DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

DECLARED RARE FLORA

MANAGEMENT WORKSHOP

ABSTRACTS OF PAPERS PRESENTED

Acacia depressa

August 1-2, 1988
Training Centre, State Operations Headquarters, Como

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Training Centre, State Operations Headquarters, Como

Department of Conservation and Land Management
50 Hayman Road, Como, W.A. 6152

PREFACE

This workshop was convened as part of the Department's strategies for conservation of Declared Rare Flora in the wild as outlined in Policy Statement No. 9. Strategy 4.1 of that document states that staff will "undertake training in Departmental obligation to conserve and manage endangered flora".

All participants are thanked for their participation and/or papers presented at this first workshop organized by Flora Conservation, Woodvale Research Centre.

R.E.S. Sokolowski
WORKSHOP ORGANISER

PROGRAM - DAY 1 Aug 1st, 1988

0800-0830	Registration, Como Training Wing	
0830-0845	Mr R. Underwood, Gen. Mgr.	Opening of Workshop
	Speakers	
0845-0915	Dr S.D. Hopper, SPRS/ Woodvale	Departmental Policy and The Schedule of DRF.
0915-0945	Mr M. O'Donoghue S/C Como	Legislation and Permits to take DRF. The Rare Flora Field Report Form.
0945-1015	Dr D. Coates, SRS/Woodvale	Flora Conservation Research Program. Population Biology of Rare and Endangered Species.
1015-1030	MORNING TEA	
1030-1100	Ms A. nee Kelly, Consultant Botanist/Woodvale	Wildlife Management Programs for DRF in the Northern Jarrah Forest.
1100-1130	Mr S. Van Leeuwen, Consultant Botanist/ Woodvale	Rare Flora Data Base. Rare Flora Field Report Form.
1130-1200	Mr A. Hopkins, SRS/ Woodvale	Management of Rare Flora in Respect of Fire.
1200-1300	LUNCH	
1300-1330	Dr B. Shearer SRS/Dwell. Mr T. Hill Res Asst./Como	Diseases Threatening Declared Rare Flora
1330-1400	Ms A. Napier, Consultant Botanist/Woodvale	Surveys of Rare & Poorly Known Eucalypts of W.A.
1400-1430	Mr G. Keighery, SRS/ Woodvale	Managing DRF and other Possibly Rare Flora in Nat. Parks.
1430-1500	Mr G. McCutcheon, Envr. Officer/Bunbury	The Role of the Env. Officer in Flora Conservation with regards to DRF. Education, Monitoring and Liaison in the District.
1500-1520	AFTERNOON TEA	
1520-1550	Dr N. Marchant) W.A. Mrs S. Patrick) Herbarium	Plant Names and the Role of the W.A. Herbarium.
1550-1620	Mr D. Mell, C.W.O./Como	Declared Rare Flora Protection.
1620	CLOSE	

PROGRAM - DAY 2 Aug 2nd, 1988

LOCATION: COMO TRAINING CENTRE

0830-1000	R. Sokolowski, STO A. Brown, TO Other	Practical: Setting up Quadrats and Transects in a Field Situation. Data compilation.
1000-1020	MORNING TEA	
1030-1130	Mrs S. Patrick) W.A. Mr R. Cranfield) Herb.	Practical: A conducted tour of the W.A. Herbarium. Collection and Preservation Techniques.
1145-1215	Mr M. Graham, Nature Reserves Officer	A Record System for the Management of Rare Flora in the Wheatbelt.
1215-1300	LUNCH	
1300-1330	Mr D. Lamont, Ranger/ Research Assist.	Mapping. An essential component of Vegetation Management.
1330-1400	Mr A. Brown, T.O.	Declared Rare Orchids and Fire.
1400-1430	R. Sokolowski, S.T.O.	Field Herbarium. Data Submission Sheets, Vegetation Classification.
1430-1500	General Discussion with contributions from W.O's/Flora Mr P. Roberts/Geraldton and Mr L. Anderson/Metro Region.	
1500	CLOSE	

DEPARTMENTAL POLICY AND THE SCHEDULE OF DECLARED RARE FLORA

Dr S.D. Hopper
Senior Principal Research Scientist, Woodvale

The development of Policy Statement No. 9 (September 1987) and its contents will be outlined (see Attachment 1). Procedures adopted in the annual revision of the Schedule of Declared Rare Flora have been implemented recently. An Endangered Flora Consultative Committee has been established and a timetable agreed to. The Committee meets once a year to consider proposals on additions and deletions to the Schedule.

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

POLICY STATEMENT NO. 9

CONSERVATION OF ENDANGERED FLORA IN THE WILD

SEPTEMBER 1987

1. BACKGROUND

(N.B. Existing legislation uses the term "rare flora". It is necessary to continue to use this term when quoting the legislation but the term "endangered flora" is to be used generally, as it will replace the other term when the Act is amended.) — use threatened flora.

The Department of Conservation and Land Management has statutory responsibilities for endangered flora conservation. This is a major concern because:

i) Western Australia has a flora that is exceptionally rich in localised and rare endemic plant species. Moreover, areas where rare species are concentrated coincide predominantly with the wheatbelt and other areas where there has been extensive clearing or modification of the native flora.

ii) Section 23F of the Wildlife Conservation Act prohibits the taking (injury or destruction) of declared rare flora by any person on any land throughout the State without the consent in writing of the Minister. A breach of this provision may lead to a fine of up to $10 000. The flora provisions of the Act are binding on the Crown.

Officers of the Department need to know how to identify declared endangered flora, to know where it occurs, and to know how best to manage it. Moreover, the Act prescribes that endangered flora be protected on all categories of land throughout the State. Hence, the legislation requires officers of the Department to advise and otherwise deal with a broad spectrum of land owners and users. Endangered flora conservation is thus an issue of high public profile, and one where the Department's activities are subject to intense public scrutiny.

Legislation

Rare flora is defined in subsection 23F(1) of the Wildlife Conservation Act as "flora for the time being declared to be rare flora for the purposes of this section." Further clarification is provided in subsection 23F(2):

> "Where the Minister is of opinion that any class or description of protected flora is likely to become extinct or is rare or otherwise in need of special protection, he may, by notice published in the

Government Gazette declare that class or description of flora to be rare flora for the purposes of this section throughout the State."

The Schedule of Declared Rare Flora

The Schedule of Declared Rare (Endangered) Flora is reviewed annually.

Plants (not including hybrids) which are protected flora declared under the Wildlife Conservation Act may be recommended for gazettal as declared rare (endangered) flora if they satisfy the following criteria:

i) The taxon (species, subspecies, variety) is well-defined, readily identified and represented by a voucher specimen in a State or National Herbarium. It need not necessarily be formally described under conventions in the International Code of Botanical Nomenclature, but such a description is preferred and should be undertaken as soon as possible after listing on the schedule.

ii) Have been searched for thoroughly in the wild by competent botanists during the past five years in most likely habitats, according to guidelines approved by the Executive Director (see Appendix).

iii) Searches have established that the plant in the wild is either:

a) rare;

or

b) in danger of extinction;

or

c) deemed to be threatened and in need of special protection.

(Plants which occur on land reserved for nature conservation may be considered less in need of special protection than those on land designated for other purposes.)

The status of an endangered plant in cultivation has no bearing on this matter. The legislation refers only to the status of plants in the wild.

Plants may be deleted from the schedule of declared rare (endangered) flora where:

i) recent botanical survey as defined in (ii) above has shown that the taxon is not rare, in danger of extinction or otherwise in need of special protection;

ii) the taxon is shown to be a hybrid;

iii) the taxon is presumed to be extinct (has not been collected or reliably observed over the past 50 years, or all known wild populations have been destroyed more recently).

or

iv) the taxon is no longer endangered because it has been adequately protected by reservation of land where it occurs, or because its population numbers have increased beyond the danger point.

