ITINERARY - CSIRO INSTITUTE VISIT/FIELD TRIP 064002

27 November 1985

0715	Depart New Esplanade Hotel
0730	Depart Como by minibus along Albany and Brookton Highways.
0900	Detour into Russell MPA, virgin wandoo commentary by Mr Joe Havel
1030	Arrive Tutanning Nature Reserve Stop 1 Revegetation of previously cleared farm land
1100	Tutanning Stop 2 Small patch of low heath - discussion of patchiness
1130	Travel on through Tutanning with commentary by Mr Angas Hopkins
1200	Lunch at Research Station with discussion of work being undertaken and proposal for study of wheatbelt reserves
1300	Depart Tutanning for Dryandra with brief stop at Ovens Nature Reserve - discussion of problems of management of small reserves
1400	Dryandra State Forest arrive Stop 1 discussion of numbat research program - Tony Friend
1430	Dryandra State Forest Stop 2 an area burnt in autumn 1985
1500	Depart Dryandra for Perth via Pumphreys Bridge
1730	ETA Como
1745	ETA New Esplanade Hotel

PERSONNEL

CALM

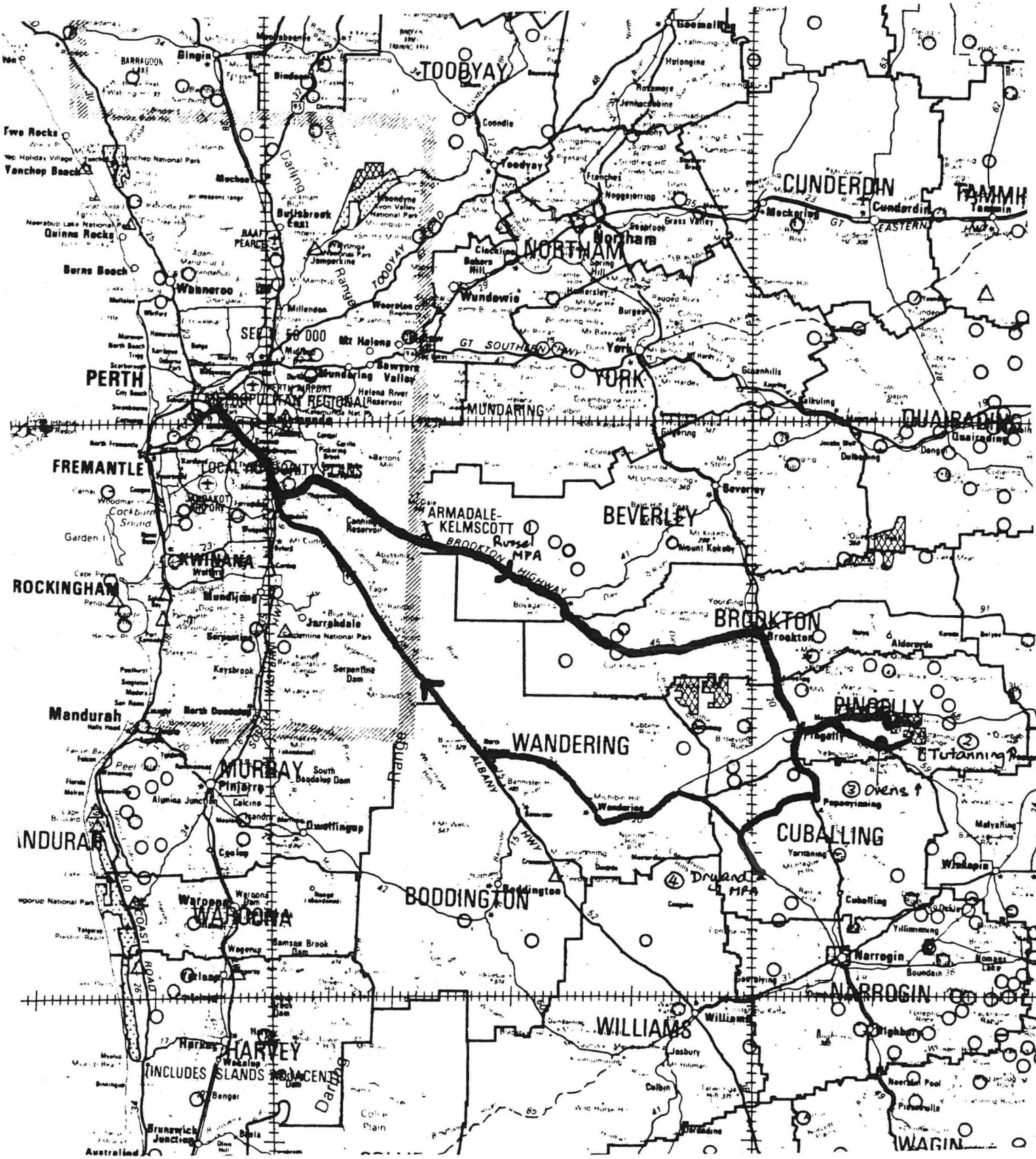
Mr Joe Havel
Mr Chris Haynes
Mr Jim Sharpe
Dr Andrew Burbidge
Dr Gordon Friend
Mr Angas Hopkins
Mr Ken Wallace (at Tutanning)

Dr Tony Friend (at Dryandra)

CSIRO

Dr Ted Henzell
Dr Brian Walker
Dr Dick Millington
Dr David Mitchell
Dr Phil Carne
Dr Edwin Mak
Mr Jack Brophy
Dr Denis Saunders
Dr Graeme Arnold
Dr Richard Hobbs

WRC:1A:ITINER



ROUTE - CSIRO INSTITUTE FIELD TRIP

27 NOVEMBER 1985

RUSSELL

PURPOSE

The primary purpose of the Russell Management Priority Area is the preservation of the largest remaining area of virgin wandoo woodland in System 6. Provision is also made for the conservation of a number of associated vegetation types, and of the fauna associated with them.

