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SOME NATURE RESERVES OF THE WESTERN AUSTRALIAN
WHEATBELT

PART 2 : KELLERBERRIN SHIRE

B.G. MUIR
1978

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Department of Fisheries and Wildlife unpublished report

survey of the western Australian wheatbelt. pt. 6. Durokoppin and
Kodj Kodjin Nature Reserves. Rec. West. Aust. Mus. Suppl. 7.

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1.

SOME NATURE RESERVES OF THE KELLERBERRIN SHIRE
B.G. MUIR

Preamble

Kellerberrin Shire lies in the central wheatbelt and has an area of about 1853 square km. There are 17 Nature Reserves within the Shire, totalling about 30.12 square km or ca 1.6% of the area of the Shire.

Two of the Nature Reserves within the Shire have "A" classifications (Mt. Caroline, A11047 and Durokoppin, A22921). The remainder enjoy no particular protection and have variable vestings. Three of the Reserves have been studied extensively by the Western Australian Museum (Chapman et al. in prep., Muir et al. 1978, in press) and another by Fisheries and Wildlife (unpublished report).

The current survey took place in February 1978 and consisted of brief examinations of 8 reserves: 10719, 11024, 21153, 23137, 24897, 25112, 26266, and 30903. Reports on these Reserves are presented. Methodology of survey is presented in Appendix 8.

Overview

Of the 8 Reserves examined, 3 were mostly salt flats, 2 were non-arable laterite areas, 1 was an unwanted surveyed road and 1 was completely cleared and under crop. The remaining Reserve was arable land which fortuitously escaped clearing. It is thus clear that the Reserves can in no way be considered typical of the wheatbelt vegetation prior to European settlement but are rather remnants left after all arable land was cleared. Nonetheless their significance for conservation of flora and fauna is considerable and the need for their preservation great. There is also little doubt that the Shire of Kellerberrin has some of the largest, more interesting and important Reserves in the wheatbelt.

References

CHAPMAN, A., DELL, J., KITCHENER, D.J. & MUIR, B.G. (in prep.). Biological survey of the Western Australian wheatbelt. Pt. 11. Yorkrakine, East Yorkrakine and North Bungulla Nature Reserves. Rec. West. Aust. Mus. Suppl. 11.

MUIR, B.G., CHAPMAN, A., DELL, J., & KITCHENER, D.J. (in press). Biological survey of the Western Australian wheatbelt. Pt. 6. Durokoppin and Kodj Kodjin Nature Reserves. Rec. West. Aust. Mus. Suppl. 7.

Located ca 21 km N of Kwolyin Siding on lithograph 2434-1, A3.

Background

Originally gazetted 5 April 1907 as "Water" Reserve and this was changed to "Conservation of Flora" on 20 August 1954.

Physical characteristics

The Reserve is approximately square, has an area of 11.7359 ha and a perimeter of 1.3 km. The north-eastern side is about 292 m above sea level (ASL) the south-western corner about 285 m ASL. Higher ground is laterite, passing through lateritic granite clays to red clayey soils in the lower areas.

Vegetation

There are basically 3 associations on the Reserve, Tamma scrub, Jam woodland and Salmon Gum woodland.

Tamma scrub

Casuarina campestris (Tamma) Open Scrub with scattered Acacia acuminata (Jam) and Ecdeiocolea monostachya sedge clumps in the understory. Soil is very gravelly, pale brown, sandy clay.

Jam woodland

Acacia acuminata (Jam) Low Forest B, with no understory except scattered shrubs. Soil is light yellowish brown, sandy clay with granite pebbles.

Salmon Gum woodland

Eucalyptus salmonophloia (Salmon Gum) and scattered E. salubris (Gimlet) and E. loxophleba (York Gum) with no understory but scattered shrubs in small clumps are present. Soil is light reddish brown, sandy clay loam.

Plant species

Thirty-eight plant species were recorded, 17 in Tamma scrub, 9 in Jam woodland and 15 in Salmon Gum woodland. Only three species were in common between any 2 associations. Eight of the recorded species are exploited by the wildflower seed trade and one species, Santalum spicatum (Sandalwood) is becoming rare and endangered in the wheatbelt.

3.

Weeds

There are scattered grasses, mostly Avena sativa fatua (Wild-oat) throughout the Reserve.

Fire history

There is no evidence of fire and the vegetation may be older than about 30 years.

Fauna

Grey Kangaroo (Macropus fuliginosus) scats and footprints were noted. Although the weather at time of survey was very hot and still, 5 species of birds were recorded. These were: Port Lincoln parrot (Platycercus zonarius zonarius), Galah (Cacatua roseicapilla), Black-faced Cuckoo-shrike (Coracina novaehollandiae), Weebill (Smicrornis brevirostris) and Western Magpie (Cracticus tibicen dorsalis).

The woodland contained many recently used nesting hollows of parrots.

Exotic fauna

No trace of any exotic fauna apart from a few old rabbit scats.

Firebreaks and fences

No firebreaks or fences except on the southern and eastern boundaries adjacent to farmland. The fences are in good condition. Firebreaks are within paddocks, not in the bushland.

Human usage

A gravel pit of about 1 ha in area is on the northern side of the Reserve, but has not been used for some time. A small amount of rubbish dumping has taken place, mostly farm refuse. Timber has been removed from both the Jam and Salmon Gum woodlands.

Adjacent uncleared land

A small strip of Avon Location 8909 lies between Reserve 10719 and the road which passes down the W side of the Reserve. The owner of this property has left it uncleared as it would be too difficult to farm. It effectively enlarges the Reserve by ca 2 ha to about 14 ha.

4.

Remarks

The old lithograph (4/80) shows the Reserve to have "No. 1 Bore" present on it. This marking is absent on the new lithograph and I could find no trace of a bore on the Reserve.

Opinion and recommendations

This Reserve contains a small but quite good stand of Salmon Gum woodland, an association poorly represented in the wheatbelt. Although of small size ^{Reserve is} the quite rich in plant species, has 3 associations and is a good nesting site for birds. It is probably also important as a "stepping stone" of vegetation for migratory birds, particularly as other woodland is fairly scarce in the area (excepting that on road verges).

I therefore recommend that Reserve 10719 be vested in the Western Australian Wildlife Authority and that a sign be erected indicating that it is a Reserve and that rubbish dumping and timber removal is not allowed.

APPENDIX 1
VEGETATION DETAILS RESERVE 10719

Tamma scrub

Casuarina campestris shrubs, mature, 1-3 m tall, 2-10% canopy cover over Ecdeiocolea monostachya sedge, mature, 0.5 m tall, 2-10% canopy cover. Scattered Acacia acuminata are present to 4 m tall. Species recorded were: Acacia acuminata, A. hynesiana, Astroloma serratifolium, Baekkea crispiflora, Casuarina campestris, Chamaexeros fimbriata, Cyperaceae sp. 1., Dampiera spicigera, Ecdeiocolea monostachya, Gastrolobium affin. hookeri, Grevillea paniculata, Lepidosperma angustatum, Leptospermum erubescens and Mirbelia spinosa

Jam woodland

Acacia acuminata trees, varying from immature to mature, stratum 2.5-5 m tall, 30-70% canopy cover. No understory but scattered shrubs present. Species recorded were: Acacia acuaria, A. acuminata, Borya nitida, Eucalyptus loxophleba, Hakea decurva, Lepidosperma gracile, Melaleuca uncinata, Santalum spicatum, and Waitzia acuminata.

Soil is light yellowish brown, sandy clay with granite pebbles and some gravel. Abundant quartz grit present. Well drained.

Salmon Gum woodland

Eucalyptus salmonophloia trees, mature, stratum 10-18 m tall, 2-10% canopy cover. Scattered E. salubris present and some E. loxophleba to 15 m tall. No understory present but scattered shrubs throughout. Species recorded were: Acacia acuaria, A. erinacea, A. graffiana, A. merrallii, Atriplex paludosa, Bassia affin. diacantha, Enchylaena tomentosa, Eucalyptus loxophleba, E. salmonophloia, E. salubris, Exocarpus sparteus, Olearia muelleri, Rhagodia nutans, R. spinescens, Santalum acuminatum and Stipa compressa.

Soil is light reddish brown, sandy clay loam with clay at depth. Poorly drained.