"Taking" Endangered Flora

In the Wildlife Conservation Act (subsection 6 (1)) the following definition is given:

> ""to take" in relation to any flora includes to gather, pluck, cut, pull up, destroy, dig up, remove or injure the flora or to cause or permit the same to be done by any means;"

Thus, taking declared endangered flora would include not only direct injury or destruction by human hand or machine but such activities as allowing stock to graze on the flora, introducing pathogens that attack it, altering water tables such that the flora is deprived of adequate soil moisture or is inundated, allowing air pollutants to harm foliage etc.

In the case of endangered plants which need fire for regeneration, burning at an appropriate time may not adversely affect the survival of the population. However, burning would injure existing plants and constitutes "taking" under the Act. Therefore, Ministerial approval is required prior to conducting a burn which involves any species of endangered flora. Amended Jan 88

2. OPERATIONAL OBJECTIVE

To conserve endangered flora in the wild in Western Australia and to comply with Section 23F of the Wildlife Conservation Act.

3. POLICY

The Department will:

3.1 Identify, locate and seek to conserve endangered flora.

3.2 Undertake research into the taxonomy, population biology, ecology, protection and propagation of endangered flora.

3.3 Implement management practices to conserve endangered flora and its habitat.

3.4 Publicise the need for conservation of endangered flora, and encourage involvement in conservation from all sectors of the community.

3.5 Liaise with other land management and research agencies and private land owners to enhance the study and conservation of endangered flora.

3.6 Develop and manage a geographic data base for endangered flora at its headquarters and at regional and district offices.

4. STRATEGIES

To accomplish the Department objective and policies, staff will:

4.1 Undertake training in Departmental obligations to conserve and manage endangered flora.

4.2 Nominate Endangered Flora Officers (additional to District Wildlife Officers) in each region and district who shall be responsible for identifying, locating, mapping, training staff, overseeing management programs and providing liaison and advice on endangered flora.

4.3 Establish and maintain field herbaria, photographic collections, map records and other aids concerning endangered flora at each Ranger station and district and regional office.

4.4 Arrange an inspection to establish whether declared endangered flora are present before undertaking any activity on CALM land that involves permanent destruction (i.e. clearing for road-making, building, mining or other purposes) of native flora.

4.5 Ensure that no known declared endangered flora is destroyed, damaged, or otherwise injured by Departmental staff or their contractors without first obtaining a ministerial permit so to do.

4.6 Ensure that any burning program (for fire protection purposes) will not cause irreparable damage to species of endangered flora known to be susceptible to fire.

4.7 Observe other operational guidelines for protection of endangered flora on CALM lands as detailed in Administrative Instruction No. 24 "Protection of Endangered Flora in Departmental Operations".

4.8 Monitor known populations of endangered flora.

4.9 Maintain a geographic and biological data base on endangered flora.

4.10 Develop management programmes for species of endangered flora.

4.11 Collect seed and propagate endangered flora in Departmental nurseries. Replant propagated material in the wild under approved management programmes.

4.12 Undertake research on the distribution, taxonomy, genetic systems, population biology, ecology, protection and propagation of endangered flora.

4.13 Assist private property owners and other land management agencies in the protection and conservation of endangered flora.

4.14 Acquire land through donation, exchange or purchase to protect endangered flora where land and/or funds are available.

4.15 Maintain a system for listing and delisting flora on the declared endangered schedule.

4.16 Establish a consultative committee with the Western Australian Herbarium, Kings Park Board, tertiary institutions and other relevant organisations to ensure that research and management of declared endangered flora are co-ordinated.

4.17 Publicise information on endangered flora (without disclosing precise locations) and encourage community involvement in the conservation of endangered flora.

4.18 Maintain, through the Wildlife and Land Administration Branch, central records of all correspondence, discoveries of endangered flora populations, basic information on susceptibility to fire or dependence on fire for regeneration, applications for ministerial permits and other matters to do with declared endangered flora.

4.19 Refer enforcement matters regarding the taking of declared endangered flora to the appropriate District Wildlife Officer.

Syd Shea
EXECUTIVE DIRECTOR

Distribution: Lists A, B, C, D, E, F

APPENDIX

GUIDELINES FOR SURVEYS OF PLANTS PROPOSED FOR ADDITION OR DELETION TO THE SCHEDULE OF DECLARED ENDANGERED FLORA

These guidelines were developed in conjunction with new criteria for additions and deletions to the Schedule of declared endangered flora.

Criterion (ii) for additions states:

> The taxon "have been searched for thoroughly in the wild by competent botanists during the past five years in most likely habitats, according to guidelines approved by the Executive Director."

The intensity of survey necessary to understand the conservation status of a plant varies according to a number of factors. Important considerations are:

1 Geographical range

A taxon extending over 10km of terrain will take less time to survey than one that occurs over 100km.

2 Area of available habitat

Taxa confined to specific localised habitats (e.g. granite outcrops) will require less time to survey than those more catholic in habitat preference.

3 Plant Size

Large conspicuous perennial plants (e.g. eucalypts) can be identified and counted more quickly than small inconspicuous annuals.

4 Seasonality and identification

Some plants are identifiable and conspicuous on vegetative features at any time of year. Others only stand out during flowering or fruiting, which may be confined to just a few weeks in the year, and may also be dependent on good seasonal conditions.

5 Disturbance opportunism

Some plants only germinate and/or flower following disturbance events such as bushfire or earthworks, and hence can only be surveyed after such events.

These three categories of endangered flora are defined below.

Rare

Less than a few thousand adult plants of the taxon exist in the wild.

In danger of extinction

The taxon is in serious risk of disappearing from the wild state within one or two decades if present land use and other causal factors continue to operate.

In need of special protection

The taxon is not presently in danger of extinction but is at risk over a longer period through continued depletion, or largely occurs on sites likely to experince changes in land use which would threaten its survival in the wild.

Based on these considerations, and the accumulated survey experience of many botanists and other CALM officers who have searched for hundreds of Western Australian plants over the past decade, the following matrix provides guidelines as to the duration of search necessary for plants to be considered for addition or deletion to the schedule of declared endangered flora.

Extremes of plant taxa in terms of ease and seasonality of identification are given.

		Recommended period of full time field survey	
Geographical Range	Area of available habitat	*Taxon easily identifiable any time	#Taxon identifiable with difficulty over short flowering period in certain years
<50km	small	0.5-1 month	1-2 months over several years
	large	1-2 months	3-6 months over a decade
>50km	small	3-6 months	6-12 months over a decade
	large	6-12 months	not possible

*e.g. large perennial plants identifiable any time on vegetative characteristics - Eucalyptus crucis, Banksia tricuspis.

#e.g. short-lived small annuals with inconspicuous flowers - Hydrocotyle spp., annual sedges etc.

Having completed surveys according to the above guidelines, the next phase in considering listing on the schedule is described under Criterion for additions (iii).

"Such recent botanical survey has shown that the taxon in the wild is either rare, or in danger of extinction or in need of special protection".

LEGISLATION AND PERMITS TO TAKE DRF: RARE FLORA FIELD REPORT FORMS

Mike O'Donoghue, Senior Clerk Flora

- Summary of the relevant provisions of the Wildlife Conservation Act in relation to protection of declared rare flora.
- Definition of "to take".
- Legal requirement to obtain written permission of the Hon. Minister for CALM prior to taking rare flora.
- Procedure involved in obtaining Ministerial approval and guidelines for submissions.
- Rare Flora Field Report Forms.

WESTERN AUSTRALIA

WILDLIFE CONSERVATION ACT, 1950-1980
EXTRACT

"to take" in relation to any flora includes to gather, pluck, cut, pull up, destroy, dig up, remove or injure the flora or to cause or permit the same to be done by any means;

9. (1) The provisions of this Act relating to flora bind the Crown.

