FIRE MANAGEMENT ON NATURE CONSERVATION LANDS

A NATIONAL WORKSHOP

October 1987

Department of Conservation and Land Management, W.A.

FIELD TRIP

BORANUP FOREST AND

LEEUWIN-NATURALISTE NATIONAL PARK

WEDNESDAY, OCTOBER 14 1987.

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INTRODUCTION

The Boranup forest and Leeuwin-Naturaliste National Park illustrate some of the many factors which must be considered in relation to fire management in conservation lands. Whilst some may be peculiar to this area, others are generally applicable to a greater or lesser extent. Discussions on the field trip may assist to "set the scene" for considerations during the workshop sessions.

The accompanying notes (largely Frewer et al [N.D]) provide some brief background.

1. Vegetation.

Vegetation plays a vital role in the ecosystem, nutrient recycling, maintenance of water quality, soil stabilisation, provision of habitats and landscape values.

The vegetation also determines the type, arrangement and rate of accumulation of fuels.

Within this area there is a very wide range of vegetation types which may influence fire management both in their differing fuel types and responses to fire.

1.1 Vegetation Description.

The area comprises part of the Boranup and Chapman vegetation systems defined by Smith (1973). The complexity of the vegetation associations within these systems reflect physical environmental factors, such as climate, soil types, geology and exposure.

(a) Karri forest.

Karri (Eucalyptus diversicolor) forest is primarily found in more southerly parts of the Study Area. Stands are supported by limestone soils in contrast to the typical soils of granite or gneiss origin.

The most northerly stand of karri occurs north of Quininup Brook, within Reserve 8428 (approx. 10 km south of Yalingup). The largest stands of karri occur in the Boranup Forest block.

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Karri usually occurs in pure stands (Smith, 1973), grading into jarrah (Eucalyptus marginata) and marri (Eucalyptus calophylla) at its edges. Understorey tree species include bull banksia (Banksia grandis), peppermint (Agonis flexuosa), swamp banksia (Banksia littoralis), Allocasuarina decussata, and Agonis juniperina. Common shrubs include Acacia pentadenia, Chorilaena quercifolia, Hibbertia tetrandra and Hovea elliptica (Smith, 1973). Bracken (Pteridium esculentum) often replaces scrub which has been subject to periodic burning.

(b) Jarrah/Marri associations.

Jarrah and jarrah-marri open forest associations replace the karri forest in sheltered areas with lateritic soils. Understorey trees include Banksia and Allocasuarina species, peppermint, snottygobble (Persoonia longifolia) and christmas trees (Nuytsia floribunda). Blackboys (Xanthorrhoea preissii) are common.

As exposure increases, open forest associations are replaced by jarrah woodlands; jarrah-marri, peppermint or banksia low open forest; and jarrah, banksia or peppermint low woodlands.

(c) Scrub associations.

Sheltered areas on the westerly facing slopes of the Ridge often support peppermint closed scrub associations. Peppermint is accompanied by parrot bush (Dryandra sessilis) in the limestone soils north of Cape Leeuwin and with Boronia elata near Deepdene (Smith, 1973).

Peppermint open scrub occurs widely on coastal sands and limestones. Principal species include peppermint, Jacksonia horrida and Acacia decipiens. Where limestone is present, parrot bush and Melaleuca huegelii occur. Near Cape Naturaliste, the peppermint open scrub consists of jarrah as tall shrubs. In some areas, Banksia species or bullich (Eucalyptus megacarpa) are common.

(d) Heath.

Stable dunes and areas on the exposed western slopes of the Ridge are dominated by open heath associations. Principal species include Acacia decipiens, Jacksonia horrida, Scaevola crassifolia and S. nitida. Olearia axillaris becomes common towards the coast, whilst areas with limestone soils may support parrot bush or Melaleuca huegelii.

Areas close to the ocean, mobile sand dunes and blowouts, characteristically support a low shrubland dominated by Olearia axillaris.

(e) Wetlands.

