding land.

### Vegetation

Five major associations are present on the Reserve plus numerous variations due to granite exposures and differential runoff. The most important ones are set out below.

Jam woodland: Acacia acuminata (Jam), Open Low Woodland A with scattered Eucalyptus loxophleba (York Gum) trees and no understory but dense cover of everlastings in winter.

Tamma shrubland: two types are present, of similar structure but differing species components. Structure is Casuarina campestris (Tamma) Scrub or Thicket over Dwarf Scrub D or Open Dwarf Scrub C. One association contains a much greater diversity of undershrub species than does the other.

Tamma-bottlebrush shrubland: Tamma and Calothamnus quadrifidus (One-sided Bottlebrush) Scrub over Open Dwarf Scrub over Very Open Low Sedges.

Wattle thicket: Acacia saligna Dense Thicket over Dense Low Heath C. Found in area of excessive runoff from granite.

York Gum woodland: Eucalyptus loxophleba (York Gum) Woodland over patchy areas of Jam Open Low Woodland A.

Granite outcrop: bare rock or pockets of shallow or deep soil with a mosaic of various species. Some parts have scattered Casuarina huegeliana (Huegel's sheoak) or Hakea trees or clumps of shrubs. There are scattered pools of water on the granite area after rain. A small water course near the granite contains Hakea trees over Dense Low Sedges.

Gravel pit: regrowth to 1 m tall on a small gravel pit on the SW corner of the Reserve.

### Plant species

Ninety species were recorded, 12 in Jam woodland, 32 in Tamma shrubland, 16 in Tamma-bottlebrush shrubland, 9 in Wattle thicket, 7 in York Gum woodland, 32 directly on granite and 19 in the gravel pit. Although all the associations contain reasonable numbers of species, the granite and tamma/tamma-bottlebrush shrublands account for the majority of species. Of particular interest is the gravel pit which contained 19 species, 13 of which were not recorded elsewhere on the Reserve. This suggests that disturbances of this nature may encourage establishment of plant species not normally present.

Seventeen of the species recorded are exploited by the wildflower seed trade.

### Weeds

Abundant grass, particularly on W side of Reserve where fertilizer blown from adjacent farmland has encouraged its growth. Also a dense mat of wind-blown wheat stalks to 30 cm deep on W boundary of Reserve. Scattered grass where rubbish is dumped.

### Fire history

Probably no fire for at least 20-30 years.

### Fauna

During this survey the following species were recorded.

Grey Kangaroo (Macropus fuliginosus): 4 seen in Tamma thicket.

Emu (Dromaius novaehollandiae): 2 seen in Tamma thicket on W side of Reserve, at least 1 other heard at NW corner.

Common Bronzewing (Phaps chalcoptera): 1 seen in Wattle thicket.

Crested Pigeon (Ocyphaps lophotes): Several seen on granite area (1 seen drinking at pool) and in Tamma thicket.

Pipit (Anthus novaeseelandiae): common, mostly seen on farm edges.

White-browed Babbler (Pomatostus superciliosus): birds and nests seen in Tamma thickets.

Ornate Dragon (Amphibolurus ornatus): occasional lizard seen on granite area.

A report by a Fisheries and Wildlife fauna warden, T.E. Neal, made on 25 September 1973, lists 10 species of birds and 1 lizard not recorded by me. These were:

Brown Falcon (Falco berigora)

Port Lincoln Parrot (Platycercus zonarius)

Welcome Swallow (Hirundo neoxena)

Red-capped Robin (Petroica goodenovii)

Grey Fantail (Rhipidura fuliginosa)

Willy Wagtail (R. leucophrys)

Pied Honeyeater - this record may be the Pied Honeyeater (Certhionya variegatus) but is very likely to be a mis-identification of the Black Honeyeater (C. niger).

Western Magpie (C. tibicen dorsalis)

Australian Raven (Corvus coronoides)

Bobtail Lizard (Tiliqua rugosa)

#### Exotic fauna

Sheep tracks are present within the Reserve boundary and rabbit scats were recorded.

#### Firebreaks and fences

Firebreaks are present outside the Reserve boundary on the W, N and E sides and tracks inside the fenceline form a fairly effective secondary firebreak although the W side is up to 30 cm deep in dry wheat stooks, creating a major fire hazard. Fences are present on all sides except adjacent to the road (S boundary) which has neither fence nor firebreak.

A picnic area on the SE corner of the granite exposure has no firebreak but numerous tracks would isolate a fire unless severe.

#### Human usage

Rubbish dumps in woodland; mostly farm refuse and fairly old. Broken glass abundant on E side of rock. Barbecues in woodland and on rock edge, and advertised by "Picnic Ground" sign on roadway. Rolls of old fence wire dumped on N boundary. York Gum and Jam posts have been cut from the woodlands.

A small gravel pit on the SE corner of the Reserve was examined by Warden J.E. Neal on 25 September 1973 and was described as being ca 100 m by 180 m by 30 cm deep. This approximates its size when I examined it, about 5 years later. Warden Neal examined the site after being informed that the Public Works Department were to fill the pit and replant natural flora. It was subsequently reported that the pit had been levelled but there was no replanting (5 November 1974). Further examinations on 9 March 1976 showed that natural regeneration had begun, and by 6 July 1976 this had reached 60 cm high. My examination in March 1978 indicates that regeneration is progressing at a rate of about 25 cm/yr but that many of the species present have not been recorded elsewhere on the Reserve.

#### Adjacent uncleared land

Isolated except for a few additional hectares of granite outcrop on the N boundary.

#### Opinion and recommendations

Reserve 13494 shows a very high diversity of formations and associations, considering its size. There is also a particularly high number of plant species. It is of considerable importance as a refuge for fauna, a "stepping stone" for migratory birds and as a seed source and genetic reservoir of plants found in the area.

The picnic area appears to be used extensively by local people and for this reason I suggest that the barbecue area be cleaned up, firebreaks improved and rubbish bins provided (and emptied regularly). The area is attractive and safe for children and so could provide an important recreation area. I see no reason why it shouldn't be retained as such, as impact on the majority of the bushland is minor.

I recommend that Reserve 13494 be vested in the Western Australian Wildlife Authority and that signs be erected near the track into the picnic area to indicate that the fauna and flora is protected. I also recommend that a firebreak of about 20 metres (1 chain) be created on the western boundary of the Reserve and that the fence on that boundary be fitted with rabbit netting wire to restrict wind-blown wheat stooks which are creating a severe fire hazard.

APPENDIX 2  
VEGETATION DETAILS RESERVE 13494

Jam woodland

Acacia acuminata trees, immature to mature, 6-8 m tall, ca 10% canopy cover. Scattered Eucalyptus loxophleba trees and tree mallee, mature to senescent, 10 m tall. No understory present but scattered shrubs and Loxocarya pubescens clumps present, mostly mature or senescent. There would be a very dense cover of Asteraceae during the winter. Other plant species recorded were as follows: Acanthocarpus preissii, Borya nitida, Casuarina campestris, Gnaphalium candidissimum, Harperia lateriflora, Lepidosperma pubisquameum, Santalum spicatum, Stypandra imbricata, Waitzia acuminata. Soil was pinkish yellow, sandy clay loam, poorly drained. Situated on flat area well away from granite.

Tamma shrubland type 1

Casuarina campestris, shrubs, senescent, stratum 2-4 m tall, 10-30% canopy cover (locally up to 70%) over sedges and mixed shrubs, mature-senescent, 0.5m tall, 10-30% canopy cover. Other species recorded were as follows: Acacia lasiocalyx, A. restiacea, Borya nitida, Calothamnus quadrifidus, Conostylis aculeata, Darwinia sp. 7., Ecdeiocolea monostachya, Hibbertia affin. glomerosa, Lepidosperma drummondii, Leptospermum erubescens, Melaleuca scabra, Persoonia striata, Santalum acuminatum, Verticordia sp. Soil is pale brown, fine sandy loam.

Some areas which receive maximum runoff from the granite outcrops have the C. campestris, 1.5-2.5 m tall, and 70-100% canopy cover with no understory.

Tamma shrubland type 2

Casuarina campestris shrubs, senescent, stratum 1.5-3.5 m tall, 30-70% canopy cover over mixed shrubs 1 m tall, 2-10% canopy cover. Other species recorded are listed below: Acacia acuaria, A. acuminata, A. filifolia, A. multispicata, Baeckea muricata, B. sp. 8, Calothamnus quadrifidus, Dianella revoluta, Ecdeiocolea monostachya, Eucalyptus loxophleba, Grevillea eriostachya, G. petrophiloides, Hakea falcata, H. subsulcata, Melaleuca platycalyx, Persoonia coriacea, Petrophile shuttleworthiana, Platysace maxwellii, Schoenus compressus. Soil was yellow, sandy loam, poorly drained.

### Tamma-bottlebrush shrubland

Casuarina campestris and Calothamnus quadrifidus shrubs, mature, stratum 1.5-4 m tall, 10-30% canopy cover over mixed shrubs, senescent, stratum 1 m tall, 2-10% canopy cover over Ecdeiocolea monostachya sedge, senescent, stratum 30 cm tall, 2-10% canopy cover. Other species recorded are listed below:

Acacia saligna, Baeckea crispiflora, Cassytha racemosa, Conospermum stoechadis, Daviesia aphylla, Dianella revoluta, Keraudrenia integrifolia, Melaleuca fulgens, M. spathulata, Persoonia coriacea, P. striata, Platysace maxwellii, Verticordia brownii. Soil is yellow brown, fine sandy loam, well drained, but receives a good deal of runoff.

### Wattle thicket

Acacia saligna shrubs and trees, mature to senescent, stratum 2-8 m tall, 70-100% canopy cover over Hypocalymma angustifolium, Acacia affin. restiacea, and Thomasia affin. tenuivestita shrubs, senescent, 1 m tall, 70-100% canopy cover. Other species recorded were: Hibbertia sp. Jacksonia furcellata, Keraudrenia integrifolia, Muhlenbeckia adpressa, Spartochloa scirpoidea. Situated in area of extremely high runoff.

### York Gum woodland

Eucalyptus loxophleba trees and tree mallee, mature to senescent, stratum 8-16 m tall, 10-30% canopy cover over Acacia acuminata, immature to mature, stratum 4-7 m tall, 2-10% canopy cover but of patchy distribution. Other species recorded were: Bassia diacantha, Dianella revoluta, Lomandra effusa, Rhagodia preissii and Santalum spicatum. Soil was reddish yellow, sandy clay, poorly drained.

### Granite outcrop

The granite could be divided into 4 areas; bare rock with pools after rain; shallow soil pockets; deep soil pockets and tumbled boulders on deep soil; watercourses.

The bare rock areas had only lichens, mostly Parmelia sp. or mosses (Grimmia sp.) and very shallow soil pockets of Borya nitida or tufts of grass, mostly Enneapogon caerulescens or Amphipogon debilis. Shallow pools formed in several areas after rain and one of these contained a good growth of Isoetes sp.

Shallow soil pockets contained scattered shrubs, including Astroloma serratifolium, Borya nitida, Casuarina campestris, Dodonaea attenuata, Gastrolobium callistachys, Hibbertia affin. glomerosa, Kunzea pulchella, Lepidosperma drummondii.

Deeper soil pockets and tumbled boulder areas contained: Acacia lasiocalyx, A. saligna, Borya nitida, Calothamnus quadrifidus, Cassytha racemosa, Casuarina campestris, C. huegeliana, Darwinia sp. 7, Dianella revoluta, Dodonaea attenuata, Gastrolobium callistachys, Glischrocaryon flavescens, Grevillea paniculata, Hakea

petiolaris, Kunzea pulchella, Lepidosperma drummondii, L. gracile, L. tenue, Muhlenbeckia adpressa, Platysace maxwellii, Stypandra imbricata, and Thomasia tenuivestita. In some areas canopy cover exceeded 2% and became small pockets of woodland. One such area was Hakea petiolaris and Casuarina campestris trees, senescent, stratum 4-10 m tall, 10-30% canopy cover over a scattered shrub and sedge understory.

Water courses were mostly broad and produced a fairly large area of dense vegetation e.g. Wattle thicket. Other water courses were narrow and of restricted area. One such site had Hakea petiolaris trees, stratum 2-12 m tall and 70-100% cover but only ca 20 m in diameter. Beneath these trees and surrounding them was an area of Lepidosperma gracile sedge 0.5 m tall, 70-100% cover and ca 80 m diameter. Other species collected here were: Glischrocaryon flavescens, Grevillea paniculata, Hibbertia sp., Melaleuca lateriflora, Olearia muricata, Stipa elegantissima, and Thomasia tenuivestita.