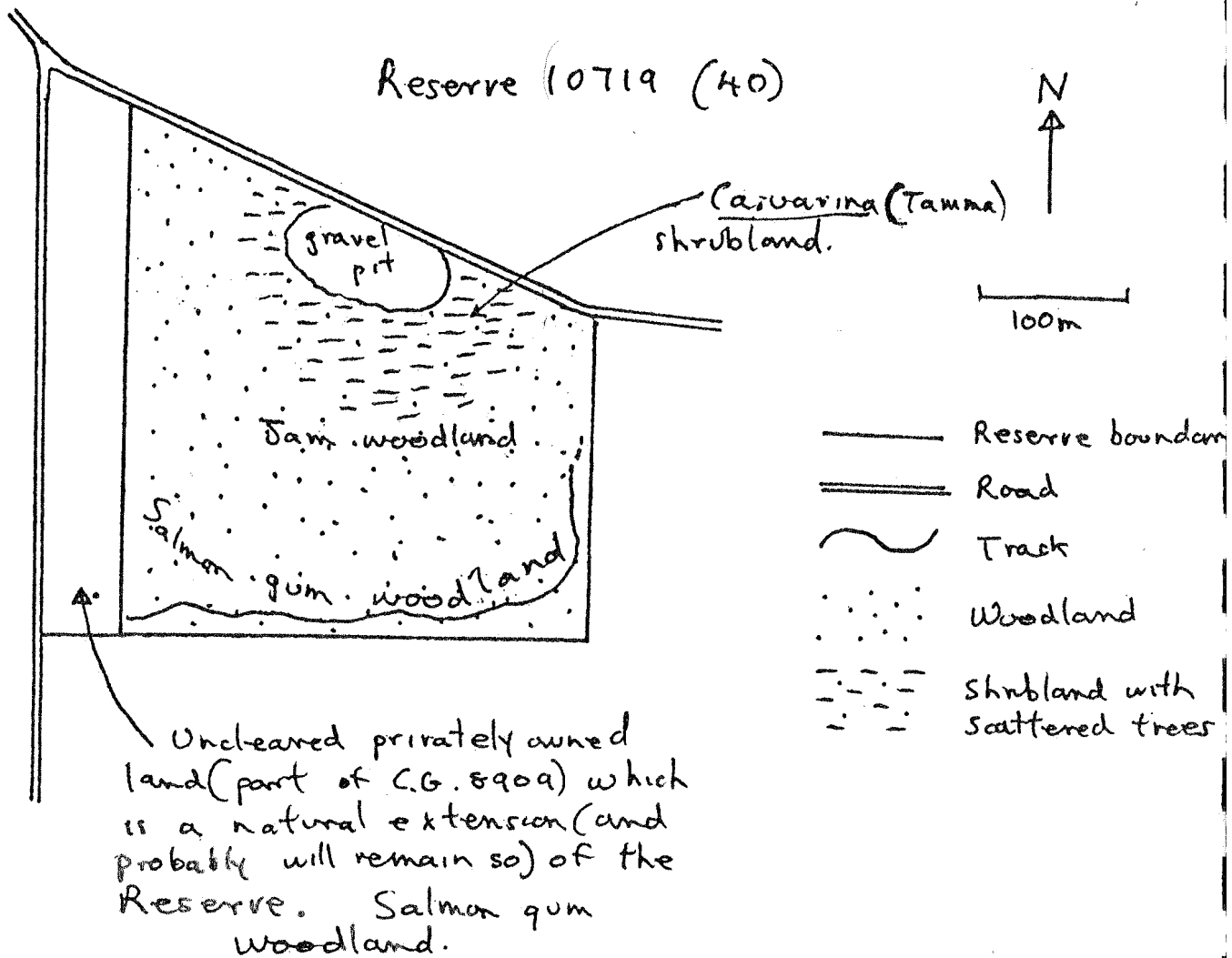


Plate 1. Reserve 10719. View N from S end of Jam woodland. Association is Jam with scattered understory shrubs and abundant grass. Association passes into Tamma scrub on higher ground.



Plate 2. Reserve 10719. Salmon Gum woodland on southern edge of Reserve. View E along southern boundary.

6a.



7.

Reserve 11024

Located ca 15 km N Yoting Siding and shown on lithograph 2434-111, AB1.

Background

Gazetted on 13 March 1908 as reserve for "Conservation of Flora".

Physical characteristics

The Reserve is triangular, has an area of 21.8530 ha and a perimeter of 2.15 km. The northern end is 240 m above sea level (ASL) and the southern end 235 m ASL. Soils are colluvial and derived from nearby granite outcrops, the nearest and largest being Mt. Caroline, ca 3 km to the NW and ca 345 m ASL. Immediately S of Reserve 11024 is an extensive salt complex, the average altitude of which is about 230 m ASL.

Vegetation

The majority of the vegetation on the Reserve is Eucalyptus salmonophloia (Salmon Gum) Open Woodland with some E. loxophleba (York Gum) Very Open Tree Mallee, particularly to the northern end.

There is a patchy understory of shrubs of several species and some grass.

Plant species

Twenty-three species of plants were recorded, 7 of which are exploited by the wildflower seed trade; and also Santalum spicatum (Sandalwood) which is rare and endangered in the wheatbelt and is being examined as a possible commercial species in Western Australia.

Weeds

Abundant annual grasses, mostly Stipa compressa, not in dense stands but scattered evenly throughout the Reserve. Roadside ditches had Ehrahta longiflora (Annual Veldt Grass) in small amounts. An inspection by an Agricultural Department Officer in 1954, following up a report of Cape Tulip (Homeria sp.) infestation, found only scattered plants in roadside ditches. My 1978 survey gave no evidence of this weed although inspection was in mid-summer and the previous years dead leaves would be difficult to detect.

8.

Fire history

No evidence of fire for a very long time, possibly in excess of 30 years.

Fauna

Very little seen because afternoon very hot and still. Galah (Cacatua roseicapilla) and Port Lincoln Parrot (Platycercus zonarius zonarius) were recorded in a nearby road verge and many nesting hollows, probably used by these species, were noted on the Reserve. Western Magpie (Cracticus tibicen dorsalis) and Australian Raven (Corvus coronoides) were seen and several crows' nests were seen. A nest of Yellow-rumped Thornbill (Acanthiza chrysorrhoa) was also found.

Exotic fauna

A few old rabbit warrens were seen but there was no evidence of fresh diggings or scats.

Firebreaks and fences

There are no firebreaks or fences except on the north-eastern boundary, which adjoins a paddock. The fence is in good condition.

Human usage

A small amount of rubbish, mostly metal, is present. There has been some timber cutting but probably not within the last 5 years.

Adjacent uncleared land

None except a nearby salt complex.. The margins of this complex do, however, form a belt of vegetation which connects indirectly to Mts. Caroline and Stirling and Reserves 25112 and 26266 (see this report).

9.

Opinion and recommendations

Although not significant in itself, Reserve 11024 forms an important part of a chain of reserves and uncleared privately owned land. Mts. Caroline and Stirling contain unusual assemblages of plants and fauna and I have suggested in the report on Reserves 25112 and 26266 (please refer) that these Reserves may also contain unusual assemblages. Until more is known about the vegetation and fauna of this region I feel it essential to retain as much of it as possible. Therefore, I recommend that Reserve 11024 be vested in the Western Australian Wildlife Authority and that steps be taken in the near future to promote a biological survey of this region.

APPENDIX 2
VEGETATION DETAILS RESERVE 11024

Eucalyptus salmonophloia trees, mature to senescent, 16-24 m tall, 2-10% canopy cover with scattered E. loxophleba tree mallee and trees, mature to senescent, 8-12 m tall, locally up to 3% canopy cover. The understory consists of mixed shrubs, no particular dominant, mature, 1 m tall, mostly less than 5% canopy cover. Beneath this is Loxocarya pubescens sedge and Stipa compressa grass to 30 cm tall, 2-10% canopy cover. At the northern end of the Reserve the E. loxophleba becomes more abundant and Acacia acuminata becomes prominent.