GENERAL FEATURES

Russell is located sixty-five kilometers south-east of Perth to the north of the Brookton Highway in the State Forest of the Mundaring Division.

Russell is similar in vegetation to parts of Gyngoorda (3.4), Duncan (3.5), Wandering (3.10) and Stene (10.8). It consists of dissected lateritic slopes, lateritic uplands and gently incised valleys which typify the Nockine Surface. It is drained by the headwaters of the Beraking Brook which flows into Mundaring Weir.

The uplands carry an open forest of Eucalyptus marginata, E. calophylla and E. accedens. Open woodland of E. wandoo, sometimes in admixture with E. patens and E. rudis, covers the valleys. Lower, more open vegetation occurs in swamps and on rock outcrops.

Logging, followed by regeneration, took place in the buffer zone during 1950-1973. The core remains in the virgin state. Dieback occurrence is restricted to a few peripheral gullies and depressions. The undisturbed core and the cut-over buffer provide an excellent opportunity to study the impact of logging.

VEGETATION

The dominant vegetation types are H, M and Y. The types A, D, E, F , G, J, L and Z are also present but only on smaller areas.

Type H of the uplands is open forest of E. marginata - E. calophylla largely without understorey, and with shrub storey of Hakea cyclocarpa, Daviesia pectinata, Isopogon dubius and Styphelia tenuiflora. Optimum development of E. accedens ocurs near the transition between this type and type M. The latter is primarily a mixed forest of E. wandoo, E. marginata, E. calophylla and E. accedens on upper slopes. It lacks understorey, but has well developed shrub storey of Hakea lissocarpha, Gastrolobium calycinum and Macrozamia riedlei. Type Y of the lower slopes and valley floors is an open woodland of E. wandoo, without understorey but with a shrub and sedge storey of Hakea lissocarpha, Hypocalymma angustifolium, Mesomelaena tetragona and Baechea camphorosmae.

SUMMARY AND RECOMMENDATIONS

1. Russell should be managed for the protection and conservation of the flora and fauna.

2. The area is particularly significant as it includes a substantial area of virgin wandoo.

3. Quarantine measures should be maintained and extended to include the buffer area in Russell.

4. Predictably, recreation will increase in the future. Recreational facilities such as picnic areas could be located in buffer areas along the Brookton Highway. Zoning should prevent recreational pressures on the virgin wandoo woodland.

TUTANNING NATURE RESERVE, WESTERN AUSTRALIA

Notes for post-workshop tour (28, 29 September 1985) prepared by AJM Hopkins, JM Brown and P Farrington.

The Regional Setting

The wheatbelt is the cereal producing area of the Southwest of the State and occupies an area of about 14 m ha within the 280 mm 580 mm annual rainfall zone. The biota is important for several reasons. The flora is rich in species (perhaps 2 000 vascular plants in total) of which a large proportion are endemics. It is probable that these two features reflect evolutionary history of the region where the dissection of the highly weathered, subdued, nutrient-poor, landscape has created a mosaic of soil types and microhabitats, patchy disturbances such as fire and drought have caused local extinctions and major wet-dry climatic cycles over the past 2.5 m year have promoted fragmentation of a poorly dispersed flora.

The fauna of the wheatbelt area was once extremely rich but has been reduced greatly since European settlement. For example, of the 44 mammal species originally recorded for the region, 4 are probably extinct, a further 11 are no longer found there (mainly confined to offshore islands) and the survival of an additional 10 species is in doubt.

The central wheatbelt that includes Tutanning was intensively settled over 100 years ago, at which time little priority was given to setting aside land for non-agricultural purposes. As a result nature reserves occupy only about 1.5% of the land area. The reserves are typically small (medium size 125 ha) and often poorly shaped and not representative of the variety of landforms. It is clear that the effective management of the existing reserves

is crucial to the persistence of the biota. The reserves are inadequate and under constant pressure because of the intensive nature of the adjacent land-use. Fire control and kangaroo management are major concerns; others include weed invasion, salinization, mining and general maintenance of the biological systems.

The Reserve

Tutanning Nature Reserve has an area of 2078 ha of which some 315 ha is in a block to the southeast separated from the main body of the reserve by 700 m of cleared farmland. The reserve was gazetted in 1960 over an area that had previously (1929) been set aside for timber. Over the past 25 years, extra land has been consolidated into the reserve; this has come about by inclusion of other timber reserves, road reserves and through the purchase of intervening blocks of farmland.

The reserve has a mediterranean-type climate which is mapped as Kopen Csa a or Thermomediterranean attenuated. Annual rainfall is about 420 mm while free pan evaporation is 1500 mm. Mean summer temperature is 22°C; that for winter is 10°C.