#### Gravel pit regrowth

Area ca 100 x 180 m and 30 cm deep. Soil ripped but no topsoil replaced. Several species were recorded as regrowth, the tallest of which reached 1 m. Acacia acuaria, A. assimilis, Astroloma serratifolium, Brachysema daviesioides, Cassytha pubescens, Casuarina campestris, Cryptandra leucophracta, Dampiera juncea, D. spicigera, Dodonaea caespitosa, Family indeterminate 15, Gahnia polyphylla, Grevillea paradoxa, Guichenotia sarotes, Hibbertia verrucosa, Isopogon scabriusculus, Melaleuca platycalyx, Rulingia affin. cuneata, and Scholtzia parviflora.

# Reserve 13494

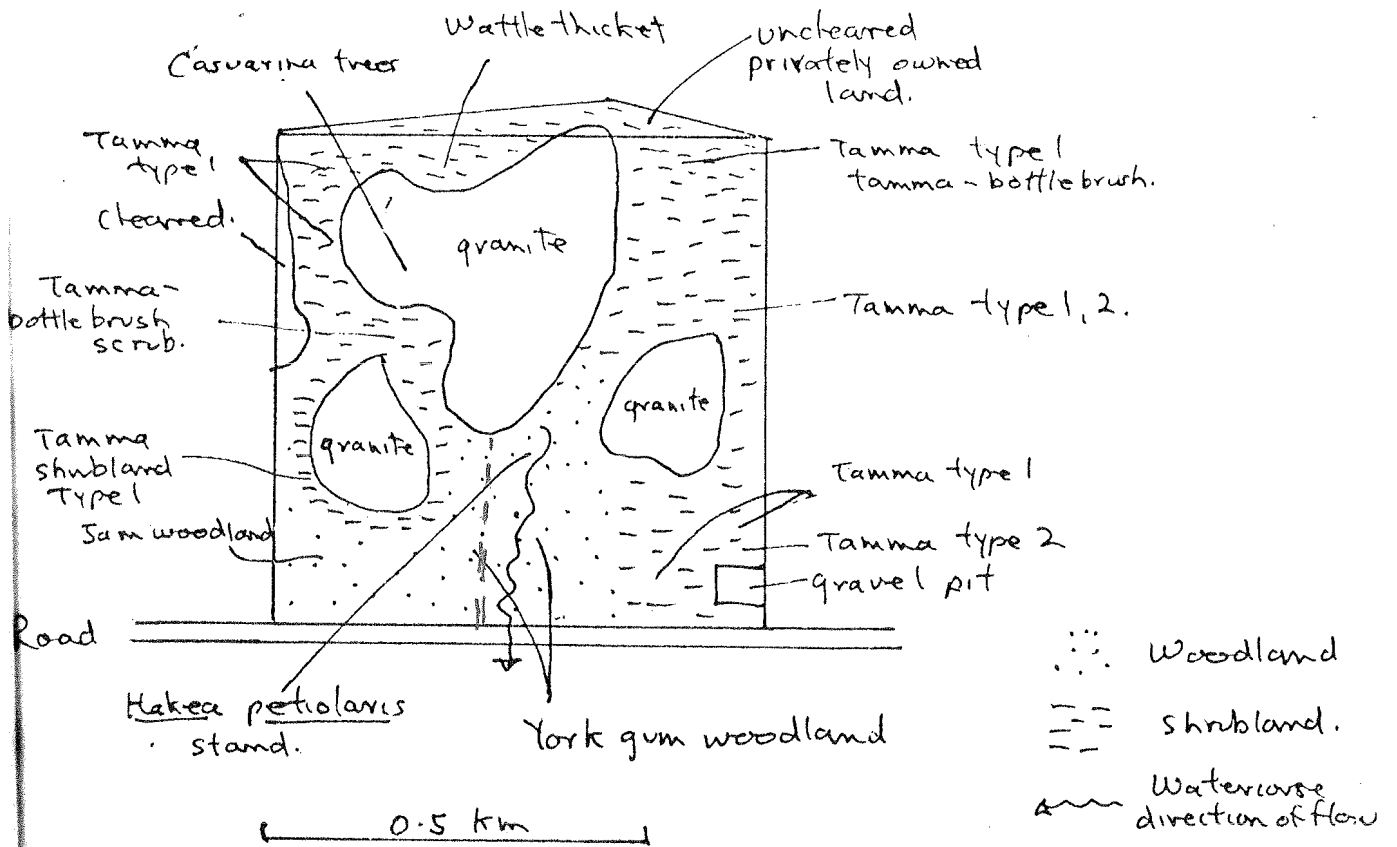




Plate 3 Reserve 13494. View NE from SW corner of Reserve showing Jam woodland with scattered York Gum trees. Scattered clumps of sedge are present.

Plate 4 Reserve 13494. View NE across Tamma (type 1) shrubland to She-oak and Hakea trees on granite outcrop.

Plate 5 Reserve 13494 showing Wattle thicket. Note dense understory as well as dense canopy. View S from N boundary of Reserve.

Plate 6 Reserve 13494. View E from W margin of York Gum woodland.

## Reserve 17778

Located ca 11 km NE Kondut and shown on lithograph 57/80, F1.

### Background

Reserve 17778 was originally gazetted on 12 August 1921 for "Recreation" and had an area of about 18 ha. This was decreased to ca 16 ha on 3 October 1952 and on the same date regazetted for "Conservation of Flora". The Reserve was then further decreased to 11.8700 ha on 15 June 1962.

### Physical characteristics

Reserve 17778 is roughly 'L' shaped (see map) and is contiguous to two other reserves, 16264 (Water) and 23610 (Gravel). Reserve 17778 is 11.8700 ha in area, 16264 is 3.2389 ha in area, and 23610 is 7.7321 ha in area. The total area of bushland is thus 22.8410 ha and has a perimeter of ca 1.6 km. There are no contour maps of the area available but an altitude of 303 m above sea level is given for a point just E of the Reserve. The Reserve is fairly flat.

### Vegetation

Six associations were noted on 17778, and another on 23610. It is pointless to divorce the 3 Reserves in terms of conservation value and so all have been considered in this report.

Briefly the vegetation is as follows:

Association 1: Broombush Thicket over M. cordata Dwarf Scrub C;

Association 2: Wattle-Broombush Dense Low Forest A over Open Dwarf Scrub C;

Association 3: Tamma-Hakea Scrub over Low Heath D;

Association 4: Black Marlock Very Open Shrub Mallee over Broombush Scrub over Open Dwarf Scrub C;

Association 5: Red-flowered Mallee Low Woodland A with understory either absent or Melaleuca undulata Heath B;

Association 6: Eucalyptus transcontinentalis Open Shrub Mallee over Open Low Scrub B over Dense Low Heath C;

Association 7: Hakea Scrub over Low Heath D.

### Plant species

Sixty-one plant species were found to be present on Reserve 17778 and its two adjacent Reserves 16264 and 23610. Additionally, one species, Brachychiton diversifolia, is introduced from Eastern Australia. Thirteen of the species recorded on the Reserves are exploited by the wildflower seed trade.

## Weeds

The tank-stand area has abundant Arctotheca calendula (Cape Weed) and Cucumis myriocarpus (Paddy Melon).

## Fire history

No evidence of fire within last 20-30 years.

## Fauna

Weather very hot and still; mid-afternoon, so very little seen. Species noted were: Mulga Parrot (Platycercus varius); Pipit (Anthus novaeseelandiae); White-browed Babbler (Pomatostomus superciliosus); Magpie-lark (Grallina cyanoleuca); Western Magpie (Cracticus tibicen dorsalis).

## Exotic fauna

Rabbits are present in small numbers. Scats were mostly old and warrens disused.

## Firebreaks and fences

No firebreaks except in adjacent paddocks. Fences only on W, S and E sides; in good condition. North side is bounded by roadway.

## Human usage

Very little rubbish is dumped on 17778 but there is considerable dumping, mostly farm refuse, around the gravel pit on 23610 and the tank stand on 16264. The tank-stand area and gravel pits are, of course, cleared of natural bush except for some regeneration. Neither appear to have been used for some time.

## Adjacent uncleared land

None: even connecting road verge vegetation is absent.

## Opinion and recommendations

Although of small area, Reserve 17778 is relatively undisturbed and has a good diversity of associations and plant species. Most of the damage from rubbish dumping and gravel removal is restricted to its adjacent reserves, 16264 and 23610, which are easily accessible from the road. This has meant the Flora Reserve has been little despoiled. The isolation of Reserve 17778 from other bushland makes it important as a representative of the vegetation of the region and extremely important as a rest site for migrating birds. Official inclusion of

Reserves 16264 and 23610 with the Flora Reserve would effectively double its area and offer some protection to the flora and fauna of the two smaller Reserves, particularly as both appear to be little used for water or gravel.

I recommend that action be taken to offer greater protection to Reserves 16264 and 23610. I also recommend that Reserve 17778 be vested in the Western Australian Wildlife Authority.

APPENDIX 3  
VEGETATION DETAILS RESERVE 17778

Association 1

Melaleuca uncinata and some Acacia resinomarginea trees, mature, 2-3.5 m tall, 30-70% canopy cover over M. cordata shrubs, mature, 0.5-1.0 m tall, 10-30% canopy cover. Other species recorded were as follows: Acacia chrysella, A. dielsii, Baeckea heteranthera, B. sp., Casuarina acutivalvis, Dianella revoluta, Ecdeiocolea monostachya, Hakea falcata, Isopogon scabriusculus, Santalum acuminatum, Stipa elegantissima, Trichoryne elatior.

Association 2

Acacia resinomarginea, Melaleuca uncinata and Hakea coriacea trees, mature 6-8 m tall, ca 90% canopy cover over M. cordata and mixed shrubs, mature, 1 m tall, ca 2% canopy cover. This area is tall and dense due to effects of superphosphate blown into the Reserve from farmland to the west. Other species recorded were as follows: Acacia affin. fauntleroyi, A. fragilis, A. multispicata, Avena fatua sativa, Baeckea muricata, Bertya cunninghami, Brachysema tomentosum, Cassytha pubescens, Ehrahta longiflora, Hakea falcata, Hybanthus floribundus, Melaleuca affin. ciliata, Stipa elegantissima.

Association 3

Casuarina campestris and Hakea sulcata shrubs, mature, 2-3 m tall, 10-30% canopy cover over Melaleuca oldfieldii, 0.5 m tall, 30-70% canopy cover. Other species recorded were as follows: Acacia dielsii, A. resinomarginea, Baeckea crispiflora, B. heteranthera, Cassytha sp., Ecdeiocolea monostachya, Gahnia polyphylla, Grevillea paradoxa, Hakea subsulcata, Hibbertia verrucosa, Leucopogon hamulosus, Melaleuca platycalyx, Petrophile incurvata, Schoenus affin. compressus, Stipa elegantissima, S. hemipogon.

Association 4

Eucalyptus redunca shrub mallee, mature, 4-7 m tall, 2-10% canopy cover over Melaleuca uncinata shrubs, mature, 2-3 m tall, 10-30% canopy cover over Acacia mackayana shrubs, mature to senescent, 1 m tall, 2-10% canopy cover. Other species recorded were: Acacia graffiana, Eucalyptus oleosa, Melaleuca acuminata, M. adnata, Olearia muelleri.

#### Association 5

Eucalyptus erythronema trees, mature, 6-8 m tall, 10-30% canopy cover with scattered E. transcontinentalis. No understory. In some areas the trees are less mature, 30-70% cover over an understory of Melaleuca undulata 1.5 m tall, 30-70% cover. Other species recorded were: Acacia sp. 7, Eremophila drummondii, Melaleuca adnata, Olearia muelleri and Stipa elegantissima.

#### Association 6

Eucalyptus transcontinentalis shrub mallee, 4-9 m tall, 10-30% canopy cover over Melaleuca adnata and Grevillea huegellii shrubs, 1-1.5 m tall, 2-10% canopy cover over M. undulata shrubs, 1 m tall, 70-100% canopy cover. Other species recorded were Acacia mackayana, A. sp. 7, Daviesia nematophylla, Eucalyptus foecunda, and Stipa elegantissima. A specimen, possibly planted or arising from dumped garden refuse, of Brachychiton diversifolia was noted.