23F. (1) In this section "rare flora" means flora for the time being declared to be rare flora for the purposes of this section.

(2) Where the Minister is of the opinion that any class or description of protected flora is likely to become extinct or is rare or otherwise in need of special protection, he may, by notice published in the *Government Gazette* declare that class or description of flora to be rare flora for the purposes of this section throughout the State.

(3) The Minister may vary or revoke a notice published under subsection (2) of this section by subsequent notice or notices published in the *Government Gazette*.

(4) A person shall not, whether or not he is -

(a) the holder of a license issued under this Act to take protected flora;

(b) the owner or occupier of private land on which rare flora exists; or

(c) authorised by the owner or occupier of land on which rare flora exists,

take any rare flora unless -

(d) where he is not the holder of a license issued under this Act, he first obtains the consent thereto in writing of the Minister;

(e) where he is the holder of a license issued under this Act, he first obtains the further consent thereto in writing of the Minister.

(6) A person who takes any rare flora contrary to the provisions of this section is liable on conviction to a penalty not exceeding ten thousand dollars.

(7) Where an owner or occupier of private land who has been refused consent to take rare flora on that land satisfies the Minister that he will suffer loss or use or enjoyment of the land by reason of that refusal, the Minister shall inform the Treasurer in writing accordingly and the owner or occupier shall be paid compensation for that loss at such rate or rates per annum as -

(a) is agreed between the owner or occupier and the Treasurer;

(b) in default of agreement, is determined by a valuer appointed by agreement between the Treasurer and the owner or occupier or in default of agreement on such an appointment, by a valuer appointed by the Minister,

for such period, not exceeding five years, as the loss continues.

(8) Where compensation has been paid under subsection (7) of this section for a period of five years in respect of any particular land, the Minister shall not refuse an application by the owner or occupier of that land to take rare flora on that part of the land for the loss of use or enjoyment of which compensation has been so paid.

(9) Notwithstanding that compensation has been paid under subsection (7) of this section, whether for a period of five years or for a lesser period, for the loss of use or enjoyment of any land, that land may at any time be taken by the Governor under and subject to the Public Works Act, 1902 for any of the purposes of this Act.

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

Form CLM 80B

From: SOHQ

To: REGIONAL & DISTRICT OFFICERS
Flora Wildlife Officer Geraldton, Albany, Murdoch House

Your Ref:
Our Ref:
Enquiries: Mr O'Donoghue
Phone: 3670422

Subject: GUIDELINES RELATING TO APPLICATIONS TO TAKE RARE FLORA

Enclosed for your information is a copy of the guidelines designed to assist with the preparation of submissions seeking approval to take species of rare flora. Could you please ensure that the guidelines are made available to all oficers who are likely to be involved in the preparation of these submissions.

Also enclosed is an example of an excellent submission from the District Manager of Busselton which provided the basis for a successful application to the Hon. Minister.

M. Donoghue
M O'DONOGHUE
SENIOR CLERK FLORA

13 November 1987

DISTRIBUTION:
Manager, Environmental Protection Branch
Chief Wildlife Officer
Mr G McCutcheon, Bunbury

REGIONAL MANAGERS:

KUNUNURRA
GERALDTON
KALGOORLIE
ALBANY
NARROGIN
KELMSCOTT
BUNBURY
MANJIMUP
METRO, MURDOCH HOUSE

DISTRICT MANAGERS:

BROOME
KARRATHA
EXMOUTH
ESPERANCE
NARROGIN
KATANNING
MOORA
WANNEROO
MUNDARING
JARRAHDALE
DWELLINGUP
HARVEY
NANNUP
KIRUP
COLLIE
BUSSELTON
MANJIMUP
PEMBERTON
WALPOLE

GUIDELINES FOR SUBMISSION TO REQUEST MINISTERIAL APPROVAL TO TAKE DECLARED RARE FLORA

Section 23F of the Wildlife Conservation Act prohibits the taking (injury or destruction) of declared rare flora by any person on any land throughout the State without the consent in writing of the Minister. The Act binds the Crown.

Departmental officers are required to obtain the written permission of the Minister prior to undertaking any activity which might affect populations of rare flora on CALM controlled land.

Activities which may affect populations of rare flora include:

- Prescribed burning
- Fire suppression
- Roading
- Firebreak construction, maintenance
- Mining
- Logging
- Recreation site construction
- Public activities
- Gravel or soil disturbance operations.

Applications to take rare flora are processed by the Senior Clerk Flora at State Operations Headquarters, Como.

The following checklist summarises basic information which is required to enable the preparation of a submission to the Minister.

1. Purpose of and need for the proposed burn or activity affecting declared rare flora. What are consequences of not burning.

2. Provide map details of burn, or activity. Indicate likely burning date, burn intensity and relevant information.

3. Cost of any alternative measures (eg, to exclude the rare flora from burns). Include any change in fire risks.

4. Status and condition of rare flora in the burn/activity and within the District. Include estimate of numbers of plants involved in burn/activity. Indicate estimate of total number on CALM lands and other lands in the District.

5. Provide statement on Biology of plant - ie, regenerative capacity; affect of fire on plants.

6. Previous burn and/or fire history of area, in particular year of last burn.

7. Proposals for monitoring (if any) of burn effect on plant.

8. Whose name is the permit to be made out to (eg, District Manager).

9. Other relevant information, eg, discussion with CALM Wildlife Research Officer.

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

Form CLM 808

From: DISTRICT MANAGER, BUSSELTON

To: MR M. O'DONOGHUE, COMO

Your Ref:
Our Ref: 436.11(H)
Enquiries: Mr T. Raven
Phone: (097) 521 677

Subject: **DECLARED RARE FLORA - 1987/88 BURNING PROGRAM**

I wish to obtain permission to take declared rare flora, Lambertia rariflora which occurs within an aerial burn proposed for Spring 1987.

In order to facilitate Ministerial approval I have attached details of the burn and status of the plant within Busselton District.

Your urgent assistance in this matter is appreciated.

A C Raven

Tony Raven
DISTRICT MANAGER

TR:AW

DECLARED RARE FLORA - BUSSELTON DISTRICT

1. Species - Lambertia rariflora

2. District - Busselton

3. Aerial Burn - B31 (State Forest)

4. Purpose of Burn

B31 is required in order to reduce heavy native forest fuels (13 - 15 t/ha) adjacent to the northern boundary of the high value Vasse pine plantation. The most severe fire runs occur with north-east or north-west winds and this burn will provide essential protection for the plantation in these situations. In addition the burn will provide protection for private property from fires emanating from State Forest.

5. Alternative Measures Considered to Avoid Taking the Plants

a) Defer burning the area:-

Unacceptable to have 13 - 15 t/ha fuels adjacent to a high value area. Summer wildfires can only be effectively controlled by existing fire fighting resources in fuels of 8 - 9 t/ha or less. It is imperative that the area is burnt.

b) Exclude plants from the burn:-

Construction of machine breaks to demarcate the plant population from the burn creates an unacceptable risk of introducing or spreading dieback. The plant is susceptible to dieback. Hand raking a firebreak would reduce dieback risk to an acceptable level, however, 1500 metres of fireline is required and insufficient funds are available for this work.

6. Status of Lambertia Rariflora in Busselton District

L. rariflora has been located at 32 sites within Busselton District. The species is represented at these sites by at least 8000 individual plants. The population for which approval is requested contains at least 1000 mature plants. All of these populations occur on State Forest.

7. Regenerative Capacity of the Plant

This species regenerates from seed stored in the surface litter. The plants are extremely fire sensitive but have been found to regenerate adequately following fire. The population affected by this proposed aerial burn contains well advanced mature plants which have had the opportunity to flower and set seed in adequate quantities for soil storage and regeneration requirements.

8. Fire History

It has been at least 7 years since these populations were burnt and it is planned to exclude the populations from burning in the next rotation in 4 years time such that they are burnt on an 8 year cycle.