In the setting of the relatively subdued topography of south western Australia, Tutanning Nature Reserve encompasses an extremely diverse cross section of the landscape. The reserve includes the Dutarning Range and nearby lateritic plateau remnants to 440 m in elevation and a variety of lower numbers of the landform sequence to an evaluation of 340 m. At the top of the landform sequence is the Norrine landform unit which consists of a complex of lateritic residuals and associated sediments with pools of sand, gravelly sand duplex yellow soils and duricrust (fused laterite). In the middle of the sequence is the Noombling landform, a unit stripped of lateritic materials to produce gentle slopes with sandy loams, yellow duplex soils and

exposures of doleritic or granitic country rock. The slopes of the Noombling Unit run into a valley floor unit (Buberkine landform) which, in Tutanning, is composed mainly of coarse textured soils (Figures 1 and 2).

Tutanning Nature Reserve lies in the Avon District of the South West Botanical Province in an area with predominantly Eucalyptus and Banksia woodland vegetation. The vegetation map (Figure 3), however, illustrates the mosaic pattern of units on the reserve. There is some relationships between soils and vegetation. The lateritic soils together with the pockets of overlying sands support low woodlands (Eucalyptus accedens) and mallee (E. drummondii and E. pachyloma) together with shrublands dominated by Dryandra armata, D. nobilis, D. ferruginea, D. senecifolia (on laterite) and Leptospermum erubescens, Eremaea pauciflora Banksia sphaerocarpa, Conospermum stochadis, Davesia spp. and Hakea spp. (on sand). Pediment slopes below the lateritic breakaways support woodlands (E. astringens and E. accedens with some E. wandoo and Allocasuarina huegeliana) and shrublands (Dryandra proteoides). In the mid- to lower-slope areas below the heavy clay upper slopes, soils are predominantly sandy (to sandy loam) with occasional outcrops of granite and dolerite. Woodlands and low forests of E. wandoo, E. loxlphloeba, A. huegeliana, Acacia acuminata and A lasiocalyx occur, often with Oxylobium parviflorum (box poison) in the understorey. One small area of E. salmonophloia is located at the western end of the reserve. Sandy loams on the lower slopes and the drainage floor soils support woodlands E. wandoo, Allocasuarina huegeliana, Acacia lasiocalyx and A. saligna.

Despite its relatively small area, Tutanning has a rich biota which reflects the diversity of landform and soil units occurring there. Some 630 species of vascular plants have so far been collected. Thirteen species of terrestrial mammals have been reported for the reserve including the Tammar wallaby (Macropus eugenii) and Woylie (Bettongia

penicillata) which are relatively uncommon elsewhere in the South West.

Tutanning Nature Reserve has been the site of major ecological studies over the past decade.

The work has included:

1. The development of a grid of 316 permanently marked sampling points on a 250 grid interval and sampling of these (to be used per monitoring and other studies as well).