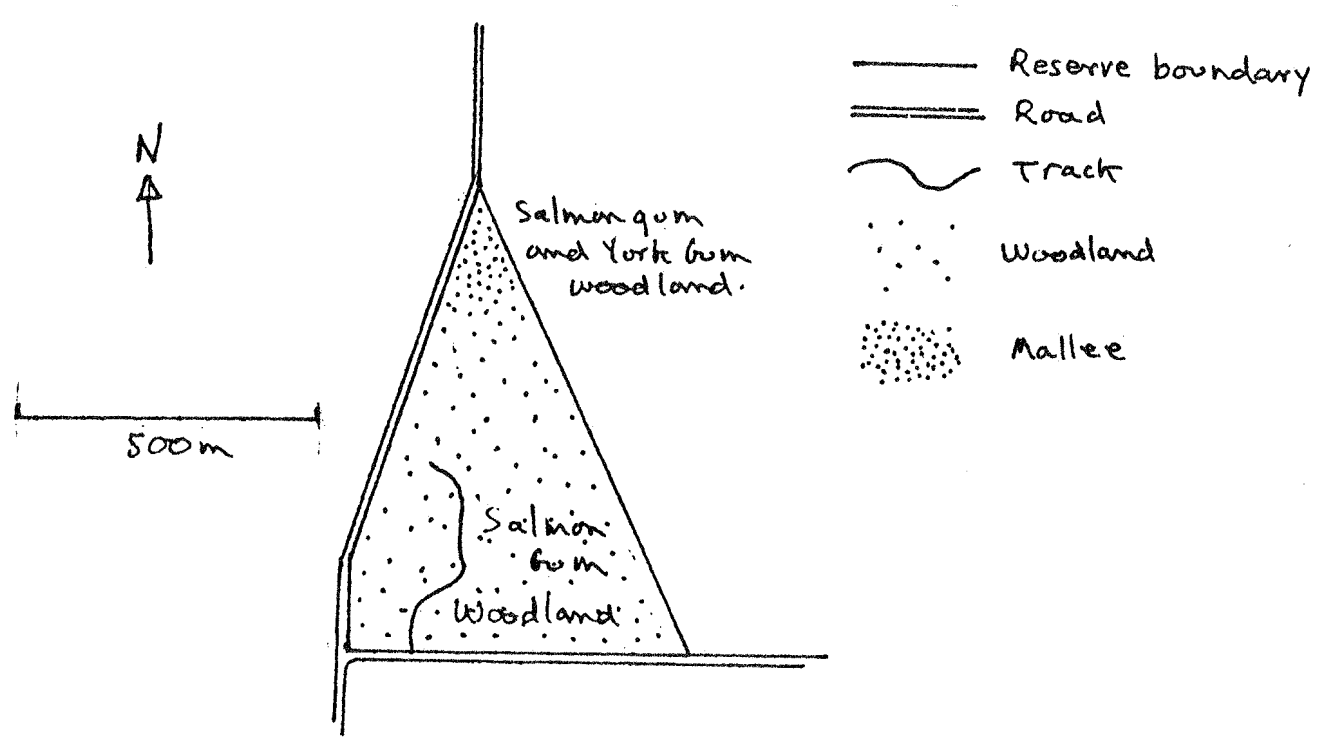
Plant species recorded: Acacia acuaria, A. acuminata, A. graffiana, A. microbotrya, Baeckea sp., Bertya cunninghami, Cassia nemophylla, Dampiera tomentosa, Dianella revoluta, Dodonaea bursariifolia, Enchylaena tomentosa, Eremophila drummondii, Eucalyptus loxophleba, E. salmonophloia, Grevillea paniculata, Lomandra effusa, Loxocarya pubescens, Olearia revoluta, Rhagodia spinescens, Santalum spicatum, Stipa elegantissima, S. compressa, Westringia affin. cephalantha.



Plate 3. Reserve 11024. View N from S end Reserve showing Salmon Gum woodland and patchy understory of shrubs, sedge and grass. Note numerous piles of dead leaves and branches which resulted from wind damage during a violent storm about 1 month before this survey.

11.

Reserve 11024



Reserve 21153 (Mooranoppin)

Located about 6 km NE Kellerberrin, and shown on lithograph 2434-1, A1/2

Background

Gazetted 22 December 1933 as "Campsite (Aboriginals)" but was not vested in any controlling body. On 12 May 1967 was recognised by Proclamation under the Native Welfare Act as being a camp site for Aboriginals, then on 3 November 1967 the Reserve was regazetted as "Conservation of Flora and Fauna" but remained unvested.

Physical characteristics

The Reserve is roughly square, has an area of 40.4686 ha and a perimeter of ca 2.5 km. The highest point on the Reserve is ca 290 m above sea level (ASL) on the western side, grading down to ca 273 m ASL on the eastern side.

The western side (high ground) is granite tors and flat granite outcrop; ~~this covers~~ about 10% of the Reserve. The remainder is colluvial granite derived soils of variable depth. A shallow creek enters the Reserve from adjacent farmland to the NW and passes across the Reserve towards the SE. The creek is poorly defined and very shallow.

Vegetation

The vegetation is entirely woodland, being dominated by Acacia acuminata (Jam) Low Woodland A over an understory of Borya nitida Herbs. Eucalyptus loxophleba (York Gum) is scattered throughout, and in some areas becomes sufficiently dense to become the dominant species.

In winter there is a dense cover of Waitzia acuminata (yellow everlastings).

Soil in the Jam stands is well drained, but receives some runoff from granite outcrops. It is a reddish yellow, sandy clay loam containing abundant coarse (up to 5mm) angular grit and pebbles of granite. The York Gum dominated areas are pinkish grey, sandy clay loam, slightly less well drained than the Jam woodlands.

Plant species

Seventeen species of plants were recorded. Among them were: Acacia lasiocalyx, A. microbotrya, Dianella revoluta and Pittosporum phylliraeoides, exploited by the wildflower seed trade; Waitzia acuminata exploited for cut flowers and seeds; and Santalum spicatum (Sandalwood) which is rare and endangered, of historical interest and exploited for seeds.

Weeds

There is an abundance of Avena sativa fatua (Wild Oat) and some Hordeum leporinum (Barley Grass) particularly in the high runoff areas near the granite. Scattered Osteospermum candestinum (Stinking-roger) were present in wetter areas.

Fire history

There is no evidence of fire on the Reserve within the last 30 years. Most of the vegetation is mature or senescent.

Fauna

Nearby farmer reports Grey Kangaroo (Macropus fuliginosus) scarce in the area, and that they tend to move between the Reserve and nearby uncleared land.

The only fauna seen were Australian Raven (Corvus coronoides) and Weebill (Smicrornis brevirostris). There are sure to be many other species present but the weather at time of survey was extremely hot and still, and birds were not calling.

Exotic fauna

Rabbit scats were present throughout the Reserve and a warren was noted amongst the granite outcrops on the western boundary. A fox hole and scats were also found amongst the granites. The Reserve is commonly visited by dogs from an Aboriginal camp which occupies an old school site about 300 m to the South.

Firebreaks and fences

There are no firebreaks on the Reserve but adjacent farmland on the N and W sides have perimeter breaks. The S and E sides are bounded by roads. The N and W sides are also fenced from the adjacent farmland and the fences are in good condition. The S and E boundaries are unfenced.

Human usage

Numerous small dumps of rubbish, mostly household refuse and sheets of roofing iron, are present throughout the Reserve but the two main dumping areas are near the granite outcrop and another in the centre of the Reserve. The latter covers about 0.5 ha and contains car bodies, sheets of roofing iron and household rubbish. The Reserve has been grazed at various times in the past. It is still used occasionally as an Aboriginal camping ground.

14.

Adjacent uncleared land

A portion of Avon Locations 1137 and 3666 and the NE corner of 10769 are uncleared and consist of granite outcrop with varying proportions of Acacia acuminata or Eucalyptus loxophleba woodlands. Those areas are, however, heavily grazed.

Remarks

Mooranopping Rock and Mooranopping Spring are not part of the Reserve, and are not directly connected to it.

Opinion and recommendations

The Reserve is probably of considerable value as a "stepping-stone" of vegetation to be utilised by migratory birds in the wheatbelt. Within itself, however, it probably is of limited value, being small and degraded. Being mainly woodland of homogenous structure it is unlikely to provide habitats for bird species which prefer woodland with mosaic understrata and ecotones.

APPENDIX 3
VEGETATION DETAILS RESERVE 21153

Jam woodland

Acacia acuminata trees, 9 m tall, 10-30% canopy cover with scattered Eucalyptus loxophleba trees to 15 m tall. All stages of maturity from young trees to standing dead trees are present. Senescent trees average 15% of those present. The understory is Borya nitida herbs, 10 cm tall, 30-70% canopy cover.

Scattered shrubs of Hakea decurva and Acacia acuaria are present 1-2 m tall, mostly less than 2% cover. There is an additional winter herb layer of Waitzia acuminata and Avena sativa fatua.