Permanent swamps are usually surrounded by a belt of low open forest, consisting of paperbark (Melaleuca rhaphiophylla) and Agonis juniperina. Rushes, mainly Juncus sp. are common in the swamp floors.

Higher ground supports Melaleuca preissiana and swamp banksia. Near the northern coast, peppermint and flooded gum (Eucalyptus rudis) are common. The understorey of damp or frequently flooded areas usually consists of Gahnia trifida or Lepidosperma gladiatum.

1.2 Poorly Conserved Plant Communities.

There are several plant communities present within the area which are poorly conserved elsewhere, either locally or regionally.

Peppermint Open Forest.

Peppermint open forest occurs in sheltered valleys and hollows such as around Deepdene, west of Boranup State Forest, along Point Road and south of Yallingup. In these areas, they grow to more than 10 metres in height, whereas elsewhere height ranges from 2-10 metres. This association has few understorey species, the principal species being the sedge - Lepidosperma gladiatum.

Melaleuca Associations.

Melaleuca lanceolata forms stands of open forest near Bunker Bay, Canal Rocks and Conto's Field where the trees reach up to 12 metres in height. A low closed forest is located east of Cape Clairault and low open forest immediately north of Cape Leeuwin.

Melaleuca huegelii closed scrub can be found on the westerly slopes of the Leeuwin-Naturaliste Ridge in areas where limestone occurs close to the soil surface. This association is found near Yallingup, Canal Rocks, Cape Mentelle and Injidup Springs where it is accompanied by Dryandra sessilis (Smith, 1973).

Melaleuca preissiana occurs as an open woodland north of Conto's Road. Swamp banksia, is a frequently co-dominant species. Stunted jarrah and blackboys may be common. The understorey is a closed heath with close sedgeland in the wetter parts (Smith, 1973). Shrubs include Agonis parviceps, Astartea fascicularis

and Melaleuca preissiana. Common sedges include Lepidosperma longitudinale and Mesomelaena tetragona. Borania species also occur.

Banksia Low Woodland.

A banksia low woodland consisting primarily of Banksia species and jarrah occurs west of Augusta on high ground with sandy soils, also north east of Gracetown and north of Conto's Road.

Karri High Open Forest.

The most northerly stand of karri occurs in the valleys of the escarpment and slopes above Quininup Brook. In contrast to the karri of the southerly areas the trees are shorter stemmed with heavy branches and wide crowns (Smith, 1973).

1.3 Rare or Restricted Flora.

Four species of gazetted rare flora have been recorded from the area. A number of geographically restricted species have also been found within the area. Table 4 lists the known rare and endangered flora of the Study Area.

Rare and Endangered Species

SPECIES LIST, RARITY CLASSIFICATION AND DISTRIBUTION

GRF Gazetted rare flora
PG Proposed for gazettal as rare flora
RF Rare flora (not Gazetted)
R Geographically restricted flora
OP Outlying population (disjunct)
CR Confined to the Leeuwin-Naturaliste
CLN Confined to the Leeuwin-Naturaliste National Park
KNP Known from at least one population in the Leeuwin-Naturaliste National Park