It is necessary to undertake this burn on an approximate 4 year cycle because of its strategic significance in relation to protection of private property and high value pine plantations.

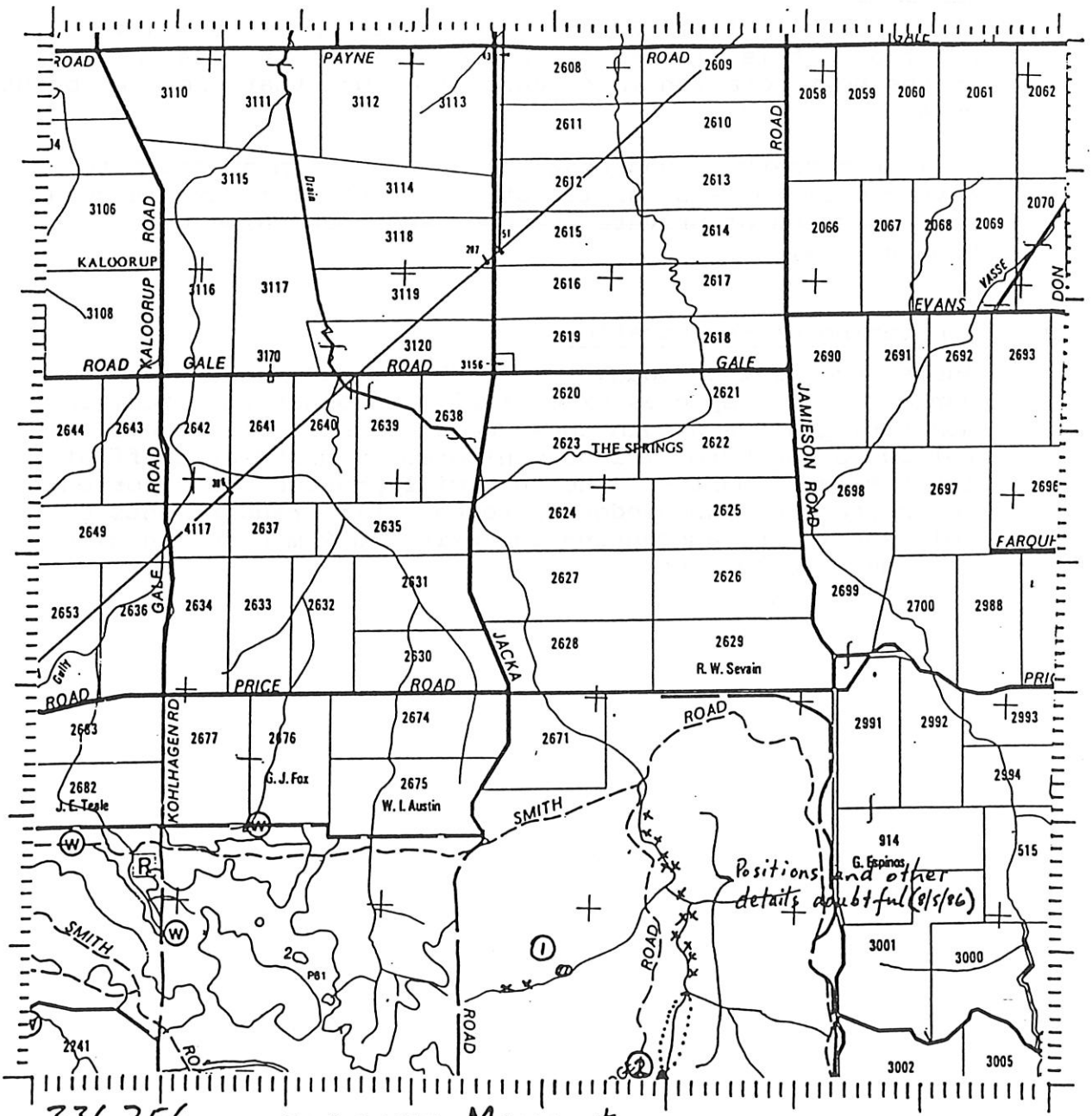
9. Monitoring of Regeneration

Assistance will be sought from SDFO G. McCutcheon, who has worked on this species extensively, in order to establish monitoring sites within these populations. Plant development following the burn will be monitored by District staff at least every 3 months. The burn will provide the opportunity to increase our knowledge of regeneration requirements of this species by augmenting the existing 2 monitoring sites in other populations.

REGISTER OF PLANTS OF SPECIAL STATUS

Gazetted ☑ Rare ☑ File No. 1350/80

Classified ☐ Weed ☐ Species: Lambertia rariflora



F.M.I.S. Ref.: 336 256 MAP SHEET: Margaret SCALE R.F. 1:50 000

District: Busselton Shire: Busselton and Augusta-Margaret River

Land Status: State Forest

(STUDY SITE No: 15)

Location: ① Between northern plantation demarcation track and creek, about 30 m south-west of an orange-painted post close to the left side of the track. ② On the west bank of the creek, between 325 m and 435 m north of Gayswal Road. (STUDY SITE No. 14)

Area: ① 60 m²; ② ± 550 m² Plant Density: 4·4; ± 0·5; /m²

Soil: ① Slightly gravelly yellowish brown sandy loam over clay at 55 cm. Undisturbed ☑

Landform: ① Gentle lower slope to drainage line. ② Moderate, convex lower slope. Disturbed ☐

Vegetation: ① Euc. marginata/E. calophylla open forest with Allo-casuarina fraserana over Hakea ?varia, Kingia australis, Petrophile diversifolia, Dasypogon hookeri, Xanthorrhoea preissii, Pultenaea drummondii, Hibbertia hypericoides, Isopogon sphaerocephalus, Patersonia xanthina, Dryandra nivea, Bossiaea ornata, Leucopogon australis, Hovea elliptica.

② E. marginata/E. calophylla open forest with Banksia grandis & Allo-casuarina fraserana over Mirbelia dilatata, Kingia australis, Pultenaea drummondii, Hovea elliptica, Acacia varia, Boronia molloyae, Thomasia foliosa and numerous other more common species.

POPULATION DATA

	Survey Dates	No. of Plants	Age Structure	Mature Height (m)	Condition	Reproductive Stage*					
						Pin Bud	Mature Bud	Full Flower	Late Flower	Green Fruit	Ripe Fruit
①	15/11/77	?	Mature	to 3.0	? Scorched & killed by hot fire.						
①	20/3/79	?	Seedlings	0.12	Healthy						
①	4/5/81	± 240	Juvenile & Seedling	0.15–1.0	Healthy						
①	28/8/85	264	Mature	1.0–3.5	Healthy	Few	Nil	Nil	Persist.	20% shoots	Nil
		but 2 dead at lower edge, adjacent to dead B. grandis, with another of latter nearby.									
②	28/8/85	256	Mature	1.3–6.0	Healthy	Few	Nil	Nil		28% shoots	Nil

*Single [✓] or Multiple [✓✓] ticks for stages applicable, or words, e.g. few, many.

WESTERN AUSTRALIA

WILDLIFE CONSERVATION ACT 1950-1980
SECTION 23F

PERMIT TO TAKE DECLARED

RARE FLORA

The undermentioned person may take declared rare flora for the purpose described, subject to the terms and conditions contained on this permit.

DESCRIPTION OF PLANT:

Scientific Name	Parts to be Taken	Quantity
Darwinia meeboldii	All parts of the plant susceptible to fire.	Sufficient only to allow for the controlled burn to be successfully undertaken.

PURPOSE OF COLLECTION:

1. Controlled burn in accordance with the approved fire management plan.
2. Study the impact of fire and monitor the regeneration of the rare species.

AREA FROM WHICH COLLECTIONS CAN BE MADE:

Stirling Range National Park.