York Gum woodland

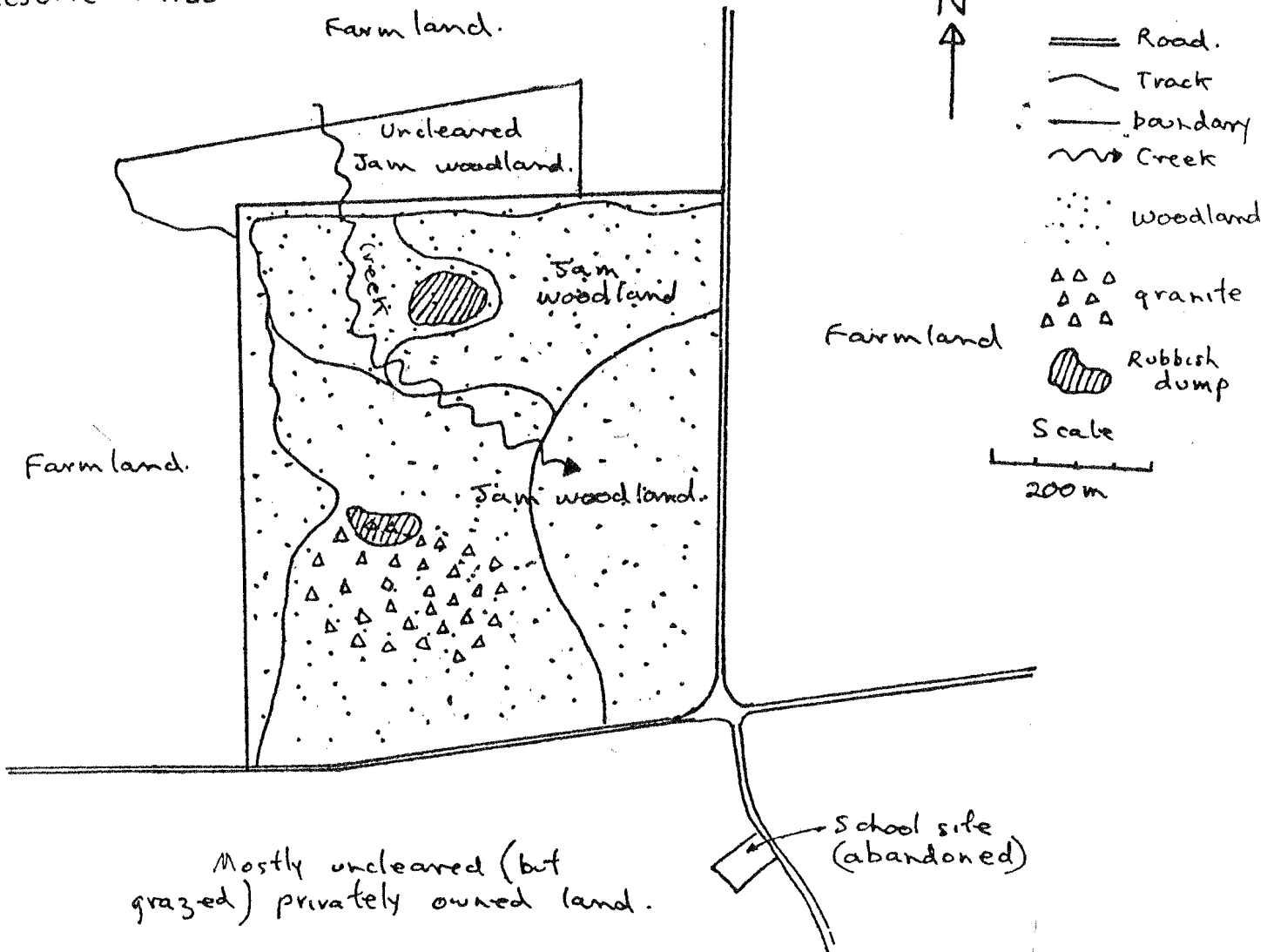
As above, but York Gum reaches ca 5% canopy cover. In these areas Acacia graffiana is commonly abundant and grass is absent.

Species noted were: Acacia acuminata, A. graffiana, A. lasiocalyx, A. microbotrya, Borya nitida, Casuarina huegeliana, Dianella revoluta, Eucalyptus loxophleba, Grevillea paniculata, Hakea decurva, Lepidosperma gracile, Olearia revoluta, Pittosporum phillyraeoides, Santalum spicatum, Stipa elegantissima, Stylobasium australe, Waitzia acuminata.



Plate 4. Reserve 21153, showing Jam woodland with scattered York Gum. An understory of Borya nitida and grasses of variable density is present. View NE from Southern boundary of Reserve.

reserve 21153



17.

Reserve 23137

Located about 2 km due E Doodlakine Siding, and shown on lithograph 2434-1 BC/2.

Background

Gazetted 15 September 1950. Originally a surveyed road, then left as windbreak.

1978 survey

An examination of the area where the Reserve was located showed that the Reserve had been cleared and was under crop. Examination of airphotographs taken in 1972 showed the Reserve had been cleared prior to that date. There still exists a line of *Eucalyptus loxophleba* (York Gum) and scattered *E. salmonophloia* (Salmon Gum) between Avon Locations 73 and 31; and 24 and 31. There are no remnants of vegetation between Locations 25 and 31 or 26/27 and 30 except for a few York Gums. The boundary between Locations 37 and 10712 is also cleared.

Fencelines indicate that the Reserve had been cleared by whoever owns Locations 30, 31, and 37.

Opinion and recommendations

As the Reserve is totally destroyed there remains little point in its remaining gazetted as a Flora Reserve, and such gazettal should be rescinded. Action should be taken against the farmer in order not to set a precedent of lack of action against illegal clearing.

Reserve 24897

Located about 8 km S of Kellerberrin, and shown on lithograph 2434-IV, C3.

Background

Gazetted 17 January 1958 for "Conservation of Flora". In 1973 Reserve 32086 of 43.7980 ha was excised from the northern end of Reserve 24897 as a Rubbish Disposal Site.

Physical characteristics

The Reserve is roughly rectangular, has an area of 704.8629 ha and a perimeter of ca 16.7 km. The highest point on the Reserve is ca 240 m above sea level on the North-western side, grading down rapidly to the rest of the Reserve which is almost flat except for minor undulations. The majority of the Reserve is ca 230 m above sea level. The highest point is a hill of deep yellow sand, the remainder of the Reserve being salt flats. A small permanent salt lake on the Western side of the Reserve is bordered on its eastern side by a semicircular dune. Shallow evaporite deposits, mostly halite or gypsum, are present.

Vegetation

There are six basic vegetation types present on the Reserve.

1. Arthrocnemum halocnemoides (Samphire)
flats, situated on lowest lying ground where water does not flow strongly over the surface, these latter areas being bare of all vegetation.
2. Melaleuca uncinata (Broombush)
and/or M. lateriflora Thickets or Dense Thicket situated on slight rises within or on the edges of salt flats. Soils are generally pink and sandy or clayey, being very variable.
3. Hakea preissii
Thicket on the same type of soil as Broombush thickets (above) but on slightly higher ground.
4. Eucalyptus albidula (White-leaved Mallee)
Open Shrub Mallee over mixed heath. This association is on reddish yellow, sandy loam soil underlain by gypsum. This association is restricted to semicircular ridges which surround the permanent salt lake on the NW side of the Reserve.

19.

5. Eremaea pauciflora and Grevillea pritzellii or Leptospermum erubescens
Dense Heath A with scattered Xylomelum angustifolium (Woody Pear)
on yellow, sandy loam. This association is restricted to the
highest part of the Reserve.

6. Eucalyptus gracilis
Open Woodland over Templetonia sulcata (Centipede Bush) and Exocarpus
aphyllus (Ballart) Open Scrub. Soil is light reddish brown, sandy
clay loam. This association is restricted to slightly higher ground
on the south-eastern side of the Reserve.

About 97% of the Reserve is a mosaic of salt flat and Melaleuca or Hakea
shrublands. The other associations make up the remaining 3% of the Reserve.

Plant species

Eighty-three plant species were recorded, 7 on salt flat, 6 in Melaleuca
thicket, 20 in Hakea thicket, 42 on mallee ridges, 15 in Eremaea thicket and
19 in woodland. It can be seen that the mallee on ridge formation has the
most species, although it is of the smallest area. Additionally 51 species
(61%) were found only in a single association, thus the destruction of any
part of the Reserve would result in a considerable decrease in species number.

Of the plant species recorded 17 are exploited by the wildflower seed
trade.

Weeds

Apart from scattered Avena fatua sativa (Wild-oat) grass in the wetter,
non-saline areas, there is no weed problem on this Reserve.

Fire history

There is no evidence of fire in any of the associations although the
Eremaea pauciflora thicket near the sand pit is young vegetation. This is
believed to be regrowth following clearing rather than fire produced.

Fauna

Echidna (Tachyglossus aculeatus) scats were found in the Eucalyptus
gracilis woodland and Grey Kangaroo (Macropus fuliginosus) sighted in
Melaleuca thicket. A nearby farmer, M. Inverarity, informs me that he collected
a Fat-tailed Dunnart (Sminthopsis crassicaudata) on the Reserve a "few years
ago". Numerous species of birds were seen including the following.

Crested pigeon (Ocyphaps lophotes) occasional.

White-backed Swallow (Cheramoeca leucosterna). Nest burrows in sand pit.