2. Detailed mapping soils, vegetation, fire history, and topography (development of a Geographical Information System).

3. Detailed ecological studies of species-rich shrublands on different soil types and in relation to fire history.

4. Studies of the effects of fire and subsequent regeneration of the vegetation (a prescribed fire in April 1985).

5. Studies of secondary succession and rehabilitation of abandoned farm land.

6. Studies of the ecology of the tammar and the woylie

7. Behavioural studies of the grey Kangaroo (Macropus fuliginosus).

8. Studies of fire fuel-accumulation, litter decay sites.

9. Some surveys of litter invertebrate.

10. Pattern analysis of species-rich shrublands.

11. Development of a version of PREPLAN, a computerised land management information system.

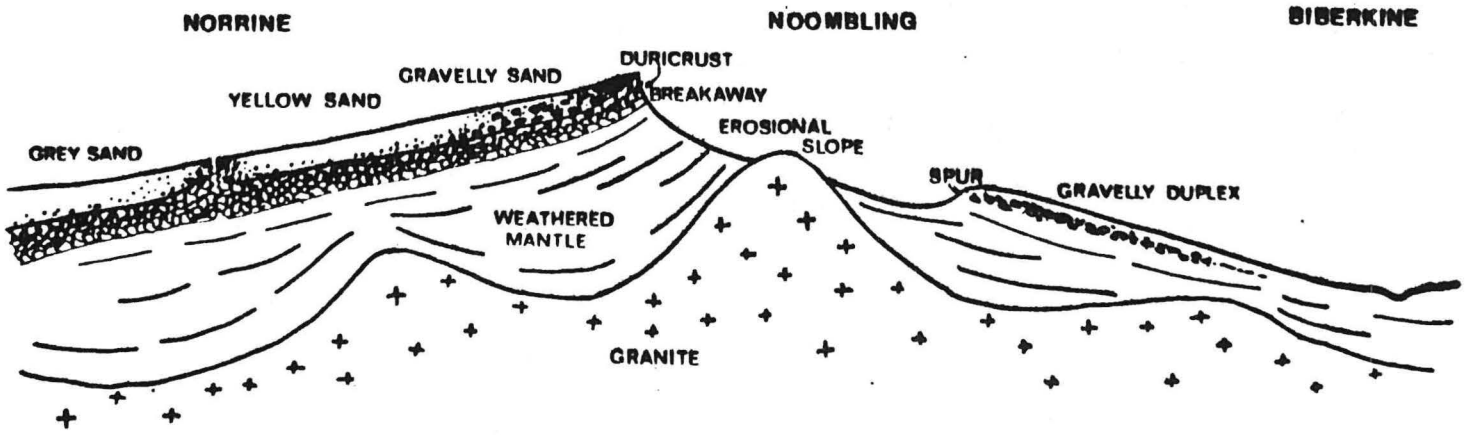
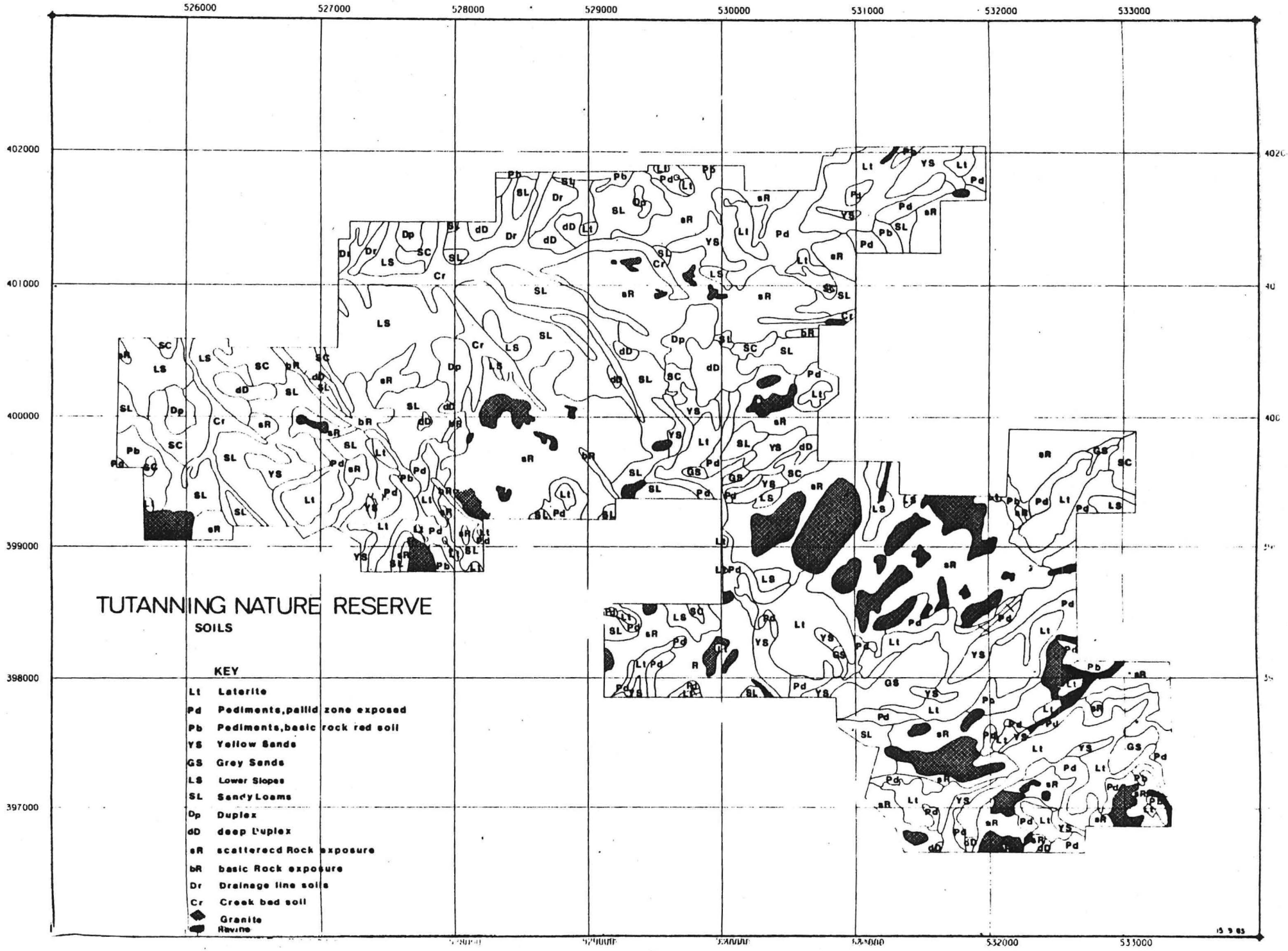