CONDITIONS

1. No plant material may be removed or used for commercial purposes.
2. The location of rare plant populations shall be treated as strictly confidential and under no circumstances be disclosed to other persons without the express permission of the Executive Director.
3. Plants may only be burnt or damaged where absolutely necessary to ensure a "successful burn".
4. Report is submitted to the Executive Director, 6 months after the burn indicating recovery, or otherwise, of species. Further report is submitted 12 months after the burn.
5. Regeneration burn is conducted according to Bush Fires Act and Regulations.
6. The burn is undertaken in a manner which does not threaten the remainder of the State forest or adjoining private property.
7. The burn is undertaken during cool conditions in early Spring 1987.

THIS PERMIT IS VALID FOR THE PERIOD Until completion of the burn.

Permit Holder: Mr Hugh CHEVIS

Address: A/Regional Manager
South Coast Region
ALBANY
Postcode: 6330

.....D. J. Healy.....
MINISTER

DATE .....26/8/87.....

DEPARTMENT OF CONSERVATION & LAND MANAGEMENT

RARE FLORA FIELD REPORT FORM

Gaz [ ] Proposed Gaz [ ] Not Gaz [ ]

File No.: 024431F3707

Population No.: 2

TO: S/C FLORA, COMO

FROM: R A COUGHRAN TITLE: DISTRICT WILDLIFE OFFICER

TAXON: Grevillea erectiloba SURVEY DATE: THURSDAY, 3 MARCH 1988

REGION: WHEATBELT DISTRICT: MERREDIN

SHIRE OF: YILGARN MAP REF: No/TYPE: JACKSON 1:50 000

LAND STATUS: Nature Res. [ ] Nat. Park [ ] State Forest [ ] Water Res. [ ] Rly Res. [ ]
Shire Res. [ ] Private [ ] Rd. Verge-MRD [ ] Rd. Verge Shire [ ]
Gravel Res. MRD [ ] Gravel Res. Shire [ ] VCL [ ] Other (state) PASTORAL LEASE

LOCALITY: 8.6KM SOUTH OF MT JACKSON STATION TURN-OFF ON THE BULLFINCH - DIEMALS STATION ROAD

LATITUDE: 119°21' LONGITUDE 30°25' ALTITUDE 10 metres

HABITAT: SOIL TYPE: Laterite Ridge: [x] Pebble [ ] Gravel [ ] Limestone [ ] Granitic [ ]
Loam [x] Peat [ ] Sand-White [ ] Grey [ ] Yellow [ ]
Clay [ ]

CONDITION: Perm wet [ ] Moist [ ] Saline [ ] Dry [x] Other (state)

LANDFORM: Cliff [ ] Hilltop [ ] Ridge [ ] Breakaway [ ] Slope [x]
Lake Edge [ ] Drainage line [ ] River bank [ ] Gully [ ] Valley [ ]
Lowplain [ ] Flat [ ] Sand Dune [ ] Firebreak [ ] Other (State)

ASPECT:

VEGETATION CLASSIFICATION: OPEN TREE MALLEE OVER OPEN LOW SCRUB.

ASSOCIATED SPECIES: Alyxia buxifolia, Eucalyptus gracilis, Acacia spp.

NO. OF PLANTS: Mature: 30 Seedlings: Area Occupied (m²): 500-600
(Estimated)

CONDITION: Healthy [x] Dying [ ] Other (state) UNDER SEVERE SUMMER STRESS.

REPRODUCTIVE STATE: In bud [ ] Flower [ ] Fruit [ ] Immature [ ] Dehisced [x]

RELEVANT OBSERVATIONS: e.g. Recently burnt [ ] Dieback [ ] Undisturbed [x]
(please describe) SEVERAL PLANTS ON ROAD RESERVE.

POLLINATORS: Native Bees [ ] Honey Bees [ ] Mammals [ ] Birds [ ] Others (state if observed)

ATTACHED: Map [x] Illustration [ ] Photo [ ] Voucher Specimen [ ] Mudmap [ ]

ACTION REQUIRED: [ ] Taken [ ] (state) YILGARN SHIRE AND MT JACKSON STATION LESSEE TO BE ADVISED OF PRESENCE OF THIS POPULATION.

COPY: Regional Office: [ ] District Office [ ] Other [ ] (state)

Signed:

Date:

Note: More than one box can be ticked.

THE FLORA CONSERVATION RESEARCH PROGRAM AND POPULATION BIOLOGY OF RARE AND ENDANGERED SPECIES

David J. Coates
Senior Research Scientist

The greatest area of species richness and local endemism within the State occurs in the cereal growing and nearby adjacent areas. Consequently, the Flora Conservation Research Program has given highest priority to research on endangered and poorly known flora of the wheatbelt and Swan Coastal Plain. Although field surveys of these areas and the annual review of Declared Rare Flora remain high priority, the past two years have also seen an increase in research on the population biology and management of selected endangered flora of varying life histories. The aim has been to develop Declared Rare Flora management programs for individual species or related species groups (i.e. *Banksias, Grevilleas*). In addition to these species based programs the production of regional or district based management programs is also underway.

Detailed population biology studies on rare and endangered flora have been achieved by establishing permanent monitoring quadrats and undertaking population genetic and ecological investigations. The techniques utilised in these studies will be reviewed together with the findings from research on a number of species of Declared Rare Flora.

FLORA CONSERVATION PROGRAM

PROGRAM LEADER:

D.J. Coates

CURRENT RESOURCES:

This program comprises 5.1 persons (3.2 Professional (2 contract) + 1.9 Technical). Its budget is $ ($ salaries).

RESOURCES IN PREVIOUS YEAR

6.0 persons (4.1 Professional (2.7 contract) + 1.9 Technical) ($ salaries $69,000 other).

BACKGROUND

Western Australia has a vascular flora world-renowed for its richness (about 10 000 species) and high endemism (75%-80% for the south-west). About 2 000 species have been considered rare, endangered, vulnerable or extinct by various authorities. Some 1 500 species are used commercially in the cut wildflower, seed, nursery, bee-keeping and timber industries. While there has been considerable progress in knowledge during the past few years, in most cases the taxonomy, geographical distribution, reproductive biology and conservation status of these species is inadequately documented for appropriate management to be implemented.

Due to the coincidence of greatest areas of species richness and local endemism for the State with cereal-growing areas, highest priority has been given to research on endangered and poorly known flora of the wheatbelt and Swan Coastal Plain. Although field surveys of these areas and the annual review of declared rare flora remain high priority it is also intended to increase research on the population biology and management of selected endangered flora of varying life histories. This will be achieved by establishing permanent monitoring quadrats, undertaking population ecology/genetic studies and developing a computer data base on endangered flora. The expected end product will be the preparation of declared rare flora management programs. In addition to these species based programs the development of regional and district based programs is also underway. Limited research will continue on more common flora where conservation problems are likely. These include effects of dieback and wildflower picking on Banksias; fragmentation of the range of widespread eucalypts by clearing; impact of beekeeping; competition by weeds with keystone species, and impacts on granite outcrop species.

AIM:

To provide scientific information that maximizes effective conservation and management of the flora of Western Australia.

PRIMARY OBJECTIVES

Rare and Endangered Flora

To undertake research on rare and endangered flora systematics, geographical distribution, genetics, population ecology and management techniques (e.g. fire, mechanical disturbance, weed competition, grazing regimes, pest and

disease control, propagation and re-establishment in the wild), and to recommend on land acquisition, management techniques, future research and conditions for Ministerial permits to take with a view to producing rare flora wildlife management plans. To prepare wildlife management programs for species that require management.

Flora Data-Base

To establish and maintain a data base on the geographical distribution and conservation status of Western Australia's native flora and plant communities.

Public Involvement

To foster a sympathetic public attitude to flora conservation through direct involvement of the public in appropriate research projects and through open communication of research findings.