Pipit (Anthus novaeseelandiae) mostly on edges of Reserve.

Red-capped Robin (Petroica goodenovii) in woodland.

Willie Wagtail (Rhipidura leucophrys) common on salt flats and in Melaleuca and Hakea thickets.

White-browed Babbler (Pomatostomus superciliosus). Very common throughout dense thickets.

Chestnut-rumped Thornbill (Acanthiza uropygialis). Very common in Hakea thickets.

White-fronted Chat (Epthianura albifrons). Occasional on salt pans and in thickets.

Australian Raven (Corvus coronoides). Occasionally in woodland or flying over Reserve.

Exotic fauna

None recorded, but old rabbit scats were noted in various parts of the Reserve. Agricultural Protection Board signs indicated the Reserve had been poisoned on 2 February 1977.

Firebreaks and fences

There are no firebreaks except those in adjacent farmland. The majority of the Reserve would not support a fire, except for the Eremaea and mallee stands.

The boundaries adjacent to farmland have substantial fences in good condition but the E side against the road is unfenced.

Human usage

The rubbish dump (Reserve 24897) at the north end of the Reserve contains mostly farm and household rubbish, particularly sheet iron, car bodies, timber and rubble. There is a minimal amount of organic matter dumped and the effects of the dump are largely confined to within its boundaries.

There is very little rubbish elsewhere on the Reserve except near the permanent salt lake. Salt from this lake is mined on a very small scale by hand scraping and loading into bags. Apparently at night when the water table rises, water of high salt concentration flows into the lake from the north-east. In the morning the flow stops, the lake dries out and the almost dry salt is harvested in the late afternoon. The original application for permission to mine the salt was in 1975 or 1976 and presumably the "mine" has operated since then.

A difficulty arises in that the operator of the "mine" lives on site in a brushcovered lean-to. Household rubbish and food scraps are dumped in bushland nearby, as are several car bodies, broken furniture, etc. A further problem is fire which could arise from the open fireplace at the hut.

A sandpit in the Eremaea thicket just NW of the salt lake was applied for in 1972 and in October of that year was "about 2 acres in extent and 3-8' deep" (Fisheries and Wildlife warden's report). In February 1978 the pit itself was about 0.5 acres in extent and about 12 feet deep. The wardens report must therefore apply to the area of the lease, not the area of the pit. This being the case there has been very little sand removed over the past 6 years although a front-end loader was on the site at the time of this survey.

On the eastern edge of the salt lake part of the gypsum dune carrying the mallee association is being mined. The pit at present is about 10 m long and 6-10 m wide, the gypsum being removed on a 2-3 m face. The gypsum is mostly of low to moderate grade but has pockets of very high quality. A farmer who lives adjacent to the Reserve said that it was being mined by a local farmer for application to paddocks to improve drainage. There is no record on Fisheries and Wildlife files to indicate that the gypsum mine was officially leased.

The salt pans immediately south of the rubbish tip are being degraded by cars driving in circles at speed. Some Arthrocnemum has been destroyed and water forms pools in some wheel ruts.

Remarks

Uncleared privately owned land adjacent to the SE corner of the Reserve forms a considerable extension of the Eucalyptus gracilis-E. loxophleba woodland.

This land has been left uncleared by the owner, M. Invararity, as an extension of the Reserve. Mr. Invararity also voluntarily watches over the Reserve and discourages other farmers from shooting on it.

Opinion and recommendations

There is little doubt that Reserve 24897 is one of the best in the Kellerberrin Shire and contains an interesting assemblage of plants and many animals. The very variable nature of the Reserve's vegetation, even in the repeating mosaic of the salt pan and Melaleuca-Hakea thickets, gives it a wide range of habitat types for its area.

The two habitat types most different to the majority of the Reserve are both endangered. These are the Eremaea thicket which is within the sand pit lease, and the Mallee association which is on the ridges currently being mined (perhaps illegally) for gypsum. Not only does the mallee association provide an unusual habitat within the Reserve, but gypsum ridges of this type carrying intact vegetation are probably rare in the wheatbelt, being encountered by me on only one other occasion. (Marchagee Reserve, Muir, in press).

I feel it advisable to take action to ensure that the mallee covered ridges are not destroyed and that removal of sand from the sand pit is limited. The "miner's camp" near the salt lake presents a more difficult problem in terms of rubbish dumping and fire hazard. No doubt local authorities must be involved in any action in this respect.

I recommend that Reserve 24897 be vested in the Western Australian Wildlife Authority and that action be taken to preserve this Reserve from further exploitation. Signs should be erected to discourage shooting and an attempt should be made to restrict, or preferably stop, sandy and gypsum mining.

Reference

- MUIR, B.G. (in press). Vegetation of Marchagee Nature Reserve. in
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APPENDIX 4
VEGETATION DETAILS RESERVE 24897

Plant species are listed in Appendix 5.

Arthrocnemum flats

Arthrocnemum halocnemoides shrubs to 20 cm tall, 30-70% canopy cover.

Broombush thicket

Melaleuca hamulosa shrubs, mature, 1.5-2.5 m tall, 30-70% canopy cover.

Melaleuca uncinata shrubs, immature, 3.5-6 m tall, 70-100% canopy cover
or 1-2.5 m tall, 30-70% canopy cover.

Hakea preissii thicket

Hakea preissii shrubs, mature to senescent, up to 2.5 m tall, 10-30% canopy cover and average foliage density up to 80%.

Eucalyptus albida mallee

E. albida shrub mallee, mature, stratum 6-8 m tall, 2-10% canopy cover over mixed shrubs, no particular dominant, 0-1.5 m tall, 30-70% canopy cover. Some areas with mallee 12 m tall, 10-30% canopy cover over shrubs 1 m tall ca 3% cover over Harperia lateriflora sedge, 30 cm tall, ca 10% cover. Scattered E. gracilis to 16 m tall.

Eremaea shrubland

Eremaea pauciflora and Grevillea pritzellii shrubs, 0.5-3 m tall, 70-100% cover with scattered Xylomelum angustifolium to 6 m tall.

Eucalyptus gracilis woodland

E. gracilis trees, mature, 15-16 m tall, 2-10% canopy cover over Templetonia sulcata and Exocarpus aphyllus shrubs, 1-4 m tall, 2-10% canopy cover.

DISTRIBUTION OF PLANT SPECIES ON RESERVE 24897

Species Recorded	Species Recorded												
	Chamaexeros fimbriata	Comesperma scoparia	Conostephium preissii	Cyanostegia angustifolia	Darwinia sp.	Dianella revoluta	Disphyma blackii	Ecdiocollea monostachya	Enneapogon caerulescens	Eremaea pauciflora	Eremophila drummondii	Eucalyptus albida	Eucalyptus gracilis
<u>E. gracilis</u> woodland	x	x	x	x	x	x	x	x	x	x	x	x	x
<u>Eremaea</u> sand patch	x	x	x	x	x	x	x	x	x	x	x	x	x
Mallee on ridge	x	x	x	x	x	x	x	x	x	x	x	x	x
<u>Hakea</u> thicket	x	x	x	x	x	x	x	x	x	x	x	x	x
<u>Melaleuca</u> thicket	x	x	x	x	x	x	x	x	x	x	x	x	x
Saltpan	x	x	x	x	x	x	x	x	x	x	x	x	x
<u>E. gracilis</u> woodland	x	x	x	x	x	x	x	x	x	x	x	x	x
<u>Eremaea</u> sand patch	x	x	x	x	x	x	x	x	x	x	x	x	x
Mallee on ridge	x	x	x	x	x	x	x	x	x	x	x	x	x
<u>Hakea</u> thicket	x	x	x	x	x	x	x	x	x	x	x	x	x
<u>Melaleuca</u> thicket	x	x	x	x	x	x	x	x	x	x	x	x	x
Saltpan	x	x	x	x	x	x	x	x	x	x	x	x	x
Acacia acuminata	x	x	x	x	x	x	x	x	x	x	x	x	x
A. brachyclada	x	x	x	x	x	x	x	x	x	x	x	x	x
A. colletiooides	x	x	x	x	x	x	x	x	x	x	x	x	x
A. eremaea	x	x	x	x	x	x	x	x	x	x	x	x	x
A. erinacea	x	x	x	x	x	x	x	x	x	x	x	x	x
A. filifolia	x	x	x	x	x	x	x	x	x	x	x	x	x
A. graffiana	x	x	x	x	x	x	x	x	x	x	x	x	x
A. affin. heteroneura	x	x	x	x	x	x	x	x	x	x	x	x	x
A. merrallii	x	x	x	x	x	x	x	x	x	x	x	x	x
A. multispicata	x	x	x	x	x	x	x	x	x	x	x	x	x
A. stereophylla	x	x	x	x	x	x	x	x	x	x	x	x	x
A. affin. ulicina	x	x	x	x	x	x	x	x	x	x	x	x	x
Acacia 3 species unident.	x	x	x	x	x	x	x	x	x	x	x	x	x
Adenanthos argyrea	x	x	x	x	x	x	x	x	x	x	x	x	x
Alyxia buxifolia	x	x	x	x	x	x	x	x	x	x	x	x	x
Arthrocnemum bidens	x	x	x	x	x	x	x	x	x	x	x	x	x
A. halocnemoides	x	x	x	x	x	x	x	x	x	x	x	x	x
A. pergranulatum	x	x	x	x	x	x	x	x	x	x	x	x	x
Atriplex exilifolia	x	x	x	x	x	x	x	x	x	x	x	x	x
A. paludosa graciliflora	x	x	x	x	x	x	x	x	x	x	x	x	x
Baeckea heteranthera	x	x	x	x	x	x	x	x	x	x	x	x	x
Bassia affin. diacantha	x	x	x	x	x	x	x	x	x	x	x	x	x
Callitris verrucosa	x	x	x	x	x	x	x	x	x	x	x	x	x