FIG 3. Cross section of the Tutanning landscape showing the landform units and the major soil types.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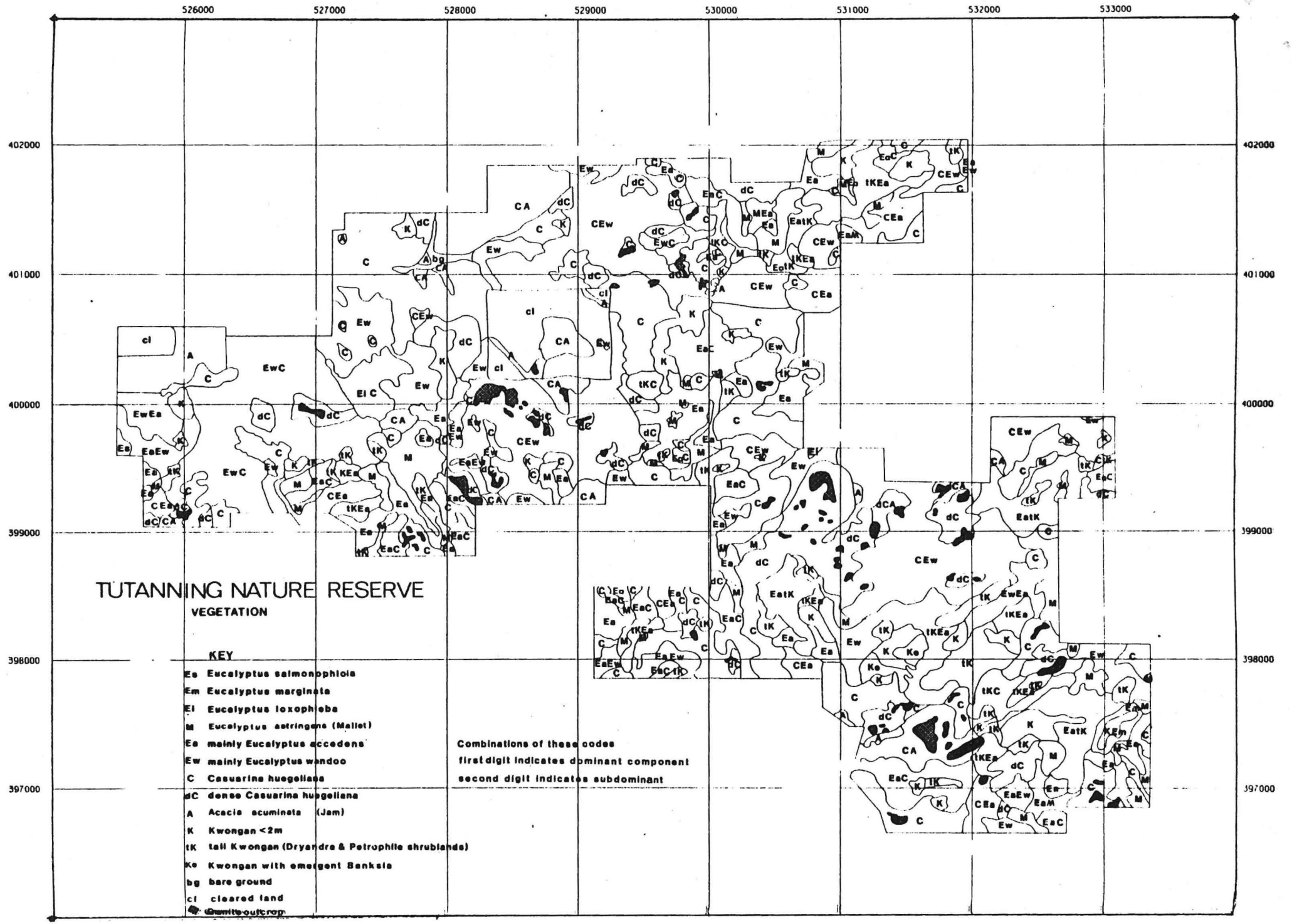
TUTANNING NATURE RESERVE
SOILS
KEY
Lt Laterite
Pd Pediments, pallid zone exposed
Pb Pediments, basic rock red soil
YS Yellow Sands
GS Grey Sands
LS Lower Slopes
SL Sandy Loams
Dp Duplex
dD deep Duplex
sR scatteredd Rock exposure
bR basic Rock exposure
Dr Drainage line soils
Cr Creek bed soil
Granite
Ravine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TUTANNING NATURE RESERVE
VEGETATION
KEY
Es Eucalyptus salmonophloia
Em Eucalyptus marginata
El Eucalyptus loxophleba
M Eucalyptus astringens (Mallet)
Ea mainly Eucalyptus accedens
Ew mainly Eucalyptus wandoo
C Casuarina huegeliana
dC dense Casuarina huegeliana
A Acacia acuminata (Jam)
K Kwongan <2m
tK tall Kwongan (Dryandra & Petrophile shrublands)
Ke Kwongan with emergent Banksia
bg bare ground
cl cleared land
Granite outcrop
Combinations of these codes
first digit indicates dominant component
second digit indicates subdominant

MOCKERDUNGULLING NATURE RESERVE
(THE OVEN) - PINGELLY A 2023

This small, 40 ha, nature reserve 17km east of Pingelly supports a remnant of York gum-Jam woodland; Eucalyptus loxophleba and Acacia acuminata. This vegetation type was used by early farmers as an indicator of 'good' deep red loams and consequently has largely been cleared. It occurs on the mid to lower parts of the landscape and is not well represented on the upland reserves; Tutanning, Boyagin and Dryandra. It is now difficult to find stands of York gum with the original shrub and ground layer intact, due to grazing and weed invasion. The Oven reserve is an example of a degraded but mature York gum community highlighting some of the management problems associated with small reserves.

The reserve had not been burnt for over 30 years prior to April 1985 when one third was intentionally burnt. This hot fire (scorch hieght to 5m) killed the Jam and Casuarina and the York gum was sprouting from the crown (observed Nov 85). An increase in wild oats was obvious but few native tree seedlings were found.

Recovery will be limited by the availability of native seed and the prolific weed invasion.