#### Association 7

Hakea subsulcata shrubs, mature, 2-3 m tall, 10-30% cover over Melaleuca oldfieldii shrubs, mature, 0.5 m tall, 30-70% canopy cover. Scattered Actinoscrobis arenarius to 6 m tall. Other species recorded were Baeckea heteranthera, Borya nitida, Gahnia polyphylla, Isopogon scabriusculus, Petrophile incurvata, P. shuttleworthiana, Solanum hystrix and Stipa elegantissima.

Regrowth in gravel pit contained the following species: Astroloma serratifolium, Casuarina acutivalvis, C. corniculata, Cryptandra leucophracta, Grevillea paradoxa, Leucopogon hamulosus, Melaleuca uncinata.

A small gravel scrape on the SE corner of the Reserve had Baeckea muricata regrowth to 30 cm tall, 10-30% cover. No other species were noted.

A disturbed area around an old tank stand on Reserve 16264 has a dense stand of Hakea coriacea, Acacia resinomarginea and Melaleuca uncinata shrubs and trees to 6 or 8 m tall, 70-100% canopy cover. This is probably due to excessive runoff, removal of competition or some other influence of the adjacent clearing.

Reserve 17778.

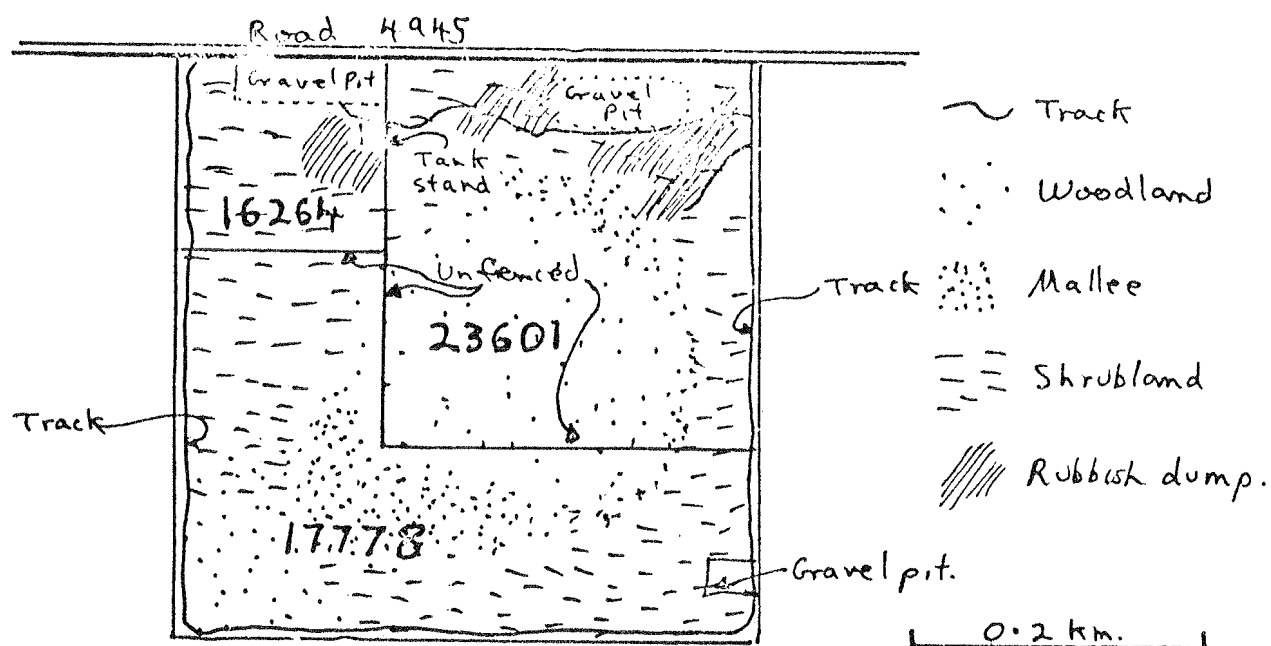




Plate 7 Melaleuca uncinata (Broombush) shrubland on the W side of Reserve 17778.  
View E.

Plate 8 Eucalyptus erythronema (Red-flowering Mallee) stand in the middle of  
Reserve 17778. View N from S end of stand.

Reserve 22289  
Reynoldson's Flora Reserve

Located ca 15 km NE Wongan Hills Townsite and shown on lithograph 57/80, E2.

#### Background

Originally part of Ninghan Location 3778 (3800) and donated by W.C. Reynoldson to the Wongan-Ballidu Roads Board in 1941. The land was officially vested in the Roads Board in November 1941 as an 'A' Class Reserve for the 'Protection of Flora'. It was enlarged to ca 20 ha in 1962 with the addition of Ninghan Location 4091.

#### Physical characteristics

The Reserve is linear, oriented roughly ~~NE-SW~~ and is 20.0775 ha in area. It is ca 1.5 km long by ca 15 m wide at its northern end and ca 60 m wide at its southern. There are no contour maps or spot altitudes available. The Reserve is on the top of a low hill, the highest point being near its southern end, with a gentle downhill slope towards the north.

#### Vegetation

Only three major associations are present, the northern (narrow) portion of the Reserve being largely destroyed by clearing and gravel removal. The southern portion of the Reserve has: White Mallee and Oil Mallee Open Shrub Mallee over Baeckea sp. Dwarf Scrub D; the highest portion has Acacia and Grevillea Open Scrub over Melaleuca and Verticordia Low Heath D; and the northern end Verticordia Dense Low Heath C.

Of particular interest is a comparison between the vegetation of the Reserve, which is relatively untouched, and that of the adjacent uncleared land which is frequently rolled or burnt to "encourage the wildflowers". This management policy is carried out on the adjacent land (by the farmer) to promote better flowering, the area being somewhat of a local tourist attraction. The table below indicates the major differences between the Reserve and immediately adjacent burnt areas.

Location	Southern portion		Highest point		Northern portion	
	Reserve	Adjacent	Reserve	Adjacent	Reserve	Adjacent
Dominant in stratum 1	2 spp mallee	<u>Acacia chrysella</u>	<u>Acacia + Grevillea</u>	<u>Acacia + Grevillea</u>	<u>Verticordia</u>	<u>Acacia chrysella</u>
Dominant in stratum 2	<u>Baeckea</u> sp. 8	<u>Verticordia</u> <u>Monodelpha</u>	<u>Melaleuca</u> <u>Verticordia</u>	<u>Verticordia</u> <u>Baeckea</u>	-	<u>Verticordia</u>
Total plant species recorded	18	10	17	9	14	8
Canopy cover of <u>Verticordia</u> stratum	10-30% but <u>Verticordia</u> sparse	30-70%	30-70%	10-30%	70-100%	30-70%

Several points of interest become apparent from this table. Primarily these are:

1. frequent burning has encouraged Acacia chrysella to dominate the association;
2. fire encourages Verticordia to become dominant in stratum 2;
3. at all sites the number of plant species has been reduced by about 55% by frequent burning;
4. in 2 of the 3 sites the Verticordia stratum has lower canopy cover than that in the unburnt area.

It is clear from this data that the policy of frequent burning has encouraged Acacia chrysella to the point where it may be excluding other species; that it has severely reduced the number of plant species being preserved; and that although it encourages the dominance of Verticordia over other species it is also reducing the number of individual Verticordia plants. The burning policy is thus detrimental to the vegetation rather than improving it.

#### Plant species

Twenty-eight species were recorded on the broad, southern portion of Reserve 22289, and another 9 species on the narrow northern portion, making a total of 37 species for the whole Reserve. Five species are exploited by the wildflower seed trade.

#### Weeds

The only weed species recorded was Solanum hystrix (Afghan Thistle) which is abundant in the disturbed areas of gravel and sand pits.

## Fire history

Reserve not burnt for many years. Adjacent uncleared land burnt frequently.

## Fauna

Fresh kangaroo scats were noted. White-backed Swallow (Cheramoeca leucosterna) nests in sand pit; Pipit (Anthus novaeseelandiae); Willy Wagtail (Rhipidura leucophrys); White-browed Babbler (Pomatostomus superciliosus); Black-faced Wood Swallow (Artamus cinereus).

## Exotic fauna

Fresh rabbit scats were present. A dog or dingo skull was recorded.

## Firebreaks and fences

Refer to vegetation map for position of firebreaks. No fences except around sand pit on S end of Reserve.

## Human usage

Gravel and sand pits have destroyed the majority of the vegetation on the narrow northern portion of Reserve 22289 and some of the S end. A pipeline along the W side of the Reserve has taken up a considerable width of the vegetation adjacent to the road. Fire management policies exercised in adjacent uncleared land may have affected the Reserve's flora in some way.

## Adjacent uncleared land

Portion of Ningham Location 3778 remains uncleared (refer management discussion under 'Vegetation' above). N end of narrow portion abutts edge of extensive salt marsh.

## Opinions

Although of small area Reserve 22289 is valuable as a representative of sand plain vegetation E of Kondut. It is also a local tourist attraction and an interesting contrast to the adjacent frequently burnt, privately owned land. The Reserve is already "A" class but is currently vested in the Local Authority. I recommend this vesting be changed to the Western Australian Wildlife Authority and that action be taken to rehabilitate, if possible, the sand and gravel pit areas. This could be accomplished by reducing the steepness of banks around the pits and replacing topsoil which is heaped nearby.

APPENDIX 4  
VEGETATION DETAILS RESERVE 22289

Southern end

Eucalyptus albida and E. oleosa var. planissima shrub mallee, immature, stratum 2-5 m tall, 10-30% canopy cover over Baeckea sp. 8, mature, stratum 0.5 m tall, 10-30% canopy cover. Acacia chrysella is clumped to 5% canopy cover in places. Other species recorded were as follows: Acacia multispicata, Beaufortia micrantha, B. squarrosa, Cassytha pubescens, Casuarina acutivalvis, Gahnia polyphylla, Grevillea armigera, Hakea falcata, Jacksonia furcellata, Leptospermum erubescens, Melaleuca cordata, Stipa elegantissima, Verticordia brownii, V. monodelpha. Soil is yellow, fine sandy loam, well drained.

Highest point

Acacia chrysella and Grevillea armigera shrubs, mature, 4 m tall, 2-10% canopy cover over Melaleuca cordata, Verticordia monodelpha 0.5 m tall, 30-70% canopy cover. Other species also recorded were as follows. Acacia comans, A. filifolia, Baeckea sp. 8, Beaufortia micrantha, Burtonia gompholobioides, Casuarina acutivalvis, Conospermum triplinervum, Gahnia polyphylla, Hibbertia huegellii, Melaleuca cordata, Persoonia saundersiana, Stipa elegantissima, Verticordia drummondii. Soil is yellow, fine sandy loam, well drained.

North end broad portion

Verticordia brownii, 1 m tall, 70-100% canopy cover. Scattered Grevillea armigera present to 3% canopy cover in some areas. Other species recorded were: Acacia chrysella, A. comans, A. filifolia, Actinostrobos arenarius, Baeckea sp. 8, Cassytha pubescens, Cryptandra myriantha, Leptospermum erubescens, Stipa compressa, S. elegantissima, Verticordia brownii, V. monodelpha. Soil is yellow, fine sandy loam.

Narrow portion southern end

Mostly sand pit or regrowth following clearing. Very little vegetation except Verticordia monodelpha with scattered Acacia chrysella or Casuarina acutivalvis.

Narrow portion - remainder

Gravel pit and disturbed areas with patchy regrowth of Acacia insolita, Baeckea muricata, Brachysema daviesioides, Cryptandra myriantha, Daviesia preissii, Dodonaea bursariifolia, Eucalyptus albida, Glyschrocaryon flavescens, Hakea falcata, Platysace maxwellii, Rhagodia nutans, Solanum hystrix.

APPENDIX 5  
VEGETATION DETAILS OF UNCLEARED LAND  
ADJACENT TO THE SOUTHERN PORTION OF RESERVE 22289

Adjacent to 'Southern end'

Scrub rolled and frequently burnt. Acacia chrysella shrubs, immature, 3 m tall, 2-10% canopy cover over Verticordia monodelpha shrubs, immature, 0.5 m tall, 30-70% canopy cover. Other species recorded were: Baeckea sp. 8, Casuarina acutivalvis, Enneapogon caerulescens, Grevillea armigera, Leptospermum erubescens, Verticordia brownii, V. drummondii, V. sp.