Wildflower Industry

To undertake research and provide advice with a view to producing wildlife management programs for plants used in the wildflower industry.

Communication

To communicate research results through scientific and technical publications, through advice and liaison with other CALM staff, other organisations and the public and through involvement in training and public conferences and seminars.

20 YEAR GOALS (based on current resources and in priority order)

1. To develop and maintain a comprehensive data base for declared endangered flora and other priority species and undertake surveys and implement findings on poorly known species at risk.***

2. To prepare Wildlife Management Plans and establish a network of permanent monitoring quadrats for all declared endangered flora.***

3. Involve the public in monitoring and surveys of all declared endangered flora and other groups of flora.

4. Provide management plans for all major species utilized in the wildflower industry, continue monitoring effects of the industry on native flora and undertake research on the management of selected priority species.

5 YEAR GOALS

1. Undertake field surveys of poorly known high priority species at risk, and review the schedule of declared rare flora annually.

2. Develop a computerized data base for declared rare flora and other priority species, and an ability to map geographical distributions using FLORAPLOT.

3. Produce 5 Endangered Flora Wildlife Management Plans that are either species, reserve or CALM Region based.

4. Establish a network of permanent monitoring quadrats on all species for which Endangered Flora Wildlife Management Plans are produced.

5. Produce a colour book on the Declared Endangered Flora.

6. Carry out studies on the biosystematics and conservation status of Western Australian flora.

7. Publish the Orchid atlas.

8. Complete an endangered eucalypt atlas.

9. Seek public involvement in the monitoring of declared endangered flora.

10. Produce, through the letting of consultancies, three Wildlife Management Plans on species used in the wildflower industry.

11. Undertake research on the management of Boronia megastima and other priority species in relation to commercial harvesting techniques.

12. Conduct an annual review of the Australian National Parks and Wildlife Service's statistics on Western Australian cut flowers exported under permit from their legislation.

13. Review research priorities regarding the wildflower industry after proclamation of the proposed flora licensing amendments to the Wildlife Conservation Act.

14. Publish educational material, field guides to eucalypts and orchids of five national parks, and books on trees and tall shrubs of Perth and on orchid pollination.

15. Establish field herbaria in all CALM regional and district offices and ranger stations.

WILDLIFE MANAGEMENT PROGRAM FOR DECLARED RARE FLORA IN THE NORTHERN FOREST REGION

Anne Kelly, Consultant

The Wildlife Management Program for Declared Rare Flora in the Northern Forest Region is the third in a series of management programs established by the Department of Fisheries and Wildlife in 1984. These programs are prepared in addition to regional management plans to provide detailed information and guidance for the management and protection of certain exploited or endangered species (e.g. Kangaroos, Noisy Scrub Bird). The program for Declared Rare Flora provides an illustration of each of the 25 Declared Rare species known to occur within the Region and a brief description of their appearance, distribution, habitat and conservation status. Requirements for management and research action are listed and the species ranked in priority order for each of these requirements. This will enable departmental manpower and resources in the Region to be allocated to those species most urgently in need of attention. Other plants in need of special protection are included in the program.

RARE FLORA DATABASE

S. Van Leeuwen, Consultant

Information on the location, habitat, population biology and conservation status of rare flora is currently only available from Departmental files. This system, although efficient, has many deficiencies when it comes to the updating and rapid retrieval of information. The Rare Flora Database will hopefully alleviate such problems by providing a system that will be easy to update, manage, and retrieve information from. Species of DRF are of the highest priority to be incorporated onto this database, but eventually it will include all those species of flora on the Reserve lists. The database is currently operated from an IBM PC and the Tectronix computer at Woodvale but in the future will be accessible to all CALM officers through the Departmental computer.

The integral data for updating and maintaining this database is obtained from Rare Flora Field Report forms. It is essential for the reliability of this system that these RFFR forms be completed accurately, especially for DRF. From the information on these RFFR forms it will be possible to produce numerous reports on species of rare flora.

This presentation will discuss RFFR forms, the operation and function of the database and give examples of species reports.

MANAGEMENT OF RARE FLORA IN RESPECT OF FIRE

Angus Hopkins, Senior Research Scientist, Woodvale

Fire is a major management consideration for all naturally vegetated land throughout the State. Because removal by burning is included within the meaning of "to take" in relation to flora, there is a legal obligation to understand what happens to gazetted rare flora when burnt. It is also necessary to understand fire effects for ordinary conservation purposes.

At present little is known about the fire ecology of rare flora. There are, however, some guiding principles which will be outlined here. Knowledge of fire ecology of rare flora will be enforced through monitoring.

DISEASES AND RARE FLORA

Dr B. Shearer, SRS, Dwellingup
Mr T. Hill, Research Assistant, Como

RESEARCH UPDATE

PHYTOPHTHORA CINNAMOMI

Population dynamics in coastal heath and woodlands
Host susceptibility
Control of spot infections

OTHER *PHYTOPHTHORA* SPP.

ARMILLARIA LUTEOBUBALINA

PRIORITIES FOR FUTURE RESEARCH

Development of risk and hazard systems
Host database
Phytophthora spp. other than *P. cinnamomi*
Importance of diseases other than *Phytophthora*
Control options.

Diseases Threatening Declared Rare Flora

B. L. Shearer and T. C. Hill

Phytophthora species, *Armillaria luteobubalina* and canker fungi are pathogens that can threaten rare flora with extinction or decline. Examples of the destruction of plant communities following infection with *P. cinnamomi* occur throughout the south-west of the state. Plant communities in the north-west may also be at risk as illustrated by the death of *Eucalyptus tetrodonta* in the Northern Territory following infection by *Phytophthora* species.

Phytophthora means "plant killer", a name very appropriate for *P. cinnamomi* which can attack nearly 1,000 hosts. Many of endemic species belonging to the Epacridaceae, Myrtaceae, Papilionaceae and Proteaceae are susceptible to the pathogen. For example a number of rare *Adenanthos* species would become extinct if infected with *P. cinnamomi*. Many susceptible, but common hosts could become rare if *P. cinnamomi* infection goes unabated. The fungus requires moist conditions to survive and warm, moist conditions for sporulation and infection. Since it's introduction in the early 1900's, *P. cinnamomi* has mainly been dispersed in infected soil aided by human activity. We are determining the effect of environment on survival, sporulation and dispersal of the fungus and infection of hosts so as to identify areas with the greatest risk of infection. Fungicides are being tested to control "spot infections".

Phytophthora species other than *P. cinnamomi* also infect native communities. They were probably introduced into the state at about the same time as *P. cinnamomi*. Before an evaluation can be made of the threat that *Phytophthora* species other than *P. cinnamomi* pose to native communities we need to determine their distribution, host range and the conditions favouring survival, sporulation and dispersal.

Armillaria luteobubalina is a widespread endemic pathogen capable of killing a wide range of hosts throughout the south-west. As the fungus is spread by air-borne spores and through infected roots, human activity does not influence the spread of *A. luteobubalina* as much as it does *Phytophthora* species. Very little is known of communities at risk from *A. luteobubalina* infection.

Crown decline and cankered stems of *E. ficifolia* and tuart are examples of the debilitating effects of infection by canker fungi. Little is known of the distribution, pathogenicity and control of canker fungi.

As big fleas have little fleas, plants can be parasitized by other plants. Although Dodder is a widely distributed plant parasite, little is known of its effects on plant communities in the south-west.

Diseases and Rare Flora

Dr. B. L. Shearer; SRS, Dwellingup
Mr T.C. Hill; Research Assistant, Como

RESEARCH UPDATE

PHYTOPHTHORA CINNAMOMI
Population dynamics in coastal heath and woodlands
Host susceptibility
Control of spot infections

OTHER PHYTOPHTHORA SPP.