		GRF	PG	RF	R	OP	CR	CLN	KNP
1.	Acacia inops	-	-	+	+	-	+	-	-
2.	A. mooreana	-	-	-	+	-	-	-	-
3.	A. subracemosa	-	-	+	+	-	+	-	+
4.	Boronia tenuis	+	-	-	-	+	-	-	-
5.	Bossiaea disticha	-	-	-	+	-	+	-	+
6.	Caladenia arrecta, ined	-	+	-	-	-	-	-	+
7.	C. abbreviata, ined	-	-	+	+	+	-	-	+
8.	C. caesarea ssp martima ined	-	+	-	+		+	-	-
9.	C. citrina, ined	-	+	-	+	-	+	-	+
10.	C. excelsa, ined	-	+	-	+	-	+	-	+
11.	C. gardneri ssp valida, ined	-	-	+	+	-	+	-	-
12.	C. grandis, ined	-	+	-	-	-	-	-	+
13.	C. nivalis, ined	-	-	+	+	-	+	+	+
14.	C. pectinata ssp pectinata	-	-	-	-	+	-	-	-
15.	C. viridescens, ined	-	+	-	+	-	+	-	-
16.	Calothamnus graniticus ssp graniticus	-	-	+	+	-	+	-	+
17.	Conostylis aculeata ssp gracilis, ined	-	-	+	+	-	+	-	+
18.	C. laxiflora	-	-	-	+	-	-	-	+
19.	Dasypogon hookeri	-	-	-	+	-	-	-	+
20.	Drakaea thynniphila	-	-	-	-	+	-	-	+
21.	Dryandra sessilis ssp nov	-	-	-	+	-	-	-	+
22.	Eucalyptus calcicola	+	-	-	+	-	+	+	+
23.	E. cornuta	-	-	-	-	-	-	-	+
24.	E. decipiens	-	-	-	-	+	-	-	+
25.	E. diversicolor	-	-	-	-	+	-	-	+
26.	E. phylacis, ined	-	+	-	+	-	+	-	-
27.	E. rudis ssp nov	-	-	-	+	-	+?	-	-
28.	Hybanthus volubis	-	-	+	+	-	+	-	-
29.	Hydrocotyle sp Hamelin Bay	-	-	+	+	-	+	-	-
30.	Isoetes sp	-	-	-	+	-	-	-?	-
31.	Jacksonia mollissima	-	-	+	+	-	-	-	+
32.	Johnsonia inconspicua	-	-	+	+	-	+	-	-
33.	Kennedia macrophylla	+	-	-	+	-	+	-	+
34.	Leptomeria ericoides	-	-	+	+	-	+	-	-
35.	Orthrosanthus polystachyus	-	-	-	+	-	-	-	-
36.	Prasophyllum triangulare	+	-	-	-	-	-	-	-
37.	Pultinaea drummondii	-	-	+	+	-	-	-	-
38.	Samolus valerandi	-	-	-	+	-	+	-	+

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		GRF	PG	RF	R	OP	CR	CLN	KNP
39.	Thelymitra aff pauciflora	-	-	+	+	-	+	-	+
40.	Thomasia foliosa	-	-	+	+	-	-	-	-
41.	T. laxiflora	-	-	+	+	-	-	-	-
42.	Thryptomene aff hyporhytis	-	-	-	+	-	+	-	+
43.	Wurmbea centralis	-	+	-	-	+	-	-	+
44.	W. sp?	-	-	-	-	+	-	-	-
45.	Caladenia infundibularis	-	-	-	+	-	+	-	+
46.	Hodgesoniola junciformis	-	-	+	+	-	+	-	-
47.	Stylidium affine	-	-	-	-	+	-	-	-

SOURCE: A Brown (1987, unpubl)

2. Dieback.

No activity, including fire management or fire control operations, should be undertaken without consideration of the risk of spread or introduction of dieback.

Dieback disease, caused by the fungus Phytophthora cinnamomi, poses a major threat to the values of the area. The fungus produces spores which infect plant roots and which, once established, prevent the plant from absorbing water or nutrients, eventually causing death or severe degradation. The fungus is known to attack at least 900 plant species from a variety of families. Proteaceae, Leguminaceae, Epacridaceae and Myrtaceae are the four most vulnerable plant families (Muir, B.G. (N.D.) unpubl).

Dieback can be introduced into an area by a number of vectors. This includes water flow, transportation of an infected host or on the feet of animals. The wheels and underbodies of vehicles are recognised as being major transmitters of the disease.

The disease may be most evident at the base of slopes and along drainage lines. It spreads slowly uphill, usually at less than 30cm per year, but can move downhill freely.

The mobile stage of the fungus is only able to spread in wet and warm conditions. Areas safest from infection are hill tops or areas up-slope from existing infections.