Adjacent to 'Highest point'

Acacia chrysella or Grevillea armigera shrubs, immature, 4 m tall, 2-10% canopy cover over Verticordia monodelpha, Baeckea sp. 8 and mixed shrubs, 1 m tall, 10-30% canopy cover. Other species recorded were Acacia lasiocalyx, Eucalyptus albida, Stipa elegantissima, Verticordia drummondii, Xylomelum angustifolium.

Adjacent to 'North end broad portion'

Acacia chrysella shrubs, immature, 5 m tall, ca 2-3% canopy cover over Verticordia monodelpha 1m tall, 30-70% canopy cover. Scattered Eucalyptus albida or E. oleosa var. planissima mallee to 10 m tall. Other species recorded were Acacia filifolia, A. lasiocalyx, Grevillea armigera, and Verticordia brownii.

Reserve 22289

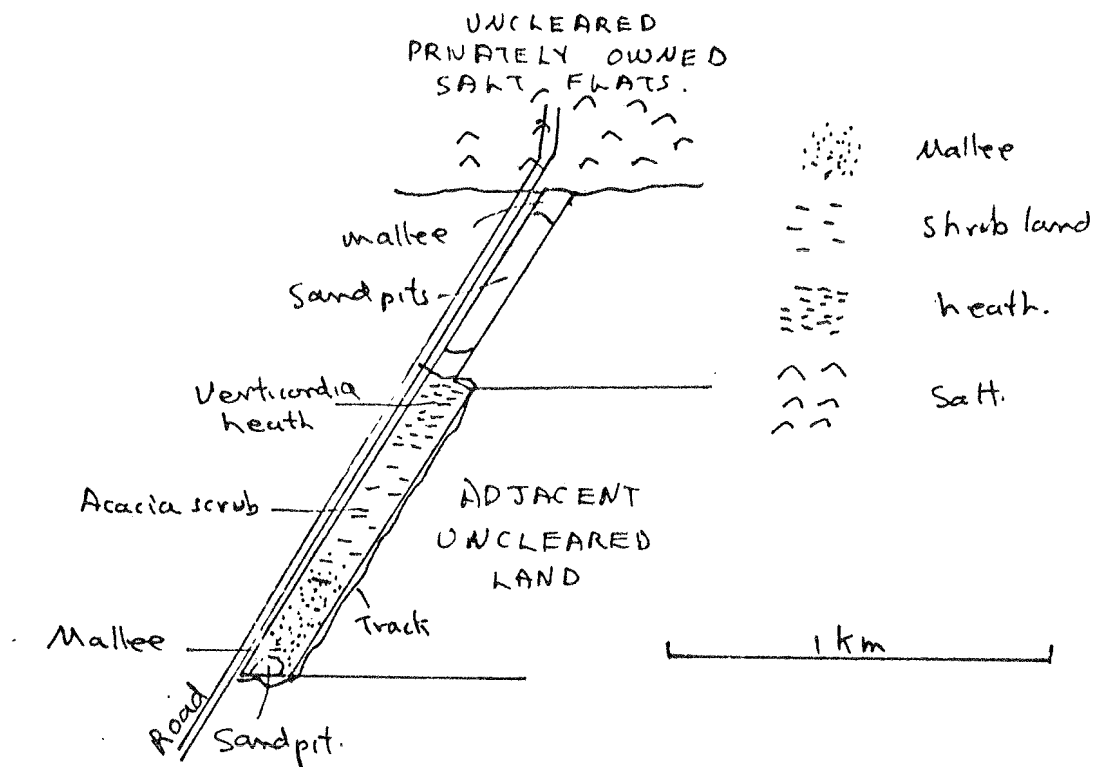




Plate 9 Reserve 22289 looking N from S end of Reserve. Vegetation is that described as "Southern end".

Plate 10 View E from S end of Reserve 22289. Vegetation is that on adjacent uncleared land which has a management policy of frequent burning. Contrast this vegetation with that shown in Plate 9 above.

Plate 11. View N across Verticordia heath of "North end, broad portion" on Reserve 22289.

Reserve 23313  
Mortlock Creek Flora Reserve

Located ca 15 km NW of Wongan Hills Townsite and shown on lithograph 57/80, C-D/2.

### Background

Originally gazetted 5 October 1951 for "Protection of Flora".

### Physical characteristics

Reserve 23313 is rectangular, 115.9854 ha in area, 1.82 km long (E-W axis) by 0.42 km ~~wide~~, thus having a total perimeter of ca 2.24 km. No contour map is available of the area and there are no spot altitudes near the Reserve. The salt complex area is flat with very low shrubby rises; the Banksia sandplain is probably up to 10-15 m above the salt flat at its highest point.

### Vegetation

The vegetation of Wongan Hills and Mortlock Creek has been dealt with by Kenneally (1977). During my 1978 survey 5 associations were noted.

Banksia sandplain: Banksia prionotes (Acorn Banksia) Thicket with scattered Xylomelum angustifolium (Woody Pear) emergents. An understory of Open Low Scrub B was present;

Salt flat: Samphire flats ranging from bare ground to Low Heath D;

York Gum Fringe: narrow belt on edge of Reserve with York Gum Open Woodland over mixed Scrub over mixed Low Heath D. This association passes into scattered She-oak trees over Acacia and samphire closer to the salt lake margin.

M. eleutherostachya shrubland: Melaleuca eleutherostachya Thicket, regrowing, possibly following drought death of above ground portions in recent times.

Dunes around lakes: bare salt lakes with low dunes on the southern and eastern sides, usually with stands of mallee of varying density and understories of low shrubs.

### Plant species

I recorded 67 species on Reserve 23313, 17 of which are exploited by the wildflower seed trade. Kenneally (1977) in his more detailed study mentions 38 species (mostly annuals) not recorded by me.

## Weeds

None recorded except for occasional Ursinia anthemoides on the dunes.

## Fire history

No evidence of fire but the Banksia sandplain may have been burnt within the last 30 years.

## Fauna

Grey kangaroo (Macropus fuliginosus) several seen including 2 females with joey at heel; Willy Wagtail (Rhipidura leucophrys) common; White-browed Babbler (Pomatostomus superciliosus) in Banksia sandplain; Yellow-throated Miner (Manorina flavigula) in York Gum; White-fronted Chat (Epthianura albifrons) on salt flat and in York Gum.

## Exotic fauna

Sheep footprints were noted on the salt lake. Rabbit and fox scats were noted in the Banksia area.

## Firebreaks and fences

No firebreaks except in paddocks. Fenced on all sides, in good condition but kangaroos have dug beneath the fence in several places, particularly the northern boundary.

## Human usage

None - possibly timber removed on S side of Reserve.

## Adjacent uncleared land

Salt lake system runs to N and SE of Reserve. Area of 1000+ ha, mostly salt flat, contiguous with the northern boundary. This area also contains Banksia sandplain and Mallee dunes.

## Opinion and recommendations

Reserve 23313 is part of a region of vegetation assemblages unusual in the wheatbelt (Kenneally 1977) and known to contain some species of disjunct distribution, or at the limit of their known range. It is therefore essential that the few remaining areas of native vegetation found on or near the Wongan Hills be preserved. I feel effort should be made to include the parts of Melbourne location 3094 which have not been cleared for agriculture, as this would greatly enhance the value of the Reserve. I also recommend that Reserve 23313 be reclassified

as "A" class and be vested in the Western Australian Wildlife Authority.

#### Reference

KENNEALLY, K.F. (Co-ord) (1977). The Natural History of Wongan Hills.  
West. Aust. Nat. Club. Hdbk 11.

APPENDIX 6  
VEGETATION DETAILS RESERVE 23313

Banksia sandplain: Banksia prionotes trees, immature, 1.5-3 m tall, 30-70% canopy cover with emergent Xylomelum angustifolium trees and Casuarina campestris shrubs to 5 m tall. A second stratum was present and comprised Petrophile ericifolia, Melaleuca cordata, and several other shrubs, 0.5-1.5 m tall, 2-10% canopy cover. Beneath this stratum is Baeckea sp. 0.5 m tall, ca 1-2% cover. Other species recorded were as follows: Acacia saligna, A. sp., Actinostrobos arenarius, Conospermum stoechadis, Dianella revoluta, Ecdeiocolea monostachya, Eremaea pauciflora, Grevillea armigera, Hakea circumalata, H. platysperma, Jacksonia sp., Melaleuca subtrigona, M. sp., Persoonia coriacea, Petrophile drummondii, Plectrachne danthonioides, Scholtzia drummondii, Synaphaea sp., Verticordia brownii, V. sp.

Salt flat: Arthrocnemum species, 0.5 m tall, variable from bare to ca 70% canopy cover. Scattered clumps of Melaleuca uncinata shrubs to 3 m tall on fringes. Species recorded were: Arthrocnemum halocnemoides, A. pergranulatum, and A. lepidospermum.

York Gum fringe: Eucalyptus loxophleba trees, mature, 8-24 m tall, 2-10% canopy cover and scattered along fenceline. Understory of Pittosporum phylliraeoides, Hakea preissii and Templetonia sulcata shrubs, senescent, 3 m tall, 10-30% canopy cover over Rhagodia nutans, Atriplex paludosa graciliflora and Acacia latipes 0.5 m tall, variable but up to 30-70% canopy cover. Eastern end of the association has some Eucalyptus gracilis, E. salubris and Melaleuca cymbifolia. On the margins of the salt flat, between it and the York Gum, is a band of Casuarina obesa trees, 8 m tall and scattered over Acacia latipes and some Arthrocnemum spp. to 30-70% canopy cover. Other species recorded were as follows: York Gum area - Acacia eremaea, Bassia affin. diacantha, Hakea preissii, Rhagodia nutans and Sclerostegia moniliformis.

M. eleutherostachya shrubland: Melaleuca eleutherostachya shrubs, 5 m tall, 30-70% canopy cover over Daviesia acanthoclona 0.5 m tall, 2-10% canopy cover but patchily distributed. Most of the association was dead or with regrowth from rootstocks to 0.5 m tall. No signs of fire; regrowth is presumably following death from drought, the two years prior to this survey being particularly dry. Other species recorded were: Acacia acuminata, Anthotroche sp., Argyrolottis turbinatus, Atriplex paludosa graciliflora, Bassia affin. diacantha, Eremophila brevifolia, Eucalyptus sp., Glischrocaryon flavescens, Santalum acuminatum, Solanum oldfieldii, Waitzia acuminata.

Dunes around lakes: Variable, mostly mallee over mixed understory. Typical association is Eucalyptus foecunda 6-8 m tall, 2-10% cover over Acacia multispicata 1-2 m tall, 2-10% cover over Rhagodia nutans scattered or up to 1% cover. Other species recorded were as follows: Acacia bidentata, Actinostrobos pyramidalis, Cassytha racemosa, Casuarina campestris, Cheiranthra parviflora, Dianella revoluta,

Harperia lateriflora, Jacksonia furcellata, Melaleuca hamulosa, M. scabra,  
M. thyoides, M. uncinata, Olearia axillaris eremicola, O. revoluta, Plectrachne  
danthonioides, Rhagodia spinescens, Santalum acuminatum, Stylobasium australe.