→ Bryan Shearer

→ Tom Hill

ARMILLARIA LUTEOBUBALINA

PRIORITIES FOR FUTURE RESEARCH
Development of risk and hazard systems
Host database
Phytophthora spp. other than *P. cinnamomi*
Importance of diseases other than *Phytophthora*
Control options

→ Bryan Shearer

SURVEY OF RARE AND POORLY KNOWN EUCALYPTS OF W.A.

Anna Napier, Consultant

The use of volunteers in helping to survey for plants of interest is becoming more common. The successful, volunteer-based "Banksia Atlas" has prompted a survey of Declared Rare, geographically restricted and poorly known eucalypts in W.A. Nearly 170 species of eucalypt are being surveyed, including 30 Declared Rare. Comprehensive field guides for each CALM Region have been produced in order to supply CALM staff and volunteers with an up-to-date, easily transportable reference. The Guides include FLORAPLOT maps of known locations of each species, and a description and illustration. It is hoped that volunteers and CALM staff will be able to cover the State in the search for eucalypt species of interest and that valuable information on population numbers, range and conservation status will be gained.

Table 1. Numbers of rare, threatened or poorly known eucalypts in CALM's eleven operational regions in Western Australia.

	IUCN CATEGORY						
REGION	EXTINCT	ENGANGERED	VULNERABLE	RARE	POORLY KNOWN	*COMMON	TOTAL
South Coast	-	1	14(31.1%)	36(41.4)	14(29.8%)	14(41.2%)	79
Wheatbelt	-	-	6(13.3%)	15(17.2%)	9(19.1%)	8(23.5%)	38
Greenough	-	2	13(28.9%)	7(8.0%)	2(4.2%)	4(11.8%)	28
Goldfields	1	-	2(4.4%)	14(16.1%)	1(2.2)	2(5.9%)	20
Kimberley	-	-	2(4.4%)	1(1.1%)	14(29.8%)	-	17
Pilbara	-	-	1(2.2%)	1(1.1%)	3(6.4%)	1(2.9%)	6
Gascoyne	-	-	1(2.2%)	1(1.1%)	2(4.2%)	2(5.9%)	6
Northern Forest	-	-	3(6.6%)	3(3.4%)	-	1(2.9%)	7
Central Forest	-	-	3(6.6%)	2(2.3%)	2(4.2%)	2(5.9%)	9
Southern Forest	-	-	-	4(4.6%)	-	-	4
Metropolitan	-	-	-	3(3.4%)	-	-	3
Total	1	3	45(100%)	87(100%)	47(100%)	34(100%)	217

*Considered in previously published works to be rare or threatened but actually common and at no risk on the basis of recent survey.

N.B: Species which occur in more than one region are counted for each region.

MANAGING DECLARED RARE AND OTHER POSSIBLY RARE FLORA IN NATIONAL PARKS

G.J. Keighery, Senior Research Scientist
Biogeography Program, Woodvale

National Parks are large multipurpose reserves usually with some "on ground" staff for management purposes. Dealing with rare flora, or managing the floral resources is generally of high concern but a low priority within these parks, for reasons to be outlined.

The paper uses several south coast National Parks to outline the problems and ways in which some can be addressed or alieviated. Most of my work has been involved in

1. identifying and locating the floral resources of each park - checklists, maps, photographs;

2. liaison with the Rangers;

3. identifying what factors enhance or detract from the continued existence of these species in the Park - fire, disease or drought;

4. public awareness of our rich floral heritage.

THE ROLE OF THE ENVIRONMENTAL OFFICER

G. McCutcheon, Environmental Officer, Bunbury

The Role of the Environmental Officer in Flora Conservation.
An Environmental Officer in a Forest District should be seen as having a role similar to that of a Wildlife Officer, with the following differences:

a) enforcement of the Wildlife Conservation Act would not normally be engaged upon;

b) the special sphere of influence is restricted to land managed by the Department; and

c) there is a responsibility to supervise other officers in the area of flora conservation.

The officer should have a basic knowledge of the relevant Act, but a good knowledge of Policy Statement No. 9 and Administrative Instruction No. 24. He/she should be able to identify the D.R.F. present in the District and preferably also other D.R.F. species in adjoining Districts, and would be expected to have a fair knowledge of other species used as indicators for *Phytophthora* activity.

The activities of an Environmental Officer can be described under the following headings:

i) monitoring

ii) liaison

iii) Education

PLANT NAMES AND THE ROLE OF THE WESTERN AUSTRALIAN HERBARIUM

Neville Marchant and Sue Patrick

The latin name of plants enables us to communicate about them and also allows us to accumulate all kinds of information about the biology of plant species or their distribution and rarity. The names themselves can be long and seem difficult to spell and pronounce. Also, scientific names are sometimes changed and it is often hard for non-taxonomists to understand the necessity for these changes. Some of these reasons and the difficulty taxonomists may have when describing new species will be explained.

The Western Australian Herbarium has a large collection of specimens of the flora of Western Australia. Current research will be briefly described and as well, the way in which CALM officers working on the Flora of Western Australia can assist the Herbarium will be discussed. One of the important aspects to be presented will be on how CALM officers can use the Herbarium identification system.

DECLARED RARE FLORA PROTECTION

D.J. Mell, Chief Wildlife Officer

The number of Declared Rare Flora species increased in 1987 from 132 to 226. The increase in numbers has implications for protection from a number of perspectives, including operational considerations and data collection. In particular, the addition of 127 newly declared species, for which, in many instances, available data are very limited, places significant demands on and poses difficulties for operational staff. This is highlighted when considering Declared Rare Flora collectively. Protection in the context of wildlife is defined as wildlife law enforcement plus wildlife management. Without the creation of restraints on certain conduct and enforcement of those restraints through prosecutions, the status of Declared Rare Flora has no real legal consequences. Management requires the provision of data from surveys and monitoring, and participation in preserving specific populations and their habitats. Operationally, protection is dependent on available resources and their deployment as well as the number and locations of Declared Rare Flora populations.

A RECORD SYSTEM FOR THE MANAGEMENT OF RARE FLORA IN THE WHEATBELT

Mal Graham, Nature Reserves Officer, Katanning

Prior to 1987 the Katanning District had started to develop a system for recording details of all flora species of scientific interest, regardless of land tenure. This system has now been in use for 18 months and, with minor refinements, has been adopted for use throughout the Wheatbelt Region.

The Katanning District currently has records for 94 plant species of scientific interest at 242 sites. This includes 23 species and 89 populations of Declared Rare Flora.

It is anticipated that this system will accommodate a foreseen large increase in both species and population numbers in the near future.

MAPPING AN ESSENTIAL COMPONENT OF VEGETATION MANAGEMENT

D. Lamont, Ranger/Research Assistant, Yancep National Park

The management of rare flora can not be considered as a discrete practice but rather should be part of overall vegetation management practices.

Vegetation maps provide a starting point and a basis for the decision making process in vegetation management. Only when there is some base data on all vegetation present can specific strategies for rare flora preservation be planned and implemented.

Currently within CALM there is no standard or uniform method in vegetation mapping and a number of different systems are in use.

A relatively simple but effective method based upon System Six mapping has recently been used within the Northern Forest Region. Maps produced using this method have enabled decisions to be made with confidence when planning for the contingencies and dynamics of vegetation management.

DECLARED RARE ORCHIDS - MANAGEMENT AND ECOLOGY

A. Brown, Technical Officer, Woodvale

In the above paper I will discuss various factors affecting the management and identification of our declared rare and endangered orchids including:-

1. The Act, which covers the 34 orchid species currently declared as rare and endangered.

2. The orchids, including identification, biology, ecology distribution and flowering period.

3. Management considerations including occurrence on/off Nature Reserves and National Parks, fire and its effect on the growth/flowering cycle of orchids, feral animals, insect pests, needs and the effect of herbicide overspray.

A slide program showing all 34 orchids will follow.