The impact of the disease is dependent on factors such as landscape, aspect, vegetation type, drainage characteristics and host susceptibility. Site investigations can identify the degree of dieback impact. Low impact areas are defined as those sites where some susceptible plants in the understorey are killed by the disease. High impact areas are those where most susceptible understorey plants and over half of the overstorey species are dead or dying from the disease.

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3. Fire History.

Australian ecosystems have evolved in the presence of fire. Fire was of extreme importance both to Aboriginal communities and to the Australian vegetation, fauna and landscape. Prior to European settlement, Aborigines appear to have established a harmonious fire equilibrium (Ford, 1985). Their initial impact on the environment is presumed to have caused marked changes. Fire was used by Aborigines for hunting, cooking and access through dense vegetation. According to Hallam (1975) and Underwood and Christensen (1978), these fires were probably periodic and varied greatly in area. Since European settlement the fire regime has been modified by the clearing of land, increased frequency of wild fires, grazing land and other land use practices.

The Study Area has experienced a large number of fires over the past 100 years. One of the worst was the Karridale fire of March 1961, which extended over 24,000 ha of pasture, State forest and Timber Reserves and burnt out Karridale townsite.

4. Grazing.

Grazing, particularly the rabbits, can markedly influence the rate of regeneration of much of the vegetation following fire. The size of the area burnt can affect the grazing pressures.

5. Caves.

There are approximately 360 known caves between Yallingup and Augusta, 200 in the Boranup forest alone!
The presence of caves in areas precludes the use of heavy equipment for management operations, including fire control. In such areas even a direct attack on a fire with hand tools is not possible at night, because of the dangers of unseen holes.

The hazard the caves and sinkholes present to firefighters and heavy machinery moving through the dense scrub will thus affect the location of fire control lines and the opportunity to contain fires to a relatively small size.

6. People.

6.1 Visitors.

There are more than 250,000 visitors to the area annually, with peak visitor periods being in the summer months.

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A systematic visitor survey of forty two sites in 1986 showed:

(a) Over 50% of park visitors are in the 15-25 age group.

(b) Nearly 75% of total visitors originate from the Perth metropolitan area.

(c) A very high proportion of visitors to the Study Area are campers - these people use both recognised and unrecognised sites.

(d) Many visitors stay in the area for extended periods ie. over 1 week.

(e) Responses indicate, sites in the northern section (Yallingup) are the most heavily used.

(f) 38% of all visitors used four-wheel drive vehicles.

(g) Majority of visitors (over 50%) participate in water-based recreation. Other popular activities including caving, sightseeing and bushwalking.

(h) Many people visit the area to enjoy the scenery.

(i) Apart from the improvement of basic park infrastructure, most visitors did not want the Park developed.

6.2 Townsites.

There are very high summer population densities in the townships of Yallingup, Gracetown and Prevelly Park, which are surrounded by the Park.

The townsite of Karridale (adjacent to Boranup forest) which was destroyed in the 1961 fires, has several new dwellings.

Many of the houses in these areas are constructed among flammable vegetation.

6.3 Neighbours.

The Reserves have a very long interface with private lands. Much of this is uncleared, and has poor access.

This long interface results in any perimeter firebreak and track maintenance programme being difficult and costly and provides a very high opportunity for fires escaping into and from the Park to neighbouring lands.

Fire management in the Reserves cannot be considered in isolation of the surrounding lands.

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7. Management Objectives.

General management objectives for National Parks are to:

1. Protect and conserve native plants and animals and their habitats.

2. Protect and conserve physical, cultural and scenic resources.

3. Provide opportunities and facilities for appropriate public recreation.

4. Regulate use to be consistent with the maintenance and protection of natural resource values and to minimise conflict between use.

5. Promote visitor safety, awareness and appreciation of natural processes and the scientific and cultural attributes of park resources.

Specifically, management objectives for this area include:

1. To ensure that fire management protects life, property and the natural values.

2. To limit the spread of dieback and other diseases.

Provision is made in the park for recreation (including camping, picnicking and caving), care protection, conservation of natural areas, cave protection, historical conservation and scientific protection.