Species Recorded		Species Recorded	
<u>E. gracilis</u> woodland		<u>E. gracilis</u> woodland	
<u>Eremaea</u> sand patch		<u>Eremaea</u> sand patch	
Mallee on ridge	x x x x x x x	Mallee on ridge	x x x x x x x
<u>Hakea</u> thicket	x x	<u>Hakea</u> thicket	x x x x x
<u>Melaleuca</u> thicket		<u>Melaleuca</u> thicket	x x x x x
Salt pan		Salt pan	
	M. thyoides M. uncinata Olearia axillaris eremicola O. muelleri O. muricata O. revoluta Phebalium tuberosum Platysace maxwellii Podolepis capillaris Rhagodia nutans R. spinescens Santalum acuminatum Stipa elegantissima Templetonia sulcata Thryptomene sp. Verticordia brownii Waitzia acuminata Xylomelum angustifolium Family indeterminate		M. didymobotrya G. paniculata G. pritzellii Hakea preissii Harperia lateriflora Jacksonia racemosa Lepidosperma angustatum Leptospermum erubescens Lomandra effusa Loxocarya pubescens Lycium australe Maireana brevifolia M. georgei Melaleuca acuminata M. hamulosa M. lateriflora M. scabra M. seriata



Plate 5. Reserve 24897 showing samphire salt flats with bare areas where water pools or flows after rain. Broombush thickets occupy slight ridges in the distance. View SW from E side of Reserve.

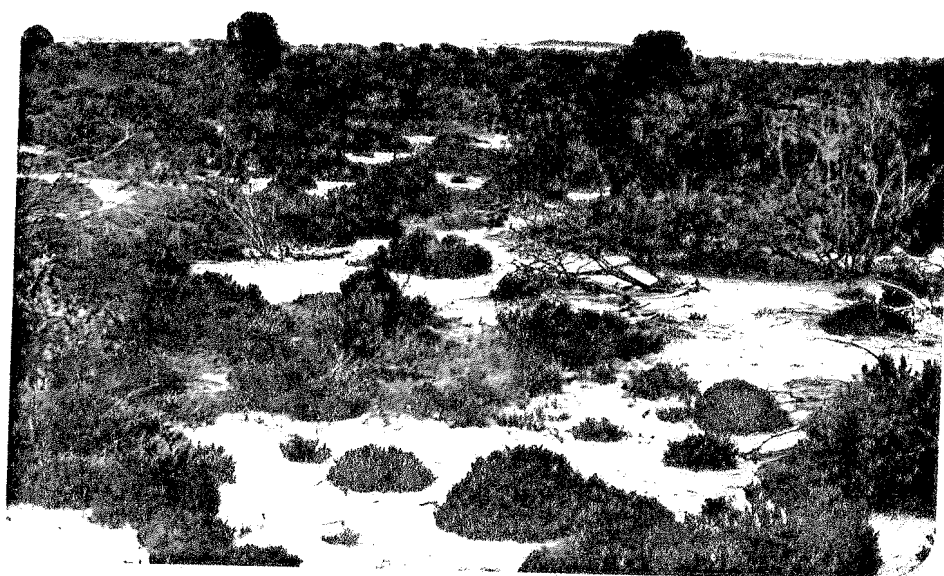


Plate 6. Reserve 24897 showing heathy raised areas amongst samphire flats. These areas carry Hakea preissii shrubland. View W from E side of Reserve.



Plate 7. Reserve 24897 showing area mined for gypsum in foreground. Vegetation on ridge behind is Eucalyptus alba association with scattered E. gracilis and York Gum. This mallee association is considered very uncommon in the wheatbelt. View E from behind salt lake.



Plate 8. Reserve 24897. A fine stand of Eucalyptus alba mallee near the Eremaea heath on the W side of the Reserve.



Plate 9. Reserve 24897. View W across salt Lake which is currently being mined. Yellow sandy hill behind has Eremaea shrubland with emergent Woody Pear trees. Portion where sand is visible between shrubs is sand pit.

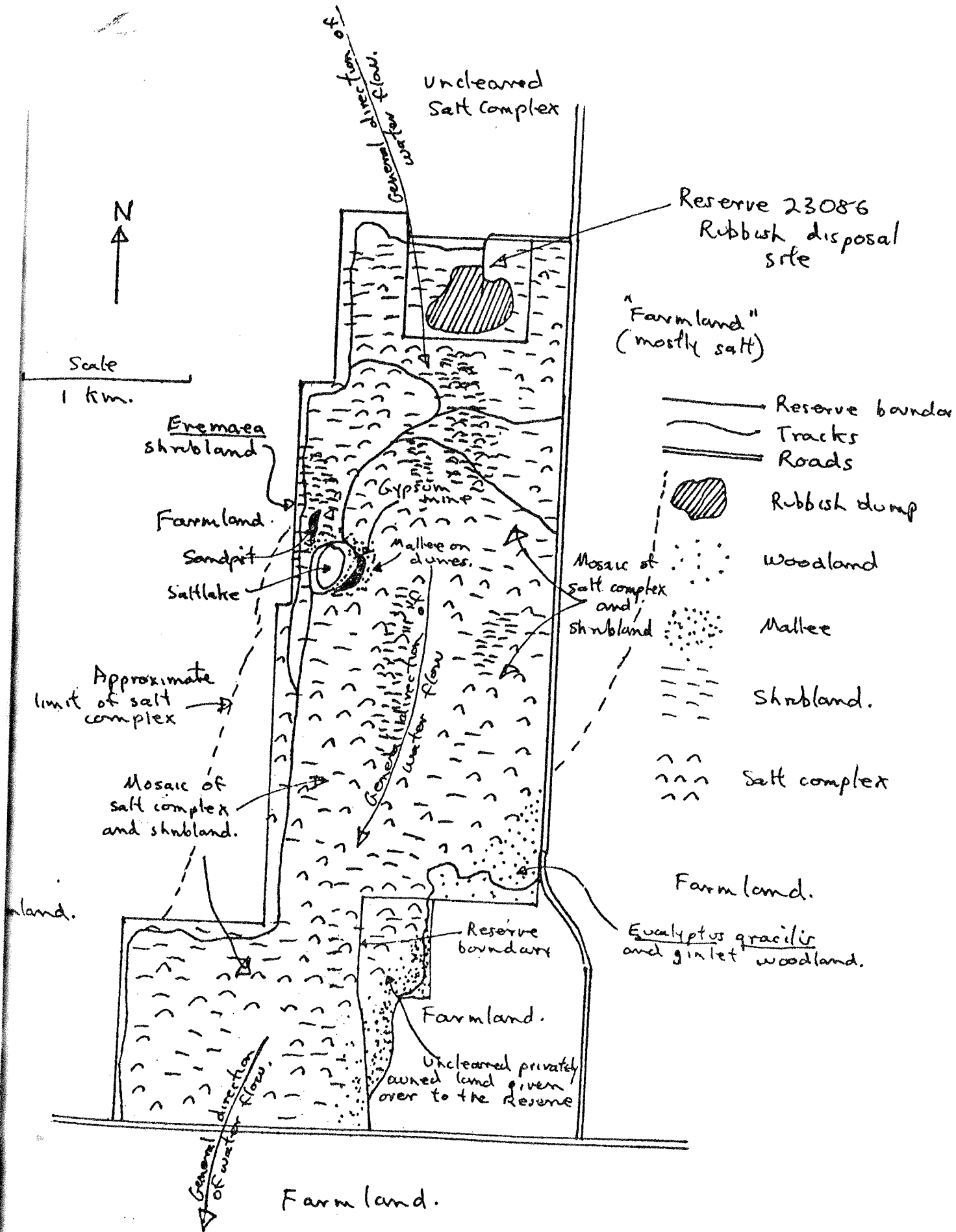


Plate 10. Reserve 24897. View SE into Eremaea pauciflora-Grevillea pritzellii heath with emergent Woody Pear trees.