Reserve 23313

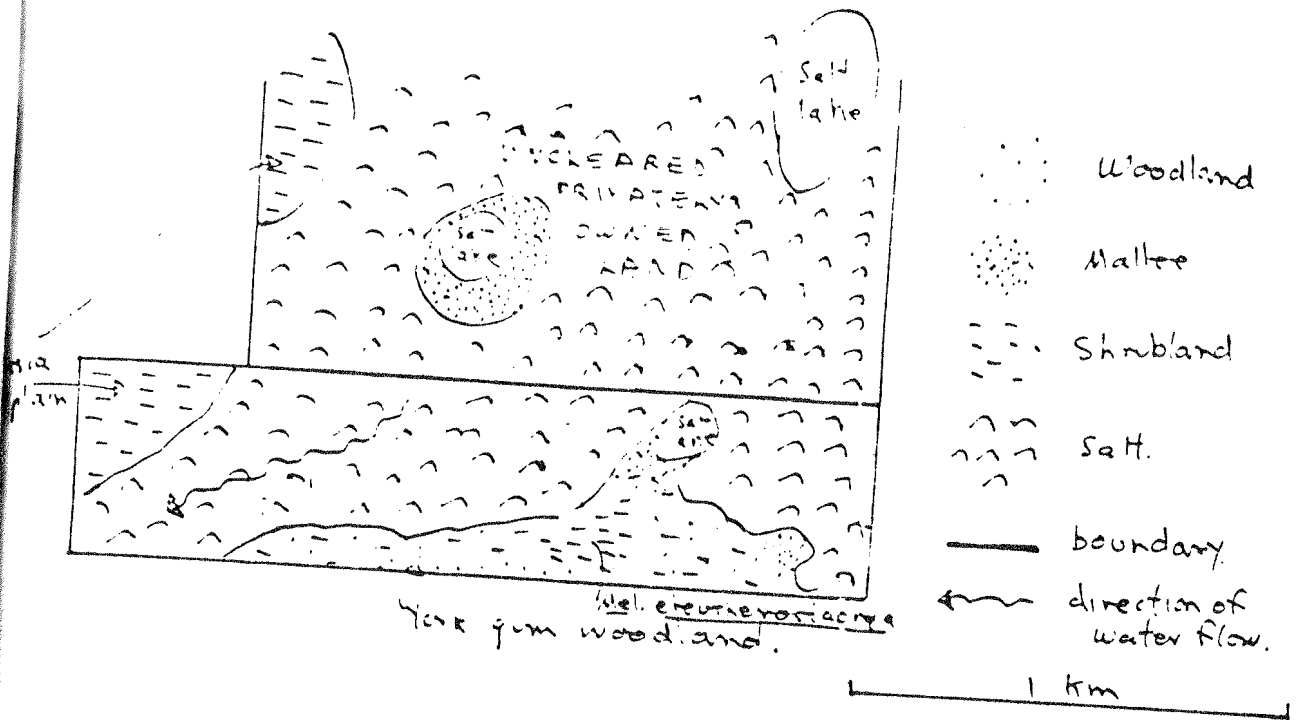




Plate 12 Reserve 23313 showing Banksia prionotes-Xylomelum angustifolium association on deep yellow sand.

Plate 13 Reserve 23313. View SE across salt flats showing Samphires and raised areas with shrubs in the background.

Plate 14 Eucalyptus loxophleba trees with Templetonia and Pittosporum understorey  
on southern boundary of Reserve 23313.

## Reserve 23665

Located ca 8 km due W of Cadoux Siding and shown on lithograph 56/80, A2.

### Background

Originally gazetted 31 December 1952 for "Native Flora" but not vested.

### Physical characteristics

Reserve 23665 is roughly rectangular, being ca 1 km long (E-W axis) by ca 0.4 km wide (N-S axis). Its perimeter is ca 2.7 km in length. No contour maps or spot altitudes are available for the area. There is a difference of probably about 50-80 m between the eastern and western ends of the Reserve, the western being of higher altitude.

Higher altitude soils are gravelly, and support heaths; intermediate soils have mallee and lower soils have woodlands on clayey soils.

### Vegetation

Nine major associations were present on the Reserve. These are listed below.

Gimlet woodland: Eucalyptus salubris (Gimlet) Low Woodland A over Open Low Scrub B.

Eucalyptus erythronema woodland: Eucalyptus erythronema (Red-flowered mallee) and E. transcontinentalis (Redwood) Open Low Woodland A over Melaleuca undulata Scrub.

Eucalyptus redunca mallee: Eucalyptus redunca (Black Marlock) Open Shrub Mallee over Low Heath C.

Eucalyptus redunca/E. sheathiana mallee: E. redunca (Black Marlock) and E. sheathiana Open Shrub Mallee over Melaleuca laxiflora Low Scrub B.

Jam scrub: Acacia acuminata (Jam) Dense Low Forest A. Situated on shallow watercourse.

Casuarina acutivalvis scrub: C. acutivalvis Scrub over Melaleuca cordata Low Heath C on sandy rise.

Tamma scrub: Casuarina campestris (Tamma) Dense Thicket over Open Dwarf Scrub C as a mosaic with Tamma Thicket over Low Sedges. Clumps of Black Marlock present.

Broombush heath: Melaleuca uncinata (Broombush) Heath A over Open Low Sedges and with clumps of Black Marlock.

Ecdeiocolea heath: Ecdeiocolea monostachya and mixed shrubs, Tall Sedges and Low Heath C. Forms mosaic with Tamma and Broombush associations.

A sand pit and gravel pit with limited regrowth are also present.

## Plant species

Eighty plant species were recorded, 20 in woodland formations, 14 in mallee, 47 in shrublands and 23 in heaths. Fourteen of the species recorded are exploited by the wildflower seed trade.

## Weeds

The only weed species recorded was Solanum nigrum (Black Nightshade), 2 plants being noted in the sand pit.

## Fire history

No evidence of fire within the last 30 years although the Broombush heath is probably <sup>younger</sup> than this.

## Fauna

Echidna (Tachyglossus aculeatus), one seen in woodland; Crested Owlet-nightjar (Aegotheles cristatus), one flushed from spout in woodland; White-backed Swallow (Cheramoeca leucosterna), nests in sand pit, some of which had been dug out, possibly by foxes; Tree Martin (Hirundo nigricans), group of 6 seen over roadway; Southern Scrub-robin (Drymodes brunropygius), one seen in Casuarina scrub, one heard in Jam scrub; White-browed Babbler (Pomatostomus superciliosus), nests seen in Casuarina scrub; Blue-breasted Wren (Malurus pulcherrimus), one seen in Tamma scrub.

## Exotic fauna

Old rabbit scats noted. Diggings in sand pit possibly a fox excavating White-backed Swallows' nests.

## Firebreaks and fences

Firebreak and fences in good condition on adjacent farmland. Road on boundary of S side of Reserve.

## Human usage

Sand and gravel pits on the main road have destroyed a very small part of the Reserve. There is minor rubbish dumping although old fence wire from the refencing of Ninghan Location 400 has been pushed into the Reserve, flattening some vegetation. Some timber has been removed from the gimlet areas.

Adjacent uncleared land

Absent except for small area on SE corner of Reserve.

#### Opinion

Reserve 23665 is in excellent condition and carries a diverse flora at formation, association and species level. It also contains a good representative of fauna, Southern Scrub-robin and Blue-breasted Wren being only occasionally recorded elsewhere in this survey. I recommend that Reserve 23665 be vested in the Western Australian Wildlife Authority and that signs be erected on the main roadway indicating that Fauna and Flora are protected.

Gimlet woodland: Eucalyptus salubris trees, senescent, stratum 6-12 m tall, 10-30% canopy cover or Melaleuca undulata or mixed shrubs, mature, stratum 1.5 m tall, ca 2-5% canopy cover. Other plant species recorded are listed below: Acacia acuminata, A. erinacea, A. ligulata, A. mackayana, Alyxia buxifolia, Bassia diacantha, Daviesia preissii, Eucalyptus erythronema, E. salmonophloia, E. transcontinentalis, Exocarpus sparteus, Maeriana brevifolia, Melaleuca adnata, Olearia muelleri, Rhagodia preissii, Santalum acuminatum. Soil was dark reddish brown, heavy clay, poorly drained.

Eucalyptus erythronema woodland: Eucalyptus erythronema and E. transcontinentalis trees and some E. transcontinentalis tree mallee, mature, stratum 8-12 m tall, 2-10% canopy cover (locally up to 20%) over Melaleuca undulata shrubs, mature, 2 m tall, 10-30% canopy cover. Other species recorded were: Acacia ligulata, Exocarpus aphyllus, Melaleuca adnata and Phebalium tuberculosum. Soil was light yellowish brown, sandy clay, poorly drained.

Eucalyptus redunca mallee: Eucalyptus redunca shrub mallee, mature, stratum 6-8 m tall, 10-30% canopy cover over mixed shrubs, mature, 1 m tall, 30-70% canopy cover. Other plant species recorded were Acacia nodiflora, Eucalyptus erythronema, E. sheathiana, E. transcontinentalis, and Melaleuca uncinata. Soil was very pale brown, sandy loam, poorly drained.

Eucalyptus redunca/E. sheathiana mallee: Eucalyptus redunca and E. sheathiana shrub mallee, mature, stratum 4-7 m tall, 10-30% canopy cover over Melaleuca laxiflora and mixed shrubs, mature, stratum 1-1.5 m tall, 10-30% canopy cover. Other plant species recorded were: Acacia multispicata, Baeckea heteranthera, Daviesia acanthoclona, Exocarpus aphyllus, Melaleuca spicigera, M. uncinata, Phebalium tuberculosum and Santalum acuminatum. Soil was very pale brown, sandy loam, poorly drained.

Jam scrub: Acacia acuminata shrubs and trees, mature, stratum 4-6 m tall, 70-100% canopy cover with no understory. Other species present were: Casuarina acutivalvis, Ennea pogon caerulescens, Melaleuca adnata and M. radula. Soil is reddish brown, clay loam, poorly drained. Situated along shallow, depressed, watercourse.

Casuarina acutivalvis scrub: Casuarina acutivalvis shrubs, mature, stratum 2-5 m tall, 10-30% canopy cover over Melaleuca cordata and numerous other species of shrubs, mature to senescent, 1 m tall, 30-70% canopy cover. Other species recorded were as follows: Acacia chrysella, A. multispicata, Astroloma serratifolium, Baeckea cryptandroides, Beaufortia bracteosa, Cassytha pubescens, Ecdeioclea monostachya, Eriostemon thryptomenoides, Eucalyptus drummondii, Grevillea excelsior, G. affin. filifolia, G. integrifolia, G. paradoxa, Hakea falcata, Hibbertia uncinata, Isopogon scabriusculus, Melaleuca spicigera, Micromyrtus drummondii, Persoonia saundersiana, P. striata, Petrophile incurvata. Soil deep, yellow, fine sandy loam, poorly drained.

Tamma scrub: Mostly Casuarina campestris shrubs, mature, stratum 1-2.5 m tall, 70-100% cover over mixed shrubs to 1 m tall, mature, 2-10% cover. Scattered patches of Eucalyptus redunca shrub mallee present. Species present were: Acacia stereophylla, Baeckea crispiflora, Choretrum pritzellii, Cryptandra leucophracta, Enneapogon caerulescens, Gahnia polyphylla, Hakea circumalata, H. subsulcata, Lepidosperma drummondii, L. resinosum, Leucopogon hamulosus, Melaleuca oldfieldii, M. spicigera, M. uncinata, Platysace effusa. Where the mallee clumps occur Acacia dielsii, Bertya cunninghami and Hibbertia uncinata are also present. In some areas the heath understory is replaced by Ecdeiocolea monostachya sedge 0.5 m tall, 30-70% canopy cover. In these sites the C. campestris is slightly taller (1-3 m) and less dense (30-70%). Also in these areas Calothamnus quadrifidus, Dryandra cirsioides, Isopogon scabriusculus, Persoonia striata, P. seminuda and Santalum acuminatum are prominent. Both the Tamma over heath and the Tamma over sedges are mosaiced with each other and <sup>with</sup> Broombush heath and Ecdeiocolea heath. Soil in both Tamma associations is yellow sandy clay loam with 60-80% gravel. The sedge association is slightly less well drained than the heath, but both are well drained except after heavy rain.

Broombush heath: Melaleuca uncinata shrubs, immature, stratum 1-2 m tall, 30-70% canopy cover over Ecdeiocolea monostachya sedge, 0.5 m tall, 10-30% canopy cover. Scattered clumps of Eucalyptus redunca shrub mallee or Acacia stereophylla shrubs dominate the association in some parts. Other species noted were: Acacia dielsii, Baeckea crispiflora, Borya nitida, Casuarina campestris, Hakea subsulcata, Platysace effusa. Mallee areas commonly had Eremophila drummondii and Hybanthus floribundus present. Soil was light brownish grey, sandy clay with varying percentages of gravel.

Ecdeiocolea heath: Ecdeiocolea monostachya sedge and mixed shrubs, stratum 1 m tall, 30-70% canopy cover. Scattered Casuarina acutivalvis shrubs to 5 m tall. Association is a mosaic with Tamma and Broombush associations. Other species recorded were: Acacia dielsii, Beaufortia imbricata, Darwinia sp. 3, Grevillea paradoxa, Hakea circumalata, H. scoparia, Isopogon scabriusculus, Melaleuca oldfieldii, Persoonia striata, Petrophile conifera, Thryptomene sp., Thysanotus sp.

#### Sand pit

About 60-80 m diameter and 1-2 m deep. Now used as Main Roads Department metal dump. Some brick and concrete rubble dumped as well as blue metal. Only regrowth of prominence was Grevillea eryngioides and scattered plants of Solanum nigrum.