Four monitoring sites were set up prior to the fire and two are in the burnt area.

WRC:44:MOCKERD

NATURE RESERVE 1 2023

18

FIRE BREAKS PLOUGHED 28/8/86.
3 hours. including pushing in of
break along south of creek
Carried out by R.L.B.

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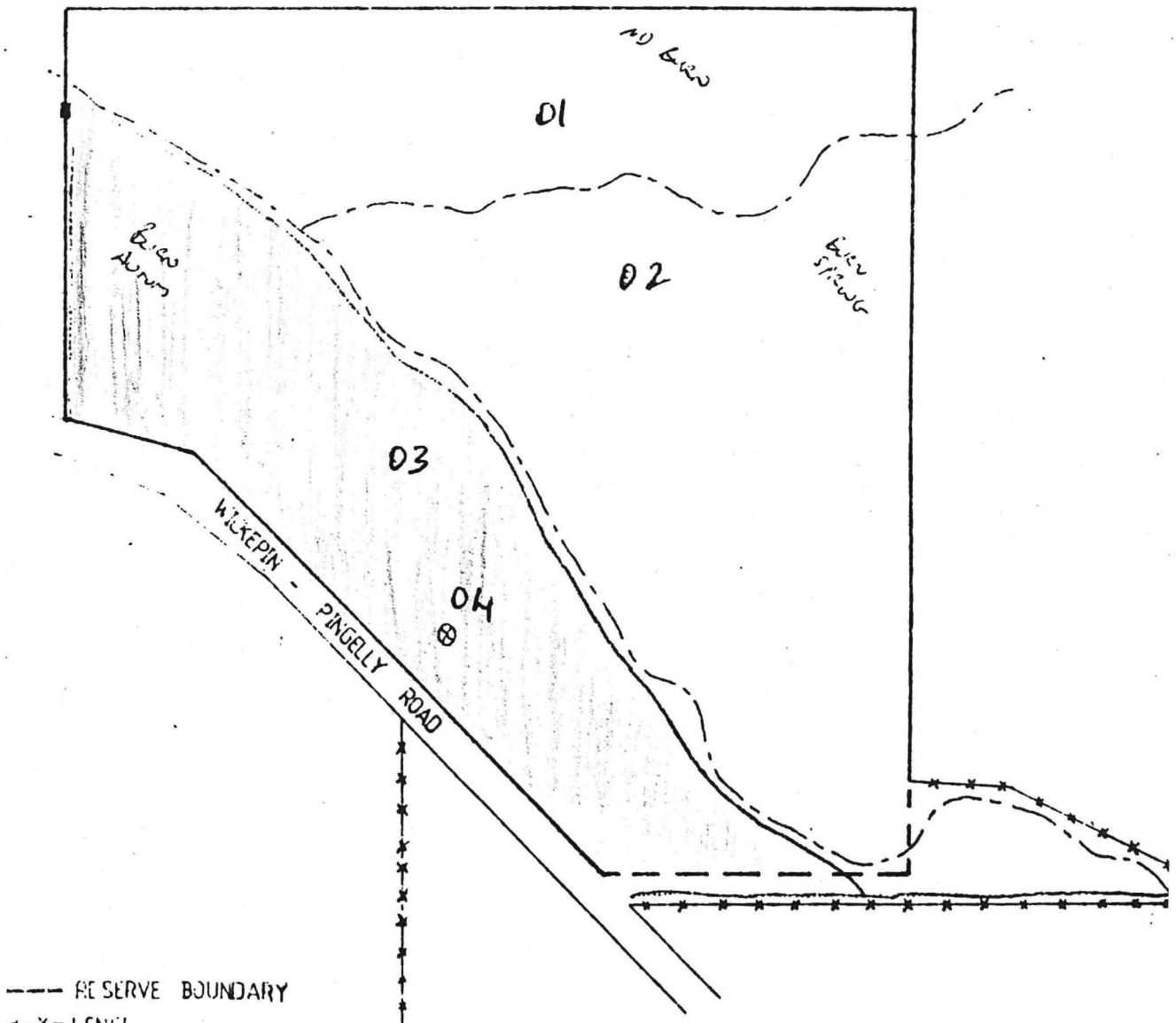


RESERVE BOUNDARY
FENCE
WATERCOURSE
GATE OUT OF RESERVE
GATE ON ADJOINING LAND
WELL
TRACK
DAM

SCALE 1:5000
1cm = 50m
Area 404686ha

R.L.B. 21.8.86

DRYANDRA FOREST

Background

Much of the 28 000 ha of Dryandra Forest was set aside as State Forest in 1926 for the establishment of brown mallet (Eucalyptus astringens) plantations. This species occurs naturally in small stands below low laterite cliffs in the area, and was valued as a source of tannin. By 1962, 8 000 ha of plantation had been established at Dryandra and this is still maintained today.

By the time the natural tannin market collapsed in the early 1960s, a small industry manufacturing tool handles from mallet timber had been set up, so the area was retained as State Forest, although its value for nature conservation was acknowledged. Land tenure at Dryandra was rationalised at this time, and several small adjacent nature reserves and a large water reserve (supplying water for steam engines on the local railway) were incorporated into the State Forest.