Plate 11. Reserve 24897. Eucalyptus gracilis woodland with scattered understory shrubs. View N from SE corner of Reserve.

Reserve 24897



30.

Reserves 25112, 26266

Located about 15 km due N of Pantapin Siding and shown on lithograph. 2434-111, BC1. In this report the two Reserves will be dealt with as one as they are entirely contiguous.

Background

Reserve 25112 was gazetted for "Conservation of Flora" on 3 October 1958 and Reserve 25266 was gazetted for "Conservation of Flora" on 4 May 1962.

Physical characteristics

The two Reserves form a roughly rectangular complex, Reserve 25112 being narrowly rectangular and contiguous with the western boundary of Reserve 26266 which is more irregular in shape (see map). The reserves have an area of 95.9940 ha and 148.4741 ha respectively, giving a total area of 244.4681 ha. Perimeter of the outer boundary of the combined Reserves is about 11 km and the Reserves are virtually flat and about 230 m above sea level. The majority of the Reserve is salt flat with low ridges supporting heath or shrubland vegetation and higher ridges supporting woodland.

Vegetation

Woodland

The western border of the Reserves (mostly on 25112) has Eucalyptus gracilis and some E. salubris (Gimlet) Low Woodland A over Acacia colletioides and Melaleuca hamulosa Open Scrub. Soil here is colluvial and derived from nearby granite areas. It is a light brownish grey, clayey sand.

Thickets

Slight mounds within the salt complex carry one of two very different associations. The commonest is Melaleuca hamulosa Thicket or Dense Thicket with no understory. The other association is Callistemon phoeniceus Scrub with variable understory. This latter assemblage of plants has not been encountered elsewhere in the wheatbelt during my studies.

31.

Salt complex

The remainder of the Reserve is salt complex with bare salt flat or Arthrocnemum halocnemoides Dwarf Scrub D.

Plant species

Twenty plant species were recorded, 6 in woodland, 7 in M. hamulosa thickets, 7 in Callistemon phoeniceus thickets and 5 on salt flat. Three species are exploited by the wildflower seed trade.

Weeds

None were noted apart from occasional Avena sativa fatua (Wild-oat) in the woodland.

Fire history

The woodland has not been burnt for a very long time and the salt complex and thickets have probably never been burnt.

Fauna

Kangaroo scats noted throughout the Reserve. Crows' nests and recently used nesting hollows in trees apparent. Possible Echidna (Tachyglossus aculeatus) diggings in woodland. Reserve was examined at mid-afternoon on very hot, still day. It is thus likely that many species of birds are present but were not sighted.

Exotic fauna

Rabbits common in thickets; warrens and fresh scats noted. Some sheep trampling noted in woodland.

Firebreaks and fences

No firebreaks other than those in adjacent farmland. The fences that were examined were substantial and in good condition.

32.

Human usage

None noted.

Adjacent uncleared land

The salt complex of which these Reserves are part extends to the NE and SW and passes between Mts. Caroline and Stirling. The Reserves are directly or indirectly connected to numerous other areas of bushland.

Opinion and recommendations

This Reserve is important in that it contains at least one assemblage of plants uncommon elsewhere (Callistemon phoeniceus thicket). Additionally it is close to Mts. Stirling and Caroline, both of which are important Reserves known to contain interesting or unusual assemblages of plants and animals. Thus these Reserves together with others nearby (including Reserve 11024, this report) form a group of reserves which may well represent an area of unusual floral and faunal assemblage.

I recommend that Reserve 25112 and 26266 be vested in the Western Australian Wildlife Authority.

APPENDIX 6
VEGETATION DETAILS RESERVES 25112, 26266

Woodland

Eucalyptus gracilis and E. salubris trees, mature to senescent, 8-12 m tall, 10-30% canopy cover over Acacia colletioides shrubs 1-2 m tall and Melaleuca hamulosa shrubs 2-3 m tall, 2-10% canopy cover. Other species noted were Santalum acuminatum (Quandong) and Rhagodia spinescens.

Melaleuca hamulosa Thicket

M. hamulosa shrubs, mature, 3-5 m tall and variable density, from 30% to almost 100% canopy cover. Other species noted were: Acacia colletioides, Carpobrotus sp., Dianella revoluta, Melaleuca thyoides and Rhagodia nutans.

Callistemon phoeniceus scrub

C. phoeniceus shrubs, mature, 1-4 m tall, 10-30% canopy cover over a variable understory (often below 2%) of Rhagodia spinescens, Enchylaena tomentosa and Thryptomene sp. Other species recorded were M. uncinata (Broombush), Santalum acuminatum (Quandong) and Atriplex sp.

Salt complex

Arthrocnemum halocnemoides shrubs 30 cm tall, and of very patchy distribution, from totally absent to almost 70% canopy cover. There are also scattered A. bidens, particularly on the western side of the Reserve and Arthrocnemum lylei where water flow is greatest. Other species recorded were: Disphyma blackii and Maireana brevifolia.

34.



Plate 12. Reserve 25112. View N on W boundary of Reserve showing Eucalyptus gracilis woodland with some Gimlet.



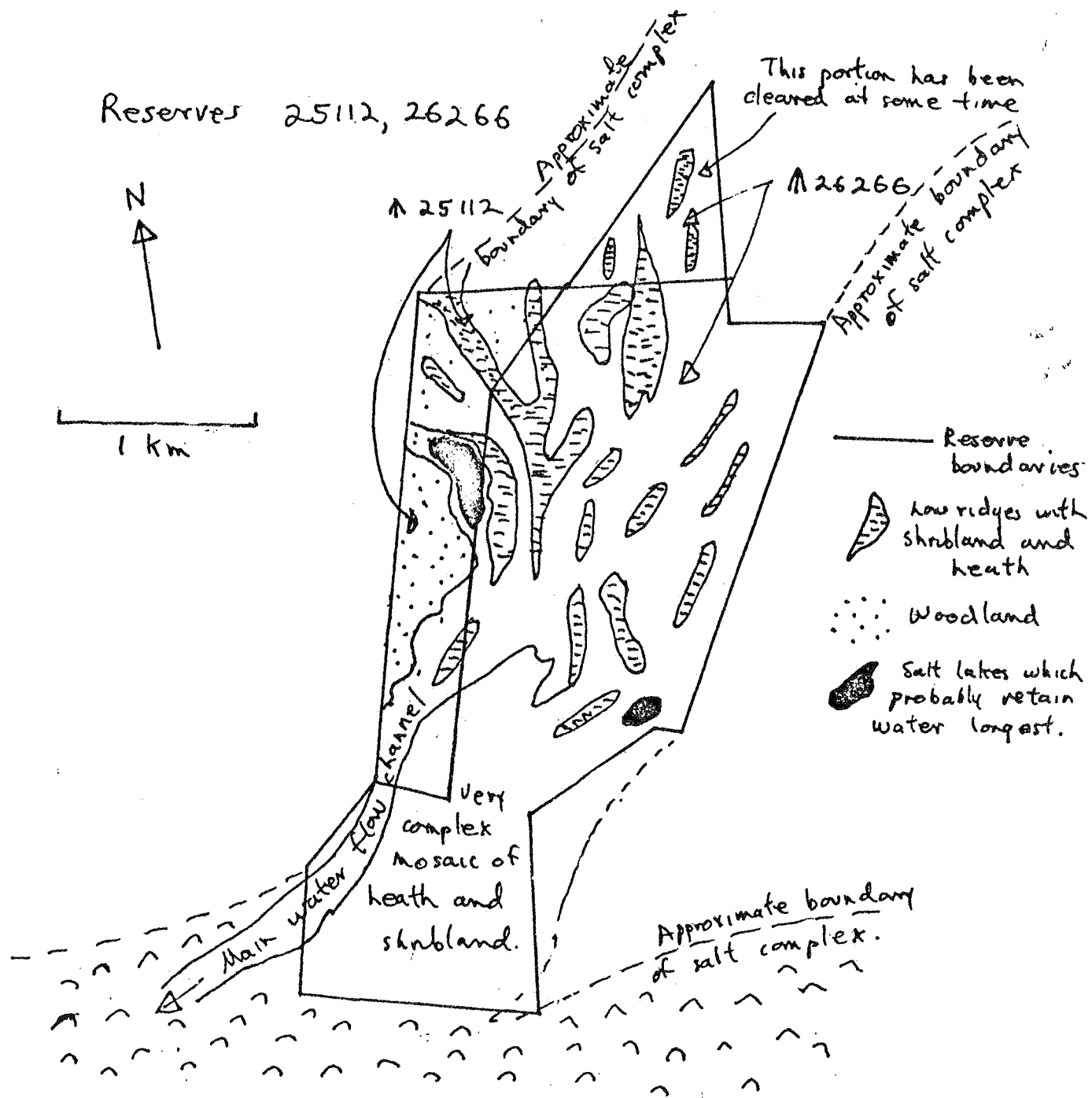
Plate 13. Reserve 26266. View E in central part of Reserve showing Melaleuca hamulosa thickets.