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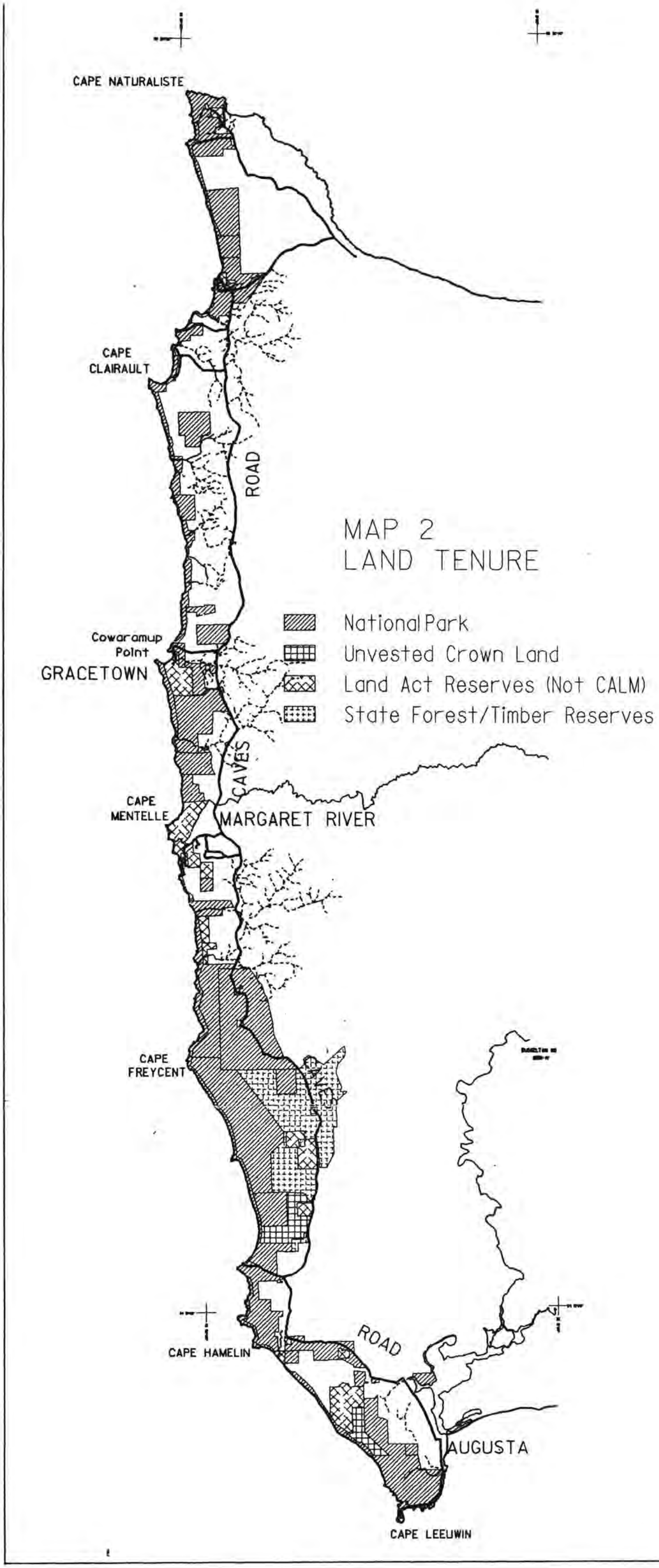
CAPE NATURALISTE
CAPE CLAIRAULT
ROAD
Cowaramup Point
GRACETOWN
CAVES
CAPE MENTELLE
MARGARET RIVER
CAPE FREYCENT
CAPE HAMELIN
ROAD
AUGUSTA
CAPE LEEUWIN
MAP 2
LAND TENURE
National Park
Unvested Crown Land
Land Act Reserves (Not CALM)
State Forest/Timber Reserves