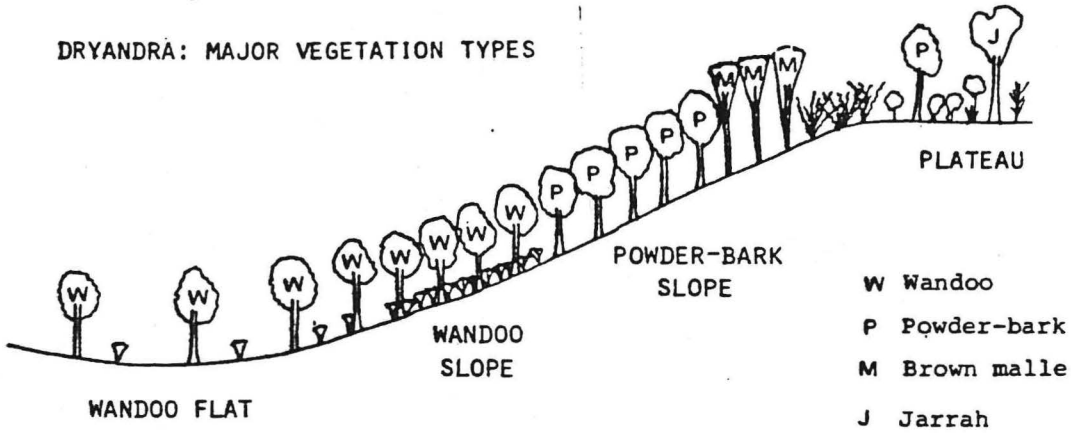
Apart from the water reserve, most valleys around and within the Dryandra area were excluded from the Forest and have been cleared for agriculture. As a result, the Forest consists of a large amount of upland (which was most suitable for mallet) and its shape is extremely dissected (see map).

Conservation value

The main conservation value of Dryandra Forest is due to its size and position. It is the largest reserve in an area which was rich in mammal species until clearing for agriculture removed most native vegetation. Although some species have undoubtedly been lost (Crescent Nail-tailed Wallaby, Western Barred Bandicoot, Burrowing Bettong,

Rabbit-eared Bandicoot) the fauna of Dryandra includes the Numbat, Brush-tailed Bettong, Red-tailed Phascogale and Western Quoll (all listed as rare and endangered) as well as the Common Ringtail Possum (rare in W.A.). Other interesting/rare species present include the Mallee-fowl, Crested Shrike-tit and Carpet Python. The avifauna comprises well over 100 species. The Forest has not been surveyed for rare plants, but it is likely that a number will be found there.

A diagrammatic representation of the forest types and their place in the landscape is shown below:



The lower slope and valley floor vegetation types (dominated by E. wandoo) are poorly represented in wheatbelt reserves. These areas comprise the favoured habitat of the Numbat.

Management problems

Dissected shape, high edge : area ratio

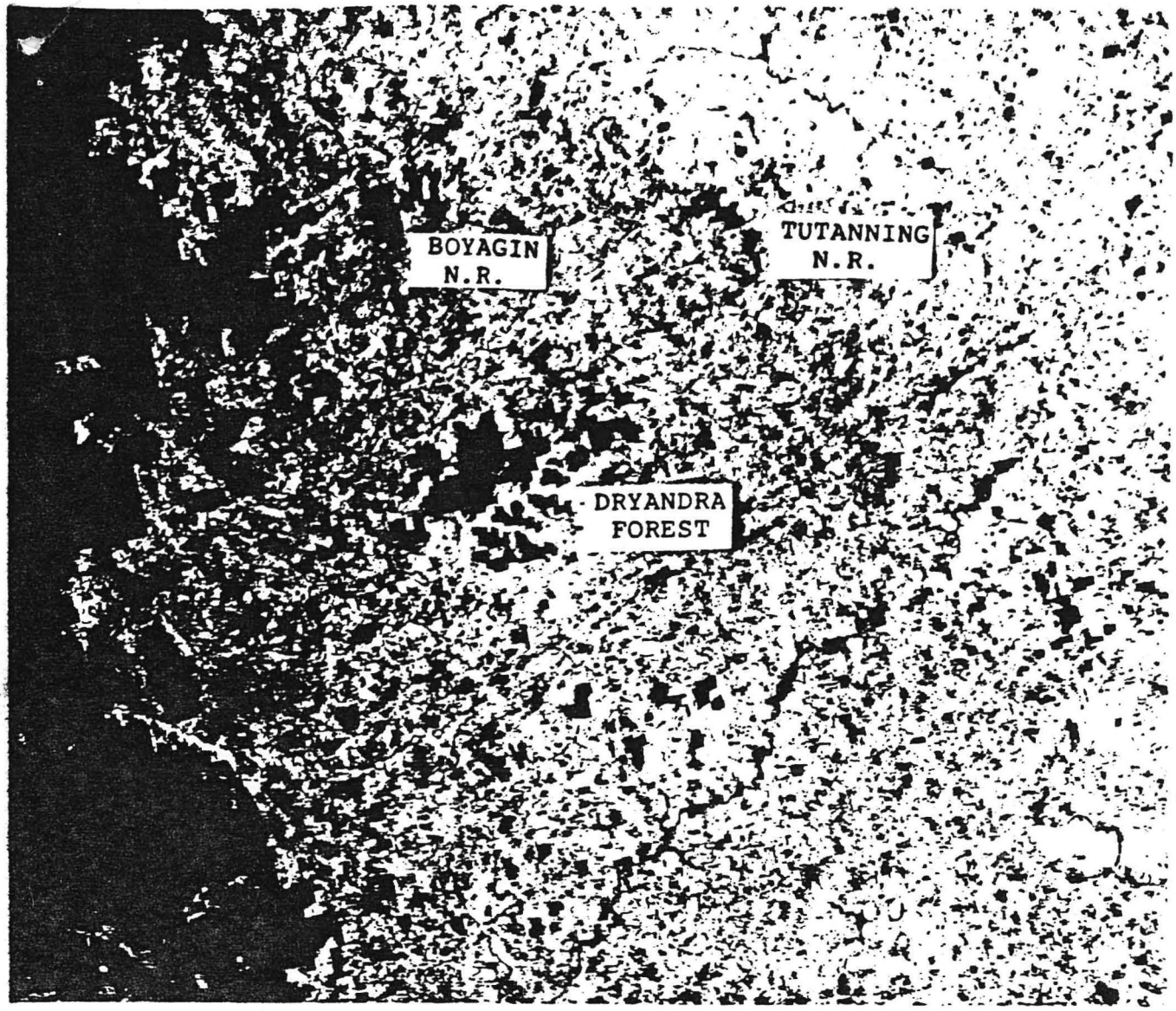
- weed invasion
- fire incursion
- edge maintenance