Plate 14. Reserve 26266. View E across low sandy rise with Callistemon phoeniceus shrubland over a shrubby understory. This assemblage of plant species is considered uncommon in the wheatbelt.



Plate 15. Reserve 26266. View E from southern end of Reserve 25112 showing samphire flats with Melaleuca hamulosa thickets on low ridges in distance.



Reserve 30903

Located ca 16 km due N of Kwolyin Siding and shown on lithograph 2434-111, C1.

Background

Originally gazetted 25 June 1971. Established as a surveyed road, not used, and so turned over to "Conservation of Flora".

Physical characteristics

The Reserve is linear, has an area of 11.4324 ha and a perimeter of ca 5.5 km, being ca 2.7 km long and ca 50 m wide. It lies in a roughly NNW to SSE orientation. The northern end is 250 m above sea level (ASL), the southern end 230 m ASL. There is thus a downslope towards the south. The higher areas have deep yellow sands, the midslope areas sand and clays mixed and the lower areas clayey soils.

Vegetation

The highest portion of the Reserve, on deep sand, has Hakea coriacea Low Forest B with almost no understory but abundant grasses.

Mid-slopes have Eucalyptus albida trees and tree-mallee or E. transcontinentalis tree mallee, mostly as an Open or Very Open Tree Mallee association. Again understory is almost absent.

Lower slopes and flats have E. salmonophloia (Salmon Gum) Open Woodland over E. transcontinentalis Very Open Tree Mallee.

Plant species

A total of 15 plant species were recorded, 3 of which are exploited by the wildflower seed trade.

Weeds

The Reserve is infested by grass, mainly Avena fatua sativa (Wild-oat) and Enneapogon caerulescens.

37.

Fire

There is no evidence of fire in any of the associations for at least the last 30 years.

Fauna

Port Lincoln Parrot (Platycercus zonarius zonarius), Galah (Cacatua roseicapilla), an unidentified honeyeater, Yellow-Throated Miner (Manorina flavigula) and Weebill (Smicronis brevirostris) were recorded.

Exotic fauna

None noted, but the whole Reserve is badly trampled by sheep.

Firebreaks and fences

No firebreaks apart from those in adjacent paddocks although the vegetation would not support a fire. The eastern side of the Reserve is unfenced and sheep move freely into it. The western side has a substantial fence.

Human usage

Minimal rubbish dumping, no other recorded. Extreme N end of Reserve is adjacent to Reserve 30903, a gravel pit.

Adjacent uncleared land.

There is a small amount of uncleared woodland to the south of the Reserve.

Opinion and recommendations

Like many other reserves of this type, Reserve 30903 forms an important part of the "corridors" of vegetation which connect other reserves and uncleared land, thus forming a network suitable for use by migratory birds.

Otherwise the Reserve is too degraded to support much fauna. Exclusion of sheep by renewed fencing would allow understory grasses to develop and create a fire hazard. I suggest the Reserve be left as it is, but vested in the Western Australian Wildlife Authority.

APPENDIX 7
VEGETATION DETAILS RESERVE 30903

Hakea coriacea association

Hakea coriacea and scattered Casuarina acutivalvis trees, very senescent, 4-6 m tall, 30-70% canopy cover. No understory, but scattered Ecdeiocolea monostachya sedge and much Enneapogon caeruleus grass. The soil is yellow, clay loam with abundant quartz grit.

Mid-slope associations

Eucalyptus albida tree mallee and trees, mature, 5-11 m tall, 2-10% canopy cover with scattered E. loxophleba and E. transcontinentalis. Closer to the Salmon Gum woodland the association becomes more E. transcontinentalis with occasional E. cylindriflora tree mallee, 6-9 m tall, 10-30% canopy cover. There is no understory but scattered Melaleuca adnata, M. hamulosa and Acacia sp. are present.

Salmon Gum association

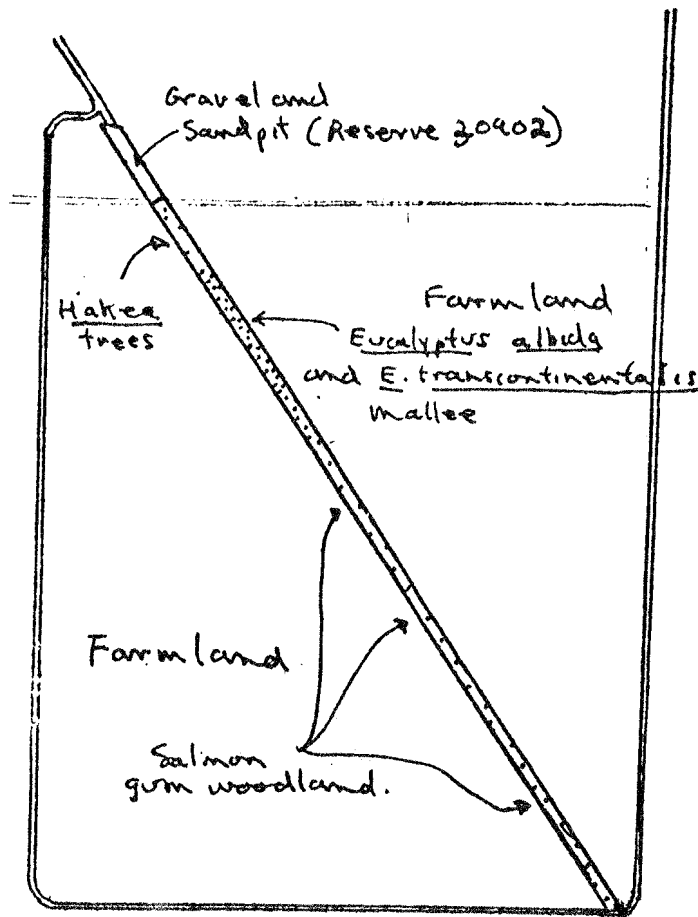
Eucalyptus salmonophloia trees, mature to senescent, 12-18 m tall, ca 2% canopy cover over E. transcontinentalis tree mallee, 6-9 m tall, 2-10% canopy cover. There are scattered Bertya cunninghami, Acacia acuaria and Santalum acuminatum (Quandong) present. Soil is pale brown, clayey sand.



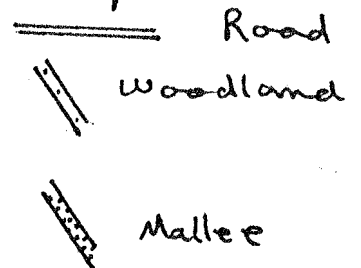
Plate 16. Reserve 30903. View S along E boundary of Reserve. Association is Salmon Gum woodland over Eucalyptus transcontinentalis tree mallees. Scattered understory shrubs are present.



Plate 17. Reserve 30903. View W across Reserve at its northern end. Very old Hakea coriacea trees form a fairly dense cover. Grasses have displaced most native understory species.



Reserve 30903



APPENDIX 8
METHODOLOGY OF SURVEY

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

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.

Vegetation was classified using Muir's (1977) system (see Table 1) and soils described briefly using Northcote's (1971) texture classification and Munsell (1954) color terms. Plant species of importance and that were not recognised, were determined from published keys and then checked against specimens in the Western Australian Herbarium.

Fire history was determined by observation on the reserve, based on previous experience, by enquiries from nearby farmers and by examination of air-photographs.

Fauna were not specifically sought but some species (usually the more obvious) were encountered while examining vegetation. Scats, footprints, burrows, nests, and other indirect evidence is used only where identification is certain. Observations by farmers are used if considered reliable.

41.

References

- MUNSELL COLOR COMPANY (1954). Munsell soil color charts. Baltimore, Md., Munsell Color Co.
- MUIR, B.G. (1977). Vegetation and habitat of Bendering Reserve. Biological survey of the Western Australian wheatbelt. Pt. 2.
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- NORTHCOTE, K.H. (1971). A factual key for the recognition of Australian soils. Glenside, S.A., C.S.I.R.O./Rellim.