#### Gravel pit

About 150 m by 120 m and 1-2 m deep. Much household and farm rubbish dumped. Only prominent regrowth was Casuarina acutivalvis, Dodonaea bursariifolia and Hakea coriacea.

# Reserve 23665

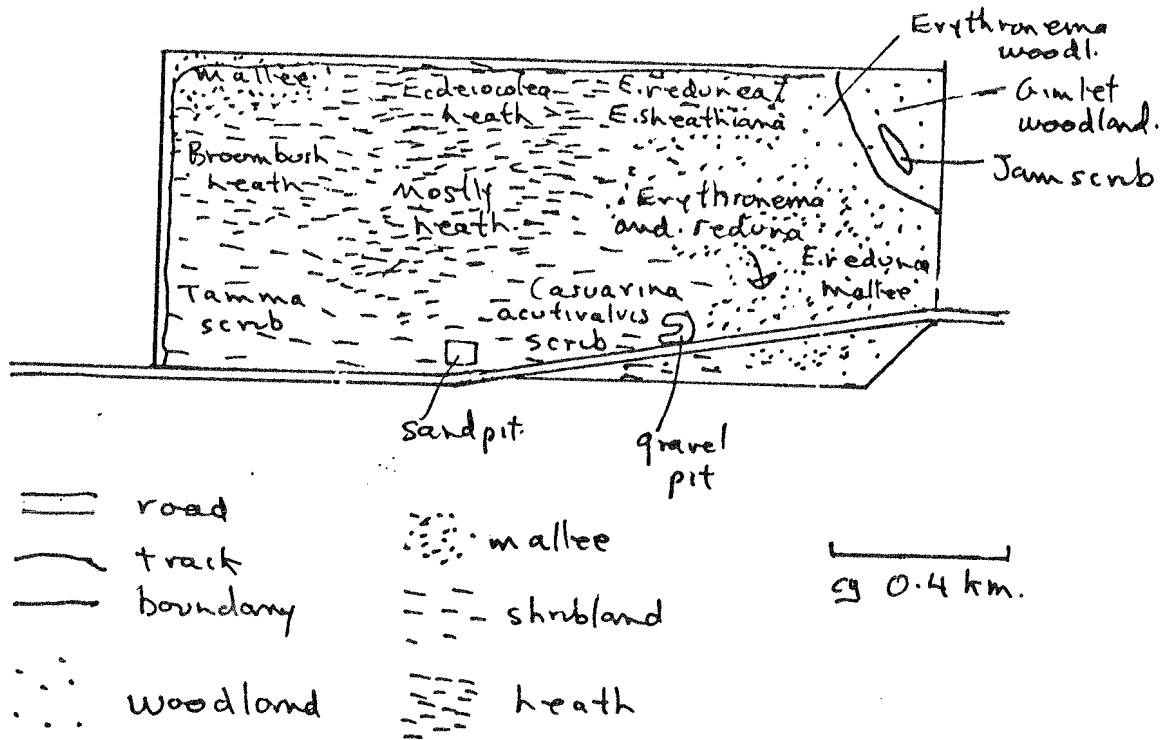




Plate 15 Reserve 23665. View N across heaths.

Plate 16 Reserve 23665 showing Eucalyptus redunca (Black Marlock) Mallee belt.

Plate 17. Reserve 23605 showing Casuarina acutivalvis shrubland.

Plate 18. Reserve 23605 showing Gimlet woodland.

## Reserve 24060

Located ca 3.5 km NE Cadoux Siding and shown on lithograph 56/80, B2.

### Background

Originally gazetted 22 October 1954 as Reserve for "Flora".

### Physical characteristics

Reserve 24060 is square, with an area of 36.4217 ha and a perimeter of ca 1.9 km. A spot altitude on the Reserve is 359 m above sea level. The Reserve is relatively flat.

### Vegetation

Six associations were recorded on Reserve 24060, 3 woodlands, 1 mallee, and 2 shrublands.

Wandoo woodland: Eucalyptus wandoo Open Low Woodland A over Melaleuca uncinata (Broombush) or Casuarina campestris (Tamma) Open Scrub.

Gimlet woodland: Eucalyptus salubris (Gimlet) Woodland over Atriplex paludosa graciliflora Open Dwarf Scrub D

Mixed woodland: complex intermingling of Wandoo, Gimlet and Black Marlock associations to produce a large stand of trees and mallee of mixed character.

Eucalyptus redunca mallee: E. redunca (Black Marlock) Open Shrub Mallee over Tamma Dense Heath B.

Broombush: Melaleuca uncinata (Broombush) and M. acuminata Open Scrub over M. adnata and M. undulata Low Scrub B.

Tamma association: Tamma and Melaleuca laxiflora Open Low Scrub A with scattered Salmon Gums and Wandoo.

### Plant species

Forty-eight plant species were recorded on the Reserve, 10 of which are exploited by the wildflower seed trade.

### Weeds

Abundant at rubbish tip, almost absent elsewhere. Species recorded were: Amaranthus albus (Tumbleweed); A. sp. (Cockscomb - introduced garden plant); Brassica tournfortii (Wild turnip); Chenopodium pumilio (Wild Mint); Digitaria sanguinalis (Crab grass); Portulaca oleracea (Purslane); Raphanus raphanistrum; Solanum nigrum (Black Nightshade). Although none of these weeds are of serious agricultural significance Brassica and Raphanus are minor pests.

## Fire

No evidence of fire within last 30 years.

## Fauna

Birds were abundant on the Reserve. The following species were recorded: Port Lincoln Parrot (Platycercus zonarius), in all woodlands, common; Mulga Parrot (P. varius), 2 pairs seen on W boundary of Reserve; Black-tailed Bee-eater (Merops ornatus), up to 20 seen, mostly in Wandoo woodland; Welcome Swallow (Hirundo neoxena), several flying over Reserve; Tree Martin (H. nigricans), about 8 seen above mixed woodland; Crested Bellbird (Oreoica gutturalis), heard calling in Wandoo woodland; Weebill (Smicrornis brevirostris), common in all woodlands and mallee; Chestnut-rumped Thornbill (Acanthiza uropygialis), in Tamma scrub; Yellow-rumped Thornbill (A. chrysorrhoa), in Wandoo woodland; White-fronted Chat (Epthianura albifrons), 2 seen on fence, N boundary; Western Magpie (Cracticus tibicen dorsalis), common near rubbish tip; Australian Raven (Corvus coronoides), common, feeding in rubbish tip.

## Exotic fauna

Numerous rabbit scats around rubbish tip. One probable fox scat collected on E boundary of Reserve.

## Firebreaks and fences

No firebreaks except in adjacent farmland. Fences poor but intact on N and W sides. E and S sides unfenced and adjacent to roadways.

## Human usage

A rubbish tip occupies about 10-15% of the central portion of the Reserve and there are scattered heaps of rubbish elsewhere. The rubbish is household, garden and farm material, including foodstuffs, sheep carcasses and garden cuttings.

Apart from removal of understory the rubbish tip appears to have had little effect on the vegetation; weeds are restricted to the tip area and do not appear to be penetrating into uncleared bushland. A graded road into the tip and the recent nature of much of the material dumped suggest the tip is used frequently and is probably being maintained by the Shire or townspeople of Cadoux Siding.

Some timber has also been removed from the Reserve.

Adjacent uncleared land

Completely absent.

#### Opinion and recommendations

Reserve 24060 contains a good diversity of formations, associations and plant species considering its small area. Woodlands (being scarce elsewhere on Reserves) are of particular importance. Eight of the 12 bird species recorded are largely dependent on the presence of the woodlands on this Reserve. Additionally the isolation of this Reserve from other bushland makes it an important resting site for migratory species.

I suggest that enquiries be made to determine who is using the Reserve as a rubbish tip and to determine if there is a satisfactory way of containing the rubbish rather than let it spread uncontrolled into bushland. This may be possible by using pits for rubbish rather than heaps as are presently used. I suggest signs be erected on the SW and NE corners of the Reserve indicating that the site is a Nature Reserve and another near the entrance to the rubbish tip requesting that dumping be restricted to the area presently in use.

Negotiations are necessary to determine who should have control of the Reserve and the best ways to maintain a satisfactory balance between the needs of conservation and the needs of sanitary waste disposal.

APPENDIX 8  
VEGETATION DETAILS RESERVE 24060

Wandoo woodland: Eucalyptus wandoo trees, mature to senescent, stratum 8-14 m tall (22 m where stand less dense), 2-10% canopy cover. Understory of variable density from absent to 10-30% cover in areas where tree stratum is sparse. Understory mostly Melaleuca uncinata or Casuarina campestris shrubs, mature, 1-2.5 m tall. Occupies central portion of Reserve. Other plant species recorded are listed below: Acacia acuaria, A. multispicata, Amphipogon debilis, Bassia sp. 1, Borya nitida, Comesperma scoparia, Dampiera spicigera, Grevillea paniculata, Harperia lateriflora, Lomandra effusa, Loxocarya pubescens, Olearia revoluta, Santalum acuminatum. Soil very pale brown, sandy loam, poorly drained.

Gimlet woodland: Eucalyptus salubris trees, mature to senescent, stratum 16-22 m tall, 10-30% canopy cover over Atriplex paludosa graciliflora shrubs, 0.5 m tall, 2-10% canopy cover. Other plant species recorded were: Acacia erinacea, A. merrallii, Bassia diacantha, Eucalyptus salmonophloia, Grevillea huegellii, Melaleuca acuminata, Olearia muelleri, Rhagodia preissii, Santalum acuminatum. Soil light reddish brown, fine sandy loam, poorly drained.

Mixed woodland: Mosaic or mixed stand resulting from overlap of ecotones of Wandoo, Gimlet and Mallee associations. Comprises Eucalyptus salmonophloia trees 10-13 m tall, E. salubris trees, 10-12 m tall and E. redunca mallee 5-8 m tall. Canopy cover averages 1-3%. Understory is mostly Melaleuca uncinata shrubs 1-2 m tall, 30-70% cover (but patchy). Species present are as found in other associations and penetrating into this mosaic. The only species not encountered elsewhere were Eucalyptus erythronema, Melaleuca undulata and Schoenus sp.

Eucalyptus redunca mallee: E. redunca shrub mallee, stratum 6-8 m tall, 10-30% canopy cover over Casuarina campestris shrubs, stratum 0.5-1.5 m tall, 70-100% canopy cover. Other plant species recorded were: Borya nitida, Daviesia brevifolia, Dodonaea caespitosa, Eremophila drummondii, Hibbertia sp., Lepidosperma drummondii, Loxocarya pubescens, Melaleuca uncinata, M. undulata, Spartochloa scirpoidea. Soil is reddish grey, silty clay loam, poorly drained. Other areas of E. redunca mallee association had no understory but scattered E. salubris emergent to 14 m tall. In these areas there were scattered shrubs of Acacia acuaria, Eremophila drummondii, Exocarpus aphyllus, Melaleuca adnata, and M. uncinata.

Broombush: Melaleuca uncinata and M. acuminata shrubs, mature, 1.5-2.5 m tall, 2-10% canopy cover over M. adnata, M. undulata shrubs, mature, 1.5 m tall, 10-30% cover. Other species recorded were: Crassula colorata, Daviesia sp., Dianella revoluta, Enchylaena tomentosa, Eucalyptus erythronema, E. salmonophloia. Soil is light brown, fine sandy loam, poorly drained.

Tamma association: Casuarina campestris, Melaleuca laxiflora shrubs, 1.0-2. m tall, ca 3-5% cover. Scattered Eucalyptus salmonophloia and E. wandoo emergent to 20 m tall. Other species present are: Acacia acuaria, A. multispicata, Ecdiocollea monostachya, Enneapogon caerulescens, Grevillea paniculata, Lepidosper sp., Leptospermum erubescens, Lomandra effusa, Melaleuca affin. ciliata.