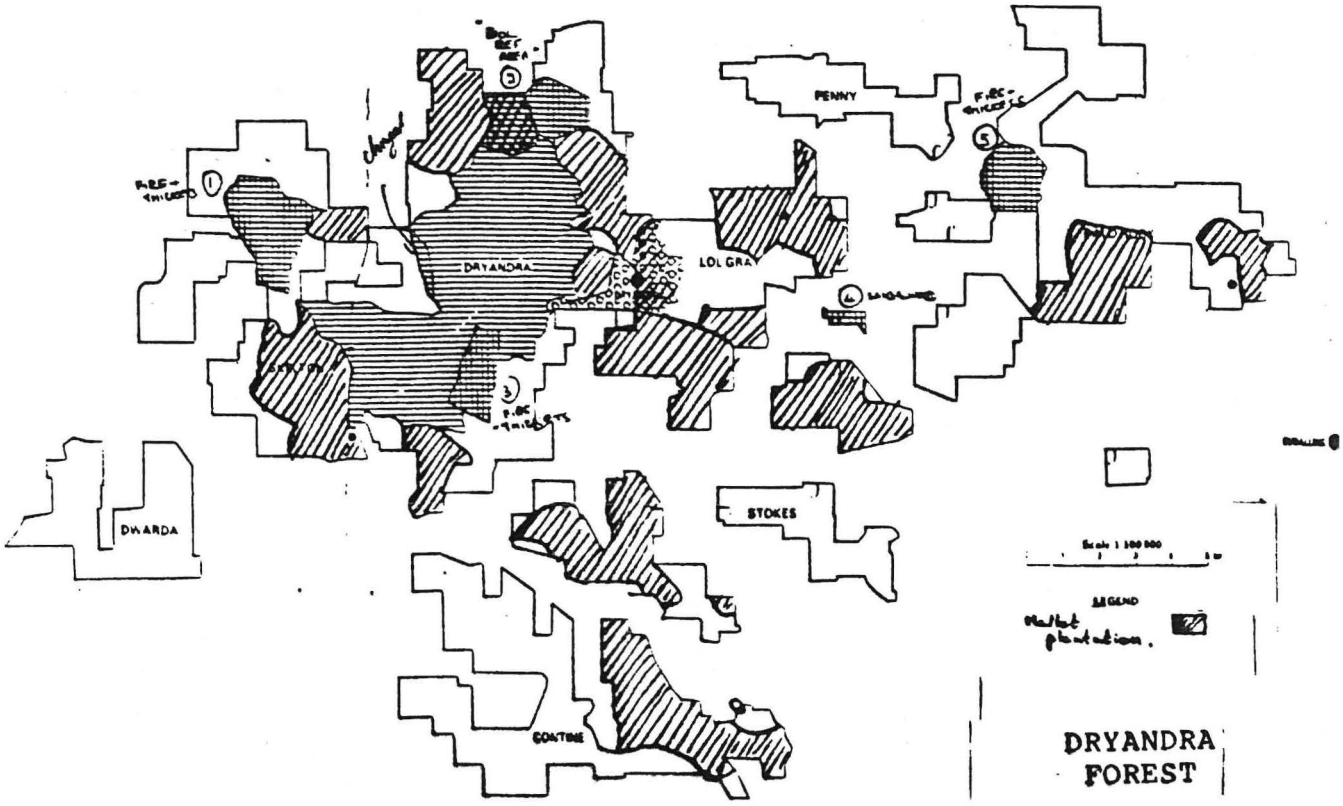
Fragmented nature

- discrete gene pools

Mallet plantations

- valuable for wildlife?
- rehabilitation methods


BOYAGIN
N.R.
TUTANNING
N.R.
DRYANDRA
FOREST
50 km


PENNY
DRYANDRA
LOL GRAY
STOKES
DWARDA
DRYANDRA
FOREST