DISTRICT FIELD HERBARIA

R.E. Sokolowski, Senior Technical Officer, Woodvale

District Field Herbaria are an essential tool in the documentation of WA Flora.

They provide a seasonal flora record and offer interpretation facilities for management and proposed fire regimes. The association of flora species within a terrestrial or aquatic environment display recognised parameters of habitats and identifiable ecosystems. In a number of cases, DRF are also found within these habitats and their documentation is paramount to ensure their protection.

INSTRUCTION SHEET FOR FIELD HERBARIA

1. Specimens

1.1 Collect adequate material for your own herbarium and for the W.A. State Herbarium.

1.2 Ensure, where possible, that each specimen is represented by fruits, flowers, buds and leaves.

1.3 Attach jewellers tag to each specimen, showing your own collecting number and date collected.

2. Data Sheets

2.1 Complete in duplicate for each specimen. The original copy accompanies the voucher specimen which you dispatch to the W.A. State Herbarium, the duplicate folds away and is inserted into your own herbarium wallet.

2.2 Ensure that you complete all documentation, map references and co-ordinates.

2.3 Number each separate data sheet in the top r/h corner e.g. 1/87, 2/87, 3/87 etc.

2.4 Ensure that you record at the top of data sheet the N.P. or District from which you are dispatching the material.

2.5 Complete Det Name and Field Indent in pencil only, on receipt of name confirmation from the W.A. Herbarium alter all records where necessary.

3. Jewellers Tags/Tie-on Labels

3.1 Ensure all material is properly labelled including your own herbarium specimen.

4. Mounting Specimens

4.1 Use Selleys Aquadhere for large specimens on your own cards and/or strips of gummed labels for delicate specimens. Endeavour to avoid damage to flowers.

Transparent Scotch Tape can be used if available. Affix plant to card at strategic points only. Seed pods and/or seeds should be mounted separately if available. Consult your instructional pamphlet on this matter.

5. Despatch of Material

5.1 Despatch adequate material to W.A. Herbarium correctly labelled together with a data sheet. I suggest that each specimen be inserted between separate newspaper folds and enclosed between two hard cardboard surfaces (margarine box etc.). Avoid, where possible, sending material between your own cardboard separators as these will not be returned. Do not mount this material, this will be done by the Herbarium.

5.2 Send by C.D.O. mail where possible.

6. Fumigation (where necessary)

6.1 Place specimens into a deep freeze for 24 hours. Take out and allow to dry in warm place.

6.2 Enclose within cardboard box containing a small quantity of moth balls, seal with tape and leave for 24-28 hours. Open this box in an outside area only due to the poison content of the Napthlathene flakes.

TABLE 1: VEGETATION CLASSIFICATION TO BE USED IN WHEATBELT SURVEY – B.G.Muir.

LIFE FORM/HEIGHT CLASS	CANOPY COVER			
	DENSE 70-100%	MID-DENSE 30-70%	SPARSE 10-30%	VERY SPARSE 2-10%
T Trees >30m	Dense Tall Forest	Tall Forest	Tall Woodland	Open Tall Woodland
M Trees 15-30m	Dense Forest	Forest	Woodland	Open Woodland
LA Trees 5-15m	Dense Low Forest A	Low Forest A	Low Woodland A	Open Low Woodland A
LB Trees <5m	Dense Low Forest B	Low Forest B	Low Woodland B	Open Low Woodland B
KT Mallee tree form	Dense Tree Mallee	Tree Mallee	Open Tree Mallee	Very Open Tree Mallee
KS Mallee shrub form	Dense Shrub Mallee	Shrub Mallee	Open Shrub Mallee	Very Open Shrub Mallee
S Shrubs >2m	Dense Thicket	Thicket	Scrub	Open Scrub
SA Shrubs 1.5-2.0m	Dense Heath A	Heath A	Low Scrub A	Open Low Scrub A
SB Shrubs 1 0-1.5m	Dense Heath B	Heath B	Low Scrub B	Open Low Scrub B
SC Shrubs 0.5-1.0m	Dense Low Heath C	Low Heath C	Dwarf Scrub C	Open Dwarf Scrub C
SD Shrubs 0.0-0.5m	Dense Low Heath D	Low Heath D	Dwarf Scrub D	Open Dwarf Scrub D
P Mat plants	Dense Mat Plants	Mat Plants	Open Mat Plants	Very Open Mat Plants
H Hummock Grass	Dense Hummock Grass	Mid-Dense Hummock Grass	Hummock Grass	Open Hummock Grass
GT Bunch grass >0.5m	Dense Tall Grass	Tall Grass	Open Tall Grass	Very Open Tall Grass
GL Bunch grass <0.5m	Dense Low Grass	Low Grass	Open Low Grass	Very Open Low Grass
J Herbaceous spp.	Dense Herbs	Herbs	Open Herbs	Very Open Herbs
VT Sedges >0.5m	Dense Tall Sedges	Tall Sedges	Open Tall Sedges	Very Open Tall Sedges
VL Sedges <0.5m	Dense Low Sedges	Low Sedges	Open Low Sedges	Very Open Low Sedges
X Ferns	Dense Ferns	Ferns	Open Ferns	Very Open Ferns
Mosses, liverwort	Dense Mosses	Mosses	Open Mosses	Very Open Mosses

Det. Name:

Field Ident.: **Family:**

Form: Tree/Sm. Tree/Mallee/Shrub/Dw. Shrub/Woody Herb/Other—

Height:

Habit: Climbing/Prostrate/Caespitose/Rhizomatous/Other—

Colour Notes:

Other Notes:

Abundance: Dominant/Abundant/Frequent/Occasional

Assoc. Veg.: Forest/Woodland/Scrub/Shrubland/Heath/Herbland/Grassland/Sedgeland/
Hummock Grassland/Other—

Characteristic species:

Topography:

Underlying Rocks: Granite/Laterite/Limestone/Sandstone/Other—

Soil Colour: White/Yellow/Grey/Red/Brown/Black/Other—

Soil Type: Laterite/Clay/Sandy Clay/Clayey Sand/Sand/Other—

Map: 1:100,000/1:250,000 **Sheet:** **Grid Ref.**

State: **Lat.** ° ' S **Long.** ° ' E

Locality:

Collector: **No.:** **Date:**

Photo: /Wood/Spirit/Seed/Pollen/Live/Duplicates

Voucher for:

INSTRUCTION SHEET ON USE OF HERBARIUM FIELD NOTE BOOKS

Field Ident:	Species name
Habit:	Self explanatory
Form:	Self explanatory
Colour Notes:	Flower, leaves, bark, buds, etc.
Other Notes:	Interesting features, i.e. bark peeling, stringy, pollinators - birds, native bees, etc. insect attack, special features.
Abundance:	Self explanatory
Associated Vegetation:	Other species
Characteristic Species:	What plants characterise the area, i.e. grasslands, shrubland.
Topography:	Land form - undulating, flat etc.
Underlying Rocks:	Type of rocks
Soil Colour:	Self explanatory
Soil Type:	It is important to determine this.
Maps, etc.:	Self explanatory
Locality:	Please be precise, i.e. 6 kms N along Brown Rd from junction with Edge Rd. Ca. 14 kms NNW of (nearest town).
Collector:	Yourself
Photo:	Record with specimen. Include flower leaf, buds, bark and general features.
Voucher for:	W.A. Herbarium, ( ) Tick appropriate box, Karratha Herbarium ( )

Additional:

i) Photography. Use good 35 mm colour slide material. Kodacolor 64 is recommended.

ii) A Herbarium Field Sheet should accompany each specimen on despatch. The duplicate is to remain in the book.

iii) Number your Field Note Books and number each species page i.e. 1, 2, 3 ...

iv) Ensure your own Collection Number is recorded on the Herbarium species sheet.

v) If possible, please determine altitude where the plant is located.