# Reserve 24060

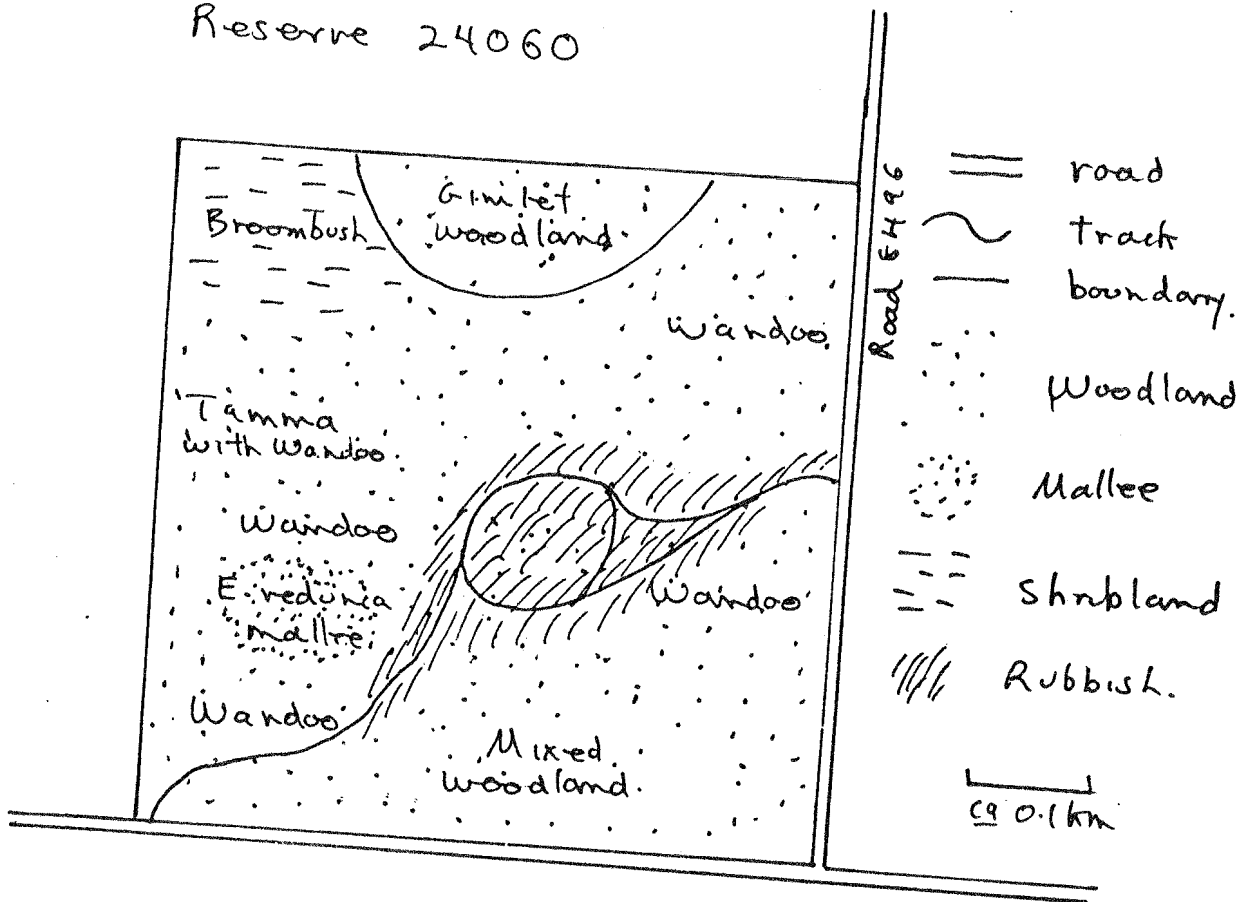




Plate 19 Reserve 24060 looking SW from N boundary of Reserve into Gimlet woodland.

Plate 20 Reserve 24060. View NE from W side of Reserve showing Wandoo woodland.

Plate 21 View E across rubbish tip site in Wandoo woodland in the centre of Reserve 24060.

## Reserve 25984

Located ca 25 km due E of Wongan Hills Townsite and shown on lithograph 56/80, A3.

### Background

Originally gazetted 14 July 1961 for "Conservation of Flora".

### Physical characteristics

Reserve 25984 is rectangular, 47.4038 ha in area, ca 0.4 km long (N-S axis) and ca 0.3 km wide (E-W axis). The total perimeter is thus ca 1.4 km. There are no contour maps or spot altitudes available. There is probably a difference of about 5-10 m between the highest point on the Reserve (probably NW corner) and the lowest point (probably SE corner).

### Vegetation

Seven associations are present on Reserve 25984; these are listed below.

Petrophile heath: Petrophile ericifolia and Melaleuca spicigera Low Scrub B over Burtonia gompholobioides and sedge Dwarf Scrub D. Heath on top of breakaway.

Petrophile shrubland: Petrophile ericifolia Thicket over Low Heath D. Situated in poor drainage area.

Tamma thicket: Casuarina campestris (Tamma) Thicket over Open Herbs or Open Low Sedges. Soil with abundant gravel.

Wandoo woodland, SW corner: Eucalyptus wandoo (Wandoo) and some Salmon Gum Open Woodland. Margins with Salmon Gum more abundant. Low lying clayey soils.

Wandoo woodland, NE corner: Wandoo Open Woodland over Tamma and Ti-tree Low Scrub B. Low lying clayey soils.

Jam woodland: Jam Low Forest A.

Mallee association: Eucalyptus redunca (Black Marlock) Open Shrub Mallee over Melaleuca uncinata (Broombush) and M. laxiflora Thicket. On slopes and flats immediately below breakaway.

### Plant species

Seventy-two plant species were recorded on the Reserve, plus an additional 4 weed species. Eleven of the species recorded are exploited by the wildflower seed trade.

## Weeds

Apart from several grass species and the semi-weed Ptilotus polystachys, 3 species of weeds are present on the Reserve. These are: Brassica tournefortii (Wild turnip), Raphanus raphanistrum (Wild radish), and Solanum nigrum (Black Nightshade). All are scarce, being present only as scattered plants in the woodlands where drainage is poorer. None constitute a danger to the Reserve or surrounding farmland.

## Fire history

There is no evidence that fire has entered the Reserve within the last 20-30 years.

## Fauna

Echidna (Tachyglossus aculeatus), scratchings common throughout the Reserve; Grey Kangaroo (Macropus fuliginosus), common, particularly in woodlands; Port Lincoln Parrot (Platycercus zonarius), common; Mulga Parrot (Platycercus varius), common, particularly in woodlands; Galah (Cacatua roseicapilla), common, particularly in woodlands; Black-faced Cuckoo-shrike (Coracina novaehollandiae), 2 seen in woodland; Willy Wagtail (Rhipidura leucophrys), common; White-browed Babbler (Pomatostomus superciliosus), in Tamma shrubland.

## Exotic fauna

Rabbit scats recorded; no warrens or recent scats found.

## Firebreaks and fences

Firebreaks are present in adjacent farmland on the E, S and W sides. The northern side is bounded by a roadway. The E, S and W sides also have substantial fences; the side adjacent to the road is unfenced.

## Human usage

Some timber has been removed from the woodland at the S end of the Reserve and some gravel in the NW corner.

I. Rowley of C.S.I.R.O. Division of Wildlife Research has been studying Galah and Blue-breasted Wren on the Reserve for about 7 years and has accumulated considerable data. Publications are in preparation.

### Adjacent uncleared land

There is no adjacent uncleared land contiguous to the Reserve or within a short distance of it.

### Opinion and recommendations

Reserve 25984 is an important representative of the vegetation of this area prior to clearing. Most Reserves in the wheatbelt are land left as "useless" after all arable land was cleared. The excellent stands of Wandoo and Jam woodland left on this Reserve survive fortuitously. As so little woodland country is represented on wheatbelt reserves it is essential that when such country becomes available it should be protected. The woodland on Reserve 25984 are very important nesting sites for parrots (Rowley, pers. comm.) and contain several plant species not found in other vegetation formations. Additionally, Rowley (pers. comm.) indicates that this is the smallest reserve on which he has encountered the extremely non-mobile Blue-breasted Wren. The Reserve is thus extremely important as a study site to examine genetic isolation and species/habitat area relationships. I recommend that Reserve 25984 be declared an "A" class Reserve for Conservation of Flora and Fauna and/or scientific purposes. I also recommend that the Reserve be vested in the Western Australian Wildlife Authority.

APPENDIX 9  
Vegetation Details Reserve 25984

Petrophile heath: Petrophile ericifolia, Melaleuca spicigera shrubs, mature, stratum 0.5-1.5 m tall, 10-30% canopy cover over Burtonia gompholobioides, Ecdeiocolea monostachya and mixed shrubs, mature, stratum 0.4 m tall, 10-30% canopy cover. Other plant species recorded are listed below. Acacia comans, A. fragilis, Aira caryophylla, Astroloma serratifolium, Baeckea crispiflora, Brachysema daviesioides, Calothamnus quadrifidus, Cassytha pubescens, Conospermum stoechadis, Grevillea integrifolia, G. paradoxa, Hakea circumalata, Jacksonia furcellata, Lepidosperma drummondii, Loxocarya fasciculata, Melaleuca oldfieldii, Mirbelia spinosa, Platysace effusa, Stipa elegantissima, Thryptomene sp., Waitzia acuminata. Soil shallow, pale yellow, sandy loam over dense laterite. Well drained but some pooling after rain.

Petrophile shrubland: Petrophile ericifolia shrubs, mature, stratum 0.5-2.5 m tall, 30-70% canopy cover over Ecdeiocolea monostachya and mixed shrubs, 0.5 m tall, 30-70% canopy cover. Other species recorded are listed below. Acacia acuaria, A. acuminata, A. fragilis, A. microbotrya, Baeckea sp., Casuarina acutivalvis, Dryandra cirsioides, Eremaea pauciflora, Eucalyptus pyriformis, Hakea falcata, H. platysperma, Mesomelaena uncinata, Ptilotus polystachys, Santalum acuminatum. Soil was fairly deep, pale yellow, sandy loam over dense laterite. Soil is well drained but is wetter than the Petrophile heath due to runoff from a sandy paddock to the W of the Reserve. Topography indicates that there is a subsurface drainage line from the paddock into this association, then SE towards the dam (see map). No doubt the structure and probably the floristics of this association is also effected by higher nutrient levels, both from windblown superphosphate and from nutrients in the subsurface water.

Tamma thicket: Casuarina campestris shrubs, mature, 3 m tall, 30-70% canopy cover over Borya nitida 20 cm tall, 10-30% cover and patches of Ecdeiocolea monostachya, 0.5 m tall, 10-30% cover. Also recorded were Melaleuca oldfieldii, Persoonia coriacea, Schoenus compressus. Soil very gravelly.

Wandoo woodland, SW corner: Eucalyptus wandoo and scattered E. salmonophloia trees, senescent, stratum 8-18 m tall, 2-10% canopy cover. Understory absent or up to 10% (average 2%) of scattered shrubs. Other species recorded were: Acacia acuaria, A. acuminata, A. microbotrya, Atriplex semibaccata, Bassia affin. diacantha, Dianella revoluta, Lepidosperma pubisquameum, Lomandra effusa, Melaleuca laxiflora, Olearia revoluta, Rhagodia nutans, Santalum acuminatum, S. spicatum, Thomasia rugosa. The weed species Avena sativa fatua (Wild-oat), Brassica tournefortii (Wild turnip), Raphanus raphanistrum (Wild radish), and Solanum nigrum (Black Nightshade) were also present. The association is surrounded by a narrow belt of E. salmonophloia trees, 8-14 m tall, 2-10% cover

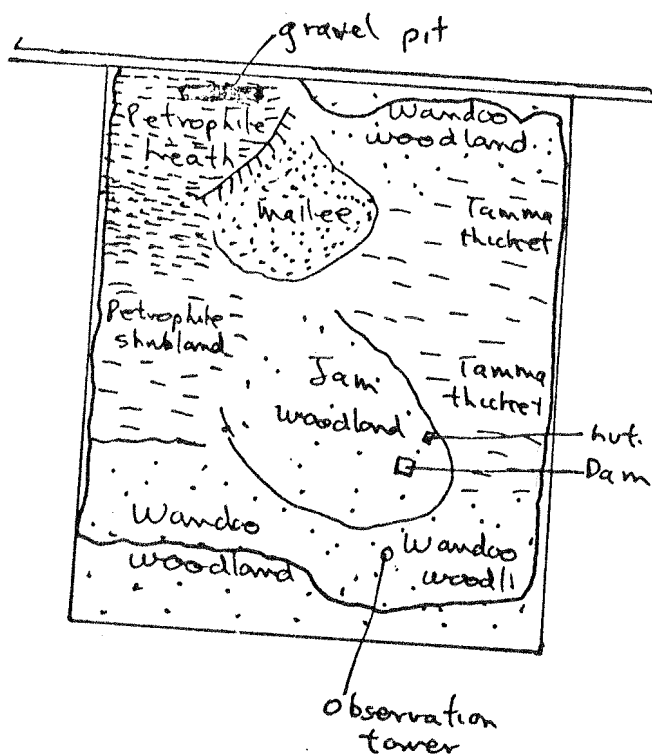
over Melaleuca uncinata, M. adnata shrubs, 4-6 m tall, 30-70% cover. This area has some of the species listed for the E. wandoo woodland and also Casuarina campestris, Melaleuca laxiflora, Rhagodia preissii and Stipa compressa. Soil in both associations is light brownish grey, sandy clay loam, poorly drained.

Wandoo woodland, NE corner: Eucalyptus wandoo trees, senescent, stratum 20-24 m tall, 2-3% canopy cover over Casuarina campestris or Leptospermum erubescens shrubs 1.5 m tall, 10-30% cover (but clumped) over Borya nitida, Loxocarya pubescens herbs and sedge, 20 cm tall, 30-70% cover. Other species present are: Acacia acutaria, A. microbotrya, Chamaexeros fimbriata, Dianella revoluta, Grevillea paniculata, Hakea lissocarpa, Harperia lateriflora, Lomandra effusa, Petrophile seminuda, Santalum acuminatum, Scaevola spinescens, Scholtzia parviflora, Stipa elegantissima. Soil and drainage is approximately the same as the SW woodland and the differences in species and structure are probably due to a sparser canopy above.

Jam woodland: Acacia acuminata trees, mature to senescent, stratum 5-10 m tall, 30-70% cover. No understory present but a dense cover of Waitzia acuminata and other herbs is present in winter. Other species recorded were: Rhagodia nutans, Santalum spicatum, Scholtzia parviflora, Stipa compressa, S. elegantissima. Soil is reddish brown, sandy loam, poorly drained.

Mallee association: Eucalyptus redunca shrub mallee, mature, stratum 4-7 m tall, 10-30% canopy cover over Melaleuca uncinata, M. laxiflora shrubs, mature, stratum 1.5-2 m tall, 30-70% canopy cover. Other species recorded were: Acacia acuminata, Astroloma serratifolium, Borya nitida, Casuarina campestris, Dryandra cirsioides, Hakea subsulcata, Hibbertia pungens, Melaleuca glaberrima, Olearia revoluta. Soil was pinkish grey, silt loam, poorly drained and with varying proportions of gravel. Situated on slopes and flats of breakaway.

# Reserve 25984



- == road
- track
- boundary
- woodland
- mallee
- — — shrubland
- — — heath
- ||||| breakaway.

ca 0.5 km.



Plate 22. Reserve 25984. View SE across Petrophile heath with understory of sedges. The other associations on the Reserve resemble woodlands and shrublands elsewhere (refer descriptions).

## Reserve 33854

Located ca 3 km due N of Burakin Siding and shown on lithograph 65/80, B3.

### Background

Originally gazetted 6 February 1976 for "Conservation of Flora" and vested in the Western Australian Wildlife Authority.

### Physical characteristics

Reserve 33854 is triangular, with a perimeter of ca 1.5 km and an area of 19.5084 ha. There are no contour maps or spot altitudes available for the Reserve, but Burakin Siding, ca 3 km S, has an altitude of ca 348 m above sea level. The altitudinal range of the Reserve is ca 3-5 m, being lowest at the SW corner.

### Vegetation

There are basically 2 associations on Reserve 33854; the largest being Acacia resinomarginea - Melaleuca uncinata (Wattle-Broombush) Thicket or Dense Thicket over Thryptomene australis and several other shrubs, Dwarf Scrub C. The association is of variable density and species composition. The second association is of smaller area and consists of Eucalyptus transcontinentalis and E. redunca (Black Marlock) Very Open Shrub Mallee over Acacia mackayana Open Dwarf Scrub C.

### Plant species

Twenty-nine species of plants were recorded, 21 in Wattle-broombush thicket and 9 in the mallee association. Three species are exploited by the wildflower seed trade.

### Weeds

None recorded.

### Fire

Evidence of very old burnt stumps in mallee area. Vegetation probably older than 20 years.

## Fauna

Southern Scrub-robin (Drymodes brunneopygius): call heard in Wattle-Broombush could be this species. White-browed Babbler (Pomatostomus superciliosus): nests seen and several birds heard in Wattle-Broombush Thicket.

## Exotic fauna

Old rabbit scats seen and dog scat found on N boundary of Reserve. Fox seen crossing railway line and running into N edge of Reserve.

## Firebreaks and fences

Unfenced on all sides. N and SW sides of Reserve well protected from fire by wide roads and E side by railway line, embankments, and railway's fire breaks.

## Human usage

Virtually none; small amount of rubbish dumped on NE corner.

## Adjacent uncleared land

None, closest uncleared is at Burakin Siding 3 km S.

## Opinion and recommendations

Although of small area, Reserve 33854 preserves an interesting plant assemblage uncommon elsewhere in the Wongan-Ballidu Shire. The shrubland is very dense and provides suitable habitat for Southern Scrub-robin, a bird now limited in its occurrence elsewhere due to frequent burning and clearing.

The Reserve would also provide an important "stepping stone" for small birds moving along road verges from bushland elsewhere.

I recommend that Reserve 33854 be preserved in its present condition and have a sign erected to indicate that its Flora and Fauna are protected. I also recommend that the Reserve be vested in the Western Australian Wildlife Authority.

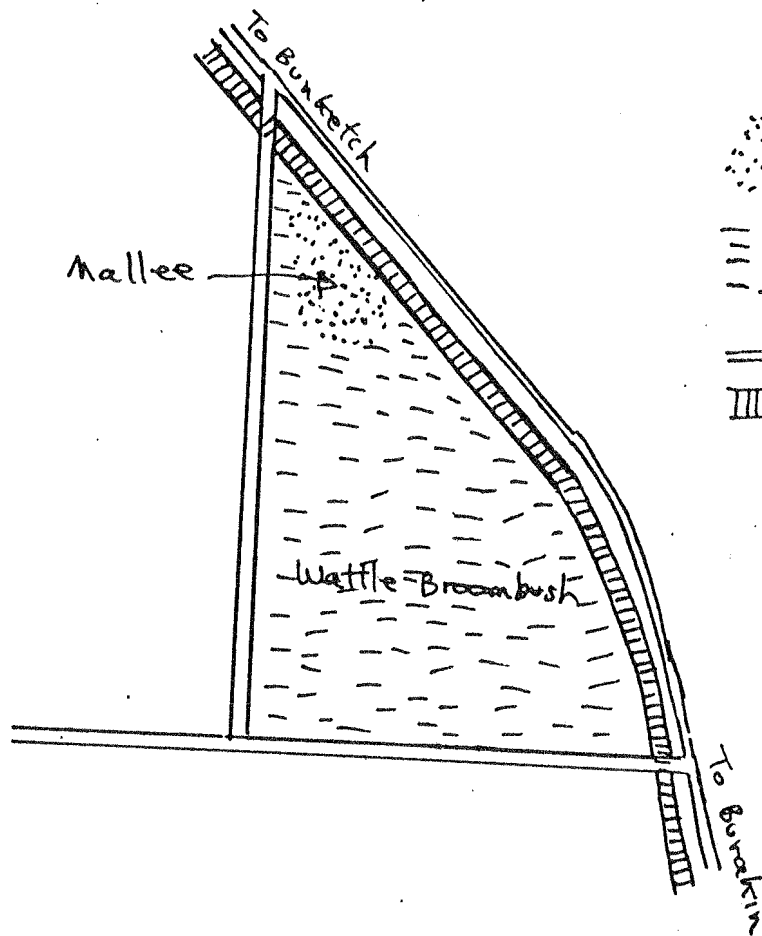
## APPENDIX 10

### Vegetation Details Reserve 33854

Wattle-Broombush: Acacia resinomarginea and/or Melaleuca uncinata shrubs and trees, mature, bottom of stratum varying from 2 to 4 m tall, the top being from 3.5-5 m tall. Canopy cover mostly 30-70% but some areas up to 100%. Understory Thryptomene australis and several other species of shrubs, mature, 1 m tall, 10-30% cover (locally up to 70%). The area where the upper story was 70-100% had the understory replaced by Eriostemon thryptomenoides and Phebalium tuberculosum megaphyllum to 0.5 m tall, ca 1% cover. Other species recorded in the area of sparser canopy are listed below. Acacia signata, Baeckea affin. floribunda, Darwinia purpurea, Eucalyptus drummondii, E. foecunda, Grevillea paradoxa, Hakea coriacea, Hibbertia stricta, Melaleuca cordata, Petrophile incurvata, Scholtzia parviflora, Thryptomene australis. Soil was yellow, loamy sand, excessively drained. There is a small area of Acacia resinomarginea trees, 8-10 m tall, 70-100% canopy cover over mixed shrubs, 3-4 m tall, 10-30% cover. This occupies a drain leading into the Reserve from a culvert beneath the railway line. Species found here were Alyxia buxifolia, Enneapogon caerulescens, Eucalyptus drummondii, Phebalium filifolium and Stipa elegantissima.

Mallee area: Eucalyptus transcontinentalis and E. redunca shrub and tree mallee, stratum 8-10 m tall, 2-10% canopy cover over Acacia mackayana (mostly) shrubs, 1 m tall, 2-10% cover but locally up to 30%. Other species recorded were: Acacia nodiflora, Eucalyptus oleosa, Melaleuca acuminata, M. cymbifolia, Santalum acuminatum, Stipa elegantissima. Soil was pinkish grey, sandy clay loam, poorly drained.

Reserve 33854



Mallee association

Wattle-Broombush association.

road

railway line.

0.1 km.

Plate 23 Reserve 33854. S end Reserve looking NE into densest area of Wattle-Broombush thicket.

Plate 24 View SW into sparser areas of Wattle-Broombush thicket showing more defined understory. Reserve 33854.

Plate 25 Reserve 33854 looking W into Mallee association. Note patchily distributed understory.

## APPENDIX II.

### METHODOLOGY OF SURVEY

Physical characteristics of the reserves were obtained directly from the most recently available metric lithographs as published by the Department of Lands and Survey, and interpreted from observations made on the reserves.

Reserves were examined by vehicle where tracks were available, or on foot. Local knowledge and air-photographs were consulted to find areas of particular interest. Only a very short time could be spent on each reserve, the smaller ones being examined in 1 or 2 hours, the larger ones in a full day.

Vegetation was classified using Muir's (1977) system (see Table 1), which was designed specifically for describing wheatbelt vegetation. In the presentation of the abbreviated descriptions (in section titled "Vegetation") capital letters in descriptive terms refer to specific classes of life form, height and canopy cover.

As the survey period on any reserve was very brief only the dominant plant species could be noted. Any species in which less than 3 individual plants were encountered within a space of 10-15 minutes examination of the vegetation were considered uncommon and are not listed. As much of the survey work was carried out rapidly and in unfavourable seasons, many plants were not flowering and so identifications were made on the spot, from foliage alone. Only if an important dominant plant was not recognised were specimens bought back to the laboratory for examination.

Soil were examined very briefly and classified according to Northcote's (1971) texture groups and Munsell (1954) colour terms.

Fire history was determined from observation of the area, appearance of air-photographs and information from nearby farmers.

Fauna were not specifically sought, but some species (usually the most obvious) were encountered while examining vegetation. The lists provided are only a small fraction of the species present on nearly every reserve examined. Scats, footprints, burrows, nests and other indirect evidence is used only where identification is certain. Observations by farmers are used if considered reliable.

Opinions and recommendations expressed in these reports are entirely those of the author and are based on extensive experience in vegetation mapping and description in the wheatbelt, and association with faunal and habitat studies conducted by suitably qualified researchers.



TABLE 1: VEGETATION CLASSIFICATION TO BE USED IN WHEATBELT SURVEY

LIFE FORM/HEIGHT CLASS	CANOPY COVER			
	DENSE <b>d</b> 70-100%	MID-DENSE <b>c</b> 30-70%	SPARSE <b>i</b> 10-30%	VERY SPARSE <b>r</b> 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

## References

MUIR, B.G. (1977). Vegetation and habitat of Bendering Reserve. Biological survey of the Western Australian wheatbelt Pt 2. Rec. West. Aust. Mus. Suppl. 3.

MUNSELL COLOR COMPANY (1954). Munsell soil color charts. Baltimore, Md., Munsell Color Co.

NORTHCOTE, K.H. (1971). A factual key for the recognition of Australian soils. Glenside, S.A.: C.S.I.R.O./Rellim.